

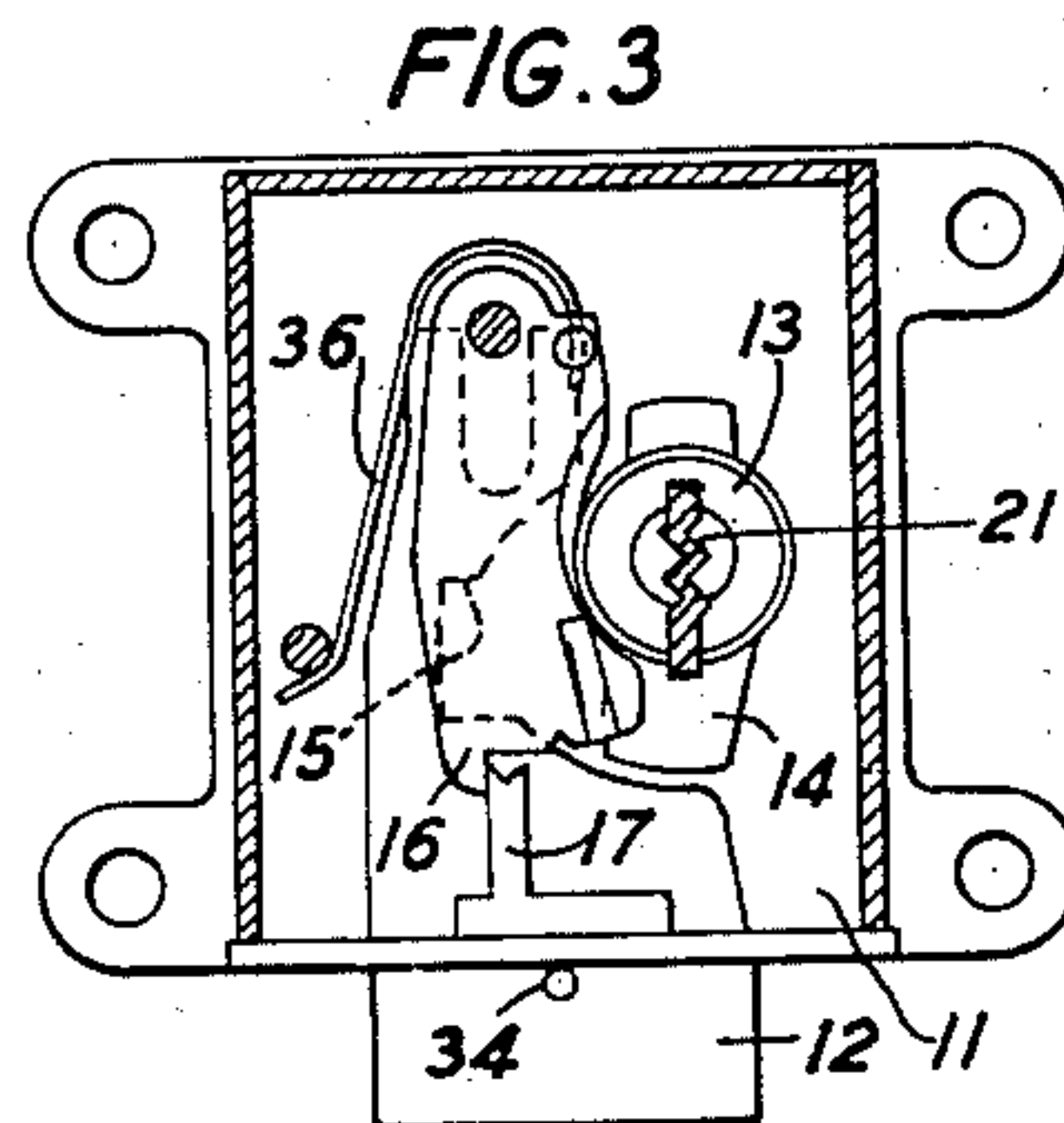
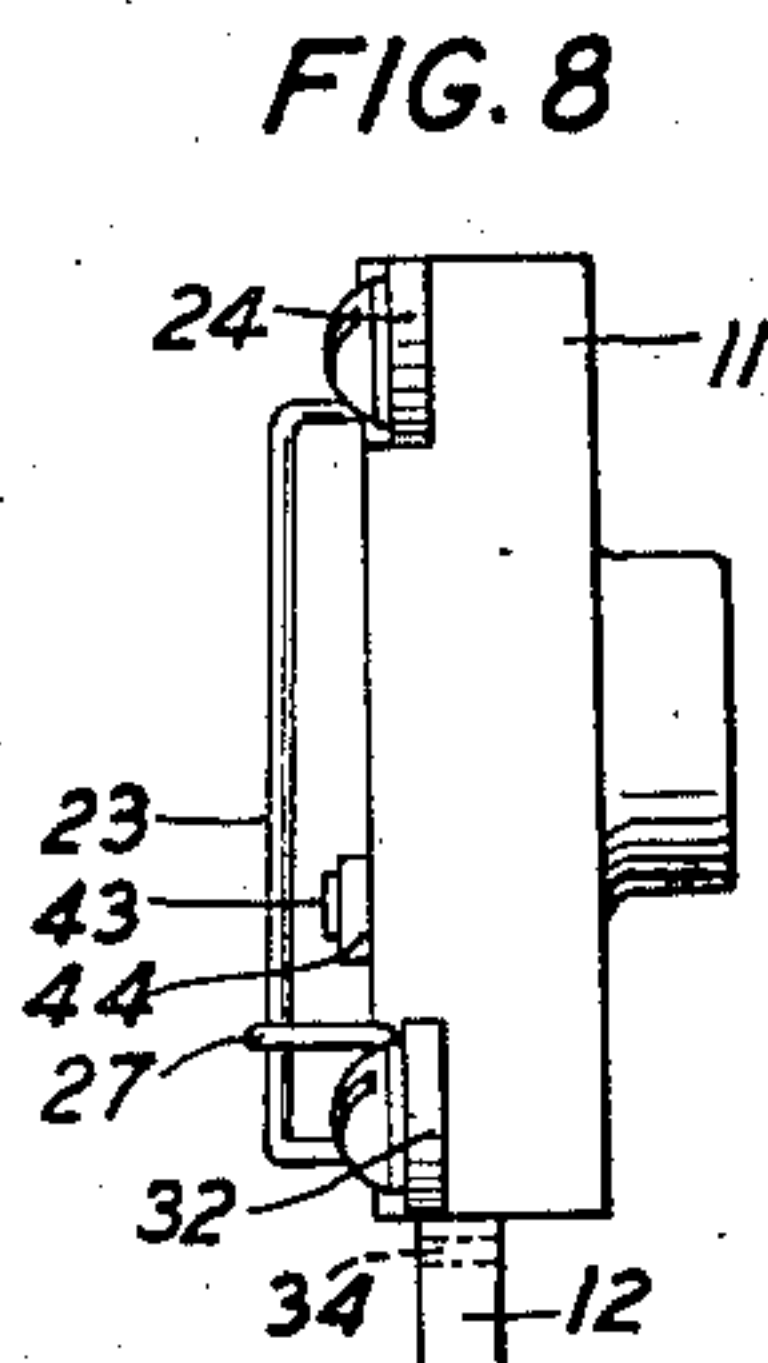
