A. M. HOES.

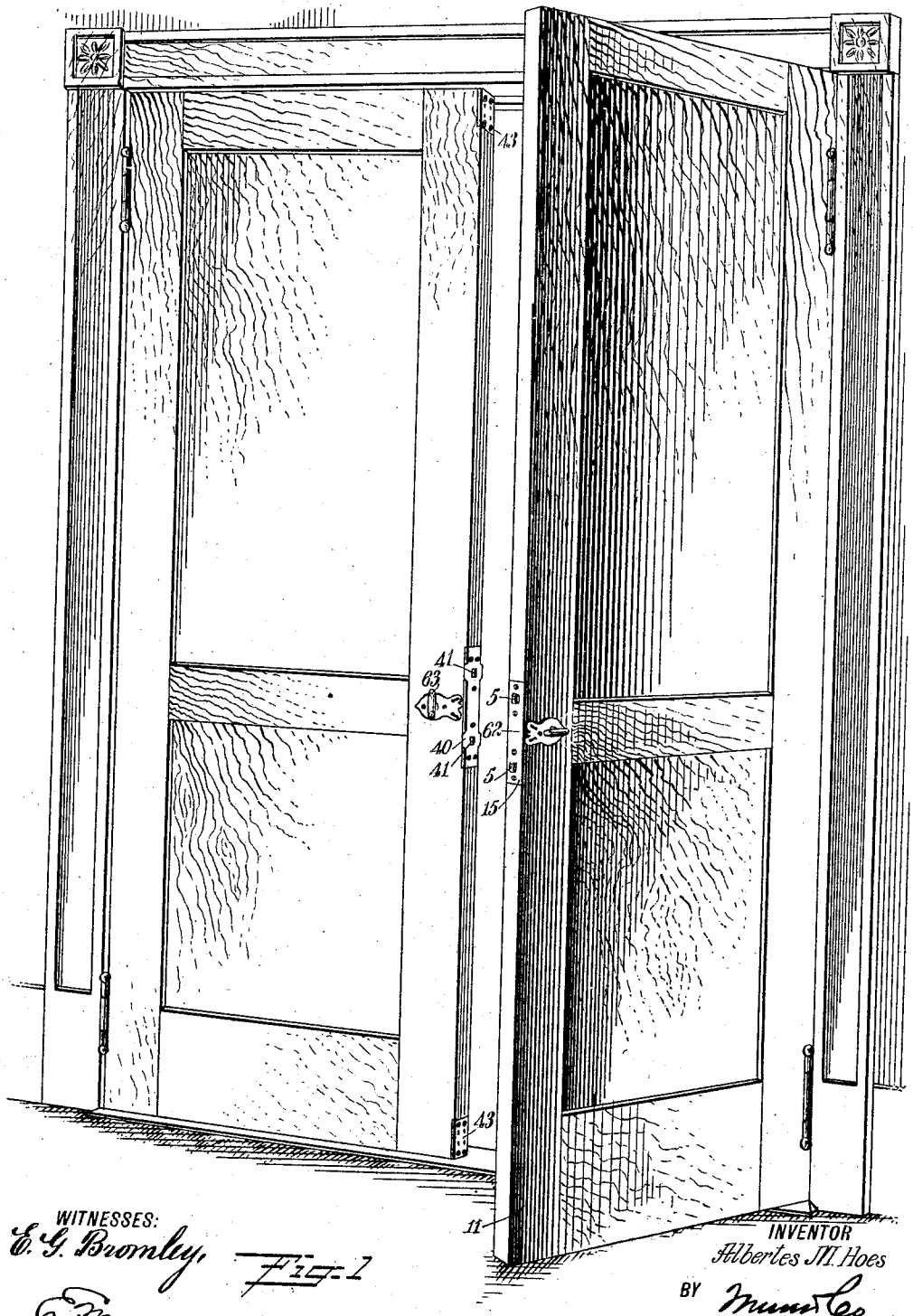
DOUBLE DOOR LOCK.

APPLICATION FILED FEB. 12, 1910.

966,208.

Patented Aug. 2, 1910.

