

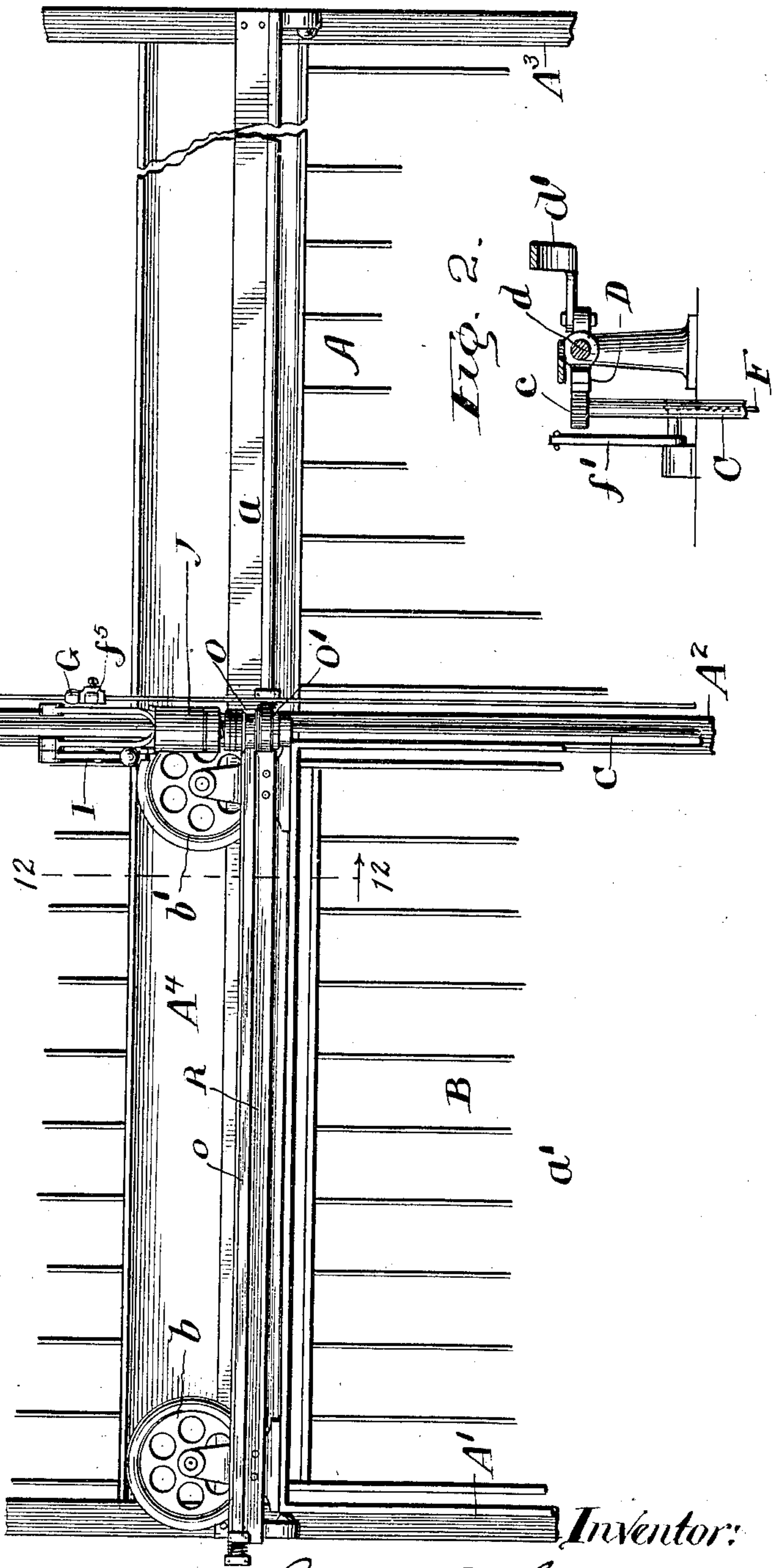
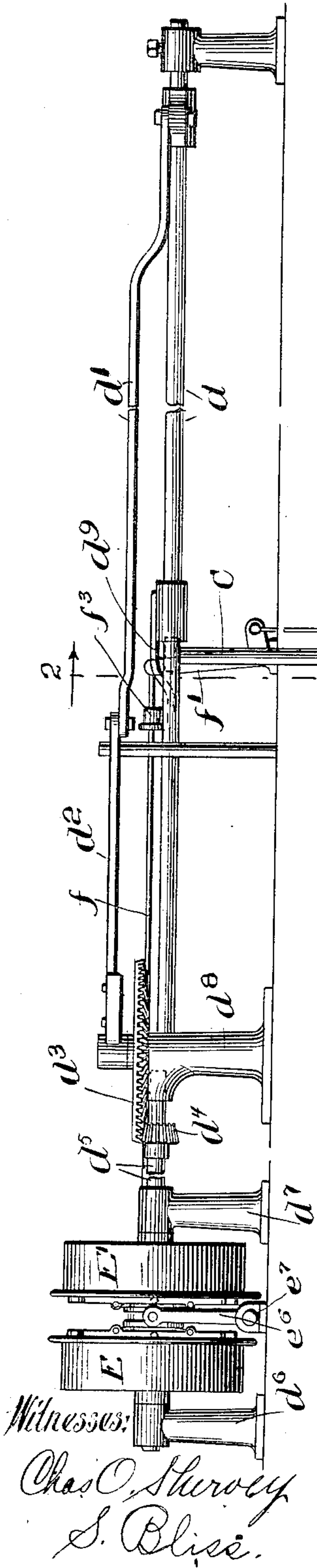
C. B. GILMORE.

MECHANISM FOR OPERATING ELEVATOR DOORS.

(Application filed Oct. 19, 1901.)

(No Model.)

