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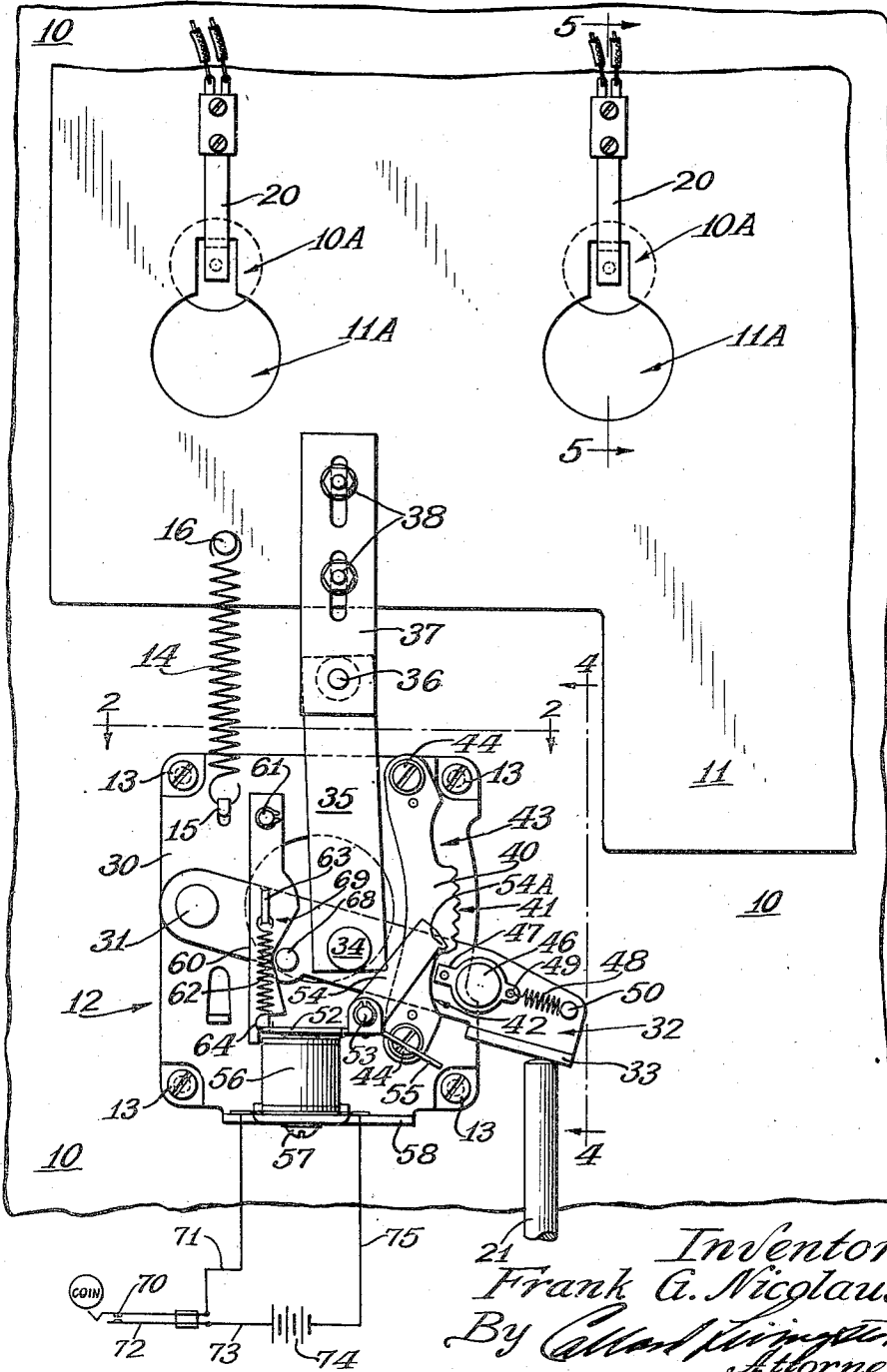
2,418,598

FULL STROKE LATCH FOR REMOTE CONTROL

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2 Sheets-Sheet 1

FIG. 1.



