

K. & I. W. NICHOLS.
TELEPHONE RECEIVER.
APPLICATION FILED SEPT. 5, 1908.

966,467.

Patented Aug. 9, 1910.

2 SHEETS—SHEET 1.

Fig. 2.

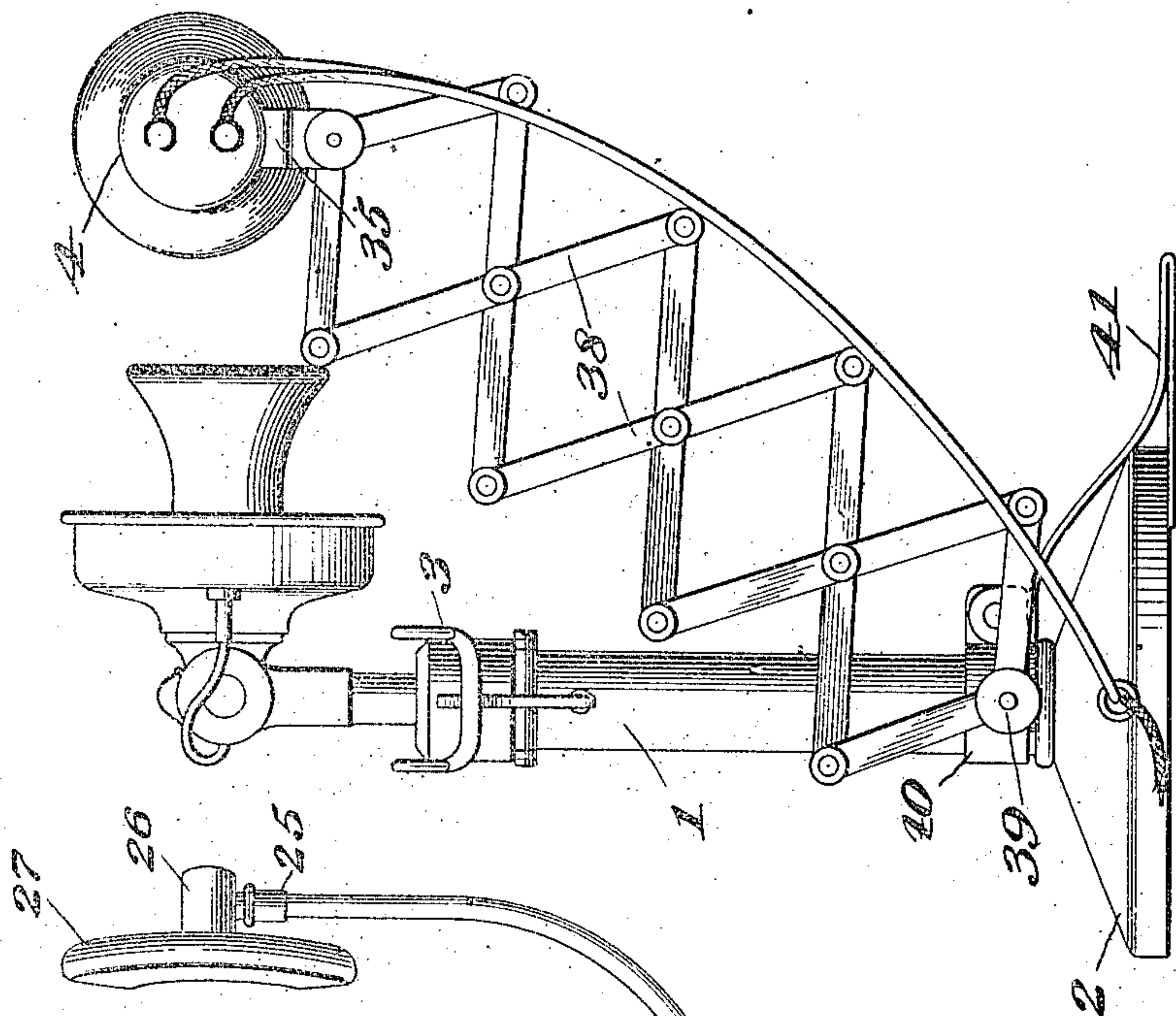
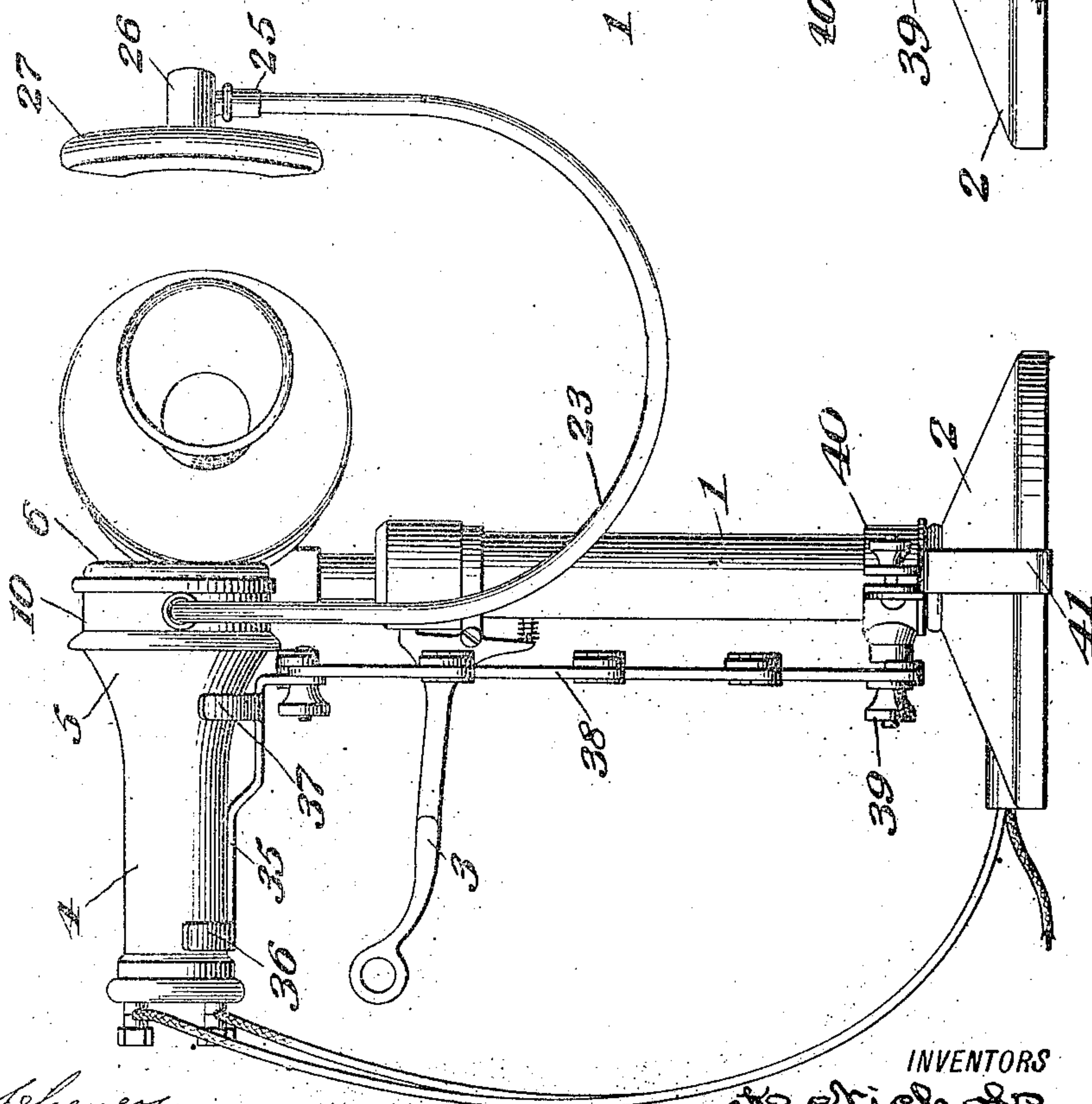