5 Sheets—Sheet 1.



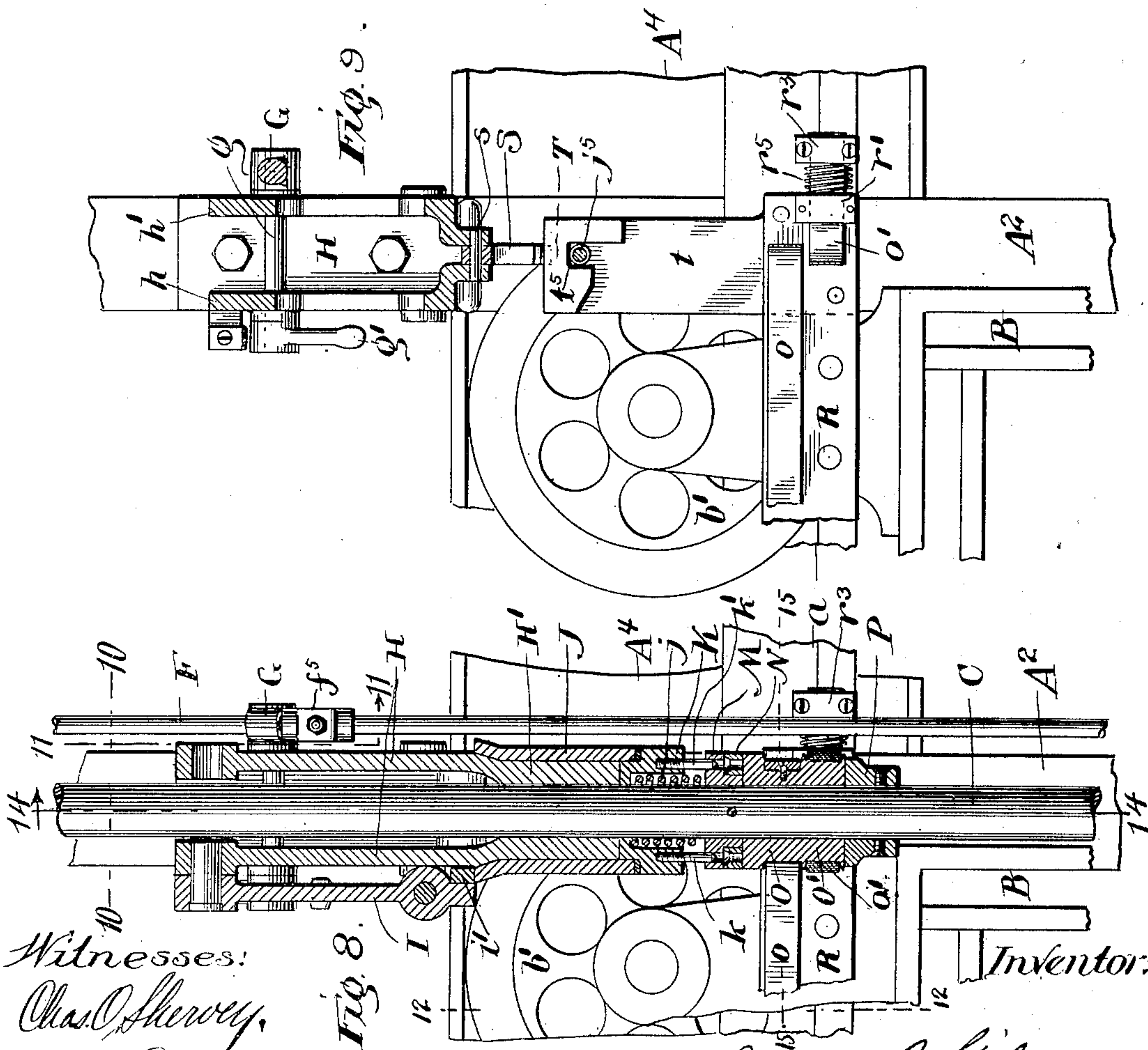
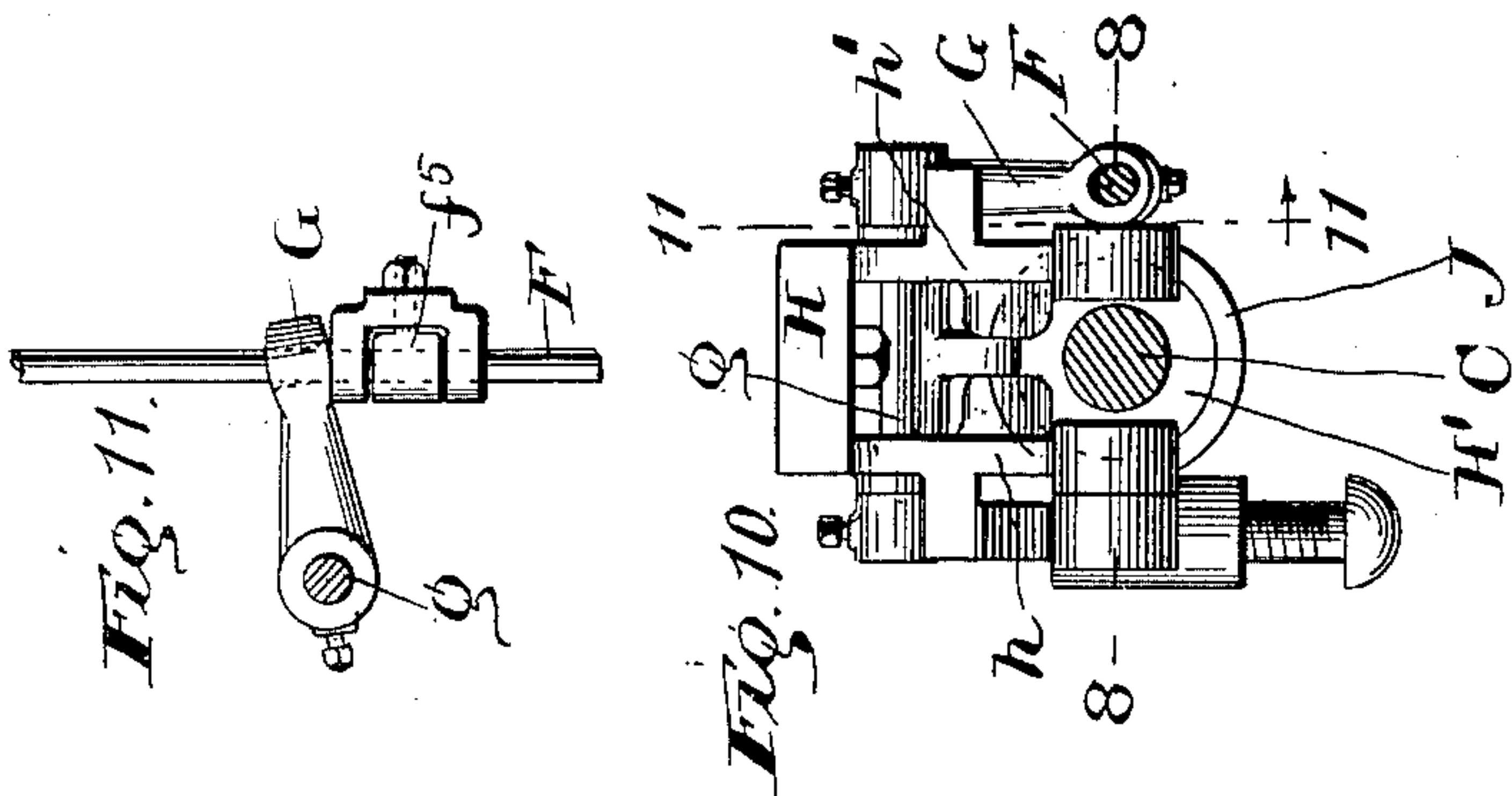
C. B. GILMORE.

MECHANISM FOR OPERATING ELEVATOR DOORS.

(Application filed Oct. 19, 1901.)

(No Model.)

5 Sheets—Sheet 3.



Witnesses:
Chas. C. Sherway,
S. Bliss.

Inventor:
Charles B. Gilmore
by Miles G. Warner & Pitman
Attys.

