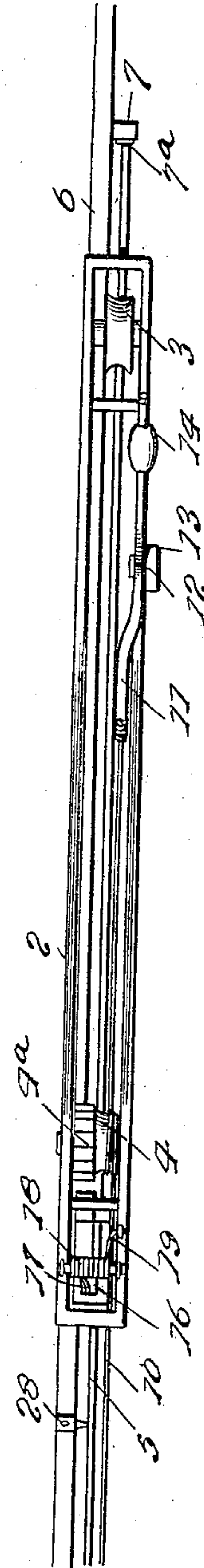
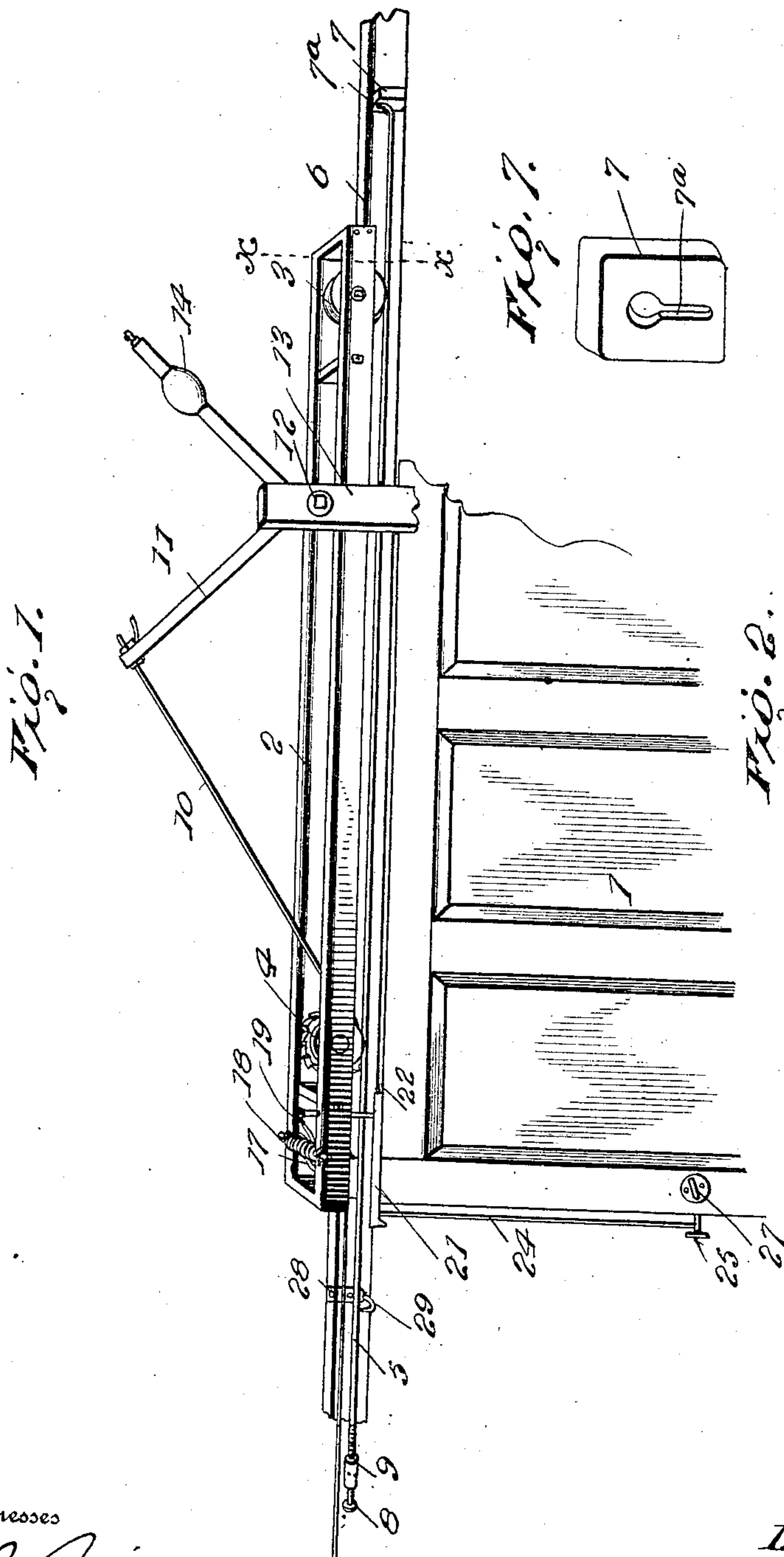