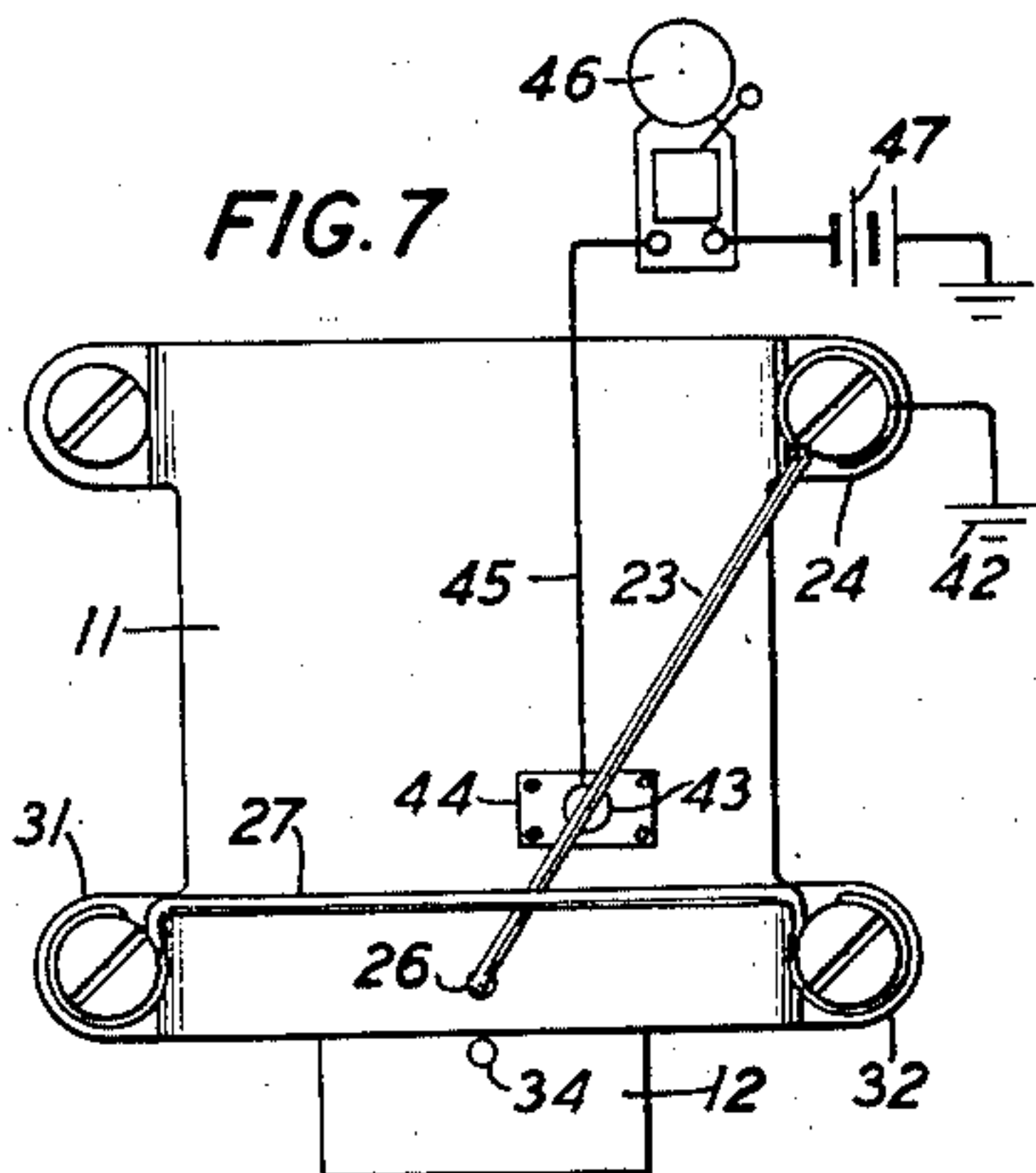
