

No. 659,699.

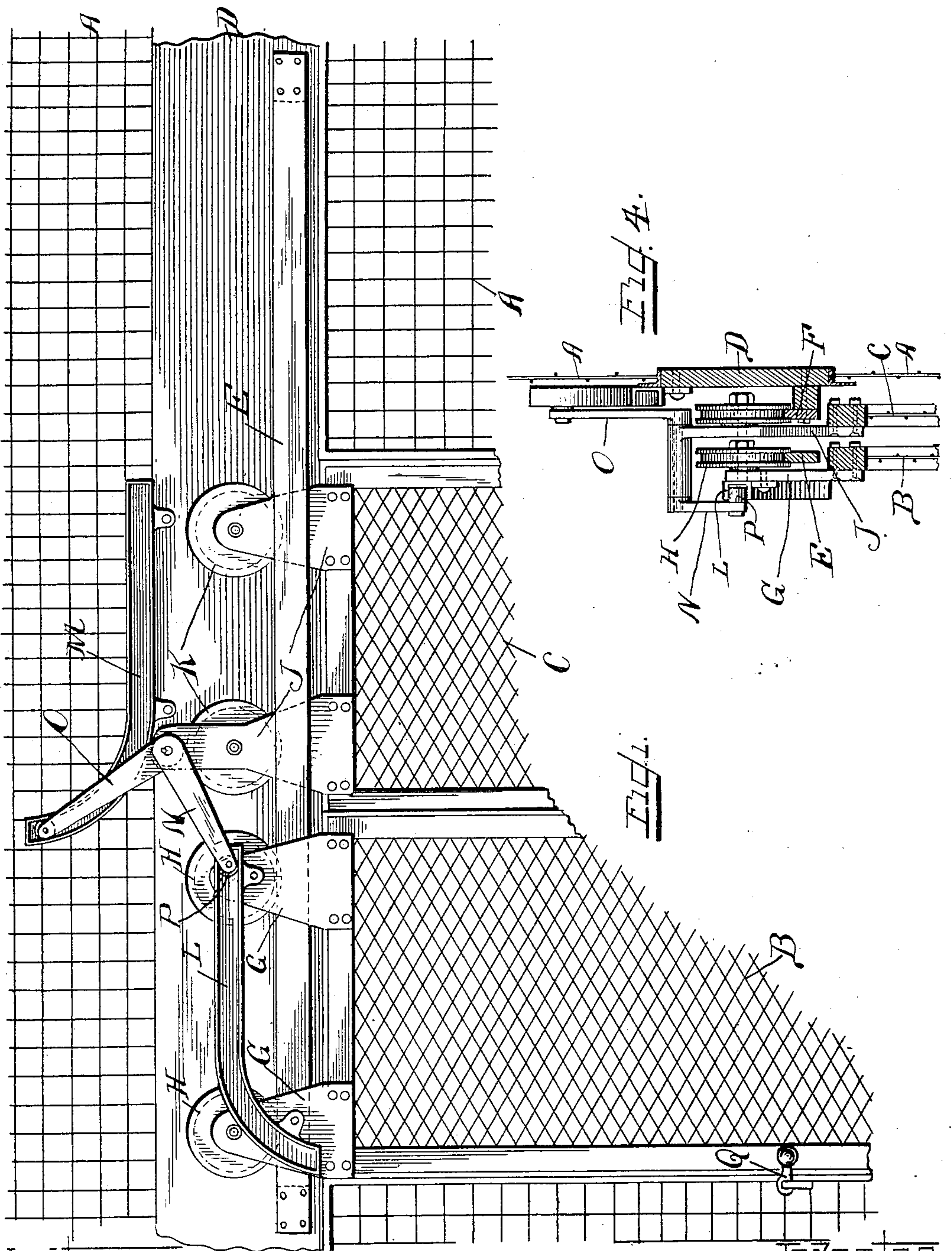
Patented Oct. 16, 1900.

H. ROWNTREE.
DOOR MECHANISM.

(Application filed Jan. 29, 1900.)

2 Sheets—Sheet 1.

(No Model.)