No. 870,238.

PATENTED NOV. 5, 1907.

I. JOHNSON.
LOCK MECHANISM FOR DOORS.
APPLICATION FILED JUNE 22, 1906.

3 SHEETS—SHEET 1.



Inventor

I. Johnson

Witnesses

J. M. M. M.
W. V. Woodson

By

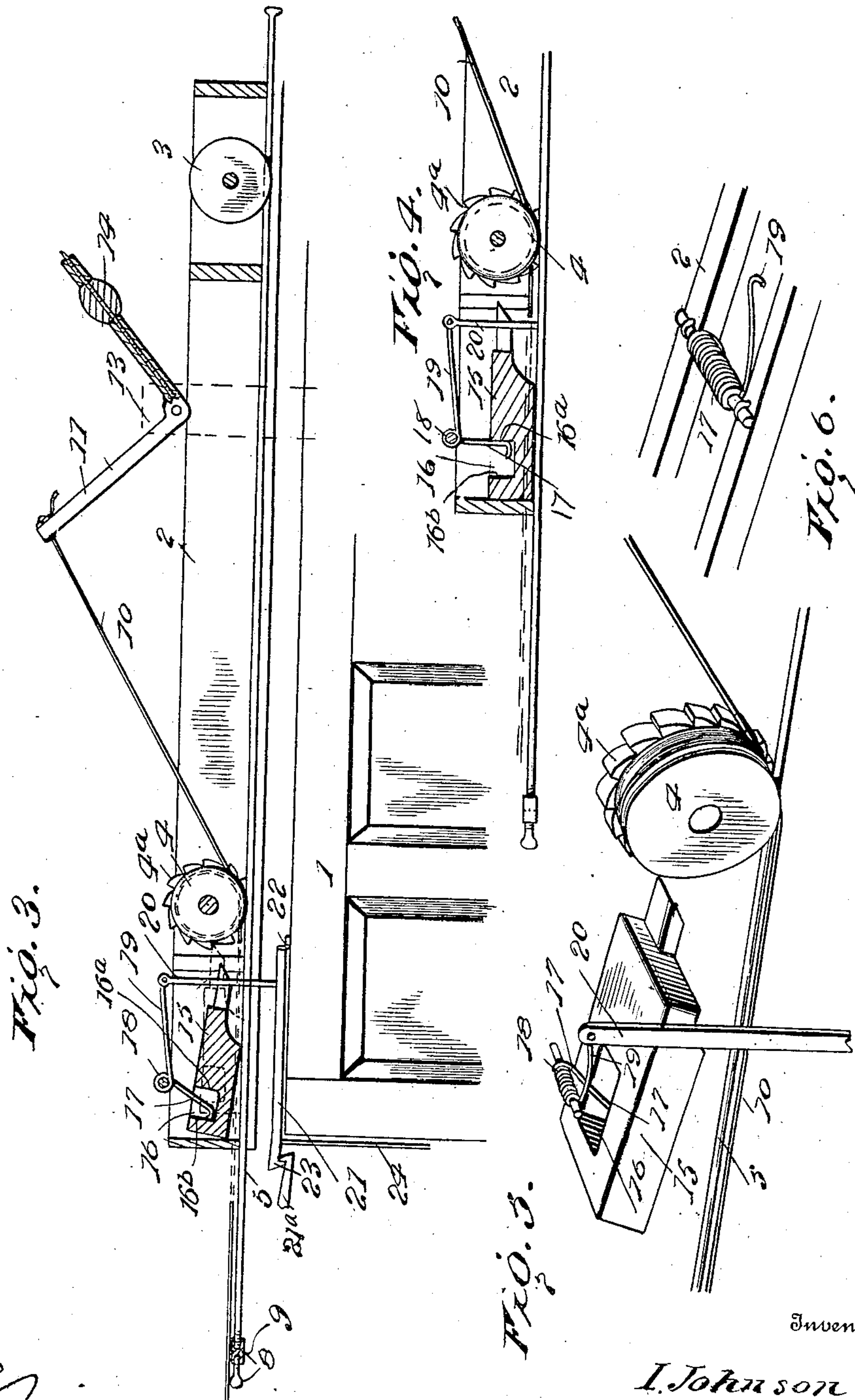
