

No. 891,233.

PATENTED JUNE 23, 1908.

C. L. CHISHOLM.
SOUND RECORDING APPARATUS.

APPLICATION FILED JULY 16, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

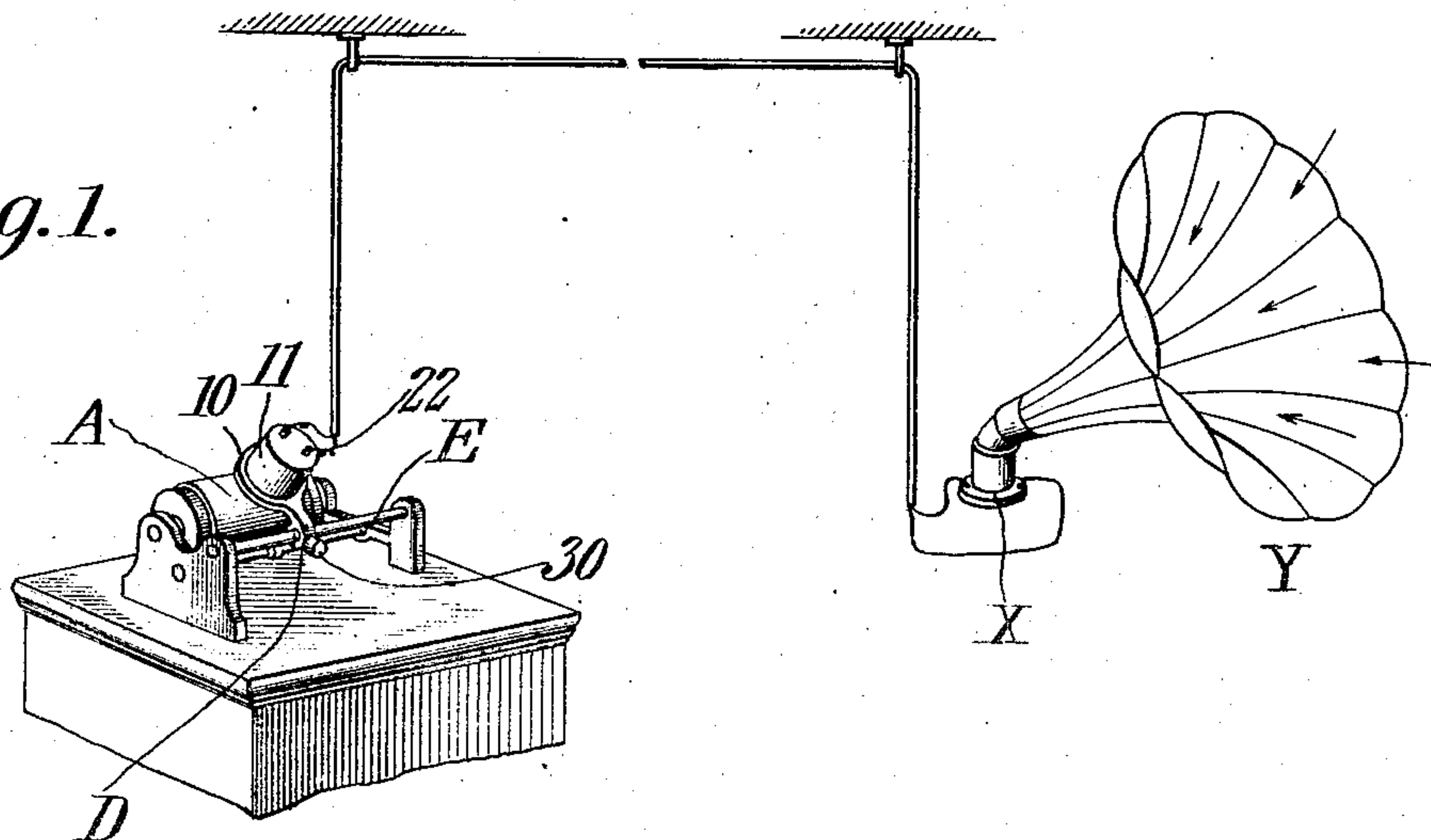
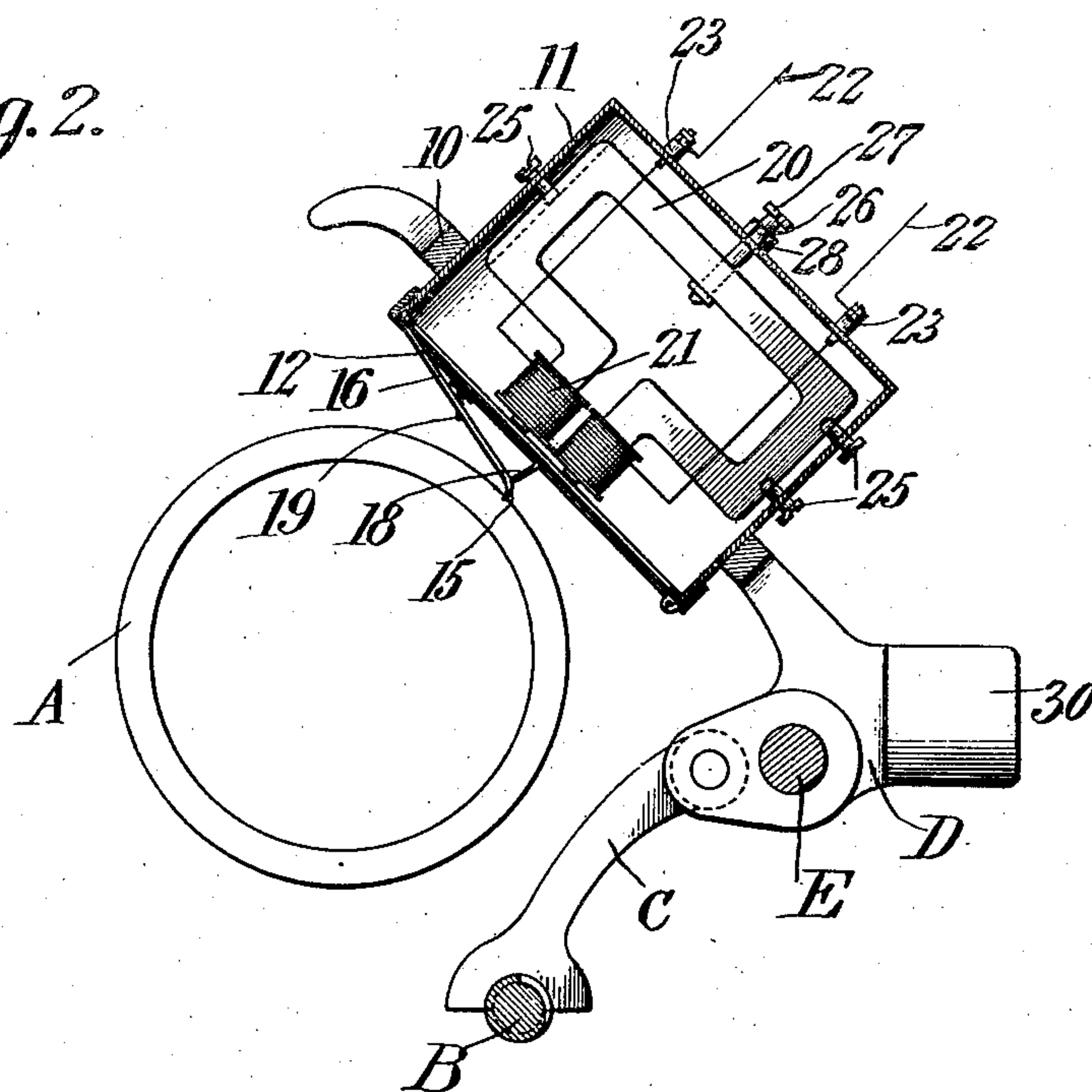


