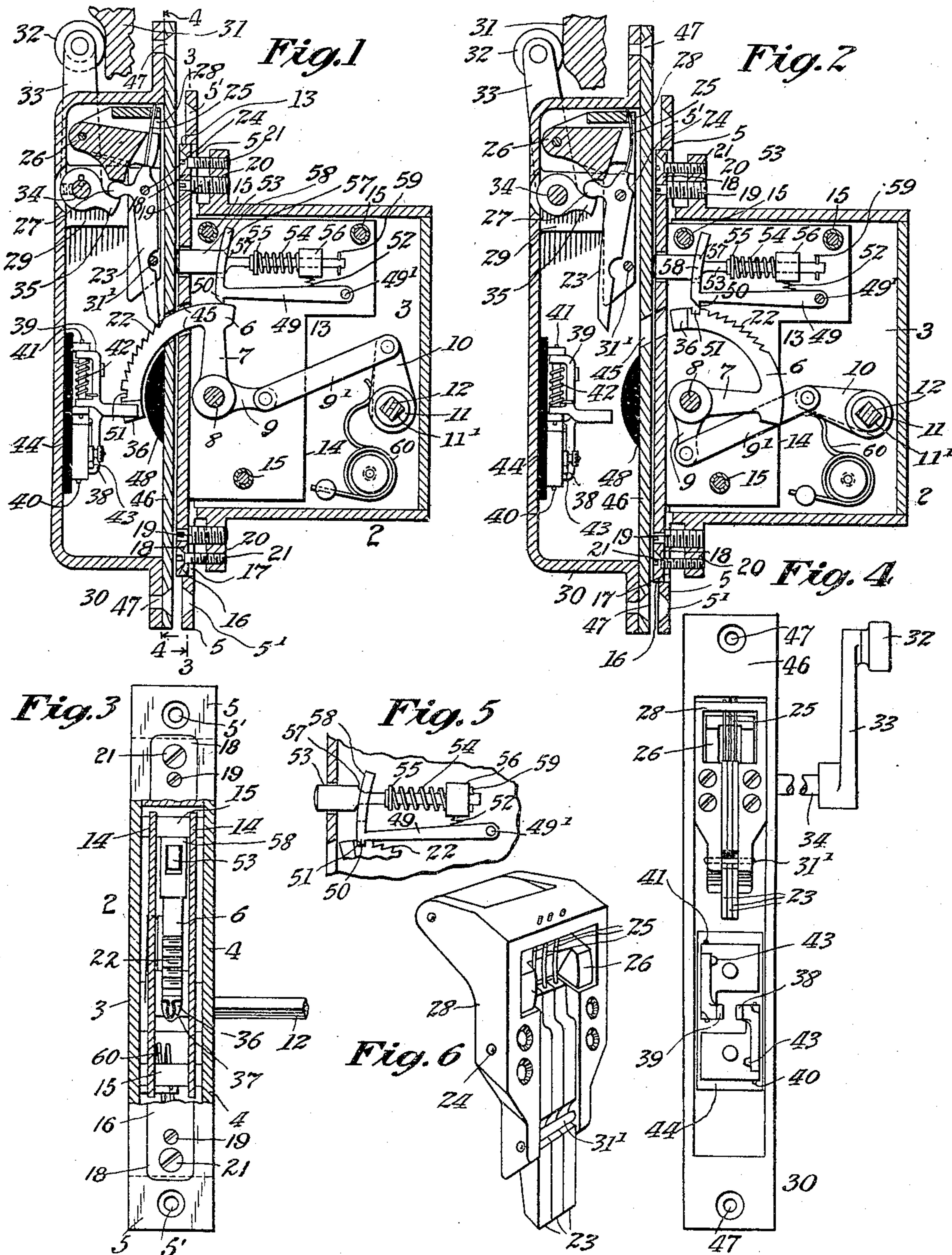


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B. E. WESTLIN.
DOOR LOCK.

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DOOR-LOCK.

