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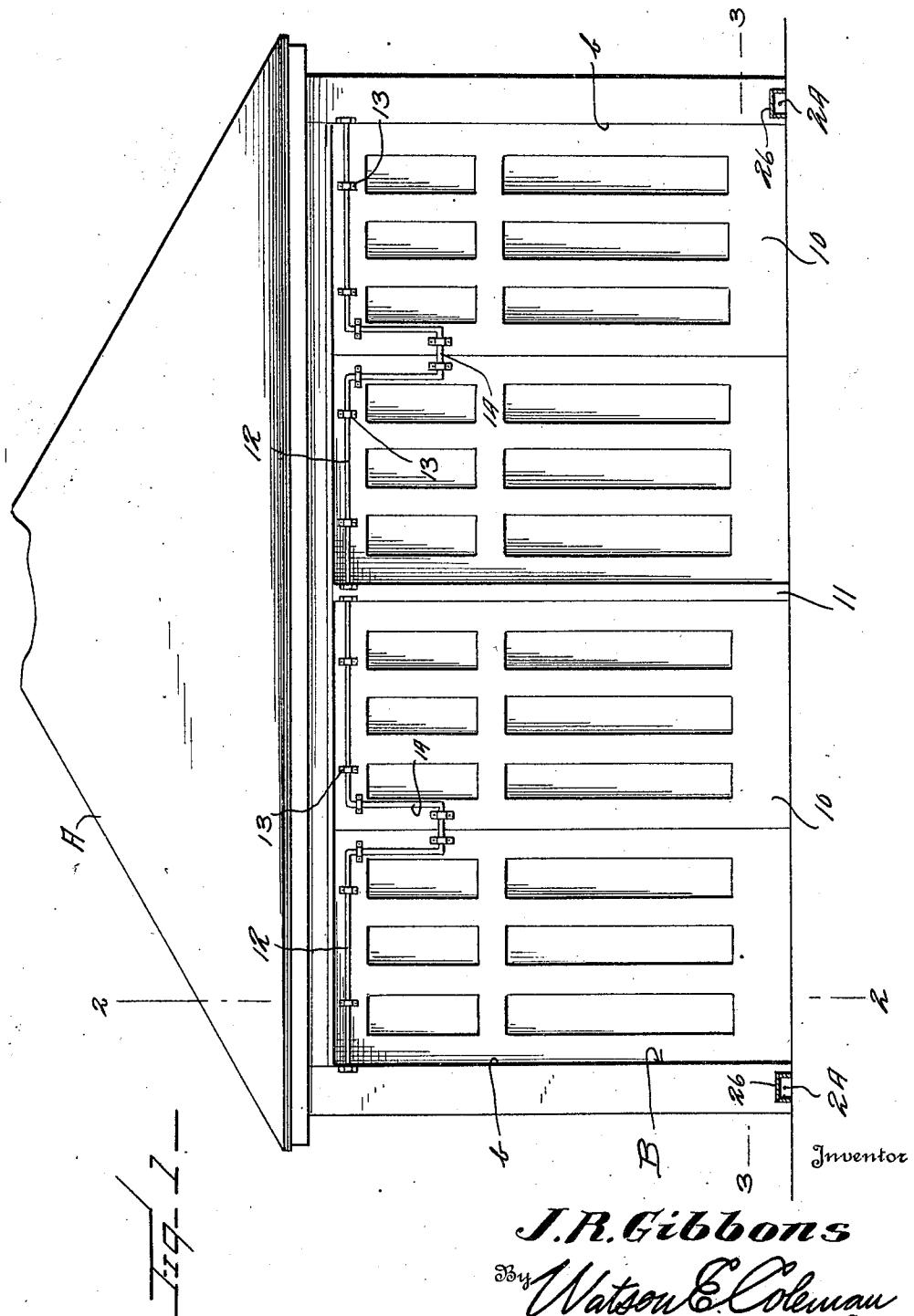
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J. R. GIBBONS

DOOR OPERATING MECHANISM

Filed April 16, 1927

3 Sheets-Sheet 1



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March 20, 1928.

