

April 21, 1942.

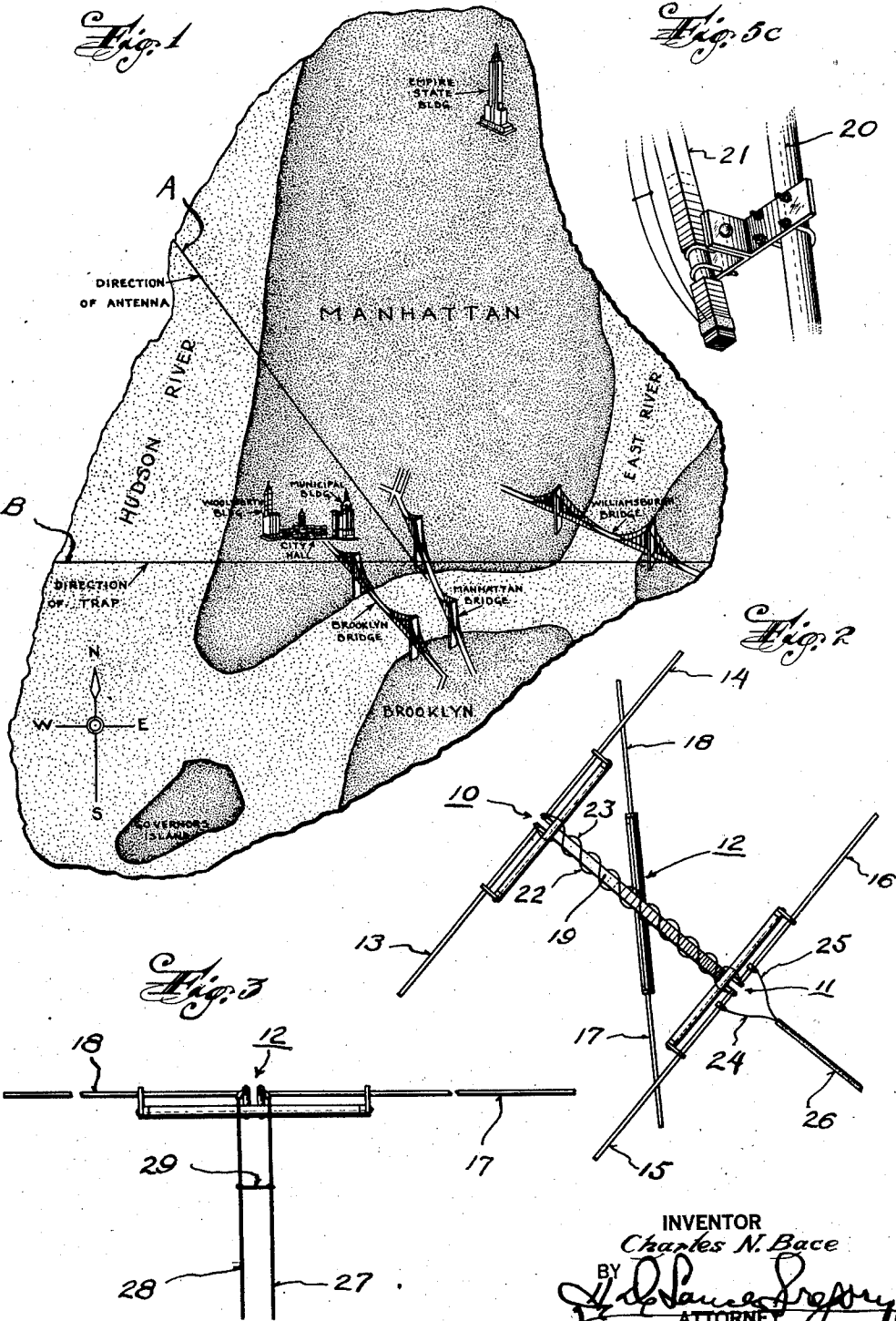
C. N. BACE

2,280,738

DIRECTIONAL ANTENNA

Filed Nov. 27, 1940

2 Sheets-Sheet 1



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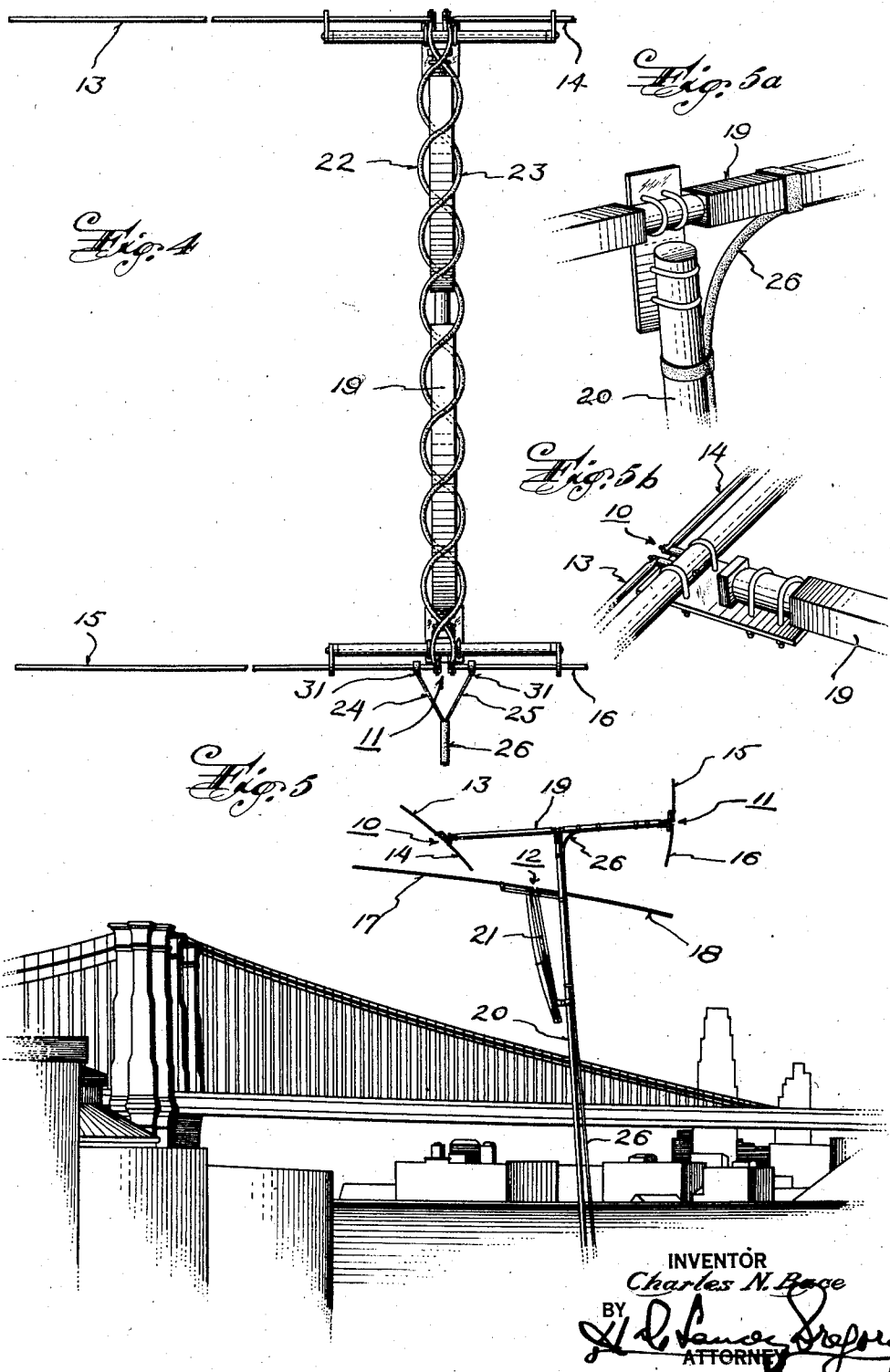
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UNITED STATES PATENT OFFICE

2,280,738

DIRECTIONAL ANTENNA

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Application November 27, 1940, Serial No. 367,358

5 Claims. (Cl. 250-11)

My invention relates to improvements in directional antennae.

In the case of television receivers at some places in metropolitan areas, the incoming television signals were reflected in such a way from tall buildings and bridges or other high structures in the immediate vicinity, as to cause "ghosts" in the picture, which produced blurred and distorted images. This has been attributed to a condition of the reflected television signals arriving at the receiving antennae in out-of-phase relation with respect to the transmitted signals.

One of the objects of my invention is the provision of an improved directional antenna adapted particularly for television reception, and whereby the undesirable condition referred to is eliminated.

Other objects and advantages will hereinafter appear.

For the purpose of illustrating my invention, an embodiment thereof is shown in the drawings, wherein—

Figure 1 is a simplified, geographical showing of a section of New York city, and is illustrative of a condition unfavorable for satisfactory television reception with an antenna of a kind used heretofore;

Fig. 2 is a plan view of my improved, directional antenna, as set up and orientated to give satisfactory television reception under the conditions illustrated in Fig. 1;

Fig. 3 is an elevational view of one of the parts of my improved antenna, looking toward the right in Fig. 2;

Fig. 4 is an enlarged, plan view of another part of my improved antenna, showing more clearly details of the construction;

Fig. 5 is an enlarged, fragmentary view taken from, and looking south in Fig. 1; and

Figs. 5a, 5b and 5c are enlarged, detail, fragmentary views taken from Fig. 5.