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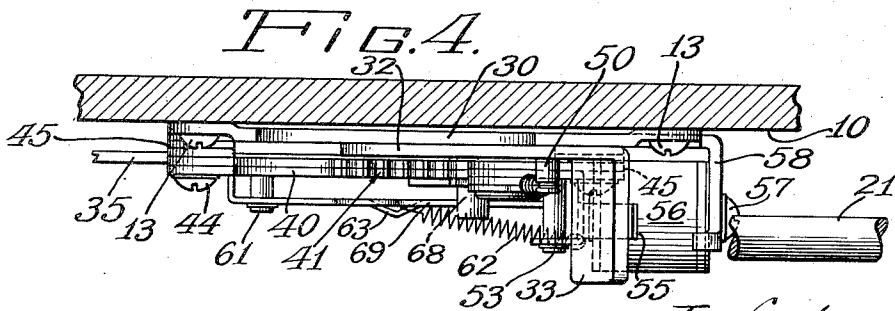
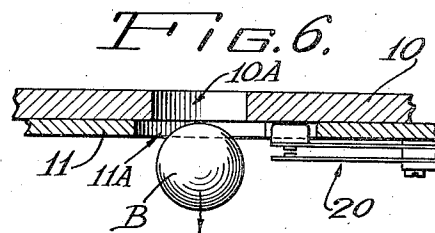
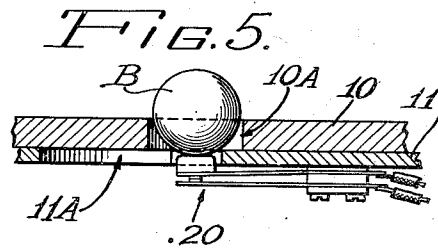
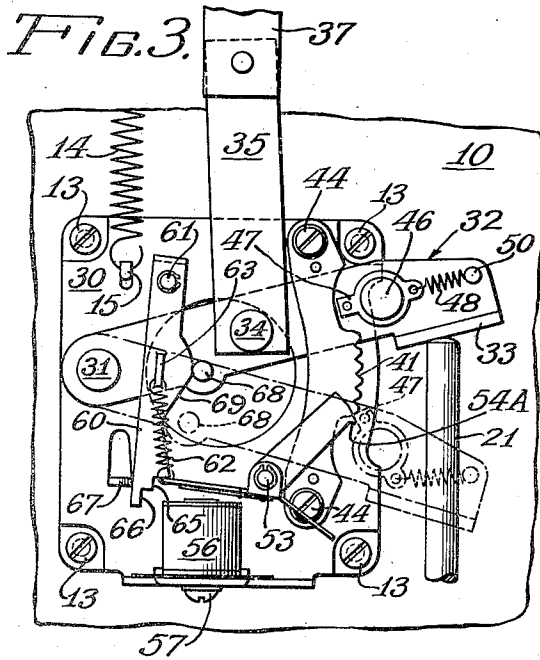
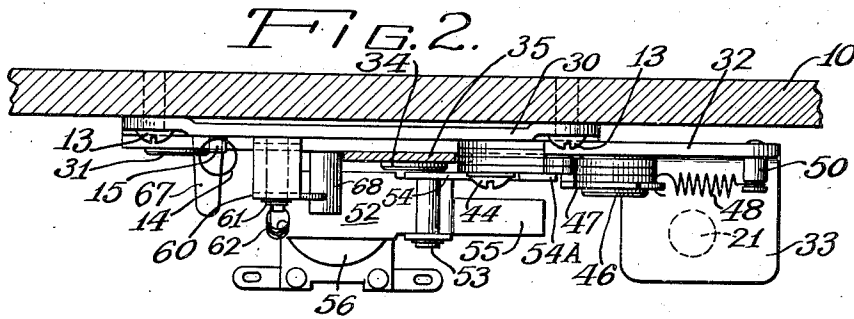
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FULL STROKE LATCH FOR REMOTE CONTROL

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

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## FULL STROKE LATCH FOR REMOTE CONTROL

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11 Claims. (Cl. 74—17.5)

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This invention pertains primarily to latching devices, and more particularly to latching devices adapted for remote control as by electrical releasing means.