Witnesses

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INVENTOR

By Harold Rowntree,
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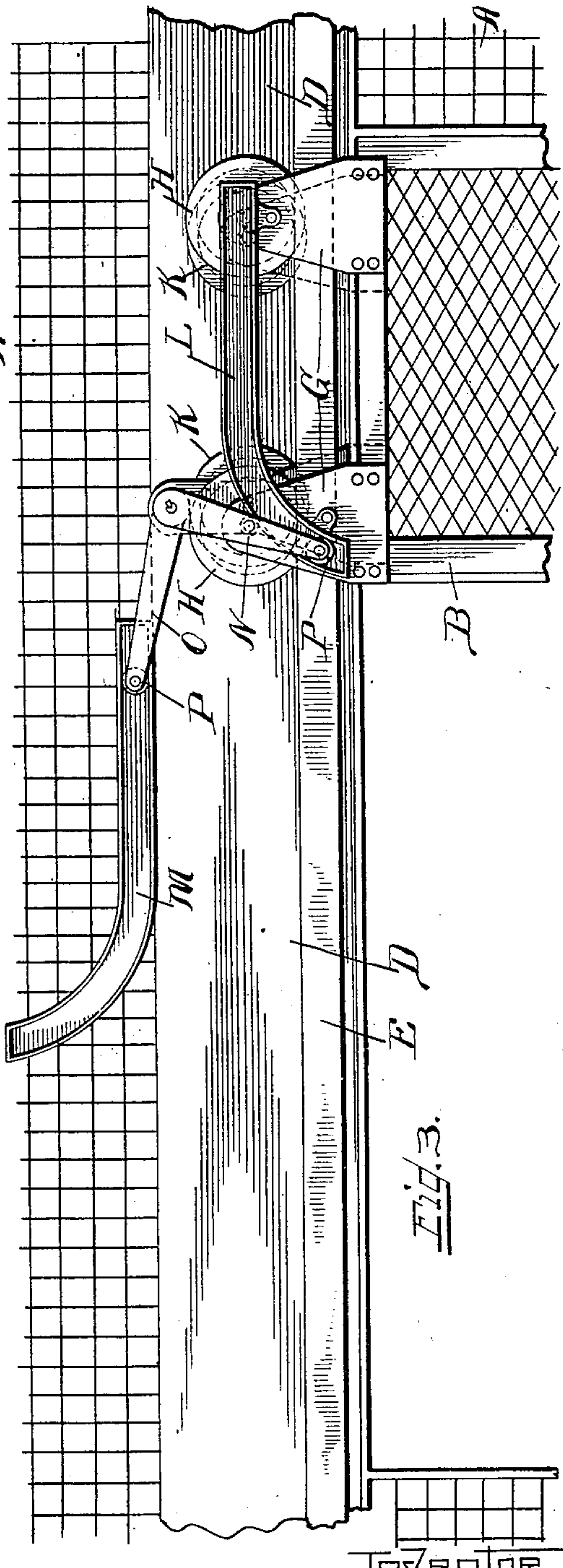
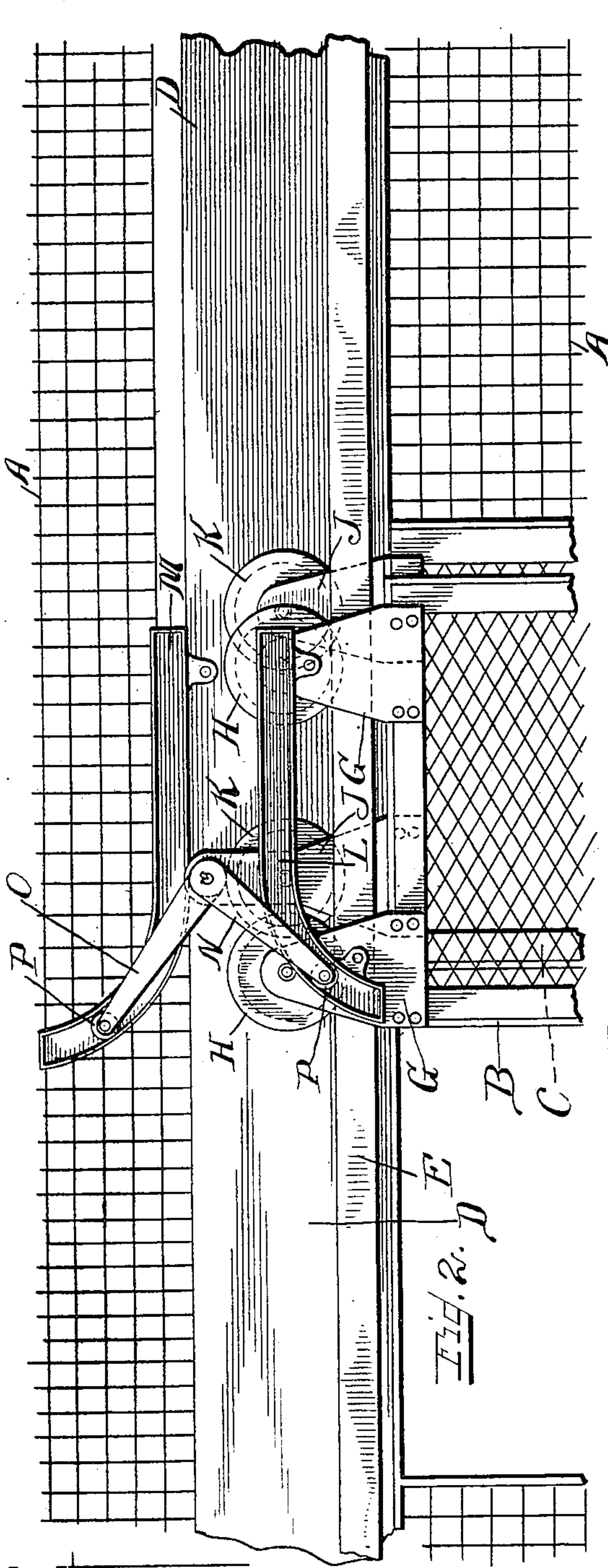
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UNITED STATES PATENT OFFICE.

