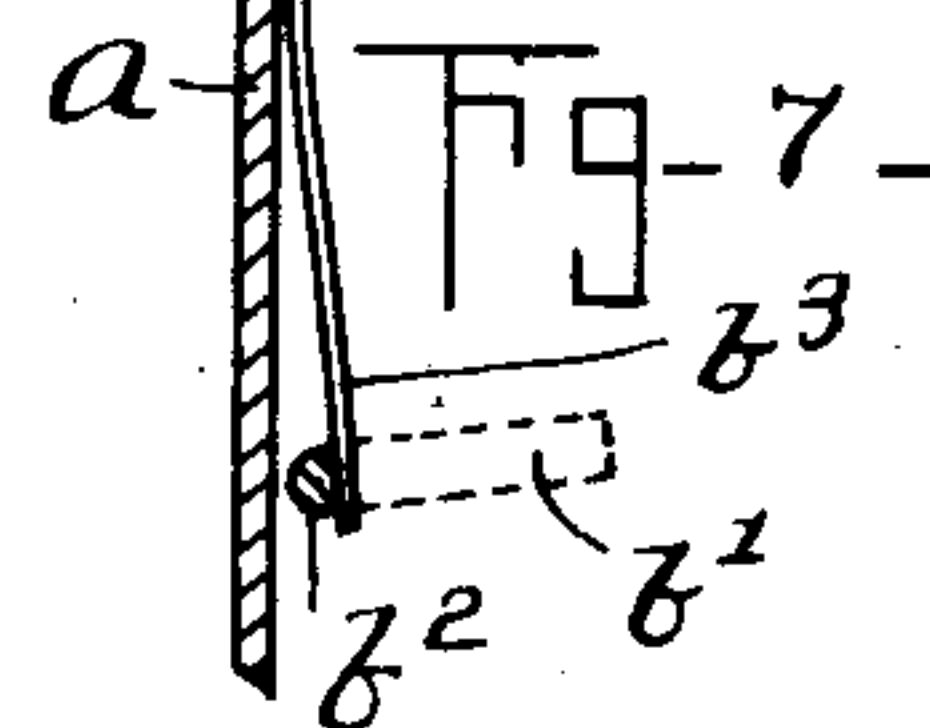
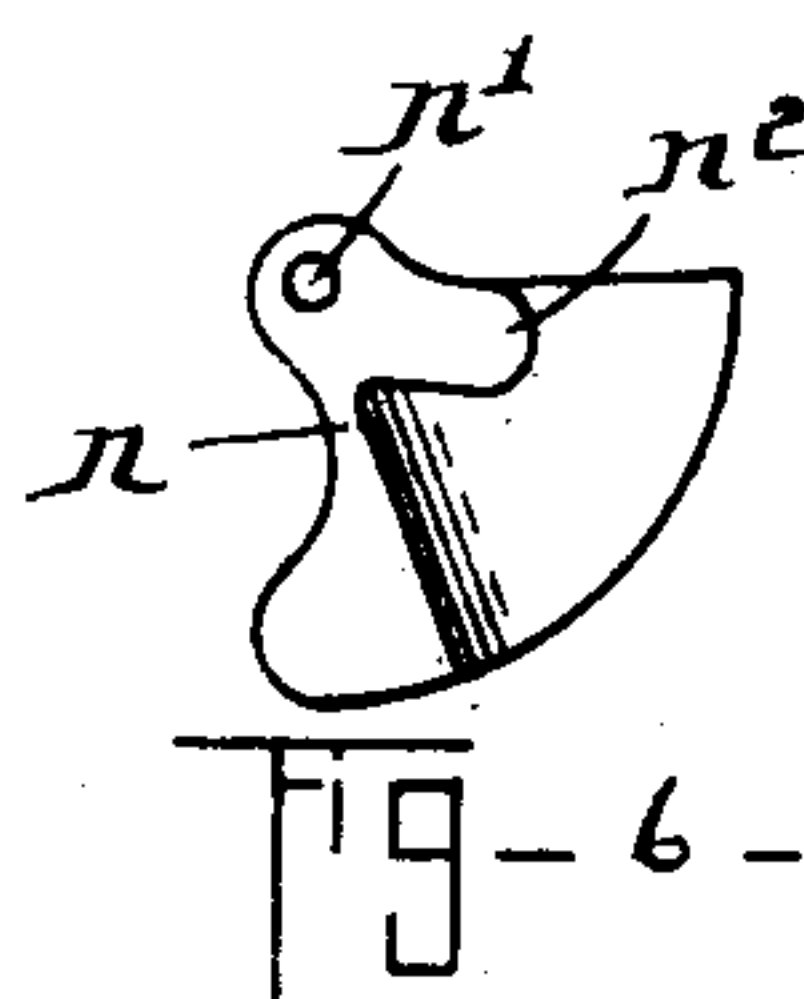
