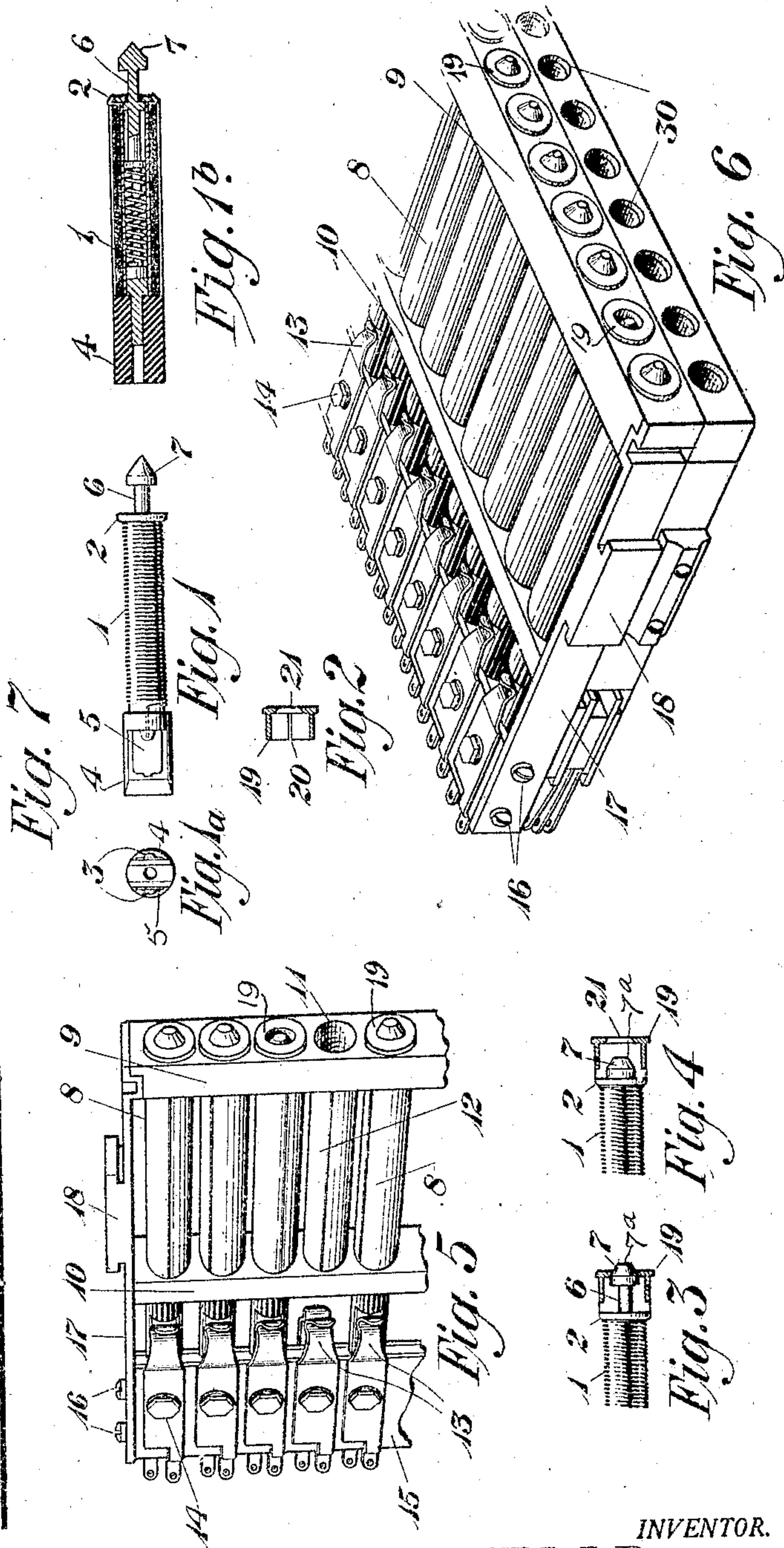
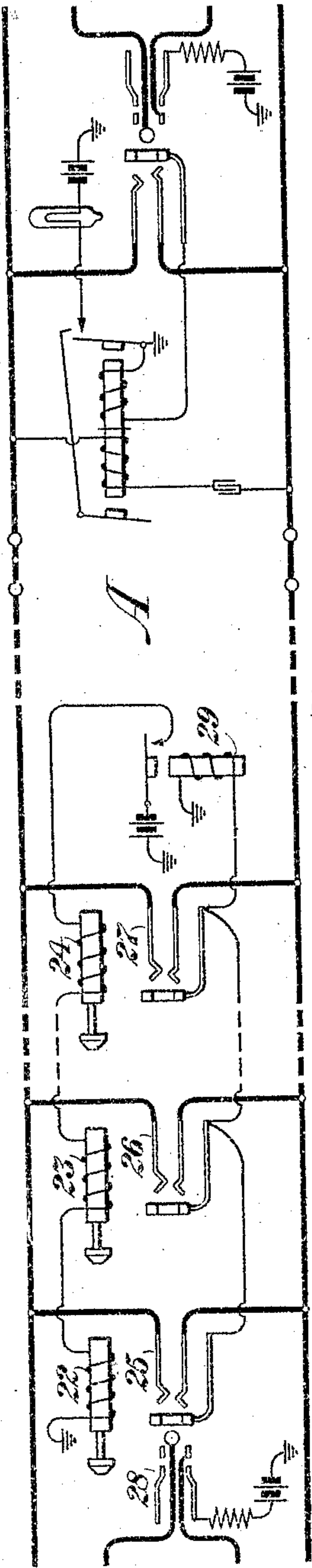