Fig. 1.



WITNESSES

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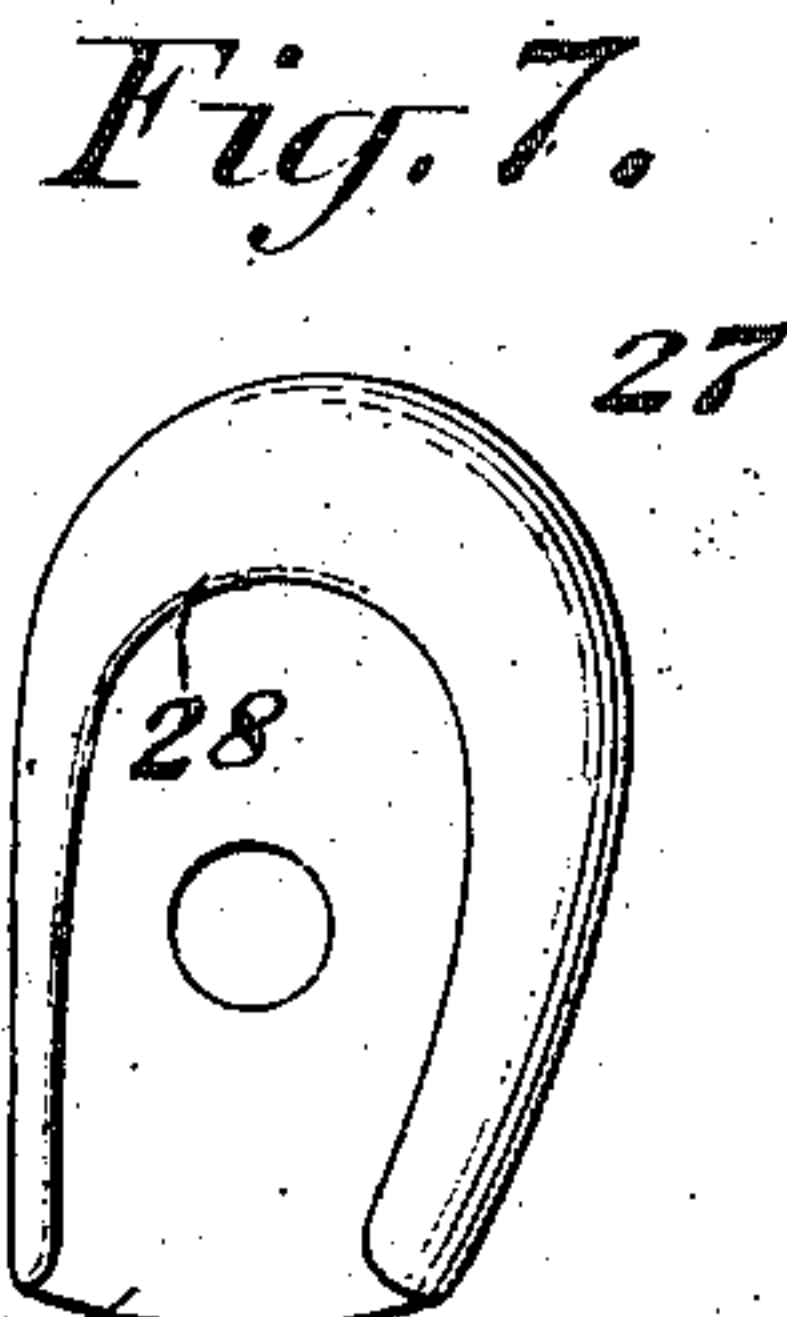
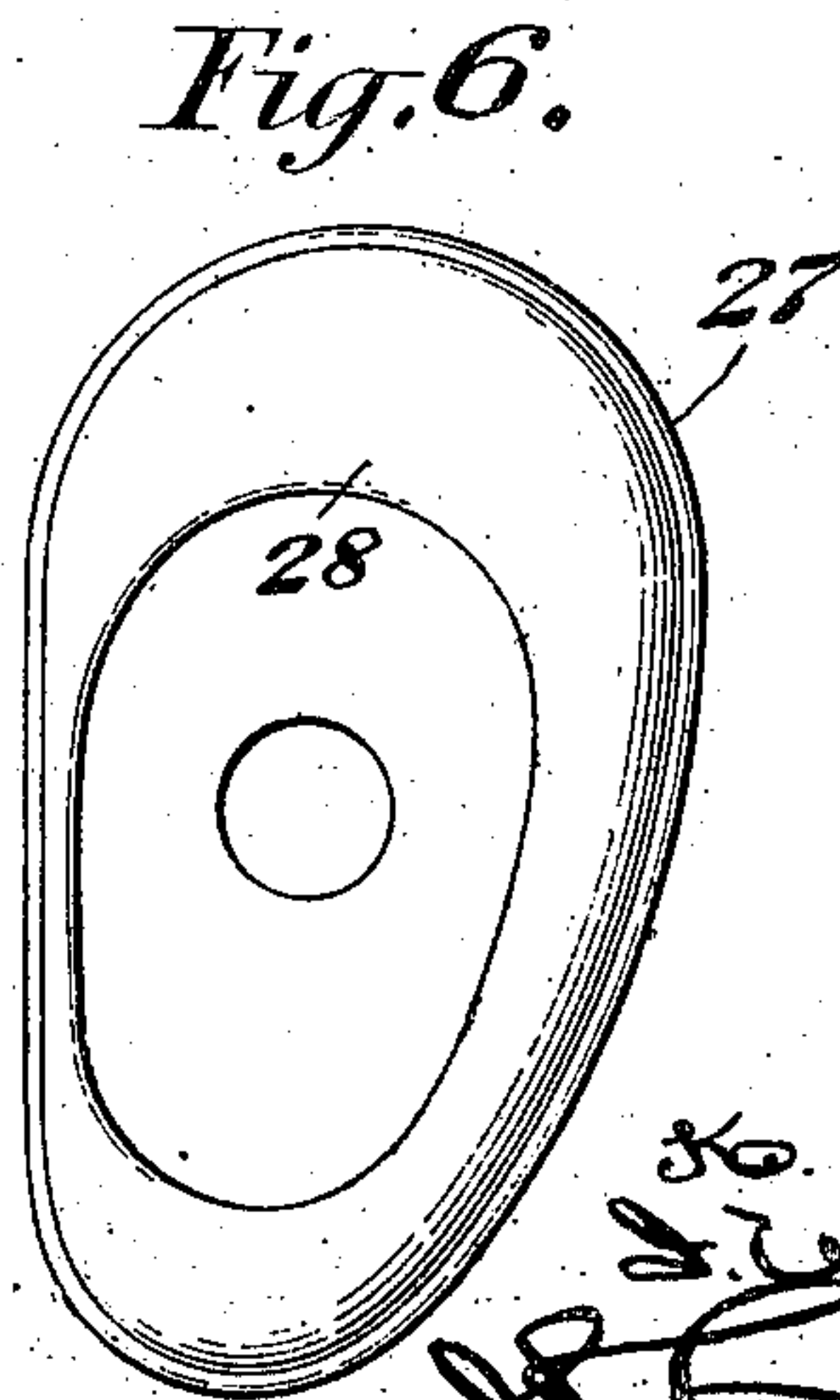
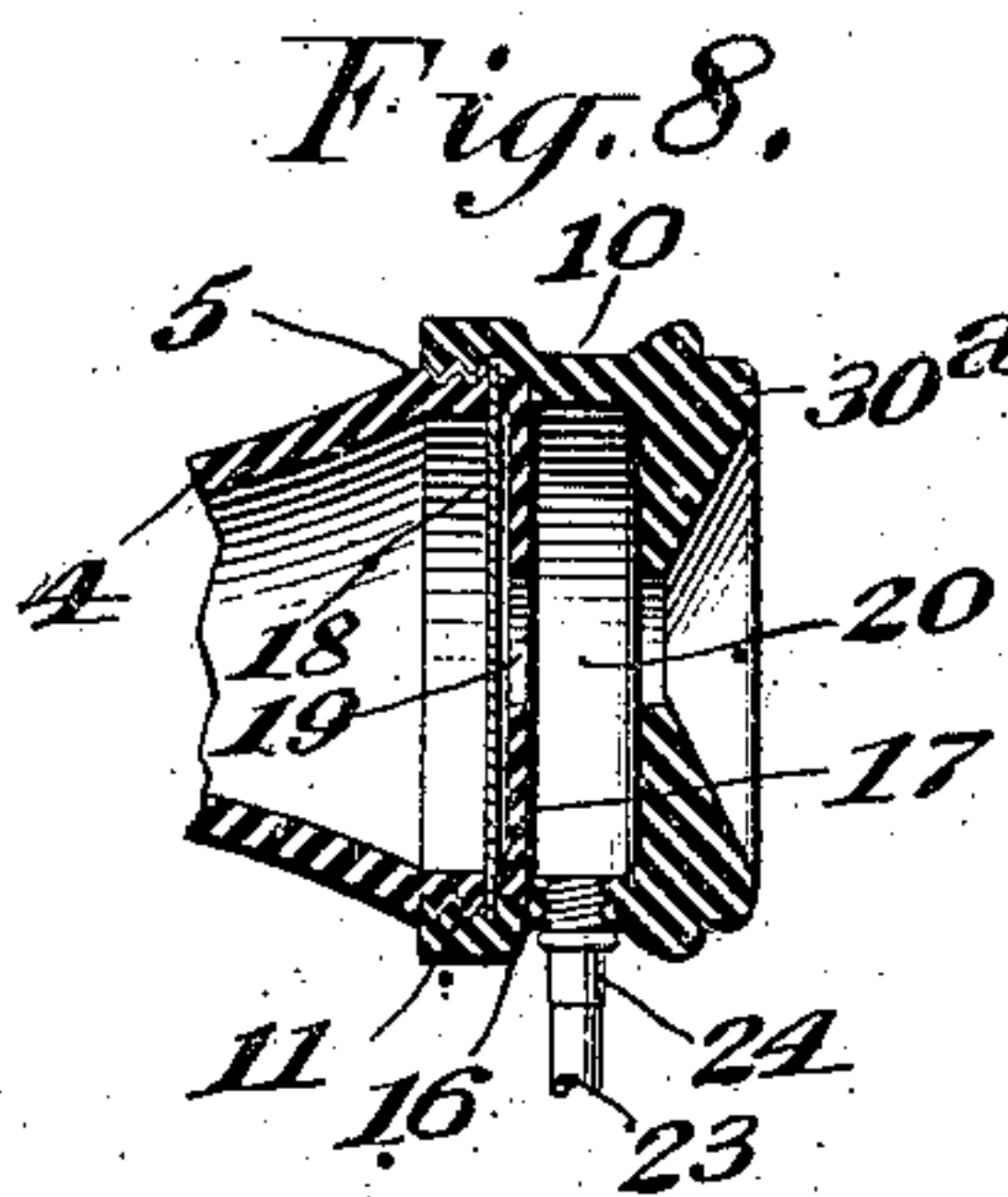