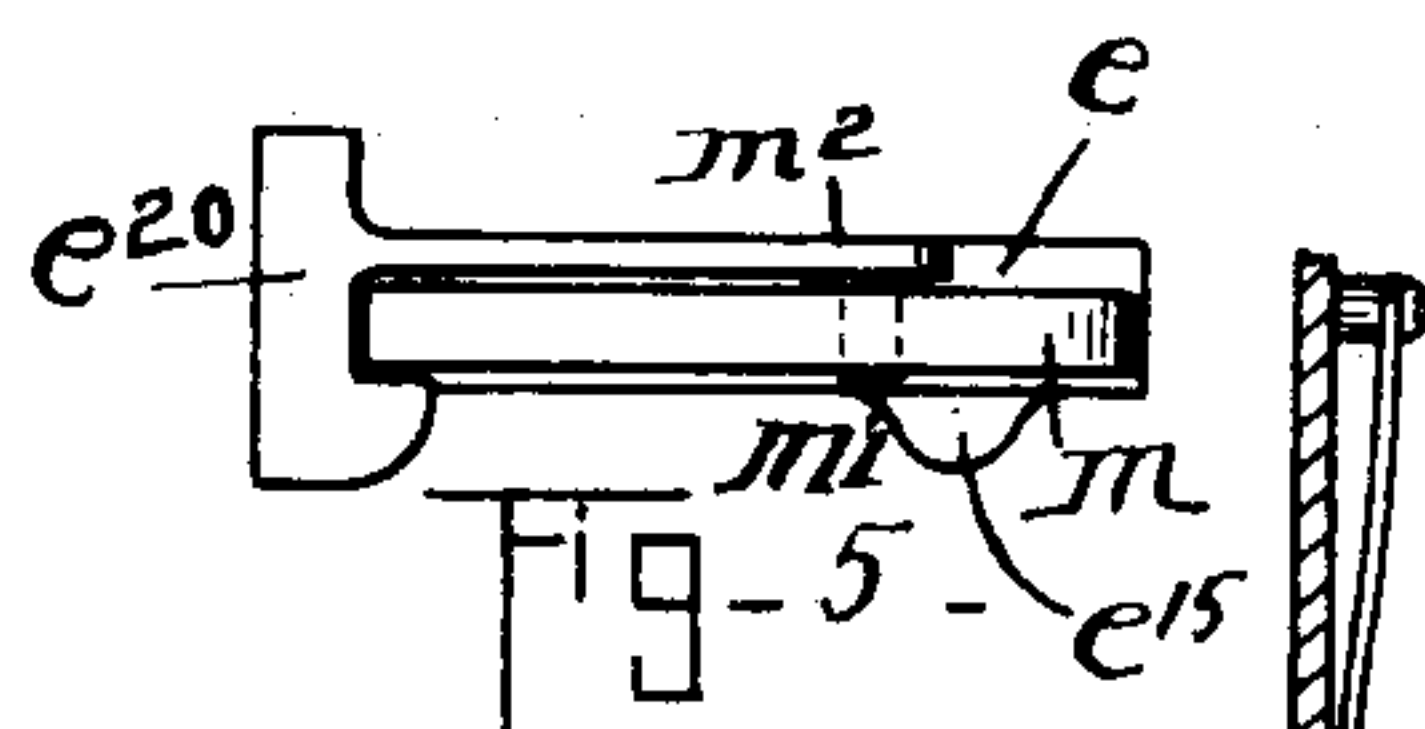