3 SHEETS—SHEET 1.



WITNESSES:

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Fig. 1

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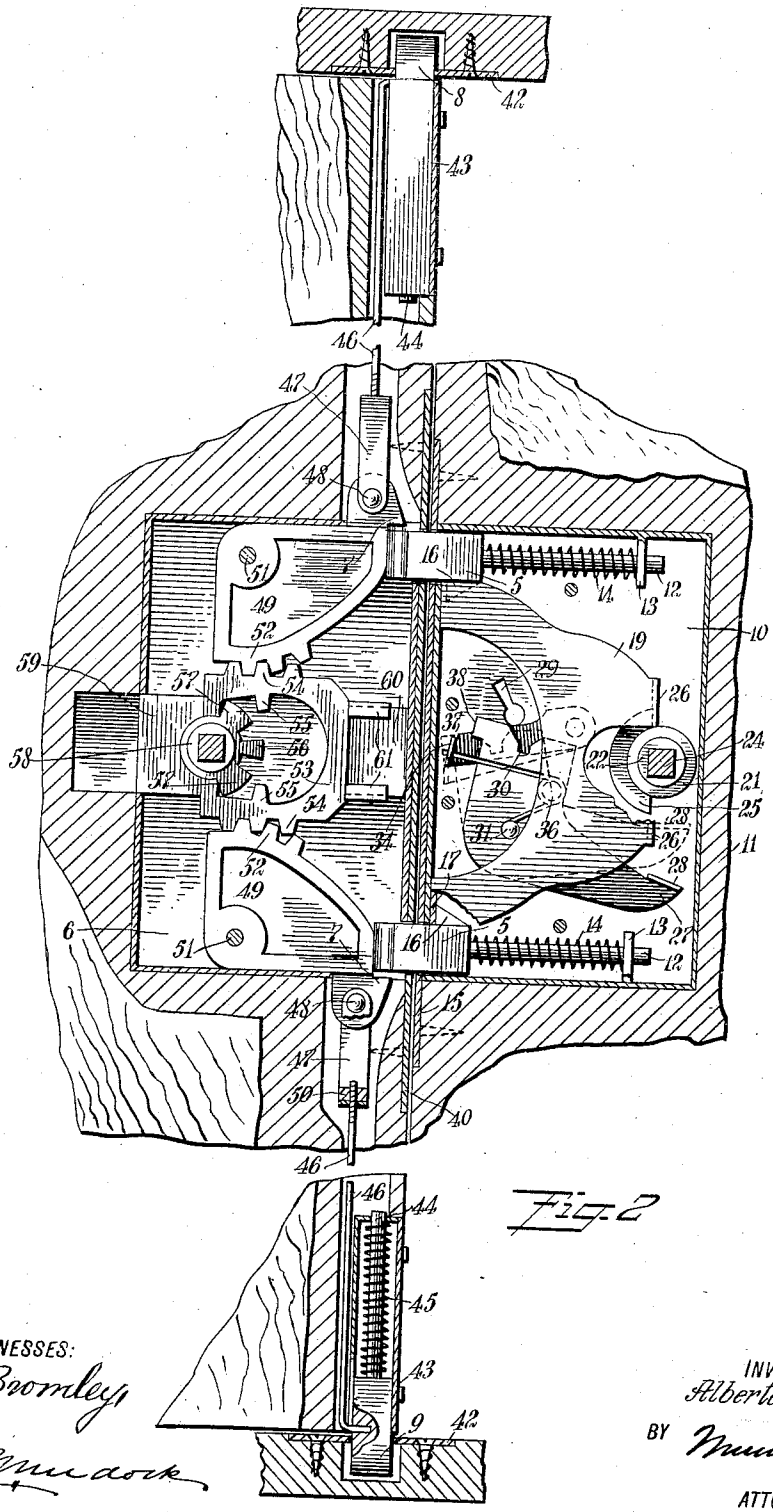

