Nov. 10, 1925.

J. E. BALES

1,560,641

DOOR LOCKING MECHANISM

Filed June 25, 1921

2 Sheets-Sheet 1

Fig. 1

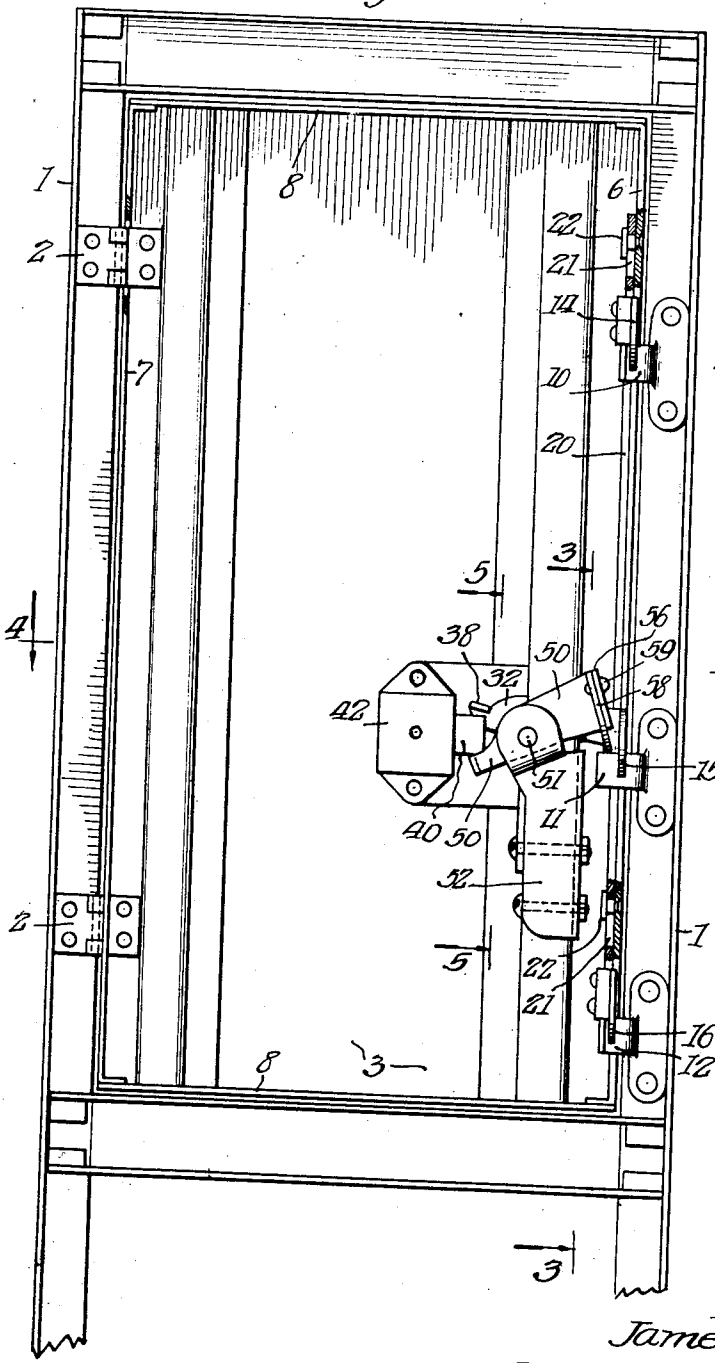



Fig. 2

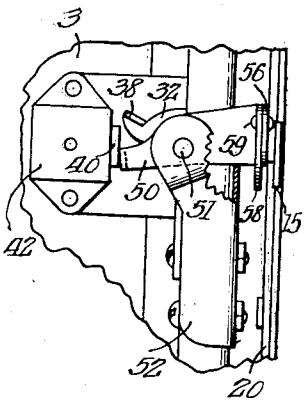
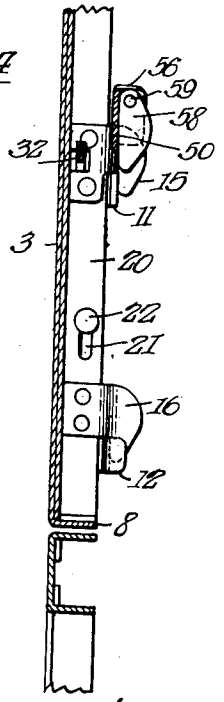