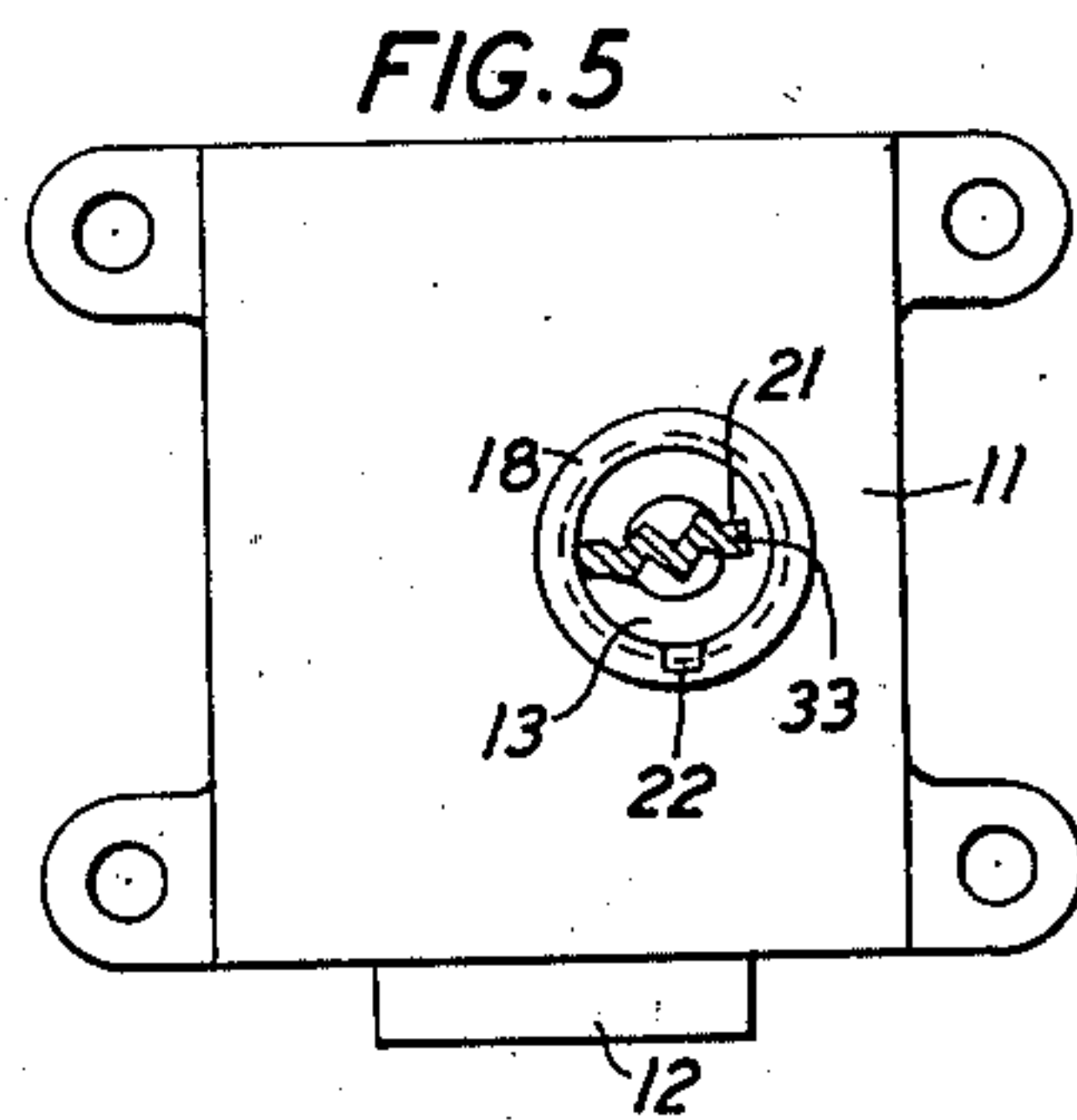
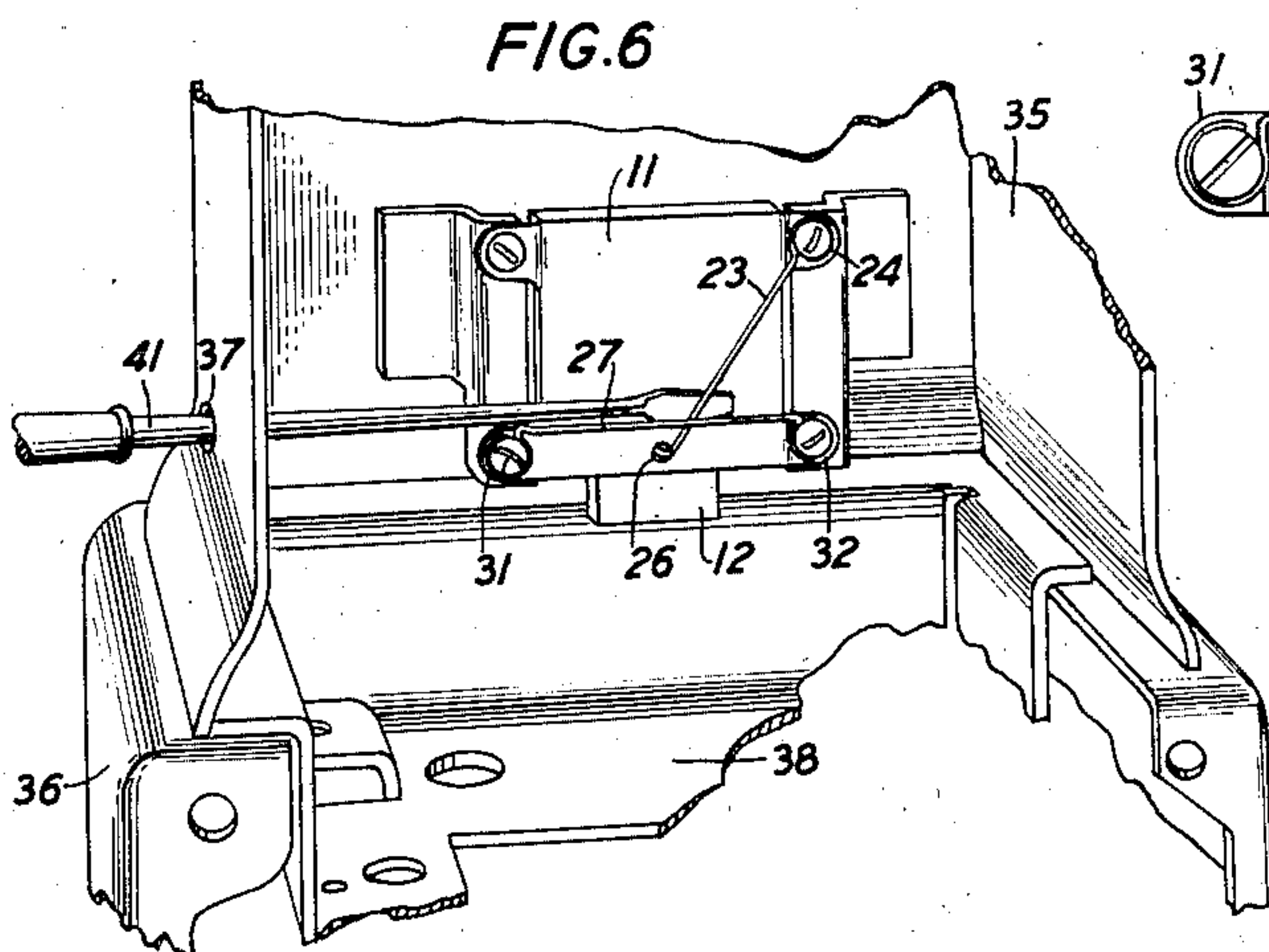