Fig. 2

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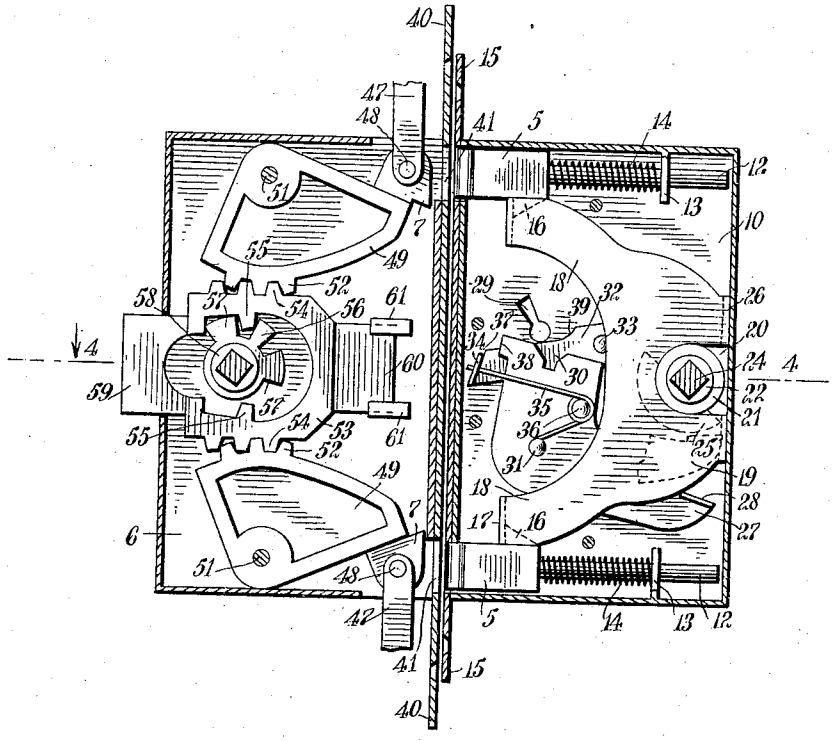

Fig. 3

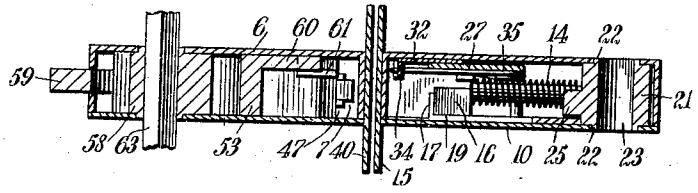

Fig. 4

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UNITED STATES PATENT OFFICE.

ALBERTES MARION HOES, OF ST. PAUL, NEBRASKA.

DOUBLE-DOOR LOCK.

966,208. Specification of Letters Patent. Patented Aug. 2, 1910.

Application filed February 12, 1910. Serial No. 543,513.

To all whom it may concern:

Be it known that I, ALBERTES MARION HOES, a citizen of the United States, and a resident of St. Paul, in the county of Howard and State of Nebraska, have invented a new and Improved Double-Door Lock, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide a plurality of locks for double doors which are controlled by a master lock; to provide an upper and a lower retaining bolt and controlling mechanism therefor operable simultaneously and from the same point; to provide a construction whereby upper and lower bolts are centrally operable and controlled; and to provide a lock mechanism which is simple, efficient and durable.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a front elevation of double doors having locks provided therefor constructed and arranged in accordance with the present invention; Fig. 2 is a fragmentary vertical section of the meeting edges of the doors and the locks and bolts provided therefor, the bolts being shown in locking position; Fig. 3 is a vertical section of the opposed locks showing the operative parts in position when the bolts are withdrawn from locking position; and Fig. 4 is a horizontal section taken on the line 4—4 in Fig. 3.

The leading purpose in the present invention is to provide a locking mechanism for doors wherein the delays, mistakes and subsequent fatalities incident to panic may be avoided. It is presumed that the difficulties which arise most frequently in opening double doors is that the upper bolt is out of reach, or that the upper or lower bolt, one or the other, becomes stuck or momentarily refuses to act. Further, that the bolts adhere to the side of the strikers by reason of the pressure applied to the side of the door by the frenzied people within. To provide a mechanism which shall be natural and sure for the withdrawing of the bolts, and at the same time to produce an effective and safe lock to secure the closure of the door opening, I have produced the construction shown in the accompanying drawings, wherein bolts 5, 5 are arranged to enter a lock casing 6 in the path of latch heads 7, 7 when in locking position, and thereby prevent the withdrawal of the upper and lower bolts 8 and 9.