Fig. 3




Inventor:
James E. Bales:
By Cheever & Cox
attys.

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Fig. 4

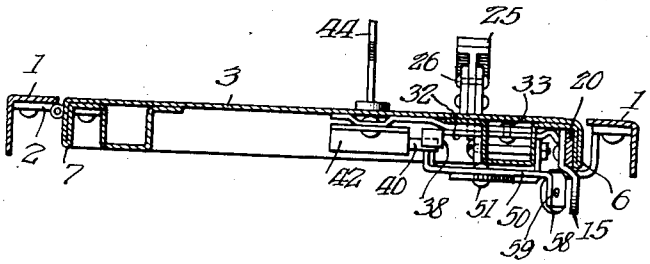



Fig. 6

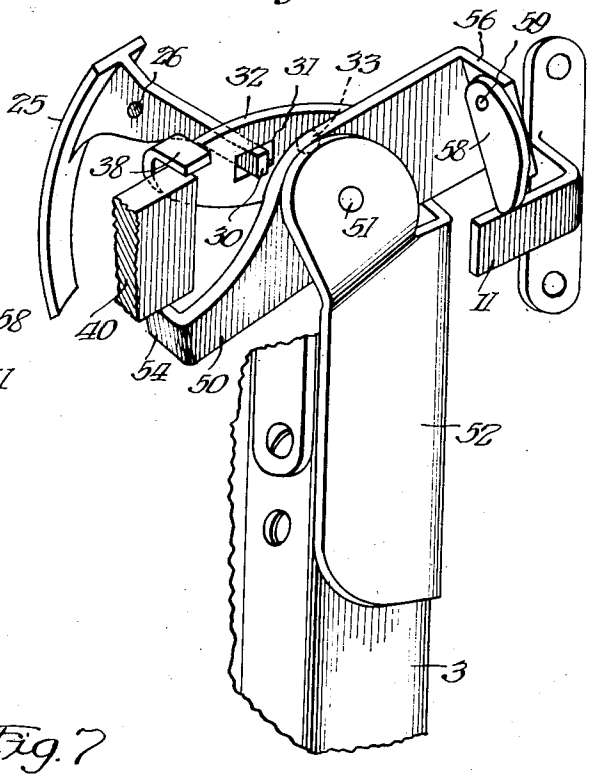



Fig. 5

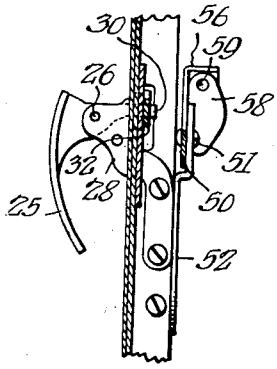
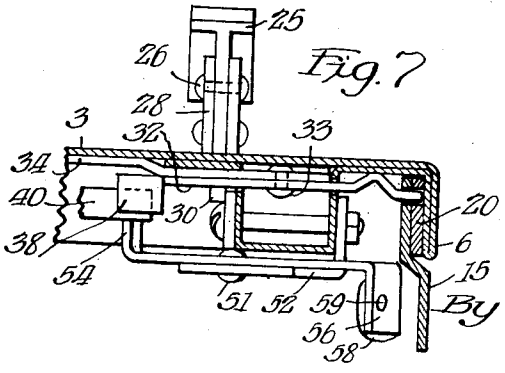



Fig. 7




Inventor:
James E. Bales,
By Cheever & Cox
attys.

