

RINGER.

APPLICATION FILED MAY 8, 1914.

Patented May 28, 1918.

1,267,470.

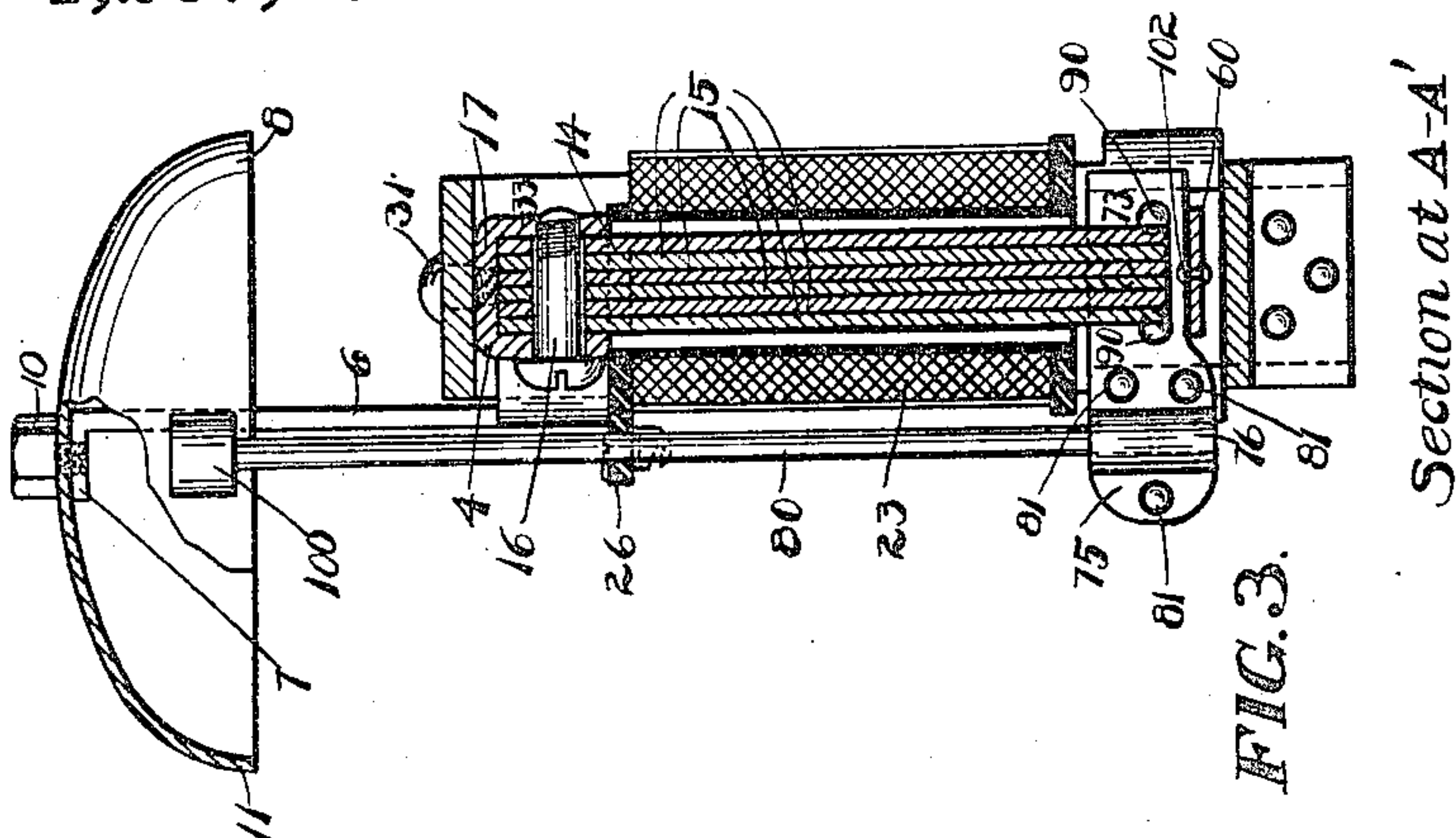


FIG. 3.