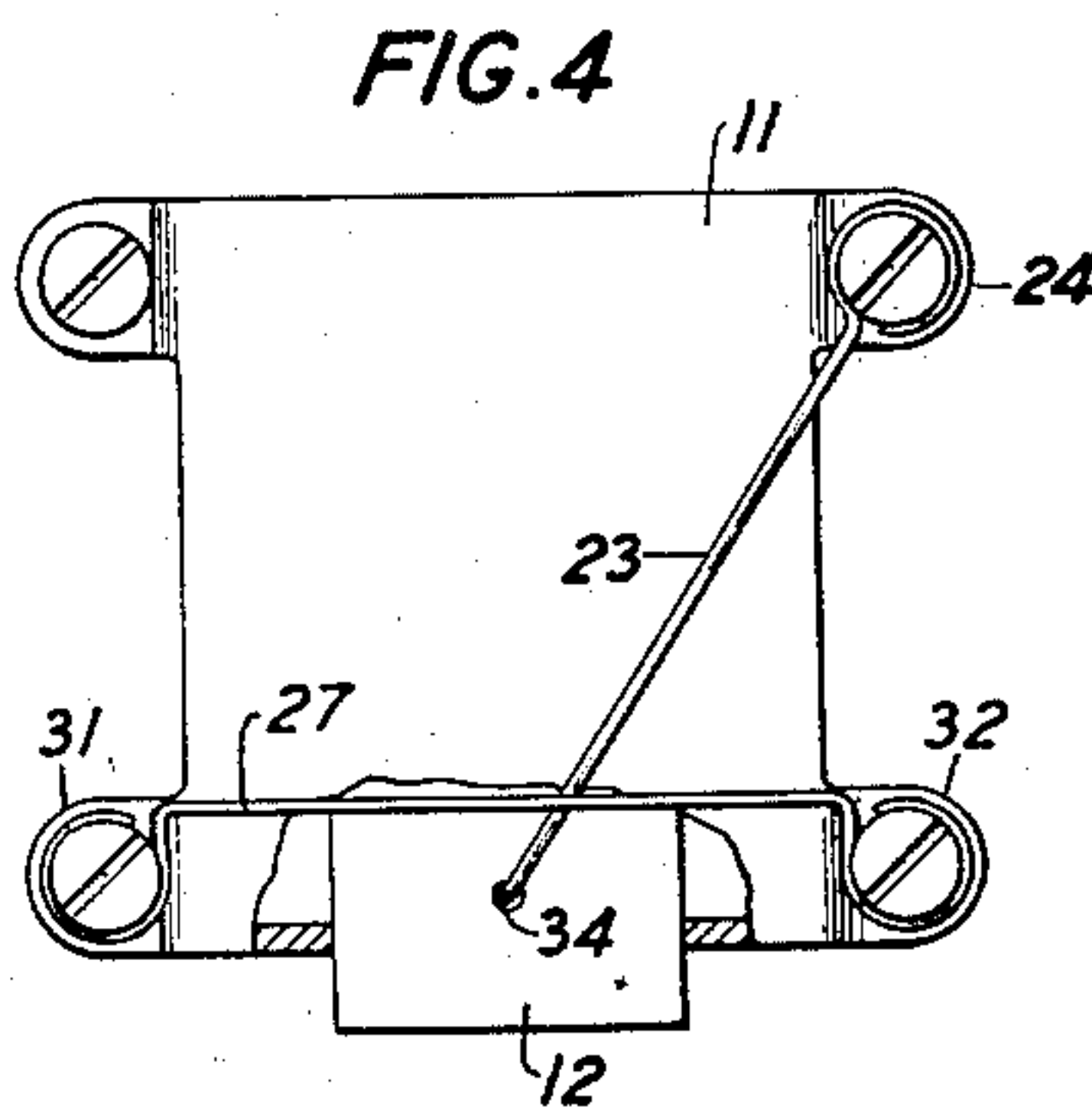