The principal object of the invention is the provision of a latching device of the class described which is of general application, but which is especially suited for use in conjunction with coin-operated dispensing, vending, and amusement machines, wherein the novel latch is released as a result of depositing a coin in one of the known types of coin-testing device.

Viewed from another aspect, it is an object of the invention to afford an electromagnetically releasable latch including a main operating lever which must be moved to the full length of its operating stroke before it can again be operated for its intended purposes, the device in this respect being characterized as a full-stroke control or latch.

A further object is the provision of a device of the class described in which the electromagnetic releasing and latching means cooperates with the full-stroke latching means to afford a simplified and sturdy construction.

Another object is the provision of an astatically balanced latching armature for the latch-release means, such that the device cannot be tampered with in attempts at fraudulent operation by jarring and shaking of the amusement or other coin-operated machine with which it is associated.

Additional objects and aspects of novelty relate to details of the construction and operation of the device, which will appear more fully as the following description proceeds in view of the annexed drawings in which:

Fig. 1 is a bottom plan view of the novel latch and fragmentary portions of a coin-controlled amusement machine actuated thereby;

Fig. 2 is a vertical cross section along lines 2—2 of Fig. 1;

Fig. 3 is another bottom plan view of the latch shown in normal and operated condition;

Fig. 4 is a side elevation of the latch looking in the direction of lines 4—4 of Fig. 1;

Fig. 5 is a vertical section along lines 5—5 of Fig. 1 showing fragmentary portions of the amusement machine controlled by the novel latch;

Fig. 6 is a view similar to Fig. 5 wherein the result of operation of the latch is illustrated.

The invention as illustrated in Fig. 1 is associated with a ball-rolling amusement game, including a ball-rolling panel 10 on the underside of which is a reciprocable shuffle panel 11, the novel latch being indicated at 12 and secured as

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by screws 13 to the underside of the main panel 10, the shuffle panel 11 being disposed in a normal condition by action of a spring 14 having one end anchored to a lug 15 on the latch, and its other end anchored to a pin 16 on the shuffle panel.

To understand the operation of the shuffle panel, attention is directed to Fig. 5, wherein it will be observed that the main or ball-playing panel 10 is provided with a plurality of ball drop-out holes 10A, and the shuffle panel 11 is provided with corresponding (and larger) holes 11A. Normally, the shuffle panel is disposed, by action of spring 14 (Fig. 1) with the holes 11A out of register with the ball pockets or holes 10A, as in Fig. 5, so that a ball B will be sustained in hole 10A for the purpose of operating a ball-switch 20 attached to the underside of the shuffle panel, to project into hole 11A.

When the shuffle panel is released or moved from normal blocking position to the condition illustrated in Fig. 6, holes 10A and 11A are in register and the ball B may drop through to be returned for further play by means not shown but well-known in the art.

The novel latch control 12 is interposed between a manual operating plunger 21 (Fig. 1) and the shuffle panel 11 so that the latter can be moved to release the balls by pushing in plunger 21 only under certain conditions, to be described.

As shown in Fig. 1, latch 12 consists of a base plate 30 secured by screws 13 to the main ball panel 10. Pivoted at 31 on plate 30 is a main operating lever 32 having an upturned edge portion 33 affording an abutment piece engaged by the inner end of the plunger 21.

Pivotally connected at 34 to lever 32 between its ends is a link 35, which in turn is pivotally connected as at 36 to a bar 37, adjustably fixed on shuffle panel 11 by means of slot bolts 38; thus, oscillation of lever 32 will effect reciprocation of the shuffle panel; however, spring 14 normally shifts the shuffle panel to ball-blocking or sustaining position, with a consequent positioning for displacement by plunger 21 in the condition shown in Fig. 1.

Mounted concentrically of the pivot point 31 is an arcuate rack 40 (Fig. 1) provided with a rack of teeth 41 intermediate of its ends, the rack of teeth being flanked by cut-outs or dog-releasing slots 42 and 43, and the arcuate rack member being secured to plate 30 by screws 44 and spacing washers 45 (Fig. 4) so that lever 32 may pivot beneath the rack bar from the normal posi-

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tion shown in Fig. 1 to the advanced position shown in full lines in Fig. 3.

