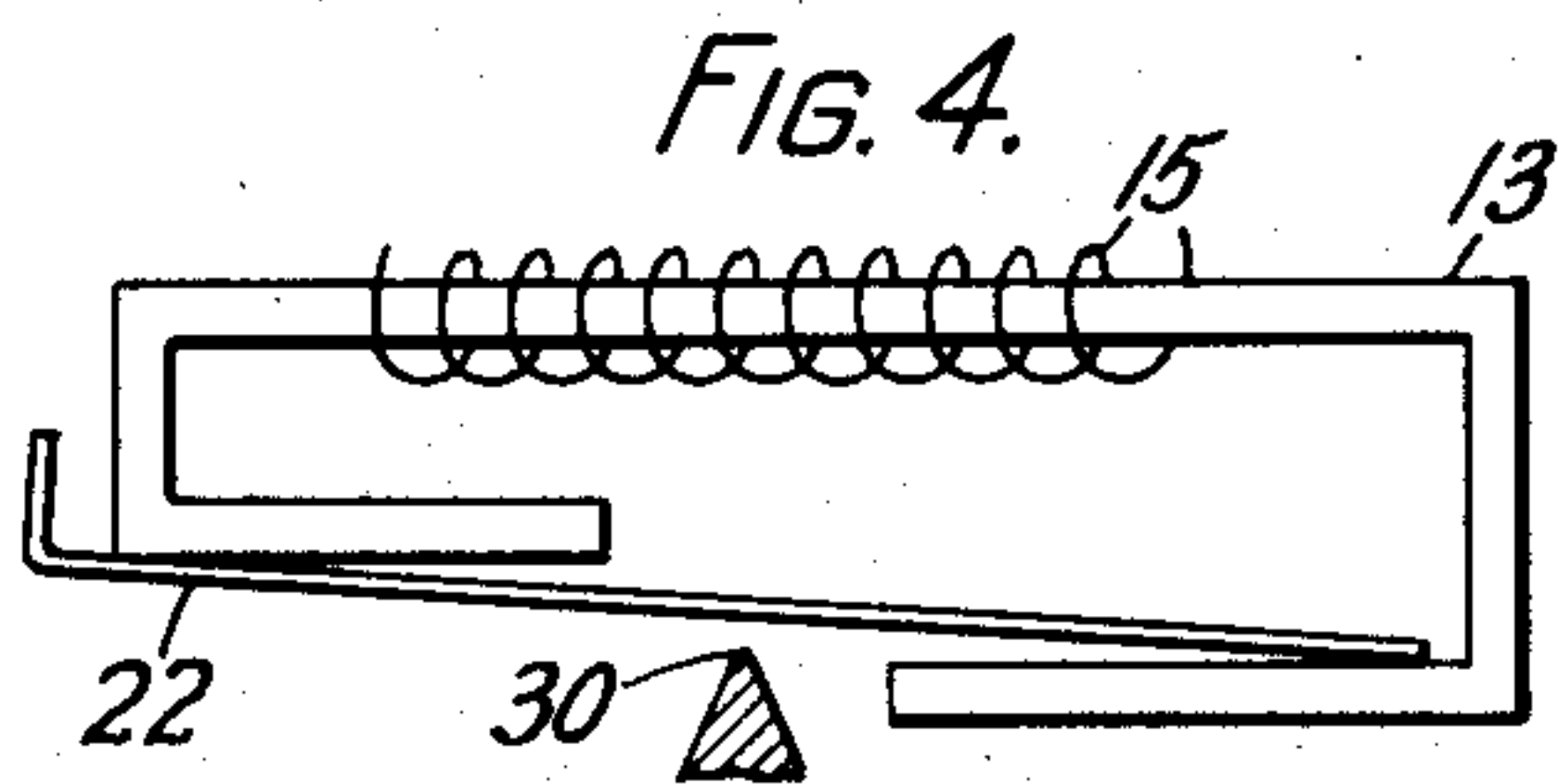