APPLICATION FILED OCT. 24, 1918.

Patented Dec. 28, 1920.

1,363,220.



INVENTOR.
H. M. Bascom
BY *G. E. Folk*.
ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY M. BASCOM, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

SIGNALING DEVICE.

1,363,220.

Specification of Letters Patent.

Patented Dec. 28, 1920.

Application filed October 24, 1918. Serial No. 259,551.

To all whom it may concern:

Be it known that I, HENRY M. BASCOM, residing at New York, in the county of New York and State of New York, have invented certain Improvements in Signaling Devices, of which the following is a specification.

This invention relates to signaling devices and more particularly to electromagnetic signaling devices such as are used in electrical signaling circuits which are adapted to operate in conjunction with other apparatus employed in telephone exchange systems.

15 An object of the invention consists in providing a signal which clearly and effectively indicates the idle or busy condition of trunk lines, subscribers' lines, or the like.

20 Another object of the invention consists in the provision of a device of this nature which is compact and unitary in structure and occupies but a small amount of space upon the face of a switchboard.

25 Further objects of the improved arrangement consist in the provision of a signaling device which is simple and inexpensive to manufacture and which is easily and quickly installed or readily removed from its mounting for inspection or replacement. Other and further objects will more fully appear hereinafter.

30 In the drawing forming a portion of this specification, in which like numerals represent like parts throughout, Figure 1 represents an elevation of the electromagnetic signaling device; Fig. 1^a is an end view thereof; Fig. 1^b is a longitudinal cross-sectional view of Fig. 1; Fig. 2 is an elevation of a face plate or cap which coöperates with said signaling device; Fig. 3 and Fig. 4 show a slightly modified form of the signal in its normal and actuated positions, respectively. Fig. 5 illustrates a series of the electromagnetic signals in mounted position. Fig. 6 shows in perspective a plurality of the improved devices mounted in a strip and associated with jacks; and Fig. 7 is a diagrammatic representation illustrating the signals in circuit with associated apparatus.

55 The invention may now be more fully understood from the following description when taken in connection with the accompanying drawing in which is illustrated a

preferred form of the invention. The electromagnetic signal is of the solenoid type having an energizing winding 1 surrounding a hollow non-magnetic spool. Suitably secured to the spool by clamping means or the like and insulated therefrom is a head 2 provided with an aperture. The terminating conductors of the energizing winding 1 extend through holes 3 in an insulating block 4 which is suitably mounted adjacent the hollow non-magnetic spool. The terminating conductors are soldered or otherwise suitably connected to contact plates 5 secured on either side of the insulating block 4. A plunger armature 6 is adapted to slidably operate in a longitudinal direction within the hollow spool. Carried on one end of the plunger armature 6 and movable therewith is a target or display member 7. Suitable cylindrical casings 8 of magnetic material are provided for inclosing each of the electromagnetic devices. These casings are supported by a face strip or mounting 9 and supporting member 10, and serve to provide magnetic parts of low reluctances and magnetically isolate the individual devices. The mounting strips 9 are provided with apertures throughout their length and at 11 is shown one of such apertures within which an electromagnetic device has not been placed. It will be apparent that a device of this character may be readily placed in position by inserting it in the aperture 11 of the mounting 9 and through the casing 12 and supporting member 10 until the contact plates 5 register with the contact springs 13. The contact springs 13 are secured by means of bolts 14 to a bar 15 which is suitably insulated, said bar being kept in place by screws 16 secured to the portion 17. The portion 17 is equipped with lugs 18 which are for the purpose of attaching the mounting to associated switchboard frame work.