Patented Nov. 10, 1925. 1,560,641

# UNITED STATES PATENT OFFICE.

JAMES E. BALES, OF AURORA, ILLINOIS, ASSIGNOR TO LYON METALLIC MANUFACTURING COMPANY, OF AURORA, ILLINOIS, A CORPORATION OF ILLINOIS.

## DOOR-LOCKING MECHANISM.

Application filed June 25, 1921. Serial No. 480,282.

*To all whom it may concern:*

Be it known that I, JAMES E. BALES, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented a certain new and useful Improvement in Door-Locking Mechanisms, of which the following is a specification.

My invention relates to door locking mechanisms, especially for clothes lockers and the like. My mechanism includes a rugged, hand-operated latch for engaging the door frame to hold the door closed, and a key operated lock which may be less rugged than the latch. The latch is provided with a handle for lifting it and the bolt of the lock is biased by a spring or otherwise towards acting position. As a result of my invention the operator can insert the key, rotate it and take it out, and afterwards pay no attention as far as the key is concerned. He can wait an indefinite time before operating the handle and opening the door—and this in spite of the fact that he employs a spring operated master bolt, and thus gets an automatic locking of the latch and of the bolt by pushing the door shut. In other words, although he employes a spring lock he can rotate the key and withdraw it before operating the door handle or opening the door. Nevertheless when he closes the door it becomes automatically latched and the latch automatically locked. To accomplish such a result is one of the objects of my invention. Another object is to provide door locking mechanism having a key controlled lock having a spring operated bolt, and a latch adapted to be locked by the bolt and biased towards acting position, so that it will automatically latch when the door is closed and the handle released, and yet will, so long as the handle is acting, prevent the projection of the bolt, the mechanism also having a dog serving as an alternative device for holding the bolt retracted but adapted to move to non-acting position automatically as the door moves shut. Contributory objects will become apparent as the description proceeds.

I accomplish my objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is a view showing the inside of a locker door and frame equipped with mechanism embodying my invention.

Figure 2 is a view of a portion of the locking mechanism showing the same in a different position from the one shown in Figure 1.

Figure 3 is a sectional elevation on the line 3—3, Figure 1.

Figure 4 is a plan section on the line 4—4, Figure 1.

Figure 5 is a sectional elevation on the line 5—5, Figure 1.

Figure 6 is a perspective view on an enlarged scale showing the latch lifting and locking mechanism.

Figure 7 is an enlarged sectional view on the line 4—4, Figure 1.

Like numerals denotes like parts throughout the several views.

While my device is not restricted to steel lockers, it has certain characteristics of special advantage in connection with such structures, and I have therefore chosen to illustrate the invention as applied to a structure of that type.

Referring to the drawings, the door frame 1 has hinges 2 by which the door 3 is supported. The door has marginal flanges 6, 7 and 8, the flange 6 being at the free vertical edge of the door, the flange 7 at the hinged edge and the flanges 8 at the top and bottom.

Fastened to the door frame near the top, bottom and mid height of the door are stationary catches 10, 11 and 12. These project into the doorway and are adapted to be engaged by latches 14, 15 and 16. Said latches are fastened to a latch bar 20 which is slidingly mounted on the inner surface of door flange 6. The bar has vertical slots 21 near the top and bottom which accommodate the shanks of large headed pins 22 riveted to flange 6. Thus the bar is free to slide up and down a limited distance to raise and lower the latches and cause them to disengage and engage the catches 10, 11 and 12. The noses of the latches are beveled on the under edge so they will ride over the catches as the door moves shut. It will be observed that the latch bar, latches and catches may easily be made (and are shown to be) comparatively large and rugged and hence remain operative at all times, even though the door and door frame be made of very light gauge metal and consequently be subject to a certain amount of distortion. In other words, a moderate distortion of the door or door frame, due to the employment of light

gauge metal or abuse will not prevent my locking mechanism from being operative.