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To all whom it may concern:

Be it known that I, BROR E. WESTLIN, of Arlington, New Jersey, have invented a certain new and useful Improvement in Door-Locks, of which the following is a specification.

The present invention furnishes a lock construction particularly designed for overcoming the faulty locking action of a locking dog or bolt due to an improper relation among the parts. This may arise in course of time from the shrinking of parts or from other causes, such occurrences oftentimes so relating the bolt and its receiving-socket that even when the door is in its closed position and the bolt thrown to its locking position no engagement, or, at least, an improper engagement, takes place, despite the fact that the locking mechanism when originally set up functioned properly. Defective operation of this character is particularly noticeable when the actuation of the locking mechanism is accompanied by or causes the opening and closing of an electric circuit—such, for instance, as that of an electrically-driven elevator or hoist system, the locking mechanisms of the doors to the elevator-shaft of which are included in the power-circuit. Under such conditions the improper functioning of any one or more lock mechanisms is generally attended by a corresponding action of the circuit making and breaking device or devices.

In order to maintain the parts of each locking mechanism and of each circuit-controlling device in proper relation to cooperate when designed so to do, there is provided by the present invention means for readily adjusting the locking dog or bolt (and likewise one of the circuit-controlling members) to and fro to compensate for the change in the relative position due to shrinkage, &c., without, nevertheless, interfering with or deranging the operative connection with the knob-spindle. This feature together with various other features and combination of parts comprised in the present invention are illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section transverse to the knob-spindle of a lock embodying the present improvement. The parts are here shown with a bolt in its locking position. Fig. 2 is a similar section, the bolt, however, being in its withdrawn or unlocking position. Fig. 3 is a view on the plane of the line 3 3 in Fig. 1 looking in the direction of the arrow adjacent to the line. Fig. 4 is a similar view on the plane of the line 4 4, but looking in the opposite direction. Fig. 5 is a detail view of the plunger-actuated bolt-restraining detent, showing the plunger as having been moved forwardly by its spring and the detent as engaged with the bolt. Fig. 6 is a perspective view of the set of bolt-locking pawls and the frame in which the pawls are mounted.

Similar characters of reference designate corresponding parts in all figures.

The type of lock to which the present improvements are here applied is that in which the locking bolt or dog of the mechanism serves the double function of a means for locking and unlocking a door, &c., and of a circuit-controller for opening and closing an electric circuit. Such locks are used with some systems of electrically-driven elevators, and it is to the door-locks employed in connection with such systems that the invention here disclosed is particularly applicable.

In the particular form or circuit-controlling lock illustrated, 2 designates the main lock-frame, which may comprise the usual construction of flanged body-plate 3, secured to which is a movable cover-plate 4. If the lock is a mortise-lock, as the illustrated one, the frame may be provided with a lateral extension 5, having openings 5' 5' for fastening the frame in place.

The present lock is designed for use indifferently either with a folding or swinging door (in either direction) and with a sliding door. To render the locking dog or bolt capable of serving its intended purpose whichever of these doors it is used upon, I have made the bolt of the lock arc-shaped in form, the radial arm 7 thereof being here

mounted upon a stud 8. An arm 9, extending from the hub of this arm, is connected by a link 9' with an arm 10, extending from a short shaft or block 11, rotatably mounted in the sides of the frame and having the usual squared bore 11' for the engagement of a knob-spindle 12. The turning of this latter will thus enable an angular movement to be given to the bolt and the latter to be swung outward to engage with a proper coöperative part. In order that this engagement may be effected in the proper manner, (including in such action the designed closing of an electric circuit, adverted to later,) means are provided for adjusting the bolt outward accordingly as the need therefor may arise through the widening of the space between the door and the door-frame as the result of shrinkage, &c., so that such increased width may be compensated for. For the convenient attainment of this permissible shifting movement a separate bolt-carrying frame may be employed within the main lock-frame. In this instance this frame 13 comprises side plates 14 14, spaced apart by separators 15 and having an end or finish piece 16. This carrier passes through an opening 17 in the said lateral extension 5 of the main lock-frame, while its part 16 is provided with extensions 18, against each of which bears the shoulder of a corresponding adjusting-screw 19, entering a tapped hole in a lug 20, projecting on that side from the main frame. It is evident from this construction that by manipulating the adjusting-screws the bolt-carrier, and hence the bolt, may be moved outward to thereby maintain the bolt in the same coöperative relation to its receiving-socket, even though in course of time such relationship tends to change. The link connection between the bolt and the spindle permits the bolt to be shifted without interfering with the capacity for the operation of the one by the other, while the bolt-carrier when adjusted may be fixed in place by binding-screws 21 21.

