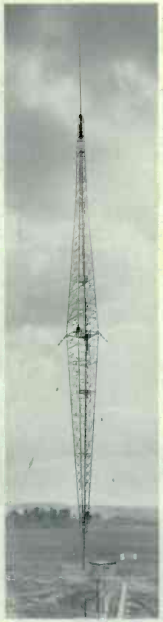
BLAW-KNOX VERTICAL RADIATORS

GUYED TYPE

(PATENTED)

WCAU, Philadelphia, Pa.—500 ft. high.



WAAB-WNAC, Boston, Mass.—430 ft. high.

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2. It increases the distance from the station at which fading occurs.

From the captioned photographs it is obvious that Radiators of this type are being used by many of the important broadcasting stations.

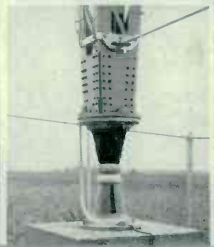
BLAW-KNOX COMPANY

PITTSBURGH, PA.

NEW YORK	342 Madison Ave.
CHICAGO	Peoples Gas Bldg.
DETROIT	Book Tower Bldg.
BIRMINGHAM	Brown-Marx Bldg.
PHILADELPHIA	908 Widener Bldg.
BUFFALO	356 Nassau Street
PACIFIC COAST DIVISION	Blaw-Knox & Western Pipe Corp., San Francisco
EXPORT DIVISION	Blaw-Knox International Corporation, P.O. Box 915, Pittsburgh, Pa.
ENGLAND	Blaw-Knox, Ltd., New Oxford House, Hart St., Holborn, London, W.C.1.
FRANCE	Campagnie Francaise Blaw-Knox, 4, Place des Saussaies, Paris —8
GERMANY	Blaw-Knox, G.m.b.H., 17, Bismarckstrasse, Duesseldorf

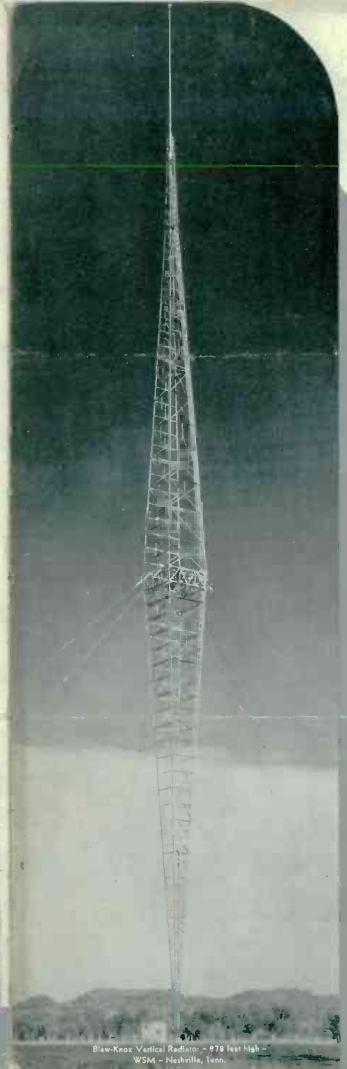
WABC, Wayne, N. J.—475 ft. high.

WCAU base insulator.



Typical guy anchor.

WSM base insulator.



Blaw-Knox Vertical Radiator — 878 feet high — WSM — Nashville, Tenn.

BLAW-KNOX VERTICAL RADIATORS

SELF-SUPPORTING TYPE

(Patent Applied For)

GUYED TYPE

(Patented)

BLAW-KNOX

Bulletin No. 1419

Typical Field Pattern obtained by using Blaw-Knox Vertical Radiators.

Blaw-Knox
VERTICAL RADIATOR
SELF-SUPPORTING TYPE
(PATENT APPLIED FOR)

BLAW-KNOX Radio Towers are used by broadcasting stations, radio telephone stations and radio communication stations in practically every part of the world.

Wide experience dating back more than thirty years to the infancy of radio, forms the enviable background for acknowledged achievement in tower design and manufacture by Milliken Brothers (the original company) and later by the Blaw-Knox Company who succeeded them.