The locking mechanism contained in a casing 10 is herein termed by me the master lock, and the door 11 in which the said lock 10 is mounted is styled by me the master door. The bolts 5, 5 of the lock 10 are provided with shanks 12, 12, which are extended through guide plates 13, 13, and are enfolded by spiral expansion springs 14, 14. The springs 14, 14 bear against the rear squared shoulder of the body of the bolts 5 and press upon the plates 13 to force the bolts outward. The heads of the bolts 5 are rectangular and extended through openings provided in a cover plate 15 and are guided therein. The bolts are limited in their forward throw and retracted therefrom by extensions 16, 16, which form shoulders which bear against down turned ends 17, 17. The ends 17, 17 are formed from the yoke ends 18, 18 of a slide plate 19. The slide plate 19 is guided by a recess 20 formed in the rear extension thereof to surround the barrel of a roll-back 21.

The roll back 21 is formed with pivotal extensions 22, 22, which are extended through the sides of the casing 10 to be rotated therein. To rotate the said roll back there is provided a squared hole 23 through which is extended the squared shank 24 of a knob 62 for operating the roll back. Extended from the side of the roll back 21 is an extension 25, the ends whereof rest upon the over-turned ends of the plate 19. When, in operation, the roll back 21 is rotated the extension 25 in the one side or the other of the center of the roll back bears upon down-turned ends 26 of the plate 19, to thrust backward the plate 19, compressing the springs 14, 14 and withdrawing the bolts 5, 5 from engagement with the opposite lock.

The plate 19 may be freely moved to withdraw the bolts 5, 5 in the manner stated, until prevented by the interposition of a locking lever 27. The lever 27 is constructed from plate metal and is provided with an upturned end 28. The upturned end 28 is arranged to be interposed in the path of one of the ends 26 of the plate 19. To accomplish this a key must be inserted through a keyhole 29, in the swing of which key the head is brought in contact with the

lever 27 by insertion in a recess 30 thereof. The lever 27 is rotated about a pivot 31, to which movement it is compelled by the said key.

The lever 27 is locked in its extreme positions by a rocking lever 32, which is pivoted at 33. The lever 32 is constructed from light plate material with an upturned tab end 34. The upturned end 34 is perforated to receive the free end of a spring 35. The spring 35 is coiled about a pin 36 set up from the lever 27 and anchored on the pivot 31. The operation of the spring 35 is to force the end of the lever 32, with which it is connected, toward the keyhole 29. Formed in the forward edge of the lever 32 are suitable nicks or cuts 37, 37, which engage an overturned end 38 of the lever 27, and in holding relation thereto. The engagement between the levers 27 and 32 is such as to prevent the movement of the lever 27 without primarily removing the lever 32 from engagement therewith. This is the first office of the key which is inserted in the hole 29. To receive the ward of the key a curved surface 39 is provided in the adjacent edge of the lever 32.

When the key is placed in the lock, the ward is first brought in contact with the lever 32, and with the curved surface 39 thereof, forcing the said lever backward against the pressure of the spring 35, rotating the lever on the pivot at 33. This disposition of the lever 32 removes the nick or recess in its forward edge from engagement with the lever 27, permitting the latter free movement. In the course of the travel of the ward of the key, it is next brought in contact with the side of the recess 30 in the lever 27, causing the said lever 27 to rotate on its pivot 31 while retreating from the pressure of the ward of the key to insert the upturned end 28 of the said lever in the path and to the rear of the end 26.

The series of actions just portrayed carries the various parts constituting the lock from the position shown in full lines in Fig. 2 to the position shown in dotted lines in said figure. In this position the nick 37 at the outer end of the lever 32 engages the end 38 of the lever 27, locking the two levers in permanent engagement. While the lever 27 remains in this position it is obvious the plate 19 may not be retracted to withdraw the bolts 5, 5 within the casing 10. When the levers are permitted to resume the position shown by full lines in Figs. 2 and 3, the plate 19 may be moved at will to retract the bolts 5, 5.

The bolts 5 are rounded on the forward end to ride easily over a striker plate 40 with which the opposite door is provided. The plate 40 is provided with bolt holes 41, 41 to form locking members for the bolts 5, 5. The striker plate 40 protects the edge of the casing 6, wherein is disposed the mechanism for operating the bolts 8 and 9, which operate in openings in shield plates 42, 42. The bolts 8 and 9 are mounted in box casings 43, 43, through perforations in the removed ends whereof shanks 44, 44 of the said bolts are protruded. The shanks 44 are enfolded by spiral springs 45, 45, the office of which is to extend the bolts 8 and 9 to their full outward position. The bolts 8 and 9 are retracted from the outward extension by draw rods 46, 46, these being inserted in the back of the said bolts, as shown in Fig. 2 of the drawings, and connected at the opposite end adjacent to the lock casing 6 with links 47, 47. The links 47 are perforated to pass the said rods 46, and are pivoted at 48 on the latch heads 7, 7 extended from quadrants 49, 49. The rods 46, 46 are held in the links 47, 47 by screw nuts 50, 50, the ends of the said rods being provided with screw threads to receive the said nuts. By means of this construction the throw of the bolts 8 and 9 may be nicely adjusted, the rods 46, 46 limiting the throw of the said bolts.

