

AERONAUTICS ILLUSTRATED

FOR SERVICE · A.T.C. · CIVIL USE

WINGS

ENGINES

FUSELAGE

FORMATIONS

ARMAMENTS

DETAILS, ETC.



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London, W.6

AERONAUTICS

WHEN the present editor wrote a history of aeronautics in 1935, it was only six years after the first Atlantic crossing by air, and the journey was still so hazardous and uncertain, so dependent on weather conditions, that it had been made only a score of times, and the westbound voyage remained a dangerous and daring adventure. To-day—not more than eight years later—the trip is a matter of regular routine, and made between breakfast and dinner.

The conquest of the air is an achievement of our own times. At a period when the bullock cart and the ship propelled by oars represented the last word in rapid transit, men dreamed of the possibilities of flight.

In the beginning of the sixteenth century, Leonardo da Vinci worked out the science of aerodynamics, but the steamship, the locomotive, and electric traction had to materialise before the internal combustion motor gave engineers a motor combining sufficient power with sufficient lightness to lift—and steer—a heavier-than-air flying machine.

Less than fifty years have elapsed since Percy Pilcher made his first flight in a man-carrying aeroplane. Between 1903 and 1910 pioneers in various countries,

including Blériot, Farman, the Wright Brothers, Dela-
grange, Esnault-Pelterie, Santos Dumont, and Paulhan,
fashioned the aeroplane into the means of locomotion—
and of war—that we know to-day. New and revolu-
tionary conceptions of military strategy were born;
neither seas nor mountain ranges were any longer
barriers against invasion.

The war of 1914–1918 hastened technical develop-
ment. Civil aviation was born in 1919, and the Atlantic
first crossed in 1929. After this war, the journey from
London to Sydney will be made within forty-eight hours
—England to Australia and back, with half a week in
which to transact business, in seven days.

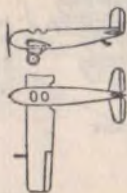
Every illustration on the following pages represents a
commonplace of to-day. Every one also represents
something that forty years ago either existed only on
paper, in model form, or as an adjunct to land trans-
port—or did not exist at all. Each of these little
illustrations depicts a stage in one of man's greatest
victories over nature. Regarded in that light, here is a
book that embodies romance as well as technical
achievement.

TAIL-FIRST
MACHINE

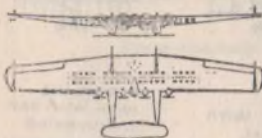


TAILLESS AEROPLANE
WING-CONTROLLED

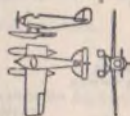
TAIL-CONTROLLED
MONOPLANE



GIANT MONOPLANE



ALL-WING TYPE AEROPLANE



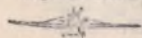
CANTILEVER
MONOPLANE

EXTERNALLY
BRACED
MONOPLANE



LOW-WING
MONOPLANE

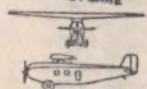
SEMI-CANTILEVER
LOW-WING
MONOPLANE



AEROPLANE
WITH
MID-SET WING

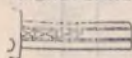


MONOPLANE
WITH
HIGH-SET WING

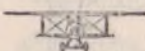


PARASOL
PLANE

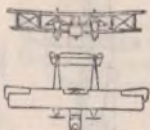
INTERNALLY
BRACED
MONOPLANE



BIPLANE
WITH
OVER HANG

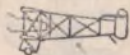


BIPLANE
SINGLE FUSELAGE
AEROPLANE

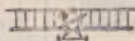


DOUBLE FUSELAGE
AEROPLANE

AEROPLANE
WITH OPEN
OUTRIGGER
TAIL



UNBRACED
AEROPLANE



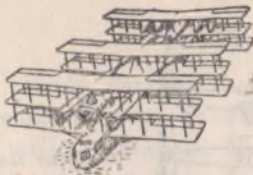
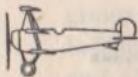
EXTERNALLY
BRACED
AEROPLANE



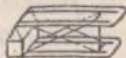
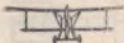
TANDEM
PLANE



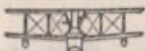
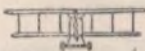
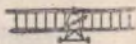
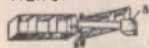
TRIPLANE



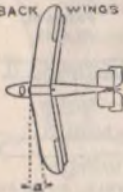
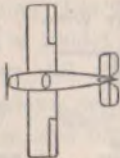
TRIPLE TRIPLANE

HALF-STRUTTER
BIPLANESINGLE-BAY
BI-PLANEONE-AND-A-HALF
STRUTTER

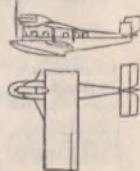
TWO-BAY BIPLANE

THREE-BAY
BIPLANEMULTI-STRUT
BIPLANEBOX-KITE
AEROPLANEAEROPLANE WITHAILERONS
PLACED BETWEEN THE WINGSAEROPLANE WITH
DIHEDRALAEROPLANE
WITH WIND GAP
DIMINISHING

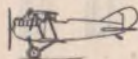
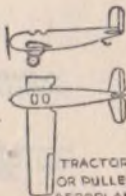
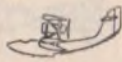
TOWARDS THE TIPS

AEROPLANE
WITH SWEEP
BACK WINGSSINGLE
SEATERTWO-SEATER
WITH SEATS
IN TANDEM

MULTI-SEATER



THREE-SEATER

AEROPLANE
WITH
IN-LINE TYPE
ENGINEAEROPLANE
WITH
RADIAL ENGINEAEROPLANE
WITH
ROTARY
ENGINETRACTOR
OR PULLER
AEROPLANEPUSHER OR
PROPELLER
AEROPLANE



SINGLE-ENGINE
AEROPLANE

TWIN-ENGINE AEROPLANE

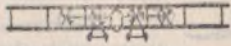


THREE-ENGINE AEROPLANE



FOUR-ENGINE AEROPLANE

AEROPLANE WITH
CENTRAL POWER PLANT



AEROPLANE WITH
DECENTRALIZED
POWER PLANT

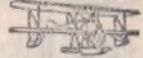


TURBINE
AEROPLANE

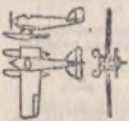


- (A) BOILER PLANT.
- (B) CHAMBER UNDER INTERNAL PRESSURE.
- (C) TURBINE.

SINGLE FLOAT
PLANE



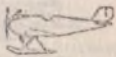
DOUBLE FLOAT
SEAPLANE



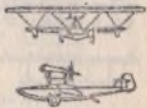
FLYING BOAT



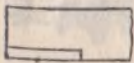
SLID
PLANE



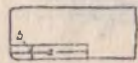
AMPHIBIAN
FLYING BOAT



RECTANGULAR
WING PLAN
WITH SQUARE
CORNERS



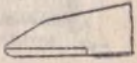
RECTANGULAR
WING PLAN
WITH
ROUNDED-OFF
CORNERS

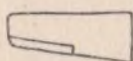


WING PLAN WITH
NEGATIVE RAKE

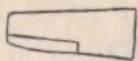


WING PLAN WITH
SWEEP-BACK
LEADING EDGE

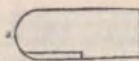




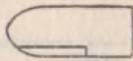
WING PLAN WITH SWEEP-FORWARD TRAILING EDGE



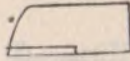
WING PLAN WITH CONVERGENT LEADING AND TRAILING EDGES



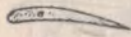
WING WITH CIRCULAR TIPS



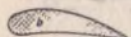
WING WITH ELLIPTICAL TIPS



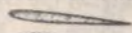
WING WITH PARABOLIC TIPS



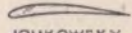
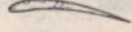
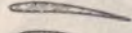
(a) THIN WING PROFILE
(b) THICK WING PROFILE



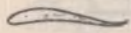
TADPOLE SECTION



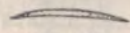
JOUKOWSKY WING SECTION



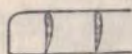
DOUBLE CAMBERED WING SECTION



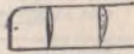
BI-CURVE SECTION



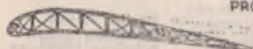
KNIFE-EDGE SECTION



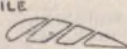
AEROFOIL WITH UNIFORM PROFILE



WING SECTION DIMINISHING TOWARDS WING TIPS



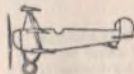
VARIABLE WING CAMBER



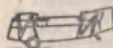
SLOTTED WING PROFILE



WING CURVATURE
(a) TOP CAMBER
(b) BOTTOM CAMBER



BIPLANE ARRANGEMENT OF WINGS

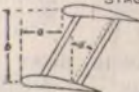


TANDEM ARRANGEMENT OF WINGS

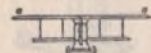
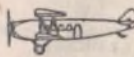
FORWARD STAGGER
ANGLE OF FORWARD STAGGER



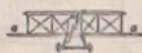
BACKWARD STAGGER
ANGLE OF BACKWARD STAGGER



UNSTAGGERED WING CELLULE

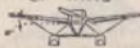


OVERHANGING TOP WING



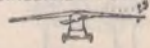
OVERHANGING BOTTOM WING

UPWARD DIHEDRAL OF WING

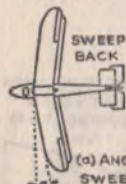


(a) UPWARD DIHEDRAL ANGLE

DOWNWARD DIHEDRAL OF WING

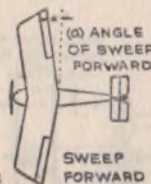


(b) DOWNWARD DIHEDRAL ANGLE



SWEEP BACK

(a) ANGLE OF SWEEP BACK

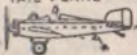


(a) ANGLE OF SWEEP FORWARD

SWEEP FORWARD

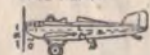
POSITIVE ANGLE OF WING SETTING

(a) POSITIVE ANGLE OF STABILIZER
(b) SETTING OF TAIL PLANE



NEGATIVE ANGLE OF WING SETTING

(a) NEGATIVE ANGLE OF STABILIZER
(b) SETTING OF TAIL PLANE



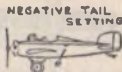


LANDING ANGLE



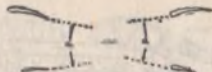
POSITIVE TAIL SETTING

(a) POSITIVE TAIL SETTING ANGLE



NEGATIVE TAIL SETTING

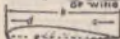
(a) NEGATIVE TAIL SETTING ANGLE



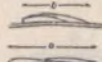
EXCESS OF INCIDENCE OF UPPER PLANE

EXCESS OF INCIDENCE OF LOWER PLANE

- (a) CHORD OF WING
 (b) DEPTH OF WING
 (c) POSITIVE DIRECTION OF WING CHORD
 (d) NEGATIVE DIRECTION OF WING CHORD



- (b) MINIMUM VALUE OF VARIABLE CHORD

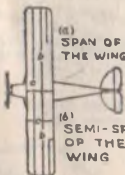
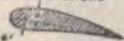


- (a) MAXIMUM VALUE OF VARIABLE CHORD

WING THICKNESS



DISTANCE OF THE PROFILE CURVES FROM THE WING CHORD

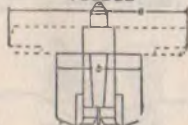


(a) SPAN OF THE WING

(b) SEMI-SPAN OF THE WING

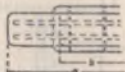
- (a) SPAN OF THE FOLDING WING UNFOLDED

- (b) SPAN OF THE FOLDING WING FOLDED



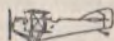
- (a) SPAN OF TELESCOPIC WING IN EXTENDED POSITION

- (b) SPAN OF TELESCOPIC WING IN CLOSED POSITION

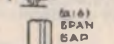


(a) WING GAP

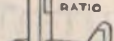
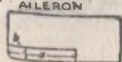
(a-b) GAP-CHORD RATIO



LENGTH OF OVERHANGING SPAR



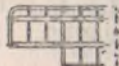
(a) SPAN GAP RATIO

(a) AILERON SPAN
(b) DEPTH OF AILERON

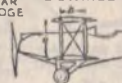
- (a) DISTANCE BETWEEN LEADING EDGE AND CENTRE LINE OF FRONT SPAR

- (b) DISTANCE BETWEEN CENTRE LINE OF FRONT SPAR TO CENTRE LINE OF REAR SPAR

- (c) DISTANCE BETWEEN CENTRE LINE OF REAR SPAR AND TRAILING EDGE



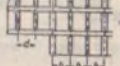
- (a-b) RATIO OF WING GAP TO SPAR DISTANCE



- (a) WIDTH BETWEEN SPARS

- (c) DISTANCE BETWEEN SPARS (COMPRESSION OF RIBS)

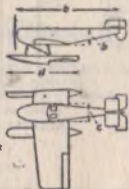
- (b) DISTANCE BETWEEN RIBS



- (a) DEPTH OF HORIZONTAL TAIL LIFT
 (b) CHORD OF THE TAIL PLANE
 (c) CHORD OF THE ELEVATOR
 (d) SPAN OF THE TAIL PLANE
 (e) SPAN OF THE ELEVATOR

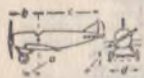


- (a) LENGTH OF FUSELAGE
 (b) MAXIMUM HEIGHT OF FUSELAGE
 (c) MAXIMUM WIDTH OF FUSELAGE
 (d) LENGTH OF FLOAT



- (a) LENGTH OF HULL
 (b) OVERALL HEIGHT OF HULL
 (c) HEIGHT OF HULL ABOVE WATER
 (d) DRAUGHT
 (e) WATER CLEARANCE OF WING
 (f) OVERALL LENGTH





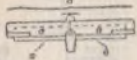
(a) DISTANCE OF UNDER-CARRIAGE AXLE FROM THE CENTRE OF GRAVITY OF THE AIRPLANE

(b) DISTANCE OF THE AIR-SECTION HUB FROM THE CENTRE OF GRAVITY OF THE AIRPLANE

(c) DISTANCE OF THE TAIL OF THE AIRSECTION FROM THE CENTRE OF GRAVITY OF THE AIRPLANE

(d) WHEEL TRACK WIDTH

(e) TRACK OF LANDING GEAR AXLE



(a) WING



(a) SUPPORTING SURFACE OF THE FUSELAGE
(b) SUPPORTING SURFACE OF THE FUSELAGE
(c) SUPPORTING SURFACE OF THE TAIL UNIT

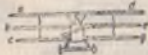
ONE-PIECE WING



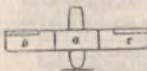
a. TOP WING.
b. MIDDLE WING.
c. BOTTOM WING.



TWIN SECTION WING
a. RIGHT WING.
b. LEFT WING.



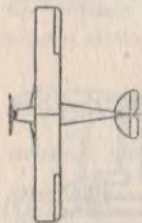
a. TOP RIGHT WING.
b. MIDDLE RIGHT WING.
c. LOWER RIGHT WING.
d. TOP LEFT WING.
e. MIDDLE LEFT WING.
f. LOWER LEFT WING.



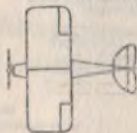
WING IN THREE SECTIONS
a. MIDDLE SECTION
b. RIGHT OUTER SECTION
c. LEFT OUTER SECTION



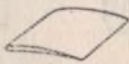
a. WING STUMP.
b. WING ROOT.



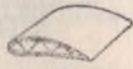
WING WITH WIDE SPAN.



