Dec. 27, 1932. H. C. ARMSTRONG 1,892,562

ROLLING DOOR WITH GLASS COVERED OPENING

Filed March 9, 1931 7 Sheets-Sheet 1

FIG. 1.

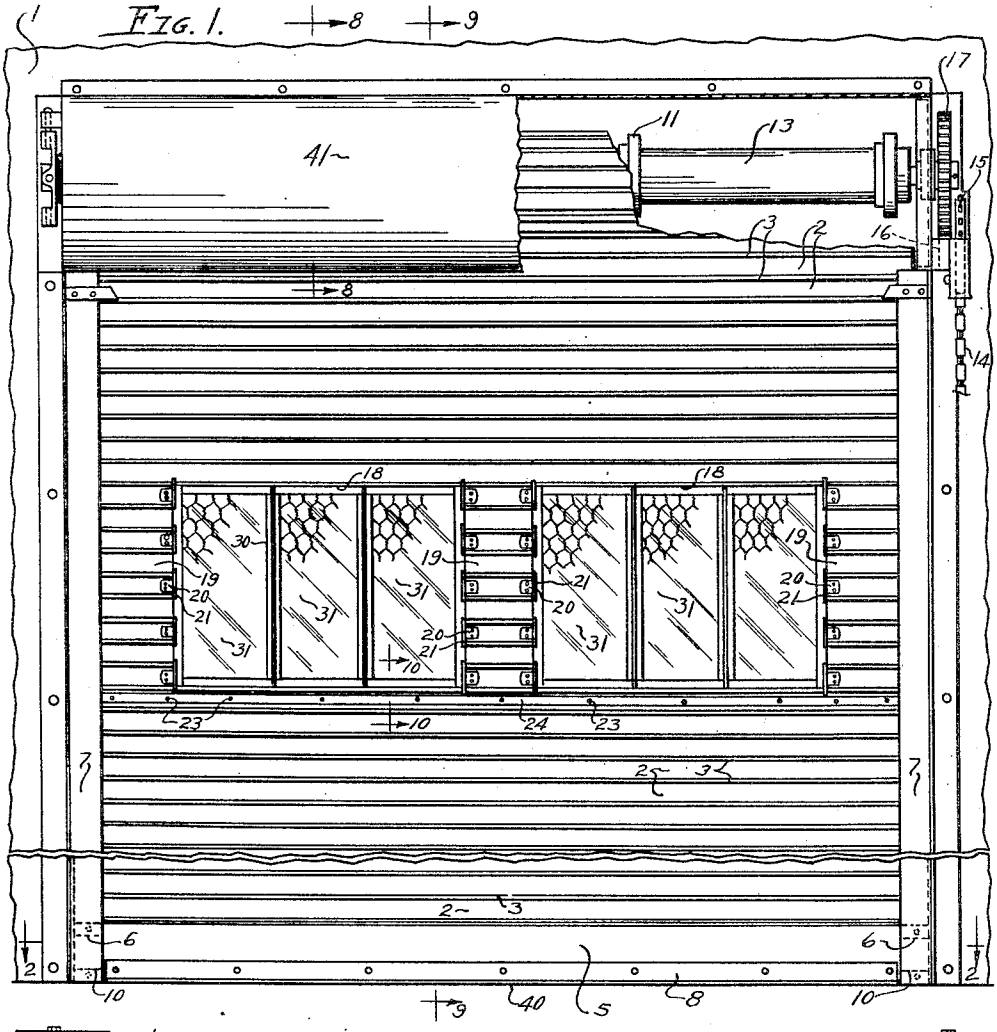


FIG. 2.