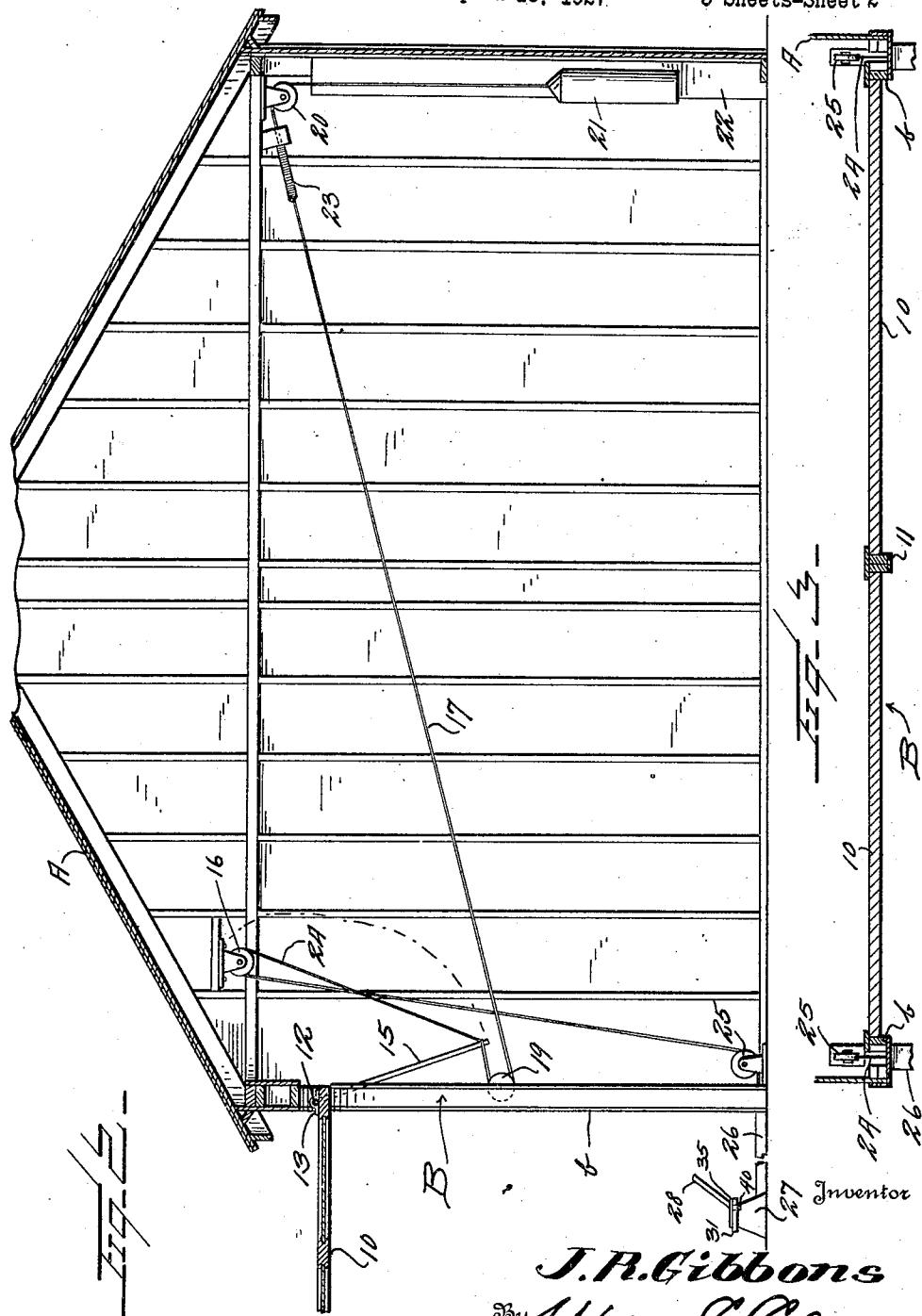
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3 Sheets-Sheet 2