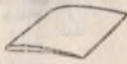
WING WITH NARROW SPAN



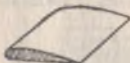
THIN SECTION WING.



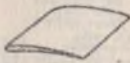
THICK SECTION WING.



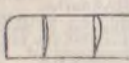
CAMBERED WING.



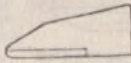
WING WITH STRAIGHT SIDE.



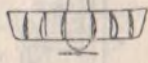
WING WITH CAMBERED UNDERSIDE.



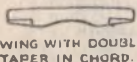
WING WITH TAPERING PROFILE.



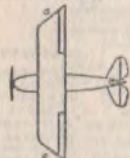
WING WITH DIMINISHED CHORD.



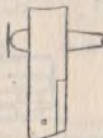
WING WITH DOUBLE TAPERING IN PROFILE.



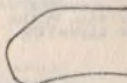
WING WITH DOUBLE TAPER IN CHORD.



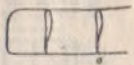
WING WITH POSITIVE RAKE



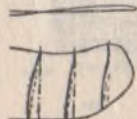
WING WITH NEGATIVE RAKE



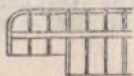
WING SWEEPED BACK AT WING TIP



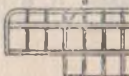
WING WITH REFLEX TRAILING EDGE.



WING WITH WARPED TIPS.



SINGLE SPARRED WING.



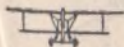
TWIN SPARRED WING.



CANTILEVER WING.



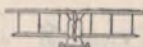
SEMI-CANTILEVER WING.



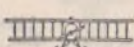
SINGLE STRUT
WING CELL.



TWIN STRUT
WING CELL.



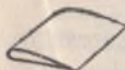
THREE STRUT
WING CELL.



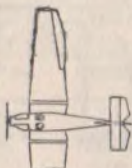
MULTI-STRUT
WING CELL.



WING WITH STEEL
TUBE FRAMEWORK



SOLID
WOODEN WING.



DETACHABLE
WING.



FOLDING
WING.



DOUBLE-JOINTED
FOLDING WING.



UPWARD FOLDING
WING.



WING WITH INSIDE RAILS FOR
INSPECTION PURPOSES.
a. WING INSPECTION TROLLEY.



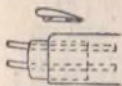
PLANE
UNDER-CARRIAGE.



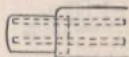
AXLE FAIRING
EXTENDING
BEYOND WHEELS.



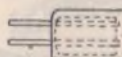
VARIABLE CHORD
WING.



TELESCOPIC
WING



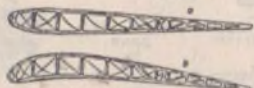
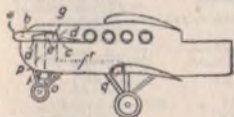
EXTENDED
TELESCOPIC
WING



CONTRACTED
TELESCOPIC
WING



RIGID
VARIABLE INCIDENCE
WING



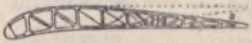
ELASTIC VARIABLE CAMBER WING
a. HIGH SPEED CAMBER.
b. LANDING SPEED CAMBER.



WING WITH
AUTOMATIC
INCIDENCE VARIATION



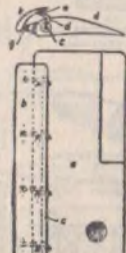
WING WITH VARIABLE CAMBER
LEADING EDGE



WING WITH VARIABLE CAMBER
TRAILING EDGE

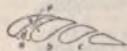


VARIABLE CAMBER WING
ADJUSTABLE IN CENTRE.



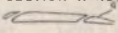
SINGLE SLOTTED WING.
a. PRINCIPAL WING.
b. AUXILIARY WING.
c. CONTINUOUS CONTROL SURF.
d. BELL CRANK.
e. REAR HINGING POINT.
f. FORWARD HINGING POINT.

THREE-SLOTTED WING



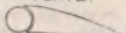
- a FORWARD SLOT
- b MIDDLE SLOT
- c REAR SLOT
- d SLOT SECTION
- e WIDTH OF SLOT

DOUBLE SECTION WING

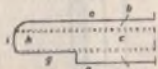
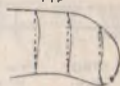


SLOTTED WING WITH REAR FLAP.

WING TIP PLATE

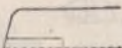


WARPED WING TIP

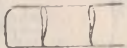


- a LEADING EDGE
- b FORWARD POSITION OF WING
- c MIDDLE PORTION OF WING
- d REAR PORTION OF WING
- e STRAIGHT TRAILING EDGE
- f CUT-AWAY FOR ALLECON
- g WING TIP

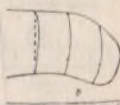
- 1 FRONTAL AREA
- 2 UPPER SUCTION SIDE OF WING
- 3 LOWER PRESSURE SIDE OF WING



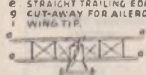
SERRATED TRAILING EDGE



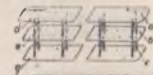
REFLEX TRAILING EDGE



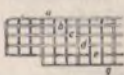
- a UPWARD WARPED WING TIP
- b DOWNWARD WARPED WING TIP



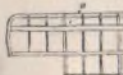
UNSUPPORTED WING TIP.



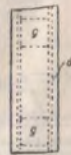
- a TOP WING SPAR
- b MIDDLE WING SPAR
- c LOWER WING SPAR
- d LEFT WING SPAR
- e RIGHT WING SPAR
- f TOP LEFT WING SPAR
- g MIDDLE LEFT WING SPAR
- h BOTTOM LEFT WING SPAR
- i TOP RIGHT WING SPAR
- j MIDDLE RIGHT WING SPAR
- k BOTTOM RIGHT WING SPAR



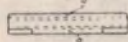
- a LEADING EDGE
- b FRONT SPAR
- c MIDDLE SPAR
- d REAR SPAR
- e AUXILIARY SPAR
- f TRAILING EDGE



MAIN SPAR.



BOX SPAR.



CONTINUOUS SPAR.



- a DIVIDED SPAR
- b PANEL OF SPAR
- c INNER PANEL OF SPAR
- d OUTER PANEL OF SPAR
- e OVERHANGING PORTION OF SPAR



DOUBLE T SECTION SPAR REINFORCING WEB



SQUARE SECTION SPAR.



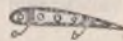
SPAR OF SYMMETRICAL CROSS SECTION.



SPAR OF ASYMMETRICAL CROSS SECTION.



CUT-OUT SPAR.

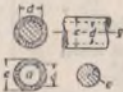


POSITION OF SPAR IN THE RIB.

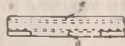
- a SPAR SET ON EDGE
- b SPAR LYING FLAT.



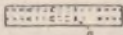
SOLID CYLINDRICAL SPAR



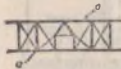
- a TUBULAR SPAR.
- b AREA OF INTERNAL HOLLOW SECTION
- c EXTERNAL DIAMETER OF TUBE
- d INTERNAL DIAMETER OF TUBE
- e CORE RADIUS OF SPAR
- f SPAR AXIS



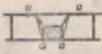
SPAR OF OVERALL SYMMETRICAL CROSS-SECTION THROUGHOUT LENGTH.



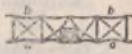
SPAR WITH TAPERING SECTION.



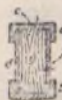
STRAIGHT SPAR.



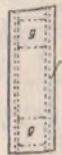
PIN JOINTED SPAR.



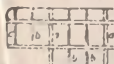
- a BENT SPAR
- b UPWARD DEFLECTION OF SPAR
- c DOWNWARD DEFLECTION OF SPAR



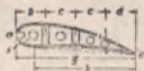
a. b SPAR FLANGE



- a TOP FLANGE
- b BOTTOM FLANGE
- d WEB OF SPAR
- e THICKNESS OF SPAR WEB
- f FILLER BLOCK



a. MAIN WING RIB.
b. NOSE RIB.
c. END RIB.



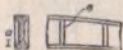
WEB RIB
a. NOSE OF RIB.
b. FORWARD PORTION OF RIB.
c. MIDDLE PORTION OF RIB.
d. REAR PORTION OF RIB.
e. TRAILING EDGE TIP OF WING RIB.
g. DEPTH OF RIB.
i. LIGHTNING HOLE.



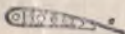
OUTLINE OF RIB.



CROSS-SECTION OF RIB.



a. I-SECTION RIB
a. REINFORCING WEB.



a. FLEXIBLE TAIL PORTION OF RIB.



BOX RIB.



a. T-RIB FLANGE.



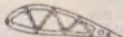
a. U-SECTION OR SHAPED RIB FLANGE.



WARREN TRUSS RIB.



MODIFIED WARREN TRUSS RIB
a. LATTICE TIE.



LATTICE RIB WITH TUBULAR TIES.



LATTICE RIB WITH CRUCIFORM SECTION TIES.



RIB FLANGES.
a. TOP RIB FLANGE.
b. BOTTOM RIB FLANGE
c. FLANGE THICKNESS.
d. WIDTH OF FLANGE.
e. WEB OF FLANGE.
g. THICKNESS OF RIB WEB.
h. HEIGHT OF RIB.
i. HEIGHT OF RIB WEB.



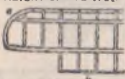
a. NOSE PIECE OF HOLLOW SEMI-CIRCULAR SECTION



a. NOSE PIECE OF TRIANGULAR SECTION.
a. EXTERNAL NOSE PIECE.



NOSE PIECE LET IN.



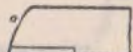
a. CURVED WING TIP FORMER.
b. TRAILING EDGE STIFFENER PIECE.



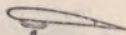
a. TRAILING EDGE STIFFENING WIRE.



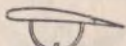
a. ROUND MOULDING.



a. PARABOLIC MOULDING.



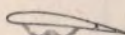
a. WING TIP HAND GRIP.



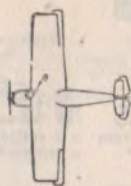
a. BOW WING SKID.



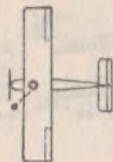
a. WING TIP SKID.



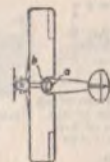
a. WING TIP SKID WITH ROLLER.



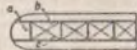
CUT-AWAY IN LEADING EDGE



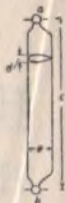
CUT-AWAY IN MIDDLE OF THE WING



CUT-AWAY IN THE TRAILING EDGE
a RIM OF CUT-AWAY



COMPRESSION STRUT
b c INTERNAL DIAGONAL BRACING



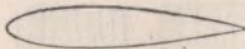
WING STRUT
a TOP OF STRUT
b BOTTOM OF STRUT
c LENGTH OF STRUT
d THICKNESS OF STRUT
e WIDTH OF STRUT
f FINENESS RATIO OF STRUT



SOLID STRUT



HOLLOW STRUT



STREAMLINE FORM



SHAPE OF A FALLING DROP



STREAMLINE FAIRING OF THE STRUT



FORKED STRUT



DOUBLE FORKED STRUT
b INTERMEDIATE STRUT



STRUT INCLINED BACK



STRUT INCLINED FORWARD



T-TYPE STRUT



U-TYPE STRUT



V-TYPE STRUT



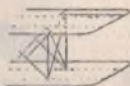
N-TYPE STRUT
a CROSS STRUT



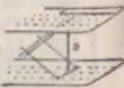
CROSSING STRUTS



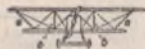
STRUT IN THE MIDDLE



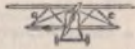
PAIR OF STRUTS



MAIN STRUT



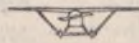
OVERHANG STRUT
a SLOPING STRUT
b VERTICAL STRUT



STRUT SLOPING INWARDS



COMBINED FLYING AND LANDING STRUT



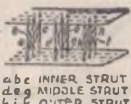
BRACING THE WING TO THE LANDING GEAR



PYRAMID STRUT



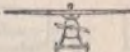
ENGINE STRUTTING
ENGINE STRUT



abc INNER STRUT
deg MIDDLE STRUT
hik OUTER STRUT
a d h FORWARD STRUT
b e i MIDDLE-INTER-LONGERON STRUT
e g k REAR STRUT



a WING CANOPY WITHOUT OVERHANG
b WING CANOPY STRUT



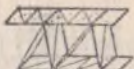
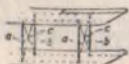
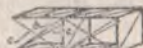
a CANTILEVER WING CANOPY



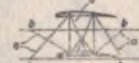
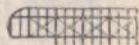
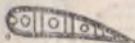
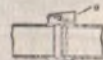
BRACED PYLON
a PYLON STRUT
b PYLON BRACING



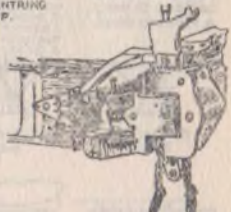
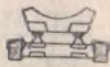
FRAME PYLON.

OUTER PYLON.
& WING MAST.STREAMLINE
BRACING WIRE.
& WIRE FAIRING.CONVENTIONAL
BRACING.a LIFT OR DRAG WIRE
b ANTI-LIFT OR
LANDING WIRE.INCIDENCE
BRACING.
& DIAGONAL
INCIDENCE WIRE.SEMI DIAGONAL
INCIDENCE
BRACING.FRAME
INCIDENCE
PANEL.KNOLLER-DEVZ BRACING
SYSTEM. & CASE IN SPACE.
& WIRE IN PLANE
BRACING SYSTEM.VERTICAL COMPONENT
OF THE BRACING SYSTEMS.OUTER BRACING
WIREEXTERNAL DRAG
BRACING.
& DRAG WIRE.

a LIFT WIRE.

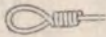
DISPOSITIONS OF WIRES
BRACING WING TO BODY.
a WIRE BRACING WING
TO BODY
& POINT OF CONNECTION
TO BODY.UNCOVERED
WING.PLYWOOD COVERED
WING NOSE.FOOT PLATE ON
THE WING.WEDGE SHAPED
SPAR BUTTSCREW SPAR
COUPLING.
& SELF-CENTRING
CAP.CENTRE SECTION
SPAR CONNECTION.
& TUBULAR PIN
& DISTANCE TUBE.ATTACHMENT OF WING TO THE
BODY BY A SCREW JOINT.
c SPAR BUTT FITTING.
d FORKED OR JAW FITTING.
e BRACING WIRE FITTING.

BALL JOINT

ATTACHMENT BY
HOOK ON FITTING.
a HOOK.
b STRAP FITTING
c FORK.HINGED JOINT FOR FOLDING
BACK THE WINGATTACHMENT OF
RIBS TO THE SPAR
& SECURING STRIP
& LINER TAPESTRUT JOINT.
& NODAL POINT FITTING.
& STRUT NIPPLE
& STRUT SOCKET.UPTURNED LUG
OF THE FITTING.TWIN-SUPPORT
STRUT.BALL AND SOCKET
STRUT JOINT.
& SOCKET



SPliced BRACING WIRE EYE & HEART-SHAPED THIMBLE



WIRE LOOP.



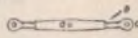
WIRE CLAMP SHEATH



WEDGE CLAMP.



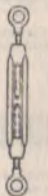
SHACKLE.



TIGHTENING SCREW & TIGHTENING SCREW SLEEVE.