No. 699,305.

Patented May 6, 1902.

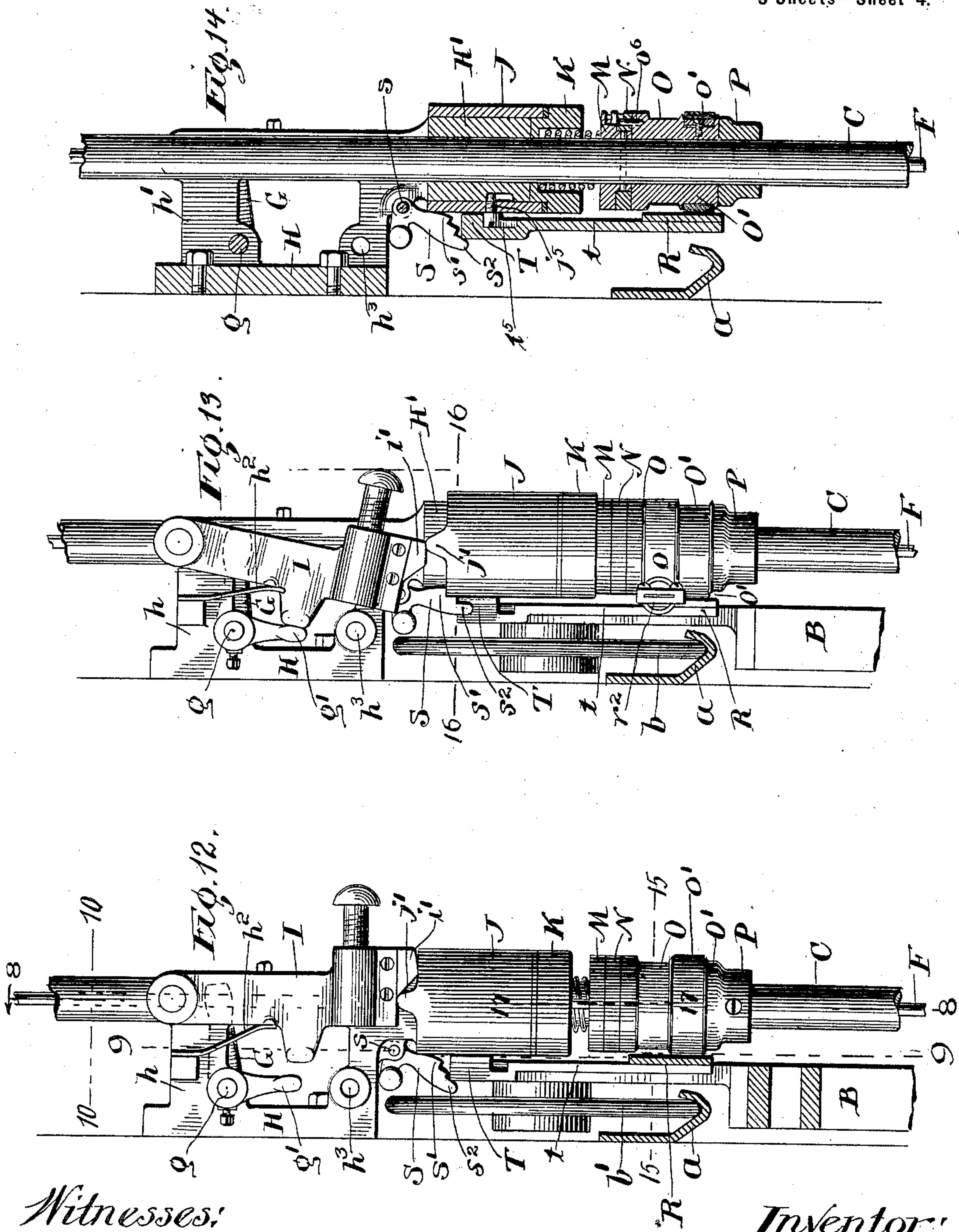
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MECHANISM FOR OPERATING ELEVATOR DOORS.

(Application filed Oct. 19, 1901.)

(No Model.)

