

RR

Aug. 24, 1926.

1,596,984

A. H. MARKS

METHOD AND APPARATUS FOR BROADCASTING

Filed March 26, 1923 2 Sheets-Sheet 1

T3458

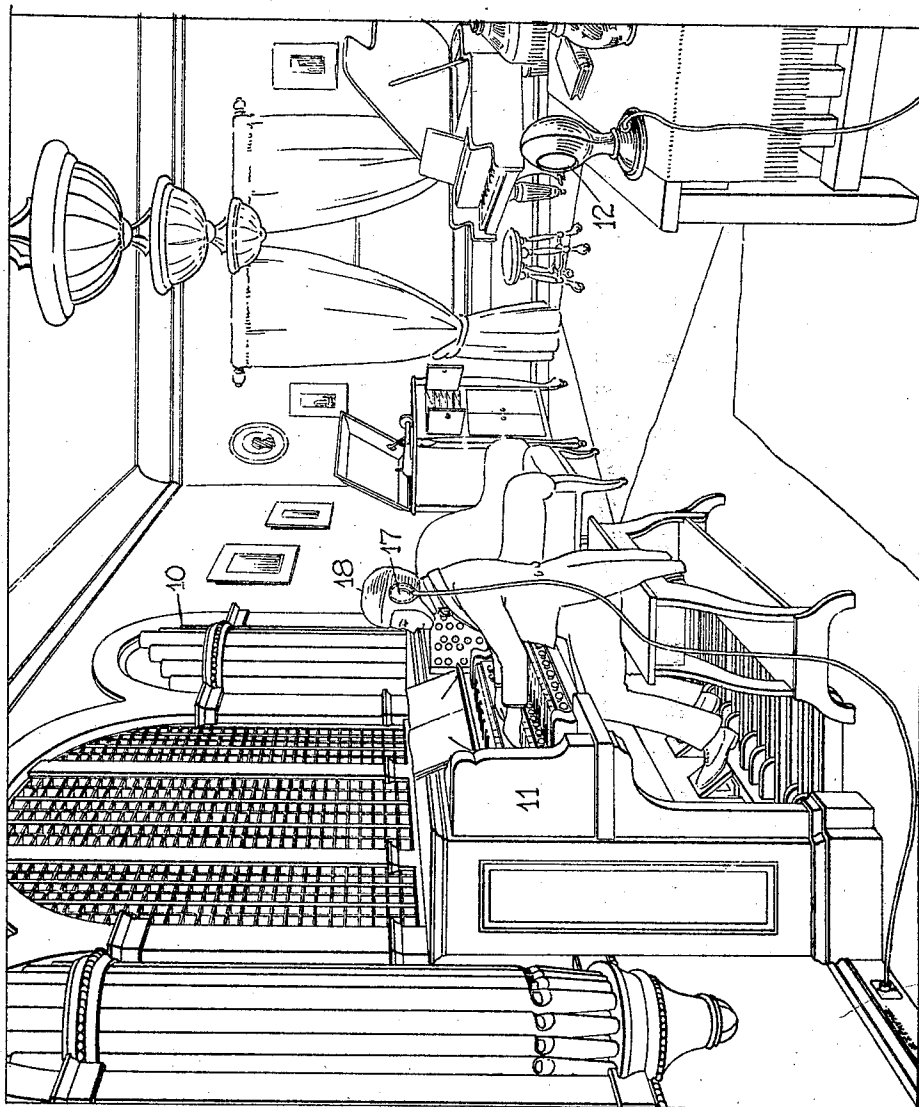


FIG. 1.

INVENTOR
ARTHUR H. MARKS.
BY *John P. Zarbox*
ATTORNEY.

Aug. 24, 1926.