The latch bar may be lifted by means of a handle 25 pivoted on a pin 26 carried by a bracket 28 on the front of the door, as shown in Figure 5 and elsewhere. The handle has an arm 30 which passes through a hole 31 formed in a lever 32 fulcrumed on a stationary pin 33 carried by a plate 34 fastened to the inside of the door as best shown in Figure 7. Said lever at one end projects into apertures formed in latch 15 and bar 20, as best shown at the right end of Figure 7. When the lever rocks about its fulcrum 33 it raises and lowers the latch bar 20 and the latches fastened thereto. At the opposite end lever 32 has a lug 38 which overlies the bolt 40 of a lock 42 when the bolt is "shot" or projected, as shown in Figures 1, 4, 6 and 7. The result is that when the lock is locked—that is, when the bolt is projected, the bolt will move into the path of lug 38 and prevent the descent of the latter, and this will prevent the lifting of the latch bar and the opening of the door. It will be observed that if the door is locked and an attempt is made to pry it open, the strain comes upon the latches and catches and not upon the lock. The function of the lock is merely to prevent the rotation of the lever 32, and hence a small and delicate lock may be used if desired, and yet this will not weaken the construction of the locking mechanism as a whole.

Lock 42 is a spring lock, and the bolt is constantly urged outward by spring mechanism, which need not be described as spring locks are articles of common use. It is operated by a key 44.

To now refer to the mechanism by which the bolt is automatically held back as soon as it is retracted by the key: a tumbler 50 is pivotally mounted upon a pin 51 carried by a bracket 52 bolted or otherwise rigidly fastened to the inside of the door and rotatable in a plane parallel to the plane of the door. This tumbler has a lug 54 which underlies bolt 40 when the latter is projected, as shown in Figures 1, 4, 6, and 7. This may be regarded as the non-operating position of the tumbler. The tumbler is overbalanced, however, and when it is disengaged gravity rotates it to a position in which lug 54 will rise into the path of bolt 40 and hold the latter in retracted position, as illustrated in Figure 2. Thus the lug 54 forms a self acting dog for holding the bolt in non-acting position. At the end opposite to lug 54 tumbler 50 has a lug 56 to which is pivoted a cam 58 which hangs freely pendant from a pin 59 carried by lug 56, as shown in perspective in Figure 6. The cam is free to swing inward, away from the door, but cannot swing in the opposite direction as it is backed up by the tumbler. The cam is so constructed that when the door moves shut the cam will engage catch 11 and ride up over it, thus lifting the adjacent end of tumbler 50 and lowering the lug or dog 54 and releasing bolt 40. In other words, cam 58 constitutes a trip for tilting the tumbler to such position as to release the bolt. When the door is moved open, the cam, being freely pivoted on its pin 59, swings freely and rides over the catch. Operation: When the door is locked and under normal conditions the parts assume the relative positions shown in Figure 1. The lug 38 of the latch-lifting lever 32 overlies bolt 40 and lug 54 underlies it and is held down by it. If, now, the operator inserts and rotates the key and draws back the bolt he frees the lug 38 and hence makes it possible to lift the latch bar and latches by manipulating the handle 25. The retraction of the bolt also releases the lug 54 of tumbler 50 and gravity causes the heavier end of the tumbler to drop and to move lug 54 up into the path of the bolt, thus holding it back, as shown in Figure 2. It is immaterial whether the user then leaves the key in the lock or takes it out. The tumbler will hold its acting position and hold the bolt pushed back until the tumbler is tripped. One of the advantages of this construction is that although the lock is a spring lock, it is not necessary for the operator to manipulate handle 25 while holding the bolt retracted by means of the key. The two operations of rotating the key and manipulating the handle 25 may occur one after the other instead of having to occur simultaneously and requiring two hands for the purpose. As soon as the bolt is retracted it stays retracted until the locker door has been opened, and closed. As soon as the bolt has been retracted and the lug 54 has moved to acting position, the operator, either with or without withdrawing the key, may pull on the handle 25 thus rotating the lever 32 and lifting the latch bar and latches. As the door swings open the cam 58 will swing on its pivot and produce no effect upon the tumbler. When the operator wishes to close the locker he simply pushes the door shut, whereupon the cam 58 rides up over catch 11, lifting the adjacent end of the tumbler and lowering lug 54 out of engagement with the bolt. At the same time the latches 14, 15, 16 ride up over the catches 10, 11 and 12 and finally drop into locking position, causing the lug 38 to rise. Thus the closing of the door causes the lug 54 to descend out of the way of bolt 40 and causes the lug 38 to rise out of the way of the bolt and hence the spring in the lock moves the bolt outward to locking position and the parts return to the condition shown in Figure 1.