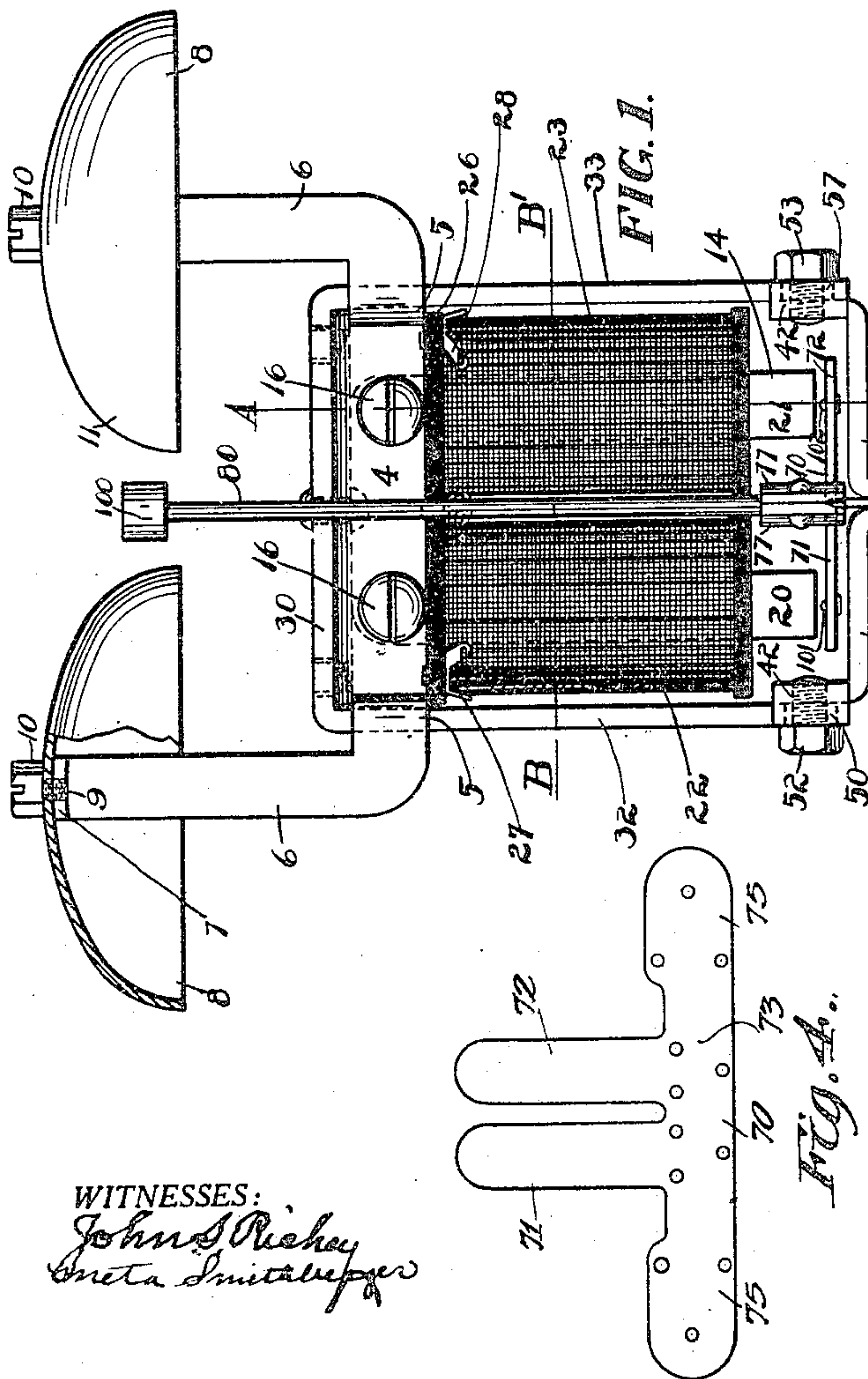


FIG. 1

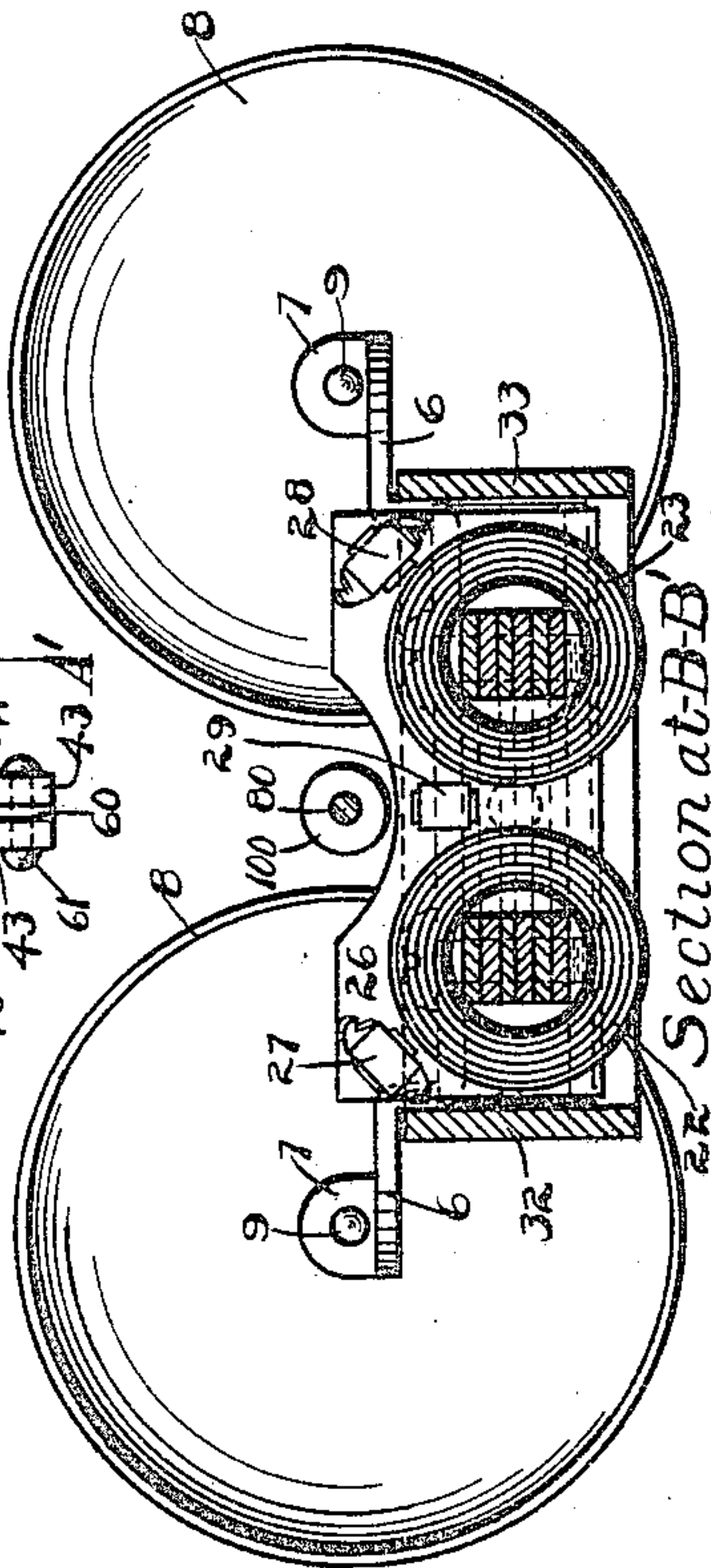


FIG. 2.

WITNESSES:
John S. Richey
Meta Smitalapper

INVENTOR.
Frank M. Slaughter
 BY *F. O. Richey*
His ATTORNEY.

UNITED STATES PATENT OFFICE.

FRANK M. SLOUGH, OF ELYRIA, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
STROMBERG-CARLSON TELEPHONE MFG. CO., OF ROCHESTER, NEW YORK, A
CORPORATION OF NEW YORK.

RINGER.

1,267,470.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK M. SLOUGH, a citizen of the United States, and a resident of Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Ringers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to ringers, and more especially to ringers to be used in connection with telephones. While my invention is adapted to be used with what are commonly known as straight line, or ringers having pivoted armatures, it is more particularly designed for use with reed selective signaling systems.

I aim to produce a ringer which will be cheaper and more convenient to manufacture and more efficient in operation. I also aim to produce a ringer which is easier to adjust and disassemble, and one in which the reed structure may be readily removed from the ringer and another substituted. I also aim to produce a ringer in which the spools or coils may be readily removed, and in which this removal may be accomplished without disturbing the relation between the reed and the armature.

Other objects of my invention and the invention itself will probably be better understood from a description of an embodiment of the invention.

Figure 1 is a front elevation of an embodiment of my invention.

Fig. 2 is an end section taken through the line B—B' of Fig. 1.

Fig. 3 is a longitudinal section taken through the line A—A' of Fig. 1.

Fig. 4 is an elevation of the blank of the single piece clamp and armature employed in the embodiment of my invention illustrated here.

Referring now to the particular embodiment of my invention illustrated in the drawing, at 4 is illustrated a frame piece made of suitable material, such as soft iron or steel. This member extends across the top of the structure, and is bent outward at 5 on either side. Arms or gong posts 6 6 extend upward at right angles to the mem-

ber 4, being preferably integral therewith to form supports for the gongs. The top of each arm is turned over to form hands 7 7 to which the gongs 8 are connected. The hands 7 7 are perforated at 9, and these perforations are threaded. The gongs are connected to the hands by suitable means, such as screws 10 which are driven into the threaded perforations 9.