The present lock construction is such as to adapt the lock to use with that type of so-called "automatic" electrically-operated elevator systems in which the knob is not free to be turned to open the door unless the car is at the landing. To fit the mechanism for operation in this manner, a pawl-and-ratchet device is combined with the bolt of the lock, this device here comprising a series of ratchet-teeth 22 on the bolt, with which teeth a pawl is adapted to engage when the bolt is projected. Preferably there are a plurality of these pawls 23, all coincidentally mounted upon a pin 24, the fact that there are a number of pawls insuring the engagement of at least one of them when it is proper that engagement should take place. Each pawl is provided with a spring 25, constantly urging the pawl

to its engaging position, which movement may be further assured by a pivoted weight 26, that bears against respective arms 27, extending from the hub portion of each pawl. For convenience in assembling, the aforesaid pin 24 and supported pawls and the pivoted weight are mounted upon a support 28, removably secured to bosses 29 in a casing 30. A stop-pin 31' for the pawls is also indicated. For withdrawing the pawls from the ratchet-teeth of the bolt a cam 31 (represented in a conventional way) is movable with the car and so positioned thereon that when the car stops opposite the landing the cam will have engaged with a cam-roll 32 and forced the supporting-arm 33 to one side, thus turning the shaft 34 (to which the arm is secured) and elevating a toe 35 on the shaft. This toe co-operating with the arms 27 withdraws the pawls from engagement with the teeth. (See Fig. 2.) When the car leaves the landing the parts are returned by the springs and gravity to the engaging position of the pawls. Assuming the bolt to be in its locking position, the organization is such that the circuit through the lock is closed thereby. The construction for this purpose here consists of a metallic strip 36 at the end of the bolt, the strip being insulated from the bolt by non-conducting material 37. Bearing against this strip when the bolt is in its proper locking position relatively to the casing 30 are contact-arms 38 39. These arms are so mounted by respective pins 40 41 as to be movable toward and away from each other laterally of the plane of movement of the locking-bolt. Corresponding springs 42 42 urge the contact-arms to their position of nearest relative approach, determined by stops 43 43. Plus and minus leads are electrically connected to the arms, and the latter are insulated from the casing 30 by a block 44, of insulating material. The bolt when thrown to its locking position forces the contact-arms apart, and so retains them, thus insuring a good contact. The bolt enters the casing 30 through an opening 45 in the finish or locking plate 46 of the former (secured by screws 47 to the casing) and when so located is situated over a block 48, of insulating material.

In closing a door, whether it be a sliding or a swinging door, provided with a lock such as hereinbefore described it is plain that the bolt must be in its withdrawn or retractive position, since if it projects it will prevent a full closing movement. Means are therefore provided for automatically holding the bolt in its withdrawn position when it is moved in that direction by the turning of the knob. The means here illustrated for the purpose comprises a detent-arm 49, pivoted at 49' and provided with a detent 50, (beveled, preferably, so as not to interfere with the ratchet-teeth on the bolt,) adapted