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

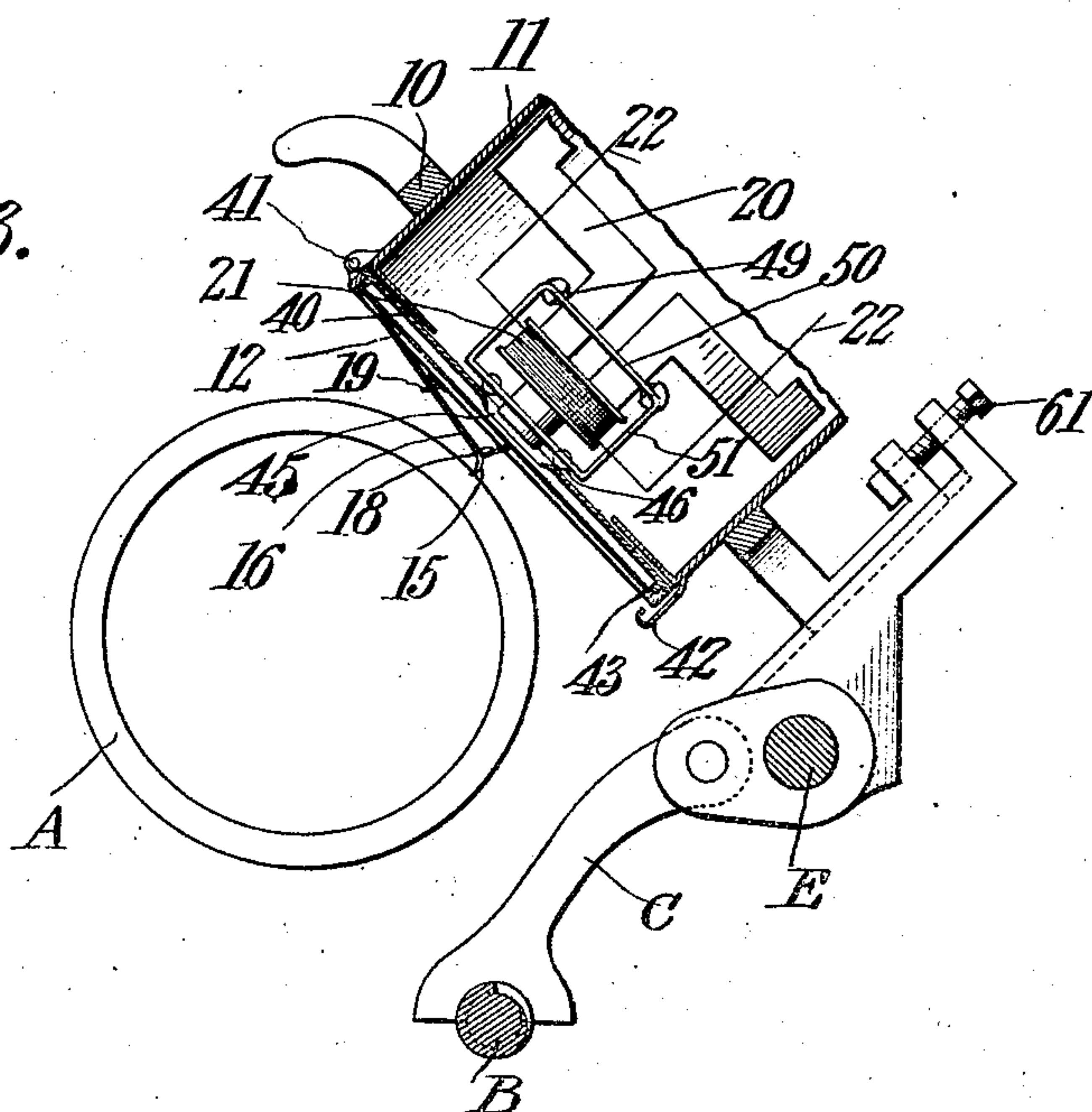


Fig. 4.