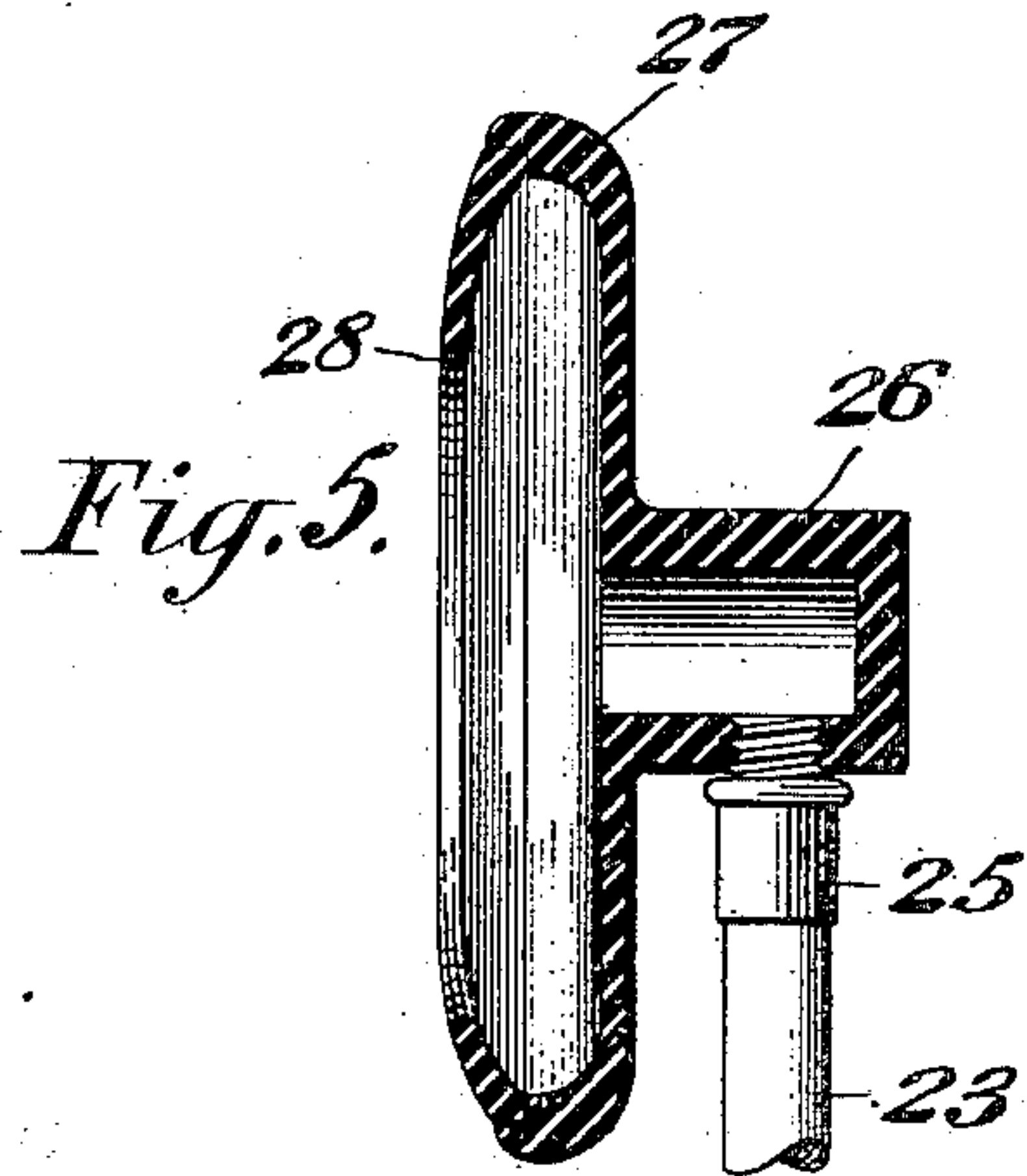
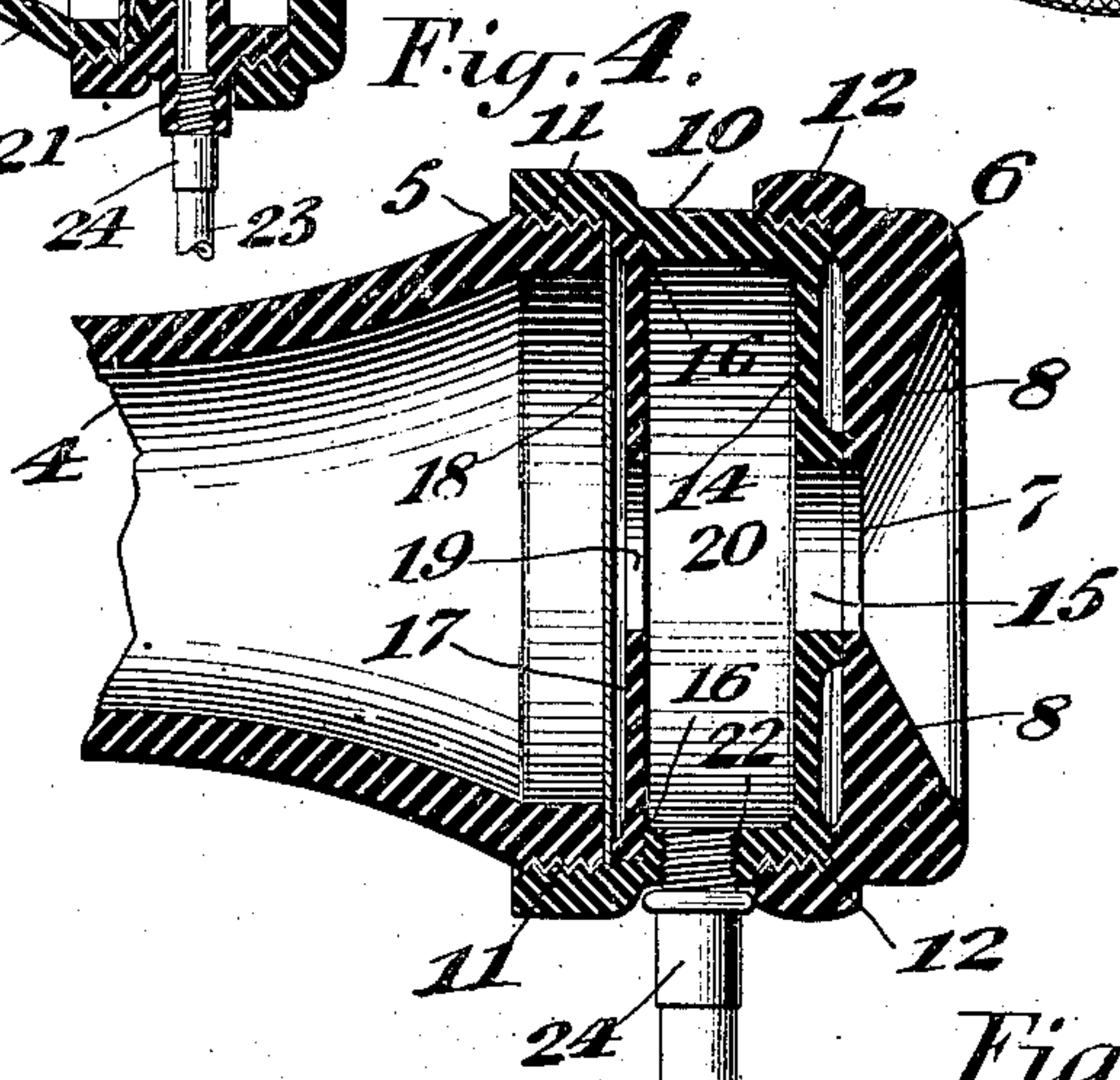