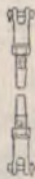
TIGHTENING EYE-BOLT



TURN-BUCKLE.



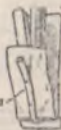
FORKED TURNBUCKLE.



TIE-ROD.



LOCKING OF THE TURNBUCKLE & LOCKING WIRE.



ATTACHING WING COVERING BY NAILING ON A SMALL STRIP & STRIP.



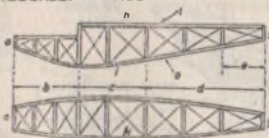
ATTACHING WING COVERING BY NAILING ON AN ADHESIVE STRIP.



ATTACHING WING COVERING BY LACING & LACE



FIXING PLYWOOD COVERING BY NAILS. & PLYWOOD SHEET.



DIVISION OF THE FUSELAGE. a. NOSE OF THE BODY. b. FORWARD PART OF THE BODY. c. CENTRAL PART OF THE BODY. d. REAR PART OF THE BODY. e. BODY END. f. TOP OF THE BODY. g. BOTTOM OF THE BODY. h. SIDE OF THE BODY. i. UPPER PART OF THE BODY. j. BOTTOM EDGE OF THE BODY.



RECTANGULAR BODY SECTION.



CIRCULAR BODY SECTION.



OVAL BODY SECTION.



SQUARE BODY.



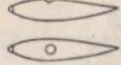
RECTANGULAR BODY.



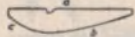
CIRCULAR BODY.



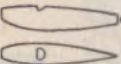
OVAL BODY.



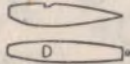
CIGAR SHAPED BODY.



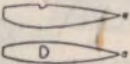
BODY WITH STRAIGHT TOP EDGE & BOTTOM EDGE OF THE BODY RUNNING UP TOWARDS THE TAIL. c. BOTTOM EDGE OF THE BODY CURVING UP TOWARDS THE NOSE.



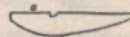
BODY TAPERING TO A VERTICAL KNIFE EDGE TOWARDS THE TAIL.



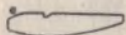
BODY TAPERING TO A HORIZONTAL KNIFE EDGE AT THE TAIL.



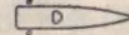
POINTED TAIL.



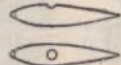
TOP EDGE OF THE BODY RUNNING STRAIGHT TO THE NOSE.



TOP EDGE OF THE BODY CURVE DOWNWARDS AT THE NOSE.



BODY WITH SIDES RUNNING STRAIGHT TOWARDS THE NOSE.



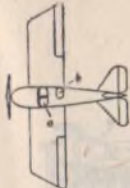
BODY WITH SIDES CONVERGING TOWARDS THE NOSE.



a. CAMBERED TOP OF THE BODY. b. FLAT BOTTOM OF THE BODY.



a. DEEP CAMBER OF THE TOP OF THE BODY. b. SLIGHT CAMBER OF THE TOP OF THE BODY.



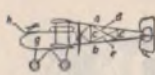
SINGLE BODY.



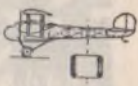
TWIN BODIES
SIDE BY SIDE



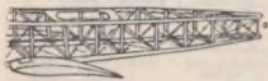
TWIN BODIES
SUPERIMPOSED.
a. FORKING OF THE BODY.



OUTRIGGER TAIL.
a & b OPEN TAIL GIRDER.
a. TOP TAIL BOOM
b. BOTTOM TAIL BOOM.
c. TAIL BOOM STRUT.
d. DIAGONAL WIRE OF
TAIL GIRDER.
e. BRACING WIRE OF
TAIL GIRDER.
g. NACELLE
h. GUNNERS COCKPIT.

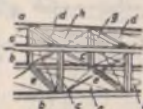


COVERED
OUTRIGGER TAIL.



WOOD AND WIRE BODY FRAME.

o TAIL OR STERN POST



ab LONGERON. a TOP LONGERON. b BOTTOM LONGERON.
c VERTICAL BODY STRUT
d e BODY TRANSVERSE MEMBER
d. TOP TRANSVERSE MEMBER
OF BODY. e. FUSELAGE
PANEL. g EXTERNAL
BODY BRACING.
h. LONGITUDINAL BRACING.



TRANSVERSE
BRACING
a. TRANSVERSE
BRACING WIRE.



FUSELAGE JOINT.
a. BODY FITTING



a BOTTOM OF THE
BODY



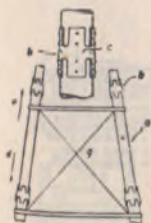
a. FLOOR GRATING



THREE-PIECE BODY
a ENGINE MOUNTING
b. MIDDLE PORTION OF THE BODY.
c TOP WING MOUNTING
e. REAR PORTION OF THE BODY.
g WALL OF BODY.



SHELL BODY.
a. VENEER SHELL.
b WOODEN PANEL



a TUBULAR LONGERON
b TUBE JOINTING
SLEEVE. c TUBE JOINT
d EXPANDING SECTION
OF THE TUBULAR
LONGERON. e CONTRACTING
SECTION OF
THE TUBULAR LONGERON
g BODY PANEL.



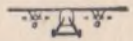
TUBULAR
TAIL POST



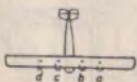
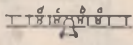
TRANSVERSE
FRAME
a GUSSET PLATE OF
FRAME b MIDDLE
PANEL c REAR PANEL



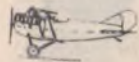
127.02-01



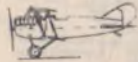
THREE POINT
ENGINE
SUSPENSION



EXPOSED ENGINE NACELLE
abcd wing engine nacelle
bc INNER ENGINE NACELLE
ad OUTER ENGINE NACELLE
cd STARBOARD ENGINE NACELLE
ab PORT ENGINE NACELLE
c INNER STARBOARD ENGINE NACELLE
d OUTER STARBOARD ENGINE NACELLE
b INNER PORT ENGINE NACELLE
a OUTER PORT ENGINE NACELLE



ENGINE SET WITH
NOSE UP



ENGINE SET WITH
NOSE DOWN



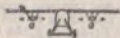
OFFSET
ENGINE



ENGINE NACELLE
ON WING TOP.



ENGINE NACELLE BUILT IN WING



ENGINE NACELLE BUILT BELOW THE WING



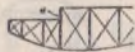
a SINGLE ENGINE NACELLE



TWIN ENGINE NACELLE



ENGINE MOUNTING
 a ENGINE BED b BOTTOM LONGERON OF ENGINE MOUNTING c ENGINE BULKHEAD d ENGINE SUPPORT e ENGINE SUPPORT STRUT f ENGINE TOP PLATE



a ENGINE BACKPLATE



DETACHABLE ENGINE MOUNTING



HINGED ENGINE MOUNTING
 a HINGED BULKHEAD



BALL AND SOCKET HINGE



a ENGINE COWL
 b ENGINE FOOTHOLD
 c INSPECTION FLAP OF ENGINE COWLING



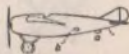
a CIRCULAR COWL



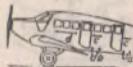
a CYLINDER COWL



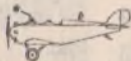
a CATCH



a HANDHOLD ON BODY
 b FOOTHOLD



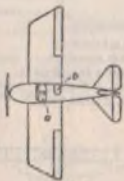
a SINGLE-RUNG STEP
 b TWO RUNG STEP
 c HAND HOLD
 d HAND RAIL



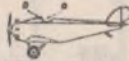
a PADDING
 b BACK FAIRING OF BODY



a COCKPIT CUT AWAY
 b FRONT SEAT & REAR SEAT



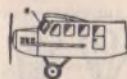
a SIDE-BY-SIDE SEATS & STAGGERED PASSENGER SEAT



a PILOTS COCKPIT
 b WINDSCREEN



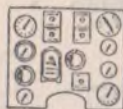
a PADDED LEATHER RIM ROUND PILOTS COCKPIT



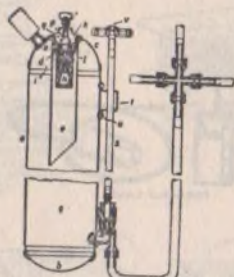
a ENCLOSED PILOT'S COCKPIT
 b FRONT WINDOW
 c SIDE WINDOW



a SLIDING COCKPIT
 b FACING



DASH BOARD



AIRCRAFT FIRE
 EXTINGUISHER



FOLDING SEAT



SAFETY BELT a BELT
 b REMOVABLE PIN
 c STRIP OF ELASTIC
 d LEATHER STRAP
 e SAFETY BELT BUCKLE



CLOSED PASSENGER CABIN a CABIN FLOOR
 b CABIN WALL c CABIN CEILING d PASSENGER'S
 SEAT e SEAT FACING FORWARD f SEAT FACING
 BACKWARD g COLLAPSIBLE WALL TABLE
 h WINDOW CURTAIN i GLASS WINDOW
 j CENTRAL GAWCWAY k COLLISION SPACE
 l PART BY PART TO LET m WASH ROOM n WASH
 BASIN o MAIL COMPARTMENT p LUGGAGE
 HOLD q RADIO CABIN



SIDE ENTRANCE a CABIN DOOR
 b HEIGHT OF DOOR c WIDTH OF
 DOOR d DOOR HANDLE e DOOR
 FRAME f WINDOW OF DOOR



OVERHEAD ENTRANCE
 a FOLDING CABIN ROOF
 b MOUNTED CABIN ROOF c ENTRANCE



TWO-STORY CABIN



CHEMICAL STORE
 a ASBESTOS CARPET
 b COTTON SOAKED IN
 PETROL c WICK



FENDER



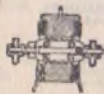
BOATHOOK



LIFE BELT



ACCUMULATOR
 a PLATE SPACE
 b ACCUMULATOR PLATE
 c ELECTRODE TERMINAL
 d FILLING PIPE FOR ACID
 e AIRHOLE
 f ACCUMULATOR TROUGH



DIRECT CURRENT MOTOR



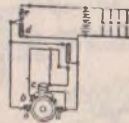
ALTERNATING CURRENT GENERATOR



AMMETER



VOLTMETER



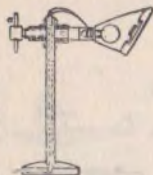
REGULATOR a DYNAMO BRUSH
 LEVITER BRUSH b EXCITER WINDING
 c SHUNT COIL d SERIES COIL



PORTABLE LAMP



SIDE LAMP



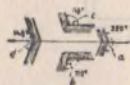
CEILING LAMP



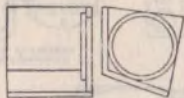
INCANDESCENT LAMP



POCKET LAMP



a HEADLIGHT b SIDELIGHT
c STARBOARD LIGHT & PORT
LIGHT d STERN LIGHT



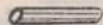
SIDE LIGHT SCREENS



o PARABOLIC LAMP



INSULATED WIRE



INSULATED TUBE



ELECTRIC CABLE



FUSE



PLUG FUSE



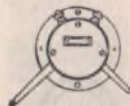
SCREW IN BOX FUSE



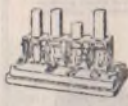
STRIP FUSE



ROTARY SWITCH



LEVER SWITCH



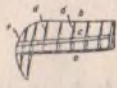
- PUSH-BUTTON SWITCH



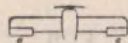
WALL PLUG



deg. RIGHT AILERON
abc. LEFT AILERON
aa. TOP AILERON
d. TOP RIGHT AILERON
e. MIDDLE WING AILERON
b. MIDDLE WING LEFT AILERON
c. BOTTOM AILERON
c. BOTTOM RIGHT AILERON
c. BOTTOM LEFT AILERON



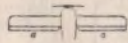
ROUNDED-OFF AILERON
a. AILERON LEADING EDGE
b. AILERON TRAILING EDGE
c. AILERON SPAR
d. AILERON RIB
e. CURVED AILERON TIP FORMER



a. AILERON PROJECTING BEHIND TRAILING EDGE



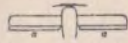
a. AILERON PROJECTING BEYOND WING TIP



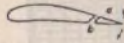
o UNBALANCED AILERON



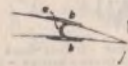
o BALANCED AILERON



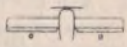
o UNBALANCED AILERON



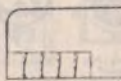
SLOT AILERON



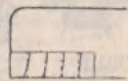
RUBBER MEMBRANE



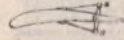
CONTINUOUS AILERON



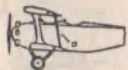
AILERON WARPED UPWARDS



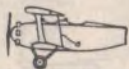
AILERON WARPED DOWNWARDS



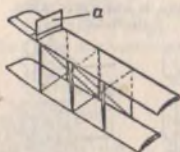
AILERON LEVER



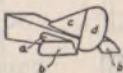
AILERON CONNECTING STRUT



AILERON CONNECTING WIRE

FRONT CONTROLS
a FRONT STABILIZING SURFACE
b FORWARD STABILIZER
c FORWARD FIN
d FRONT CONTROL SURFACE
e FRONT ELEVATOR
f FRONT RUDDERa WING STABILIZER
b WING ELEVATOR

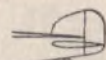
WING FIN

TAIL ORG. TAIL UNIT
a. FIXED TAIL SURFACE
b. TAIL SURFACE CONTROL

CONCAVE TAIL PLANE



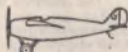
CONVEX TAIL PLANE



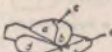
BI-CONVEX TAIL PLANE

a RUDDER UNIT
c TAIL FIN
d RUDDER
e ELEVATOR UNIT
f TAIL PLANE
g ELEVATOR

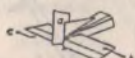
UNCAMBERED TAIL PLANE



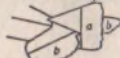
INTEGRAL FIN RUNNING INTO BODY

a ROUNDED FIN
b BALANCED RUDDER
c RUDDER BALANCING SURFACE
d ROUNDED TAIL PLANE
e ROUNDED ELEVATOR
f BALANCING SURFACE

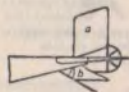
CANTILEVER TAIL UNIT

TAIL PLANE WITH STRUT TO PIN
a TAIL PLANE STRUT
b STRAIGHT FIN
c UNDIVIDED RUDDER
d DIVIDED ELEVATOR

a TRAPEZOIDAL RECTANGULAR TAIL PLANE

a SERRATED RUDDER
b SERRATED ELEVATOR

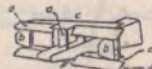
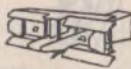
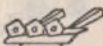
a TRIANGULAR TAIL PLANE

a RECTANGULAR RUDDER
b TRAPEZOIDAL TAIL PLANE
c TRAPEZOIDAL ELEVATORa RHOMBIC RUDDER
b TRIANGULAR RUDDER

a RENIFORM RUDDER



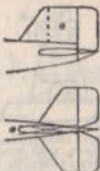
a OVAL RUDDER

a QUADRUPLE FIN
b QUADRUPLE RUDDERBOX TAIL UNIT
a SQUARE FIN
b CONTROL SURFACE
c DUAL RUDDERS
d DUAL TAIL PLANE
e DUAL ELEVATORSa RUDDER BAY
b ELEVATOR BAY