A. H. MARKS

1,596,984

METHOD AND APPARATUS FOR BROADCASTING

Filed March 26, 1923

2 Sheets-Sheet 2

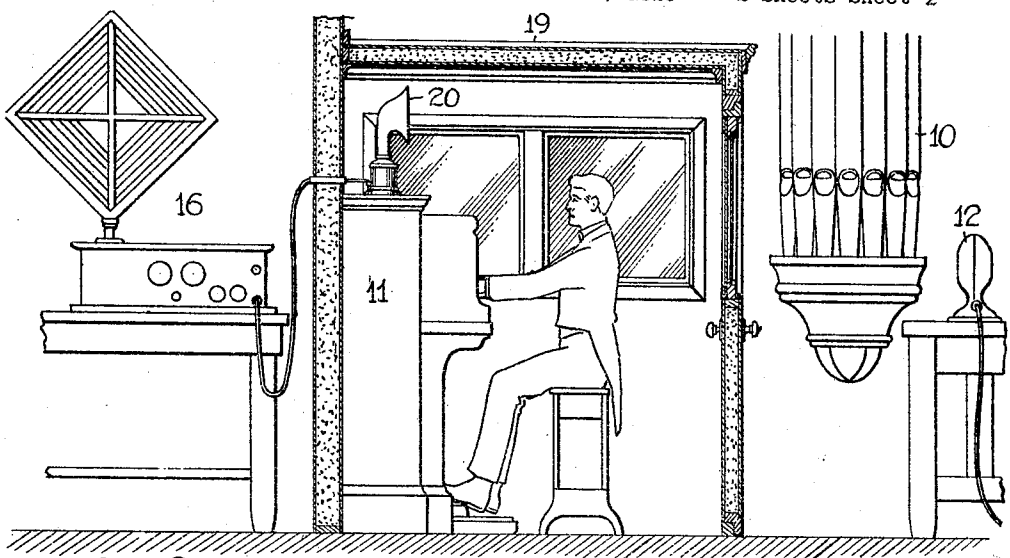


FIG. 2.

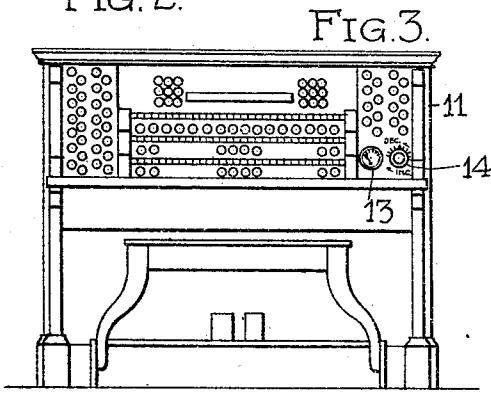


FIG. 3.

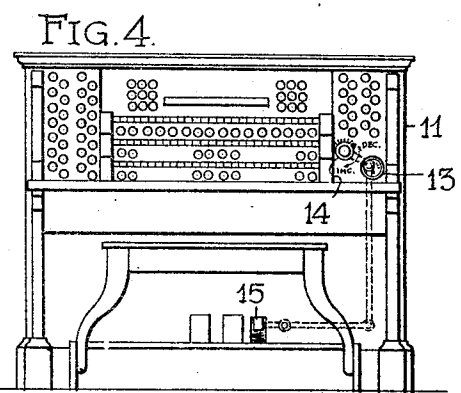


FIG. 4.

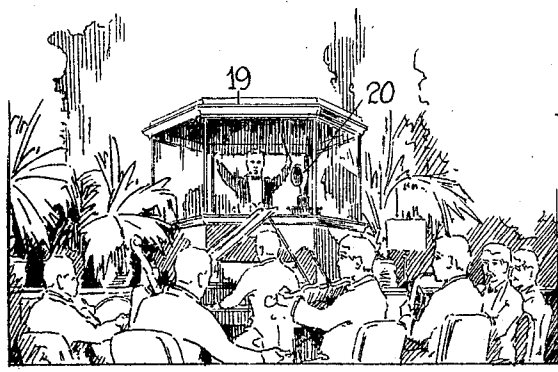


FIG. 5.

INVENTOR
ARTHUR H. MARKS.

BY *John P. Tarbox*
ATTORNEY.

17
Patented Aug. 24, 1926.

1,596,984

UNITED STATES PATENT OFFICE.

ARTHUR H. MARKS, OF NEW YORK, N. Y.

METHOD AND APPARATUS FOR BROADCASTING.

Application filed March 26, 1923. Serial No. 627,534.

The art of wireless broadcasting is the field to which my invention particularly pertains, but it may be found applicable to other fields as well. The attainment in the sound produced at the receiving stations of the highest possible degree of fidelity to the original rendition or interpretation of the speaker or performer, is my object. The fact that the expression and quality of original renditions and interpretations are often greatly altered and sometimes obliterated in the processes of transmitting, broadcasting and receiving constitutes not only one of the great annoyances to the radio receiving public but constitutes also one of the greatest drawbacks to the general patronage of radio by lovers of music. I claim for my invention that it eliminates this annoyance and this drawback to a very large extent, if not completely.

