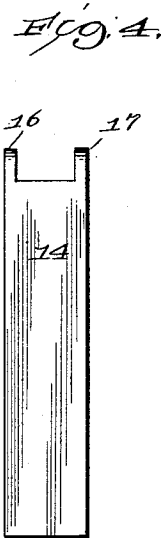
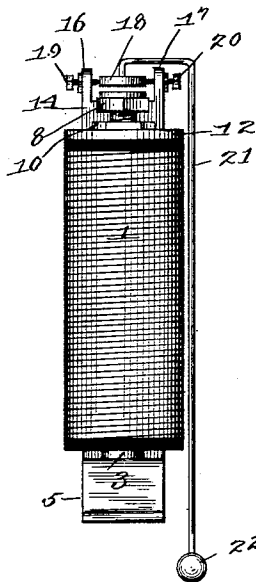
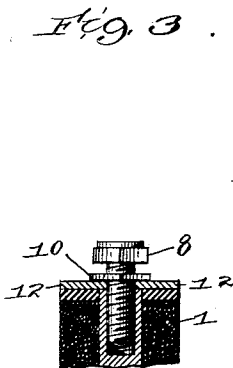
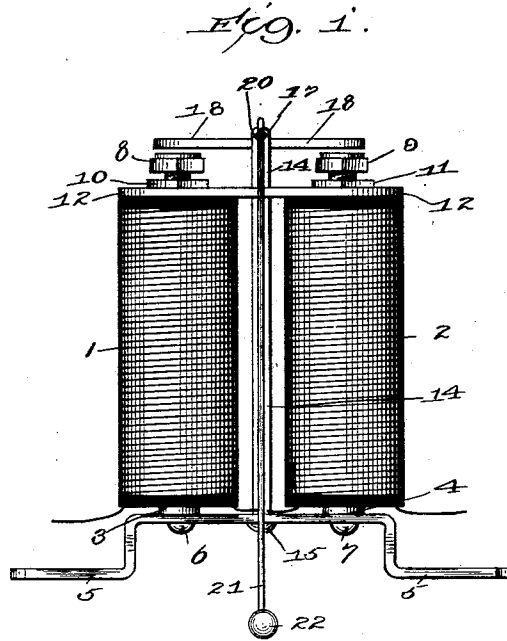


No. 733,225.

PATENTED JULY 7, 1903.

T. LIDBERG.
ELECTRIC BELL RINGER.
APPLICATION FILED NOV. 20, 1901.

NO MODEL.



Witnesses:
Ray White.
L. J. White.

Inventor:
T. Lidberg
By J. J. Bain 4/16/04.

UNITED STATES PATENT OFFICE.

THODOLF LIDBERG, OF CHICAGO, ILLINOIS, ASSIGNOR TO SWEDISH-AMERICAN TELEPHONE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELECTRIC BELL-RINGER.

SPECIFICATION forming part of Letters Patent No. 733,225, dated July 7, 1903.

Application filed November 20, 1901. Serial No. 82,980. (No model.)

To all whom it may concern:

Be it known that I, THODOLF LIDBERG, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
 5 Improvements in Electric Bell-Ringers; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

10 My invention relates to improvements in electric bell-ringers. It is more especially adapted to be used in connection with telephone-lines for the purpose of signaling, and it is essentially designed to be used in connection
 15 with alternating electric currents.

The object of my invention is to produce a simple, efficient, and durable construction.

With this and other objects in view, which will hereinafter appear and become obvious
 20 to those skilled in the art from the description hereinafter, my invention consists in the features, details of construction, and combination of parts, which will first be described in connection with the accompanying drawings and then particularly pointed out in the
 25 claims.

In the drawings, Figure 1 is a front elevation of my improved bell-ringer. Fig. 2 is a side elevation of the same. Fig. 3 is a broken-away
 30 part of one of the magnets in section, showing the means for adjustably moving the core of the said magnet. Fig. 4 is a side view of a permanent magnet, upon which the armature of the bell may be pivoted.

35 In all of the views the same numerals indicate similar parts.

1 and 2 are electromagnets, having cores 3 and 4, which are connected to the yoke 5 by means of the screws 6 and 7. The cores of
 40 the magnets are hollow upon their polar ends and are each provided with a screw-threaded stud 8 and 9. The heads of the studs may be provided with spanner-holes or they may be made hexagon-shaped, so as to be conveniently
 45 moved for the purpose of adjustment with reference to their approach to the armature. Each stud is provided with a threaded check-nut 10 and 11 for the purpose of retaining the stud after it has been adjusted in a given
 50 position. A diamagnetic yoke-piece 12 holds

the salient ends of the permanent and electro magnets rigidly in position. I prefer to perforate the yoke-piece 12 and to pass the studs 8 and 9 through the ends of the yoke for this purpose. This yoke-piece 12 is also perforated
 55 at a point midway between the two electromagnets for the purpose of permitting the permanent magnet 14 to pass through it and for holding the said magnet in place. The permanent magnet 14 is located midway between the
 60 cores 3 and 4 and is held in place on the magnetic yoke 5 by means of the screw 15, its upper end being guided in the yoke 12. The salient end of this permanent magnet 14 is notched, as shown in Fig. 4, and is thereby provided with
 65 lugs 16 and 17, in which the armature 18 is pivoted by means of the screws 19 and 20. The armature need not necessarily be pivoted on the end of the magnet 14. It may be pivoted near to the end of the magnet and become
 70 inductively polarized thereby. To the center of the pivoted armature 18 a striker-rod 21 is secured. This rod is provided with a striker 22, which is adapted to be brought into forcible contact with gongs, (not shown) that
 75 may be located on either side thereof. One magnetic circuit is completed through the permanent magnet 14, the armature 18, the core 4, and the yoke 5. The other magnetic circuit is completed through the magnet 14, the armature 18, the core 3, and the yoke 5. The
 80 proximity of the salient poles 8 and 9 of the cores 3 and 4 may be adjusted by means of the screw-threaded stud 8 and 9 and the check-nuts 10 and 11. This construction produces
 85 a very durable, efficient, rigidly-constructed bell.

The permanent magnet, located between the electromagnets, as shown, provides very short magnetic paths producing vigorous active responses to the varying electric impulses sent through the electromagnetic coils.

Having described my invention, what I claim as new and useful, and desire to secure by Letters Patent of the United States, is—
 95

1. In an alternating-electric-current bell-ringer the combination, of two electromagnets, a yoke joining said magnets, a permanent magnet secured to said yoke midway between said electromagnets in axial alinement
 100

therewith, and a polarized armature pivoted upon the salient end of said permanent magnet, substantially as set forth.

2. In an alternating-electric-current bell-ringer, the combination of two electromagnets, a yoke joining said magnets, an apertured diamagnetic yoke fixed to the salient ends of the magnet, a permanent magnet secured to the first said yoke and projecting
10 through the diamagnetic yoke, said permanent magnet being arranged midway between

the electromagnets in axial alinement therewith, and a pivoted armature polarized by said magnet, substantially as set forth.

In testimony that I claim the foregoing as
my own I affix my signature in presence of
two witnesses.

TODOLF LIDBERG.

In presence of—

FORÉE BAIN,
M. F. ALLEN.