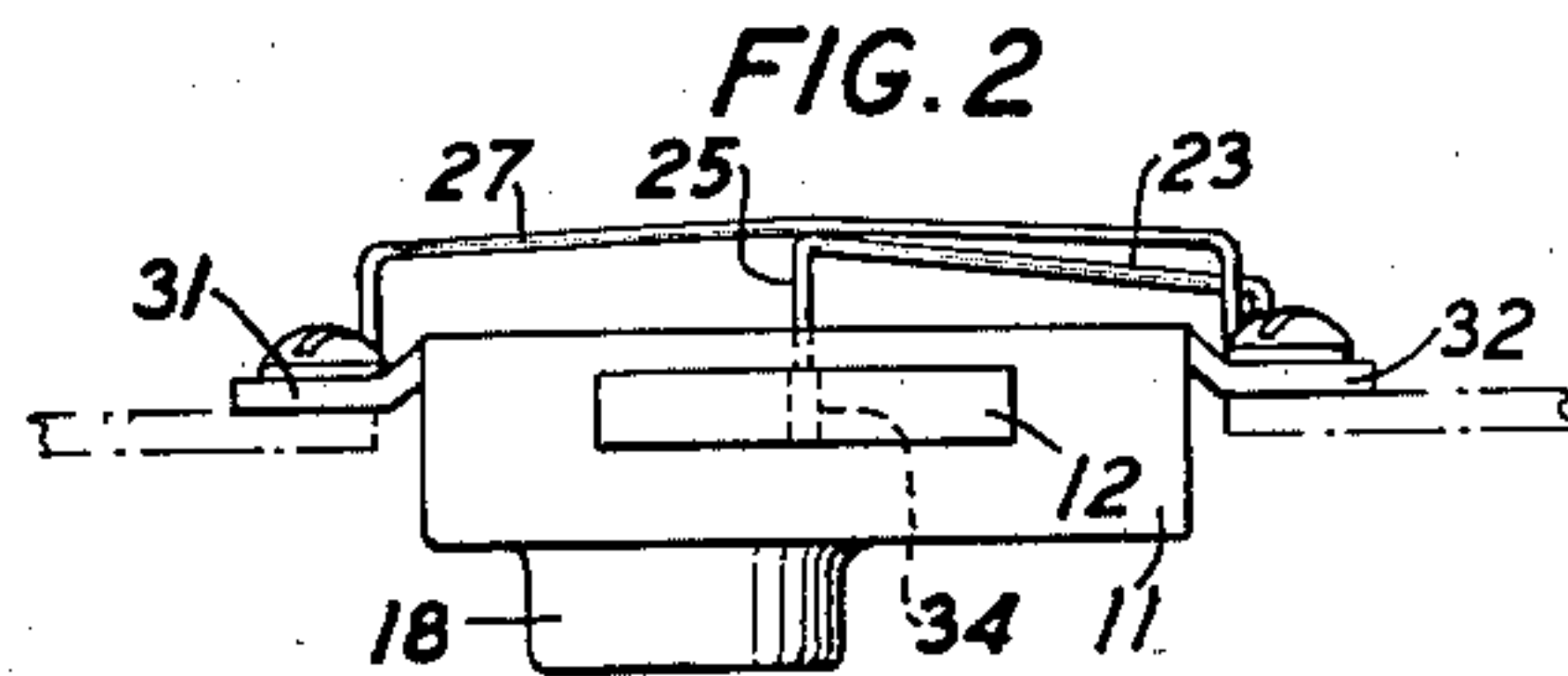
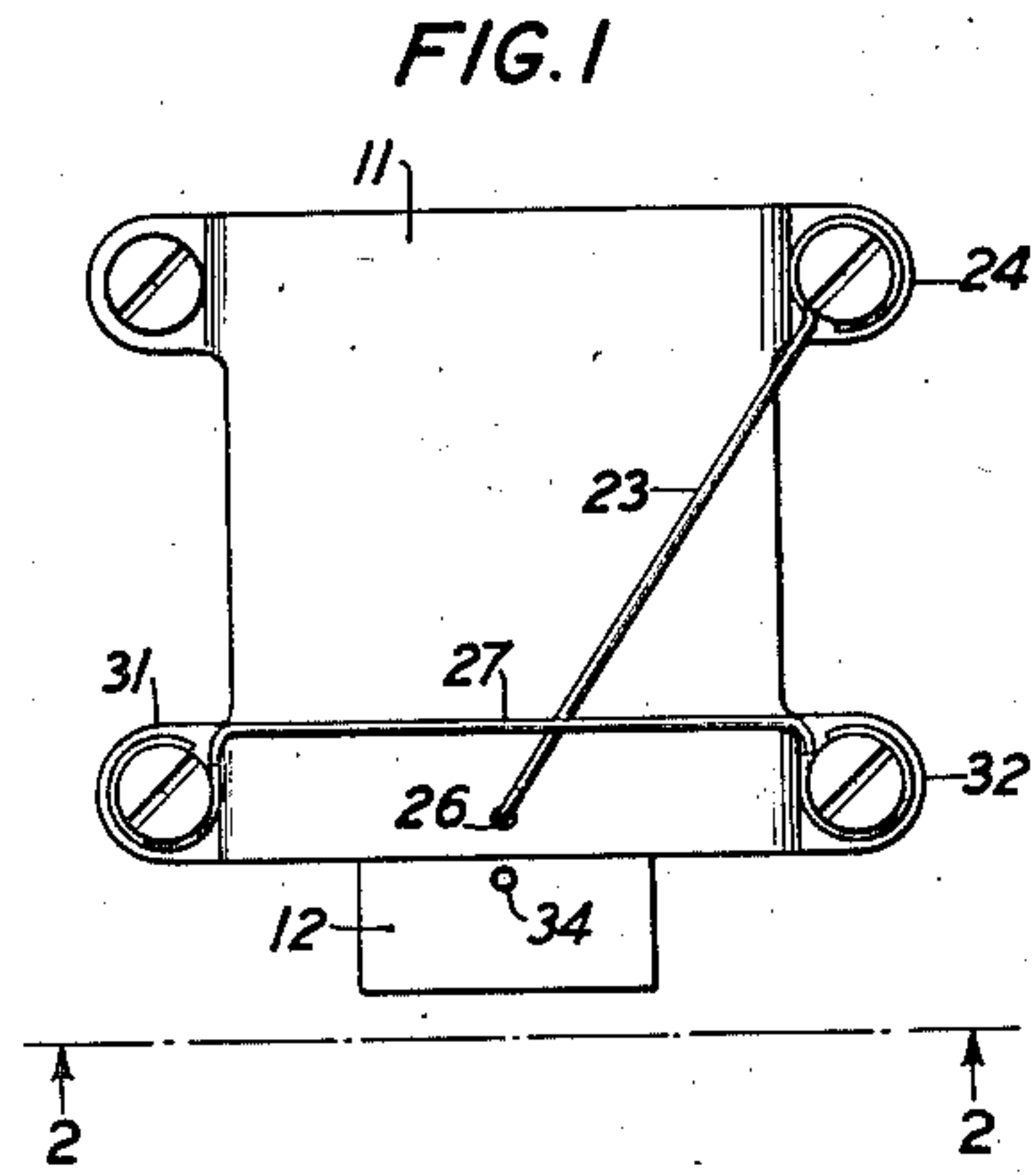
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LOCK