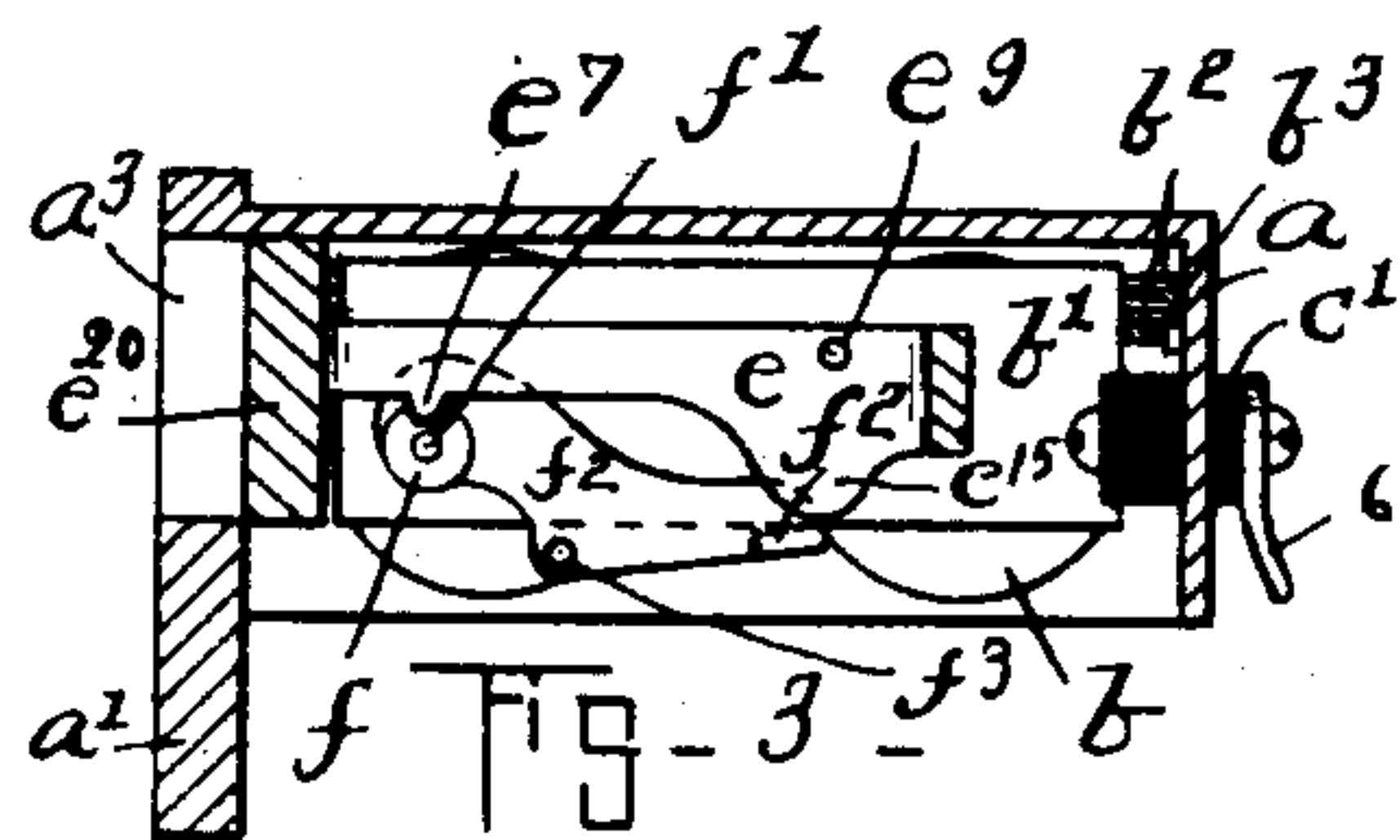
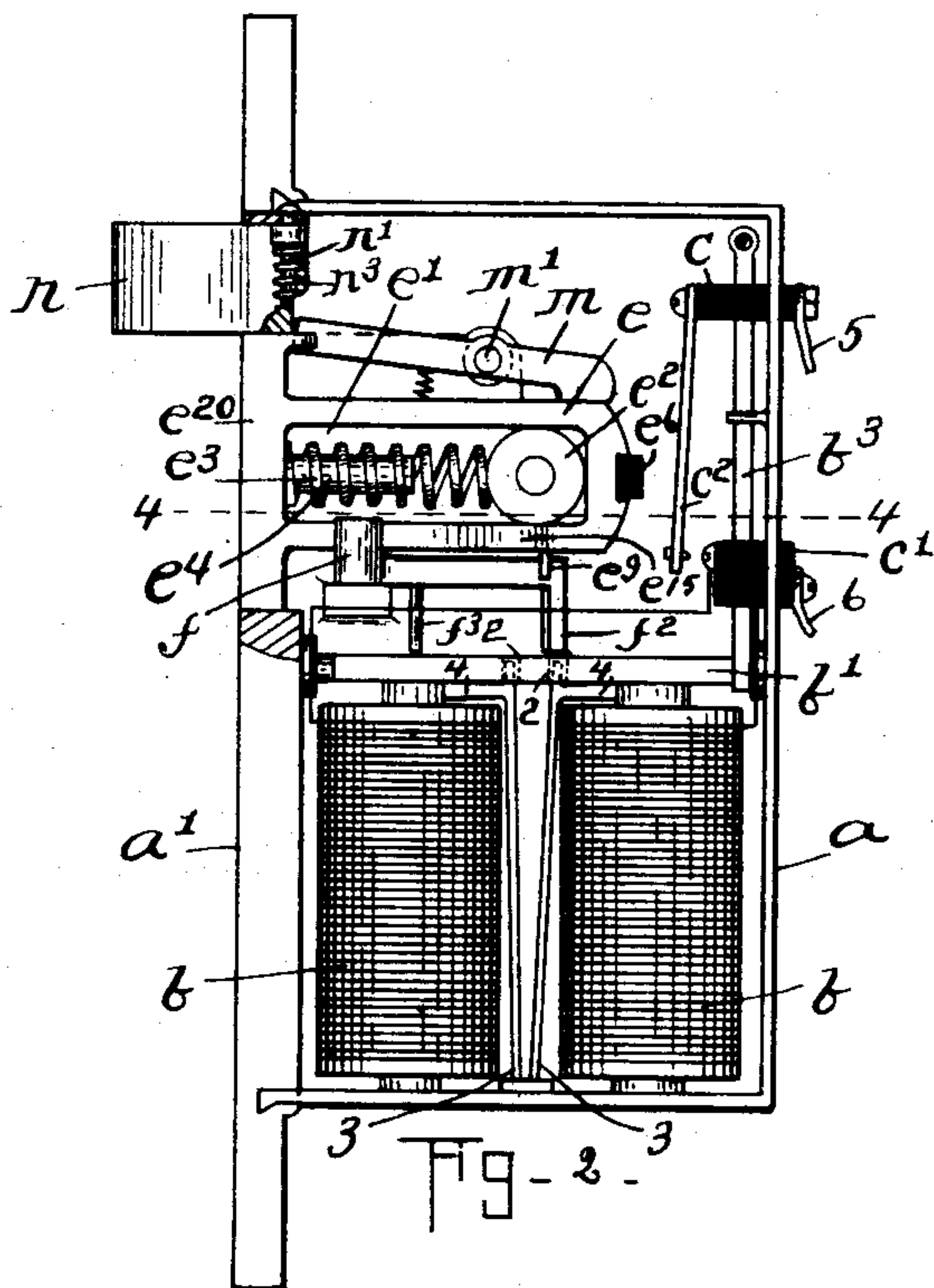