The ringer is provided with electromagnetic means here shown as an electromagnet consisting of a core 14 and magnet windings. I have found it highly desirable to form the core 14 of a plurality of U-shaped punchings 15. The core 14 is connected by suitable means to the member 4 and the same means may be employed to clamp the punchings together. A preferred form of construction is to form an ear or ears 17 upon the member 4, bend them into the shape of a channel which fits over the end of the core, and perforating the sides of the channel member thus formed into which perforations screw means 16 is driven, as is illustrated in Fig. 3. The limbs 20 and 21 of the core extend substantially parallel downward from the member 4 and the spools 22 and 23 are mounted thereon. These spools may be provided preferably with a common head 26, upon which the terminals 27, 28 and 29 are mounted. The coils 22 and 23 are removable without the head 26. A U-shaped permanent magnet 30 is employed, being connected by suitable means, such as a rivet 31, to the member 4, as illustrated in the form shown. The limbs 32 and 33 of the permanent magnet extend downward substantially parallel to the magnet coils and outside the same, forming a support for the armature and taper rod structure.

The armature and taper rod structure is assembled in a removable unitary structure which is adjustably mounted upon the permanent magnet. A supporting bridge, suitably formed of two members 40 and 41 is employed, each one preferably Z-shaped and having arms 42 and 43 extending in opposite directions and substantially perpendicular to the body portions of the members. The arms 42 are perforated and threaded to receive means for connecting them to the ends of the permanent magnets. The ends of the permanent magnets are

slotted, as shown at 50 and 51. Screws 52 and 53 extend through these slots into the threaded perforations in the ends of the members 40 and 41. Armature supporting means, such as a reed 60 is clamped between the arms 43 and fastened therein by suitable means, such as rivets 61. The armature 70 is formed of a single piece of metal having arms 71 and 72 adjacent the ends of the cores 20 and 21. The arms 71 and 72 are integral with the body portion 73, which is formed by doubling the metal back upon itself and extending it beyond the members 71 and 72 to form a portion 75 which is struck up at 76 and 77 to form a socket for one end of the tapper rod 80. The tapper rod is clamped and firmly held in this socket by rivets 81 and the whole armature structure is fastened to the free end of the reed 60 by suitable means, such as rivets 90. The other end of the tapper rod carries a tapper 100 positioned to strike the gongs when the armature is vibrated.

The ringer of my invention here illustrated and described is especially adapted for alternating current, the cores being laminated to reduce eddy currents and formed preferably of punchings which are conveniently and cheaply made. The laminated cores are more efficient, especially with high frequency currents, enabling me to reduce the excessively high voltages employed to operate high frequency reed ringers, and making it possible to employ uniform voltages for ringers of all commercial frequencies and to correspondingly reduce insulation and other means employed to guard against the danger resulting from the use of high voltages. Among the dangers resulting from the use of high voltages are injury to the person of those working with or using the system, the danger of fire, the danger of injuring and temporarily disabling the system. I am also enabled to greatly reduce the expense of installation and maintenance, since the protection required for low voltages is much cheaper both to install and maintain than that for high voltages. The efficiency of the ringer may also be increased by increasing the permanent magnet strength and by arranging the permanent magnet means and electromagnet means in such manner as to increase this efficiency. One of the objects of my invention is to so associate these parts as to increase the efficiency and the mechanical strength of the ringer, at the same time making it compact.

The frame member and gong posts, as will be seen, are formed of a punching which can also serve as a part of the magnetic circuit, thus utilizing both the mechanical and magnetic properties of the material thereof and eliminating unnecessary parts. By extending the permanent magnet down into limbs separated some little distance apart, I am en-

abled to employ the same as a supporting means for the armature structure, so that the same will be held firmly in position during the operation of the ringer, in addition to using the permanent magnets for the function of polarizing the ringer. This results in a good stiff, rigid and compact structure. By making the members 40 and 41 of steel and connecting them to the armature and the permanent magnet, I provide a magnetic circuit in which there are no air gaps between the armature and the permanent magnet, thus increasing the efficiency of the magnetic circuit and of the ringer. The ringer can also be conveniently adjusted from the front thereof by applying a wrench to the heads of the screws 52 and 53, loosening one or both of them and moving the armature structure to the desired position. The whole armature structure may be removed from the front of the ringer by removing the screws 52 and 53 and substituting another reed structure if it is desired to do so. By making the parts thus accessible from the front, I make it possible to crowd telephone apparatus up close to the sides of the ringer, so that this apparatus may be closely packed into the telephone casing. If the magnet spools are injured or for other reasons it is desired to remove one or both of them, it can conveniently and quickly be done by removing the armature structure, as described, slipping the injured spool off of the core and replacing it with another. The armature is provided with copper rivets 101 and 102, which strike against the core when the armature is vibrated, and prevent the armature freezing to the core.