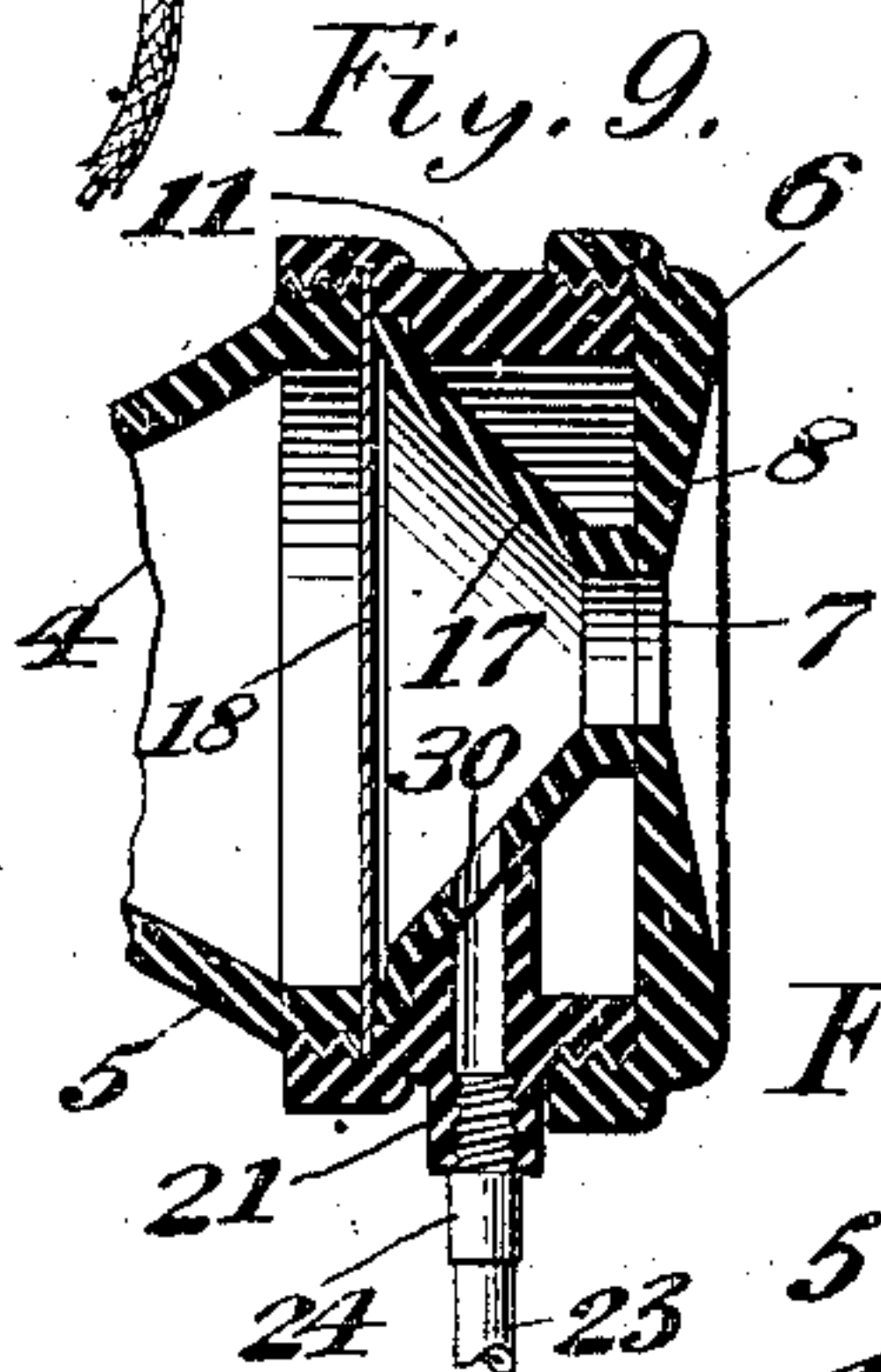
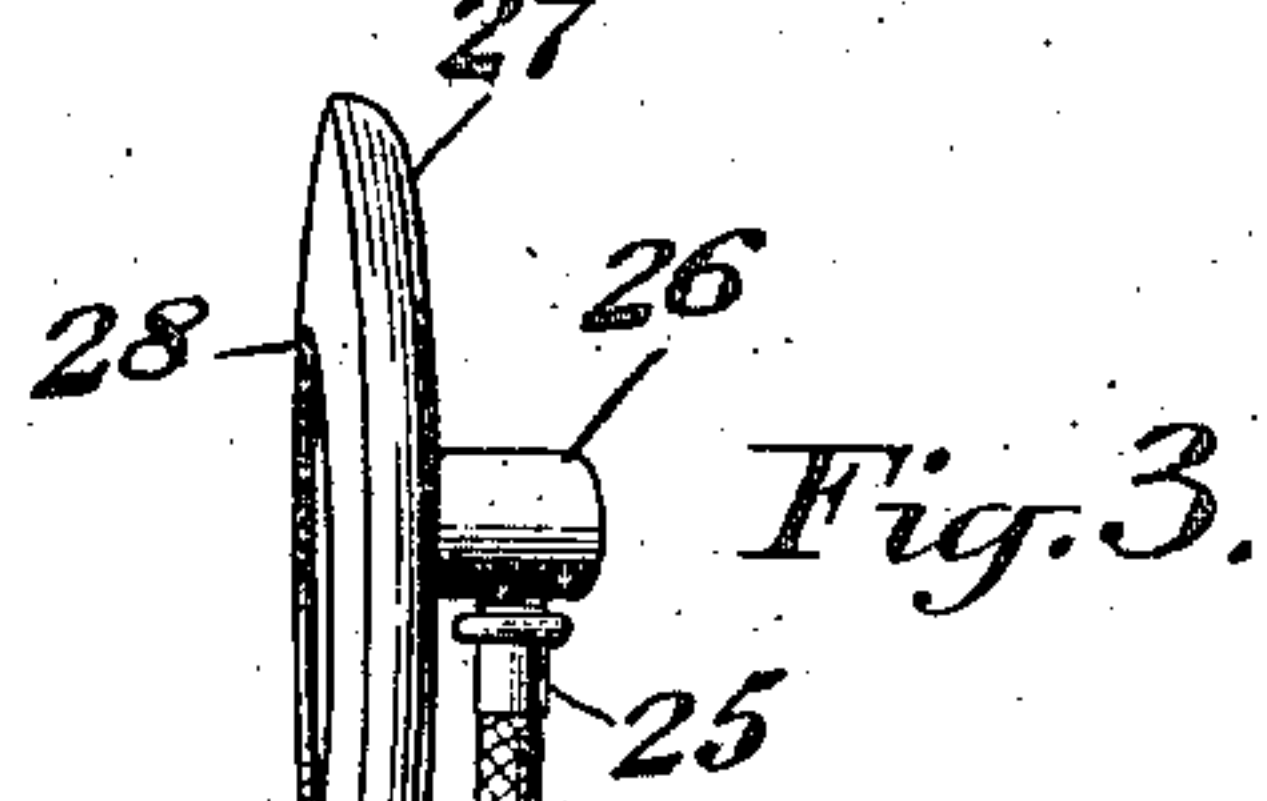