When the electromagnetic device is properly placed in position and within its casing with its contact plates 5 in engagement with the springs 13, a face-plate 19 is inserted in aperture 11 of the mounting or face strip 9. The face plate 19 is made of resilient material and aided by slots 20 provided in the face-plate is adapted to engage with the walls of the aperture 11 and by the resulting tension is thereby firmly held in place. The face plate 19 at its outer sides is pro-

vided with an aperture 21 coinciding with the form of the target member 7 and through which said member may partially protrude. A series of jack openings 30 associated with the electromagnetic devices (Fig. 6) are provided on the face of the switchboard into which plugs may be inserted.

The target or display member 7 is composed of some suitably polished metal and is made in conoidal form, the angle of the apex of the cone being such that when the target is retracted within the walls of the face-plate 19 the light striking its surface will be reflected to the walls of the face plate and effectively trapped so that the target is rendered substantially invisible. In order that this result shall be obtained, the cone shaped member should be brought to a sharp point as shown in Fig. 1, since if the end of the target were blunt or rounded in any manner, a certain amount of light would be reflected outside of the face plate 19, thereby rendering the target visible. Where, however, it is impracticable to bring the apex of the cone shaped member to a sharp point, this difficulty may be overcome by blackening the blunt end 7^a, (as shown, for example, in Figs. 3 and 4) of the target or by drilling a small hole in the end thereof and filling the hole with some suitable black substance, such as lamp black or black rubber.

A trunk circuit A is shown in Fig. 7 comprising electro-magnetic signals diagrammatically represented at 22, 23 and 24, provided with jacks 25, 26 and 27 respectively. A plug 28 and relay 29 are also illustrated, all of these elements comprising the usual equipment embodied in a telephone circuit and, being well known, need no further elucidation than a brief description of their operation in connection with the improved signal.

In the operation of the device, when the winding is energized the plunger armature is attracted and causes the target associated therewith to be withdrawn or retracted within the face plate and when in such position the configuration of the target is such as to cause a complete light trap within the walls of the face plate and the target is entirely obscured, thereby signifying positively and effectively that the particular line is in use. Upon the deenergization of the winding the plunger armature and associated target member are released and forced forward by spring or other tension means common in connection with solenoid arrangements. The target member is thus caused to protrude through the face plate and is discernible in an unmistakable manner, showing that the line and its associated apparatus are in normal and unengaged condition. It will be

seen by reference to Fig. 7 that the operation of the device by the insertion of plug 28 in any of the jacks in a multiple switchboard causes the actuation of the line relay 29 by a circuit from ground and battery through the plug and jack, over the sleeve conductor, through the winding of the relay 29 to ground. Upon the energization of relay 29 the electromagnetic signals at all the positions in the multiple where they appear are actuated and their plunger armatures and target members withdrawn within the cap members as previously described, so that it will be apparent to all the operators that that particular line is busy. Upon the withdrawal of the plug the apparatus associated with the above described circuit assume their normal condition.

While the arrangements of this invention have been illustrated as embodied in certain connection with telephone apparatus, it will be understood that they are capable of embodiment in many and widely varied forms in other electrical and mechanical apparatus without departing from the spirit of the invention as defined in the appended claims.

Having now described my invention what I claim and desire to secure by Letters Patent is:

1. An electromagnetic signaling device comprising a solenoid, a plunger armature for said solenoid, a conoidal target member carried by the armature, a casing for the solenoid from which the target member normally projects, said target when in projected position being rendered visible by light reflected from its surface and upon the energization of the solenoid and the attraction of the armature being withdrawn within the casing, thereby producing a light trap which renders said target invisible.

2. An electromagnetic signaling device comprising a solenoid, a plunger armature for said solenoid, a conoidal target member carried by the armature, the apex of said target member being blackened to produce a non-reflecting surface, the remaining surface of said target being light reflecting, a casing for the solenoid from which the target member normally projects, said target when in normal projected position being rendered visible by light from its reflecting surface and upon the energization of the solenoid and the attraction of the armature being withdrawn within the casing, thereby producing, by means of said reflecting surface cooperating with the walls of said casing, a light trap which renders said target invisible.

In testimony whereof I have signed my name to this specification this twenty-second day of October, 1918.

HENRY M. BASCOM.