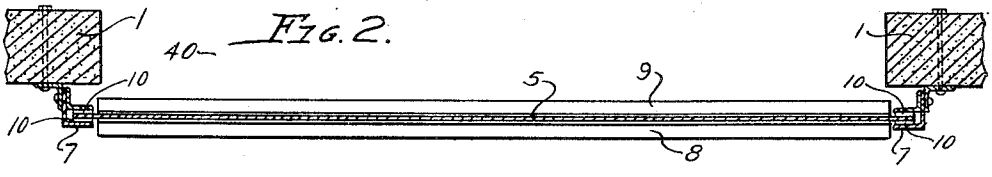
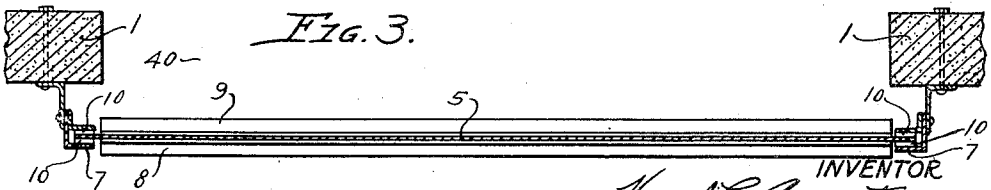


FIG. 3.



INVENTOR
Hugh C. Armstrong
BY
Toulmin & Toulmin
ATTORNEY

Dec. 27, 1932. H. C. ARMSTRONG 1,892,562

ROLLING DOOR WITH GLASS COVERED OPENING

Filed March 9, 1931 7 Sheets-Sheet 2

FIG. 4.

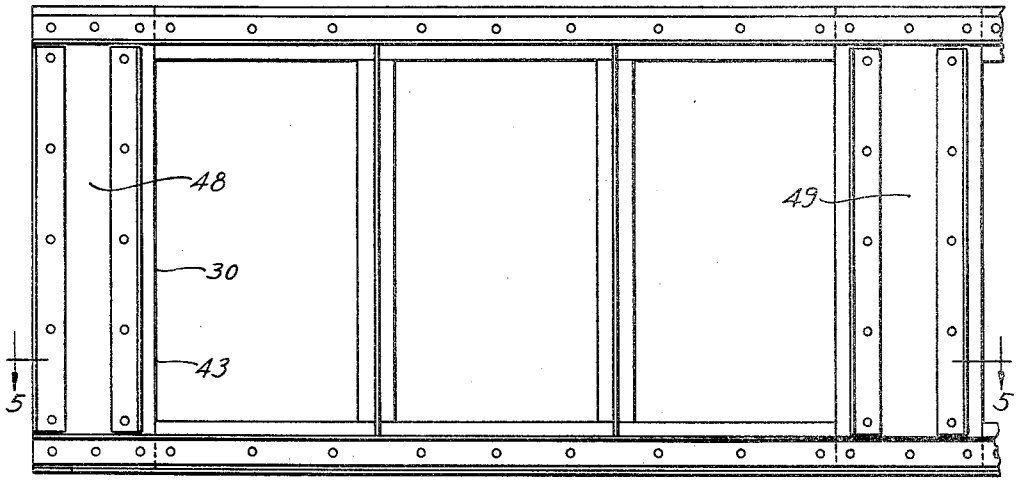


FIG. 5.

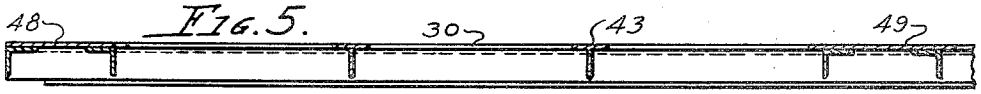


FIG. 6.