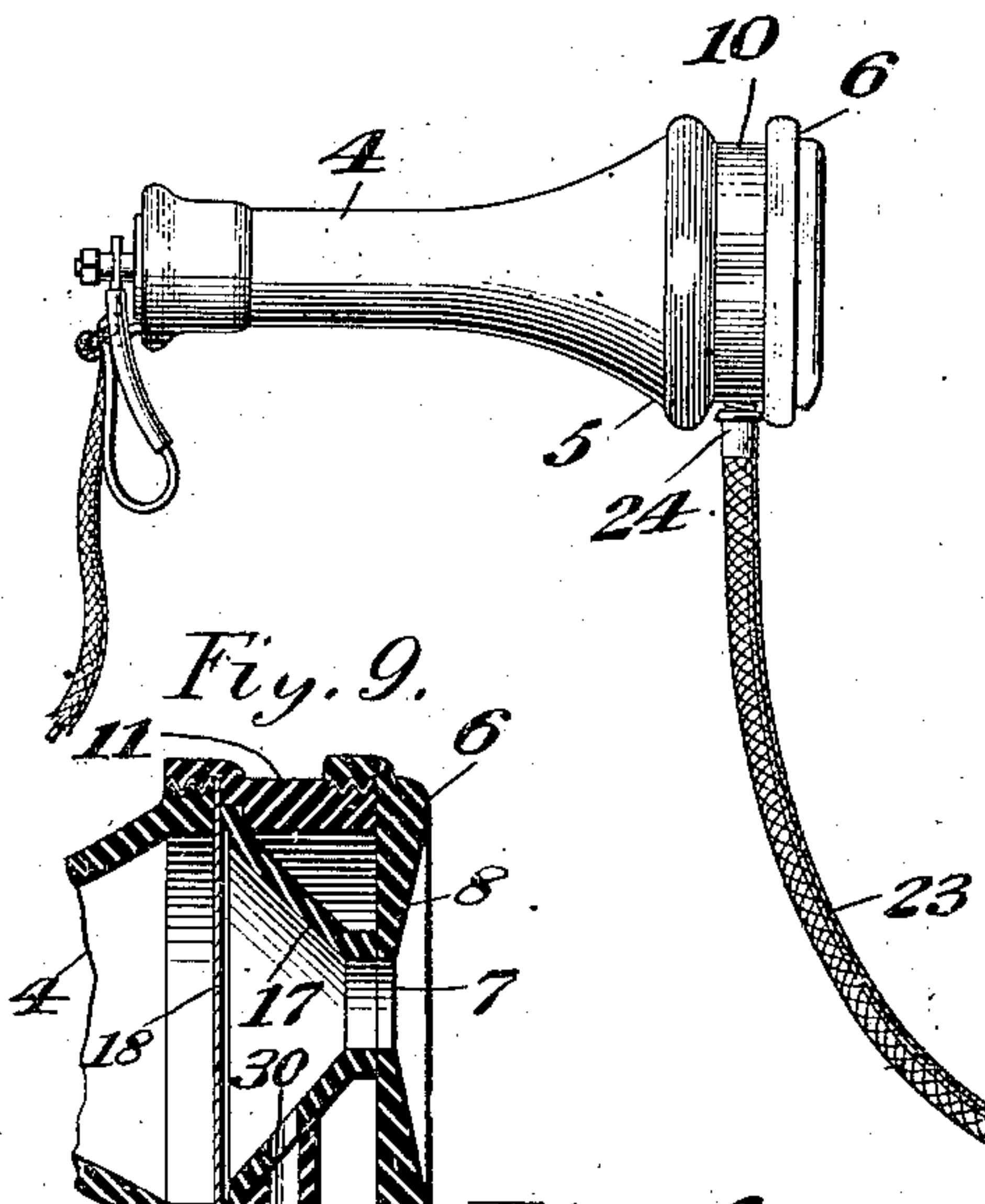
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