HAROLD ROWNTREE, OF CHICAGO, ILLINOIS.

DOOR MECHANISM.

SPECIFICATION forming part of Letters Patent No. 659,699, dated October 16, 1900.

Application filed January 29, 1900. Serial No. 3,077. (No model.)

To all whom it may concern:

Be it known that I, HAROLD ROWNTREE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Door Mechanism, of which the following is a specification.

This invention relates to door mechanism, and while adapted generally for use in divided doors is particularly designed for use in connection with the doors of elevator shafts or wells.

One object of the invention is to provide means of simple and efficient construction and arrangement whereby when one of the door-sections has been moved to a position substantially coinciding with the position of the next adjacent door-section in opening the doorway the movement of the adjacent door-section is begun, so that thereafter the two sections move together in closing the doorway until the one section attains its ultimate position, and thereafter the other door-section continues its movement alone until its ultimate position of closure is attained.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference signs appearing thereon, Figure 1 is a broken view in front elevation showing a door mechanism constructed in accordance with the principles of the invention, the door-sections being shown in their relation when closing the doorway. Fig. 2 is a similar view showing the one door-section closed upon the next adjacent section and substantially at the point where movement of the adjacent section of the door begins in the opening of the doorway. Fig. 3 is a similar view showing the arrangement of the doors in position to completely open the doorway. Fig. 4 is a transverse section through the door mechanism.

The same part is designated by the same reference sign wherever it occurs throughout the several views.

Reference sign A designates the grille-work or other form of casing of the elevator shaft or well.

B designates one of the door-sections, and C the other door-section.

D is a beam forming part of or supported by the frame of the elevator shaft or well and arranged above the doorway.

Supported upon the beam or strut B are the tracks E and F. Bolted or otherwise connected to the door-section B are hangers G, in which are journaled rolls H, arranged to operate upon the track E. Similar hangers J are connected to the door-section C and carry rolls K, arranged to operate on the track F. Connected to move with the door-section B is a track L, said track in the particular form shown (to which, however, the invention is not limited) being in the form of a groove and having one end thereof curved, as clearly shown in the drawings. Bolted or otherwise secured to the strut or beam D is a similar track M and having a similar curved end portion. A bell-crank lever having arms N O is journaled in a support connected to the door-section C, the arm N of such bell-crank lever being arranged to engage the track L and the arm O of such lever being arranged to engage the track M. If desired, and in order to reduce friction, the engagement of arms N O with tracks L M, respectively, may be by means of rollers P, as clearly shown.

Having now described the mechanical construction of the mechanism embodying the principles of my invention, I will explain the purpose, function, and mode of operation thereof.