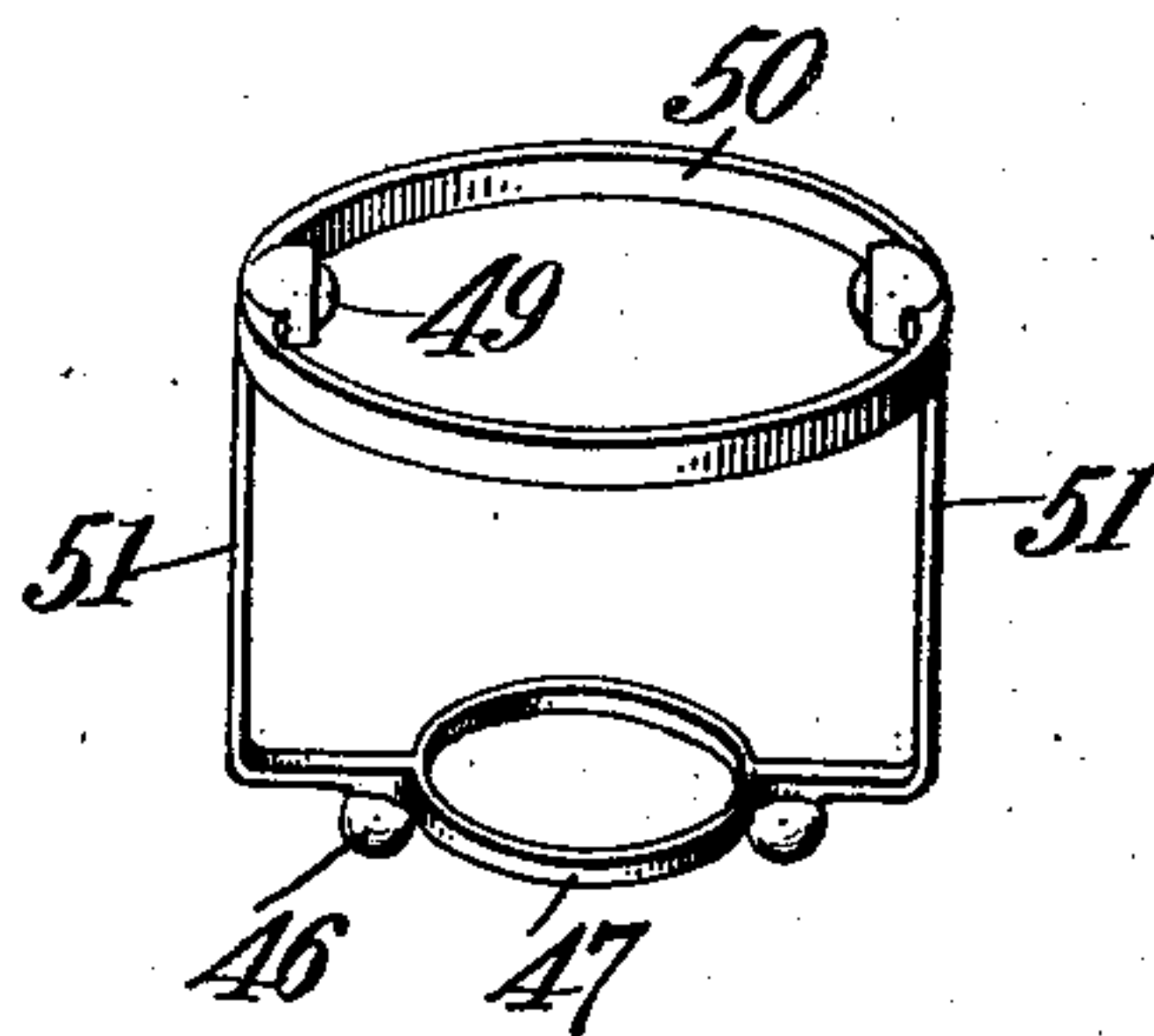