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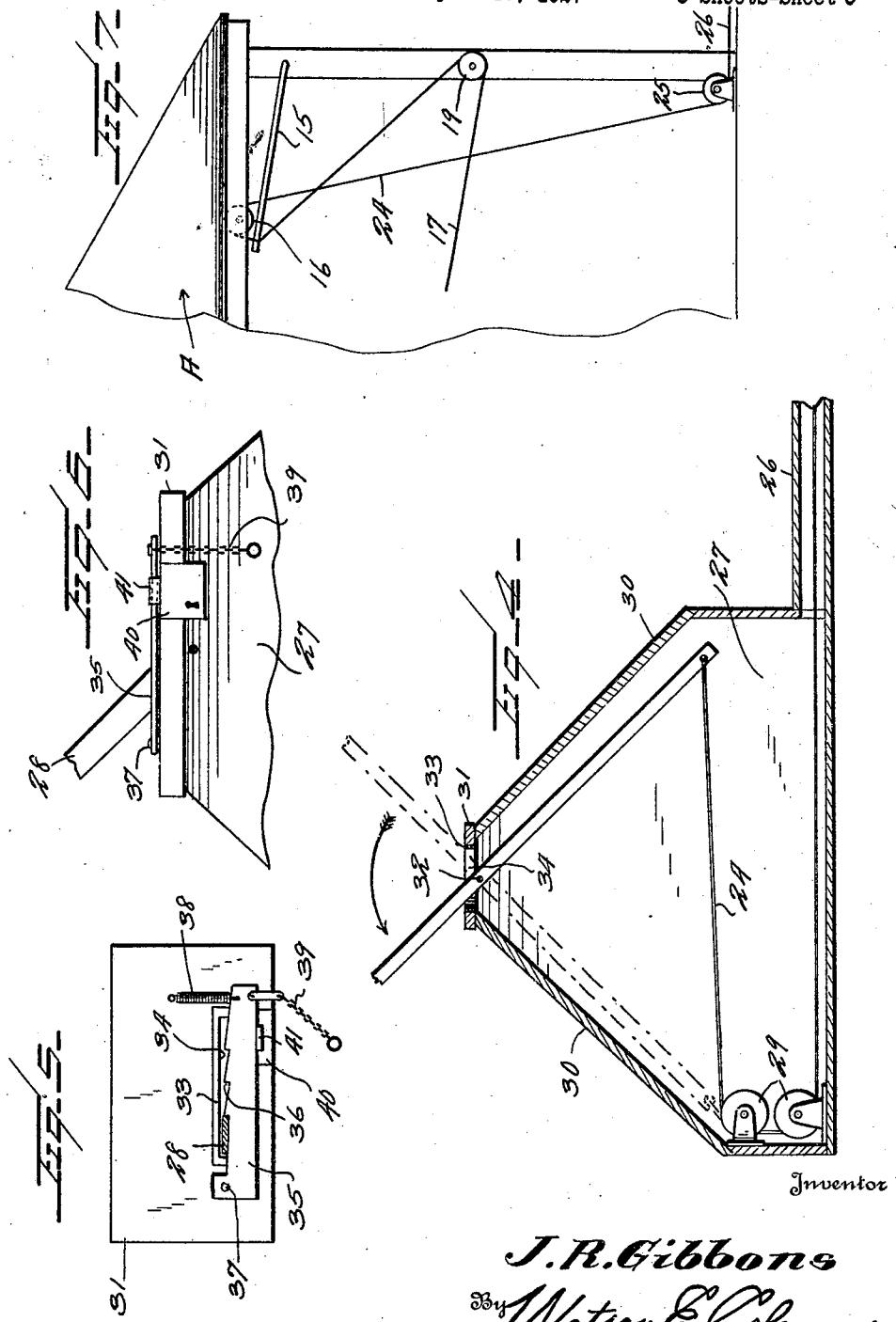
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Patented Mar. 20, 1928.

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# UNITED STATES PATENT OFFICE.

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## DOOR-OPERATING MECHANISM.

Application filed April 16, 1927. Serial No. 184,322.

This invention relates to a door operating mechanism for garages, barns, stables, and the like and the general object of the invention is to provide means whereby the door which is swung at its upper end upon a horizontal axis may be raised by the action of weight, the weight being released by means exterior to the garage.

A further object of this invention is to provide means whereby the door may be swung to a closed position.

Another object is to provide a simple system of cables or pulleys whereby the door may be operated and to provide simple manually actuatable means exterior to the garage or stable whereby the door may be released from its closed position, and whereby the releasing lever may be locked so that after the door is closed, the door may be locked in closed position. Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings wherein:

25 Figure 1 is a front elevation of a garage having a door constructed in accordance with my invention;

Figure 2 is a vertical longitudinal sectional view on the line 2—2 of Fig. 1;

30 Figure 3 is a section on the line 3—3 of Fig. 1;

Figure 4 is a vertical sectional view through the door operating mechanism;

35 Figure 5 is a top plan view of the construction shown in Figure 4;

Figure 6 is a fragmentary elevation of the upper portion of the casing having the operating mechanism;

40 Figure 7 is an elevation showing the manner in which the operating cables may be trained on the exterior of the garage.