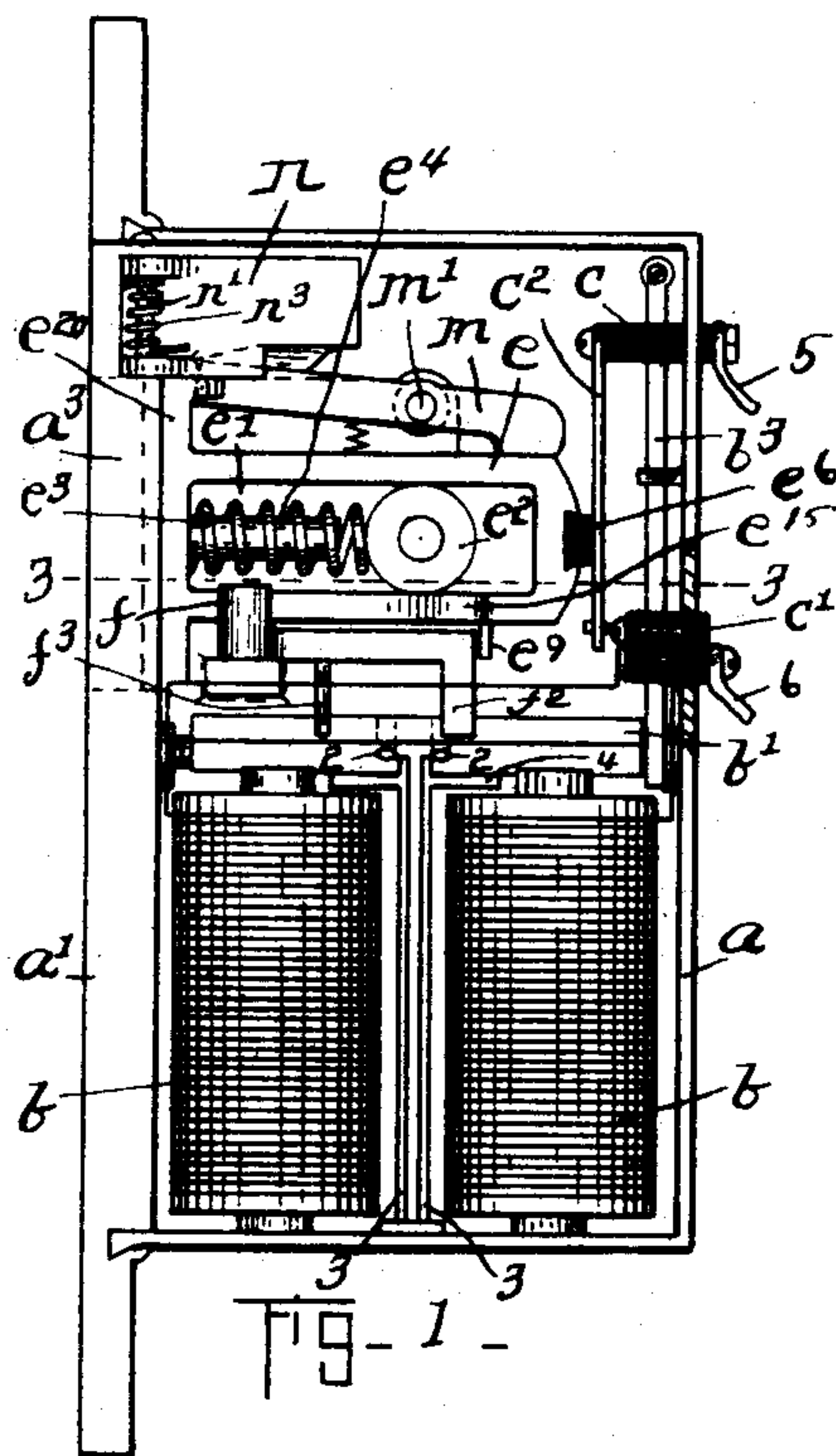


