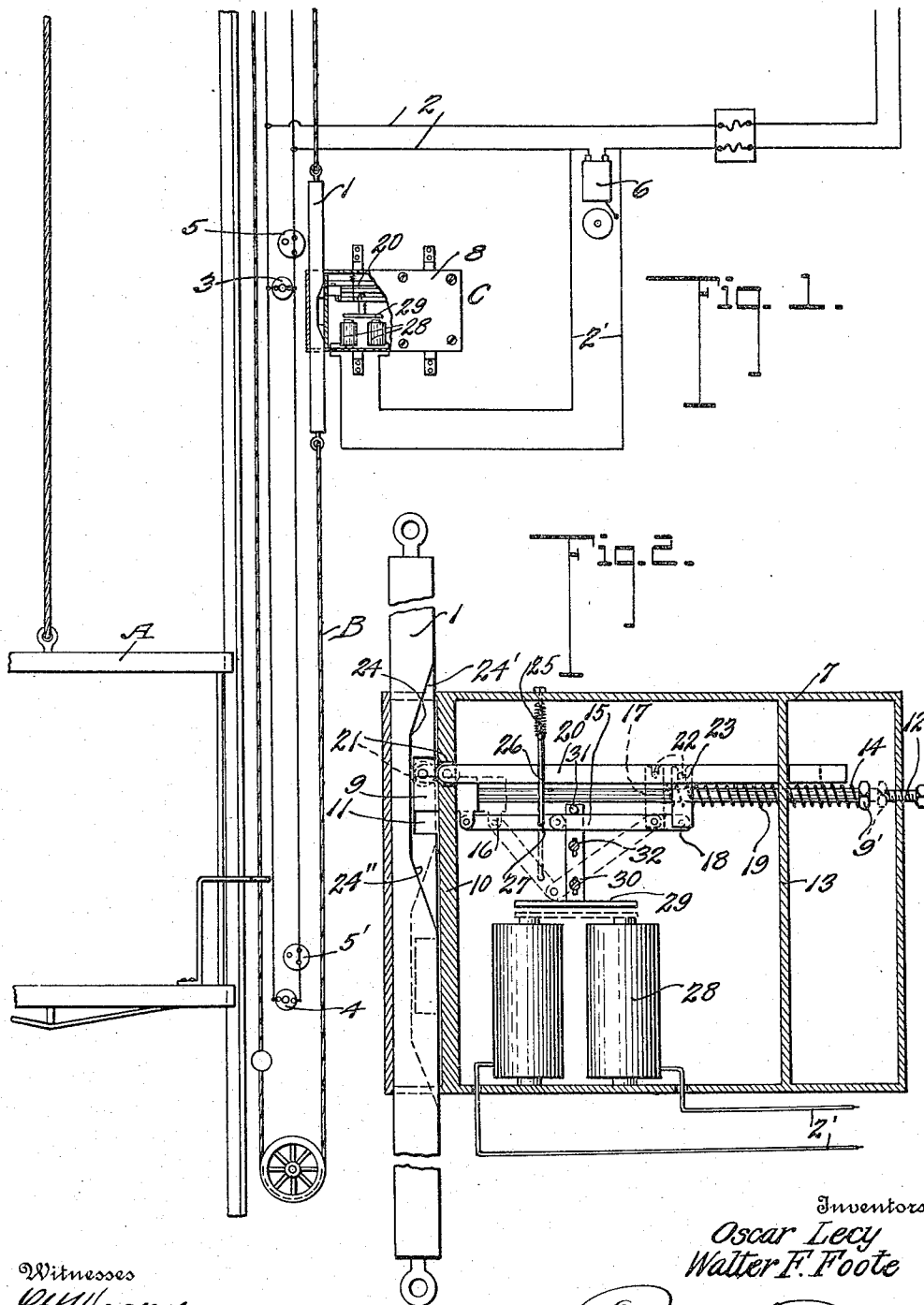


1,173,006.

2 SHEETS—SHEET 1.



Witnesses
 C. Wagner
 D. R. Partello.

