

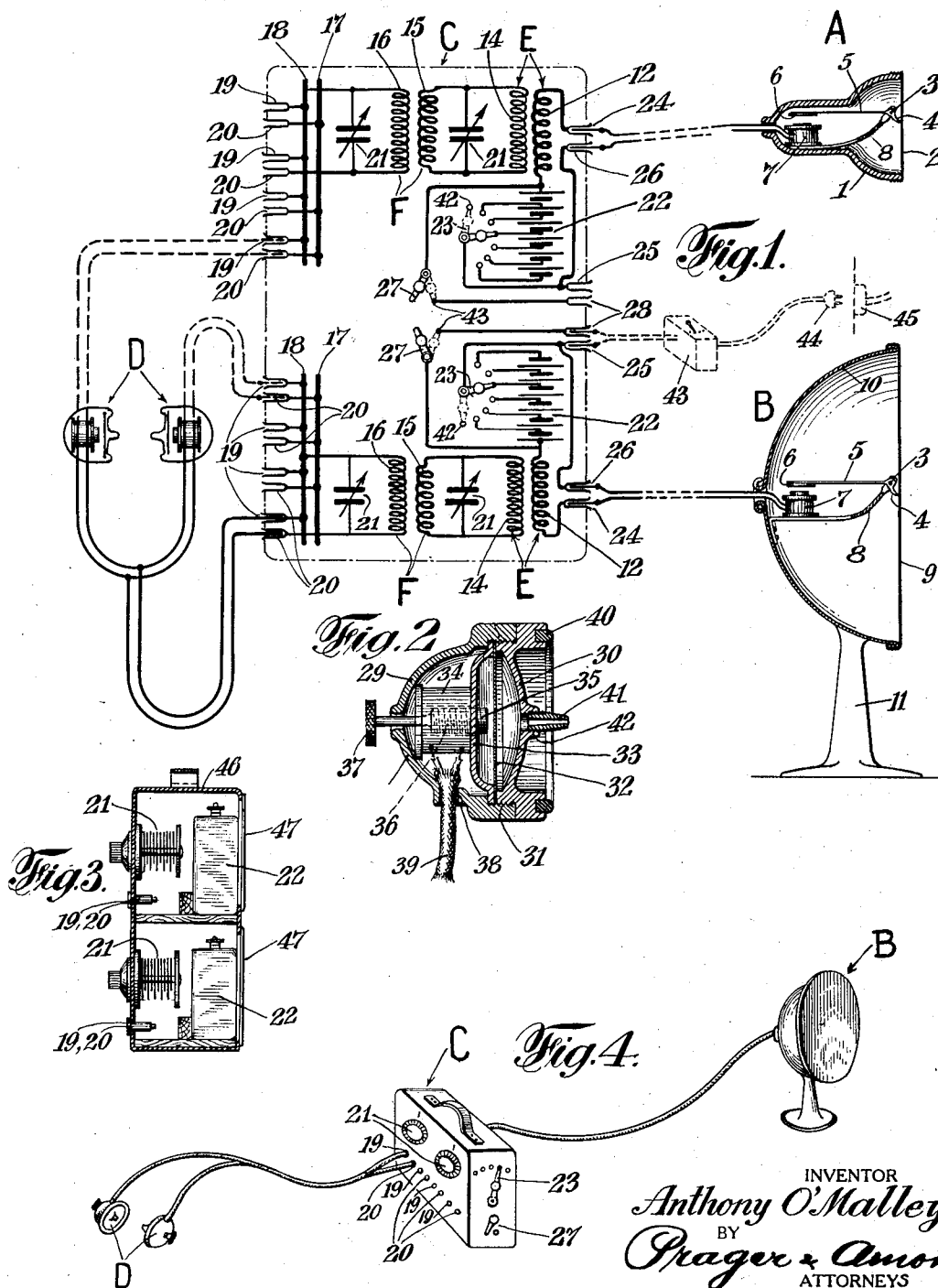
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MULTIPLE STETHOSCOPIC SOUND DETECTOR

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MULTIPLE STETHOSCOPIC SOUND DETECTOR.