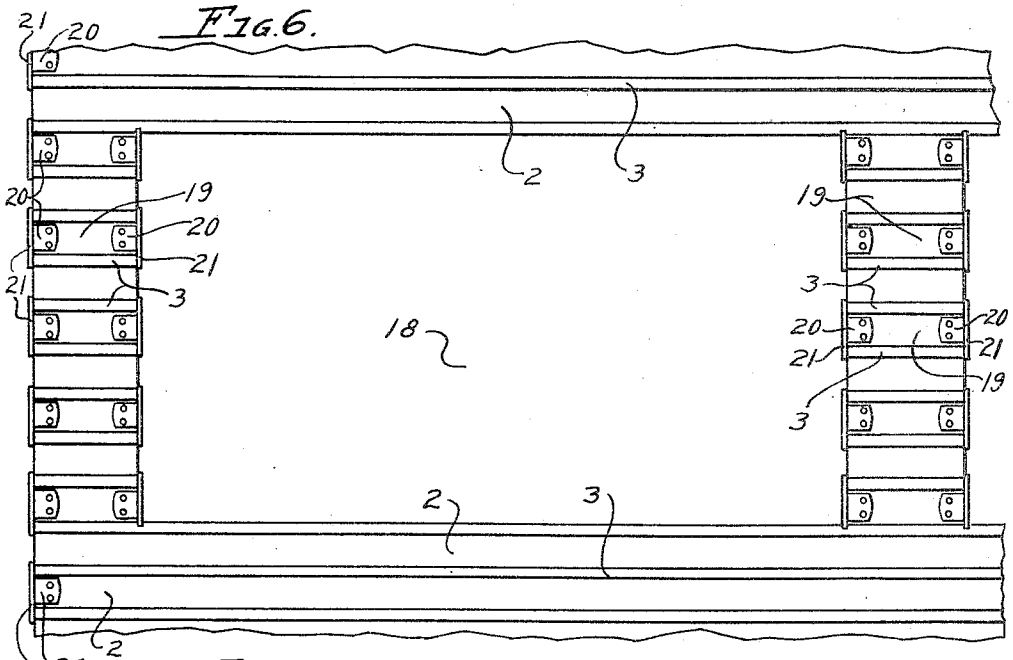
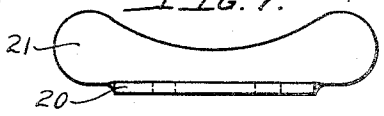


FIG. 7.



INVENTOR

Hugh C. Armstrong.