KATHERINE NICHOLS AND ISAAC W. NICHOLS, OF NEWARK, NEW JERSEY; SAID ISAAC W. NICHOLS ASSIGNOR TO SAID KATHERINE NICHOLS.

TELEPHONE-RECEIVER.

966,467.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed September 5, 1908. Serial No. 451,808.

To all whom it may concern:

Be it known that we, KATHERINE NICHOLS and ISAAC W. NICHOLS, both citizens of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain Improvements in Telephone-Receivers, of which the following is a specification.

This invention relates to certain improvements in telephone receivers, and has for its object, in part, to provide a device of this general character of a simple and comparatively inexpensive nature, having a novel arrangement of sound conveying means whereby the transmission of the reproduced sounds to the ear is facilitated in such a manner as to permit the same to be heard with greater distinctness than under ordinary conditions, and in part, to provide means of an improved and simplified construction for supporting the receiver during use, so as to relieve the hand or hands of the subscriber and permit them to be freely employed for writing or other purposes.

The invention consists in certain novel features of the construction, and combinations and arrangements of the several parts of the improved telephone receiver, whereby certain important advantages are attained, and the device is rendered simpler, less expensive, and otherwise better adapted and more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In order that our improvements may be the better understood, we have illustrated the same in the accompanying drawings wherein—

Figure 1 is a front elevation showing a telephone of ordinary construction, provided with a receiver constructed according to our invention, and in position for use; Fig. 2 is a side view of the parts illustrated in Fig. 1; Fig. 3 is a view showing, in elevation, a modified construction comprised in our invention; Fig. 4 is an enlarged fragmentary sectional view taken axially through the ear piece of the hand telephone and showing our improvements applied thereto; Fig. 5 is an enlarged sectional detail view taken through the connected ear-piece of the hand telephone, and illustrating the means for retaining the same upon the ear; Fig. 6 is an inner side or face view of the ear-piece shown in Fig. 5; Fig. 7 is a view similar to Fig. 6,

but showing a modified formation of the ear-piece comprised in our present invention; Fig. 8 is a sectional view somewhat similar to Fig. 4, but showing a modified formation of the hand telephone comprised in the present invention, and Fig. 9 is a view somewhat similar to Figs. 4 and 8, but illustrating still another modified formation of the hand telephone comprised in our present invention.

As shown in these views 1 represents the pedestal of a desk telephone set, having an enlarged base 2 and provided with a hook-lever 3 in the usual way, and 4 represents the receiver, herein shown as made in the ordinary form, being adapted to be supported when not in use upon the hook-lever, and having a body portion provided with an enlarged or bell shaped end portion 5, having external screw-threads adapted to be engaged by a corresponding screw-thread produced internally in a removable ear-piece 6, of a well known kind, having a central aperture 7 the walls of which are made to diverge outwardly, as shown at 8 on the drawings.

10 represents an intermediate section, adapted to be fitted upon the bell shaped end portion 5 of the receiver when the ear piece 6 is removed therefrom, as clearly shown in the drawings, and this intermediate section has one end provided with internal screw threads as shown at 11 for engagement with the external screw-threads at the bell shaped end portion of the receiver, while its opposite end is externally screw-threaded as shown at 12 for engagement with the internal screw threads of the ear piece 6, so that when the intermediate section 10 is in position, such screw threads afford a secure connection of the same with the body portion of the receiver, and with the ear piece 6, as clearly shown in Figs. 3 and 4. The screw threads at 11 in the intermediate sections being similar to the screw threads within the ear piece 6, a material advantage is attained in that said intermediate section is capable of employment in connection with hand telephones of the kind ordinarily in use.

Within the intermediate section 10, as shown in Fig. 4, is produced a diaphragm 14, extended across the same adjacent to that end wherewith the ear piece 6 is detachably engaged, and this diaphragm 14 is centrally perforated as shown at 15 in registry with the central aperture 7 of the

ear-piece. Adjacent to its opposite end, the intermediate section 10 has an annular shoulder 16 produced around its interior cavity, and serving as an abutment against which is engaged the edge portion of a removable diaphragm 17, extended across the interior of the said section closely adjacent to the diaphragm 18 of the receiver, and also provided with a central aperture 19, in registry with the apertures 7 and 15 of the receiver ear piece 6 and of the diaphragm 14 at the opposite end of said section.

The surface of the diaphragm 17 adjacent to the diaphragm 18 is provided with an annular rim or shoulder projecting around its margin, and adapted, when the parts are assembled, for clamping engagement upon the margin of said diaphragm 18 in such a manner as to retain the parts in secure position and prevent contact of the diaphragm 17 of the intermediate section upon the receiver diaphragm 18, and said diaphragms 14 and 17 of the intermediate section are spaced apart, as clearly shown in Fig. 4, to produce between them an enlarged space or chamber 20, to which the sound waves produced by the receiver diaphragm 18 are admitted by way of the central aperture 19 and from which such waves are discharged to the ear through the apertures 15 and 7 above referred to.

By this construction, a much greater volume of sound is produced than is possible with the constructions heretofore employed, wherein the sound waves are caused to pass through restricted passages in such a manner that a great proportion of the sound is destroyed or lost. The structure is also of such a nature as to permit of applying the intermediate section to receivers already in use, no change being required except the removal of the ear-piece 6 and its application to the intermediate section, and the application of the said intermediate section to the receiver body portion in the place of said ear piece.