R. A. Racy, Attorneys

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3 SHEETS—SHEET 2.



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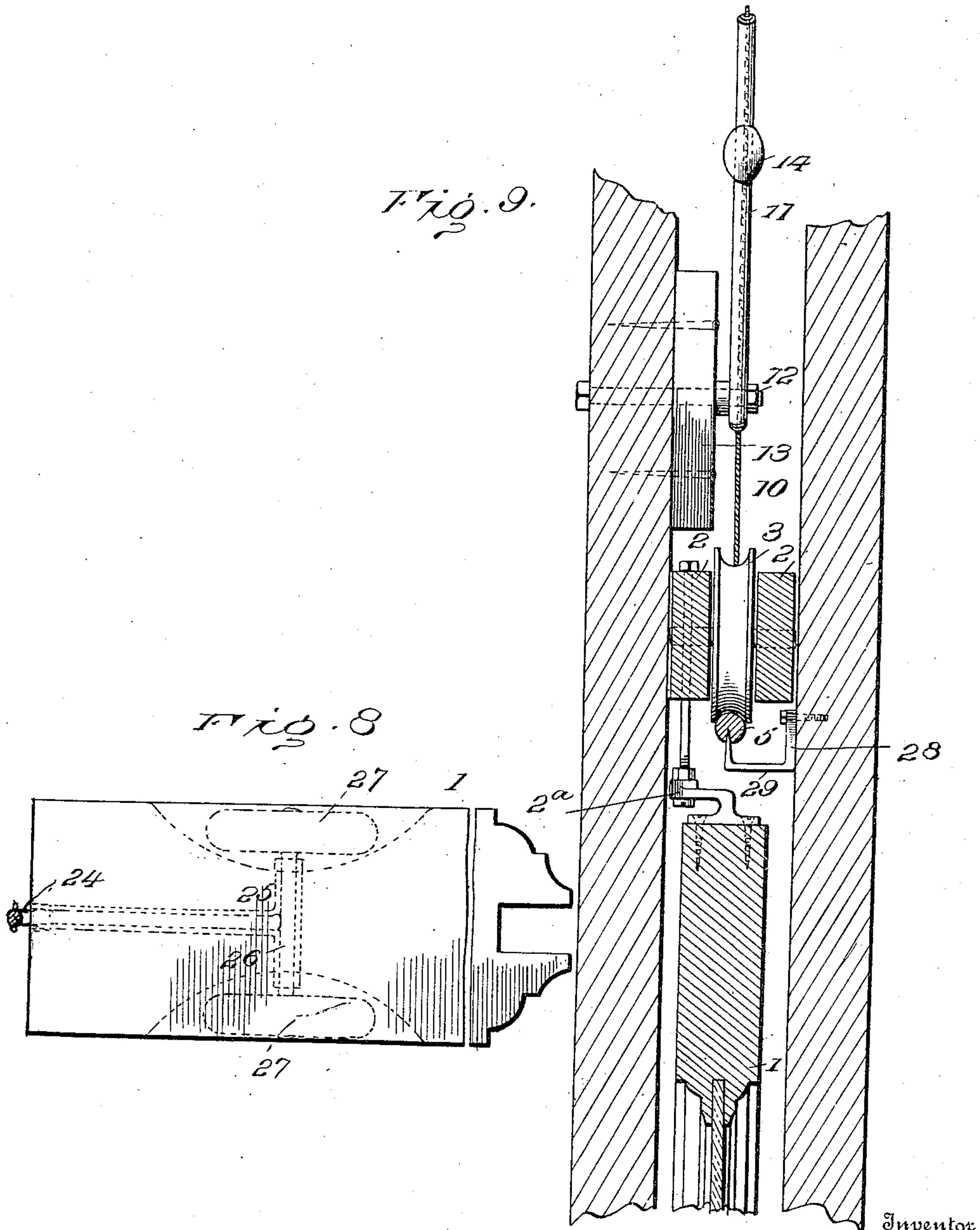
Inventor
I. Johnson
By *W. H. Macy*, Attorneys