BY Toulmin & Toulmin

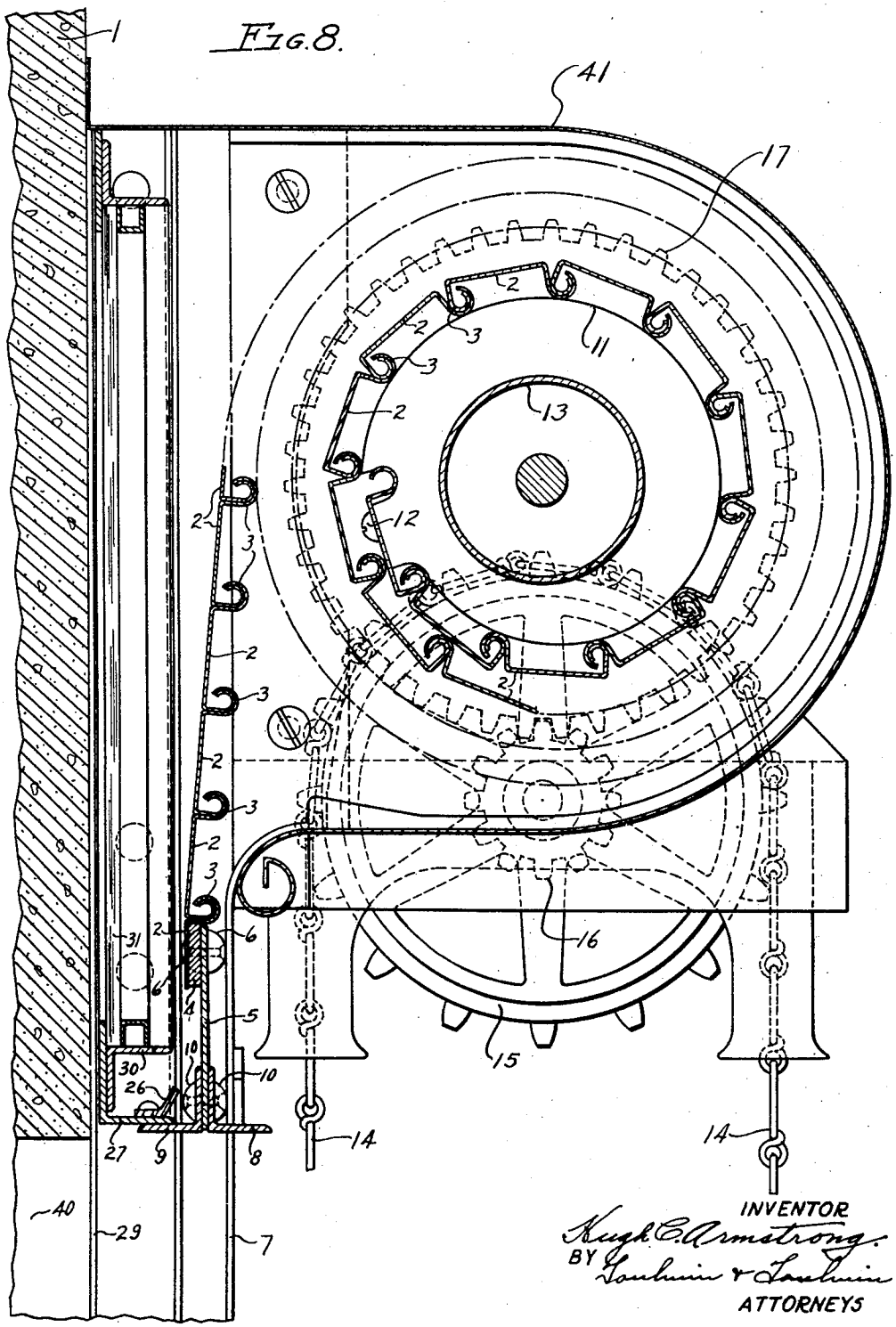
ATTORNEY

Dec. 27, 1932. H. C. ARMSTRONG 1,892,562

ROLLING DOOR WITH GLASS COVERED OPENING

Filed March 9, 1931 7 Sheets-Sheet 3

FIG. 8.



INVENTOR
Hugh C. Armstrong.
BY Goubin & Goubin
ATTORNEYS

Dec. 27, 1932. H. C. ARMSTRONG 1,892,562

ROLLING DOOR WITH GLASS COVERED OPENING

Filed March 9, 1931 7 Sheets-Sheet 4

FIG. 11.

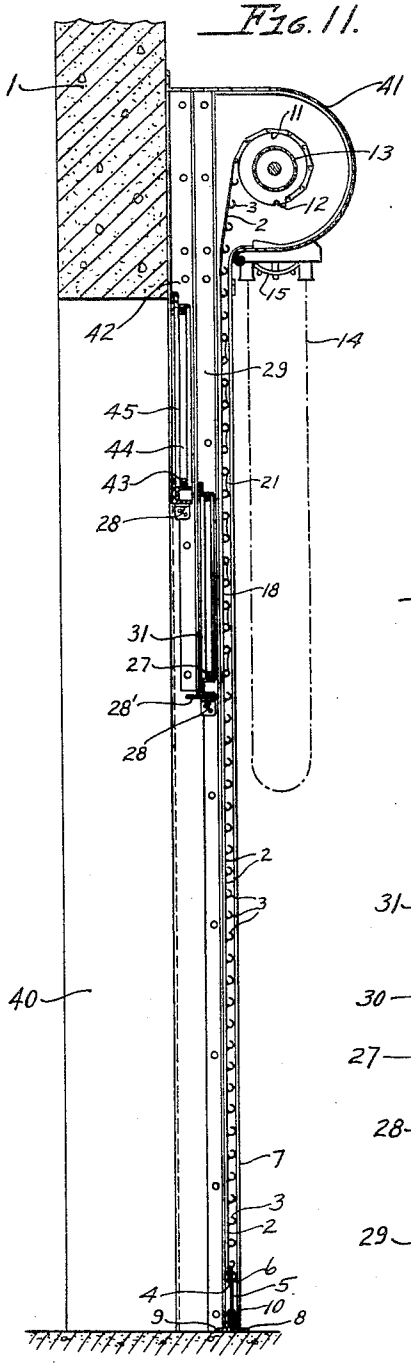


FIG. 10.

