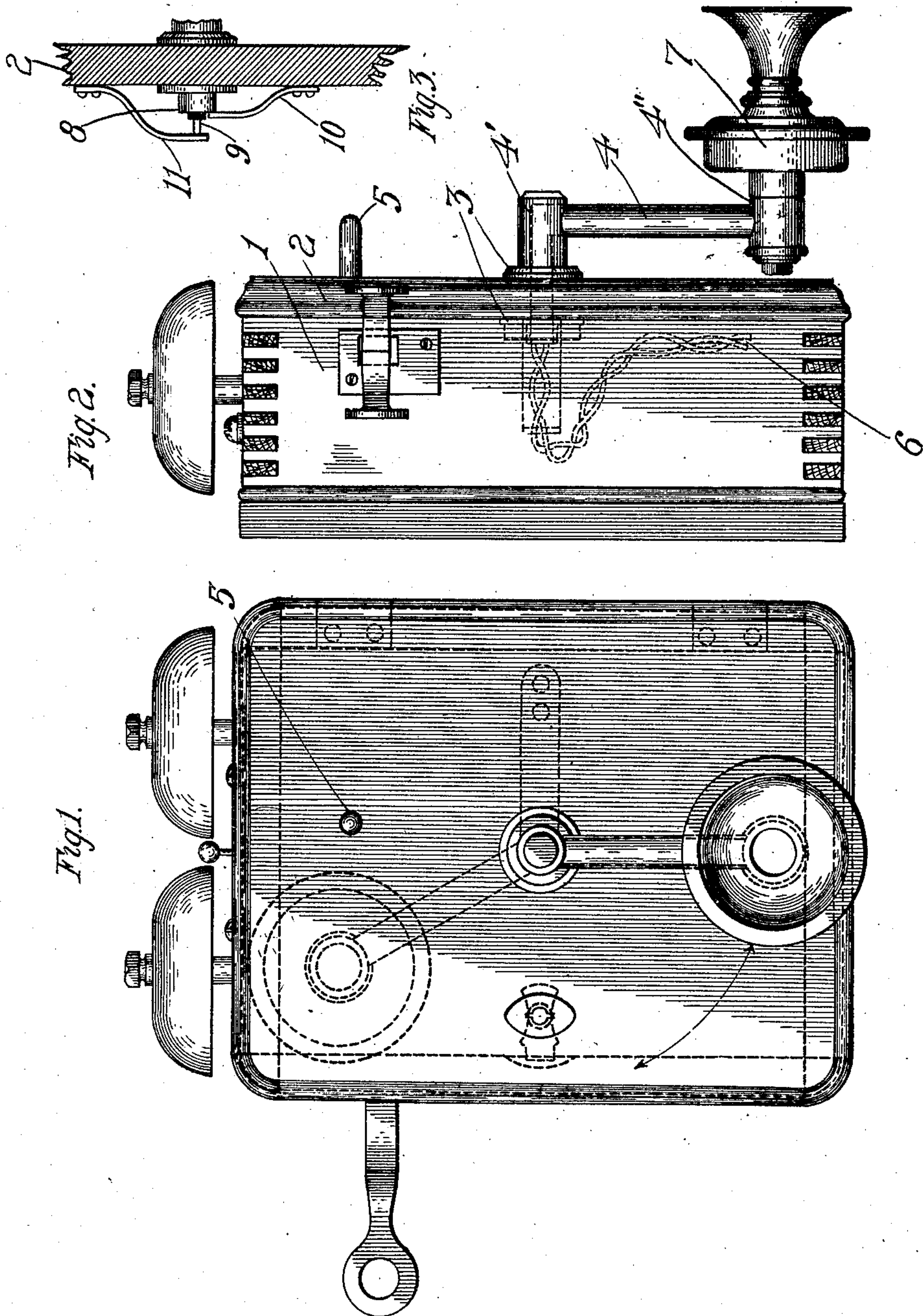


W. AITKEN.  
TELEPHONE INSTRUMENT.  
APPLICATION FILED MAR. 1, 1909.

985,120.

Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.



Witnesses:

David S. Lufish  
Wm Bergahn.