The method consists in the faithful development of the interpretation of the performer in the sound produced at the receiving station (which may be appropriately called a secondary rendition) through the manipulation of expression, quality, etc., at the producing, transmitting or broadcasting stations or any or all of them, synchronously with the primary rendition by the performer or performing apparatus and irrespective of the interpretation of the primary rendition. It contemplates the communication to the primary performer or other person having control of the aforesaid manipulations, of a secondary rendition identical with or closely correlative to the secondary rendition of receiving stations, and through the performer or other party so communicated with, synchronously altering the primary rendition or its transmission or its broadcasting or any or all of them comprising the broadcasting train, to produce with fidelity the performer's interpretation of the selection in the secondary rendition. It contemplates further the exclusion of the sounds of the primary rendition partly or wholly from the performer or other person or both of them. It contemplates still further as a step preliminary to general broadcasting the production of a preliminary secondary rendition and the uniting therefrom or thereby of a revised score for the primary rendition which when followed by the performer will develop in the secondary rendition the interpretation desired.

The apparatus consists first of a means

for producing a secondary rendition. This means may be a receiver or loud speaker connected with the detecting, transmitting or broadcasting circuits or apparatus or any or all of them at an appropriate point or points, or it may comprise a wireless receiving set responsive to the waves broadcasted, and either received from a point local to the producing, transmitting or broadcasting stations or any of them or received from a distant point by wire or other appropriate means of transmission. It comprises further the detecting, transmitting and broadcasting apparatuses and the usual and any special controls for the same. These controls include means for both clarifying and modifying expression and quality of the secondary rendition through variation of electrical effects within the apparatuses themselves. By special controls these effects can be added to or subtracted from, and it is contemplated that synthetic effects shall be produced by some of them. The invention comprises further a means for soundproofing the performer or other desired person from the sounds of the primary rendition. This means may be receivers of the helmet type of soundproof wireless head sets designed for the use of aviators and others operating telephone or telegraph equipment in regions where interfering noises are encountered. Or this means may be either a cabinet or room with soundproof walls or a location sufficiently distant from the primary sound producing instrumentality to remove the performer from the primary sounds. Still further it comprises a primary sound producing instrumentality adapted to make the primary rendition, and controls for the same. These controls and the controls of the detecting, transmitting and broadcasting apparatuses are associated together for manipulation by the performer alone or by one or more performers in duet or by a performer and some other person. In the case of permanently correlated or coordinated effects, the control elements thereof in addition to being associated together are actually interconnected or interlocked so that the operation of the controls of the primary sound producing instrumentality to bring about a change in the energy produced thereby will effect also operations of the controls of the detecting, transmitting or broadcasting apparatuses which operations will supplement or augment the effects of the primary con-

trols. Lastly there is a rewritten score setting forth that revised primary rendition and its electrical modifications which when broadcast will produce a secondary rendition faithful to the interpretation of the performer.

The operation should be apparent from the foregoing but consider for example particular embodiments shown in the drawings.

Of the drawings, Fig. 1 is a perspective illustrating application of the invention to broadcasting from a pipe organ.

Fig. 2 is a sectional elevation of a similar application.

Fig. 3 is a front elevation of a pipe organ console with associated broadcasting apparatus controls.

Fig. 4 is a similar view of another embodiment; and

Fig. 5 is a perspective illustrating the application of the invention to the broadcasting of orchestral music.

Referring first to Figs. 1-4, this embodiment comprises a primary sound producing instrumentality comprising a pipe organ 10, means for controlling this organ comprising the console 11 with its keys, complement of stops and control appurtenances, means for broadcasting comprising the sensitive transmitters 12 placed at appropriate points in the organ or studio, transmitting circuits, and the wave broadcasting apparatus *per se* (not shown), controls for the same including the usual means for modifying the transmitted and broadcast waves in frequency, amplitude, form, etc., which latter control means (indicated symbolically by galvanometer or milliammeter 13 and rheostat 14) is located at the console or built into the same (Fig. 3), and which still further is or may be actually interconnected and interlocked with the same (as for example in Fig. 4 the swell pedal 15 with the volume control 14 of the broadcasting apparatus in such manner as to control against "blasting" when the swell is operated), means for communicating to the performer the secondary rendition in the form of the usual wireless receiving set 16 tuned to receive from the broadcasting apparatus aforesaid and equipped with head set receivers 17, and means for the removing of the performer from the sound of the primary rendition comprising a sound-proof helmet 18 carrying the receivers. All of the apparatuses being properly attuned and in operation, the performer dons the soundproof receiving helmet 18 carrying receivers 17 and manipulates his controls (either the console controls or the broadcasting controls or both of them) not to produce his interpretation in the primary rendition, but to produce his interpretation in the secondary rendition which rendition he hears and is guided by to the exclusion of the primary one. The excel-

lence born of the soul of the musician instead of being confined to the studio is thus translated with fidelity to the great radio audience.

In Fig. 2 there is illustrated the application of a soundproof cabinet 19 instead of the soundproof helmet 18, and a loud speaker 20 in the cabinet instead of receivers 17. The cabinet 19 encloses the console 11, but the organ pipes are all outside of it. Either the receivers 17 or the loud speaker 20 may be connected with the transmitting or broadcasting circuits in lieu of wireless receiving set 16.