Referring to Fig. 1, it will be seen that the door-sections B C are in position to close the doorway. When in this position, the arm N of the bell-crank lever is in engagement with the track L at the extreme limit of the rectilinear portion thereof, and the end of arm O of the bell-crank lever is in engagement with track M at the extremity of the curved portion thereof, as clearly shown. Now suppose it is desired to open the doorway. The door-section B is moved toward the right from the position shown in Fig. 1, the rollers or other hangers H riding upon the track-rail E and the end of arm N riding in engagement with the rectilinear portion of track L. So long as

the end of the arm N continues to move in the rectilinear portion of track L not only is there no tendency of the bell-crank lever to rock, but such lever is locked against rocking movement, and hence during such movement of the door-section B the door-section C remains locked in its closed position. The opening movement of the door-section B continues until finally the end of arm N of the bell-crank lever enters the curved portion at the extreme left-hand end of track L. When this point is reached, the end of arm N, which engages track L, follows the curve at the end of said track, and hence is depressed, thereby drawing the end of lever O downwardly and along the curved portion of track M. The result of this movement of the bell-crank lever is to cause the point of support of such lever to move in the same direction in which the door-section B is moving, as clearly indicated in Fig. 2, and since the bell-crank lever is supported upon the door-section C it will be readily understood that such movement of the support of the bell-crank lever is imparted to the door-section C and the two sections begin to move together. This point is not reached, however, as will be seen by reference to Fig. 2, until the door-section B has been moved substantially into position to register with the door-section C, and it will be readily seen that the initial movement of door-section C will be gradual and slower than the movement of door-section B; but such movement will accelerate until the end of lever O reaches the rectilinear portion of track M. When this point is reached, the end of lever N has reached the limit of its movement relative to track L, and thereafter the two door-sections B C will move together, the end of the lever O traveling in the rectilinear portion of track M until the two door-sections arrive in their completely-open position, as shown in Fig. 3. It will also be seen that when the end of lever N reaches the limit of its relative movement in the extremity of the curved portion of track L the door-section B will be locked to the door-section C. The two sections of the door are now in the position illustrated in Fig. 3. To effect a closure of the doorway, the two sections B C of the door move together toward the closure position by reason of the two sections being locked together, as above explained, so long as the end of lever O traverses the rectilinear portion of track M. The beginning of the curved portion of track M is reached about the time the section C of the door approaches its closed position, and thereafter the speed of movement of door-section C toward closure position begins to decrease by reason of the end of lever O traversing the curved part of track M, and at the same time the end of lever N begins to traverse the curved portion at the end of track L, and hence an independent movement of door-section B commences, the speed of which movement is at first slower than the speed of movement of door-section C, but gradually in-

creases until finally the end of lever O reaches the limit of its relative movement with respect to track M, whereby the door-section C becomes locked against movement and the door-section B continues to move, the arm N engaging the rectilinear portion of track L until said door-section B reaches its closure position.

Of course it will be understood that the power for opening and closing the door-sections may be derived from any suitable source or said door-sections may be operated by hand.

The door-sections may be locked in their closed position in any suitable manner, and I have indicated a latch Q (see Fig. 1) for accomplishing this purpose and which may be of any ordinary construction. A similar latch may be provided for holding the doors in their opened position, though this is not an essential.

It is obvious that instead of two door-sections three or more may be employed, if desired.

While I have described my invention as applied to doors for elevator shafts or wells, it is obvious that the principles thereof may be applied to any sliding-door construction.

Having now set forth the object and nature of my invention and a form of construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a door mechanism, a slidable door composed of sections, in combination with means controlled by the movement of one section toward open position for gradually picking up the next adjacent section as said first section approaches a position coinciding with that of said adjacent section, as and for the purpose set forth.

2. In a door mechanism, a slidable door composed of sections, in combination with means controlled by the movement of one section toward open position for effecting a gradually-increasing movement of the next adjacent section until said sections are in approximately-coinciding positions, and thereafter causing said adjacent section to move in unison with said first section, as and for the purpose set forth.

3. In a door mechanism, a slidable door composed of sections, and means controlled by the movement of the door toward closed position for causing the sections to travel in unison until each section approaches its own normal position, said means operating to automatically stop said sections successively when they respectively arrive at their normal position, as and for the purpose set forth.