to enter a restraining-notch 51 in the bolt. This detent-lever is urged toward the bolt by a spring 52 and coöperates with a plunger 53 in such a manner that when the plunger is pushed backward against the resistance of its projecting spring 54 (inserted between a collar 55 on the plunger and an abutment 56) an inclined face 57 on the plunger comes in contact with a coöperative face on an extension 58 of the detent-lever and raises the latter, withdrawing the detent from the restraining-notch. Conversely, when the plunger moves forward under the impulse of its spring the detent-lever is forced downward by its spring. This plunger projects sufficiently beyond the finish-piece 16 of the bolt (determined by the stop-pin 59 on the plunger) to enable it to be forced inward from its outward position (assumed upon the opening of the door) by the finish-plate 46 of the casing 30 and the inclined face 57 to be brought into action—that is to say, assuming the parts to be in the position indicated in Fig. 1, with the bolt in its locking position, the plunger 53 is in its inner position and the detent-lever is raised. If now the pawls are withdrawn from the ratchet-teeth, the bolt may be retracted by turning the knob and the door opened. Immediately upon the disengagement of the plunger from the casing finish-plate the former springs forward and the detent drops into its notch in the bolt, holding the same in its retracted position. When the door is being closed, the plunger coming into contact with the finish-plate is forced inwardly, and the detent being withdrawn from the restraining-recess the bolt is permitted to be thrown forward by its spring 60. It should be stated that the plunger and its accessories are mounted upon the carrier supporting the bolt, and hence move with the latter upon adjustment, while the shaft 34 may be so formed at its outer end as to be engageable with a key or other device by which it may be turned if it is desired to render the locking mechanism operable without the intervention of the cam on the car.

Having described my invention, I claim—
 1. The combination in a locking mechanism of a locking dog or bolt, means for adjusting the same to thereby maintain the dog or bolt in continued coöperative relation with its receiving-socket, a detent for holding the dog or bolt in its locking position, and means carried by the car for releasing the detent.

2. In a locking mechanism, the combination of a circuit-closing locking dog or bolt, and means for bodily adjusting the same in the direction of its throw.

3. In a locking mechanism, the combination of a circuit-closing locking dog or bolt, a pair of contacts with which the dog or bolt is

adapted to engage, and an adjustable carrier upon which the bolt is mounted.

4. In a locking mechanism, the combination of a main lock-frame, a carrier adjustable relatively thereto, a pair of spring-pressed contacts and a locking-bolt mounted on the carrier and adapted when projected to engage with said contacts.

5. The combination of a main lock-frame, a carrier adjustable relatively thereto, a locking-bolt mounted on the carrier, an actuating-spindle mounted in said main frame, and operatively connected to said locking-bolt, a pair of spring-pressed contacts, a detent for holding the bolt in its locking position, and means carried by the car for releasing the detent.

6. The combination of a main lock-frame, a carrier adjustable relatively thereto, a locking-bolt mounted on the carrier, an actuating-spindle mounted in said main frame, a link connecting the bolt and the spindle a pair of spring-pressed contacts, a detent for holding the bolt in its locking position, and means carried by the car for releasing the detent.

7. The combination of a main lock-frame, an independent frame therewithin, and projecting beyond the outer edge thereof, a locking-bolt carried by said independent frame, a spindle mounted in the main lock-frame and having an operative connection with said bolt, means for adjusting the independent frame relatively to the other a pair of spring-pressed contacts, a detent for holding the bolt in its locking position, and means carried by the car for releasing the detent.

8. The combination in a locking mechanism, of a curved circuit-closing locking-bolt having an angular locking and unlocking movement, a locking-plate through an opening in which said bolt may pass, and a pair of spring-pressed contacts with which the projected bolt is adapted to engage.

9. The combination in a locking mechanism, of a curved locking-bolt having an angular locking and unlocking movement, a locking-plate through an opening in which said bolt may pass, a carrier upon which the bolt is mounted, and a pair of spring-pressed contacts with which the projected bolt is adapted to engage.

10. The combination in a locking mechanism of a locking-bolt, an actuating-spindle, a restraining-detent for holding the bolt in its withdrawn position, a spring-pressed plunger for actuating such detent, a detent for holding the bolt in its locking position, and means carried by the car for releasing the latter detent.

11. The combination in a locking mechanism of a locking-bolt, an actuating-spindle, a restraining-detent for holding the bolt in its withdrawn position, a spring-pressed plunger

for actuating such detent, an adjustable carrier for the bolt, a detent for holding the bolt in its locking position, and means carried by the car for releasing the latter detent.