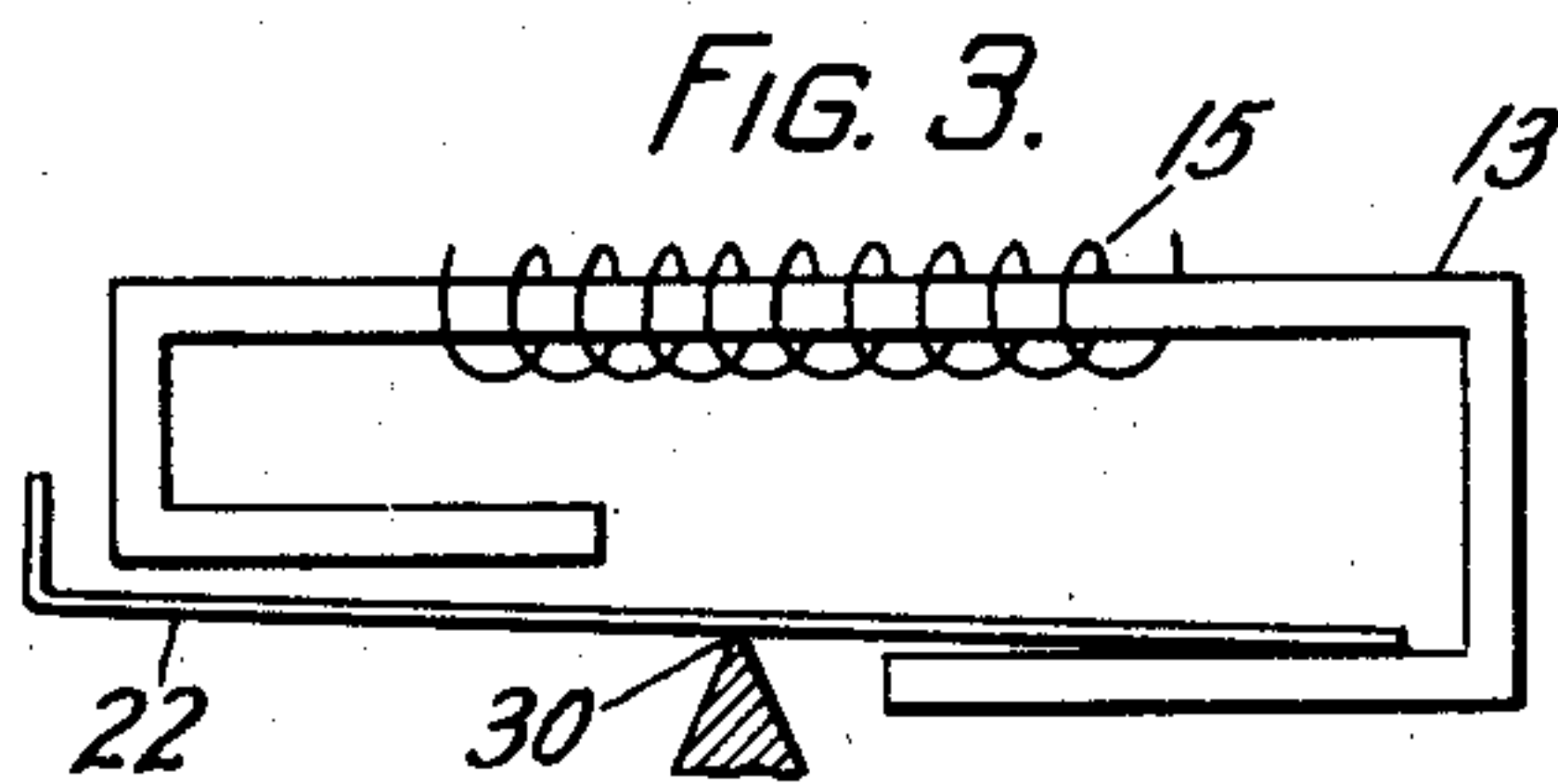
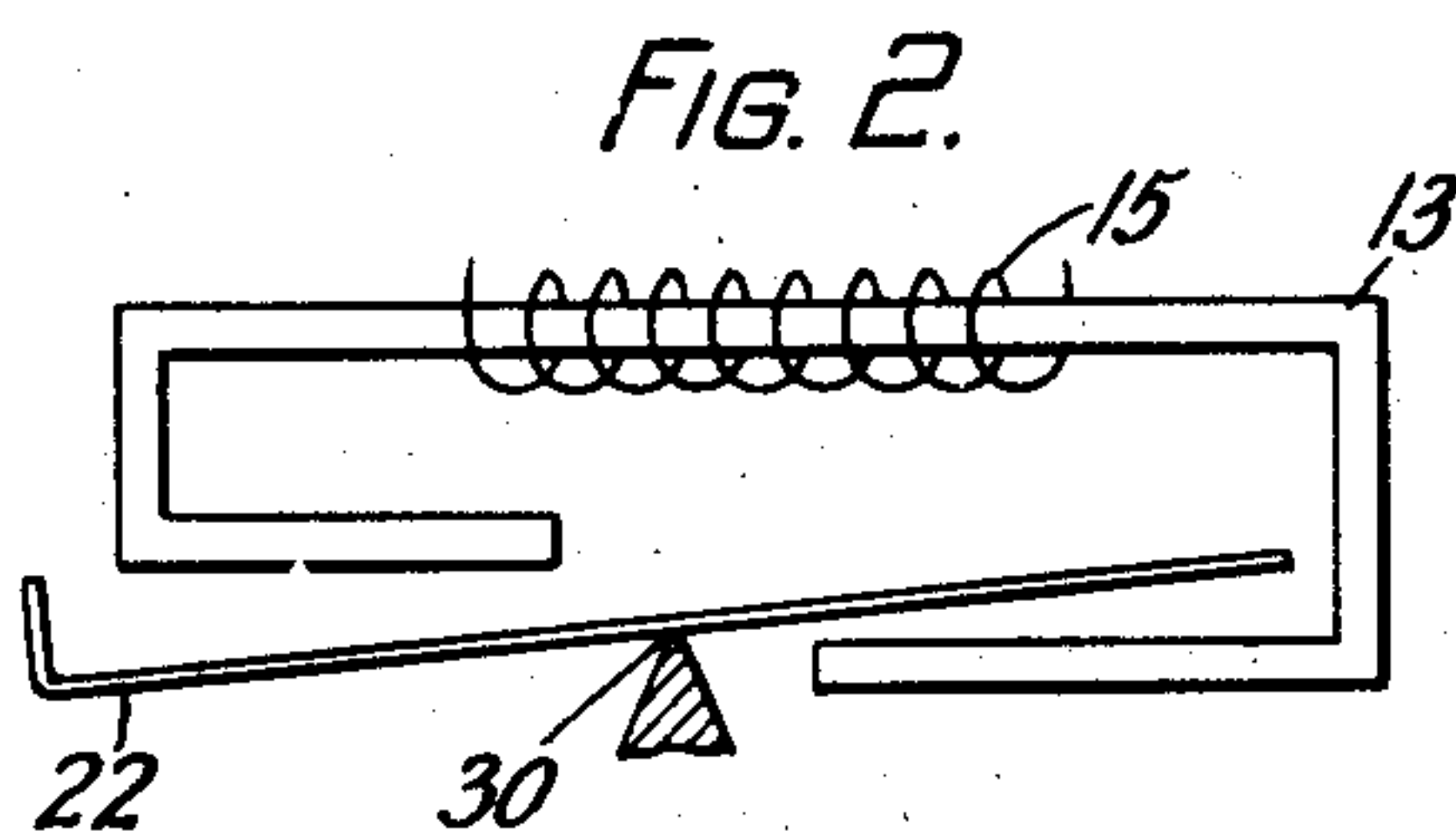