The company policy of cooperation with the radio engineering profession at large has resulted in most modern practice in design, from an electrical as well as a purely structural standpoint. The types of vertical radiators illustrated and described in this folder are evidence that the development of Blaw-Knox Radio Towers has kept pace with the latest developments in antenna design.

It is generally recognized that the ideal broadcasting antenna should consist of a high vertical wire. However, in the conventional "T" or inverted "L" type of antenna the vertical height is definitely limited and it is customary to provide the necessary electrical length by the use of a "flat-top" construction. This flat-top portion, while serving to load the antenna and improve the current distribution, contributes nothing to its useful radiation.

Steel supporting towers may act as "re-radiators" or reflectors and introduce a directional effect which distorts the normal shape of the field pattern. At the same time the signal is weakened because of losses due to induced currents circulating in the towers. These effects become greater as the tower height approaches or exceeds the resonant value; consequently, an antenna suspended between steel towers also suffers from height limitations.

The condition can be remedied to a certain extent by widely separating the towers and by insulating their bases, but even with these precautions losses will always be present. Particularly serious is the case where the antenna is located on the roof of a building. Here the available space is usually so limited that proper spacing of the towers is impossible. Also the towers, even when insulated, become electrically a part of the building framework and their combined height is such that the efficiency will be greatly decreased.

If wood poles are used for supports, practical considerations such as lack of strength, maintenance expense and the necessity for guying, fix the maximum height. In addition there is the fire hazard and the general impermanency of wooden construction. Metal halyards, used to support the antenna, have the same undesirable characteristics as the steel towers when approaching resonance with the operating frequency.

The development of the Blaw-Knox Vertical Radiator, self-supporting type, which itself is an antenna, has resulted in definite improvements which may be summarized as follows:

1. THE RADIATOR IS A VERTICAL ANTENNA, THE MOST EFFICIENT TYPE FOR BROADCASTING. There are no height limitations either by reason of electrical or strength considerations. It is both economical and practicable to erect a Radiator having a height of a quarter wave length or more, thereby securing the full advantages of the maximum effective height.

2. THE FUNDAMENTAL PATTERN IS CIRCULAR. The radiator itself acts as the antenna so there are no absorptions or reflections from the supporting structures.

3. ALL LOSSES DUE TO INDUCED CURRENTS IN SUPPORTING TOWERS ARE ELIMINATED.

4. THE RADIATOR IS A PERMANENT STRUCTURE. It is free from fire hazard due to lightning or other causes. There are no swaying antenna wires with their attendant difficulties and expense due to breakage, particularly under ice and sleet conditions.

5. LESS GROUND AREA IS REQUIRED. The initial cost is therefore reduced. It is also possible to erect the Radiator on roofs of buildings where conditions would prohibit the installation of two towers.

6. The BLAW-KNOX VERTICAL RADIATOR, SELF-SUPPORTING TYPE IS WELL ADAPTED FOR DIRECTIONAL INSTALLATIONS. Two or more of these Radiators may be economically and efficiently used for practically any design of directional antenna system.

7. A CONSIDERABLE PUBLICITY VALUE IS ATTACHED TO THE USE OF A VERTICAL RADIATOR. Many of the principal broadcasting stations in the United States are employing similar antennas. It has been stated by advertising agencies that in some cases the gain in prestige alone has been worth the cost of installation.

In order for a structure to function efficiently as a Radiator it must possess certain electrical characteristics. Most important is that the electrical capacity at the base must be as low as possible. This insures small dielectric losses in the base insulators and a proper distribution of radio frequency current along the height of the tower. A high base capacity would tend to concentrate the current at this point, and therefore to decrease the "effective height" of the antenna, seriously impairing its radiation efficiency.

In the Blaw-Knox Vertical Radiator, self-supporting type, an extremely low base capacity is obtained by the unusual insulator arrangement (patents pending) shown in the photographs. The four corner legs of the tower rest on their respective insulators with no attachment other than a pin to prevent lateral movement. These insulators therefore are required to take the down load only and the entire uplift of the tower is taken by the center insulator through the bolt which is tied into the foundation. *No porcelain is in tension.*

As a result of this special construction the total capacity of the five insulators at the base is lower than any other type insulation yet devised and is far below the capacity values usually present in conventional insulated towers. This is largely due to the fact that the top cap of the corner leg insulators becomes virtually a part of the tower leg and does not materially add to its capacity. Consequently the corner leg insulators have a practically negligible capacity, while with conventional "push-pull" tower insulators this is far from being the case because of the presence of a bolt through the unit, a bottom cap and additional porcelain.

