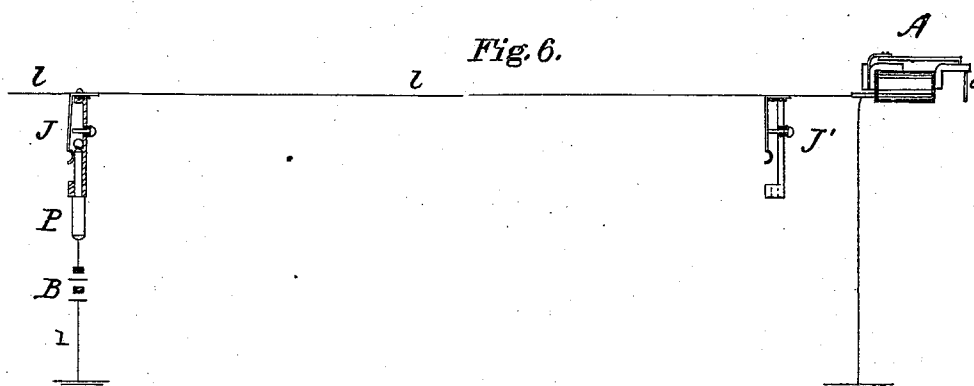
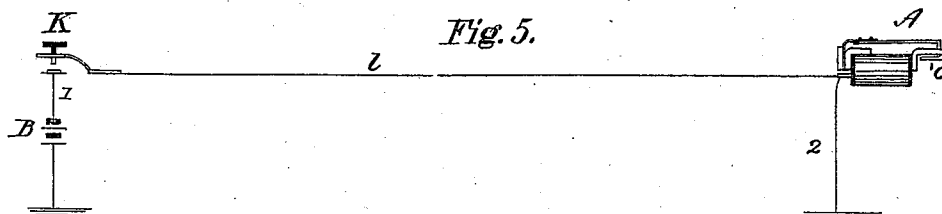
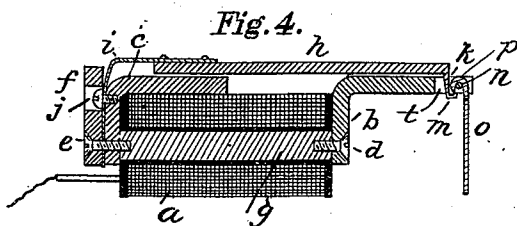
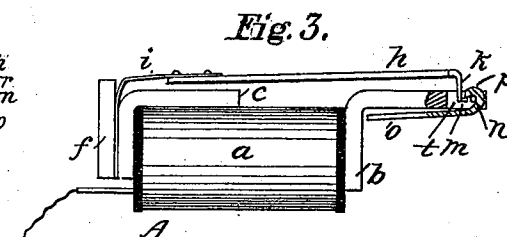
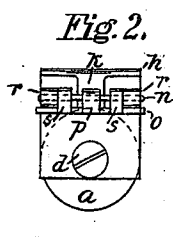
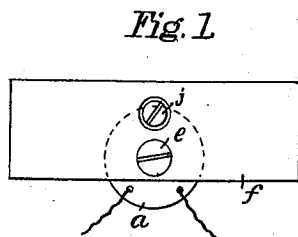


(No Model.)

F. W. DUNBAR.
VISIBLE SIGNAL.

No. 501,185.

Patented July 11, 1893.



Attest.

Frederick Lewis
J. M. Copenhaver.

Inventor.

Francis W. Dunbar.
by J. B. K. Mauro,
his atty.

UNITED STATES PATENT OFFICE.

FRANCIS W. DUNBAR, OF NEW YORK, N. Y., ASSIGNOR TO THE AMERICAN
TELEPHONE AND TELEGRAPH COMPANY, OF NEW YORK.

VISIBLE SIGNAL.

SPECIFICATION forming part of Letters Patent No. 501,185, dated July 11, 1893.

Application filed May 4, 1893. Serial No. 472,967. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS W. DUNBAR, residing at New York, in the county of New York and State of New York, have invented certain Improvements in Visible Signal Appliances, of which the following is a specification.

It is common in telephone and telegraphic signaling to employ annunciators or indicators at the several stations into or through which the circuits extend for the purpose of calling the attention of the operators or subscribers at such stations to an incoming call and also to indicate to them the condition of the circuit whether it is in use or busy, or that it is disengaged.

This invention relates to electrical apparatus of this class, and to a special form of electro magnetic visible signal annunciators frequently termed automatically resetting annunciators in which the display and withdrawal of the signal shutter is controlled by the attraction and retraction of the armature.