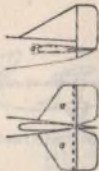
a TRIPLE RUDDER



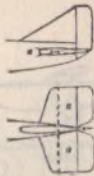
• TAIL FIN ADJUSTABLE ON GROUND



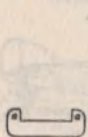
TAIL FIN ADJUSTABLE IN FLIGHT



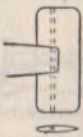
• TAIL PLANE ADJUSTABLE ON GROUND



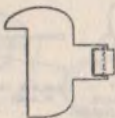
TAIL PLANE ADJUSTABLE IN FLIGHT



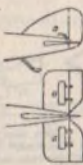
• BALANCED CONTROL SURFACE



• REAR HINGE OF CONTROL SURFACE



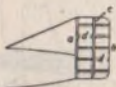
SERVO RUDDER



BALANCED CONTROL SURFACE (COMPENSATING SURFACE)



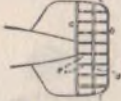
• COMPENSATED RUDDER WITH COMPENSATING SURFACE



• RUDDER LEADING EDGE
• RUDDER TRAILING EDGE
• RUDDER SPAR
• RUDDER RIB



• RUDDER LEVER



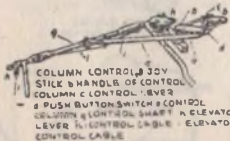
• ELEVATOR LEADING EDGE
• ELEVATOR TRAILING EDGE
• ELEVATOR EDGE
• ELEVATOR SPAR & ELEVATOR RIB



• ELEVATOR LEVER



RUDDER HINGE
• HINGE PLATE
• HINGE LUG



COLUMN CONTROL
• JOY STICK
• HANDLES OF CONTROL COLUMN
• CONTROL LEVER
• PUSH BUTTON SWITCH
• CONTROL COLUMN
• CONTROL SHAFT
• ELEVATOR LEVER
• CONTROL CABLE
• ELEVATOR CONTROL CABLE



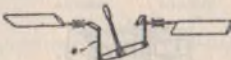
• KNOB
• THUMB REST
• CONTROL COLUMN BEARINGS



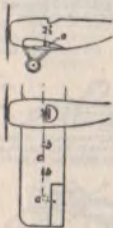
CONTROL COLUMN WITH ADJUSTABLE HANDLES
• THROTTLE LEVER



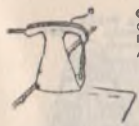
WHEEL CONTROL
• CONTROL WHEEL
• WHEEL RIM
• WHEEL SPOKE
• CONTROL WHEEL CENTRE PLATE
• AILERON CONTROL CABLE



ROD CONTROL
• PUSH & PULL ROD

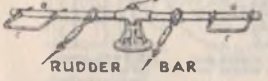


AILERON CONTROL
• CONTROL PULLEY
• CABLE PULLEY
• AILERON CONTROL CABLE WIRE



CONTROL BY MEANS OF PARALLEL DIS-PLACEMENT OF THE AUXILIARY WING
 (a) HAND LEVER
 (b) HORIZONTAL CONTROL SHAFT
 (c) SWING BOLT
 (d) PIVOT ARM

(a) GUIDE FOR CABLE



RUDDER BAR

(a) FOOT REST (b) PIVOT (c) STIRRUP

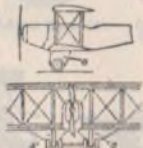


MONOWHEELED UNDERCARRIAGE

- (a) FORWARD UNDERCARRIAGE STRUT
- (b) REAR UNDERCARRIAGE STRUT
- (c) STRUT PLANE
- (d) FOOT STEP ON UNDERCARRIAGE
- (e) STRAIGHT UNDERCARRIAGE AXLE
- (f) DIAGONAL BRACING WIRE OF UNDERCARRIAGE
- (g) FIXED LANDING WHEEL



SPLIT PIN

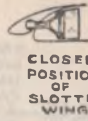


TWO WHEELED UNDERCARRIAGE

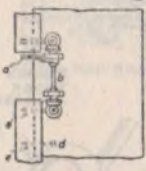
(a) AXLE BAR OF UNDERCARRIAGE



OPEN POSITION OF SLOTTED WING



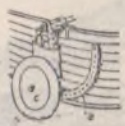
CLOSED POSITION OF SLOTTED WING



TRIM TANK (IN TAIL)

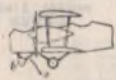


(b) TRIMMING TANK PIPE



(a) MAIN UNDERCARRIAGE

(b) AUXILIARY UNDERCARRIAGE MOUNTED ON OUTRIGGERS



(a) UNDERCARRIAGE WITH PILOT WHEEL



(b) PILOT WHEEL



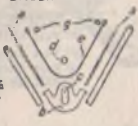
RETRACTABLE UNDERCARRIAGE

(a) COG WHEEL
 (b) DRILLED BRASS QUADRANT

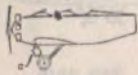


UNDERCARRIAGE WITH RUBBER SHOCK ABSORBER

- (a) MAIN AXLE
- (b) AUXILIARY AXLE
- (c) AXLE FLANGE
- (d) HUB CAP
- (e) STUB AXLE
- (f) RUBBER SHOCK ABSORBER
- (g) RUBBER CORD



STEEL SPRING UNDERCARRIAGE
 (a) UNDERCARRIAGE STIRRUP



OLEO UNDERCARRIAGE
 (a) OLEO SHOCK ABSORBER



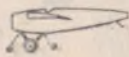
SIDE-FOLDING UNDERCARRIAGE

(a) ARCHED UNDERCARRIAGE AXLE

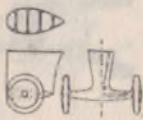
NON-AXLE TYPE UNDERCARRIAGE



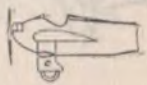
POINT OF ATTACHMENT OF UNDERCARRIAGE



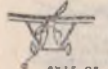
(a) BENT UNDERCARRIAGE AXLE
 (b) H-STRUT



CENTRAL UNDERCARRIAGE STRUT



FAIRED UNDERCARRIAGE STRUT



AXLE OF UNDERCARRIAGE ENCLOSED IN FUSELAGE



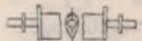
AXLE BAR



DIVIDED UNDERCARRIAGE AXLE
 (a) HALF AXLE



INVERTED V-TYPE STRUT



STREAMLINED AXLE

PAIRED UNDER-CARRIAGE AXLE

FREELY MOVING UNDER-CARRIAGE AXLE FAIRING

TELESCOPIC SHOCK ABSORBER

- (a) TELESCOPIC UNDERCARRIAGE STRUT
- (b) INTERNAL RUBBER SHOCK ABSORBER



RUBBER SHOCK ABSORBER

WIRE SPOKE LANDING WHEEL

- (a) WHEEL HUB.



- (b) WHEEL RIM
- (c) WHEEL SPOKE

TWO PIECE CONICAL STEEL CASING

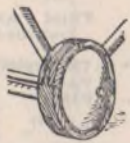


- (b) TYRE COVER
- (c) INNER TUBE
- (d) INNER WHEEL

CUSHION TYRE



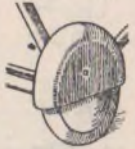
SOLID TYRE



WHEEL SIDE COVER



(a) WHEEL WITH STREAMLINED GUARD



(a) MUD GUARDS FOR LANDING WHEELS



DUAL WHEELS

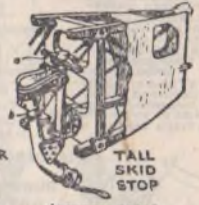


PIVOTED WHEEL



TAIL SKID SHOCK ABSORBER

- (b) TAIL SKID PIVOT
- (c) TAIL SKID SHOE
- (d) TAIL SKID SHEATH
- (e) TAIL SKID STRUT



TAIL SKID STOP

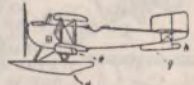
- (b) CHECK CABLE
- (a) RUDDER SKID

TAIL SKID ATTACHED TO WATER RUDDER

- (a) LEAF SPRING TAIL SKID



TAIL WHEEL



TAIL SKID

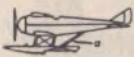


- (a) FLOAT UNDERCARRIAGE
- (b, c) FLOAT
- (d) FLOAT STEP
- (e) WING TIP FLOAT
- (f) TAIL FLOAT
- (h) WATER RUDDER

(a) BACKWARD INCLINED STRUT



(a) CENTRAL FLOAT



(a) LANDING UNDERCARRIAGE SKID



(a) RIGID LANDING SKID



(a) UNDER-CARRIAGE SKID



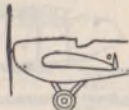
HOOK BRAKE
(a) BRAKE SKID



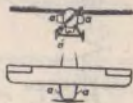
BAND BRAKE



WING AIR BRAKE



(a) **AIR BRAKE**
ACTUATED BY PULLING
UP OR DOWN
THE AILERONS



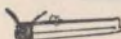
(a) **AIR BRAKE**
ACTUATED BY PULLING
OUT BODY FLAPS

- (a) BOW
- (b) MIDSHIP
- (c) STERN
- (d) BOTTOM OF HULL
- (e) KEEL
- (f) CORRUGATIONS



(A) WATER FLANKING
SIDE FIN

HULL



RABBET

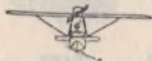


HULL FRAMING

- (a) FRAME BULKHEAD
- (b) WATERTIGHT COMPARTMENT
- (c) TRANSVERSE BULKHEAD
- (d) SKIN OF THE HULL



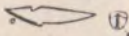
(a) **DECK**
(b) FLARED LINE
(c) DECK



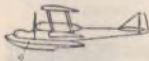
(a) **LIFTED BOW**
(b) LIFTED STERN



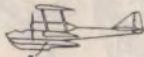
(a) **KEELED BOW**



**SPOON
SHAPED
BOW**



**GLIDER
WITH TRAPEZE
(FOR PILOT)**



**GLIDER
WITH
PILOT
LYING
PRONE**



(a) **PLANING FIN**

(a) **FORWARD
PLANING FIN**



**GLIDER
WITH
SEAT**

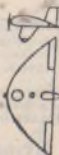
(a) **PARABOLIC
CONTOUR
WING**

**AEROPLANE
WITH
PARABOLIC
CONTOUR
(a) PARABOLIC
CONTOUR**

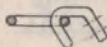
**WING FLAP
CONTROL**



SAIL PLANE



RELEASE HOOK





WING WITH SIDE ADJUSTMENT



(a) LONGITUDINAL TUBE



WHEEL UNDERCARRIAGE



(a) FOOTBALL UNDERCARRIAGE (WHEELS)



(a) CENTRAL SKID UNDERCARRIAGE

(a) PIVOTED FLAP



TWO-SKID UNDERCARRIAGE



(a) SKID UNDERCARRIAGE



PNEUMATIC-BUFFER

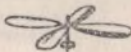


DOUBLE HELICOPTER

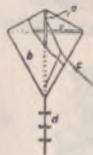


(a) TWIN BLADED LIFTING SCREW

FOUR-BLADED HELICOPTER



AUTOCYRO

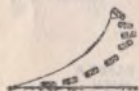


PAPER KITE

(a) KITE SPAR (b) DIAGONAL STRUTS



KITE



SELF-LANDING GLIDER KITE



COLLAPSIBLE OBSERVATION KITE



GLIDER KITE



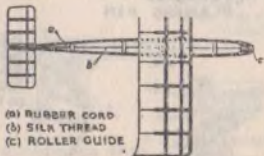
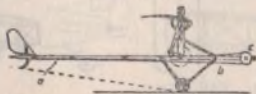
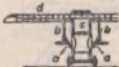
ANCHORED PARACHUTE



PADDLE DRIVEN AEROPLANE

WIND FLAPPING MACHINE (ORNITHOPTER)

- (a) CRANK ARM
- (b) CONNECTING ROD
- (c) STRAIGHT GUIDE
- (d) FLAPPING WING



- (a) RUBBER CORD
- (b) SILK THREAD
- (c) ROLLER GUIDE

MODEL AEROPLANE MADE WITH RODS

WINDING ROLLER



RIGID AIRSCREW.



(a) **MAXIMUM DIAMETER OF AIRSCREW**



SOLID SECTION.



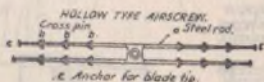
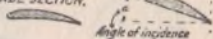
HOLLOW SECTION



FLAT BLADE SECTION.



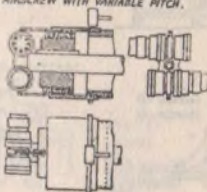
CAMBERED INCIDENCE OF AIR SCREW BLADE.



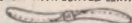
AIRSCREW WITH STRAIGHT LINE



AIRSCREW WITH VARIABLE PITCH.



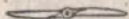
AIRSCREW WITH CURVED CENTRE LINE.



AIRSCREW WITH CONSTANT PITCH.



TWO-BLADED AIRSCREW.



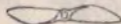
THREE-BLADED AIRSCREW.



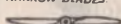
FOUR-BLADED AIRSCREW.



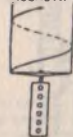
AIRSCREW WITH WIDE BLADES.



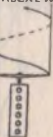
AIRSCREW WITH NARROW BLADES.



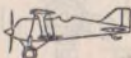
RIGHT-HANDED AIRSCREW.



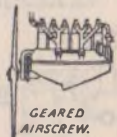
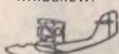
LEFT-HANDED AIRSCREW.



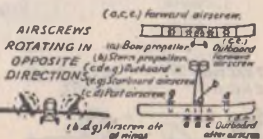
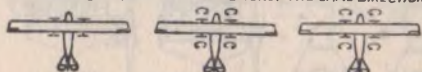
TRACTOR AIRSCREW.



PUSHER AIRSCREW.



TANDEM AIRSCREWS ROTATING IN OPPOSITE DIRECTIONS. **TANDEM AIRSCREWS ROTATING IN THE SAME DIRECTION.**



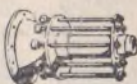
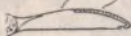
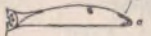
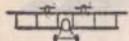
AIRSCREW MOUNTING BY MEANS OF THE CONVENTIONAL HUB.

FLANGED COUPLING OF AIRSCREW.

AIRSCREW MOUNTED ABOVE THE WING.

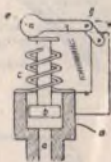
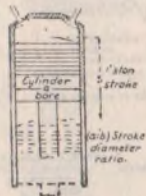
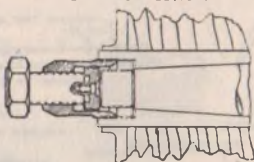
(a) AIRSCREW BLADE TIP (b) BLADE TIP METAL SHEATHING.

(a) EDGE OF AIRSCREW BLADE. (b) SHEATHING FOR EDGE OF BLADE.



PULLING OFF DEVICE.

HIGH-SPEED INDICATOR.



ELECTRIC MOTOR.

STEAM ENGINE.

DIFFERENTIAL TURBINE.



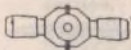
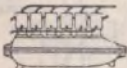
V-TYPE ENGINE.

W-TYPE ENGINE.

VERTICAL ENGINE.

INVERTED ENGINE.

ENGINE WITH HORIZONTALLY OPPOSED CYLINDERS.



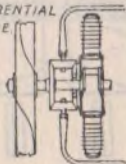
FAN ENGINE.

SINGLE BANK RADIAL ENGINE.

DOUBLE ROW STAGGERED (CYLINDERS) RADIAL ENGINE.