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My invention relates to improvements in sound detectors of the stethoscopic type, and the objects of this invention are as follows:

5 First: To produce a supersensitive stethoscopic sound detector which by the nature of its design permits the reception and transmission of a number of sounds at one and the same time.

10 Second: To arrange a stethoscopic sound detector in such manner as to permit a number of persons to listen at one and the same time.

15 Third: To provide means, within the stethoscopic sound detector, to transmit and magnify the sounds.

20 Fourth: To provide intermediate electrical sound amplification and regulating means so that any desired degree of amplification may be obtained.

Fifth: To provide means in a sound receiver to exclude all other sounds except those admitted, from entering the ears of the listeners.

25 Sixth: To provide exact adjusting means in a sound receiver, to regulate and control the sound transmission and also individually adjust the sound conducting tubes entering the ears of the listeners.

30 Seventh: To so design a supersensitive stethoscopic sound detector as to permit not only the detection of sounds upon the human body, but also to detect and amplify seemingly hallucinatory or natural sounds heard by one person and not by another.

35 The invention consists of the novel combination, construction and arrangements of various elements and parts, as fully described in this specification and shown in the accompanying drawing in which:

40 Figure 1 represents a diagrammatical arrangement of a stethoscopic sound detector.

Figure 2 is an enlarged sectional side elevation of the sound receiver.

45 Figure 3 represents a sectional view of a portable sound amplifying and regulating cabinet.

50 Figure 4 is a perspective view of a complete stethoscopic sound detecting equipment for the purpose of detecting hallucinatory sounds.

55 In the diagram (Figure 1) all the principal elements comprising such a stethoscopic sound detector are clearly shown and described hereafter. The principal elements consist of

1. The stethoscopic sound detectors "A" and "B."

2. The electrical sound amplifying control and regulating equipment "C."

3. The sound receivers "D."

1. The stethoscopic sound detector.

The preferred design of a sound detector for use upon human bodies is indicated by 65 letter "A."

This receiver consists of a shell 1, a suitable diaphragm 2, mounted upon the bell shaped receiver end of shell 1.

A sensitive and delicately adjusted vibration multiplying lever, consisting of the short lever-arm 4, engaging diaphragm 2, and the long lever arm 5, carrying a thin metal disk 6, made of magnetic material and playing in the magnetic field of a suitable electromagnet 7. 75

The multiplying lever 4 and 5 is pivoted at 3 upon a suitably supported bracket 8.

Letter "B" indicates the preferred design of a sound detector for the detection of 80 sounds of hallucinatory nature. For this purpose, a much larger and more sensitive diaphragm 9, is mounted upon an accordingly enlarged shell 10, preferably mounted upon a pedestal 11. The vibrating multi- 85 plying arrangement and its functioning is principally alike to the one described for the sound detector "A."

2. The electrical sound amplifying control and regulating equipment. 90

This equipment indicated by letter "C" is of the multiple type, and designed for the detection of different sounds at the same time, as frequently required in diagnosing 95 diseases in the human body. An inductive transformer "E" consisting of a primary coil 12, a secondary coil 14, connected to the primary coil 15 of another inductive transformer "F" whose secondary coil 16, 100 is electrically connected to bus bars 17 and 18. These bus bars 17 and 18 are electrically connected to a series of connection plugs 19 and 20. Suitable capacity condensers 21, are interposed for regulating pur- 105 poses.

One leg of primary coil 12, is connected with connection plug 24, the other leg is connected in series with a number of electric dry cells or storage batteries 22, the 110 individual cells of which are connected to the contact buttons of a selector switch 23,

the pivot hub of which connects to connection plug 25 and 26. A switch 27 is interposed and electrically connected to primary coil 12 and connecting plug 28.

3. The sound receivers.

The sound receivers indicated by letter "D" consist of a bell shaped body 29, see also Fig. 2, a suitably shaped cover piece 30, preferably fastened to body 29, by means of a screw thread 31. Body 29 and cover 30 are so designed as to tightly clamp and hold a magnetic diaphragm 32, and a supporting disk 33, upon which a suitable electrical magnet 34, is fastened. The core 35, of this magnet is provided with a very fine thread 36, so it may be adjusted into the proper position relative to the diaphragm 32. A stem and knob 37, attached to core 35, is provided to facilitate the adjusting of core 35. A suitable opening 38, in body 29 is arranged to permit the entrance of the electrical conductor 39.