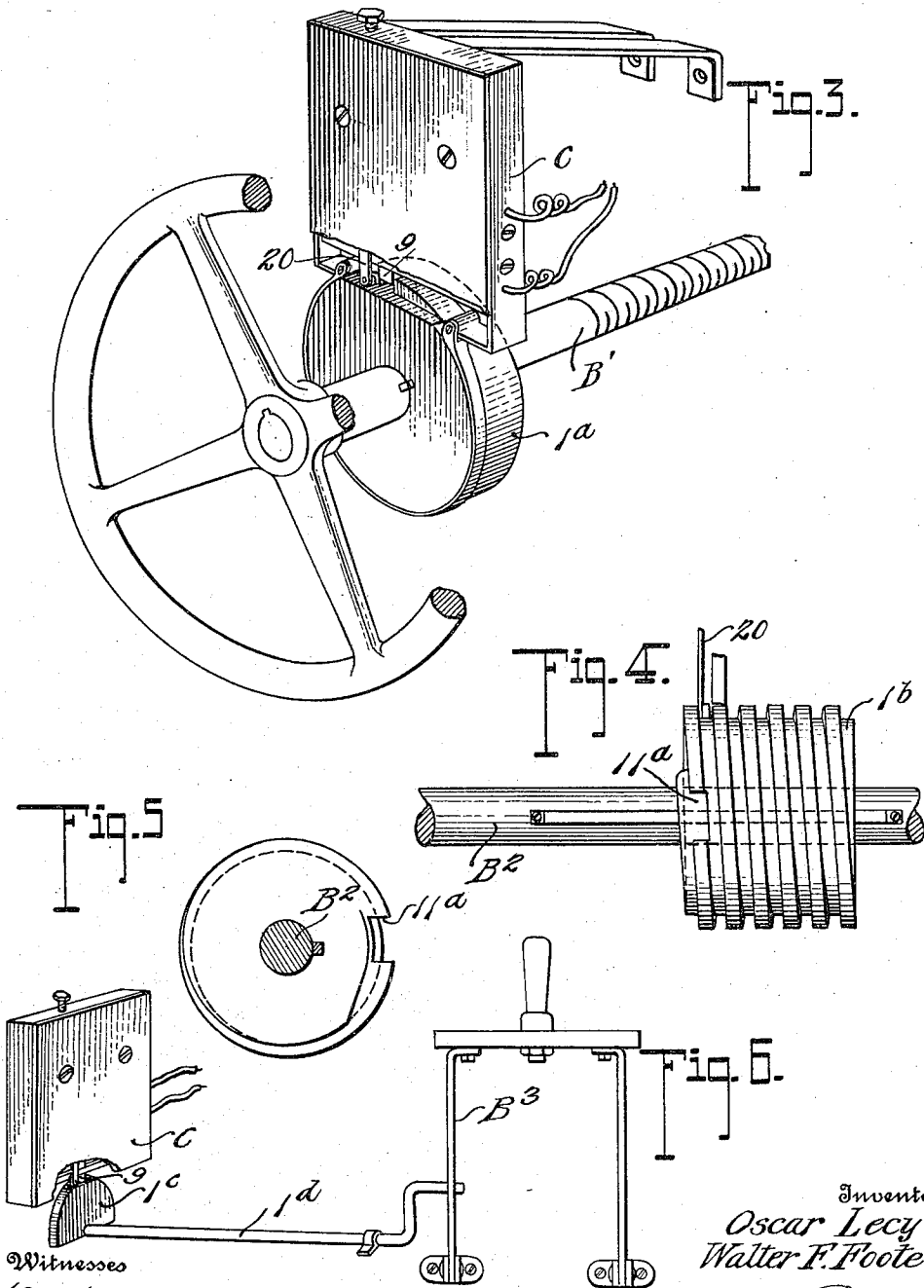
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O. LECY & W. F. FOOTE.
CONTROL LOCKING MECHANISM.
APPLICATION FILED APR. 14, 1915.

1,173,006.

Patented Feb. 22, 1916.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

OSCAR LECY AND WALTER F. FOOTE, OF PORT EDWARDS, WISCONSIN.

CONTROL-LOCKING MECHANISM.

1,173,006.

Specification of Letters Patent.

Patented Feb. 22, 1916.

Application filed April 14, 1915. Serial No. 21,366.