It consists essentially of an electro-magnet, preferably of but one coil or helix whose iron core has prolonged angular pole pieces with active faces extending parallel to the said core itself, and an armature mounted on a spring in inductive proximity to the said pole pieces and provided with a hooked extension at its front end; and a signal shutter or target pivoted to the forward pole piece, provided with a shoulder or detent on its pivot axis which engages with the said armature hook so that when the armature is in its normal or unattracted condition the shutter is held up out of sight by means of the said hook. When the armature is attracted to the poles of the magnet the shutter falls by gravity into a position to display its face; and when the armature ceases to be attracted by reason of the demagnetization of the electro magnet, the armature is retracted by the resiliency of its spring, and its hook draws the shutter up out of sight, all of which I will now proceed to describe in detail.

In the drawings Figures 1, 2 and 3 are rear end, front end and side views respectively of an annunciator embodying my invention. Fig. 4 is a longitudinal section thereof, and

Figs. 5 and 6 show the annunciator associated in circuits with a key or plug and a battery.

A represents the annunciator, which is composed of an electro magnet with a single coil or helix *a* having attached to its core at each end thereof angular polar extensions *b* and *c*, the ends of which extend forward parallel with the said core, as shown; the forward extension *b* is connected to the core *g* by the screw *d*, and the rearward extension is connected to the opposite end of the core by the screw *e*, which also secures to the electro magnet the heel piece *f*.

i is a flat metal spring secured at one end between the heel piece *f* and the pole extension *c*. It is bent nearly at right angles near the middle of its length, and its opposite end is riveted to the soft iron armature *h* which extends parallel with both of the polar extensions *b* and *c*. The free end of the armature *h* has a downwardly projecting extension *k* provided with a hook *m*. The forward polar extension *b* is cut out at its end, as at *t*, and a display shutter *o* is hung therein by a pin-
dle *n* which passes through the ears *r r* of the armature and the lugs *s s* of the shutter.

p is a detent or shoulder in the center of the top part of the shutter, and is located immediately over the hook *m* of the armature and in such proximity thereto that it is always ready to be raised and supported thereby; but when the armature is attracted to its poles, the extension *k* and its hook *m* drop away from the detent *p* and the shutter falls by gravity, as shown in Fig. 4.

j is a screw passing through the spring *i* and into the corner of the rear extension polar piece *c* for the purpose of adjusting the relations of the hook *m* and the detent *p*.

Fig. 5 illustrates the operation of the visible signal indicator in a simple normally open circuit consisting of a ground wire 1, battery B, key K, line wire 1 including the indicator A grounded by wire 2. When the key K is closed, the battery B energizes the electro magnet *a*, the poles of which attract the armature *h* thereto, causing the hook *m* to fall away from the detent *p*, and per consequence the display shutter falls into position shown in Fig. 4, and remains there while the key is

closed. Upon releasing the key and opening the circuit, the helix becomes demagnetized, and the spring *i* retracts the armature *h* to its normal position. In so doing the hook *m* strikes against the detent or shoulder *p* and turns and lifts the shutter *o* upon the pintle *n* into the position shown in Figs. 3 and 5, so that it is concealed from sight. This is the usual arrangement when the indicator serves to denote that there is a communication for the station where it is located.

Fig. 6 illustrates an arrangement of the visual signal to denote that a line is in use and serves as a block to the line. Two spring jacks *J J'* of a series are shown connected in a line *l* which includes the indicator *A*. Upon the insertion of the plug *P* in the spring jack *J*, the display or visual signal *A* at the jacket *J'* is set as already described and remains in this position as long as the plug is in the socket, and indicates say to the operator of the section of a switchboard upon which the jack *J* is located some predetermined signal, as that the line is in use.

Having now described my invention, I claim—

1. An annunciator or visible signal indicator consisting of an electro-magnet having angular polar extensions; an armature overlapping both polar faces supported and normally retracted by a spring; and a signal shutter or target controlled by the said armature and positively withdrawn from view by the retraction thereof but released and permitted to fall into view when the said armature is attracted, substantially as described.

2. An annunciator or visible signal indicator comprising an electro magnet with polar extensions as described, a spring armature overlapping the said polepieces and having a hooked tongue at its free end; and a signal shutter or target pivoted to the front pole piece and provided with a hook at its upper edge engaging with the hooked tongue of said armature, whereby the said signal shutter is displayed upon the attraction of the armature, and withdrawn upon the retraction thereof, substantially as described.

3. The combination in an electric annunciator or visible signal indicator, of a bar electro-magnet; angular pole pieces therefor, whose active faces are parallel with the core of said magnet; an armature mounted on a spring in inductive proximity to the said polepieces and provided with a hooked extension at its front end; and a signal shutter or target, pivoted to the forward polepiece the said shutter being provided with a hook or detent on its pivot axis engaging with the said armature hook, whereby the display and withdrawal of the signal shutter are controlled by the attraction and retraction respectively of the armature, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 28th day of April, 1893.

FRANCIS W. DUNBAR.

Witnesses:

R. J. MORGAN,
CHARLES D. M. COLE.