For the purpose of illustration, it is assumed that my improved directional antenna is set up at the intersection of the two directional lines A and B, to intercept television signals transmitted from the Empire State building. It comprises an antenna made up of the two dipoles designated generally by the respective numerals 10 and 11, and a third dipole designated generally by the reference numeral 12.

The dipole 10 comprises the two one-quarter-wave elements 13 and 14, the dipole 11 comprises the two one-quarter-wave elements 15 and 16,

and the dipole 12 comprises the two one-quarter-wave elements 17 and 18.

The dipoles 10 and 11 are secured respectively to the opposite ends of a cross-arm 19. Each of these dipoles is adjustable with respect to the cross-arm 19 by using some suitable connection for this purpose, as shown in Fig. 5b.

The cross-arm 19 is secured at its center to a fixed upright or mast 20, and is adjustable with respect to the latter by using some suitable connection for this purpose, as shown in Fig. 5a.

The dipole 12 is fixed to the upper end of a staff 21. The staff 21 is supported from the mast 20, and is adjustable with respect thereto by using some suitable connection for this purpose, as shown in Fig. 5c.

By means of the pair of wires 22 and 23, connected and twisted as shown, the four one-quarter-wave elements 13, 14, 15, and 16 are connected out of phase.

The distance or spacing between the two dipoles 10 and 11 is substantially one-quarter wave.

A Y-match 24, 25 provides a connection between the antenna 10, 11 and the coaxial cable 26 to the television receiving apparatus.

The one-quarter-wave dipole 12 is provided with the lines or "feeders" 27 and 28 connected, respectively, to the dipole elements 17 and 18 of the dipole 12 and electrically connected by a cross-piece or "matching stub" 29, thus forming a dipole-trap as shown in Fig. 3.

In setting up one of my improved directional antennae, the various adjustments are made to give the best performance, these particular adjustments depending upon the particular local conditions. One of these adjustments is to tune the matching stub or cross-connection 29 until the best results are obtained, after which it is soldered to the feeders 27 and 28. The free ends of the feeders are not connected together. They may be taped to the supporting staff 21 for the dipole 12, as shown in Fig. 5c.

The vertical spacing of the dipole 12 under the antenna consisting of the dipoles 10 and 11, for best results, depends upon local conditions. In practical applications of my inventions, this spacing varied from 11 inches to 18 inches. The length of the feeders 27 and 28 varied from 14 inches to 2½ feet. The space between the substantially parallel feeders 27 and 28 varied from 1½ inches to 2½ inches. The length of each of the elements 13, 14, 15, 16, 17 and 18 was about 5¼ feet. The adjustment of the cross piece or matching stub 29 on the feeders 27 and 28 was

such that the dipole 12 and feeders 27 and 28 were tuned to a resonant point within the frequency-range of the incoming television signals, i. e., a frequency-range from 44.25 to 49.75 megacycles. The distance between the points of connection 31 of the Y-match 24, 25 to the elements 15 and 16, varied from 2 inches to 6 inches.

In the particular installation under the conditions illustrated in Fig. 1, the antenna 10, 11 was orientated as represented by the directional line A, and the antenna or trap 12 was orientated as represented by the directional line B.

I claim as my invention:

1. The combination with a directional receiving antenna and reflector associated therewith, of a trap in the form of a dipole supported in proximity to and electrically coupled but not directly connected by a conductor to said antenna and reflector, said trap being tunable to a frequency in the frequency-range to which said antenna responds, said trap being adjustable with respect to said antenna and reflector both angularly and at different distances therefrom.

2. In combination, a directional receiving antenna comprising four one-quarter wave elements connected to be in out-of-phase relation with respect to each other, and a trap in the form of a dipole supported in proximity to and electrically coupled but not directly connected by a conductor to said antenna, said trap being tunable to a frequency in the frequency-range to

which said antenna responds, said trap being adjustable with respect to said antenna both angularly and at different distances therefrom.

3. The combination with a directional receiving antenna, of a trap in the form of a dipole supported in proximity to and electrically coupled but not directly connected by a conductor to said antenna, said trap being tunable to a frequency in the frequency-range to which said antenna responds, said trap being adjustable with respect to said antenna both angularly and at different distances therefrom.

4. A directional antenna assembly for receiving signals, said assembly having three dipoles, each comprising two quarter wave elements, two of said dipoles being parallel and substantially a quarter-wave length apart and electrically connected to each other, the third one being electrically insulated from the others and adjustably located at an angle thereto.

5. A directional antenna assembly for receiving signals, said assembly having three dipoles, each comprising two quarter wave elements, two of said dipoles being parallel and substantially a quarter-wave length apart and electrically connected to each other, the third one being electrically insulated from the others and adjustably located at an angle thereto, and means connected to said insulated dipole for tuning it to the frequency of an incoming signal.

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