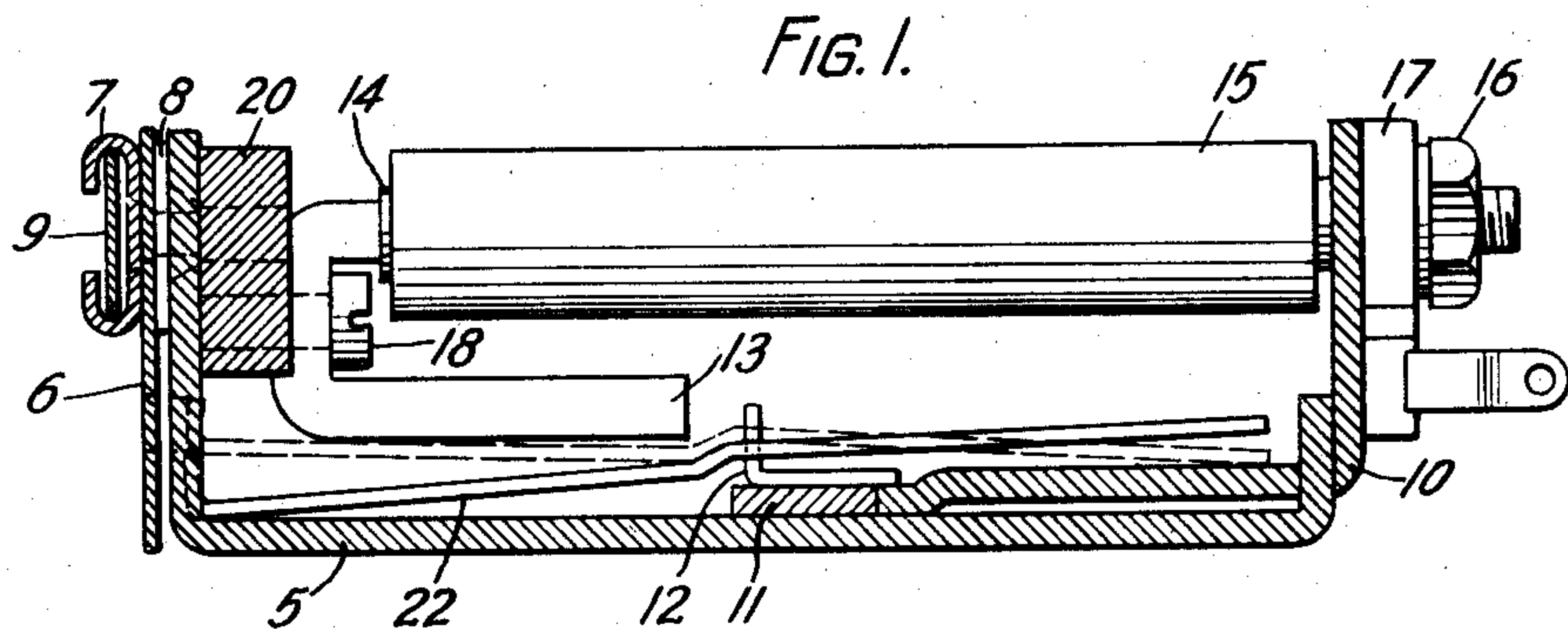