J. M. G. GOULD.

ELECTROMAGNETICALLY OPERATED DOOR OPENER.

(Application filed Nov. 26, 1900.)

(No Model.)



UNITED STATES PATENT OFFICE.

JOHN M. G. GOULD, OF BOSTON, MASSACHUSETTS.

ELECTROMAGNETICALLY-OPERATED DOOR-OPENER.

SPECIFICATION forming part of Letters Patent No. 682,796, dated September 17, 1901.

Application filed November 26, 1900. Serial No. 37,752. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. G. GOULD, residing in Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Electromagnetically-Operated Door-Openers, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings representing like parts.

10 This invention has for its object to improve and simplify the construction of electromagnetically-operated door-openers.

The invention consists in providing means for holding the armature of the electromagnet against vibration except when operated by the energized electromagnet, thereby providing against releasing the actuating mechanism by a shock or jar; also, in providing a circuit-operating device adapted to be operated by the actuating mechanism to open the circuit as soon as said actuating mechanism is released, thereby providing against excessively using the battery by holding the circuit closed for an unnecessary length of time; also, in providing an actuating member which when released moves outward and is constructed and arranged to positively thrust inward the spring-bolt on the door, so that the door can be opened, said member thereby constituting a bolt-actuating member; also, in constructing suitable mechanism for releasing and otherwise controlling the operation of said bolt-actuating member; also, in providing means for restoring or resetting the bolt-actuating member adapted to be operated by the closing of the door.

15 20 25 30 35

Figure 1 shows in front elevation an electromagnetically-operated door-opener embodying this invention, the parts being in the position they will occupy when the bolt-actuating member is "set" and the door locked. Fig. 2 is a similar view showing the parts in the position they will occupy when the bolt-actuating member has been released and the door is opened. Fig. 3 is a cross-section of the door-opener shown in Fig. 1, taken on the dotted line 3 3 looking downward. Fig. 4 is a similar cross-section of the door-opener shown in Fig. 2, taken on the dotted line 4 4 looking downward. Fig. 5 is a plan view of the bolt-actuating member. Fig. 6 is a detail of a pivoted cam-block adapted to be