Inventor

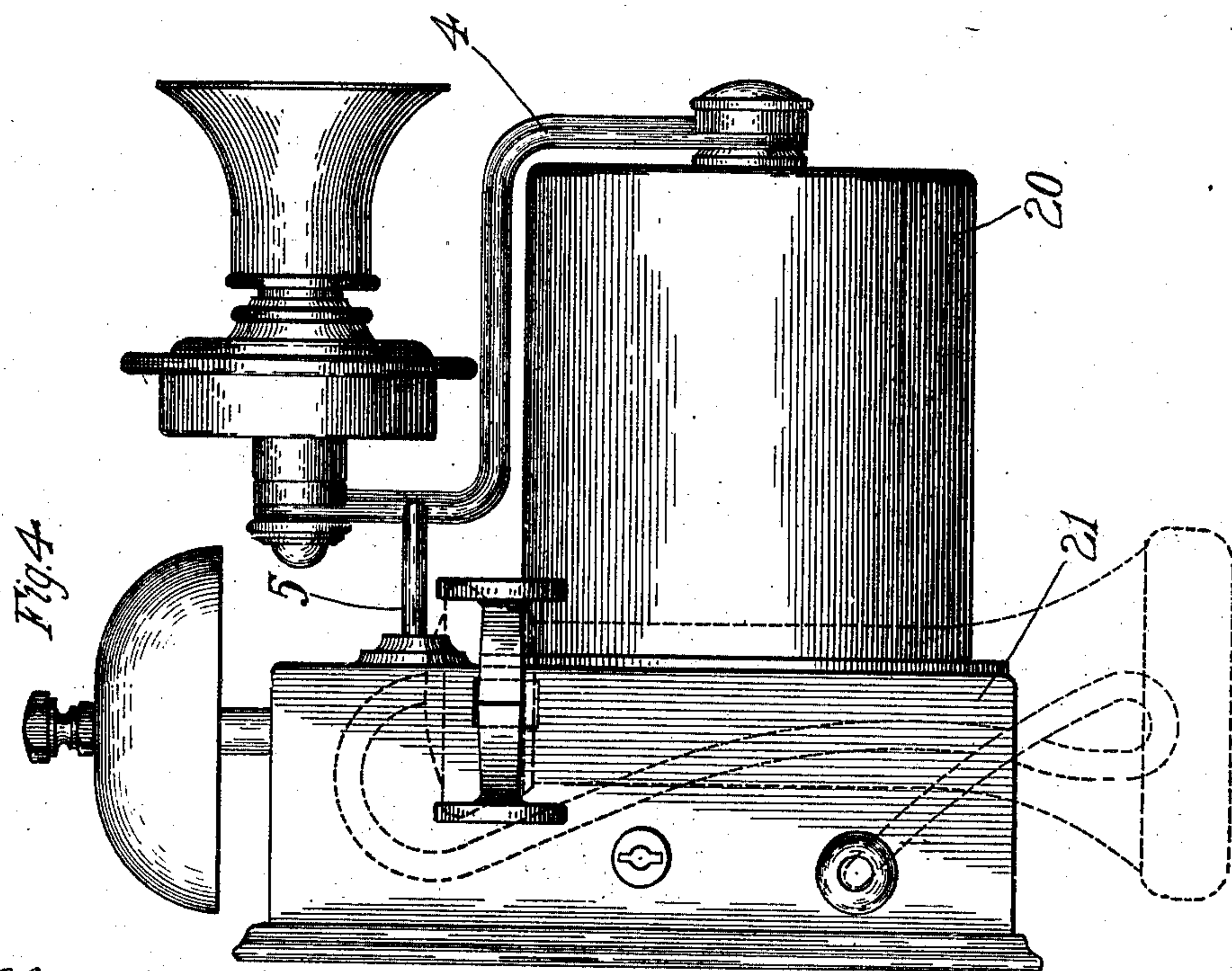
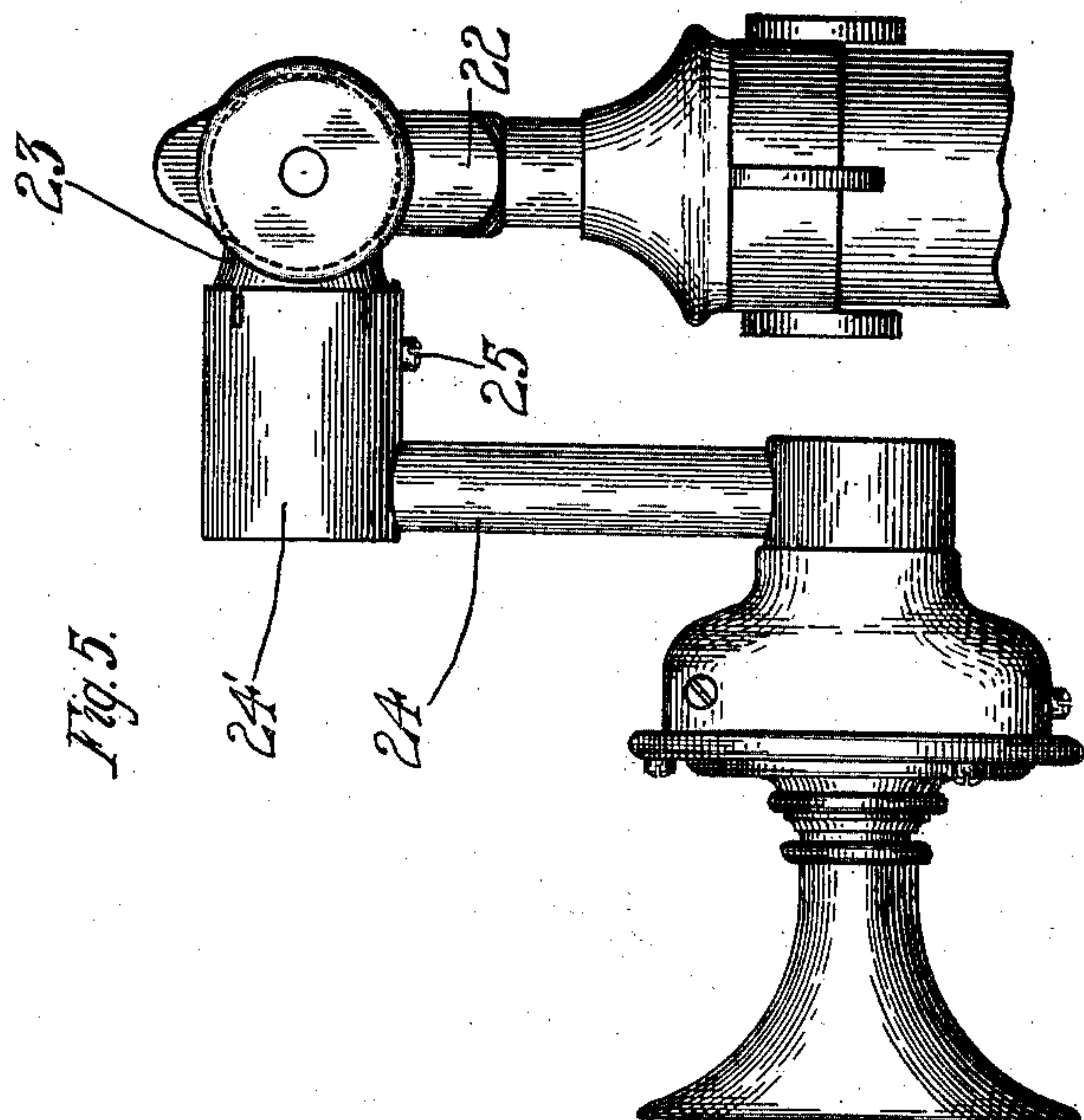
William Aitken  
By McQueen & Miller,  
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2 SHEETS—SHEET 2.