ROTARY ENGINE.

DIFFERENTIAL ENGINE.



TRACTOR ENGINE.

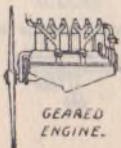
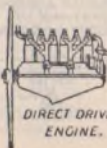
PUSHER ENGINE.

RIGHT-HAND ENGINE.

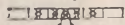
LEFT-HAND ENGINE.

DIRECT DRIVE ENGINE.

GEARED ENGINE.



- (a) Forward centre engine
 (b) Rear centre engine
 (c) Forward starboard engine
 (d) Rear starboard engine
 (e) Forward port engine
 (f) Rear port engine



T-HEAD
CYLINDER.

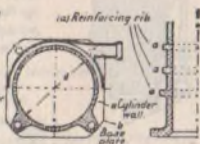
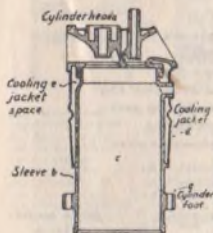


L-HEAD
CYLINDER.

I HEAD
CYLINDER



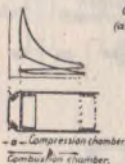
F-HEAD
CYLINDER.



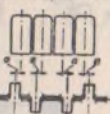
COMPRESSION
COCK.



RELIEF
VALVE.



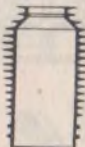
OFFSET CYLINDERS
 (a) Offset between cylinder
 and crank pin centres



OVAL
CYLINDER.



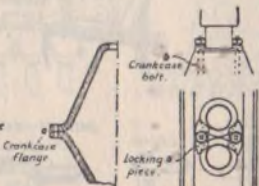
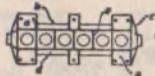
FLANGED
CYLINDER



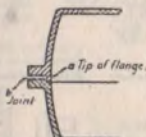
TOP OF
CRANKCASE



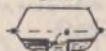
- (a) Engine arm.
 (b) Longitudinal rib.
 (c) Lateral rib.
 (d) Longitudinal wall.
 (e) Lateral wall.

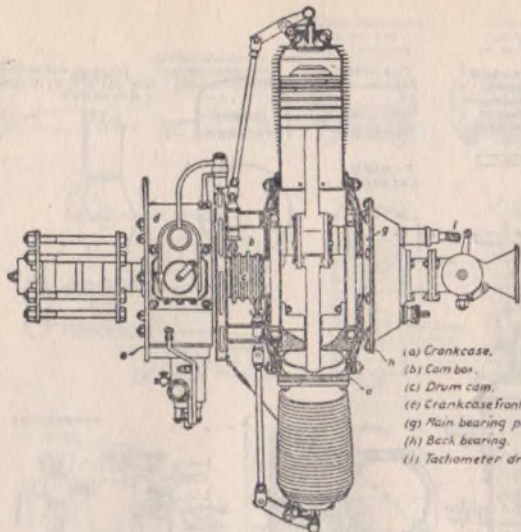


AIR VENT
Air vent tube



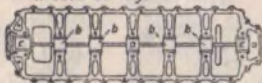
CRANKCASE
SUMP.





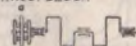
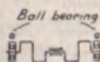
- (a) Crankcase.
- (b) Cam bar.
- (c) Drum cap.
- (e) Crankcase front cover.
- (g) Main bearing plate.
- (h) Back bearing.
- (i) Tachometer drive.

- (b) Crankshaft bearing.
- (c) Outer bearing.



- (a) White metal lining.
- (b) Dorettailed groove.
- (c) Oil groove.

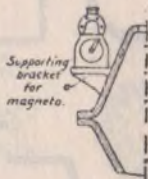
AIRSCREW THRUST BLOCK



BUSH WITH CAST-IN LINER.



- (a) Bearing cup.
- (b) Bearing bolt.



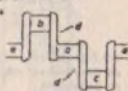
Supporting bracket for magnet.



Engine name plate.

CRANK

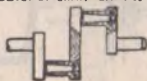
- (a) Crankshaft pin
- (b, c) Double throw
- (d) Crank arm



- (a) Taper end of crankshaft
- (b) Hollow crank pin.



BUILT UP CRANKSHAFT.



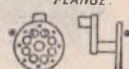
CRANK



BALANCE-WEIGHT.



CRANKSHAFT FLANGE.

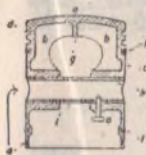


HUB WITH CONICAL BORE.

- 1 a. Air screw hub body
- 1 c. Air screw flange
- 1 d. Air screw hub bolt
- 1 e. Air screw hub bolt nut
- 1 g. Main hub nut

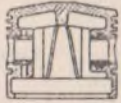


COMBINED NOSEPIECE AND AIRSCREW HUB.



ALUMINIUM PISTON WITH CAST-IN PISTON PIN BUSH.

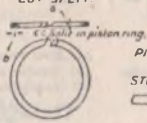
- (a) Piston head
- (b) Reinforcing rib
- (c) Body of piston
- (d) Piston groove
- (e) Oil catcher
- (f) Piston ring
- (g) Oil sealer
- (h) Piston pin
- (i) Piston pin bearing
- (j) Grub screw



- (a) Gudgeon pin bearing bracket
- (b) Piston pin
- (c) Gasket ring



PISTON WITH DIAGONAL CUT SPLIT.



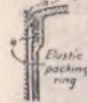
PISTON RING WITH STEPPED JOINT.



GRUB SCREW.



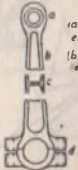
Obrutator ring.



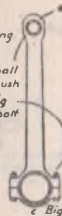
(a) Piston ring tongs.



- (a) Small end of connecting rod
- (b) Shank of connecting rod
- (c) Connecting rod big end bearing



- (a) Small end bush
- (b) Big end bolt



ASSEMBLY OF CONNECTING RODS.

- (a) Master connecting rod
- (b) Articulated connecting rod



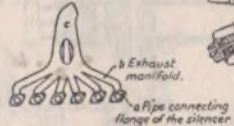
FORKED CONNECTING ROD.



EXHAUST PIPE.



SILENCER



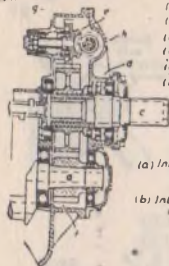
EXHAUST FLAME DAMPER.



Silencer



30 TWO AXLE GEAR.



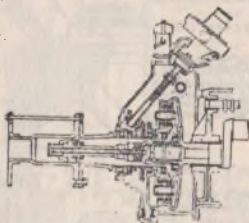
- (a) Pinion shaft.
- (b) Pinion.
- (c) Airscrew shaft.
- (d) Airscrew shaft bearing.
- (e) Magneto drive.
- (g) Gear box.
- (h) End cover to gear box.

THREE AXLE GEAR.

- (a) Intermediate gear.
- (b) Intermediate wheel.



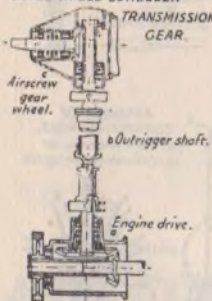
SUN AND PLANET GEAR.



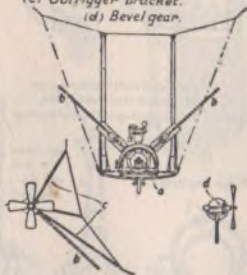
OUTRIGGER TRANSMISSION GEAR.



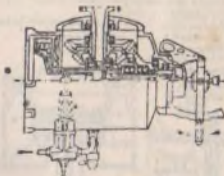
BEVEL WHEEL OUTRIGGER TRANSMISSION GEAR.



- (a) Bevel wheel reversing gear.
- (b) Tubular shaft.
- (c) Outtrigger bracket.
- (d) Bevel gear.



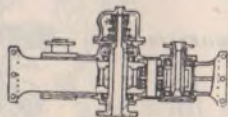
CHANGE SPEED GEAR.



BEVEL GEAR ASSEMBLY.



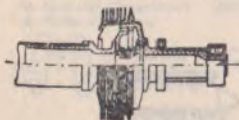
SPUR WHEEL GEAR ASSEMBLY.



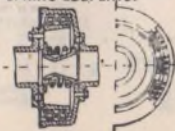
RIGID COUPLING.



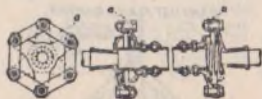
BALL AND SOCKET JOINT.



SPRING COUPLING.



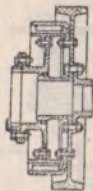
SPRING BAND COUPLING.



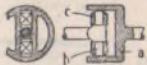
LAMINATED SPRING COUPLING.



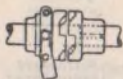
LAMINATED LEATHER COUPLING



UNIVERSAL JOINT.



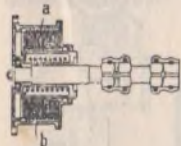
DOG CLUTCH.



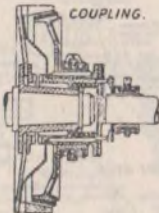
CONE COUPLING.



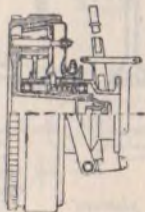
MULTIPLE DISC CLUTCH.



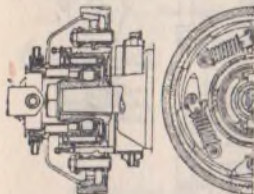
CONICAL DOG CLUTCH COUPLING.



CONICAL BOLT CLUTCH.

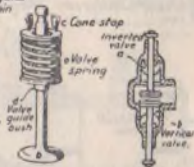
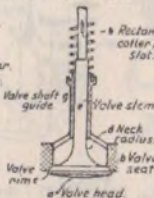


CONICAL LATCH CLUTCH.



TAPER SEAT VALVE

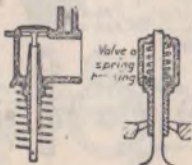
- (a) Admission gear.
- (b) Exhaust gear.



FLAP VALVE.



SCREWED-IN VALVE GUIDE.



- (h) Valve life
- (d) Valve diameter



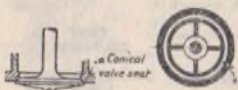
SLOPING VALVE.



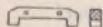
HORIZONTAL VALVE.



ANNULAR SEAT,



VALVE SPRING
-CUTTER.



SPIRAL SPRING.



CONICAL SPIRAL SPRING.



SPIRAL SPRING.



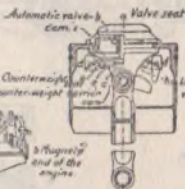
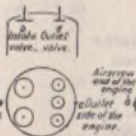
VALVE WITH HOLLOW SPINDLE.



VALVE WITH COOLING RIBS.



MULTI-VALVE ARRANGEMENT.

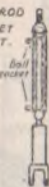


VALVE GEAR.

ACTUATING CAM.



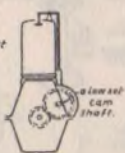
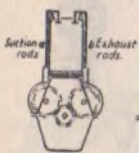
VALVE PUSH ROD BALL AND SOCKET JOINT.



VERTICAL DRIVING SHAFT.



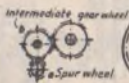
INCLINED DRIVING SHAFT.



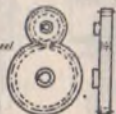
WIRELESS DRIVE.



SPUR WHEEL DRIVE.



PAIR OF GEAR WHEELS



BEVEL WHEEL DRIVE.



WORM WHEEL.



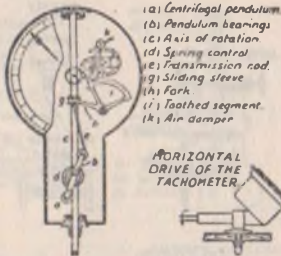
SUN AND PLANET WHEEL.



INTERNAL GEAR.

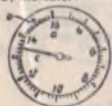


CENTRIFUGAL PENDULUM TYPE TACHOMETER



SPEED INDICATOR

(a) Figure
 (b) Luminous point on dial
 (c) Indicator



VERTICAL DRIVE OF THE TACHOMETER



TACHOMETER WITH OVERHEAD DRIVE



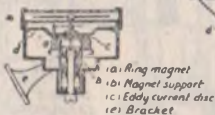
HORIZONTAL DRIVE OF THE TACHOMETER



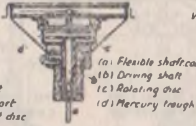
RECORDING TACHOMETER



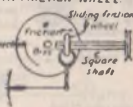
EDDY CURRENT SPEED INDICATOR



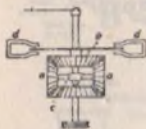
TACHOMETER WITH ROTATING MERCURY



REVOLUTION INDICATOR WITH FRICTION WHEEL



SPEED INDICATOR WITH DIFFERENTIAL DRIVE



ELECTRICAL TELE TACHOMETER



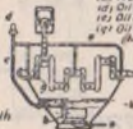
MULTIPLE TACHOMETER



FREQUENCY REVOLUTION INDICATOR



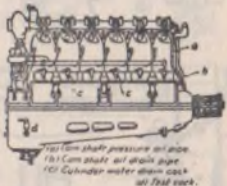
LUBRICATION BY OIL CIRCULATION



CENTRIFUGAL LUBRICATION



RING LUBRICATION



OIL CAN.



PROTECTIVE CAP WITH NEEDLE.



CAPPED LUBRICATOR NIPPLE FITTING.



FLAP COVERED LUBRICATOR FITTING.



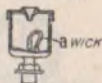
LUBRICATOR WITH ROTATING COVER.



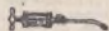
LUBRICATOR WITH TELESCOPIC COVER



WICK LUBRICATOR.



GREASE GUN.



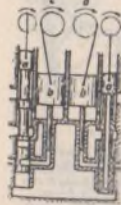
GREASE CUP



SELF-FEEDING GREASE CUP

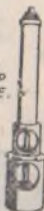


PLUNGER PUMP.



- (a) Distributor piston
- (b) Plunger
- (c) Suction stroke
- (d) Compression stroke

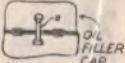
OIL PUMP DRIVE.



OIL DRAINING VALVE



OIL TANK ON UNDER CARRIAGE



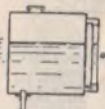
GEAR PUMP.



OIL FILTER



OIL GAUGE PIPE.



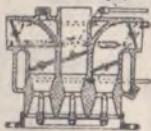
VALVE CARBURETTOR



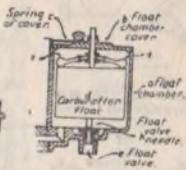
SPRAY ATOMIZING CARBURETTOR



MULTIPLE JET CARBURETTOR



DOUBLE JET CARBURETTOR



PIVOTED FLOAT.



ANNULAR FLOAT.



PRIMER



FUEL JET.



NOZZLE WITH TRANSVERSE HOLES.



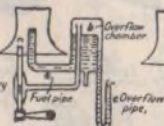
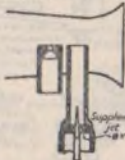
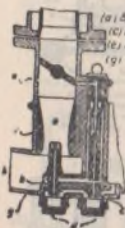
MULTIPLE NOZZLE.



NOZZLE CARRIER.