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3 SHEETS—SHEET 3.



Witnesses

J. H. Ross.
T. H. Johnston.

Inventor

I. Johnson

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I. Johnson
Pharm. Racy,

Attorneys

UNITED STATES PATENT OFFICE.

IVER JOHNSON, OF BELLINGHAM, WASHINGTON.

LOCK MECHANISM FOR DOORS.

No. 870,238.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed June 22, 1906. Serial No. 322,970.

To all whom it may concern:

Be it known that I, IVER JOHNSON, a citizen of the United States, residing at Bellingham, in the county of Whatcom and State of Washington, have invented certain new and useful Improvements in Lock Mechanisms for Doors, of which the following is a specification.

This invention consists of novel locking mechanism designed particularly for use on sliding doors which are commonly in use in dwelling houses.

The locking mechanism comprising the invention is peculiarly adapted for doors of the above mentioned type and includes means for locking the door or doors in closed position, together with means for locking the doors from closing movement at any point in the opening movement thereof.

The invention further involves special means for automatically closing the door, in peculiar coöperation with the locking mechanism hereinbefore generally described.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a perspective view showing a door hung in accordance with the invention and embodying the locking mechanism, and other features thereof, certain parts being broken away. Fig. 2 is a top plan view of the parts shown in Fig. 1. Fig. 3 is a vertical longitudinal section, the door being shown in side elevation. Fig. 4 is a detail longitudinal sectional view showing the relative positions of the locking pawl and the ratchet wheel with which it coöperates, in the initial opening movement of the door. Fig. 5 is a view in perspective showing the locking pawl up-raised from the track and in its normal position with respect to the ratchet wheel or roller. Fig. 6 is a perspective view of the spring which coöperates with the locking pawl. Fig. 7 is a detail perspective of one of the end blocks with which the rod comprising the track, is connected. Fig. 8 is a top plan view on an enlarged scale of the outer stile of the door, the finger-pieces appearing in dotted lines. Fig. 9 is a vertical sectional view on the line $x-x$ of Fig. 1 looking toward the weighted lever, and shows portions of the door frame not appearing in the other figures.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In the drawings the numeral 1 designates an ordinary construction of sliding door, the same being supported by means of a carriage or frame 2 attached to its upper portion by hangers 2^a and movable with said door. The carriage or frame 2 may be described to be of somewhat rectangular form consisting of spaced sides