40 45 50

struck by the door, and thereby restore or reset the bolt-actuating member. Fig. 7 is a detail showing the retractile spring for the armature for the electromagnet, and Fig. 8 is a plan view of the bolt-actuating member and cam-block for restoring or resetting it.

a represents a case which contains the operating parts, and it has formed or provided on one side of it a striker-plate *a'*. This case, with its striker-plate, is adapted to be inserted in a mortise cut in the jamb of the door-frame. *b* is an electromagnet contained in said case *a*, and *b'* its pivoted armature. As herein shown, one of the journals, as *b*², of said pivoted armature is flattened on one side, (see Fig. 7,) and a long slender flat spring *b*³ is connected to the frame, the free end of which bears upon said flattened side of the journal *b*² and acts to normally hold the pivoted armature in its retracted position, as shown in Figs. 1 and 7. The spring *b*³ therefore serves as a retractile spring for the armature. The pivoted armature *b'* is formed or provided with two sockets 2 2, although any other number of sockets may be provided, and back of said armature two spring-acting arms 3 3 are located, which are made quite long and slender, and said arms are attached at their lower ends to the case, and their upper ends terminate quite close to the armature and adjacent the sockets 2 2. When said spring-acting arms 3 3 are held in their normal position, as shown in Fig. 1, by their inherent spring action, they will be disposed out of alinement with the sockets 2 2 and will consequently serve as back-stops for the armature, to thereby prevent movement of said armature toward the electromagnet *b*, so that in the event of any shock or jar the said armature will not be moved to release the actuating mechanism. The spring-acting arms 3 3 are formed or provided at or near their upper ends with auxiliary armatures 4 4, one for each core or pole piece of the electromagnet *b*, and when said electromagnet is energized said auxiliary armatures 4 4 will be attracted, and when so moved the arms 3 3 will be moved in opposite ways and will be brought into correct alinement with the sockets 2 2. The armature *b'* may at such time be attracted by the energized electromagnet to thereby release the actuating mech-

55 60 65 70 75 80 85 90 95 100

anism. I may employ any number of stop-arms 3 3, although two are herein shown, which are adapted to be moved in opposite ways, and in practice I prefer to employ two
5 stop-arms which are movable in opposite ways.

One of the circuit-wires, as 5, is connected to a binding-post c , of insulating material, and the other circuit-wire, as 6, is connected
10 to a binding-post c' , of insulating material, said binding-posts being set in one side wall of the case a , and a contact-spring c^2 is attached to one of said posts, as c , for instance, the opposite or free end of which is adapted
15 to engage and make contact with a contact-point on the post c' , and said contact-spring c^2 serves as an automatic circuit-operating device for the circuit of the electromagnet b . The contact-spring c^2 is normally held in en-
20 gagement with the contact-point to thereby close the circuit at such point by a coöperative part of the actuating mechanism and will be released whenever said actuating mechanism is released to thereby open the
25 circuit at such time.

By providing a circuit-operating device having the functions above set forth it will be seen that the battery is saved, as the circuit is immediately automatically opened
30 whenever the actuating mechanism is released, and even if the press-button or other circuit-operating device for the circuit of the electromagnet b should be held closed by the operator for an unnecessary length of time
35 no more current will be used than is required to operate the electromagnet and release the actuating mechanism.

The striker-plate a' has a recess a^3 , (see dotted lines, Fig. 1,) adapted to receive any
40 usual spring-bolt on the door when said door is closed. A bolt-actuating member e is provided for positively thrusting said spring-bolt out of said recess whenever released, so that the door can be opened, and in this particular my door-opener differs essentially
45 from any known to me. The bolt-actuating member consists of a plate having a slot or opening e' formed in it, which receives a stud e^2 , projecting from the case, and said stud is
50 made of suitable size to serve as a guide and support for said plate. One end of said plate, as e^{20} , is made of suitable size and shape to enter the recess a^3 in the striker-plate and to form the bottom wall of said recess, and
55 said end portion e^{20} has an abutting face adapted to bear upon or against the bolt. The bolt-actuating member e has a sliding movement sufficient for its end portion e^{20} to move outward to a position whereby its abut-
60 ting face is flush with the face of the striker-plate a' , and when said member is thus moved the bolt contained in the recess will be positively thrust out of the recess. The bolt-actuating member e is thrust outward by
65 means of a spring e^3 , which, as herein shown, is contained in the slot or opening e' , being supported on a stud e^4 and bearing at one