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LOCK

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1 Claim. (Cl. 70—73)

This invention relates to locks and particular-
ly to locks of the key operated type.

An object of the invention is to trap keys, by
means of which unauthorized persons may be
attempting to operate the lock, and to prevent
the removal of the key from the lock by such un-
authorized persons.

Another object of the invention is to permit
the removal of the trapped keys by authorized
persons without necessitating dismantling the
lock or in any way damaging the lock itself or
the enclosure.

Another object of the invention is to cause
an alarm to be sounded upon a key being trapped.

It is, of course, well known that unscrupulous
persons often attempt to gain access to locked
enclosures for fraudulent purposes by "picking"
the lock. In order to defeat such attempts im-
provements in the lock mechanisms, in order to
render them as nearly as possible "pick-proof",
have been made from time to time. It quite
often happens, however, that unscrupulous per-
sons come into possession of the proper key for
unlocking a certain lock and "pick-proofing" ar-
rangements are, of course, no protection against
such persons.

According to a feature of the invention, should
an unauthorized person, who has come into
possession of a key as above mentioned, attempt
to utilize such key to operate the associated lock,
not only is the lock held in a locked condition
but the key itself is trapped in the lock and its
removal by the unauthorized holder is prevented.
Means are included, however, whereby an au-
thorized person may "collect" the key, that is,
remove it from the lock, without damaging the
lock or the enclosure in any way. The "col-
lected" key is then, of course, returned to the
proper authorities.

In accordance with another feature of the
invention, an alarm may be sounded upon a key
being trapped which alarm may be instrumental
in causing the apprehension of the person using
the key for fraudulent purposes.

Locks of the nature contemplated by the in-
vention may be used, to mention one specific ap-
plication, on telephone coin collectors of the gen-
eral type disclosed in Forsberg U. S. Patent
1,043,219 of November 5, 1912.

In accordance with a preferred arrangement
of the lock contemplated by the invention, a
spring member is mounted on the outer case of
the lock, a portion of the member projecting
through an opening in the case and normally
resting on the surface of the bolt. Now when an

attempt is made to unlock the lock, the key is
inserted and rotated which tends to retract the
bolt. As the bolt starts its retracting move-
ment, however, a hole therein is brought into
registry with the end of the spring member
which thereupon drops into the hole and arrests
the movement of the bolt. The end of the spring
member resting in the hole in the bolt not only
prevents further retraction of the bolt to unlock
the lock but also prevents movement of the bolt
in the opposite direction to its previous position.
The unauthorized holder of the key is there-
fore prevented from unlocking the lock and also
from rotating the key back to the point where
it could be removed from the lock.

In order that authorized persons may be able
to remove the trapped key without damaging
the lock itself or the locked enclosure, an aper-
ture is preferably provided in the case of the
locked enclosure through which a tool may be
inserted to raise the spring member thereby lift-
ing the end thereof out of the hole in the bolt
and releasing the bolt for movement in either
direction.

A thorough understanding of the operation
of the contemplated arrangement and an ap-
preciation of the various features thereof may
be gained from a consideration of the following
detailed description in connection with the at-
tached drawing in which:

Figure 1 is a top view of a lock provided with
key trapping means in accordance with the in-
vention;

Fig. 2 is an end view of the lock shown in
Fig. 1;

Fig. 3 is a bottom view of the lock shown in
Fig. 1, the cover of the lock being removed to
show the bolt, key barrel and tumbler of the
lock;

Fig. 4 is a top view of the lock with the bolt
partially retracted, a portion of the case being
broken away;

Fig. 5 is a bottom view of the lock as shown in
Fig. 4;

Fig. 6 is a rear view of a part of a telephone
coin collector, a portion of the case being re-
moved to show the lock in position, a tool for
freeing a trapped key also being shown;

Fig. 7 is a top view of a lock of the type shown
in Fig. 1, modified to include alarm controlling
means; and

Fig. 8 is a side view of the lock shown in Fig. 6.

Referring now to Fig. 1, a lock 11 is shown in
normal "locked" condition, that is with the bolt
12 in fully extended position. The inner mech-

anism of the lock including the tumblers, bolt, key barrel, etc. may be of any standard construction such, for example, as that fully disclosed in Shann U. S. Patent 1,793,254, issued February 17, 1931. While it is not believed necessary to describe these parts of the lock, or their operation, in detail it might be pointed out, in order to aid in the understanding of the key trapping means with which the invention is concerned, that key barrel 13 is provided with projection 14 (see Fig. 3) which, when the barrel is rotated, strikes shoulder 15 provided on bolt 12 and causes retraction thereof. A plurality of key operated tumblers or levers 16 (only one shown to avoid complicating the drawing unnecessarily) are arranged adjacent the key barrel having faces of different lengths to correspond to notches in the operating key. The lower portions of the tumblers have projections which extend into the path of lug 17 provided on bolt 12 and prevent retraction thereof unless the projections are aligned and withdrawn from the path of the lug by rotation of a properly designed key in the key barrel.