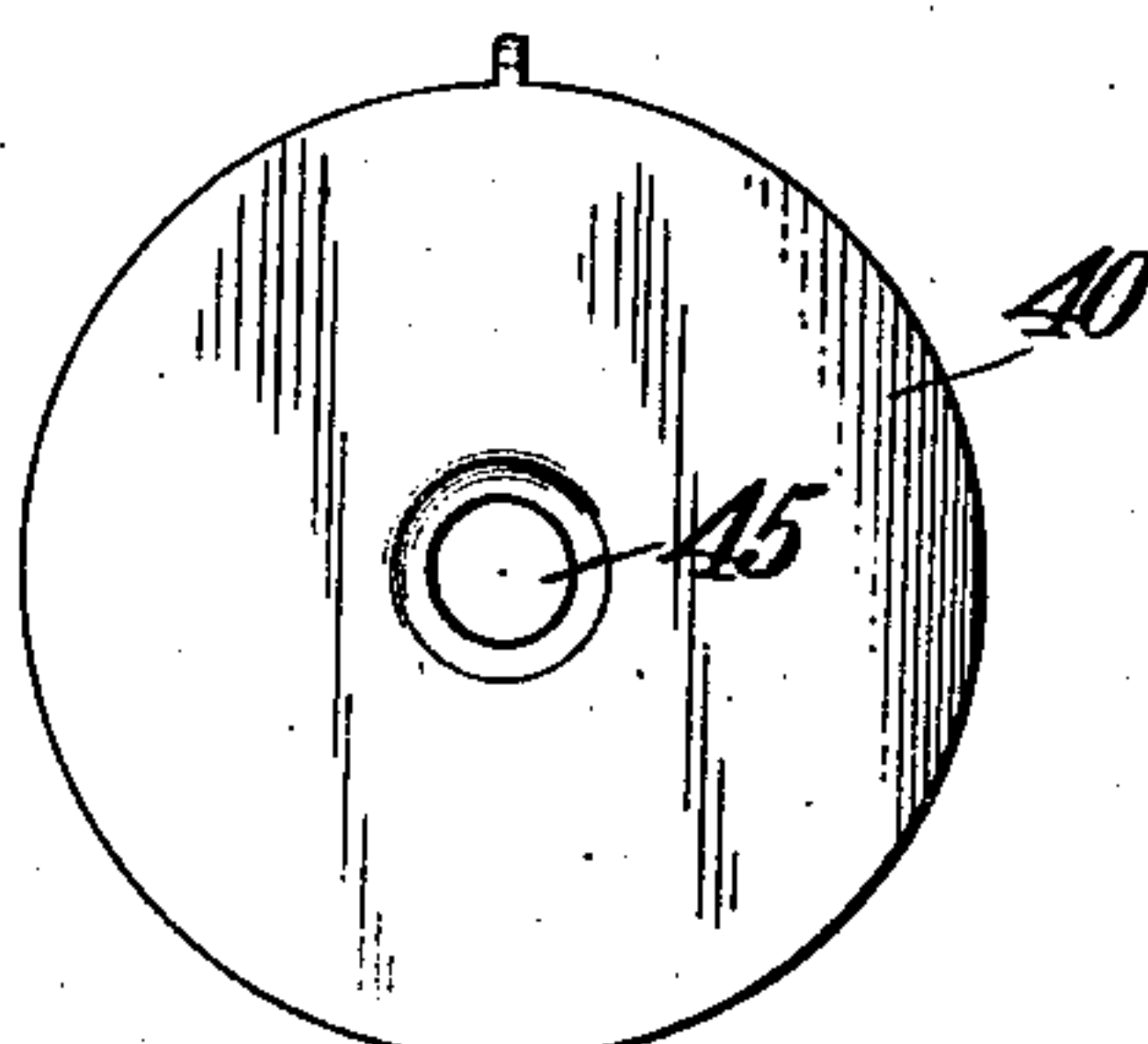