5 Sheets—Sheet 4.



Witnesses:
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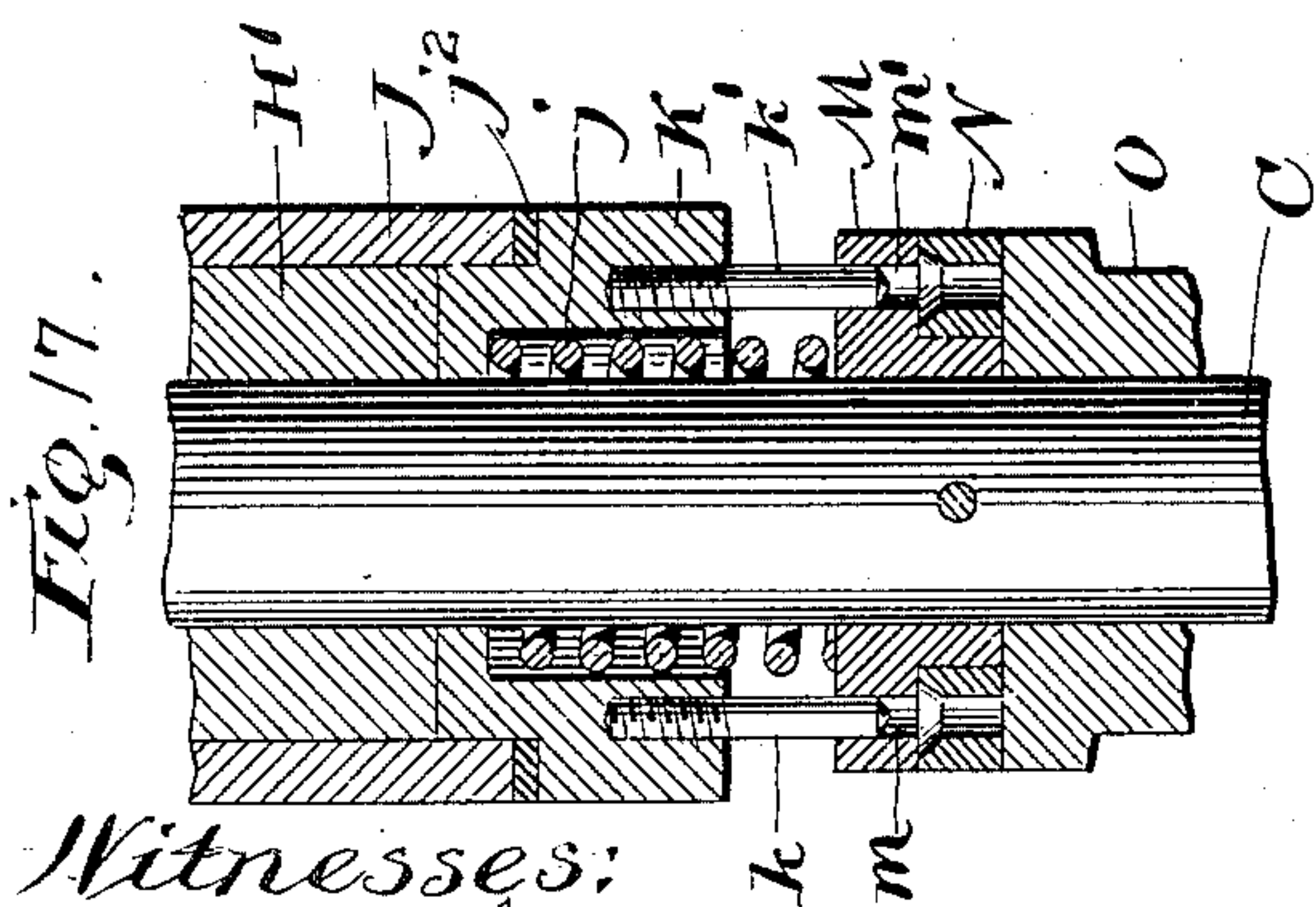
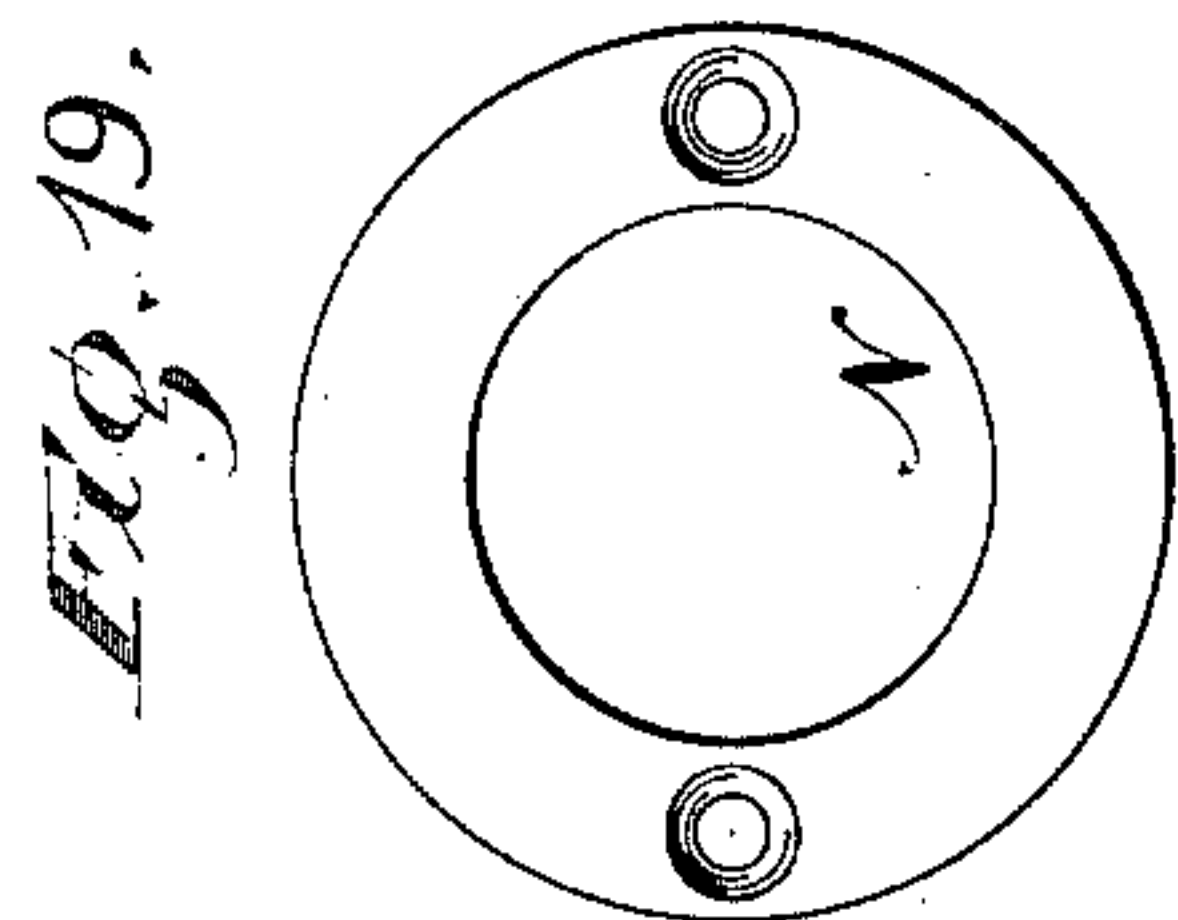
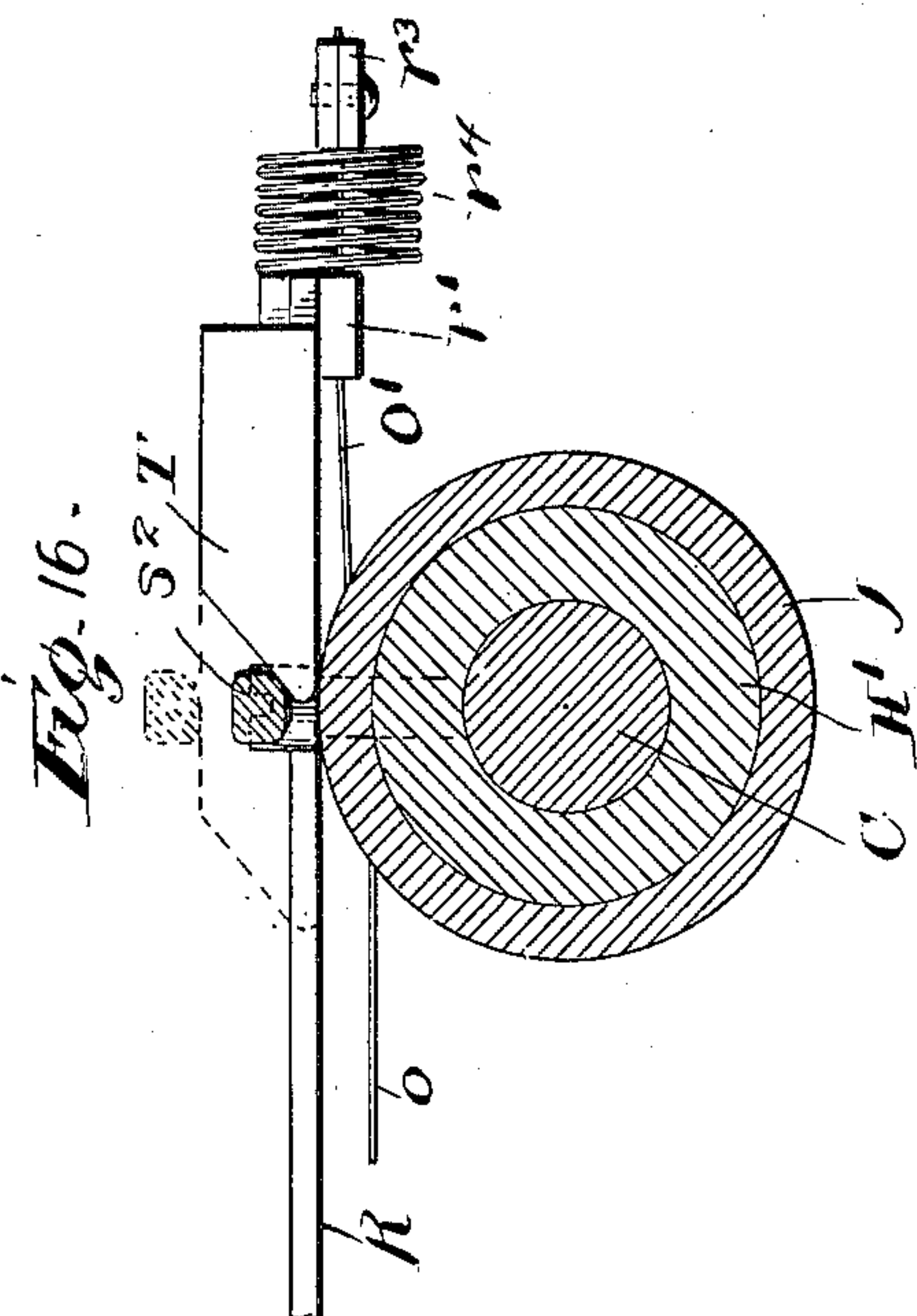
C. B. GILMORE.

