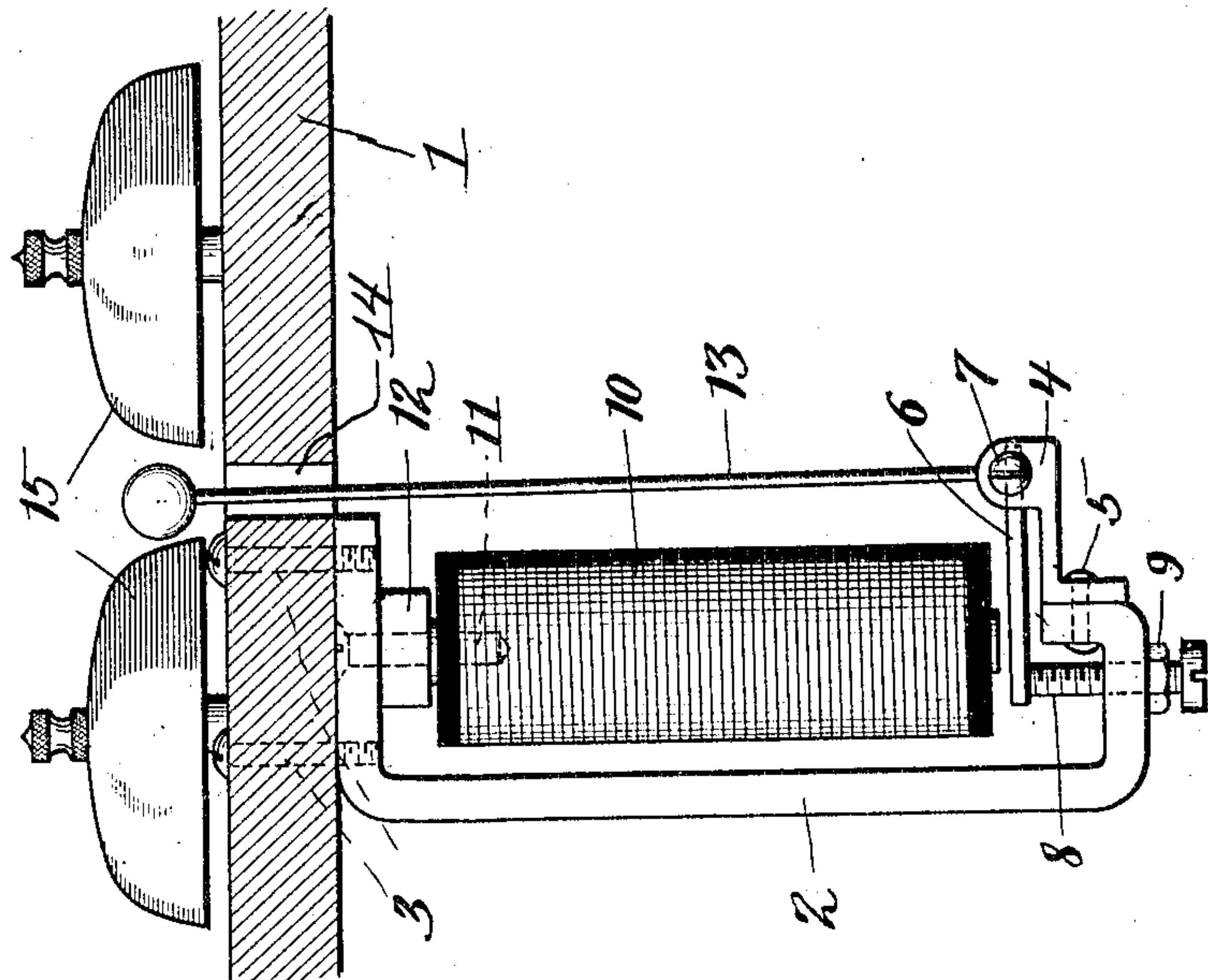


No. 843,283.

PATENTED FEB. 5, 1907.

C. L. KRUM.  
ELECTRIC SIGNAL.  
APPLICATION FILED JAN. 10, 1903.



Witnesses:  
*Frederick*  
*Lillian Prentice*

Inventor:  
*Charles L. Krum*  
By *Pierce & Fisher*  
Attorneys



# UNITED STATES PATENT OFFICE.

CHARLES L. KRUM, OF CHICAGO, ILLINOIS.

## ELECTRIC SIGNAL.

No. 843,283.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed January 10, 1903. Serial No. 138,578.

*To all whom it may concern.*

Be it known that I, CHARLES L. KRUM, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Electric Signals, of which the following is declared to be a full, clear, and exact description.

The invention relates to audible electrical signals used in connection with telephones and for other purposes, and seeks to provide a simple construction which may be easily adjusted and kept in order and which may be readily operated over a long line.

The invention consists in the features of construction and arrangement of parts set forth in the following description, illustrated in the accompanying drawing, and more particularly pointed out in the appended claims.

In the drawing the preferred form of the invention is illustrated in elevation with the support for the operating parts shown in section.

A suitable support 1 is provided, which may be a part of a suitable casing for inclosing the operating parts of the signal. A field-magnet 2, of suitable magnetic steel, is secured to the under side of the support 1 by means of screws 3. The main body of the magnet 2 extends downwardly or at right angles to the support 1, while its upper end is bent laterally and is held against the support 1 by the screws 3. The lower end or pole of the field-magnet extends laterally and then upwardly, as shown.