To all whom it may concern:

Be it known that we, OSCAR LECY and WALTER F. FOOTE, citizens of the United States, residing at Port Edwards, in the county of Wood and State of Wisconsin, have invented certain new and useful Improvements in Control-Locking Mechanism, of which the following is a specification.

The present invention in its broader phase relates to locking mechanism for controllers of machine units or operating devices and is designed to prevent the operation or actuation of the latter until proper precautions have been taken or warning that the machinery is about to be started has been given.

Its essential characteristics comprehend the combination with a locking device normally engaging the control element for any machine and preventing operation of the control element as aforesaid, of releasing means for disengaging the locking device to enable the actuation of the machine through said control element, such releasing means in the embodiment illustrated including a warning signal indicating to the operator that the controller is in release position.

More specifically in carrying out the invention, we have provided a locking member adapted to engage a control member, an electrically operated trip device for releasing the locking member and simultaneously rendering operative a restoring means for coaction with the control member whereby the locking member is restored to operative condition for reengaging the control member as the latter assumes its normal position; and further, a signal included in the circuit of the trip device and adapted to be sounded upon release of the locking member.

For a full understanding of the present invention, reference is to be had to the following description and the accompanying drawings, in which:

Figure 1 shows a plan view of the embodiment of our invention as applicable to the controlling means for an elevator. Fig. 2 is a sectional view through our locking mechanism alone showing more clearly the details of construction. Fig. 3 is a perspective view, the parts being broken away and shown in section of the adaptation of our locking mechanism to a throttle valve operating member. Fig. 4 is a detail view

in elevation of a different style of throttle valve operating member with which our locking mechanism may be modified to coact. Fig. 5 is an end elevation of the construction shown in Fig. 4. Fig. 6 is a view showing the adaptation of our device to electric switches of well known type.

Throughout the following detail description, and on the several figures of the drawings, similar parts are referred to by like reference characters.

Referring to the drawings, it will be observed that we have illustrated the application of our locking means to control mechanism for elevators but we desire it to be particularly understood that we do not wish to be limited in respect to the instrumentalities with which our locking mechanism may be employed, since it will be obvious from the following description that our device may be readily combined with electric switches, friction levers, throttle or other valves, or in fact wherever a control member is employed for controlling the operation of a machine.

In the drawing A designates an elevator or lift of conventional rope or cable controlled type, the controlling element being designated B and C referring to the locking means which forms the subject-matter of this invention. It will be noted that the controlling cable B is provided for the purpose of carrying out this invention with a bar 1 connected to the cable at any suitable point in its length.

2 designates an electric circuit leading from a suitable source of electric current and including the ordinary push button connections 3, 4 which may be located on each floor of a building in which the elevator is located, or at each position from which the elevator or other machine is to be released for starting. An ordinary snap switch 5, 5' is included in the circuit, one adjacent to each button connection hereinbefore referred to and by means of which the circuit of the device may be opened to thereby prevent all other stations from starting the mechanism until the particular switch referred to is again closed. In the circuit 2 is also included a signal or bell 6 so that whenever the circuit is closed a warning is sounded that the elevator or mechanism as the case may be is about to start.

Specifically describing our particular invention, the locking mechanism C, the reference numeral 7 indicates a casing of any desired size and conformation, having a removable cover 8 attached thereto, said casing being disposed adjacent to the bar 1 of the starting cable B. For the purpose of this description, the member 1 will be considered as the control element, it being understood that the starting cable B is designed to operate a controller of ordinary reversing type for motor drive or a belt shifter for a belt drive elevator, the cable as is usual with this type being pulled a short distance one way or another to start the elevator upwardly or in the opposite direction to start it downwardly. As shown particularly in Fig. 1, the bar 1 passes through one end of the casing 7 and said casing constitutes a guide for the bar or controlling element 1, maintaining said bar in proper operative relation to the locking instrumentalities disposed in said casing.