As previously indicated, my mechanism has at least two important advantages; first, there is no strain on the lock itself. The

strain comes on parts which are controlled by the lock, but which may be made strong and rugged and of a size enabling them always to operate even though the door may be abused and bent more or less out of shape. A second advantage is that when the operator turns the key in the lock the bolt will be withdrawn and will stay back under the automatic action of the mechanism, and the operator may release his hand from the key or withdraw the key altogether and subsequently manipulate the handle 25 to lift the latches and release the door. Thus my device affords the advantage of a spring lock combined with the advantage of operating the key and the door handle in sequence instead of forcing the operator to hold the bolt retracted until the door is opened.

Having thus described by invention what I claim as new and desire to secure by Letters Patent is:

1. Door locking mechanism having a latch for locking the door, a handle on the front of the door for lifting the latch, a spring urged bolt for locking the latch in acting position, key-operated means accessible by key from the front of the door for retracting the bolt, means for preventing the bolt from locking prematurely including a dog for holding the bolt retracted, and means operated by the door frame as the door is closing for moving the dog to release the bolt.

2. A door locking mechanism having a latch for locking the door, a key controlled lock having a spring projected bolt remote from the door frame and adapted when projected to prevent the latch from disengaging the door frame, a dog for normally holding the bolt retracted, and means adapted to cooperate with the door frame when the door is closing for causing the dog to release the bolt, the latch therefore remaining unlocked until the door is closed.

3. In combination, a door and door frame, a liftable latch for holding the door closed, a key operated lock having a spring projected bolt which when projected prevents the lifting of the latch, a dog for normally holding the bolt retracted, and a cam on the dog adapted to engage the door frame as the door moves shut for moving the dog to non-acting position, thus automatically releasing the bolt upon closure of the door.

4. In combination, a door and door frame, a latch for holding the door closed, a spring actuated bolt which when projected prevents the lifting of the latch, a self-acting dog pivotally mounted on the door, and a cam on the dog adapted to engage the door frame as the door moves shut, for moving the dog to nonacting position, the cam being pivoted to the dog and being adapted to yield as the door moves open.

5. In combination, a door and door frame, a vertically movable latch bar, a plurality of latches on said bar for engaging the door frame at a plurality of points, a lock having a spring actuated bolt for preventing the lifting of the latch bar, a self-acting dog adapted to hold the bolt retracted, said dog being adapted to be held non-active by the bolt when the latter is projected, a cam adapted to engage the door frame as the door moves shut for moving the dog from acting to nonacting position, and means blocked by the bolt when the latter is projected for preventing the lifting of the latch when the bolt is projected.

6. In combination, a door frame, a door hinged to the frame, a latch mounted on the door and adapted to engage the frame for holding the door closed, the latch having a cam whereby it automatically is lifted as the door moves shut and finally drops into acting position when the door reaches closed position, a handle on the outside of the door for lifting the latch, a key operated spring lock mounted on the door and having a spring projected bolt adapted to prevent the lifting of the latch when the bolt is projected, a self-acting dog adapted to hold the bolt retracted, said dog being adapted to be held in non-acting position by the bolt whereby when the bolt is retracted the dog automatically moves to acting position to hold the bolt retracted, and means carried by the door and adapted to engage the door frame for moving the dog to non-acting position as the door closes.