As usual in locks of this general type a portion 18 of the case is extended and encloses the key barrel 13, the edge of this extended portion overlapping the end of key slot 21 in such a way that a key of proper size for operating the lock can be fully inserted into the key slot, or removed therefrom, only if the barrel is in such a position that the end of the slot registers with recess 22 provided in extended portion 18. The barrel occupies this position only when bolt 12 is fully extended, that is when the lock is in normal "locked" condition.

A wire spring member 23 is mounted on lock 11, one end being attached to mounting lug 24 while the other end 25 is bent at right angles to the major length of the wire, as clearly shown in Fig. 2, and, passing through hole 26 in the case of the lock, rests on the upper surface of bolt 12. A second wire spring member 27 is also mounted on the lock, each end of this spring being rigidly attached to mounting lugs 31 and 32, respectively. Member 27 passes over member 23 and is in contact therewith; the spring action of member 27 supplementing that of member 23 and insuring that end 25 remains in firm contact with the surface of bolt 12.

Let us assume now, for purposes of description that a key 33 properly designed for operation of the lock, be inserted in key slot 21 and rotated in an attempt to unlock the enclosure. As the key barrel is rotated the tumblers are moved and retraction of the bolt is started as described in Shann U. S. 1,793,254 referred to above. Now, a hole 34 is provided in bolt 12 and as the bolt is retracted this hole is brought into registry with the end 25 of spring member 23 which, as described above, normally rests on the upper surface of the bolt. As this point of registry is reached the end of spring member 23, due to its own spring action and that of spring member 27, drops into hole 34, as shown in Fig. 4, and prevents further movement of bolt 12 in either direction. This action takes place before sufficient retraction of the bolt to unlock the enclosure and it will be apparent therefore that the user of the key is prevented from unlocking the lock. Further, he is prevented from removing the key from the lock as the key barrel, at the time the above action takes place, is in the position shown in Fig. 5. As shown the end of key slot 21 is not in registry with recess 22 and it has been pointed out above that the key cannot be

removed until this point of registry is reached. The key barrel cannot, of course, be rotated as the bolt is held against movement as described above.

Assuming now that an authorized person visits the premises and wishes to remove the trapped key. Referring to Fig. 6 a portion of a telephone coin collector, which may be of the type described in Forsberg U. S. Patent 1,043,219, issued November 5, 1912, is shown. The lock 11 is shown in use for fastening the upper housing 35 of the collector to the lower housing 36. A hole 37 is provided in the side of the upper housing. The view is taken from the rear of the collector, the usual back plate being omitted to facilitate illustration of the invention. It will be understood, however, that this back plate is to be provided as usual and that it acts to close the rear openings of upper housing 35 and lower housing 36 and also that it cooperates with certain portions of the housings in such a manner that upper housing 35 cannot be removed from lower housing 36 unless bolt 12 of lock 11 be fully retracted. It will be understood that wall 38 is securely attached, for example by welding, to housing 36.

In order to free the key, the authorized person inserts tool 41 through hole 37 and utilizes the end of the tool to exert pressure on spring member 23 in a manner to lift the end 25 out of hole 34. After this has been done the bolt is, of course, free to move in either direction if the key be rotated. The authorized person may therefore either rotate the key in the direction to unlock the lock or in the opposite direction to the point where the key may be removed.

In certain instances it may be desirable that an alarm be sounded upon a key being trapped in order that the key may be removed promptly and that apprehension of the person using the key fraudulently may be facilitated. A modification of the lock providing for the control of such an alarm is shown in Fig. 7 and Fig. 8.

As shown in Fig. 7, ground 42 is connected to spring 23 at the point of its attachment to lug 24. Contact 43 is positioned under spring 23 being separated electrically from the case of the lock by insulator 44. Conductor 45 connects contact 43 to one terminal of alarm device 46, the other terminal of which is connected to battery 47. As shown in Fig. 8, when spring 23 is in normal position, that is with end 25 resting on the upper surface of the bolt as in Fig. 2, members 23 and 43 are not in contact. However, when end 25 of member 23 drops into hole 34, the position of Fig. 4 whereby a key is trapped, contact is made between parts 23 and 43 thereby completing a circuit to energize alarm 46, this circuit being traced from battery 47, alarm 46, conductor 45, contact 43, spring 23 to ground 42. The alarm may be located on the premises or at a central office as desired.

While certain specific embodiments of the invention have been selected for detailed description, the invention is not, of course, limited in its application to the specific embodiments described. These embodiments should be considered illustrative of the invention rather than restrictive thereof.

What is claimed is:

A lock comprising a casing having an aperture therein, a bolt, a shoulder on said bolt, a barrel having a slot for the reception of a key, an extension on said barrel engaged with said shoulder for causing movement of said bolt as said barrel is rotated, said casing having a notch adjacent

said barrel to permit the insertion of a key in said barrel only when said notch and said slot are in alignment, a key operated tumbler for controlling the retraction of the bolt and a spring member mounted on the exterior of the casing with one end thereof passing through said aperture, said spring member being biased to cause said one end to normally rest on the surface of the bolt, said bolt having a hole so located therein

that after partial rotation of said barrel and partial retraction of the bolt said hole is brought into registry with the end of the spring member which thereupon enters the hole and prevents further movement of the bolt and further rotation of said barrel. 5

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