At 9 is designated a locking bolt or catch which is adapted to extend through a partition 10 of the casing 7 and into a notch 11 formed intermediate the length of the member 1 and at one side thereof. So long as the locking member 9 is seated in the notch 11, the starting cable B cannot be moved for controlling operation of the elevator. The bolt 9 extends longitudinally of the casing 7, its free extremity being adapted to cooperate with an adjustable stop 12 carried by the casing 7 at one side thereof. The bolt 9 passes through a partition 13 adjacent this side and a tension member or spring 14 surrounds the bolt end and is seated against one side of the partition 13 and the headed extremity 9' of said bolt. In the engaged position of the bolt this spring 14 is under compression, tending to retract the bolt from engagement with the member 1. Such retraction, however, is prevented by the retaining means comprising a jointed lever or toggle 15, one end of which is pivotally connected at 16 to the bolt 9 while at its other end the lever is pivotally connected to a sliding collar 17 as at 18, the locking bolt 9 passing through an opening in said collar. Disposed about the locking bolt 9 intermediate one side of the partition 13 and the collar 17 is a spring 19 which, for the purposes of this description, we will term a locking spring. This spring normally tends to engage the bolt 9 in the recess 11 through its cooperation with the collar 17, so long as the toggle 15 is in its operative position shown in full lines in Fig. 2 wherein the toggle members are in alined position.

Reciprocally mounted in the casing 7 adjacent to the locking bolt 9 and parallel therewith is disposed a restoring member or bar 20 which is guided in its reciprocal movement by the partitions 10 and 13

through which it extends. This bar carries at its end adjacent to the partition 10 a bearing member or roller 21 and said bar is furthermore operatively connected to the locking bolt 9 through the instrumentality of a lateral projection 22 which is engaged by the bifurcated extremity of a lateral projection 23 extending from the collar 17. When the bolt 9 is in its engaged position with respect to the notch 11 of the member 1 and the toggle 15 is in its full line position, the restoring member 20 is in the full line position shown in Fig. 2, out of cooperative relation with respect to the member 1 aforesaid, but when it is in cooperative position with respect to the member 1 its roller carrying extremity coacts with an elongated recess 24 formed in the control element adjacent to the notch 9 and at the opposite side of said element to said notch. As will be observed particularly by reference to Fig. 2 this recess 24 at each end is formed with an inclined wall 24', 24'' leading to one side of the control element. A spring 25 connected at one end to the top of the casing 7 and at its other end to a link 26 which in turn is connected to the toggle member 15 as at 27 normally tends to hold the toggle elements in alined position as when the locking bolt 9 is engaged in the recess 11.

At the lower portion of the casing 2 is located an electro-magnet 28 which is included in a circuit 2', the coils of said magnet being connected in parallel with the bell terminals so that they receive current whenever the circuit is closed for sounding the signal 6. It will be understood that the coils will be constructed for the same voltage as the bell so as to be properly operated in this device. The electro-magnet is provided with an armature 29 from which extends a trip arm 30, the terminal of said arm being provided with a lug 30' which coacts with the toggle 15 at one side thereof in a manner to be more clearly apparent as this description proceeds. The trip arm is suitably slotted to receive guide members 32 extending into the casing 7 so as to maintain the trip arm and armature 29 in proper relation to the magnet 28.

Describing the operation of our invention and assuming that it is desired to move the elevator upwardly or downwardly as the case may be, the operator presses the button 3 closing the circuit through wires 2, 2' sounding the signal 6 indicating that the elevator is about to start, and at the same time energizing the magnet 28. Said magnet draws the armature 29 downwardly and along therewith the trip arm 30 which in turn "breaks" the toggle lever 15, the levers of which assume the dotted line position shown in Fig. 2. As soon as the toggle members are out of alinement, the locking spring

19, which coacts with the collar 17, tending to hold the bolt 9 in the recess 11 through the retaining toggle, moves the slidable collar 17 laterally on the stem of the locking bolt. The tension on this spring is, therefore, relieved and in its expansion the bolt 9 is actuated through not only the toggle 15 but by the interlocking spring 14 which moves the bolt laterally against the adjustable stop 12. The bolt being now retracted from its notch 11 the starting rope B may be moved as customary, such movement also moving the bar 1 accordingly.