MECHANISM FOR OPERATING ELEVATOR DOORS.

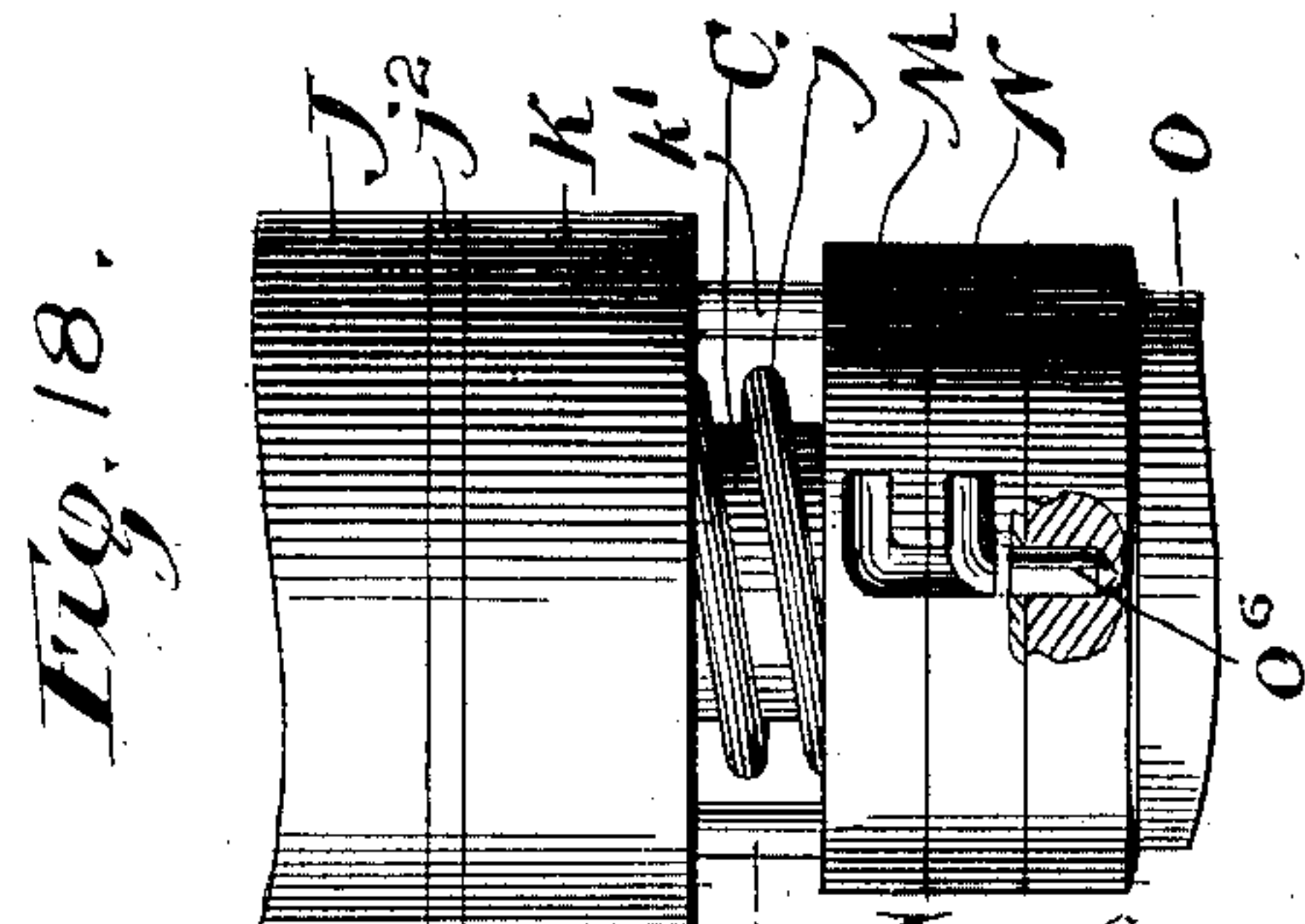
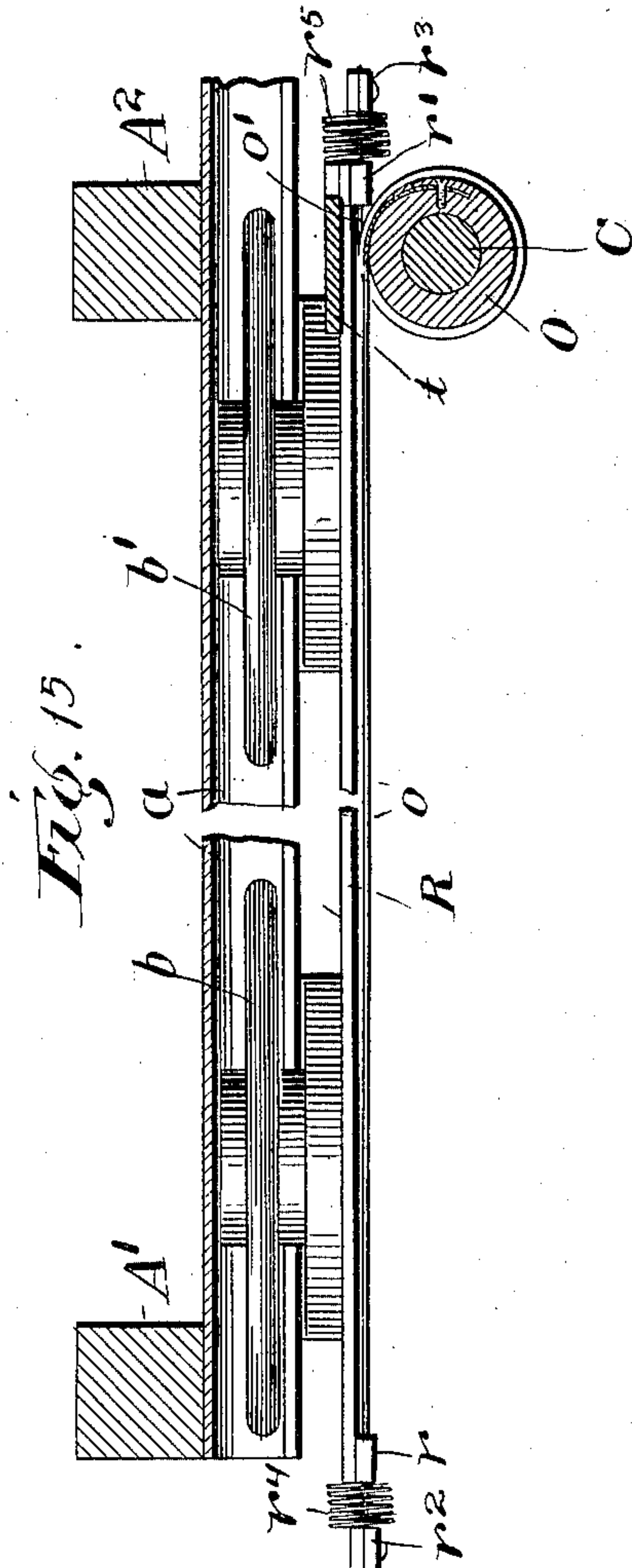
(Application filed Oct. 19, 1901.)