end against the bolt-actuating member and at the other end against the stud e^4 . This bolt-actuating member e is herein shown as
70 the member which is selected for operating the circuit-operating device c^2 , and it is therefore provided with a projection e^6 of insulating material which is adapted to engage the contact-spring c^2 . The bolt-actuating
75 member e has a detent e^7 , (see Figs. 3 and 4,) which normally enters a recess formed or provided in the hub of a locking-lever f , which is pivoted at f' to the case, and as said member e moves or slides in either direction the
80 locking-lever f will be correspondingly moved, yet said parts may be otherwise connected together. It is intended that the locking-lever f shall hold the member e in its normal or set position, as shown in Figs. 1 and 3,
85 and when released shall permit said member e to be moved outward by the spring e^3 , and when said member e is restored or reset to employ said member e as the means for restoring or resetting said locking-lever f .
90 Therefore a connection between said parts becomes necessary.

The locking-lever f has at its outer end a detent f^2 , which normally engages the pivoted
95 armature b' of the electromagnet b and is held by said armature in its normal or set position, (see Figs. 1 and 3;) but when said armature b' is attracted said locking-lever will be released and will be swung on its pivot
100 into the position shown in Figs. 2 and 4, such movement being caused by the spring e^3 moving the bolt-actuating member. The locking-lever f has also a stop-pin f^3 , and when said lever is swung into its abnormal position, Fig.
105 4, said stop-pin will occupy a position just over or above the armature b' , and thereby serve to mechanically hold said armature in its attracted position until said locking-lever is restored or reset. The bolt-actuating member
110 e has also a pin e^9 projecting from it at such point as to cross the path of movement of the locking-lever when the parts are released and to thereby engage and mechanically hold said locking-lever in its abnormal
115 position. (See Fig. 4.) The bolt-actuating member e has a projection or ear e^{15} , which overlies the end of the locking-lever f to prevent said locking-lever rising if it should work loose on its pivot. Whenever the bolt-actuating member e is released by releasing
120 the locking-lever and the parts are moved by the spring e^3 into their abnormal positions, they will remain in such position until positively restored or reset by means provided for this purpose. The means herein shown
125 for restoring or resetting said parts consists, essentially, of a pivoted cam-block n adapted to be engaged and operated by the closing of the door. The cam-block n is pivoted at n' to the case a and is formed with a shoulder
130 n^2 on its under side, (see Fig. 6,) which is adapted to engage one end of a latch m , pivoted at m' to an ear m^2 on the top side of the bolt-actuating member e . The cam-block n is

normally concealed within the case, as shown in Fig. 1, but is adapted to be turned on its pivot and projected out of the case, as shown in Fig. 2, by means of spring n^3 . The tendency of the spring n^3 is to continuously thrust outward said cam-block, and, consequently, whenever the door is opened and the cam-block thus released it will project. When said cam-block is struck by the door, it will be turned on its pivot against the action of said spring n^3 , and its shoulder n^2 will strike against the end of the latch m , and the bolt-actuating member e will be thrust inward by said cam-block until it has been returned to its normal position and has in turn reset the locking-lever f , and at such time said shoulder n^2 will slip off of or pass by the end of said latch. The bolt-actuating member e having thus been restored or reset is free to move outward independent of said cam-block whenever released, so that the bolt of the door can be thrust out of the recess a^3 before the cam-block is released by the opening of the door.

I claim—

1. In an electromagnetically-operated door-opener, the combination with the actuating mechanism, of an electromagnet for releasing it having a pivoted armature, a stop-arm for normally holding said armature in its retracted position, and an auxiliary armature borne by said stop-arm adapted to be attracted by said electromagnet for moving said stop-arm into position to permit said armature to be attracted, substantially as described.

2. In an electromagnetically-operated door-opener, the combination with the actuating mechanism, of an electromagnet for releasing it having a pivoted armature provided with one or more sockets, and one or more stop-arms normally held out of alinement with said sockets, each bearing an auxiliary armature for moving it into alinement with its socket when the electromagnet is energized, substantially as described.

3. In an electromagnetically-operated door-opener, the combination with the actuating mechanism, of an electromagnet for releasing it having a pivoted armature provided with one or more sockets, and one or more stop-arms normally held out of alinement with said sockets, and means for moving said stop-arms into alinement with said sockets operated by the energized electromagnet, substantially as described.