To the lower upwardly-projecting end of the field-magnet 2 is secured a laterally-projecting bracket 4, preferably of brass or other non-magnetic material. The bracket is held in place upon the end of the field-magnet by a rivet 5 or in any other suitable manner. A vibrating armature 6, of soft iron, is pivoted, as at 7, to the outer end of bracket 4 and extends inwardly over the upwardly-extending pole of the field-magnet 2. Preferably an adjusting-screw 8 is provided for the armature 6, against which screw the armature is normally held by the action of the permanent field-magnet 2. The adjusting-screw 8 is preferably of brass or other non-magnetic material and may be conveniently threaded through the laterally-extending portion of the field-magnet and may be provided with a suitable lock-nut 9.

An operating-electromagnet for the arma-

ture 6 is provided and preferably comprises a single-spool magnet 10, which is fixed at one end to the upper end of the field-magnet 2 by means of a brass screw 11. The electromagnet 10 is preferably separated from the end of the field-magnet 2 by means of an interposed block or washer 12, of brass or other suitable non-magnetic material. The lower end or pole of the electromagnet 10 is positioned as shown above and adjacent the armature 6.

A tappet 13 is arranged to be operated by the armature 6 and is preferably connected thereto at its pivot-point 7. The upper free end of the tappet 13 extends through an opening 14 in the support 1 and is arranged to strike one or more sounders or bells 15, secured to the upper side of the support 1. Preferably two sounders or bells are employed on opposite sides of the upper end of the tappet 13.

The armature 6, of soft iron, is polarized by the action of the field-magnet 2, so that its face farthest from the adjacent pole of the field-magnet is of like character to such adjacent pole. If now a pulsating current is transmitted over the line and through the electromagnet 10 in such a direction that the pole of the electromagnet adjacent the armature 6 is of a character opposite to that of the adjacent pole of the field-magnet 2, the armature will be rapidly vibrated, together with tappet 13, and the bells or sounders will be struck a succession of blows. If, however, the pulsating current is in the opposite direction, the armature 6 will be repelled and not successively attracted or vibrated and the signal will not sound. The instrument thus presents a simple and effective form of a so-called "biased" signal, which may be conveniently used in connection with party-line telephones and for other purposes. The signal may be operated by an alternating current, if desired.

The armature is held by the permanent magnet against the screw or stop 8, which may be adjusted and held in adjusted position to insure delicate operation of the signal.

It will be observed that the pole of the field-magnet 2 adjacent the armature 6 extends at right angles thereto and in position to effect a strong pull upon the armature and insure its return to normal position. It will also be observed that the poles of the operating-electromagnet 10 and of the field-magnet



2 are arranged on opposite sides of the vibrating armature 6 in position to readily effect the vibration of the armature.

Numerous changes may be made in the details of structure without departure from the essentials of the invention as defined by the claims.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An electric signal comprising a vibrating armature, a suitable support, a permanent field-magnet carried by said support and projecting therefrom, the end of said magnet farthest from said support being extended laterally adjacent one side of said vibrating armature, an operating-electromagnet carried by said support and having one only of its poles arranged adjacent the opposite side of said vibrating armature, a sounder carried by said support and a tappet operated by said armature arranged to strike said sounder.

2. An electric signal comprising a horizontal support, a permanent field-magnet extending downwardly therefrom and having its lower end bent laterally and then upwardly, a horizontally-disposed vibrating armature arranged above and pivoted on a bracket secured to the lower upturned end of said permanent field-magnet, an operating-electromagnet carried by said support and extending downwardly therefrom and having one of its poles arranged adjacent and above said vibrating armature, an adjusting-screw against which said armature is normally held by said permanent field-magnet, a bell or sounder carried by said support and a tappet operated by said armature and arranged to strike said bell or sounder.

3. A biased electric signal comprising a pivoted vibrating armature, a permanent field-magnet and an operating electromagnet, each of said magnets having one only of its

poles arranged adjacent the free end of said vibrating armature, said poles being arranged opposite each other and on opposite sides of said armature, a sounder and a tappet operated by said armature and arranged to strike said sounder.

4. An electric signal comprising a support, a vibrating armature pivoted below said support, a permanent field-magnet and a single-pole electromagnet mounted on said support and extending downwardly therefrom with the lowermost poles arranged adjacent the free end of said vibrating armature, an adjustable stop against which said armature is normally held by said permanent field-magnet, a tappet connected to said vibrating armature and a bell or sounder carried by said support and arranged to be struck by said tappet.

5. An electric signal comprising a pivoted armature, an operating-electromagnet therefor, a permanent magnet having its poles arranged adjacent respectively the opposite poles of said electromagnet, each of said magnets having one only of its poles arranged adjacent and on opposite sides of said armature, a sounder and a tappet operated by said armature arranged to strike said sounder.

6. An electric signal comprising a pivoted vibrating armature, a signal spool electromagnet, a permanent field-magnet having its poles arranged adjacent the oppositely-disposed poles of said electromagnet and one pole of each of said magnets being arranged adjacent the free end of and on opposite sides respectively of said vibrating armature, a stop against which said armature is normally held by said permanent magnet, a sounder and a tappet operated by said armature arranged to strike said sounder.

CHARLES L. KRUM.

Witnesses:

HARRY L. CLAPP,  
ALBERTA ADAMICK.