(No Model.)

5 Sheets—Sheet 5.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

CHARLES B. GILMORE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WINSLOW BROS. CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

MECHANISM FOR OPERATING ELEVATOR-DOORS.

SPECIFICATION forming part of Letters Patent No. 699,305, dated May 6, 1902.

Application filed October 19, 1901. Serial No. 79,193. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. GILMORE, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mechanism for Operating Elevator-Doors, of which the following is a specification.

My invention relates to certain improvements in mechanism for operating elevator-doors, this apparatus being especially adapted for operating a number of elevator-doors located one above the other, as is common in elevator structures.

One of the objects of this invention is to obviate the necessity of having a continuously-rotating shaft, which has hitherto been frequently used to actuate mechanically-operated doors, and especial attention has been given to provide means for rotating the shaft only when a door is to be operated, the shaft remaining stationary at all other times, and thereby doing away with any unnecessary noises attendant upon revolving shafting, especially when they become loose in the bearings or require oiling.

To this end the invention pertains to certain novel features of construction and arrangement, a description whereof will be found in the following specification, and the essential features definitely pointed out in the claims.

In the drawings furnished herewith, Figure 1 is a fragmentary front view of an elevator inclosure, a movable door, the mechanism for intermittently revolving the shaft, and the apparatus connecting the door with the shaft to be moved thereby. Fig. 2 is a cross-section in line 2 2 of Fig. 1. Fig. 3 is a plan view of the shaft-operating mechanism. Fig. 4 is a view partly in front elevation and partly in vertical longitudinal section, the line of section being indicated at 4 4 in Fig. 3. Fig. 5 is a detail vertical longitudinal section in line 5 5 of Figs. 3 and 6. Fig. 6 is a detail vertical cross-section in line 6 6 of Figs. 3 and 5. Fig. 7 is a detail side view of a clutch seen in Figs. 5 and 6. Fig. 8 is a detail vertical section in line 8 8 of Figs. 10 and 12. Fig. 9 is a similar section in line 9 9 of Fig. 12. Fig. 10 is a horizontal section in line 10

10 of Figs. 8 and 12. Fig. 11 is a side view of a portion of a wire or cable connected to the shaft-operating mechanism and an arm adapted to actuate the same, the parts in front thereof being removed in the line 11 11 of Figs. 8 and 10. Fig. 12 is a side view of the parts seen in Figs. 8 to 11, partly in vertical section, the line of section being indicated at 12 12 in Figs. 1 and 8. Fig. 13 is a similar view with the door fully open. Fig. 14 is a central vertical cross-section in line 14 14 of Fig. 8. Fig. 15 is a view partly in plan and partly in horizontal section, the line of section being indicated at 15 15 in Fig. 8. Fig. 16 is a horizontal section in line 16 16 of Fig. 13. Fig. 17 is a detail vertical section in line 17 17 of Fig. 12. Fig. 18 is a face view of the parts seen in Fig. 17, and Fig. 19 is a plan view of a ring used in the clutch upon the shaft.

Referring first to Fig. 1, A represents a portion of an elevator inclosure, A' A² A³ the upright members of the frame thereof, and A⁴ the transom supported upon the uprights. The door is seen at B hung upon door-hangers b b', running upon a track a, which is supported on the uprights A' A² A³ in the ordinary manner. The door moves from a position in front of the opening a' in the inclosure to a position between the uprights A³ A² and back, and said movement of the door is controlled by the elevator operator, each door in the series located one above another being operated by the same shaft and each independently of each other.

Adjacent to the upright A² is a shaft C, extending from top to bottom of the building, or at least past all of the doors in the series, and connected either at its lower or upper end with a mechanism for rotating said shaft when a door is to be opened and closed by this apparatus. The drawings show the shaft connected at its upper end to this mechanism in Figs. 1 to 7, inclusive, where said shaft will be seen to have a pinion c secured upon its end, meshing with a rack-bar D, adapted to be reciprocated back and forth once in the opening and closing of a door. Said rack-bar is slidably mounted upon a shaft d and connected at one end to a link d', the other end of which is connected to an arm d², carried by a beveled gear d³. The gear d³ meshes

with a pinion d^4 upon a shaft d^5 , journaled in bearings d^6 d^7 d^8 , and this shaft is adapted to be alternately rotated in either direction by two pulleys E E', which are driven in opposite directions by suitable belting. (Not shown in the drawings.)