Near the outer end of lever 32, pivoted on the latter as at 46 is a full-stroke dog having a locking nose 47 adapted to ride over the teeth 41, there being a centering spring 48 attached to a radial projection 49 on the dog and anchored to pin means 50 on the lever, such that the dog can pivot in either direction from a normal position determined by spring 48, as in Fig. 1 (the electromagnetic latch-releasing means, however, in Fig. 1 being energized so that the dog is free to be pivoted by spring 48 with nose 47 in cut-out or slot 42).

The electromagnetic release means includes an armature piece 52 pivoted at 53 and having a latching arm 54 adapted to cooperate with the dog nose 47, as will appear. Also part of the armature structure is an astatic balancing arm 55 which renders said structure inert to jarring efforts intended to fraudulently displace and release the latching structure.

An electromagnetic coil 56 is secured at 57 to an upset flange 58 (Fig. 4 also) on the base plate 30, and this coil, when energized, is adapted to attract the armature from its latching position (full lines, Fig. 3) to released position (full lines Fig. 1).

Means for holding the latching armature structure in released condition includes a holding dog lever 60 pivoted on the base plate 30 at 61 to swing above lever 32, there being a spring 62 attached at one end to a lug 63 struck up from dog lever 60, and attached at its other end 64 to the end of the armature 52 (Fig. 1), the location of the points of attachment of said spring being such that the latter tends to urge the free end of the dog lever toward the armature, that is, anticlockwise, Figs. 1 and 3. Said free end of the dog lever is provided with offset notches 65 and 66 such that the end of armature 52 fits in notch 65 (Fig. 3) when the armature is in latching position, the dog lever pivoted away from the end of the armature (clockwise) and against a stopping lug 67 on plate 30 at this time by a previous advance of lever 32 into the full line position of Fig. 3 as a result of inward displacement of the plunger 21, which will have caused pin 68 on lever 32 to bear against a cam edge 69 on dog lever 60, thus shifting the dog lever clockwise against stopping lug 67.

Assuming that the main operating lever 32 has been moved to advanced position, as in full lines, Fig. 3, and said lever is permitted to return toward normal position (dash-dot lines, Fig. 3), the nose 47 of the full-stroke dog will train over the rack teeth 41 until it abuts the first tooth and the angled end projection 54A of the latching arm 54, which is contrived to hold the dog nose 47 in jamming relation with said first tooth, thereby preventing another advance of the main lever 32 until such time as the latching armature portion 54 is withdrawn, as in Fig. 1, at which time, the full-stroke dog will be permitted to return to normally centered position by action of spring 48, with the dog nose 47 free in cut-away or notch 42 on the rack.

#### Operation

In Fig. 1 there is shown a simple remote control circuit including a coin switch having a first contact arm 70 connected by conductor 71 to one terminal of the coil 56, and another contact arm 72 connected by conductor 73 to one terminal of a power source or battery 74, the remaining

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terminal of which is connected by conductor 75 to the remaining terminal of coil 56. Contact arm 70 is moved into closed circuit relation with contact arm 72 by action of a coin bearing against arm 70, and the resulting energization of coil 56 attracts armature 52 from the locking condition of Fig. 3 to the released condition of Fig. 1, and as soon as armature 52 moves downwardly under attraction of the magnet coil, spring 62 on the holding lever 60 causes the latter to move inwardly toward the end of the armature so that said end latches in the second notch 66 on said holding lever, thus holding the latching arm 54 in the position of Fig. 1 so that the full-stroke dog part 47 is free to turn, under effort of its spring 48, into cut-away or slot 42.

If now plunger 21 is pushed inwardly against flange 33, main lever 32 will be free to be moved to advanced position thereby with the full-stroke dog trailing idly over the teeth 41, the full-stroke dog pivoting in an anticlockwise direction during this action until dog nose 47 reaches the end of the stroke of lever 32 and is again free to be centered by its spring 48 in the full-line condition of Fig. 3.