Referring to the drawings, the garage which is designated A is provided with a door opening B defined by the jambs b. Operating within the door opening are one or more doors 10. There may be one or more of these doors depending upon the size of the garage. I have illustrated two doors 10 and separated by the vertical stud 11. Obviously, the doors may be modified in many ways. Each door is supported upon a transversely extending rod or shaft 12 which is shown as connected at intervals to the upper margin of the door by brackets 13 and this rod is formed with the crank arms 14 which are

also connected with the doors so that when this shaft or rod is oscillated in one direction the door will be raised, and when oscillated in the other direction, the door will be lowered. Inasmuch as the opening mechanism for both doors is the same I will only describe one door. The shaft 12 is provided upon the inside of the door or front wall of the garage with the arm 15 which springs in an arc as shown by the dotted lines in Figure 2. Disclosed above the path movement of the door and mounted in any suitable manner is the pulley 16. Connected to the free end of the arm 15 is a cable 17 which extends downward and outward and passes over a pulley 19 mounted upon the front wall of the garage and then passes upward and rearward to the rear of the garage and over a pulley 20. To the end of the cable is connected a weight 21 of any suitable character, this weight being sufficient to lift the door when the weight is released. This weight operates within a sheet metal weight box 22 or may be mounted in any suitable manner. Preferably a coiled contractile spring 23 is disposed within the length of the cable 17 so as to absorb the shock of the dropping weight to some extent. It will be obvious now that when the weight is released and falls that it will pull down upon the arm 15 and cause the door to be raised and held raised until the door is manually pulled down again.

For the purpose of swinging the door downward to its closed position I provide a cable 24 which passes up over the pulley 16 and is attached to the free end of the arm 15. The cable passes downward over the pulley 16 and under a pulley 25 and out through a suitable cable housing 26. This cable housing leads into a housing 27 disposed in front of the garage to one side of the path leading thereto and then this housing 27 is mounted on the lever 28 whose upper end extends out of the housing. The cable 24 passes over the vertically disposed pulleys 29 and is connected to the lower end of the lever 28 as shown in Figure 4. When the upper end of the lever 28 is swung to the right in Figure 4, the lower end will retract the cable 24 and this will pull the arm 15 upward, closing the door, and of course, lifting the weight 21. Means are provided for holding the lever with the door closed and against the action of the weight 21.

As shown in Figure 4, the housing 27 has upwardly and inwardly inclined side walls 30 and the upper end of the housing carries a slotted plate 31 over which the lever extends, the lever being pivoted upon a pin bolt or other suitable pivoting element 32. Mounted in the slot of this plate 31 is a wear plate 33 having a slot 34 through which the lever 28 extends. Pivoted upon the plate 31 is a horizontally springing latch 35 formed with ratchet notches 36 in one edge face which are adapted to engage the lever when the lever is pulled back and the door closed to thus lock the lever in this retracted position. This latch 35 is mounted upon a pin 37 and the free end of the latch is drawn toward the lever 28 by means of the coiled contractile spring 38. Connected to the free end of the latch is a link and chain 39 whereby the latch may be manually pulled away from the lever to release the lever and permit the door to open through the action of the counterweight. A lock 40 of any suitable character is mounted upon the edge face of the plate or frame 31 and has a bolt 41 actuated by a key and adapted to be projected into the path of the latch 35 so as to prevent any retraction of the latch until the lock bolt has been retracted. Preferably, the mechanism which locks the operating lever will be entirely housed and protected from the weather by a covering. The operation of the mechanism will be obvious from what has gone before. Inasmuch as the cable 24 is disposed within the cable conduit it is impossible to release the lever 28 or release the cable 24 except by retracting the lock bolt 41 and pulling the latch out of engagement with the lever. As soon as the latch is thrown over, the counterweight 21 will act to open the door by springing it to its raised position. The door will then be held in this raised position by the counterweight. When it is desired to close the door, the lever 28 is shifted in the direction of the arrow, as shown in Figure 4, thus retracting the cable 24, pulling the lever or arm upward, closing the door and at the same time lifting the counterweight, the door acting to nearly counterbalance the counterweight so that the action of lifting the counterweight requires but little power. As the lever moves rearwardly, it is engaged by the teeth 36 until the door is fully released, the rearmost tooth of the latch 35 will engage the lever, and the door will be then held closed, and after the lock bolt 40 is thrown and the key removed, the door cannot be opened without the use of the key. While I have illustrated the cable 17, the pulley 19 and the arm 15 as being inside of the garage, these may be placed exterior to the garage. The cable 24 may also be exterior to the garage. This is illustrated in Figure 7. Even under these

circumstances, however, the door cannot be operated without the actuation of the lever 28.