The pulleys E E' are both loose upon the shaft d^5 and are thrown into engagement therewith by clutches, shown in Figs. 5, 6, and 7 as consisting, preferably, of plates E^2 E^3 , fast upon the shaft, friction-shoes e e' , guided in said plates, and devices for throwing them into engagement with the pulleys. The shoes are spring-pressed in one direction and are forced outward by bell-crank levers e^2 e^3 , one of the arms of which rests against a collar e^4 , which encircles the hubs of the plates E^2 E^3 and is moved back and forth upon said hubs by arms e^5 e^6 upon a shaft e^7 . Said shaft e^7 carries an arm e^8 , by means of which the shaft is rocked, and a spring e^9 tends to draw said arm in one direction, while a rod f , connected to it and to certain of the operating mechanism hereinafter explained, resists this tension. Said rod is connected to a bell-crank lever f' , from which extends a wire or cable F, adjacent to the shaft C, passing by all of the doors in the series and actuated by certain mechanism hereinafter described. Upon the rod f are secured two buttons f^2 f^3 , between which plays an arm d^9 , fast upon the rack-bar D and adapted to engage said buttons near the end of the stroke of the rack-bar in either direction to throw the pulleys E E' out of working engagement with the shaft d^5 . The normal position of the arm e^8 is shown in the drawings, and in this position neither of the pulleys E nor E' is in working engagement with the shaft. When, however, a door is to be opened, the wire or cable F is drawn downward through the operating mechanism at any of the doors in the series and the lever e^8 drawn to the right in Figs. 3 and 4, bringing the pulley E' into working engagement with the shaft, and consequently rotating the arm d^2 in the direction of the arrow in said figure, the shaft C in turn being rotated by the rack-bar D. As the door reaches its open position the arm d^9 strikes the button f^2 , which has been moved to the right in Fig. 3 by the action of the cable F, and throws the pulley E' out of engagement with the shaft d^5 , thereby stopping the movement of the door. The movement of the rod f , caused by the engagement of the arm d^9 with the button f^2 , is permitted because of a certain amount of elasticity in the shoe or other mechanism upon the elevator-car, through which the cable F is drawn downward.

The wire or cable F is drawn downward by an arm G striking a button f^5 upon the cable F, Figs. 9, 10, and 11, said arm being fast upon a rock-shaft g , journaled in the side plates h h' of a bracket H, secured to the upright A². Upon the other end of the rock-shaft is a second arm g' , lying in the path of a lever I, pivoted upon the bracket H and

adapted to be actuated by a shoe or other operating mechanism upon the elevator-car. A spring h^2 , secured upon the bracket H, returns the lever from the position in which the shoe forces it, Fig. 13, to the position seen in Fig. 12. The bracket H contains holes h^3 , in which the rock-shaft g may be journaled and the arm g' inverted to be struck above its pivot by the lever I, thereby raising the arm G and drawing the wire or cable F upward. This is done when the shaft-operating mechanism is located below the doors instead of above them, as is the case shown in the drawings.

Referring now to Figs. 8, 10, 12, 13, 14, and 16, the bracket H will be seen to have a downward extension H', encircling the shaft C and upon which is a vertically-movable sleeve J, spring-pressed in one direction by a spring j . Said sleeve has an upwardly-extending lug j' , lying in the path of a cam-block i' upon the lever I and adapted to be depressed by said cam-block when the lever I is engaged by the shoe upon the elevator-car. Below the sleeve J and extension H' is a cup-shaped collar K, loose upon the shaft C, but adapted to be rotatively connected therewith, as hereinafter explained, and between this collar and the sleeve J is interposed a washer j^2 (see also Figs. 17 and 18) to take up the friction between the collar K and the sleeve J, the spring j , above referred to, being seated in the collar K and bearing upon a second collar M. The collar M is fast upon the shaft C and rotates therewith, and said collar contains holes m m' near its edge, into which extend pins k k' , secured in the collar K, said pins being of such length as to pass entirely through the collar M and into a ring N, thereby rotatively connecting the ring N with the shaft C when the collar K is forced down upon the collar M by the lever I. The ring N is connected to a double spool O O', loose upon the shaft C and resting upon a collar P, secured thereto. Said spool carries two steel ribbons o o' , wound thereupon in opposite directions and leading to the sides of the elevator-door. Immediately above the door is a bar R, secured to the door-hangers and extending slightly beyond the door, where the steel ribbons o o' pass through blocks r r' upon the ends thereof, beyond which the ribbons have blocks r^2 r^3 upon their ends, between which and the blocks r r' are springs r^4 r^5 , adapted to take up any sudden jar upon the door at the commencement of the movement of the same in either direction. The rotation of the spool in one direction winds up one of the ribbons and unwinds the other, thus drawing the door in one direction, while the rotation of the spool in the other direction draws the door back. The ring N is locked to the spool O O' by pins o^6 , Fig. 18, so as to make the spool rotate with the ring when the latter is rotated; but it is sometimes necessary that the ring be disconnected from the spool, so as to permit the door to be opened by hand without necessarily rotating the

shaft. The spool may readily be disconnected by withdrawing the pin o^6 from it.

In Fig. 12 the parts are in their normal position—that is, with the door closed.

5 In Fig. 13 the lever I has been swung to the left by a shoe or other operating device upon the elevator-car and the door moved into an open position. As soon as the lever is released the spring h^2 returns the same to the
10 position seen in Fig. 12. The releasing of the lever I starts the shaft-operating mechanism to close the door; but the return of the lever I moves the cam-block i' off the lug j' on the sleeve J, which makes it necessary to
15 provide means for keeping the spools in rotatable connection with the shaft while the door is closing.

Looking at Figs. 9, 12, 13, and 14 a weighted dog S will be seen, the tendency of the weight
20 being to swing the dog toward the shaft. Said dog is pivoted to the bracket H at s and has a shoulder s' , adapted to rest upon the upper edge of the sleeve J, Fig. 13, and a finger s^2 , lying in the path of a cam-block T (see
25 also Fig. 16) upon the top of an arm t , secured to the bar R. The weighted dog S holds the sleeve J down against the action of the spring j after the lever I is released and until the door comes to a closed position, when the
30 cam-block T engages the finger s^2 of the weighted dog S and swings the shoulder s' out of engagement with the sleeve J, permitting the spring j to lift the sleeve and collar K, withdrawing the pins k k' from the ring
35 N and disengaging the spool from the shaft and permitting the shaft to be rotated to open or close other doors in the series without affecting this door.

The door is locked in its closed position by
40 a pin or screw j^5 , secured in the sleeve J and engaging a notch t^5 in the arm, Figs. 9 and 14. The pin or screw j^5 is released from the notch when the sleeve J is forced down by the lever I and permitted to enter the notch when
45 the sleeve is released by the dog S and the door fully closed.

The operation of the device is as follows: The shaft-operating mechanism being in the position shown in Figs. 1 and 3 and the pulleys E E' rotating as indicated by the arrows
50 thereon, the lever I may be swung from the position seen in Fig. 12 to that in Fig. 13, either by a shoe or other suitable mechanism upon an elevator-car. At the commencement
55 of the movement of the lever I the cam-block i' forces the sleeve J down and connecting the collar with the ring N, thereby rotatively connecting the spools O O' with the shaft C. It will be understood that all of the other
60 spools similar to the spools O O' upon this shaft which are embodied in the mechanism at each door in the series operated by the shaft C remain loose upon the shaft and are not affected by the rotation thereof. The
65 further movement of the lever I after it has connected the spool with the shaft swings the

arm g' , and consequently draws the wire or cable F downward through the engagement of the arm G with the button f^5 and moves
70 the rod f to the right in Figs. 3 and 4, throwing the clutch E³ into engagement with the pulley E' and swinging the arm d^2 in the direction indicated and, by means of the link d' , rack-bar D, and pinion c , rotates the shaft C, winding up the ribbon o upon the spool and
75 unwinding the ribbon o' , thus opening the door. When almost open, the arm d^9 , Fig. 3, strikes the button f^2 on the rod f and disconnects the clutch E³, thereby stopping the movement of the rack-bar D. When the door
80 is to be closed, the lever I is released, which permits the spring e^9 to throw the clutch E² into engagement with the pulley E, and the reversal of the movements above described then follows, until when the door is almost
85 closed the arm d^9 strikes the button f^3 and throws the clutch E² out of engagement.