By reason of the operative connection between the collar 17 and the restoring bar or member 20, upon lateral movement of said collar under action of the spring 19, this bar is moved laterally until its roller 21 co-operates with the recess 24 in the bar 1, this action taking place immediately upon retraction of the bolt 9 from its notch 11. As the bar 1 is moved upwardly or downwardly, as the case may be, the roller 21 rides up an inclined extremity of the recess 24 causing the restoring bar 20 to move in the opposite direction and correspondingly moving the collar 17 against the spring 19, said collar 17 in turn permitting the toggle members to be straightened by the spring 25 whereupon the bolt 9 is again placed under tension, tending to reengage the same with the bar 1 which, however, has moved beyond the point where said locking member 9 may be projected into the notch 11. Therefore, said locking member is held in this position until the member 1 is moved in the opposite direction for stopping the elevator. As soon as the notch is disposed opposite to the locking member 9, said member is projected thereinto and the controlling mechanism restored to locked position. This action above described takes place whenever the circuit in which the magnet 28 is included is closed as by means of push buttons 3 and 4.

As hereinbefore premised, our locking mechanism may be used to control the operation of a throttle valve and referring to Fig. 3 it will be noted that the drum 1^a is fixedly secured to the stem B' of a hand-wheel shaft which moves longitudinally as it is turned, the locking mechanism of our invention indicated C coacting with said drum in exactly the same manner as hereinbefore described with reference to the controlling cable B of the preferred construction.

In Fig. 4 is shown a slightly different form of throttle operating instrumentality, in which the grooved drum 1^b is slidable longitudinally on the stem B², the said drum being formed with the locking notch 11^a and the restoring bar 20 of my mechanism coacts with the grooves of this drum in functioning as described.

In Fig. 6, B³ designates a switch of a well known type which may be locked or re-

dered inoperative and operative by our locking mechanism which coacts with a segment 1^c, the equivalent of the plate 1 of the preferred form, said segment having a rod 1^d to hold the switch when carrying out the object of our device. Obviously other adaptations may be conceived of within the purview of our invention.

Having thus described our invention, what we claim as new is:

1. In a device of the class described, the combination with a movable operating member, of a locking member disposed to normally engage the operating member, means for maintaining the locking member in engaging position, releasing means for disengaging said locking member, and restoring means coöperating with the releasing means and operable upon disengaging movement of the locking member for establishing co-operation between the restoring means and the operating member, said restoring means being adapted for operation by the operating member incident to movement thereof whereby to normalize the means maintaining the locking member in engaging position.

2. In a device of the class described, the combination with an operating member, of a locking member normally projecting into engagement with the operating member, means for actuating the locking member in one direction to cause engaging action, other means for actuating the locking member in the other direction to disengage the same, restoring means operable by the first mentioned actuating means upon actuation of the locking member by the second mentioned actuating means to cause coöperation of the restoring means with the operating member aforesaid, said restoring means being operable incident to movement of the operating member whereby to cause reengagement of the locking member, trip means for releasing the first mentioned actuating means, and a connection intermediate the trip means and the restoring means.

3. In a device of the class described, the combination with an operating member, of a locking member normally engaged therewith and preventing operation of said operating member, releasing means for disengaging said locking member, and means for restoring the locking member to engaging condition, and operable by said locking member as the latter is moved into release position, said operating member holding the locking member in the operative position aforesaid until the operating member is moved to normal position.

4. In a device of the class described, the combination with an operating member including a movable part consisting of a notched bar formed with a cam, of a locking member normally engaged therewith.

and preventing operation of said operating member, a trip member for disengaging the locking member and permitting movement of the movable part, and restoring means for actuating the locking member when moved into disengaged position and tending to reengage the movable part, said restoring means being operable by the cam aforesaid.

5. In a device of the class described, the combination with an operating member, of a locking member normally engaged therewith and preventing operation of said operating member, toggle means for holding the locking member in engaged position, trip means for releasing the toggle means to permit disengagement of the locking member from the operating member, and a transversely arranged tension means for restoring the toggle means to operative position with respect to the locking member.

6. In a device of the class described, the combination with an operating member, of a locking member adapted for engagement with said operating member, a retaining element connected to said locking member, means cooperating with the retaining element tending to maintain the locking member in engaged position with respect to the operating member, a trip member for actuating the retaining member and releasing the last-mentioned means, means operative upon such release to retract the locking member whereby to permit operation of the operating member, a restoring member operatively connected to the retaining means and adapted to be actuated thereby to cause cooperation with the operating member, and means on said operating member for operating the restoring member to return the locking member to engaging condition with respect to the operating member.