Witnesses

David S. Kullfish

Wm. Berghahn

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# UNITED STATES PATENT OFFICE.

WILLIAM AITKEN, OF LIVERPOOL, ENGLAND.

TELEPHONE INSTRUMENT.

985,120.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed March 1, 1909. Serial No. 480,615.

*To all whom it may concern:*

Be it known that I, WILLIAM AITKEN, a subject of the King of England, and a resident of Liverpool, England, have invented a new and useful Improvement in Telephone Instruments, of which the following is a specification.

My invention pertains to telephone instruments having an adjustable transmitter support, and I provide means for adjusting the transmitter to any desired height within predetermined limits, the means being at the same time adapted to preserve the perpendicular plane of the transmitter diaphragm in all of its possible positions of adjustment. I accomplish the result desired by using a pivoted arm moving in a plane substantially parallel to the plane of the diameter of the transmitter.

In the instruments in general use, the transmitter arm is hinged so as to move in a vertical plane at right angles to the face of the instrument, the arm being hinged at a point on or near the backboard of the instrument. The rise and fall of such an instrument is limited, first, because the arm must not be too long or it will project too far in front of the other parts of the instrument and so be objectionable and a source of danger to passers by, and second, because the radius being comparatively short, the arc of a circle described by the transmitter will, if unduly extended, throw the diaphragm of the microtelephone beyond the angle of maximum speaking efficiency. In my improved telephone set, the angle of the diaphragm is not changed by the movement of the transmitter, and I limit the motion of my transmitter preferably to such positions as will not obstruct the convenient operation of other parts of the telephone apparatus. The range of vertical movement is a dimension determinable wholly in manufacture, and does not affect the diaphragm angle.

My invention is illustrated by two sheets of drawings, in which—

Figures 1 and 2 show front and side elevations respectively of a compact wall set of box type, having as a part thereof a transmitter adjustable in accordance with my invention. Fig. 3 shows a modification in the manner of carrying conductors to the

transmitter. Fig. 4 shows a further detail of improvement, in which an induction coil case is combined with the transmitter support; and Fig. 5 shows detail of a modification for attachment to a portable desk telephone and involving my invention.

Referring to Figs. 1 and 2, the box 1 is of the usual type with a swinging door 2; upon the door a bushing 3 is inserted, within which is journaled the tubular transmitter 4. In Figs. 1 and 2, this transmitter arm is shown built up of three structural parts, viz., the radial tube 4 with the end parts 4' and 4''. The part 4' is journaled within the bushing 3, and the part 4'' is adapted to receive a transmitter of any well-known type. A stop 5 upon the door 2 is adapted to interfere with the movement of the arm 4, to prevent continuous revolution of the arm, which would twist injuriously the flexible cords 6, which are the flexible conductors connecting the transmitter 7 into the circuit of the telephone set. Two stops, such as 5, may be installed in door 2, if desired, to limit the movement of the transmitter arm to 180 degrees, which is sufficient to secure its maximum vertical movement.

In Fig. 4, the transmitter arm 4 is bent at an angle in two places, so that the plane of the transmitter diaphragm is maintained perpendicularly to the axis of rotation, and the shape of the arm is modified to bring the transmitter into a more desirable position with reference to the cylindrical box 20. It is obvious that the arm 4 may be of any shape, the sole requirement of my invention being that the axis of rotation be substantially perpendicular to the plane of the transmitter diaphragm. In this statement, the expression substantially perpendicular is used to distinguish from the customary relation of axis and diaphragm plane, which is relative parallelism. Attention is called to the fact that exact perpendicularity of the transmitter plane and the axis is merely a theoretical requirement, and that a variation within the limits of a small angle, say 10 degrees, on either side is negligible for practical purposes. The maximum variation in my device need not be larger than the inaccuracies of skilled workmanship. In Fig. 4, the cylindrical case 20 is provided to contain an induction



coil and condenser of cylindrical or tubular form, the size of the box 21 being subject to reduction by reason of placing a portion of the apparatus upon the front thereof and within the space required for revolution of the transmitter 7 of Fig. 2. It will be seen, therefore, that a more compact telephone set is possible with the construction of Fig. 4. A stop 5 may be placed upon the device of Fig. 4.