The quadrants 49, 49 are pivoted at 51, 51 in the casing 6, and are provided with gear teeth 52, 52. The quadrants are each engaged by the teeth 52, 52 with a moving plunger 53. The plunger 53 is provided with teeth 54, 54, and also with teeth 55. The teeth 55 are arranged to engage teeth 56 and 57 set out from the barrel of a roll back 58. The roll back 58 is pivotally mounted in the casing 6 in a manner similar to that provided for the mounting of the roll back 21 in the casing 10. The plunger 53 is provided with a slide extension 59, guidably mounted in a perforation provided in the rear wall of the casing 6. The operation of the extension 59 is to steady the action of the plunger 53. To further aid in this, an extension 60 of the said plunger is guided by upturned guides 61, 61.

The coöperation of the quadrants 49, 49, plunger 53 and roll back 58 is as follows: The teeth 57, 57 normally rest in the position shown in Fig. 2 of the drawings. The quadrants 49, 49 are normally held in the position shown, by the pull of the springs 45, 45 on the draw rods 46, 46. When, however, by means of a knob 63 the roll back 58 is rotated irrespective of the rotary direction, the teeth 57 thrust back the plunger 53 until the tooth 56 of the said roll back engages the tooth 55 of the said plunger to further move the said plunger, and to the limit of its throw. The movement of the plunger 53, by reason of its toothed engagement with the quadrants 49, 49, causes the latter to rotate on their pivots 51, 51 and to retract the ends of the said quadrants bearing the latch heads 7, 7. This action is continued until the bolts 8 and 9 are drawn from engage-

ment with the shield plates 42, 42, and the door bearing the said bolts is free to move on its hinges. The action of the roll back 58, the teeth 56 and 57 of the plunger 53, and the quadrants 49, 49 connected therewith, is sufficiently steady to prevent the automatic extension of the bolts 8 and 9 in answer to the tension of the springs 45, 45. Thus, the bolts 8 and 9 will not be extended during the swing of the door with which they are connected.

With a door provided with locks constructed and arranged as above set forth, and as shown in the accompanying drawings, the operation is as follows: The door carrying the bolts 8 and 9 is first brought to a closed position, in doing which the bolts 8 and 9 strike upon and override the shields 42, 42, dropping into the recesses provided in said shields. The inclined and rounded surfaces of the bolts 8 and 9 assist in this action. The bolts 8 and 9 in thus retracting within their casings 43, 43, lift the draw rods 46, 46 within the links 47, 47 without affecting the mechanism contained within the casing 6. The retraction is, therefore, unimpeded except by the independent springs 45, 45, forming in this manner a sensitive and easy lock action. The controlled door being thus adjusted, the master door 11 is closed. In doing this the bolts 5, 5 strike upon the striker plate 40 to override the same and to extend within the bolt holes 41, 41 thereof. At the minute of the insertion of the bolts 5, 5, the latch heads 7, 7 of the quadrants 49, 49 are in the position shown in Fig. 2 of the drawings. It will now be seen that the bolts 8 and 9 may not be withdrawn from engagement with the shields 42, 42 until the bolts 5, 5 are removed from engagement with the heads 7, 7. This may at any time be accomplished while the parts remain in this position, by turning a knob 62 carrying the shank 24 on the master door 11. In this respect the doors operate similarly to the ordinary door; turning the knob 62 removes the lock bolt from engagement with the bolted door. With the removal of the lock bolt, however, the knob spindle 63 may be turned to withdraw the bolts 8 and 9 simultaneously from engagement with the shields 42, and thereby release the door carrying the said bolts so that it may swing on its hinges.