I claim:

1. In a ringer, the combination of a supporting member having a channel-shaped body and a pair of arms forming gong posts, the arms being bent at right angles to one of the channel sides of the body and then turned to extend substantially parallel thereto and in opposite directions from each other, each arm then being turned upward to form a gong post, gongs on said posts, a tapper and a tapper rod supported from said supporting member and means to operate said tapper to cause said tapper rod to strike said gongs.

2. In a ringer, the combination of a supporting member having a channel-shaped body and a pair of arms forming gong posts, the arms extending outward from one of the sides of the channel substantially parallel thereto and in opposite directions from each other, each arm then being turned upward to form a gong post, gongs on said posts and an electromagnet and a permanent magnet, each connected to said supporting member, an armature, tapper and tapper rod and means to support said armature adjacent the

electromagnet and with the tapper in position to strike the gongs when the armature is vibrated.

3. In a ringer, the combination of a supporting member having a channel-shaped body and a pair of arms forming gong posts, the arms being bent at right angles to one of the channel sides of the body and then turned substantially parallel thereto and in opposite directions from each other, each arm then being turned upward to form a gong post, gongs on said posts, an electromagnet including a plurality of U-shaped punchings forming the core thereof having their short limbs connected in said channel-shaped member and a permanent magnet connected to said supporting member, an armature, tapper and tapper rod, and means to support said armature adjacent the electromagnet and with the tapper in position to strike the gongs when the armature is vibrated.

4. In a ringer, the combination of a supporting member having a channel shaped body and a pair of arms forming gong posts, the arms extending in opposite directions each from one of the sides of the channel-shaped member and turned upward at right angles thereto, gongs on the ends of said gong posts, an electromagnet including a plurality of U-shaped punchings each of which is connected in the channel-shaped member, a permanent magnet, an armature, tapper and tapper rod and means to support said armature adjacent the electromagnet and with the tapper in a position to strike the gongs when the armature is vibrated.

5. In a ringer the combination of a supporting member, a pair of gong posts supported therefrom, gongs on the gong posts, an electromagnet supported from said supporting member and comprising a plurality of U-shaped punchings and magnet windings on the limbs of said punchings, common means to connect said punchings together and to said supporting member, a U-shaped integral permanent magnet supported from said supporting member, a bridge of magnetic material supported from the ends of the limbs of said permanent magnet and spanning the space between the same, an armature for said electromagnet, means connecting said armature to said bridge and supporting said armature in operative relation to the electromagnets, a tap-

per rod connected to the armature and a tapper supported by said rod in operative relation to the gongs.

6. In a ringer the combination of a supporting member having a channel-shaped body and a pair of arms forming gong posts, the arms being bent at right angles to one of the channel sides of the body and then turned to extend substantially parallel thereto and in opposite directions from each other, each arm then being turned upward to form a gong post, gongs on said posts, an electromagnet and a permanent magnet connected to said supporting member, an armature, tapper and tapper rod, and means to support said armature adjacent the electromagnet and with the tapper in a position to strike the gongs when the armature is vibrated.

7. In a ringer, the combination of a supporting member, gong posts supported therefrom, gongs on said gong posts, an electromagnet comprising a core formed of a plurality of U-shaped punchings and magnet windings on the limbs thereof, common means to clamp said punchings together and connect them to the supporting member, a U-shaped integral permanent magnet supported from the supporting member with its limbs extending substantially parallel to the limbs of the magnet core and outside the same, a bridge of magnetic material adjustably and removably connected to the ends of the limbs of the permanent magnet, a reed connected at one end to said bridge and free at the other, an armature connected to the other end of the reed and held in operative relation to the electromagnet, a tapper rod, a clamp integral with the armature for connecting the reed and tapper rod together, said clamp being provided with two wings folded one against the other, means for fastening the wings of the clamp together and securing the ends of the spring and the tapper rod therebetween and a tapper on said tapper rod in operative relation to the gong.

In witness whereof, I have affixed my signature in the presence of two witnesses this 4th day of May, 1914.

FRANK M. SLOUGH.

Witnesses:

JOHN S. RICHEY,
META M. SMITHBERGER.