7. In a device of the class described, the combination of a casing, an operating member cooperating therewith and movable with respect to said casing, locking means for preventing movement of the operating member comprising a locking bolt normally engaged therewith, retaining means for holding the bolt in engaged position consisting of a toggle and tension means, a trip member operable to "break" the toggle and permit disengagement of the locking bolt from the operating member, and means for actuating the trip member.

8. In a device of the class described, the combination of a casing, an operating member cooperating therewith and movable with respect to said casing, locking means for preventing movement of the operating member comprising a locking bolt normally engaged therewith, retaining means for holding the bolt in engaged position consisting of a toggle and tension means, a trip arm engageable with the toggle at one side and

electrically actuated means for "breaking" the toggle to release the locking member for disengagement from the operating member.

9. In a device of the class described, the combination of a casing, an operating member cooperating therewith and movable with respect to said casing, locking means for preventing movement of the operating member comprising a locking bolt normally engaged therewith, retaining means for holding the bolt in engaged position consisting of a toggle and tension means, a trip arm engageable with the toggle at one side, electrically actuated means for "breaking" the toggle to release the locking member for disengagement from the operating member, and tension means for retracting the bolt when the toggle has been actuated.

10. In a device of the class described, the combination of a casing, an operating member cooperating therewith and movable with respect to said casing, locking means for preventing movement of the operating member comprising a locking bolt normally engaged therewith, retaining means for holding the bolt in engaged position consisting of a toggle and tension means, a trip member operable to "break" the toggle and permit disengagement of the locking bolt from the operating member, means for actuating the trip member, and a restoring bar operably connected to the toggle for actuation thereby when the toggle is "broken" and adapted to cooperate with the operating member, said restoring bar being operable upon movement of the operating member to place said locking bolt under tension of the tension means aforesaid, tending to reengage the operating member.

11. In a device of the class described, the combination of a casing, an operating member passing therethrough and guided by said casing, a locking bolt normally engaging the operating member to prevent movement thereof, a spring cooperating with the bolt and normally tending to hold the same in engaged position, trip means for relieving the spring, a second spring cooperating with the bolt to disengage the same upon relief of the first-mentioned spring, and means for restoring the first mentioned spring to actuating condition upon movement of the operating member.

12. In a device of the class described, the combination of a casing, an operating member passing therethrough and guided by said casing, a locking bolt normally engaging the operating member to prevent movement thereof, a spring cooperating with the bolt and normally tending to hold the same in engaged position, trip means for relieving the spring, a second spring cooperating with the bolt to disengage the same upon relief of the first mentioned spring, and a bar member associated with the locking bolt and

adapted to be actuated by the operating member upon movement thereof for restoring the first mentioned spring to actuating condition with respect to the bolt.

5 13. In a device of the class described, the combination of a casing, an operating member extending therethrough and having a notch therein, a locking bolt in said casing normally engaged in the notch to prevent
10 the movement of the operating member, a slidable member on said bolt, a jointed lever connected to said bolt for moving the slidable member into operative position, a spring engaging the slidable member and
15 holding the bolt in engagement with the notch of said operating member, a trip arm engaging the jointed lever and operable to release the bolt, and a second spring for retracting the bolt from the notch.

20 14. In a device of the class described, the combination of a casing, an operating member extending therethrough and having a notch therein, a locking bolt in said casing normally engaged in the notch to prevent
25 the movement of the operating member, a

slidable member on said bolt, a jointed lever connected to said bolt for moving the slidable member into operative position, a spring engaging the slidable member and holding the bolt in engagement with the notch of said operating member, a trip arm engaging the jointed lever and operable to release the bolt, a second spring for retracting the bolt from the notch, a restoring bar associated with the locking bolt and operably connected with the slidable member, and a cam on said operating member for moving the restoring bar whereby to actuate the slidable member and the jointed lever and placing said bolt under tension tending to reengage the same with the locking member.

In testimony whereof we affix our signatures in presence of two witnesses.

OSCAR LECY.
WALTER F. FOOTE.

Witnesses:

FRED PADGHAM,
J. E. BRYAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."