4. In a door mechanism, the combination with a slidable door composed of sections, of means controlled by one section when moved toward open position for locking the adjacent section against movement, said means operating to release said lock and cause said sec-

tions to move in unison when they arrive in coinciding position, as and for the purpose set forth.

5 In a door mechanism, a slidable door composed of sections, one of said sections being free to move until approximately opposite the adjacent section, said adjacent section being meanwhile locked, means controlled by the movement of said movable section and
10 operating to release the adjacent section and cause the same to commence to move in the same direction with the first section when said first section approaches nearly opposite said adjacent section, said adjacent section
15 increasing its speed until finally it travels in unison with the first section, as and for the purpose set forth.

6. In a door mechanism, the combination with a door composed of slidable sections
20 which when the door is open will cover no more than the amount normally covered by one of them, and means controlled by the movement of one section toward open position for gradually picking up the next adjacent section in passing, as and for the purpose set forth.

7. In a door mechanism, the combination of a door composed of sections which when the door is open will cover no more than the
30 amount normally covered by one of them, and means controlled by the movement of one section toward closed position for locking the same to the adjoining section, said means operating to automatically detach said
35 adjoining section when it arrives at its normally-closed position, whereby the first section may continue its movement to its closed position, as and for the purpose set forth.

8. In a door mechanism, the combination
40 of a door composed of sections which when the door is open will cover no more than the amount normally covered by one of them, and means controlled by the movement of one section toward open position for picking
45 up the adjoining section while passing the latter, said means operating to detach said section in its normal position in closing, as and for the purpose set forth.

9. In a door mechanism, the combination
50 with a door composed of sections which when the door is open will cover no more than the amount normally covered by one of them, and means controlled by the movement of one section toward open position for picking
55 up the adjacent section while passing the latter, said means operating to gradually increase the speed movement of said picked-up section until it acquires the full speed of the first section, as and for the purpose set forth.

60 10. In a door mechanism, the combination of a door composed of sections which when the door is open will cover no more than the amount normally covered by one of them, and means controlled by the movement of
65 one section toward closed position for locking the adjacent section to move therewith until said doors respectively approach their nor-

mally-closed positions, said means operating to gradually decrease the speed of movement of the adjacent section, and finally to cause
70 the same to be detached, whereby said adjacent section will be stopped in its normally-closed position, while the first section continues its movement to its normally-closed position, as and for the purpose set forth. 75

11. In a door mechanism, a door composed of sections, and means for supporting the same, in combination with a track connected to one of said sections, a stationary track,
80 and means carried by the other of said sections, arranged to engage said tracks, as and for the purpose set forth.

12. In a door mechanism, a door composed of sections, a track carried by one of said sections, a bell-crank lever connected to the
85 other of said sections, one arm of said lever engaging said track, and a cooperating stationary track arranged to be engaged by the other arm of said lever, as and for the purpose set forth. 90

13. In a door mechanism, a door composed of sections, tracks, each having a rectilinear portion and a curved portion, one of said tracks being stationary and the other connected to one of said door-sections, and de-
95 vices connected to the other of said door-sections arranged to engage said tracks, as and for the purpose set forth.

14. In a door mechanism, a door composed of sections, tracks, each having a rectilinear
100 portion and a curved end portion, one of said tracks being stationary and the other connected to one of said door-sections, and a bell-crank lever connected to the other of said door-sections, having its arms respec-
105 tively arranged to engage said tracks, as and for the purpose set forth.

15. In a door mechanism, a door composed of sections, grooved tracks, each having a rectilinear portion and a curved portion, one of
110 said tracks being stationary and the other connected to one of said door-sections, and a bell-crank lever connected to the other of said door-sections, and having its arms respectively arranged to operate in the grooves
115 of said tracks, as and for the purpose set forth.

16. In a door mechanism, a door composed of sections, a track connected to one of said sections, said track having a rectilinear por-
120 tion and a downwardly-curved end portion, a stationary track having a rectilinear portion and an upwardly-curved end portion, and devices carried by the other of said door-sections arranged to engage said tracks, as
125 and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 26th day of January, 1900, in the presence of the subscribing witnesses.

HAROLD ROWNTREE.

Witnesses:

FRED H. BROWN,
E. C. SEMPLE.