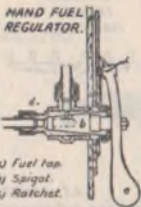
- (a) Body of carburettor
- (b) Main jet
- (c) Slow speed jet
- (d) Nut cap
- (e) Mixing chamber
- (f) Atomiser cone
- (g) Air scoop
- (h) Air intake opening



CARBURETTOR WITH INTERCONNECTED ADJUSTMENT OF JET AND AIR SUPPLY.



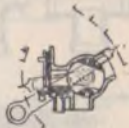
HAND FUEL REGULATOR.



IDLING POSITION OF THE CARBURETTOR.



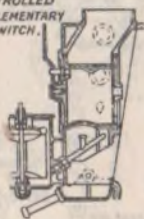
ADJUSTMENT OF CARBURETTOR FOR GROUND LEVEL.



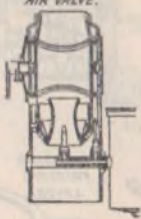
ADJUSTMENT OF CARBURETTOR FOR HIGH ALTITUDE.



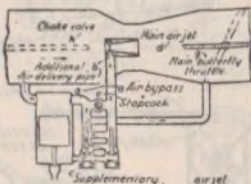
CONTROLLED SUPPLEMENTARY AIR SWITCH.



AUTOMATIC SUPPLEMENTARY AIR VALVE.



CARBURETTOR WITH MULTIPLE CHOKE TUBE.



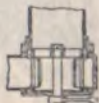
THROTTLE VALVE.



DISC OF THROTTLE VALVE.



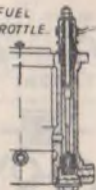
ROTARY SLIDE VALVE.



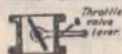
PISTON VALVE.



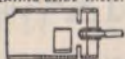
FUEL THROTTLE.



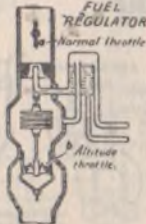
THROTTLE



REGULATING SLIDE VALVE.



BAROMETRIC FUEL REGULATOR.

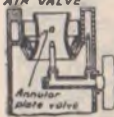


PETROL FILLER

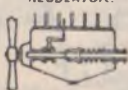


(a) Induction pipe (b) Induction manifold.

AUXILIARY AIR VALVE



THROTTLE REGULATOR.



STRAIGHT T-JOINT.



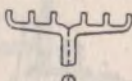
T-JOINT WITH UPTURNED BRANCHES.



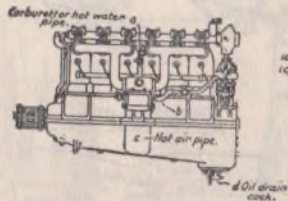
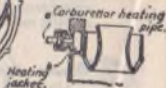
T-JOINT WITH TURNED DOWN BRANCHES.



DIVIDED INLET MANIFOLD.

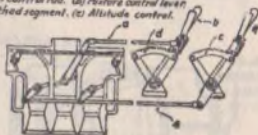


FIXED HELICAL DISTRIBUTOR.

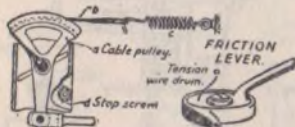
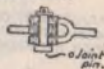


GAS LEVERS.

(a) Push control rod. (b) Mixture control lever. (c) Toothed segment. (d) Altitude control.



FORK JOINT.

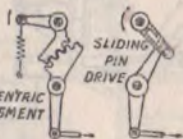


FRICITION LEVER.

REVERSING-FRICITION LEVER.



ECCENTRIC SEGMENT



SLIDING PIN DRIVE

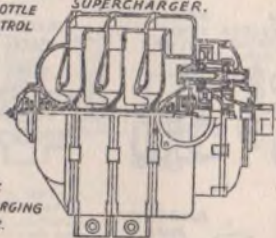


CAM DRIVE.

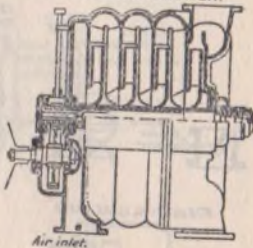


BELL CRANK THROTTLE CONTROL

CENTRIFUGAL SUPERCHARGER.



FOUR STAGE SUPERCHARGER.



165.17



ROOT'S SUPERCHARGING BLOWER.

(a) Rotor wheel (b) Blower shaft

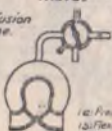


DELIVERY SPACE

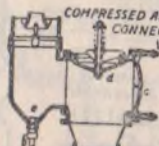


Diffusion vane.

CHANGE OVER VALVE.



COMPRESSED AIR PIPE CONNECTION VALVE.



BLOWER THROTTLE SLIDE VALVE.



(a) Pressure inlet (b) Flexible pipe connection (c) Explosion relief valve. (d) Automatic air inlet valve.

(b) Petrol chamber.

FUEL TESTER



HYDROMETER.



AEROMETER.

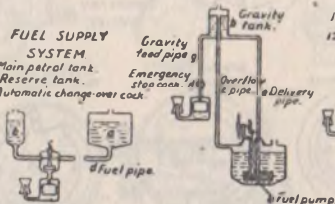
(a) WING PETROL TANK



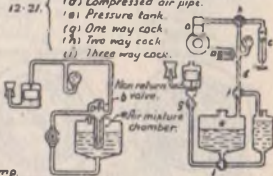
FUEL SUPPLY SYSTEM

- (a) Main petrol tank.
- (b) Reserve tank.
- (c) Automatic change-over cock.

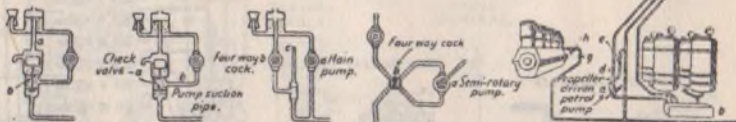
(a) DETACHABLE TANK



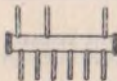
168.
12-21.
- (a) Motor driven air pump.
 - (b) Pressure regulator valve.
 - (c) Hand air pump.
 - (d) Compressed air pipe.
 - (e) Pressure tank.
 - (f) One way cock.
 - (h) Two way cock.
 - (i) Three way cock.



FLOAT OVERFLOW.



FUEL COLLECTING PIPE.



- (a) Non return check valve.
- (b) Check valve.



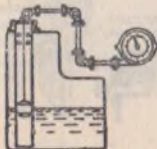
GEARED PUMP



ROTARY PUMP



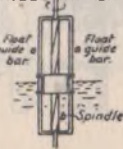
FLOAT GAUGE.



MAGNETIC TRANSMISSION OF INDICATION.



PETROL GAUGE WITH SPINDLE TRANSMISSION. LINEAR SCALE.



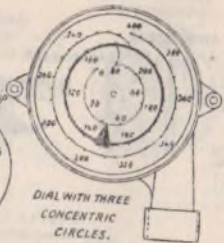
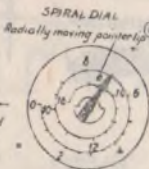
LINEAR FLOAT GAUGE.



PRESSURE FLOAT.



AIR PRESSURE GAUGE.



STANDARD DIAL



PETROL PRESSURE GAUGE.



OIL PRESSURE GAUGE.



SPRING TUBE PRESSURE GAUGE.



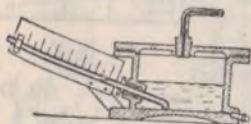
DOUBLE SPRING TUBE PRESSURE GAUGE.



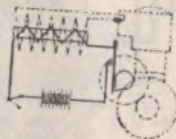
SPRING PLATE PRESSURE GAUGE.



MICROMANOMETER.



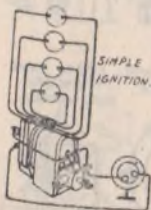
DRY BATTERY IGNITION.



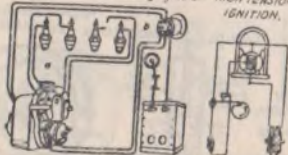
SPARKING PLUG IGNITION.



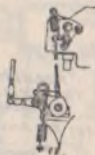
SIMPLE IGNITION.



DOUBLE IGNITION. Working Ignition Starting Ignition HIGH TENSION IGNITION.



COIL IGNITION.

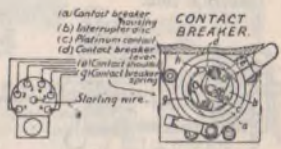
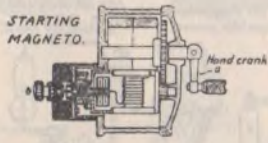
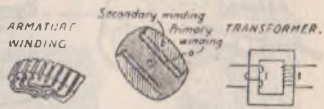
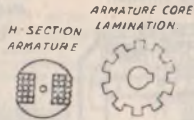


HOT TUBE IGNITION.



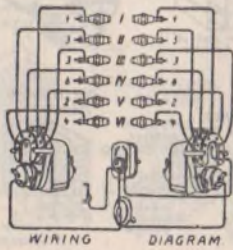
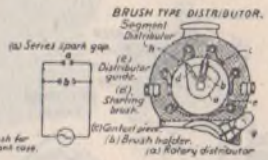
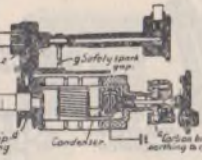
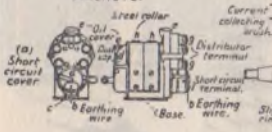
PERMANENT STEEL MAGNET.



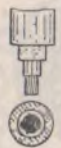


170.22-30

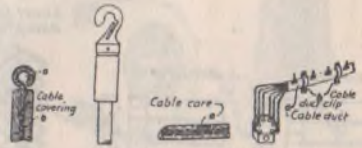
WORKING MAGNETO.



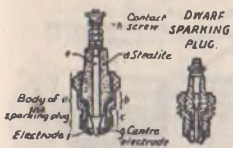
HIGH TENSION CABLE.



CABLE TERMINAL.



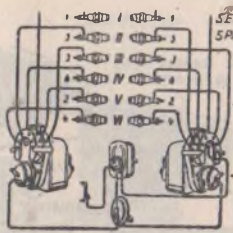
SPARKING PLUG WITH SOAP STONE.



(3) TWO POINTED SPARKING PLUG



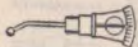
SERIES OF SPARKING PLUGS.



IGNITION SWITCH.



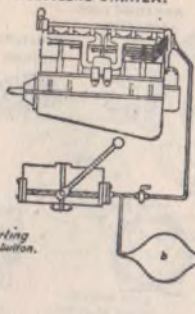
IGNITION ADJUSTMENT NEEDLE.



(a) Adjustment mark.



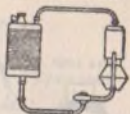
ACETYLENE STARTER.



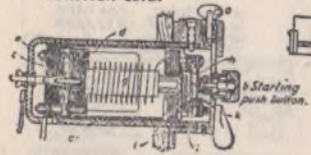
STARTING HANDLE.



COOLING INSTALLATION.



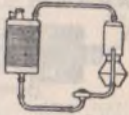
IGNITION COIL.



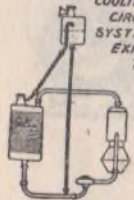
(a) Dead water pocket (b) Air pocket.



COOLING WATER CIRCULATION SYSTEM WITHOUT EXPANSION TANK.

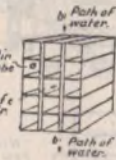


COOLING WATER CIRCULATION SYSTEM WITH EXPANSION TANK. RADIATOR CASE.



SQUARE TUBE RADIATOR.

HONEYCOMB RADIATOR.



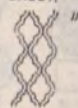
SQUARE TUBE EXPANDED INTO OCTAGONAL BUTT.



SHEET METAL RADIATOR.



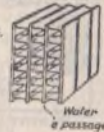
CORRUGATED SHEET.



SHEET WITH PARTIAL INDIRECT COOLING.

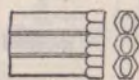
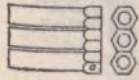


PARTITIONED RADIATOR.



(a) Expansion

OVAL TUBE.



Sheet of metal

WATER TUBE RADIATOR.

a Cooling water tube.



SADDLE RADIATOR.



SIDE RADIATOR.



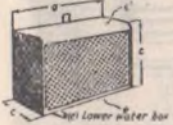
COOLING WATER CIRCULATION SYSTEM WITHOUT EXPANSION TANK.

SEMI-CIRCULAR RADIATOR.



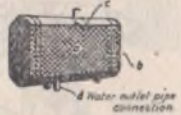
RECTANGULAR RADIATOR.

- (a.) Length of radiator.
- (b.) Height of radiator.
- (c.) Depth of radiator.
- (d.) Upper water box.



RADIATOR WITH DETACHABLE SECTIONS.

- (a.) Main block.
- (b.) Lateral radiator block.
- (c.) Water inlet pipe connection.



WING RADIATOR.

- (a.) Upper surface of wing radiator.
- (b.) Under



HORIZONTAL WATER DUCT.



VERTICAL WATER DUCT.



WING RADIATOR WITH ADDITIONAL PROJECTING RADIATOR.



NOSE RADIATOR.



POINTED RADIATOR.



UNDERSLUNG RADIATOR.



OVAL RADIATOR.



ANNULAR AIR SCOOP.

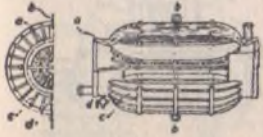


ROUNDED UPRIGHT RADIATOR.



RIBBED RADIATOR.

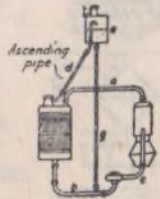
- (a.) Annular water box.
- (c.) Cooling section.
- (d.) Radiator drain cock.



BEARD TYPE RADIATOR.



AIR COOLER RADIATOR.



KNEE PIPE



Y TUBE



CURVED PIPE



RUBBER SLEEVE JOINT



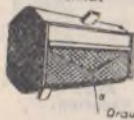
RADIATOR FILLER.



RADIATOR INLET STRAINER.



ONE PIECE BLIND.



TWO PIECE BLIND.



FLAP SHUTTER



SIDE FLAP



ROTARY SLIDE VALVE



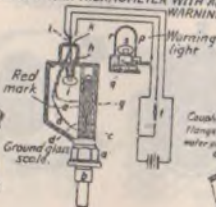
ROLL TOP DESK TYPE SHUTTER.



RADIATOR VALVE.



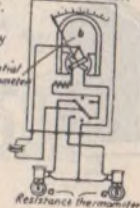
COOLING WATER THERMOMETER WITH AUTOMATIC WARNING DEVICE.



VAPOUR PRESSURE THERMOMETER.



DIFFERENTIAL MEASUREMENT.



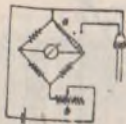
CENTRIFUGAL PUMP.



ECCENTRIC PUMP.



MEASUREMENT OF ELECTRIC RESISTANCE.



BODY OF ELECTRIC COOLING WATER TELETHERMOMETER



BARREL PROCESS.



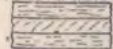
"HYDROGENIT" APPARATUS

- (a) Decomposition chamber (d) Double wall.
- (b) Compressed block of hydrogen



PLYWOOD.
 (a & b) Veneer
 longitudinal ply grain.
 (c) Transverse ply
 (d) Thickness of veneer.

THREE PLY WOOD



FIVE PLY WOOD



VEINED WOOD.



CROSS SECTION.



CHORDAL SECTION.



FLAT GRAIN.