More or less alterations and modifications of the different parts is possible, and I do not therefore limit myself to the specific details
90 thereof.

I claim as new and desire to secure by Letters Patent—

1. In a mechanism for operating elevator-doors, the combination with a slidable door
95 and a normally stationary shaft connected thereto and adapted, by its rotation, to open said door, of shaft-rotating devices connected to said shaft and adapted to be set in motion at the will of the operator; substantially as
100 described.

2. The combination with a slidable door and a normally stationary shaft connected thereto and adapted by its rotation in one direction
105 to open said door and in the opposite direction to close the same, of devices for rotating said shaft in both directions, and means for throwing said shaft-operating devices in action at the will of the operator; substantially
110 as described.

3. The combination with a slidable door and a normally stationary shaft adapted by its rotation to open and close said door, of devices
115 for rotating said shaft, means for throwing said devices into gear at will and devices for automatically throwing them out of gear when the door comes to an open or closed position; substantially as described.

4. The combination with a slidable door and a shaft connected thereto, and adapted by its
120 rotation, to open the same, of a pinion upon said shaft, a rack-bar in mesh therewith, suitable devices for advancing said rack-bar to rotate said shaft and devices adjacent to the door adapted to throw the bar-advancing de-
125 vices into gear at will; substantially as described.

5. The combination with a slidable door and a shaft connected thereto and adapted by its
130 rotation in one direction to open said door and in the opposite direction to close the same, of a pinion upon said shaft, a rack-bar mesh-

ing therewith, devices for reciprocating said rack-bar to open and close a door and means for throwing said devices into gear at will; substantially as described.

5 6. The combination with a slidable door and a shaft adapted, by its rotation in one direction, to open said door, and in the other direction, to close the same, of devices for rotating said shaft, a clutch for throwing said
10 devices into gear, and means upon the shaft-rotating devices adapted to automatically release the clutch when the door comes to an open or closed position; substantially as described.

15 7. The combination with a slidable door and a shaft connected thereto and adapted by its rotation to open said door, of a pinion on said shaft, a rack-bar, a rotatable arm connected to said bar and means for governing the rotation of said arm at the will of the operator;
20 substantially as described.

8. The combination with a rotatable shaft, of a slidable door, a spool, a ribbon connected to the door and adapted to be wound upon
25 the spool to open the door and suitable devices for throwing said spool into rotatable engagement with the shaft; substantially as described.

9. The combination with a shaft adapted
30 to be alternately rotated in both directions, of a slidable door, a spool upon the shaft, ribbons connected to opposite sides of the door, and adapted to be wound upon the spool and suitable means for rotatably connecting the
35 spool with the shaft at will; substantially as described.

10. The combination with a shaft adapted to be rotated in both directions and a slidable door, of a spool, loose upon said shaft, connecting devices between the door and spool a
40 clutch fast upon the shaft, and suitable devices for throwing said clutch into working engagement with the spool; substantially as described.

45 11. The combination with a shaft extending vertically in the elevator-well, and a slidable door, of suitable devices upon the shaft operated thereby to open the door when rotated in one direction and to close the same
50 when rotated in the opposite direction, of means for throwing said devices into working engagement with the shaft and for simultaneously starting the rotation; substantially as described.

55 12. The combination with a normally stationary shaft, and a slidable door, of a spool loose upon said shaft, a flexible connection between said spool and one side of the door, a clutch upon the shaft, devices for rotating
60 said shaft and a lever adapted to be actuated to throw said clutch into engagement with the spool and simultaneously start the shaft-operating devices; substantially as described.

65 13. The combination with a shaft and a slidable door, of a spool loose upon the shaft, flexible connections between said spool and the sides of the door, whereby the rotation of

the spool in one direction opens the door, and in the other closes the same, a clutch upon said shaft, mechanism for rotating said
70 shaft in either direction, a lever for throwing said clutch into engagement with the spool and simultaneously starting the shaft-operating mechanism in the direction to open the door, devices whereby the release of said lever starts the shaft-operating mechanism in
75 the other direction, and devices for keeping said clutch in engagement with the spool when said lever has been released and until the door is fully closed; substantially as described.

14. The combination with the shaft and a slidable door, of a spool loose upon said shaft, a flexible connection between said door, and the spool adapted to be wound thereupon in
85 the closing of the door, mechanism for rotating the shaft, a lever for throwing said spool into engagement with the shaft, a dog for holding it in engagement therewith after the release of the lever until the door comes to a
90 closed position, means for rotating the shaft and connections between said lever and the shaft-rotating mechanism, whereby the release of the lever starts said mechanism to close the door; substantially as described.

15. A rotatable shaft, a slidable door, a spool loose upon the shaft, a ribbon connecting the door with the spool, and adapted to be wound thereupon in the opening of the door, and a clutch upon the shaft adapted to
100 rotatably connect the shaft with the spool; substantially as described.

16. A rotatable shaft, a slidable door, a spool loose upon said shaft adapted by its rotation to open and close said door, a clutch
105 for throwing said shaft into engagement with the spool and devices for locking the door to the clutch when in a closed position, said devices being unlocked by the throwing of the clutch into engagement with the spool; substantially as described.

17. In a door opening and closing mechanism, the combination with a suitably-supported slidable door, of a rotatable shaft journaled adjacent thereto, suitable driving mechanism, connections between the shaft and the driving mechanism, adapted, when thrown into engagement, to rotate the shaft, connections between the shaft and the door adapted to move the door by the rotation of the shaft
120 when engaged with the latter, and means for simultaneously throwing the shaft-rotating connections into action and the door-moving connections into engagement with the shaft; substantially as described.

18. The combination with a suitable support, and a slidable door mounted thereon, of a rotatable shaft journaled adjacent to the door, connections between the shaft and the door normally out of engagement with the shaft, but adapted when in engagement therewith to move the door by the rotation of the shaft, suitable driving-gear, connections between the driving-gear and the shaft, nor-

mally out of action, but adapted, when thrown into action, to rotate said shaft, and means for simultaneously throwing said shaft-rotating connections into action and said door-moving connections into engagement with the shaft; substantially as described.

In witness whereof I have hereunto set my

hand, at Cincinnati, in the county of Hamilton and State of Ohio, this 2d day of August, A. D. 1901.

CHAS. B. GILMORE.

Witnesses:

JOHN E. HAY,

WM. C. MULLER.