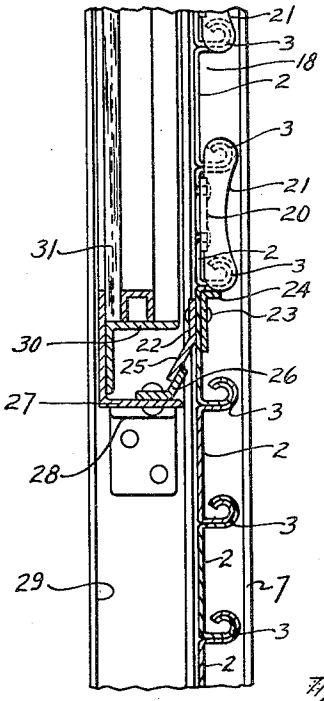
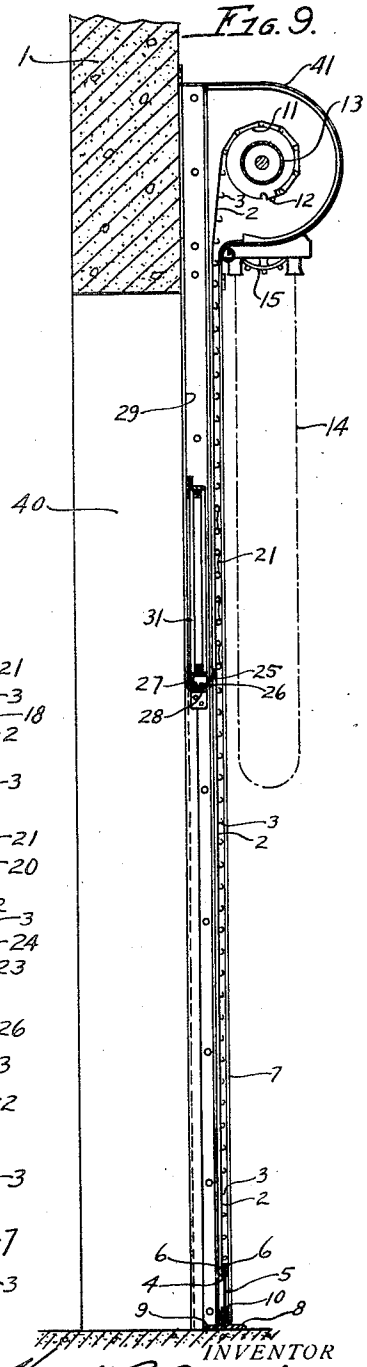


FIG. 9.