Fig. 5.



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SOUND-RECORDING APPARATUS.

No. 891,233.

Specification of Letters Patent.

Patented June 23, 1908.

Application filed July 15, 1907. Serial No. 383,761.

To all whom it may concern:

Be it known that I, CHARLES LOGAN CHISHOLM, a subject of the King of England, residing at Edmonton, Alta, Dominion of Canada, have invented a new and useful Sound-Recording Apparatus, of which the following is a specification.

This invention relates to apparatus of that class employed in recording the vibrations of a telephone receiver, and has for its principal object to provide a novel mechanism which may be applied to existing phonographs, graphophones, and similar sound recording machines at small cost.

A further object of the invention is to improve and simplify the construction and arrangement of the diaphragm, the recording stylus, and the electro magnet of the receiver.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a perspective view, partly in the nature of a diagram, illustrating a sound recording machine arranged to be operated from a distant transmitter. Fig. 2 is a cross sectional view of the recording mechanism. Fig. 3 is a view similar to Fig. 2, illustrating a modification of the invention. Fig. 4 is a detail perspective view of the counter-weight of Fig. 3 detached. Fig. 5 is an elevation looking from the rear of the diaphragm carrier.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In the drawings there is shown a portion of a phonograph, graphophone, or similar instrument, A being the record, B the screw shaft, C the nut carrying arm and D the pivoted sound box carrier, the carriage being supported by a rod E that is parallel with the screw shaft B.

The carriage is provided with an obliquely disposed arm 10 to which is secured a cylinder 11 that may be formed of any suitable

material, preferably aluminum, in order that the weight may be as small as possible. To the lower edge of the cylinder 11 is secured a diaphragm 12, the periphery of the diaphragm being secured to the cylinder in any suitable manner, and the diaphragm being formed of iron as is usual in telephonic receivers, or it may be formed of other suitable material and provided with a small iron armature.

The diaphragm is arranged to actuate a recording stylus 15, the stylus being secured to an arm 16 which may be fastened to the diaphragm. The stylus arm is provided with a projecting tongue 18 which engages with the central portion of the diaphragm and is held in contact therewith by a spring arm 19 which may be adjusted for the purpose of varying the degree of force exercised in keeping the stylus tongue and diaphragm in contact. Other forms of stylus, however, may be employed and the stylus may, if necessary, be soldered or otherwise secured directly to the diaphragm.

Mounted within the casing is a horseshoe magnet 20 and spool 21 that is connected by wires 22 to binding posts 23 at the outer closed end of the cylinder. The pole piece of the magnet is arranged adjacent to the center of the diaphragm, and the operation of the diaphragm is similar to that of an ordinary receiver.

In order to adjust the position of the magnet with relation to the diaphragm, screws 25 are employed at the side walls of the casing, these screws extending through into contact with the side bars of the magnet, while at the rear wall of the casing is an adjusting screw 26 having a knurled knob or handle 27 which may be turned for the purpose of effecting close adjustment of the electro-magnet with relation to the diaphragm, after which the electro-magnet may be locked in place by the screws 25 and a locking nut 28 on the screw 26.

It will be noted on reference to Fig. 2 that the center of gravity of the electro-magnetic sound box is but slightly to one side of the vertical plane of the axis of the supporting shaft 20, owing to the oblique position of the sound box. The weight, however, would be too great for ordinary purposes if imposed on the stylus, and in order that the pressure on the stylus may be reduced to correspond to that of an ordinary recorder, the sound box carriage is provided with a counter-weight

30, this weight being slightly less than that of the weight of the electro-magnetic sound box, so that the latter will be free to rise and fall as the recording operation progresses.