between which are journaled rollers 3 and 4 grooved upon the peripheral portions thereof. The rollers or wheels 3 and 4 are adapted to travel upon a track comprising a rail or rod 5, the latter being mounted above the door and between it and its carriage or frame 2. The rail 5 will be attached to the frame in which the door 1 operates, at the upper portion of the latter, such portion being indicated at 6. To attach the rail 5 to the frame 6, it is preferred to utilize blocks 7 which are provided with lateral openings therethrough to receive heads 8 formed at the opposite extremities of the rail 5, the lateral openings, indicated 7^a of the blocks 7 being approximately in the shape of key openings, the heads 8 of the rail 5 being first passed into the enlarged end portions of the openings 7^a and then forced into the narrower portions of said openings so as to be interlocked with the blocks 7 in a manner which is obvious. The rail 5 is of a length suitable for mounting a single sliding door thereon, or a plurality of such doors, as may be desired. At a suitable point in the length of the rail and preferably adjacent to an end thereof, is located a turn-buckle 9, by which the parts of the rail may be readily tightened. When two of the doors are employed the turn-buckle 9 will preferably be located at a point about centrally of the rail 5, though this is immaterial.

The door 1 is an automatically closing door, and the mechanism for effecting the closing movement thereof includes a flexible connection or member 10, one end of which is attached to one end of a bell-crank lever 11 pivoted between its ends as shown at 12, to a support or standard 13 at one side of the carriage or frame 2 and secured to the frame-work in which the door moves, see Fig. 9. The opposite end of the lever carries an adjustable weight 14 and the normal tendency of the weight 14 is to impart a pull to the connection 10, or place the same under tension. The connection 10 passes from the lever 11 beneath the wheel or roller 4 and has the end, opposite to that secured to the lever 11, attached in any substantial way (not shown) to the frame 6 in which the door 1 operates. The tension upon the connection 10 caused by the weight 14, normally tends to force the connection 10 upwardly and as the said connection is in contact with the roller 4, it will be evident that the tendency of the roller 4 is to travel longitudinally of the connection 10 and thereby effect movement of the door 1 toward closed position. The roller 4 is of a peculiar form, being provided with ratchet teeth 4^a at its peripheral portion, which teeth are adapted to be engaged by a sliding locking pawl 15 mounted freely between the sides, but adjacent to one end of the frame or carriage 2, said pawl being movable longitudinally of the frame as well as adapted for a certain amount of vertical movement. In the upper side of the pawl 15 is formed a recess 16 receiving an end 17 of a spring or lever 18 attached to the car-

riage 2 and having its opposite end 19 connected with the upper end of a lift-rod 20. The lift-rod 20 is mounted in a vertical opening in one of the sides of the carriage 2 and the lower extremity of said lift-rod is attached to a locking catch 21 applied to the upper edge portion of the door 1. The catch 21 is pivoted to the door 1 at one extremity as shown at 22, and the opposite end of the catch 21 is formed with the hook 23 adapted to engage a suitable fixed or rigid catch piece 21^a applied to the frame 6 in which the door 1 moves. The catch piece 21^a above mentioned will be of any ordinary type secured to the frame-work in which the door operates and adapted to be engaged by the catch 21 when the door is closed. The outer or free end of the catch 21 is connected by a rod 24 with a finger-piece 25, the latter constituting a crank projecting from a short shaft 26 mounted in the upper portion of the door 1 transversely of the latter and having other finger-pieces 27 attached to its opposite ends and exposed so as to be operated readily from either side of the door. The recess 16 in the upper side of the pawl 15 is sufficiently large to admit of a certain amount of movement of said pawl independently of the arm or end 17 of the spring or lever 18 which is received in said recess. The purpose of this will appear hereinafter. The arrangement of the locking pawl 15 is such that one end thereof is readily adapted to engage the ratchet teeth 4^a of the roller 4 and furthermore, said pawl is adapted to be slightly elevated and lowered relatively to the track rail 5 with which it may have frictional contact. It may be mentioned that the track rail 5 is supported at intervals in its length by brackets 28 having vertical points 29 engaging in recesses in the under side of the rail 5.