June 10, 1930.

N. Y. PRIESSMAN
ELECTROMAGNETIC DEVICE
Filed Jan. 19, 1929

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ELECTROMAGNETIC DEVICE

Application filed January 19, 1929. Serial No. 333,644.

This invention relates to electromagnetic signaling devices, and more particularly to such devices wherein the force of gravity is utilized to restore the moving element or armature to its normal position.

In devices of this character it is necessary, in order to initially actuate the moving element or armature from its position of rest, that a force of sufficient magnitude to offset the opposing force of gravity be supplied. In order to produce such a force magnetically, the core of the operating magnet must be sufficiently energized; that is, current of suitable amperage must be passed through the operating winding of the magnet to set up a magnetic field strong enough to move the armature through its operating distance. Ordinarily, to insure the positive action of the moving element, a magnetizing force is employed which produces magnetic saturation of the core, so that when the magnetizing force is removed, the moving element tends to stick or adhere to the magnet core due to residual magnetism. This sticking characteristic of devices of this nature is objectionable.

Heretofore, this objectionable feature has been overcome or minimized to a considerable degree by the use of a comparatively heavy armature. In such cases the weight of the armature was made sufficiently great to render the tractive effort produced by the residual magnetism ineffective, thereby insuring the prompt release of the armature upon the cessation of the magnetizing force. The increased weight of the moving element in this type of structure necessitates a correspondingly greater initial tractive force to operate it, which in turn requires a larger magnetizing force for its production.

Springs have also been employed in an endeavor to overcome this objectionable feature of sticking. The restoring force due to the springs increases during the travel of the armature, thus obviating the necessity for a comparatively great initial operating force. Due to the delicate structure of such restoring springs and the precise adjustments required thereof, their use has not been entirely satisfactory.

It is the object of this invention to produce an electromagnetic device wherein the initial force required to actuate the moving element is relatively small and wherein a restoring force of sufficient magnitude to overcome the sticking effect due to residual magnetism is obtained.

This object is attained in accordance with a feature of the invention by the provision of a substantially balanced armature which is normally fulcrumed at a point approximately midway of its extremities and which, during its actuation, is raised from its normal fulcrum and caused to pivot about one of its free ends.

The invention will be readily understood from the following detailed description made with reference to the accompanying drawings in which Fig. 1 is a side elevation of an electromagnetic device, or drop embodying the feature of the invention; Figs. 2, 3 and 4 are conventional drawings showing several positions of the armature or shutter during the course of its actuation.