5 12. The combination in a locking mechanism of a main lock-frame, a spindle mounted therein, an independent carrier adjustable relatively to said main frame, a circuit-closing locking-bolt, a restraining-detent for
10 holding the bolt in its withdrawn position, a spring-pressed plunger, said bolt, detent and plunger being mounted upon said independent carrier, adjusting-screws for the carrier, a pair of spring-pressed contacts with which
15 the bolt is adapted to engage, a detent for holding the bolt in its locking position, and means carried by the car for releasing the latter detent.

13. The combination of a locking-bolt, a
20 pawl-and-ratchet mechanism for holding the same in its locking position, means carried by the car for releasing the pawl-and-ratchet mechanism, and means for adjusting said bolt in the plane of its movement.

25 14. The combination of a curved locking-bolt, a carrier for adjusting the same in the plane of its movement, a pawl-and-ratchet mechanism for holding the bolt in its locking position, means for releasing said mechanism, a plunger-controlled detent for holding the bolt in its unlocked position, and
30 means carried by the car for releasing the pawl-and-ratchet mechanism.

15. The combination of a locking-bolt
35 formed with ratchet-teeth, a series of pawls adapted to engage with the teeth, means carried by the car for disengaging the pawls from the ratchet-teeth a spindle operative to withdraw the bolt, and an adjustable carrier upon which the bolt is mounted.
40

16. The combination of a locking-bolt formed with ratchet-teeth, a pair of laterally-movable spring-pressed contact-fingers between which said bolt is adapted to enter, a
45 series of spring-pressed pawls adapted to engage with said ratchet-teeth, a restraining-detent for the bolt, a spring-pressed plunger for actuating the detent, and an adjustable carrier upon which the bolt, detent and
50 plunger are mounted.

17. The combination, in a locking mechanism, of a curved locking-bolt having an angular locking and unlocking movement, a detent for holding the bolt in its locking position, and means carried by the car for releasing said detent.
55

18. The combination, in a locking mechanism, of a curved locking-bolt having an angular locking and unlocking movement,
60 means for adjusting the bolt toward and

away from its socket, a detent for holding the bolt in its locking position, and means carried by the car for releasing said detent.

19. In a locking mechanism, the combination of a locking-bolt, a detent for holding
65 the bolt in its locking position, means carried by the car for releasing the detent, a detent for holding the bolt in its withdrawn position, and means for releasing the latter detent on the closing of the door. 70

20. In a locking mechanism, the combination of a locking-bolt, means for adjusting the bolt in the direction of its socket substantially for the purpose set forth, a detent for holding the bolt in its locking position,
75 means carried by the car for releasing the detent, a detent for holding the bolt in its withdrawn position, and means for releasing the latter detent on the closing of the door.

21. In a locking mechanism, the combination with a locking-bolt, of a pivoted contact-piece with which the bolt is adapted to engage when the bolt is in its locking position. 80

22. In a locking mechanism, the combination with a curved locking-bolt, of a pivoted
85 spring-pressed contact-piece with which the bolt is adapted to engage when the bolt is in its locking position.

23. The combination of a curved locking-bolt provided with teeth, a detent adapted
90 to engage with said teeth when the bolt is in its locking position and there hold it, means carried by the car for releasing such detent, a restraining-detent for holding the bolt in its withdrawn position, and means for releasing
95 the latter detent.

24. In a locking mechanism, the combination of a locking-bolt, a bolt-frame, a socket-frame, a removable block in the socket-frame, a series of pawls mounted on such
100 block and adapted to engage with the bolt, a shaft, an arm thereon, a cam on the car adapted to engage with said arm, and means operative from the shaft and adapted to release the pawls from the bolt. 105

25. The combination in a locking mechanism of a locking dog or bolt, means for adjusting the same to thereby maintain the dog or bolt in continued coöperative relation with its receiving-socket, means for holding the dog or bolt in its locking position, and means for releasing the bolt. 110

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

BROR E. WESTLIN.

Witnesses:

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