In the actual operation of the invention, and assuming that the door 1 is in a closed position, when it is desired to open the door, the operator will grasp one of the finger-pieces 27 and turn the same to raise the rod 24 thereby raising the locking catch 21 so as to disengage the latter from the fixed catch with which it coöperates. The door 1 is thus capable of being opened as soon as this is done. Simultaneous with the aforesaid movement of the catch 21, however, the lift-rod 20 raises the arm or end 19 of the spring 18 and lowers the end or arm 17 of said spring, causing the pawl 15, which has previously been elevated from the track 5, as shown in Fig. 5, (this being its normal position when the member 25 is in its lower position) to be lowered thereon as shown in Fig. 3. Then as the door is opened, the wheel or roller 4 travels along the rail 5 and the connection 10, and the pawl 15 being in contact with the rail 5, is initially immovable until the end 17 of the spring 18 engages the end 16^a of the recess 16 of the pawl 15 in the manner shown in Fig. 4. The momentary immovability of the pawl 15 causes the same to be disengaged from the ratchet teeth 4^a of the wheel and it remains disengaged while the door is traveling in its opening movement. As the door 1 opens and the wheel 4 travels along the connection 10, it will be obvious that the adjacent end of the lever 11 will be lowered and the weighted end thereof raised. As soon as the opening pressure on the door 1 is relieved, the weight 14 on the lever 11 exerts a tension on the connection 10 which immediately tends to automatically close the door, but as the carriage 2 and the

door start to close, the pawl 15 is initially immovable until arm 17 strikes end 16^b of the recess 16, but the ratchet teeth 4^a of the wheel 4 will have been engaged by the engaging end of the pawl 15 and wheel 4 is locked from movement, thus locking the door in the open position with the parts 23, 24, and 25 raised. The door may thus be locked from closing movement at any point in its opening movement by reason of the coöperation of the wheel 4 and the locking pawl 15.

The door 1 being locked in its open position, as above described, should it be desired to close the door entirely, the finger-piece 25 may be pulled down upon and this will exert a downward pull upon the end 19 of the spring 18 and throw the other end 17 of spring 18 upwardly against the outer side 16^b of the recess 16 of the locking pawl 15, thereby raising the locking pawl 15 from the track 5. Said locking pawl will be held in this raised position and out of engagement with the ratchet wheel 4 and the door will automatically close and lock under the influence of the weighted lever 11 and the connection 10 of said operating wheel 4.

The reason for the provision of the finger-pieces 25 and 27, which are independently operable, is due to the fact when the door is entirely closed, the finger-piece 25, which is flush with the outer edge portion of the door, is inaccessible and to open the door a finger-piece 27 must be utilized. In like manner when the door is entirely opened and housed in the recess or pocket in the wall in which it is received, it will be obvious that the finger-piece 27, or finger-pieces 27, if two are employed, are not accessible, being between the vertical jambs in which the door operates, and to effect closing movement of the door, the finger-piece 25 must necessarily be actuated.

The mounting of the weight 14 is advantageous in that it may be adjusted to admit of application of the mechanism hereinbefore described to doors of different weights and sizes. It will be apparent that when two or more doors are utilized, locking mechanism as hereinbefore described will be duplicated for each door. The rollers or wheels 3 and 4 are preferably provided with ball bearings.