In the application to broadcasting of orchestral music shown in Fig. 5 the conductor of the orchestra (who is as respects his orchestra a performer) occupies a soundproof cabinet 19 containing a loud speaker 20. In lieu of the loud speaker the soundproof (or other) helmet 18 and receivers 17 may be used. With both the cabinet and the helmet the shutting out of the primary rendition is most complete. The cabinet 19 in this case has its upper portion entirely of glass so that the range of visibility equals or exceeds at all times the angular range occupied by the orchestra.

The broadcasting controls symbolized by elements 13 and 14 (those usually watched and manipulated by the broadcasting operator or duplicates of them) are or may be within the cabinets 19. If desired in any special case the entire broadcasting control panel may be located near the performer or within the soundproof cabinet.

In some instances the alteration of the score and the resulting primary rendition to give most perfect secondary rendition though important may be comparatively small, but in other instances it may be comparatively large involving not only changes in expression and quality but also changes of pitch. As a preliminary step therefore the performer may use the preliminary step of my invention which involves the production of a secondary rendition correlative with that at receiving stations as by connecting a loud speaker in the detecting or transmitting circuits and as a result of preliminary playing writing a score for the primary rendition which when followed will produce the secondary rendition he desires. This score when followed by any operator will give the secondary rendition of the original performer, and my invention contemplates the production of such scores for general radio broadcasting use. So an operator may become a performer.

With the detecting, transmitting and broadcasting controls embodied in the console the performer becomes to that extent also a broadcasting operator. This is as it should be. While most perfect results are to be produced in this manner yet so close

is the coordination between one musical performer and another that a second performer, or an operator capable of correctly interpreting music or of reading music or musical score, can operate the controls synchronously or in duet in perfect musical time with the first performer and produce substantially the same result whether they be located side by side or distant from each other, provided only he hears and is guided by the secondary rendition. Such an operator also becomes a performer.

The modifications of which my invention is possible are many. Some of them have been indicated herein. There are many which have not been mentioned as for example the substitution of an automatic player for the performer, of the human voice for the primary instrument, etc. No matter what these may be if they are comprehended within the generic spirit of my invention it is my intention that the annexed claims cover them.

What I claim is:—

1. The method of broadcasting which consists in effecting a primary rendition to be broadcast, synchronously translating the energies thereof through the broadcasting train into a secondary rendition, also substantially synchronously with the primary rendition varying the energies of the broadcasting train to produce primarily a perfect secondary rendition, and the while preventing the energies of the primary rendition from being acoustically transmitted to the renderer.

2. The method of broadcasting which consists in effecting a primary rendition to be broadcast, synchronously translating the energies thereof through the broadcasting train into a secondary rendition, also substantially synchronously with the primary rendition varying the energies of the broadcasting train to produce primarily a perfect secondary rendition, the while preventing the energies of the primary rendition from reaching the renderer, and communicating to him the secondary rendition exclusively.

3. The method of broadcasting which consists in effecting a primary rendition to be broadcast, synchronously translating the energies thereof through the broadcasting train into a secondary rendition, and also

substantially synchronously with the primary rendition but guided solely by the secondary rendition varying the energies of the broadcasting train to produce primarily a perfect secondary rendition.

4. A broadcasting apparatus comprising a primary sound producing instrumentality, control means for the same, a secondary sound producing instrumentality coordinated with the primary one, and means to communicate the secondary sounds to an operator of the control means to the exclusion of the primary sounds.

5. A broadcasting apparatus comprising a primary sound producing instrumentality, control means for the same, a secondary sound producing instrumentality coordinated with the primary one, and a structure proof against the primary sounds arranged to acoustically insulate the operator and the secondary instrumentality from said primary sounds.

6. A broadcasting apparatus comprising a primary sound producing instrumentality, control means for the same, a secondary sound producing instrumentality coordinated with the primary one, and a sound proof helmet for the operator of said control means containing said secondary instrumentality and arranged to exclude the primary sounds from the hearing of the operator.

7. A broadcasting apparatus comprising a primary rendering device, controls for the same, a transmitting and broadcasting equipment, and controls for the same interconnected with the controls of the primary rendering device for correlated operation.

8. A broadcasting apparatus comprising a primary sound-producing instrumentality, control means for the same, a secondary sound-producing instrumentality coordinated with the primary one, and a structure acoustically segregating the primary and secondary sounds, and separating acoustically also both the performer operating the primary instrumentality from the primary sounds and the agency of translation of the primary from the secondary instrumentality.

In testimony whereof he hereunto affixes his signature.

ARTHUR H. MARKS.