As soon as plunger 21 is released, the main spring 14 will restore lever 32 to starting position through the linkage 36, 37, 35, 34; however, during the aforesaid advance of lever 32, the pin 68 thereon will have engaged the cam edge 69 on lever 32 and have tripped out the holding lever 60 from the condition of Fig. 1 to the latching condition of Fig. 3, so that when the main lever 32 returns to normal position, i. e., the dash-dot line position of Fig. 3, nose 47 of the full-stroke dog will be held in abutment against the first tooth as aforesaid by the presence at this time of the latching arm portion 54A in blocking position adjacent said first tooth, by reason of which the full-stroke dog cannot pivot into slot 42 to normal position, and main lever 32 thereby being prevented from a further operation or advance until coil 56 is again energized so that the parts again assume the positions of Fig. 1.

As a result of the advance of lever 32 by plunger 21 as aforesaid, following energization of coil 56, linkage 34, 35, 36, 37, 38 shifts the shuffle panel 11 to bring the drop-out holes 11A into register with ball holes 12A so that any trapped balls may drop through for restoration to playing condition (not illustrated excepting for the release of the ball as in Fig. 6).

It will be understood that the full-stroke latching means hereinabove described may be used with other controlled instrumentalities, in addition to the ball-playing game means described for purposes of illustration; and it will also be understood that the releasing coil 56 may be energized by means other than the coin-actuated switch, 70-72, shown for purposes of illustration, for example by a push-button switch or the like.

I claim:

1. Mechanism of the class described comprising an operating lever mounted for oscillatory motion, a full-stroke dog on said lever, a rack for said dog and arcuately arranged to be traversed by said dog in motion of said lever back and forth, said rack being flanked at opposite ends by cut-outs serving to free said dog when said lever is fully moved to limits of travel determined by the length of said rack, whereby said lever must be moved to said limits of travel in either direction for full-stroke operation, lever means normally and yieldingly preventing move-

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ment of said dog into one of said cut-outs to latch said operating lever in a predetermined position, and electromagnetic means energizable to move said latching lever means from latching position.

2. Full-stroke mechanism comprising a pivoted lever, cooperating rack and dog means for preventing back and forth movement of said lever excepting between predetermined limits of travel of the lever in opposite directions, releasable latch means normally preventing operation of said dog means to free said lever for movement from one of said limits of travel, and electromagnetically operable means for releasing said latch means.

3. Full-stroke mechanism comprising a pivoted lever, cooperating rack and dog means for preventing back and forth movement of said lever excepting between predetermined limits of travel of the lever in opposite directions, releasable latch means normally preventing operation of said dog means to free said lever for movement from one of said limits of travel, means operable to free said dog means from latched condition by moving said latch means into non-latching position, means operable automatically to hold said latch means in non-latching condition responsive to movement of said latch means into non-latching condition, and means operable responsive to predetermined movement of said lever from latched condition for releasing said automatically operable holding means for restoration of said latching means to latching condition.

4. Full-stroke mechanism comprising a base, a main lever pivoted on said base, an arcuate rack concentric with the pivot of said lever, a full-stroke dog on said main lever and working in said rack to prevent retractive motion of said lever once the latter has been started in either of its two directions of motion from a terminal position at either end of said rack, said rack having dog-releasing formations at said terminal positions whereby said main lever may be moved from one said terminal position toward the other following release of said dog by movement of said main lever to position said dog opposite one of said releasing formations, a dog-latching lever on said base, spring means normally positioning said latching lever in latching position to prevent movement of said dog into one of said releasing formations, electromagnetic means energizable to move said latching lever from latching position, a second latching means operable to hold said first latch lever in non-latching condition responsive to movement of the latch lever from latching position by said electromagnetic means, and means for releasing said latch lever from held, non-latching condition responsive to movement of said main lever a predetermined amount following release of the first latching lever as aforesaid.

5. In a full-stroke lever mechanism of the class described, a main operating lever, cooperating rack and dog means operating to prevent movements of said lever in any but full-stroke motion between opposite terminals, locking means normally preventing operation of said dog means at a particular one of said terminals to latch said lever against movement from said terminal, electrically actuated means for rendering said locking means ineffective, and means for holding said locking means in ineffective condition and actuated to release said locking means from ineffective condition responsive to predetermined

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movement of said lever from said particular terminal following operation of said electrically actuated means.