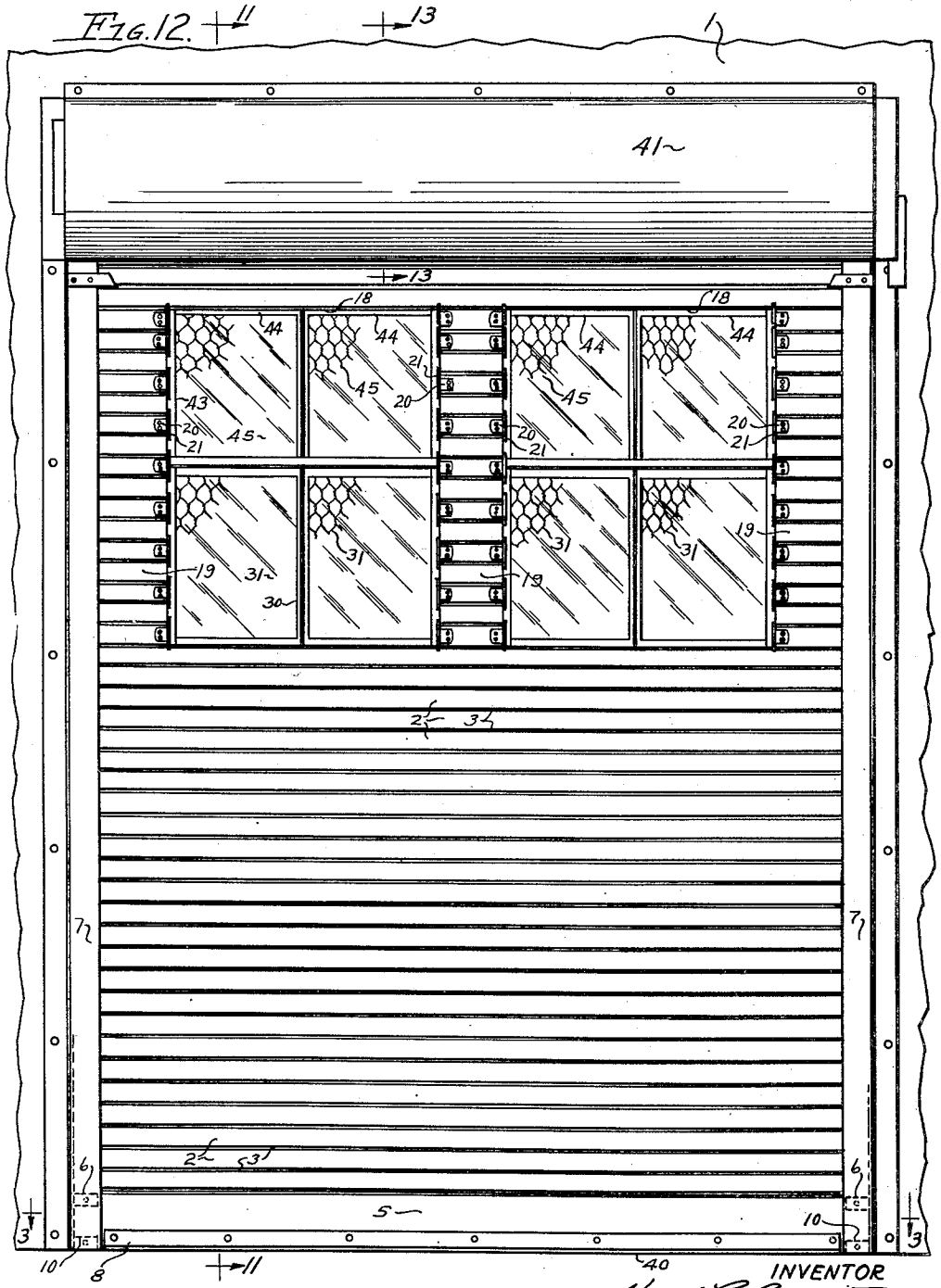
INVENTOR
Hugh C. Armstrong.
BY Toulmin & Toulmin
ATTORNEYS

Dec. 27, 1932. H. C. ARMSTRONG 1,892,562

ROLLING DOOR WITH GLASS COVERED OPENING

Filed March 9, 1931 7 Sheets-Sheet 5

FIG. 12.