A mounting plate 5 is made of suitable dimensions to accommodate a plurality of electromagnetic signaling devices or drops, there being but one shown in the drawings. A designation strip holder 7 and a face plate 6 are mounted in any suitable manner on the front face of the mounting plate 5, a spacing element 8 separating the face plate 6 from the mounting plate. The holder 7 is so formed as to permit the insertion of and retain in place the designation strip 9. A rear flange of the mounting plate 5 is notched or slotted to accommodate the L-shaped magnetic element 10, one end of which abuts against a metallic non-magnetic strip 11 which extends the entire length of the mounting plate 5 and is rigidly secured thereto. The strip 11 serves as a reinforcement to the L-shaped element 10 and also as a mounting for a plurality of pins 12, there being one pin for each drop. The pins 12 are secured to the strip 11 in any suitable manner.

A J-shaped core 13 is provided with a snugly fitting brass collar or sleeve 14 on which the windings 15 are mounted. The

core 13 extends beyond the rear-end of the mounting plate 5 and has its end threaded to accommodate the nut 16 which serves to secure the magnetic element 10 to the core, and the insulating contact block 17 in place against the element 10.

Secured to the back of the forward end of mounting plate 5 is a brass block 20 which is milled to a limited degree to form a seat for the bent portion of the core 13, so that when the screw 18 which passes through the core and engages the mounting block 20 is made up the core is made fast in its seat and prevented from twisting.

A shutter or armature 22 is provided with a hole substantially midway of its ends which accommodates the pin 12. The pin is given sufficient clearance in the hole to prevent binding when the shutter is actuated.

The front end of the shutter 22 is provided with a flange which ordinarily has its front face colored so that when the shutter assumes its actuated position, as shown in the dashed lines in Fig. 1, the colored face will appear before an aperture in the mounting plate and will be readily noticeable to the operator, there being an aperture in the face plate 6 in alignment with an aperture in the mounting plate.

The schematic representations shown in Figs. 2, 3 and 4 clearly indicate several positions of the shutter during the course of its travel from normal position to its actuated position. Fig. 2 shows the shutter 22 (like numerals are used in the schematics to identify similar parts disclosed in Fig. 1) in its normal or unactuated position, and fulcrumed at 30 which corresponds to the point of contact between the pin 12 and shutter 22, shown in Fig. 1. Fig. 3 discloses the shutter 22 partially actuated. It will be noted that, in this position, the shutter is about to lose its fulcrum point 30 and to pivot about one of its ends. Fig. 4 shows the shutter fully actuated. In this position the shutter is raised completely from the fulcrum 30. The pin 12 extending through the hole in the shutter prevents any slippage.

In order to start the shutter in motion, a substantially smaller force is required with the fulcrum initially midway of its extremities than with it at one of its free ends. This is quite obvious since the tractive effort required initially, need only be of sufficient magnitude to move the substantially balanced armature. Upon reaching a position such as shown in Fig. 3, the reluctance of the air-gaps is considerably reduced, resulting in an increase of magnetic flux. The force exerted on the armature or shutter will be correspondingly greater and will increase as the length of the air-gap decreases.

It is evident from the foregoing that applicant has devised a structure in which the large magnetizing force usually required to

initially actuate the moving element in devices of this nature is not necessary, and the flux density in the core is reduced.

When the shutter is fully actuated, as shown in Fig. 4, it rests on one of its extremities so that the force of gravity acting upon the entire mass of the armature is sufficiently large to overcome the residual magnetism tending to hold the shutter to the pole piece.

Applicant's device permits the use of a relatively small magnetizing force to produce sufficient pull to positively actuate the shutter, and by changing the axis of rotation of the shutter during its motion, increases the restoring force on the shutter thereby insuring its prompt release when the magnetizing force is discontinued.

What is claimed is:

1. In an electromagnetic device, an armature having a plurality of fulcrum points on which it pivots during the course of a single actuation thereof.

2. In an electromagnetic device, an armature, a fulcrum on which said armature pivots during a part of its actuation, and a second fulcrum on which said armature pivots during another part of the same actuation.

3. In an electromagnetic device, an armature normally fulcrumed at a point substantially midway of its ends and means for causing said armature to successively pivot about its normal fulcrum and one end.

4. In an electromagnetic device, an armature having a plurality of leverages during a single actuation thereof and means for actuating said armature.

5. In an electromagnetic device, an energizing coil, an armature having a plurality of fulcrum points on which its pivots in response to the energization of said coil.

In witness whereof, I hereunto subscribe my name this 18th day of January, 1929.

NEIL Y. PRIESSMAN.