EDGE CUT.



STAR SHAKE.



NATURAL CRACK.



HEART SHAKE.



FROST CLEFT.



INTERNAL ANNUAL SHAKE



HALO.



TWISTED GROWTH OF WOOD.



TREE-WART.



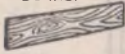
CANKEROUS GROWTH.



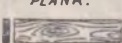
SHRINKAGE OF WOOD.



BOARD.



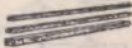
PLANK.



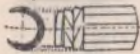
BOARD.



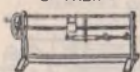
LATH.



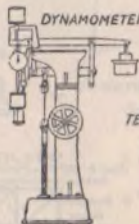
BUILT UP WOODEN TUBE.



APARATUS FOR TESTING THE TEARING STRENGTH OF FABRIC.



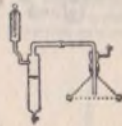
DYNAMOMETER



BURSTING TEST APPARATUS.



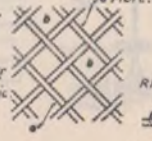
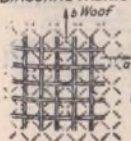
APPARATUS FOR MEASURING PERMEABILITY.



APPARATUS FOR TESTING ELECTRIC CONDUCTIVITY.



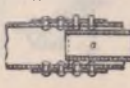
DIAGONAL FABRIC



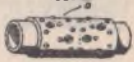
LAP RIVETING.



BUTT JOINT RIVETING.



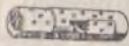
TUBE BUTT JOINT.
 Tube sleeve.



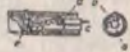
BUTT JOINT WITH WELDED SEGMENTAL SLEEVES



BUTT JOINT WITH TANGENTIAL SLEEVE



PNEUMATIC INSERTION OF RIVETS THROUGH END OF TUBE



CUP SHAPED RIVETING HAMMER



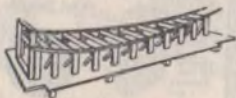
RIVETING DIES



WELDING



BUILDING CRADLE



GLUE PRESS



GLUED JOINT



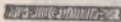
STRAIGHT HALVED JOINT



NOTCH



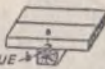
GROOVE AND TONGUE



GROOVE



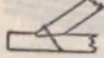
TONGUE



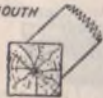
COGGING



SKEW NOTCH



BIRDSMOUTH



METAL SPRAY PROCESS



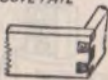
L SQUARE



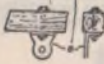
PLUMB LINE



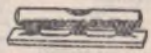
DOVETAIL



ANGLE BRACKET



SPIRIT LEVEL



PLUMB LINE LEVEL



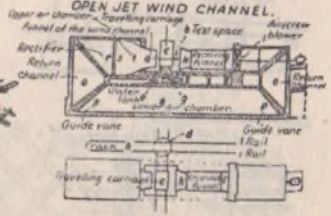
WATER TANK



WHIRLING ARM

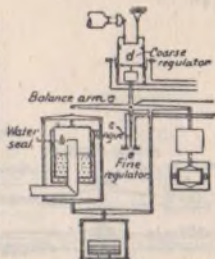
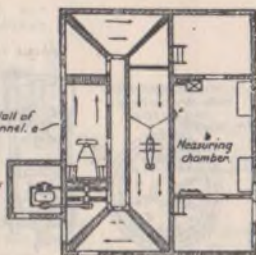
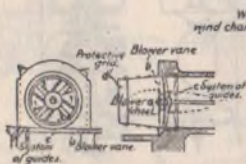


OPEN JET WIND CHANNEL

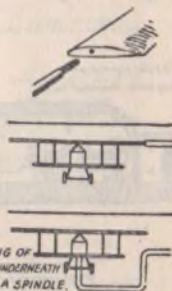
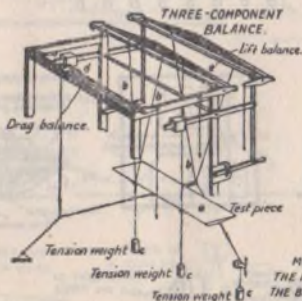
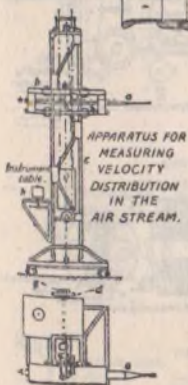
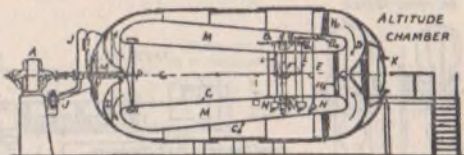
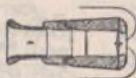


CLOSED WIND CHANNEL.

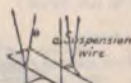
PRESSURE BALANCE.



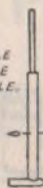
DOUBLE WIND CHANNEL



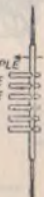
INSERTION OF PRESSURE GAUGE TUBE ON THE AEROFOIL.



SIMPLE SMOKE NOZZLE.



MULTIPLE SMOKE NOZZLE



SMOKE GENERATOR.

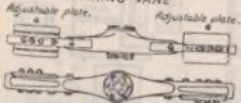


TACHOMETER WITH REVOLUTION INDICATOR.

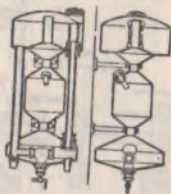
Revolutions indicator



BRAKING VANE



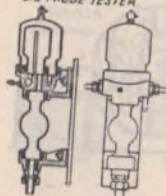
PROBE TESTER



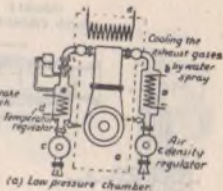
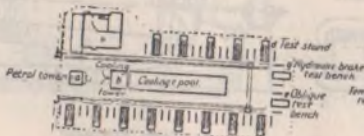
AUTOMATIC PROBE TESTER.



OIL PROBE TESTER



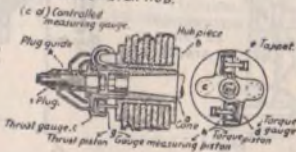
TEST FIELD.



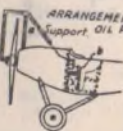
- (b) air-tight door
- (a) ante-chamber lock



DYNAMOMETER HUB.



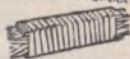
ARRANGEMENT OF SUPPORT OIL PIPES



DRIP TRAY.



LONGERON SPLICE



LACING UP THE FABRIC



WATER CAN.



WHISLING OUT THE AIRPLANE FROM THE HANGAR

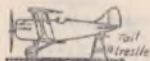


HOISTING OUT THE SEAPLANE.

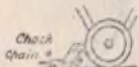
TRANSPORTING THE SEAPLANE ON THE TROLLEY.



SETTING THE TAIL TRESTLE



CHOCK BLOCK.



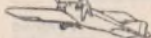
THUMB PRESSURE CAN.



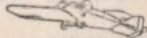
TESTING THE PLANE ON THE GROUND.



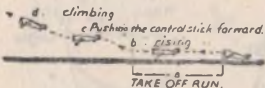
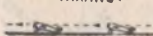
CLIMBING INTO COCKPIT.



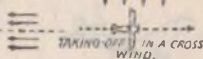
ASTRIDE POSITION.



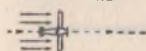
TAXIING



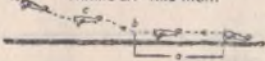
TAKING-OFF INTO THE WIND.



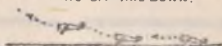
TAKING-OFF "DOWN WIND"



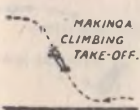
TAKING-OFF TAIL-HIGH.



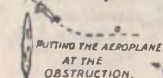
TAKING-OFF TAIL DOWN.



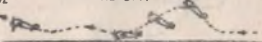
MAKING A CLIMBING TAKE-OFF.



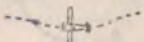
b. zooming over an obstruction.



STALLED TAKE-OFF.



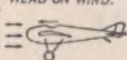
LEVEL FLIGHT.



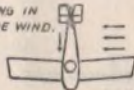
REFUELLING IN FLIGHT.



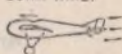
FLYING HEAD-ON WIND.



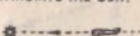
FLYING IN A SIDE WIND.



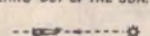
FLYING DOWN WIND.



FLYING INTO THE SUN.



FLYING "OUT OF THE SUN."



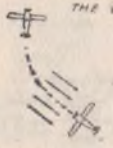
BEING LIFTED IN AN AIR GUST.



BRANCHING IN AN AIR POCKET.



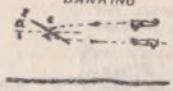
TURNING OUT OF THE WIND.



SKIMMING OVER.



BANKING



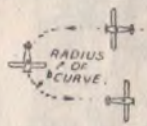
MOVEMENT OF THE RUDDER.



MOVEMENT OF THE AILERONS.

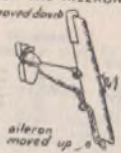


RADIUS OF CURVE.



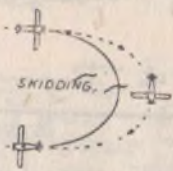
TURNING ON THE AILERONS.

aileron moved down



aileron moved up

TURNING ON THE RUDDER.

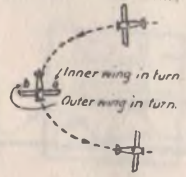


SKIDDING.

FLYING WITH CROSSED CONTROL.



LEFT HAND TURN.



Inner wing in turn
Outer wing in turn.

RIGHT-HAND TURN.



TURN WITH PUSHED FORWARD CONTROL COLUMN.



CLIMBING TURN.



FLYING A HORIZONTAL FIGURE OF EIGHT.



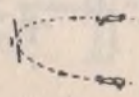
RIGHT-HAND SPIRAL.



LEFT-HAND SPIRAL.



VERTICAL BANKED TURN.



SPINNING NOSE DIVE.

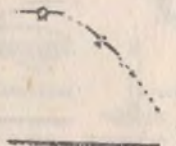
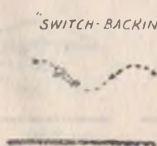


TAIL SLIDING

ZOOMING

SIDE-SLIPPING

"SWITCH-BACKING"



LOOPING

INVERTED LOOP FORWARD

HALF LOOP.

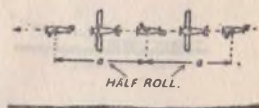
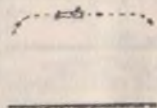
LATERAL LOOP.



IMMELMANN TURN.

INVERTED FLIGHT.

BARREL ROLL.



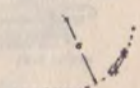
HALF ROLL.

NOSE DIVE.

A RIGHT-HAND SPIN.

A LEFT-HAND SPIN.

PULLING OUT





CYLINDER FRACTURE
OR CRACK IN CYLINDER



VALVE FRACTURE



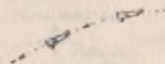
SIDE SLIP



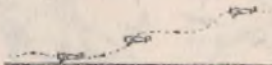
TAIL SLIDE



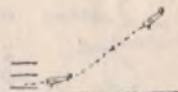
STEEP GLIDE



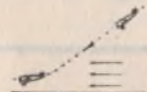
FLAT GLIDE



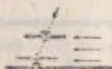
DESCENT BY STAGES



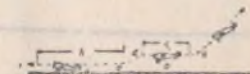
LANDING INTO THE WIND



LANDING DOWN WIND



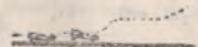
CROSSWIND LANDING



AS RIGHTLY: AEROPLANE (a) AEROPLANE FLATTENS
OUT (b) LENGTH OF FLATTENING OUT (c) LETTING
THE AEROPLANE PANCAKE (d) AEROPLANE
TOUCHES DOWN (e) LANDING RUN (f) STOPPING
OF AEROPLANE (g) LANDING DISTANCE



THREE POINT LANDING



TAIL DOWN LANDING



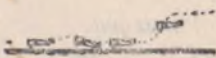
WHEEL LANDING



DESCENT ON WATER



CIRCLING ROUND



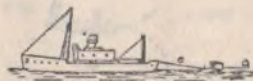
BUMPY LANDING



NOSING OVER



SOMERSAULT



TOWING THE SEAPLANE



DROGUE OR DRIVING ANCHOR
(a) ANCHOR LINE
(b) DRAG ANCHOR CROWN



SAGGING



HOG



STERN DROP



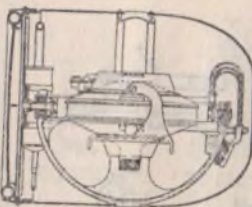
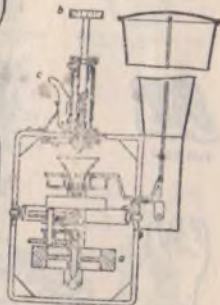
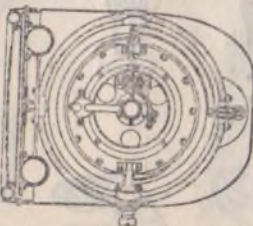
NOSE OF AIRSHIP IS STOVE IN



WADDING OPERATION

MAST MASTING
OF AIRSHIPPENDULUM WITH
AIR DAMPING

PENDULUM CLINOMETER

LIQUID LEVEL
IN AIR BUBBLEINTERNAL GYROSCOPIC DRIFT
INDICATORGYROSCOPIC CLINOMETER
(A FREE GYROSTAT)

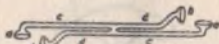
INVERTED LEVEL



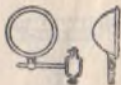
GYROSTATIC TURN INDICATOR



ROBINSON'S CUP ANEMOMETER TURN INDICATOR



LISTENING TUBE (a) MOUTH PIECE (b) EAR PIECE (c) SPEAKING TUBE



HEAD REFLECTING MIRROR



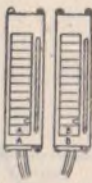
PLANE MIRROR



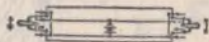
CONCAVE MIRROR



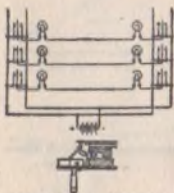
CONVEX MIRROR



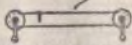
ORDER TRANSMITTER



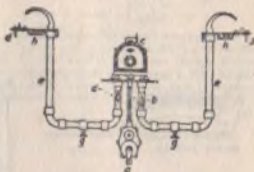
ENGINE ROOM TELEGRAPH



ORDER TRANSMITTED WITH RETURN CALL



TRANSMISSION OF MESSAGES BY ENDLESS CABLE (a) ENDLESS CABLE



PNEUMATIC POST INSTALLATION (a) PNEUMATIC TRAVELLER



FUR BOOT



PUTTEES



OVERALLS



FUR-LINED GLOVE



HEATED BOOT



HEATED GLOVE



FLYING GOGGLES (a) CURVED GLASS (b) VELVET BINDING (c) ELASTIC BAND



FLYING GOGGLES WITH FLAT GLASS



FLYING GOGGLES WITH SIDE GLASS (a) STRAP (b) WOODEN EYELET



GOGGLES WITH SIDE GLASSES



FLYING GOGGLES WITH HALF MASK (ALMOST PERFECTED BY THE U.S. GOVERNMENT)