6. Full-stroke mechanism comprising a main operating member adapted to move between opposite terminals, full-stroke means for preventing retractive movement of the main operating member once it has been started from one terminal toward the other and permitting such retractive movement provided the main operating member is fully moved to the terminal toward which it has started as aforesaid, a latching member yieldingly and normally positioned to prevent operation of said full-stroke means at a certain one of said terminals whereby the main operating member is held against movement from said certain terminal toward the other terminal, and electromagnetic means operable to move said latching member out of latching position.

7. Full stroke mechanism including a main operating member movable between opposite terminals, full-stroke dog means cooperable with said operating member to prevent retractive motion of the latter toward one said terminal after it has been moved a predetermined amount toward the other terminal, releasable latch means normally cooperable with said dog means to prevent movement of said operating member away from a certain one of said terminals toward the other, means for releasing said latch means from latching condition, releasable means for locking said latch means in non-latching condition, and means operated by said main operating member for releasing said locking means.

8. Mechanism of the class described including a reciprocable shuffle member, a main pivoted lever, means linking said shuffle member with said lever for reciprocable motion of the former with oscillatory motion of the latter, spring means normally urging the shuffle member and lever into a normal position, full-stroke mechanism cooperable with said lever to prevent retrograde motion of the latter relative to either of its limits of oscillation once the lever has been started from one said limit toward the other, said full-stroke mechanism being adapted to operate automatically upon movement of said lever to either one of said limits to permit restoration of the lever toward the other said limit, an astatically balanced latching armature spring-urged into latching position to prevent automatic operation of the full-stroke mechanism as aforesaid at one said limit whereby said lever is releasably latched at said limit, electromagnetic means for attracting said armature from latching to a non-latching position, a holding lever spring-urged to automatically engage and hold said armature in said non-latching position, and means on said main lever for tripping out said holding lever responsive to a movement of the main lever from the limit at which it is releasably latched as aforesaid.

9. Full-stroke mechanism comprising a rack, an operating member movable back and forth relative to said rack, a dog pivoted on said operating member to drag over said rack, dog release spaces at the ends of said rack, a dog spring urging said dog to a normal position of release in either of said spaces when the operating member is moved to position said dog opposite the same, a latch member movable to blocking position adjacent a particular one of said spaces to prevent movement of said dog to release position therein, a detent operable to hold said latch member against movement into blocking position as

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aforesaid, spring means cooperable with said detent and latch member for normally urging the latch member into blocking position and engaging the detent in holding relation with the latch member when the latter is moved a predetermined amount out of blocking position, means for moving the latch member said predetermined amount, and means operable responsive to predetermined movement of the operating member away from latched position for tripping out said detent.

10. In a full-stroke mechanism, a main operating member movable between limits, full-stroke dog mechanism cooperable with said operating member to prevent retrograde movements of the later when the same is moved a predetermined amount from one limit toward the other, electromagnetically released latch means normally preventing operation of the dog mechanism in the region of a particular one of said limits such that the latch means must be released as a condition precedent to movement of the operating member from said limit toward the other limit, and means operable automatically upon electromagnetic release of said latch means for holding the latter released until the operating member has been moved a certain amount from said particular limit toward the other limit.

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11. In a fluid resistant full-stroke mechanism of the class described and for use especially with coin controlled apparatus, an operating member, a full-stroke device operating to hold said member in a certain position so long as said full-stroke device is disposed in a certain position relative thereto, means normally urging said full-stroke device out of said certain position, means including an astatically balanced armature yieldingly urged into blocking relation with said full-stroke device to maintain the latter in said certain position, and electromagnetic means for attracting said armature away from said blocking position, said astatically balanced armature tending to resist displacement from blocking position by jarring efforts applied thereto.

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**Certificate of Correction**

Patent No. 2,418,598.

April 8, 1947.

FRANK G. NICOLAUS

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Column 8, line 1, claim 11, for the word "fluid" read *fluid*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of May, A. D. 1947.

[SEAL]

LESLIE FRAZER,  
*First Assistant Commissioner of Patents.*