Having thus described the invention, what is claimed as new is:

1. In combination, a sliding door, a supporting wheel for the door, means for automatically moving the door in one direction, and means coöperating with the supporting wheel for preventing the said movement. 110
2. In combination, a sliding door, a supporting wheel for the door, means coöperating with the supporting wheel for automatically moving the door in one direction, and the means for locking the supporting wheel against turning in order to prevent the said movement of the door. 115
3. In combination, a sliding door, a supporting wheel therefor, means for automatically closing the door, means for locking the door in a closed position, means coöperating with the supporting wheel to prevent closing of the door and an operating member connected to the means for locking the door in a closed position and the means coöperating with the supporting wheel to prevent the closing of the door. 120
4. In combination, a door, a supporting wheel for the door, means for automatically moving the door in one direction and a pawl coöperating with the supporting wheel to prevent the said movement of the door. 125
5. In combination, a door, a supporting wheel for the door, means coöperating with the supporting wheel for automatically closing the door, a catch for locking the door in a closed position, means coöperating with the supporting wheel for preventing the automatic closing of 130 135

the door, and an operative connection between the said means for locking the door against closing movement and the catch for holding the door in a closed position.

6. In combination, a door, means for locking the door closed, means normally tending to close the door, means for preventing closing of the door when once opened, operable connections between the locking means aforesaid and the means preventing the door from closing after opening thereof, and means for actuating the door locking means to permit the door to close automatically.

7. In combination, a door, a sliding carriage supporting said door and including a ratchet wheel, means for automatically closing the door, a locking catch for holding the door closed, a locking pawl arranged for coöperation with the ratchet wheel of the carriage, and operating mechanism for governing the action of the locking catch and locking pawl aforesaid.

8. In combination, a door, a carriage attached to the upper portion of the door and adapted for sliding movement with the door, a rail, a ratchet wheel mounted in the carriage and traveling along the rail aforesaid, a locking pawl coöperating with said ratchet wheel and movable independently of the carriage, and means for operating said locking pawl.

9. In combination, a door, a carriage attached to the upper portion of the door and adapted for sliding movement with the door, a rail, wheels mounted in the carriage and traveling along the rail aforesaid, a ratchet wheel applied to the carriage, a locking pawl coöperating with said ratchet wheel and movable independently of the carriage, a locking catch for holding the door closed, a spring operatively connecting the locking pawl and the locking catch, and means for actuating the locking catch.

10. In combination, a door, a sliding carriage attached to the door, and movable therewith, a ratchet wheel mounted in said carriage, means coöperating with said ratchet wheel to automatically close the door, and a pawl engaging the ratchet wheel for preventing closing of the door.

11. In combination, a sliding door, a carriage attached to the door and movable therewith, a ratchet wheel mounted in said carriage, means coöperating with the

ratchet wheel to automatically move the door in one direction, a pawl movable independently of the door and adapted to engage the above named ratchet wheel to prevent said automatic movement of the door and means for actuating the said pawl.

12. In combination, a sliding door, a carriage carried by the door, a supporting wheel journaled in the carriage and provided in its periphery with teeth, a tension member coöperating with the supporting wheel to automatically move the door in one direction, a pawl loosely mounted upon the carriage and adapted to engage the toothed periphery of the supporting wheel to prevent the said automatic movement of the door, a spring arm controlling the pawl and a finger piece mounted upon the door and having an operative connection with the spring arm.

13. In combination, a sliding door, a ratchet wheel connected therewith, means coöperating with the ratchet wheel to effect automatic movement of the door, a locking pawl coöperating with the ratchet wheel to prevent the automatic movement of the door, a locking catch for holding the door closed, means for operating the locking catch, and a spring operatively connecting the locking catch and the locking pawl and admitting of movement of the locking pawl independently of the door.

14. In combination, a sliding door, a ratchet wheel connected therewith, means coöperating with the ratchet wheel to effect automatic movement of the door, a locking pawl coöperating with the ratchet wheel to prevent the automatic movement of the door, a locking catch for holding the door closed, means for operating the locking catch, a spring operatively connecting the locking catch and the locking pawl and admitting of movement of the locking pawl independently of the door, the means for automatically closing the door above mentioned being comprised of a weighted lever, and a flexible connection along which the ratchet wheel is movable.

In testimony whereof I affix my signature in presence of two witnesses.

IVER JOHNSON. [L. S.]

Witnesses:

PERCY LIVESEY,
GEORGE LIVESEY.