5 In order to avoid the necessity of moving the whole of the electro-magnetic sound box, the diaphragm may be separately supported, as shown in Fig. 3. In this construction a disk 40 is hingedly connected at 41 to one
10 edge of the cylinder 11, and at the opposite edge of said cylinder is a hook shaped stop 42 that limits the outward movement of the disk in the direction of the diaphragm. The disk is provided with an annular flange 43 in
15 which the diaphragm 12 is supported, and the diaphragm is arranged to actuate the stylus 15, it being observed in this case that the cylinder is held stationary on the carriage, while the diaphragm carrier is free to
20 move.

The diaphragm supporting disk 40 is provided with a central opening 45 in alinement with the pole piece of the electro-magnet, and bearing against this disk are a number
25 of weights 46 that are connected together by a sleeve 47 encircling the pole piece, but out of contact therewith. The weights are further guided by a pair of anti-friction balls 49 that bear against the parallel sides of the
30 magnet above the spool and are connected by a ring 50. The two rings 47 and 50 are connected together by a pair of bars 51, and the whole forms a weight of such nature as to maintain the stylus in operative position
35 without subjecting it to such pressure as might interfere with the recording operation. In this latter construction the diaphragm assumes a distance from the end of the pole piece corresponding to the diameter of the
40 recording cylinder, but this variation is not in itself sufficient to interfere with the proper operation of the device, especially where new recording cylinders are employed. After the cylinders have been shaved a number of
45 times, however, the distance between the diaphragm and the pole piece may interfere with the proper operation of the diaphragm and in such cases the cylinder is lowered. In order to accomplish this the cylinder sup-
50 porting arm of the carriage is preferably made in two sections, as shown in Fig. 3, and these are connected by an adjusting screw 61, so that the position of the cylinder may be accurately adjusted.

55 In connecting up the instrument, it is merely necessary to use an ordinary telephone circuit and in Fig. 1 there has been shown a transmitter X in front of which is a trumpet Y, which may be used where sound waves

from a piano or other instrument are to be 60 recorded, or in case a record is to be made of a concert.

The apparatus may be employed for making records of music played at distant points, or it may be used as an auxiliary in ordinary 65 telephone service where the electro-magnetic sound box may be connected in series or in multiple with the ordinary telephone receiver for the purpose of recording a message over a telephone line, any suitable switching 70 connections being employed, if necessary or desired, for the purpose of starting the recording device into operation automatically when a called subscriber is absent from his office or business. The records made will be 75 exact reproductions of the vibrations of the diaphragm and these may be reproduced by any ordinary reproducer in commercial use.

I claim:—

1. The combination with a revoluble rec- 80 ord carrier, of a carriage movable in a direction parallel with the axis of the carrier, a casing supported by said carriage, a diaphragm secured to and forming a vibratory bottom member for the casing, a stylus con- 85 nected to and movable with said diaphragm, an electro-magnet mounted within the casing, and means for counter-balancing a portion of the weight of the casing and its contents to thereby prevent undue pressure of the stylus 90 against the record.

2. In sound recording apparatus, a stylus, a diaphragm for operating the same, an electro-magnet for actuating the diaphragm, a casing inclosing the electro-magnet and sup- 95 porting the diaphragm, an adjusting screw carried by the casing and serving to move the electro-magnet toward and from the diaphragm, and locking screws for holding the electro-magnet in adjusted position. 100

3. In sound recording apparatus, a casing, an electro-magnet therefor, a stylus, a diaphragm for actuating the same, a diaphragm carrying disk having an opening adjacent the pole piece of the magnet, a plurality of 105 weights bearing against said disk, a ring connecting said weights, a second ring encircling a part of the electro-magnet, anti-friction balls carried by the second ring and bearing against the electro-magnet, and a connecting 110 bar between the two rings.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CHARLES LOGAN CHISHOLM.

Witnesses:

T. AMOS WILSON,
RICHARD B. HANSON.