HALF MASK



"STOCKING" CAP



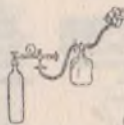
SPORTS CAP



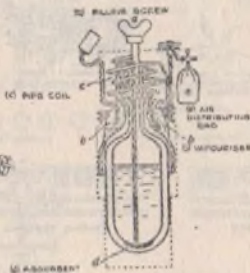
FLYING CAP



CRASH HELMET
(a) SUBSTITUTION PISTON
(b) HELD PAD
(c) LINED STRAP
(d) JERKING STRAP
(e) EYE TAB



OXYGEN BOTTLE



FLAME SCREEN

(c) NPS COIL

(d) AIR DISTRIBUTING BIRD

(e) MUFFLER

(f) ABSORBER

LIQUID OXYGEN APPARATUS



BOTTLING APPARATUS WITH DIFFERENTIAL VALVE

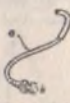
(a) LIQUID AIR BOTTLE
(b) DIFFERENTIAL VALVE
(c) BREATHING MAN



OXYGEN BREATHING APPARATUS (a) OXYGEN BOTTLE



SMALL OXYGEN MASK



(a) BREATHING TUBE
(b) MOUTH PIECE



LIQUID AIR CONTAINER FOR TRANSFER



BREATHING DEVICE FOR LIQUID AIR



PORTABLE LIQUID AIR PLANT

(a) HIGH PRESSURE COMPRESSOR
(b) QUICK BATTERY (c) DECAOXYGENIZATION APPARATUS



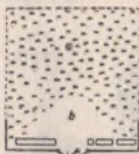
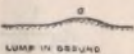
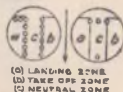
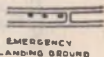
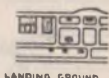
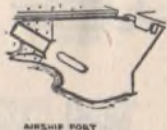
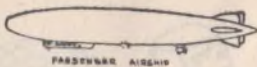
FLYING GROUND FURNISHING POINT



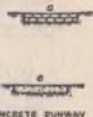
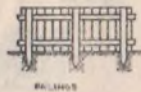
FLYING



AIR LINE NETWORK
(a) MAIN AIR LINE (b) BRANCH LINE (c) AIRWAY SECTION

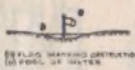


(b) BARE PATCH





IS LANDING TRIANGLE



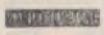
BEARING MARKING OBSTRUCTION IN FIELD OF VISION



WIND CONE



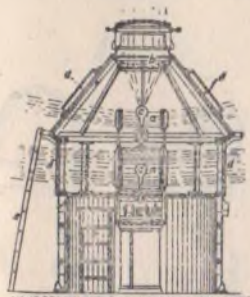
FLASHING LIGHT WITH REFLECTING MIRROR, GLASS LENS OR REFRACTIVE REFLECTOR (L) AND (U) FOR ROTARY OPERATOR (M) WITH OPTICAL TRANSMITTER (N) AND (O) FOR ROTARY OPERATOR (P)



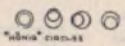
FLASHING SIGNAL



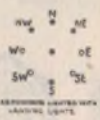
MULTI-LAMP BEACON WITH GLASS GLOBE BE SHOWN WITH COIL WITH (A) ONE LAMP IS FIRST; THE GLOBE (B) WITH (C) OTHER LAMP



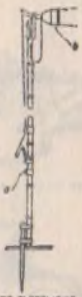
LIGHT BEACON WITH FLUO-LIGHT AND BEAM LENSES (A) FLUO-LIGHT LENS (B) SYSTEM OF BEAM LENS (C) LAMP WITH FILAMENT LAMP (D) GLASS GLOBE (E) STEP LADDER



"HANA" CIRCLES



BEARING MARKING WITH FLASHING LIGHTS



LANDING FLOODLIGHT IS PLACED IN POSITION OF PROJECTOR



POLE LANDING PLATE



SIDE LANDING LIGHT



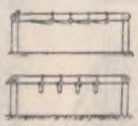
DIVERGENT CONES OF LIGHT



INTERSECTING CONES OF LIGHT



SIGNAL LIGHT PROJECTOR



SHAKING BY SECOND SHEETS



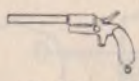
SHAKING OF POWDER



VERY LIGHT



SIGNAL VERY LIGHT



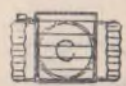
VERY DARK

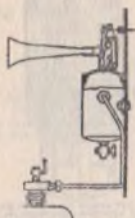


SMOKE BOMB

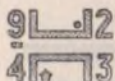


FLASH LAMP

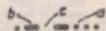




SIREN HORN



ARITHMETICAL GROUND MARK



MORSE CODE (A) DOT (B) DASH (C) PAUSE



ACETYLENE BURNER



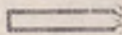
4-SECTION REVOLVING LIGHT



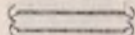
FIXED AIRSHIP SHED



FLOATING AIRSHIP SHED



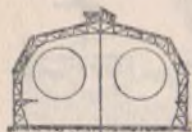
AIRSHIP SHED WITH SINGLE DOOR



AIRSHIP SHED WITH TWO DOORS



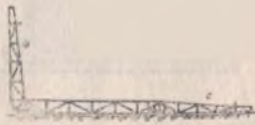
SINGLE BAY AIRSHIP SHED



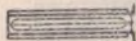
DOUBLE AIRSHIP SHED



DOUBLE AIRSHIP SHED WITH REVOLVING BALL (A) PIVOT (B) CIRCULAR RAIL



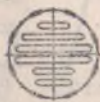
COLLAPSIBLE SHED (A) FOLDING SIDE OF SHED



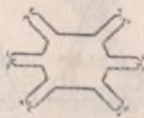
LONG AIRSHIP SHED



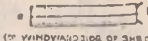
TRIANGULAR AIRSHIP SHED



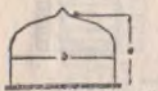
CIRCULAR AIRSHIP SHED



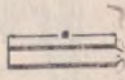
RADIAL AIRSHIP SHED



(A) WINDWARD SIDE OF SHED (B) LEeward SIDE OF SHED (C) FRONT OF SHED



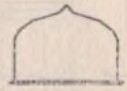
INTERNAL SECTION OF GROUP OF INTERNAL HEIGHT, SHED (A) INTERNAL WIDTH



(A) LENGTH OF AIRSHIP SHED



BRICK WALL



POINTED ROOF OF AIRSHIP SHED



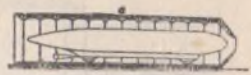
TRAPEZOIDAL SIDE OF AIRSHIP SHED



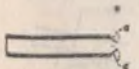
ARCHED ROOF



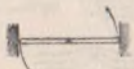
WALL UPRIGHT IN ROOF TRUSS IN TOP FLANGE OF TRUSS IN BOTTOM FLANGE OF TRUSS IN GANGWAY



AIRSHIP SHED TRUSS



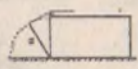
SWING DOOR IN DOOR HINGE



REVOLVING DOOR



SLIDING DOOR



FOLDING DOOR



CONVENTIONAL DOOR



ERECTING LADDER IN LOWER SECTION OF LADDER IN UPPER SECTION OF LADDER



FLOOD LIGHT



GROUND ANCHORAGE ANCHORAGE IN BARGE FOR THE ROPE ANCHORING RING



CROSS COLLAR



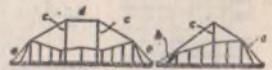
ANCHOR HAWSER WITH INTERPOSED SPLICES



THREE-WIRE MOORING



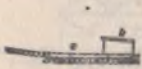
MOORING MAST IN ADEK OF MOORING MAST IN PLATFORM OF MOORING MAST TO BRIDGE OR MOORING MAST



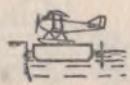
TENT FOR AIRPLANE IN ONE WALL TO BEAR WALL TO PRINCIPAL PULS IN RIGID ROPE IN GUY ROPE



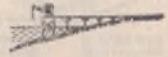
TAIL TROLLEY



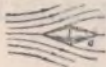
SLOPING MANGAZ ROOF



LIFTING STAGE



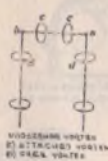
SLOPE



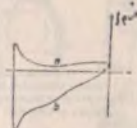
(1) DEAD WATER



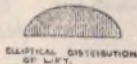
ROLLED UP TRAILING VORTICES



VORTEXES
a) ATTACHED VORTICES
b) FREE VORTICES



DISTRIBUTION OF PRESSURE OVER AN AIRFOIL



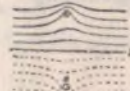
ELLIPTICAL DISTRIBUTION OF LIFT



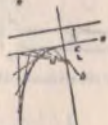
CLIMB ANGLE OF PRESSURE



JOUKOWSKI AIRFOIL PROFILE



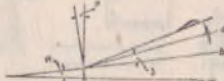
METHOD OF IMAGES
a) WING OVER FIXED WALL
b) FIXED WALL



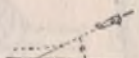
LIFT TRIANGLE
a) VERTICES
b) RESULTANT FORCE OF LIFT
c) RESULTANT FORCE OF WEIGHT



(1) LIFT AXIS
(2) DRAG AXIS



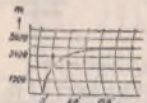
(3) DIRECTION OF FLIGHT PATH
(4) ANGLE FORMED BY FLIGHT PATH WITH THE HORIZONTAL
(5) ANGLE BETWEEN THRUST LINE AND FLIGHT PATH



CLIMB ANGLE OF CLIMB



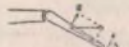
(1) LONGITUDINAL AXIS
(2) LATERAL AXIS
(3) VERTICAL AXIS
(4) CENTRE OF GRAVITY OF AIRCRAFT
(5) DIRECTION OF MOTION
(6) POSITIVE DIRECTION OF THE AXIS
(7) NEGATIVE DIRECTION OF THE AXIS



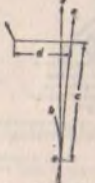
MEAN CLIMB CURVE



(1) DIRECTION OF FLIGHT PATH
(2) ANGLE FORMED BY FLIGHT PATH WITH THE HORIZONTAL
(3) ANGLE BETWEEN THRUST LINE AND FLIGHT PATH
(4) ANGLE OF CLIMB
(5) ANGLE OF ATTACK
(6) ANGLE OF DIVE
(7) ANGLE OF BANK
(8) ANGLE OF YAW
(9) ANGLE OF ROLL
(10) ANGLE OF PITCH
(11) ANGLE OF HEAVE
(12) ANGLE OF SWAY
(13) ANGLE OF SPOON



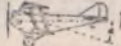
RESULTANT OF FORCES
a) RESULTANT OF WEIGHT AND LIFT
b) RESULTANT OF WEIGHT AND LIFT AND DRAG
c) RESULTANT OF WEIGHT AND LIFT AND DRAG AND THRUST



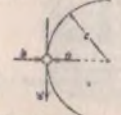
MARGIN OF STABILITY
a) MARGIN OF STABILITY
b) MARGIN OF STABILITY
c) MARGIN OF STABILITY



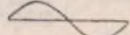
BACK PORTION OF CURVES
a) BACK PORTION OF CURVES
b) BACK PORTION OF CURVES



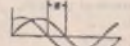
PITCH ANGLE OF WING



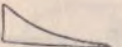
(1) CENTERLINE FORCE
(2) CENTERLINE FORCE
(3) CENTERLINE FORCE



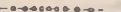
SINUSOIDAL OSCILLATION



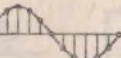
(3) PHASE DISPLACEMENT



LONGITUDINAL OSCILLATION



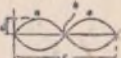
LATERAL OSCILLATION



TORSIONAL OSCILLATION



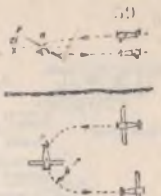
(1) WAVE LENGTH
(2) AMPLITUDE
(3) PHASE OF OSCILLATION



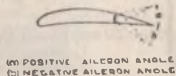
(1) WAVE LENGTH
(2) AMPLITUDE
(3) PHASE OF OSCILLATION



PHUGOID OSCILLATION



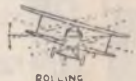
STEADY CURVIL. NEAR FLIGHT (a) ANGLE OF BANK



(a) POSITIVE AILERON ANGLE (b) NEGATIVE AILERON ANGLE



SPINNING CURVE



ROLLING



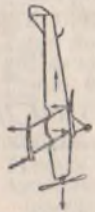
(a) POSITIVE ELEVATOR ANGLE (b) NEGATIVE ELEVATOR ANGLE



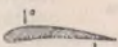
(a) POSITIVE RUDDER ANGLE (b) NEGATIVE RUDDER ANGLE



HIGH SPEED CASE



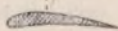
DIVING CONDITION



INVERTED FORCE ACTING FROM ABOVE (a) VERTICAL FORCE ACTING UPWARDS



INVERTED FLIGHT CONDITION



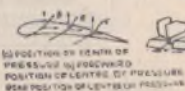
DOWNWARD PRESSURE



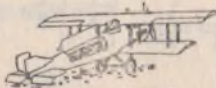
HIGH INCIDENCE CONDITION



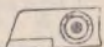
LOW SPEED CASE



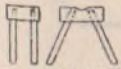
(a) POSITION OF CENTRE OF PRESSURE (b) FORWARD POSITION OF CENTRE OF PRESSURE (c) REAR POSITION OF CENTRE OF PRESSURE



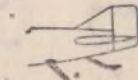
AMBULANCE FRAME



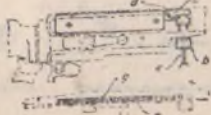
RINGS



TRUSS FOR AILERON



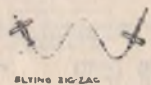
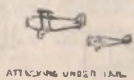
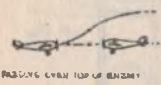
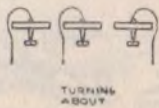
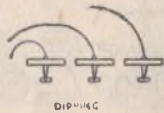
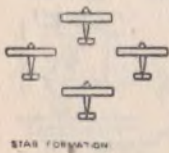
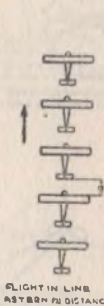
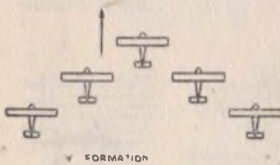
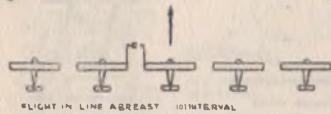
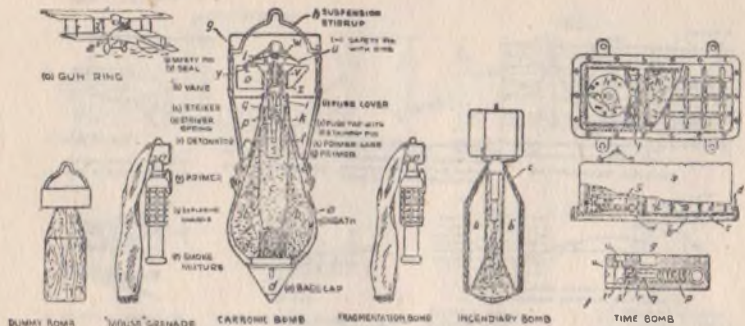
(a) FORWARD WING MACHINE GUN



GUN TURRET



MACHINE GUN MIRROR



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