The length of porcelain and separation of metal parts of the insulators is such as to adequately withstand the operating voltage of the transmitter without excessive heating. The structure itself is designed in accordance with standard Blaw-Knox practice and all metal parts are hot-dip galvanized to insure long life and high electrical conductivity.

Low Capacity Insulator Arrangement—the Outstanding Feature of the Blaw-Knox VERTICAL RADIATOR

One of two hundred Blaw-Knox Vertical Radiators, each 124 ft. high, installed by the U. S. Department of Commerce for Airway Radio Range Beacons.

Blaw-Knox Vertical Radiator, 149 ft. high. Broadcasting Station KSO, located on roof of 13-story Register & Tribune Building, Des Moines, Iowa.

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GUYED TYPE

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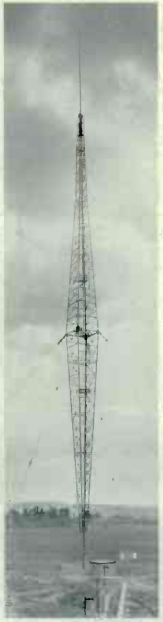

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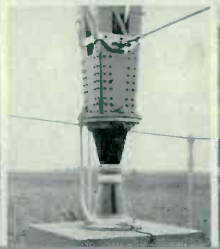
Wayne, N. J.—675 ft. high.

WCAU base insulator.



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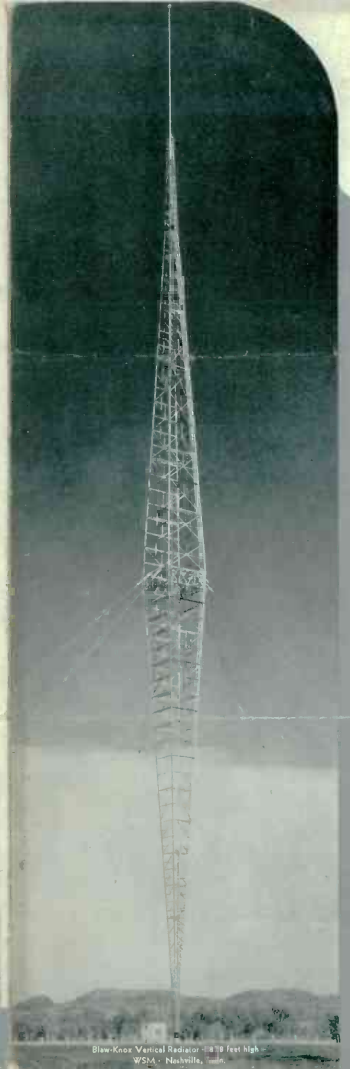

Blaw-Knox Vertical Radiator 418 feet high—WSM—Nashville, [illegible]

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SELF-SUPPORTING TYPE

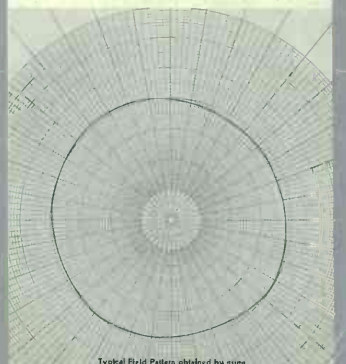
(*Patent Applied For*)

GUYED TYPE

(*Patented*)

BLAW-KNOX

Bulletin No. 1419



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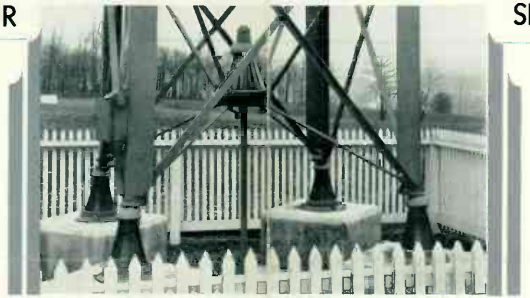

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