I claim:

1. The combination with a door pivotally mounted at its upper end, an arm rigidly connected to the door to swing therewith, a counterweight operatively connected to said arm to cause the raising of the door from a vertical position to a horizontal position, a lever operatively connected with the arm to cause the simultaneous lifting of the counterweight and the closing of the door, and means for locking the lever with the door in a closed position against the action of the counterweight. 70 75 80

2. In a building, a door mounted for swinging movement at its upper end, an arm extending inward from the door, a cable operatively connected to said arm and having a counterweight at one end, pulleys over which said cable is guided, the counterweight acting to pull downward on the arm and raise the door, a second cable connected with the arm, pulleys guiding the second cable from the arm downward to the floor of the building and then outward, and an operating member exterior of the building connected to said cable whereby the cable may be retracted to cause the closing of the door against the action of the counterweight. 85 90 95

3. In a building, a door mounted for swinging movement at its upper end, an arm extending inward from the door, a cable operatively connected to said arm and having a counterweight at one end, pulleys over which said cable is guided, the counterweight acting to pull downward on the arm and raise the door, a second cable connected with the arm, pulleys guiding the second cable from the arm downward to the floor of the building and then outward, a housing disposed exterior to the building, a lever pivoted within the housing, said cable entering the housing and being connected to one end of the lever, pulleys over which the cable passes, whereby as the lever is shifted in one direction, the cable will be retracted to cause the closing of the door against the action of said counterweight, and means on the top of the housing whereby the cable may be locked with the door closed. 100 105 110 115

4. In a building, a door mounted for swinging movement at its upper end, an arm extending inward from the door, a cable operatively connected to said arm and having a counterweight at one end, pulleys over which said cable is guided, the counterweight acting to pull downward on the arm and raise the door, a second cable connected with the arm, pulleys guiding the second cable from the arm downward to the floor of the building and then outward, a housing disposed exterior to the building, a lever pivoted within the housing, said cable entering 120 125 130

the housing and being connected to one end of the lever, pulleys over which the cable passes, whereby as the lever is shifted in one direction, the cable will be retracted to cause 5 the closing of the door against the action of said counterweight, and means on the top of the housing whereby the cable may be locked with the door closed, said means comprising a latch having a notch for the lever when 10 the lever is retracted, a spring urging the latch toward the lever, manually operable means for withdrawing the latch against the action of the spring, and means for locking the latch in its lever-impeding position. 15 5. In a building, a door mounted for swinging movement at its upper end, an arm extending inward from the door, a cable operatively connected to said arm and having a counterweight at one end, pulleys over 20 which said cable is guided, the counterweight acting to pull downward on the arm and raise the door, a second cable connected with the arm, pulleys guiding the second cable from the arm downward to the floor of the 25 building and then outward, a housing disposed exterior to the building, a lever pivoted within the housing, said cable entering the housing and being connected to one end of the lever, pulleys over which the cable passes, whereby as the lever is shifted in one 30 direction, the cable will be retracted to cause the closing of the door against the action of said counterweight, and means on the top of the housing whereby the cable may be locked with the door closed, said means comprising a latch having a notch for the lever when 35 the lever is retracted, a spring urging the latch toward the lever, manually operable means for withdrawing the latch against the action of the spring, and means for locking the latch in its lever-impeding position, and including a key actuated bolt. 40 6. A building having a door opening, a shaft extending transversely to the door opening at the top thereof, a door rigidly engaged with said shaft to oscillate therewith, the shaft having an arm, a pulley disposed below and forward of the arm, a pulley disposed in the building at the rear thereof, a cable attached to the free end of the arm and passing around the first-named pul- 45 50 ley and over the second named pulley, a weight attached to the extremity of the cable and thus acting to swing the arm downward and lift the door, a pulley disposed above the arm, a pulley disposed adjacent the floor at the front of the building, a cable attached to the free end of the arm and passing over said pulleys and out through the front of the building, and manually operable means connected to said cable whereby this second named cable may be retracted, and including a lever and a latch holding the lever in a retracted position against the action of said counterweight. 55 60 65 7. In a building, a doorway and a plurality of doors hingedly mounted at their upper ends in said doorway to swing upward and outward or downward from a horizontal position to a vertical position, a shaft extending across said doorway and mounted upon the doors at their upper ends, each shaft being formed with cranked portions engaging the doors, a counterweight operatively connected to the shaft to urge 70 the doors from a vertical position to a horizontal position, a lever operatively connected to the shaft to cause the simultaneous lifting of the counterweight and the closing of the doors, and means for locking the levers with the doors in closed position 75 against the action of the counterweight. 8. The combination with a door mounted at its upper end for swinging movement into a horizontal plane, of means for moving the door outward including a housing disposed exteriorly of the building, a lever pivoted within the housing, a cable entering the housing and being connected at one end to the lever, said cable being operatively connected 80 to the door to raise it when the lever is pulled in one direction, a latch mounted upon said housing and having a notch for the lever when the lever is retracted, a spring urging the latch toward the lever, manually 85 operable means for withdrawing the latch against the action of the spring, and means for locking the latch in its lever-impeding position. 90 95 100 In testimony whereof I hereunto affix my signature.

JOHN R. GIBBONS.