When, in the course of operation, it is desired to lock the doors, this is accomplished by inserting the necessary key in the keyhole 29 to impinge upon the levers 32 and 27, causing the former to release the latter, and moving the latter into position so that the end 28 thereof is interposed in the rear of the end 26 of the plate 19. As above described, the levers 32 and 27 are in this position locked, and before the knob 62 or 63 may be turned, the key must be again inserted and operated to remove the end 28 of the lever 27 from the path of the plate 19. When, as often happens, it is desired to lock the bolts 55 in their retracted position, this is accomplished by turning the knob 62 to retract the said bolts. While held in the retracted position the key is inserted in the lock and turned to throw the lever 27 to insert the upturned end 28 in front of the downturned end 26. This disposition of the parts prevents the forward throw of the bolts by the springs 14.

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

1. A double door lock comprising a plurality of lock casings having alined edge openings; a plurality of bolt levers mounted in one of said casings and movable laterally therein to manipulate locking bolts connected therewith; means for moving said bolt levers; and a plurality of spring actuated locking bolts mounted in the other of said casings adapted to be protruded in the path of said levers to prevent the movement of the same.

2. A double door lock comprising a plurality of lock casings having alined edge openings; a plurality of bolt levers mounted in one of said casings and movable laterally therein to manipulate locking bolts connected therewith; means for moving said bolt levers; a plurality of spring actuated locking bolts mounted in the other of said casings adapted to be protruded in the path of said levers to prevent the movement of the same; a roll back mounted in said second mentioned casing and provided with a handle extended to the outer side thereof; a connecting plate engaging said bolts and said roll back for retracting said plate when the said roll back is rotated.

3. A double door lock comprising a plurality of lock casings having alined edge openings; a plurality of bolt levers mounted in one of said casings and movable laterally therein to manipulate locking bolts connected therewith; means for moving said bolt levers; a plurality of spring actuated locking bolts mounted in the other of said casings adapted to be protruded in the path of said levers to prevent the movement of the same; a roll back mounted in said second mentioned casing and provided with a handle extended to the outer side thereof; a connecting plate engaging said bolts and said roll back for retracting said plate when the said roll back is rotated; and a key released locking member adapted to swing in the path of said plate to prevent the retraction thereof.

4. A double door lock comprising a plurality of lock casings having alined edge openings; a plurality of bolt levers mounted in one of said casings and movable latter-

ally therein to manipulate locking bolts connected therewith; means for moving said bolt levers; a plurality of spring actuated locking bolts mounted in the other of said casings adapted to be protruded in the path of said levers to prevent the movement of the same; a roll back mounted in said second mentioned casing and provided with a handle extended to the outer side thereof; a connecting plate engaging said bolts and said roll back for retracting said plate when the said roll back is rotated; a pivoted lever adapted to be extended in the retracted path of said plate to prevent the movement thereof; and a locking lever adapted to engage and hold said first mentioned lever in position to prevent the movement of said plate.

5. A double door lock comprising a centrally located bolt manipulating mechanism; a locking bolt protruded from the edge of the door at a point removed from said manipulating mechanism; a guide casing for said bolt; a spring arranged to project said bolt beyond the door structure; a connecting rod attached to said bolt and said bolt manipulating mechanism; and an interposed link loosely engaging said rod to permit action of the latter independent of the said bolt manipulating mechanism.

6. A double door lock comprising a centrally located bolt manipulating mechanism; a locking bolt protruded from the edge of the door at a point removed from said manipulating mechanism; a guide casing for said bolt; a spring arranged to project said bolt beyond the door structure; a connecting rod attached to said bolt and said bolt manipulating mechanism, the end of said rod being provided with a screw thread and a nut threadably engaged therewith; and an interposed link loosely engaging said rod to permit action of the latter independent of the said bolt manipulating mechanism.

7. A double door lock comprising a centrally located bolt manipulating mechanism; a locking bolt protuded from the edge of the door at a point removed from said manipulating mechanism, said bolt having rounded end formation suitable for accelerating the yield to the lift of the striker plate of the standing structure; a guide casing for said bolt; a spring arranged to project said bolt beyond the door structure; a connecting rod attached to said bolt and said bolt manipulating mechanism, the end of said rod being provided with a screw thread and a nut threadably engaged therewith; and an interposed link loosely engaging said rod to permit action of the latter independent of the said bolt manipulating mechanism.

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

ALBERTES MARION HOES.

Witnesses:

J. A. HAGGART,

M. D. SMITH.