At one side, the intermediate section 10 is provided with a projecting lug 21 through which is produced a passage 22 communicating with the chamber or space 20 within said section, and 23 represents a flexible tube, one end of which has a nipple 24 engaged in the outer end of said passage 22 in such a manner that a portion of the sound within said chamber 20 is conveyed by way of said passage 22 to and through said flexible tube 23.

The end of the flexible tube 23 opposite to the nipple 24 is provided with a similar nipple 25 which has connection with a chambered projection 26 at the rear side of an auxiliary ear piece 27, herein shown as made in a shape to conform generally to the ear of the subscriber and provided with an aperture through which the ear is to be inserted,

and with an overhanging flange 28, encircling said aperture and adapted to afford a secure connection with the ear when the auxiliary ear piece is in position for use, so that said ear piece may be supported in position without requiring the use of the hand.

By this arrangement of the parts, the sound from the receiver diaphragm is increased in volume and carried to both ears of the subscriber, so that the same may be heard with much greater distinctness than is possible under ordinary conditions. Furthermore, since the auxiliary ear piece is adapted to be supported directly upon the ear of the subscriber, it will be evident that one hand remains free so as to permit of being employed for writing or other purposes, thereby affording a material advantage and convenience in the use of the telephone. It may be stated that while our improvements are well adapted for use in connection with telephones upon local circuits, the device is particularly desirable for employment upon long distance lines by reason of the greater distinctness with which the reproduced sounds are audible.

The ear piece 27 may be formed from any desirable material, but the same should, of course, be made as light as possible in weight, for which purpose aluminium may be used in its construction. The flexible tube should also be of sufficient length to permit the hand telephone to be conveniently handled without detaching the ear piece from the ear of the subscriber.

In Fig. 7 we have shown a modified formation of the auxiliary ear piece 27 wherein the lower part of the same is cut away as shown at 29 for the sake of lightness, and also to avoid interference with the use of the device from the lobe of the ear.

In Fig. 8 we have shown a modified formation of the intermediate section 10, wherein the ear piece 30^a is formed as an integral part thereof, thereby dispensing with the employment of the outermost diaphragm 14.

In Fig. 9 we have shown still another modified formation of the intermediate section, wherein said outermost diaphragm 14 is dispensed with, the diaphragm 17 being made conical in form, and expanded in a direction the reverse to the tapered wall 8 of the aperture 7 of the ear piece 6, so as to convey the sound from substantially the entire available surface of the receiver diaphragm 18 to the central opening of the said ear piece 6 without loss. This construction is particularly desirable for use since the chamber within said conical diaphragm 17 is ample to afford full generation of the sound waves, and the conical form of the chamber insures conveyance of said waves to the ear with a minimum of loss. The passage 30 with which the flexible

tube communicates is herein shown as communicating with the space or chamber within this conical diaphragm so that a proper proportion of the sound is conveyed there-
5 through to the auxiliary ear piece 27.

In connection with our improvements as above described, we provide means for supporting the hand telephone, so that when desired, both hands may be freely employed
10 during use of the telephone. Such supporting means are shown in Figs. 1 and 2 and comprise a clip 35 having two sets or pairs of spaced upturned fingers or projections 36, 37 between which the hand telephone,
15 when removed from the hook lever is adapted to be securely held with its ear piece opposite the subscriber's ear.

The clip 35 is adjustably supported upon the upper end of a toggle device 38, the
20 lower end of which has an adjustable connection as shown at 39 with a clip 40 detachably held upon the pillar of the instrument, in such a manner that said toggle device may be lengthened and shortened by the
25 movement of its members and may be directed at any required inclination to the base of the instrument to permit the said clip at its upper end to retain the receiver in position opposite the subscriber's ear dur-
30 ing use of the transmitter. When the toggle device is not required for use, it may be folded up compactly at the base of the instrument so as to be out of the way.

As herein shown the clip 40 is provided
35 also with a foot 41 adapted for contact with the surface whereon the base 2 of the instrument is supported in line with the toggle device 38 so as to prevent tipping of the instrument when the weight of the receiver
40 is supported upon the extended toggle device during use.

As will be understood from the above description, the telephone constructed accord-
45 ing to our invention is of an extremely simple and comparatively inexpensive nature, and is particularly well adapted for use by reason of the increased distinctness afforded by it and of the convenience due to the possibility of freely employing one
50 or both hands during use of the instrument, and it will also be evident that the device is susceptible of considerable modification without material departure from the principles and spirit of the invention, and for
55 this reason we do not desire to be understood as limiting ourselves to the precise

formation and arrangement of the several parts of the device herein set forth in carrying out our invention in practice.

Having thus described our invention, what
60 we claim and desire to secure by Letters Patent is—

1. A telephone receiver having a body portion provided with a sounding diaphragm, and with a chamber adapted to re-
65 ceive the sound produced thereby, and an ear piece having a central aperture, said chamber having at its side opposite to the diaphragm a central contracted opening affording communication with said aperture
70 of the ear piece, and being provided with conical walls which converge in a substantially continuous manner from the outer part of the diaphragm to said central contracted opening, and are adapted to direct
75 the sound produced by the diaphragm to said central opening of the ear piece.

2. A device of the character described having a body portion provided with a sounding diaphragm and with a chamber
80 arranged to receive the sound produced by the diaphragm, an ear piece having a central aperture, said chamber having a central contracted opening at its side opposite the diaphragm and affording communication
85 with said aperture of the ear piece, and having conical walls which converge in a substantially continuous manner from the outer part of the diaphragm to said central contracted opening and are adapted to direct
90 the sound produced by the diaphragm to said aperture of the ear piece and having a passage extended laterally to one side of the body portion, a flexible tube having screw
95 connection at the outer end of said passage and adapted for communication with said chamber of the body portion, and an ear piece carried upon the end of said tube and having an inturned flange produced at its
100 upper part for supporting engagement with the ear, and provided with a passage communicating with said tube and adapted to convey the sound to the ear.

In witness whereof we have hereunto signed our names this 29th day of August
105 1908, in the presence of two subscribing witnesses.

KATHERINE NICHOLS.
ISAAC W. NICHOLS.

Witnesses:

J. S. CAPLINGER,
F. W. WIMAN.