7. Door-locking mechanism having a liftable, gravity-operated latch for locking the door, a handle on the front of the door for lifting the latch, a bolt biased towards projected position for preventing the latch from being lifted, key-operated means accessible by key from the front of the door for retracting the bolt, a dog for preventing the bolt from being projected after it has been retracted, and means actuatable by the door frame when the door is closing for causing the dog to release the bolt.

8. The combination with a door, a door frame and door latching mechanism of a key operated lock having a bolt biased towards projected position, a handle for lifting the latch, a detent adapted to hold the bolt retracted when the handle holds the latch in unlocked position, a dog adapted to normally hold the bolt retracted said dog being biased toward acting position, and a cam adapted to cooperate with the door frame for causing the dog to release the bolt as the door closes, there being consequently two elements in addition to the key for holding the bolt retracted, viz the detent and the dog, one controlled manually and the other automatically.

9. In combination, a door and door frame, a latch for holding the door closed, a

handle for lifting the latch, a key operated lock mounted on the door and having a spring actuated bolt for preventing the lifting of the latch, a dog for holding the bolt retracted, said dog being biased to acting position and being adapted to be held in non-acting position by the projected bolt, and means carried by the door and adapted to engage the door frame for moving the dog to non-acting position as the door moves shut.

10. In combination, a door and door frame, a latch for holding the door frame closed, a key operated lock mounted on the door and having a spring actuated bolt adapted to prevent the lifting of the latch, and a dog adapted to hold the bolt retracted, the dog being biased toward acting position and being adapted to be held non-active by the projected bolt whereby the bolt, upon being retracted is held retracted to permit the user to withdraw the key without thereby causing the latch to be locked by the bolt.

11. Door locking mechanism having a hand operated latch for holding the door closed, a key controlled lock including a spring projected bolt for locking the latch, a dog for holding the bolt retracted, said detent being biased toward acting position, the bolt when projected holding the dog in non-acting position and releasing the dog upon being retracted, and means operated by the door frame for moving the dog to non-acting position and thus permitting the bolt to move to locking position.

12. Door locking mechanism having a liftable latch for holding the door closed, a key controlled lock including a spring projected bolt for locking the latch, a dog for holding the bolt retracted, said detent being biased toward acting position, the bolt when projected holding the dog in non-acting position and releasing the dog when the bolt is retracted, means operated by the door frame for moving the dog to non-acting position, a handle for lifting the latch and means operated by the handle for preventing the lock bolt from being projected when the latch is in non-acting position.

13. Door-locking mechanism having a latch for locking the door, said latch being manually liftable, an independent, manually retractible bolt for preventing the latch from being lifted, a spring for normally holding the bolt projected in locking position, a dog for preventing the bolt from being projected, and means adapted to cooperate with the door frame when the door is closing for causing the dog to release the bolt and thereby permit the bolt to move to projected, latch-locking position.

14. Door-locking mechanism having a latch for locking the door, said latch being biased toward locking position, a bolt remote from the edge of the door for preventing the latch from being unlocked, a spring for urging the bolt toward locking position to lock the latch, key-operated means accessible by key from the front of the door for retracting the bolt, a stop for holding the bolt retracted, said stop being biased toward acting position and being held in non-acting position by the bolt when the latter is projected whereby the retraction of the bolt will release the stop and permit it to move to acting position, and means adapted to cooperate with the door frame when the door is closing for tripping the stop and causing it to release the bolt and thereby permit the spring to project the bolt to lock the latch.

In witness whereof, I have hereunto subscribed my name.

JAMES E. BALES.