4. In an electromagnetically-operated door-opener, the combination with the actuating mechanism, of an electromagnet for releasing it having a pivoted armature provided with two sockets, two stop-arms located between the coils of said electromagnet and normally held out of alinement with said sockets and movable in opposite ways to register with said sockets, and an auxiliary armature borne by each stop-arm, substantially as described.

5. In an electromagnetically-operated door-opener, the combination with the actuating

mechanism, of an electromagnet for releasing it, a pivoted armature therefor having one of its journals formed with a flat side, and a flat spring bearing on the flat side of said journal for normally holding the armature in its retracted position, thereby serving as a retractile spring for said armature, substantially as described.

6. In an electromagnetically-operated door-opener, the combination with the bolt-actuating mechanism, of an electromagnet having a pivoted armature for releasing it, a circuit-operating device for the circuit of said electromagnet operated by said bolt-actuating mechanism to open the circuit automatically when said bolt-actuating mechanism is released by said pivoted armature, substantially as described.

7. In an electromagnetically-operated door-opener, a case having a striker-plate formed with a recess for the bolt, a bolt-actuating member contained in said case having an abutting face adapted to engage and thrust the bolt out of said recess, a spring for moving said bolt-actuating member outward, a locking device for locking said bolt-actuating member in its "set" position and an electromagnet for operating said locking device to release said bolt-actuating member, substantially as described.

8. In an electromagnetically-operated door-opener, a case having a striker-plate formed with a recess for the bolt, a bolt-actuating member contained in said case having an abutting face adapted to engage and thrust the bolt out of said recess, a spring for moving said bolt-actuating member outward, means operated by the closing of the door for moving said bolt-actuating member inward, a locking device for locking the bolt-actuating member in its "set" position, and an electromagnet for operating said locking device to release said bolt-actuating member, substantially as described.

9. In an electromagnetically-operated door-opener, a case having a striker-plate formed with a recess for the bolt, a bolt-actuating member contained in said case having an abutting face adapted to engage and thrust the bolt out of said recess, a spring for moving said bolt-actuating member outward, a locking device for locking said bolt-actuating member in its "set" position, a pivoted cam-block operated by the closing of the door for moving said bolt-actuating member inward into engagement with said locking device, and an electromagnet for operating said locking device, substantially as described.

10. In an electromagnetically-operated door-opener, a case having a striker-plate formed with a recess for the bolt, a bolt-actuating member contained in said case having an abutting face adapted to engage and thrust the bolt out of said recess, a spring for moving said bolt-actuating member outward, a detent on said bolt-actuating member, a pivoted locking-lever having a recess for said de-

tent and also having a detent, a pivoted armature engaging the detent on said locking-lever and an electromagnet for operating said armature, substantially as described.

5 11. In an electromagnetically - operated door-opener, a case having a striker-plate formed with a recess for the bolt, a bolt-actuating member contained in said case having an abutting face adapted to engage and thrust
10 the bolt out of said recess, a spring for moving said bolt-actuating member outward, a detent on said bolt-actuating member, a pivoted locking-lever having a recess in its hub for said detent and having at its extremity a
15 detent, a pivoted armature engaging the detent on said locking-lever and an electromagnet for operating said armature, substantially as described.

20 12. In an electromagnetically - operated door-opener, a spring-actuated bolt-actuating member having a detent, a pivoted locking-lever having a recess for said detent and having a detent and also having a stop-pin, a pivoted armature engaging the detent on said
25 locking-lever when in its retracted position and engaging the stop-pin when in its attracted position, and an electromagnet for operating said armature, substantially as described.

30 13. In an electromagnetically - operated door-opener, a case having a striker-plate

formed with a recess for the bolt, a bolt-actuating member contained in said case having an abutting face adapted to engage and thrust
35 the bolt out of said recess, a spring for moving said bolt-actuating member outward, means operated by the closing of the door for moving said bolt-actuating member inward, a locking-lever for holding said bolt-actuating
40 member with its actuating-spring under tension, means for connecting said bolt-actuating member with said locking-lever, whereby said locking-lever is restored by said bolt-actuating member, a pivoted armature engaging
45 said locking-lever and an electromagnet for said armature, substantially as described.

14. In an electromagnetically - operated door-opener, a spring-actuated bolt-actuating member, a pivoted latch borne by it, a pivoted
50 cam-block for engaging said latch and restoring said bolt-actuating member, disposed to be struck and operated by the door, a locking device for said bolt-actuating member, and means for releasing it, substantially as described.

55 In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN M. G. GOULD.

Witnesses:

B. J. NOYES,

H. B. DAVIS.