In Fig. 5, I show a transmitter arm of my invention reduced to the form of an attachment for portable telephone set. In this figure, 22 is the top of an ordinary desk stand, 23 is at the same time a lug to be clamped by the part 22 and a cylindrical stud upon which the arm 24 may revolve. Screw 25 is a retaining screw, holding the part 24 upon the part 23 loosely and rotatively, and the equivalent of the stop 5 of Fig. 2 may be placed within the cylindrical portion 24' to perfect engagement between parts 24' and 23, to limit the angular movement of the arm 24. In the device of Fig. 5, the circuit may be carried by flexible cords, as in Fig. 2, or by the device of Fig. 3, which may be included within the enlarged hub 24', modified in unimportant mechanical details, as required by the restricted space.

The advantages of telephone sets fitted with the transverse radial transmitter arm of my invention are that the transmitter does not project in an objectionable manner beyond the face of the instrument, as is the case when a long transmitter arm of the usual type is used, and that a maximum desirable rise and fall may be obtained without causing the plane of the diaphragm of the transmitter to depart objectionably from the vertical, as is the case with transmitter arms of the usual type where the customary long arm is not used.

In Fig. 3, an alternative method of connecting the conductors of the radial transmitter arm is shown. In this figure, one of the conductors from the transmitter 7 terminates upon a conducting collar 8 within the door 2, and the other conductor terminates upon a central insulated pin 9. The collar 8 and pin 9 are mounted upon a movable part 4', which moves with the radial arm carrying the transmitter. Fixed contacting springs 10 and 11 rest in contact with the two conducting parts 8 and 9, and serve as stationary brushes to connect to the moving conductors of the transmitter and transmitter arm. Circuit conductors are connected to the parts 10 and 11. By this modification, flexible conductors are not used, and furthermore, the angle of movement of the transmitter arm need not be limited by the stop 5, or any similar device.

The feature of the double flexible conduc-

tors 6 may be reduced to a single conductor by using the framework of the arm 4 as one of the conductors, the remaining conductor being carried within or upon it.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. In a telephone set, a cylindrical case forming a portion of the telephone set and a rotatable transmitter arm pivotally mounted to rotate upon the axis of said cylindrical case, substantially as described.

2. In a telephone set, a cylindrical case forming a portion of the telephone set and a rotatable transmitter arm, pivotally mounted, to rotate upon the axis of said cylindrical case, said transmitter arm being bent rearwardly, and again outwardly, so that its end lies to the rear of the front plane of the cylindrical case, substantially as described.

3. In a telephone set, a cylindrical casing; and a pivoted transmitter arm partially surrounding the same and pivoted upon the axis thereof, substantially as described.

4. In a telephone set, a fixed cylindrical casing; a transmitter arm partially surrounding the same and pivoted co-axially with said casing, substantially as described.

5. In a telephone set, a cylindrical case forming a portion of the telephone set and a rotatable transmitter arm, pivotally mounted, to rotate upon the axis of said cylindrical case, and holding its transmitter with the diaphragm perpendicular to the axis of the transmitter's movement, substantially as described.

6. In a telephone set, a cylindrical case forming a portion of the telephone set and a rotatable transmitter arm, pivotally mounted, to rotate upon the axis of said cylindrical case, said transmitter arm being bent rearwardly, and again outwardly, so that its end lies to the rear of the front plane of the cylindrical case, and so that the diaphragm of the transmitter is maintained within zero or negligible variations from a vertical plane, substantially as described.

7. In a telephone set, a cylindrical casing; a pivoted transmitter arm pivoted concentrically with the axis of the cylinder and partially surrounding the same and adapted to carry its transmitter with its diaphragm constantly within negligible angular variations from the perpendicular, substantially as described.

8. In a telephone set, a fixed cylindrical casing; a transmitter arm partially surrounding the same and pivoted co-axially with said casing, and a fixed stop limiting the angular movement of the pivoted arm, substantially as described.

9. In a telephone set, a receptacle, a bushed aperture centrally located in the



front portion of said receptacle, an arm  
shaped in the form of a double bell crank,  
one extremity of said arm being pivoted  
in said bushed aperture, and a transmitter  
5 rigidly mounted on the other extremity of  
said arm and having its diaphragm parallel  
to the plane of rotation of said arm.

Signed by me at Liverpool, in England,  
in the presence of two witnesses.

WILLIAM AITKEN.

Witnesses:

WM. PIERCE,

H. WILLIAMS.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."

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