A suitable cushion ring 40, permanently mounted upon the outer rim of cover 30, is provided to exclude any interfering sounds, when brought into engagement with the ear of the listener. An ear tube 41, intended to enter the ear channel of the listener is so arranged as to permit individual adjustment or replacement, by means of an adjustment thread 42.

Functioning of the sound detector.

In case it is desired to utilize the equipment for stethoscopic purposes, to detect different sounds at one and the same time within the human body, two stethoscopic sound detectors of the type indicated by the letter "A" are to be connected to plugs 24 and 26, (the second sound receiver replacing receiver "B").

The sound receivers "D" are to be individually connected to plugs 19 and 20, as indicated in dotted lines. When sound detectors "A", are placed upon different parts of the human body, the sound waves cause the diaphragms 2 to vibrate; this vibration is transmitted to the multiplying lever 4, whose longer arm 5, carries the magnetic disk 6, which disk is forced to vibrate in the magnetic field of an electro magnet 7, in which inductive currents are created (by the vibrations) and transmitted to the primary coil 12, of the amplifying transformer "E". This primary coil 12 of the transformer is connected to a battery 22, whose individual cells are connected to a selector switch 23, for the purpose of increasing or diminishing the strength of the inductive currents transmitted to primary coil 12, by adding on or taking off any desired number of individual cells. The secondary coil 14, of amplifying transformer "E" carries the increased inductive currents into the

primary coil 15, of the second amplifying transformer "F", whose secondary coil 16 is connected to bus bars 17 and 18, to which the individual connection plugs 19 and 20, are connected. The still further increased inductive currents are then transmitted to the sound receivers "D" whose magnet 34 will be energized by these currents and thus correspondingly induces the magnetic diaphragm 31 (Figure 2) to vibrate and thereby reproducing the amplified sounds of detectors "A". Suitable variable condensers 21, are interposed between the transformer coils for capacity regulating purposes.

It is frequently desirable to be able to utilize the existing phone or other outside circuits, to energize the detector and transformer primary circuit. For this purpose selector switch 23, is positioned upon the dead contact 42, as indicated in dotted lines, thus disconnecting the battery 22 entirely, and switch 27, is placed upon contact 43, also indicated in dotted lines, then connection is made from connection plugs 25 and 28, to a suitable rheostat 43 and from there to a connection plug 44, and receptacle 45, connecting with the outside circuit.

To detect hallucinatory or natural sounds, as sometimes conceived by one person yet inaudible to others, a much more sensitive sound detector must be provided. For this purpose a diaphragm of very large area is utilized as shown, and indicated by letter "B". All other points and functions are the same as described previously, the only difference being that only one set of amplifying equipment is used and the sound receivers are connected as shown in full lines.

Figure 3 illustrates a practical application of the multiple type of sound amplifying equipment built into a portable case 46, in which suitable doors 47, are provided for the purpose of inspection and replacements.

In Figure 4 a single set of sound amplification equipment is illustrated. This represents the preferable arrangement for hallucinatory sound detection.

Having thus fully described my invention, I do not wish to limit myself to the exact construction as shown; it being apparent that there may be considerable variations in using the principles of amplification, sound vibrating multiplication or sound transmitter adjustment, without departing from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent is:

1. In combination a plurality of stethoscopic sound detectors, a plurality of suitable electrical sound amplifiers, suitable electrical means to connect said sound amplifiers with a plurality of stethoscopic sound detectors, and a plurality of independently arranged electrical selector means to connect said sound amplifiers with a plu-

ality of individual sound receivers, substantially as set forth.

2. In a stethoscopic sound detector, the combination of a plurality of electric sound amplifiers, electrical regulating and controlling means for said sound amplifiers, suitable electrical connecting means for attaching or detaching a plurality of stethoscopic sound detectors, independently arranged

electrical selector means for each electric sound amplifier, and a plurality of suitable electrical connecting means to collectively attach or detach a plurality of individual sound receivers, substantially as set forth. 10

Signed at city of New York in the county of New York and State of New York this 2nd day of August A. D. 1924. 15

ANTHONY O'MALLEY.