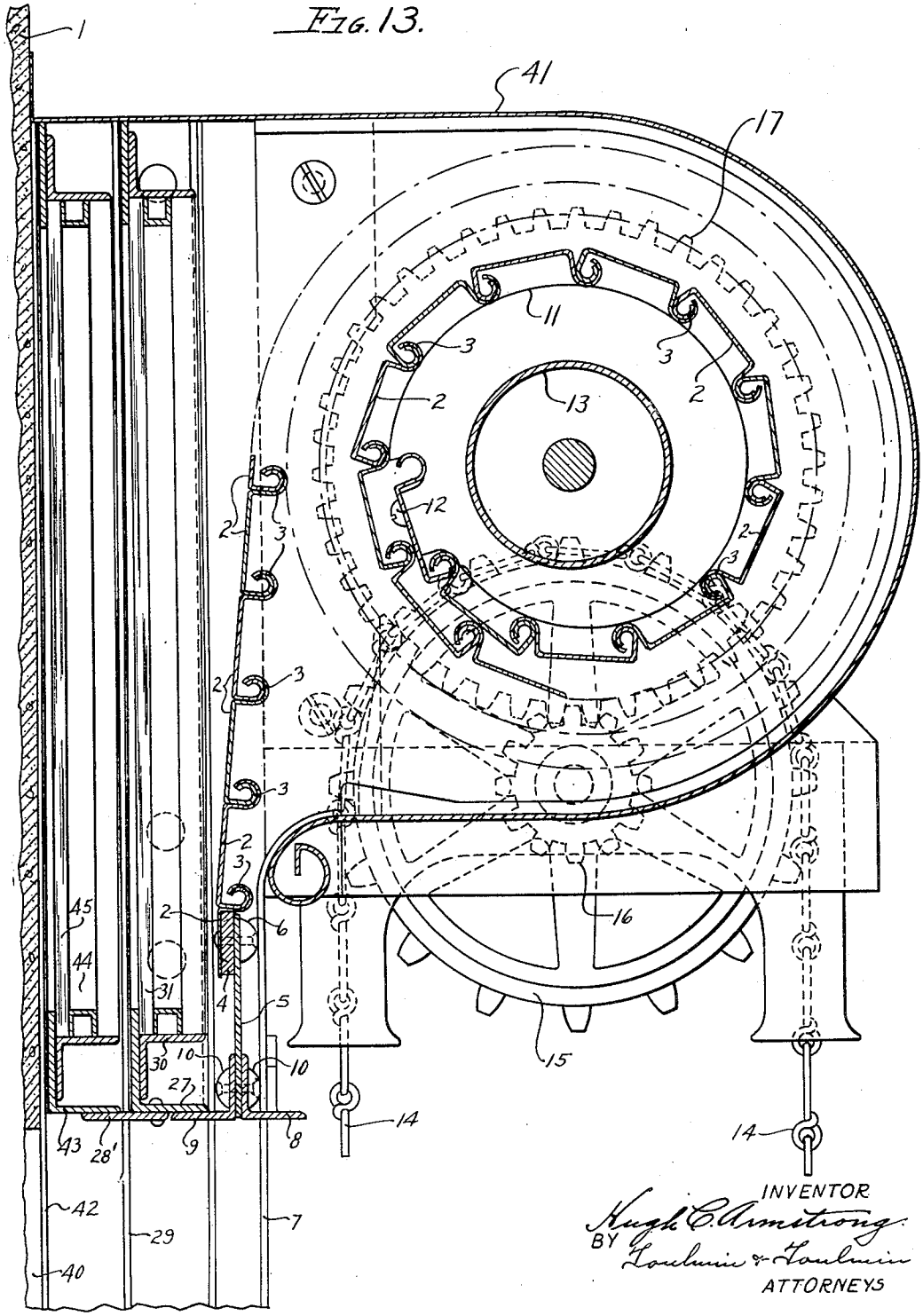
INVENTOR
Hugh C. Armstrong.
BY Toulmin & Toulmin
ATTORNEYS

Dec. 27, 1932. H. C. ARMSTRONG 1,892,562

ROLLING DOOR WITH GLASS COVERED OPENING

Filed March 9, 1931. 7 Sheets-Sheet 6

Fig. 13.



INVENTOR
Hugh C. Armstrong
BY Toulmin & Toulmin
ATTORNEYS

Dec. 27, 1932. H. C. ARMSTRONG 1,892,562

ROLLING DOOR WITH GLASS COVERED OPENING

Filed March 9, 1931 7 Sheets-Sheet 7

FIG. 14.

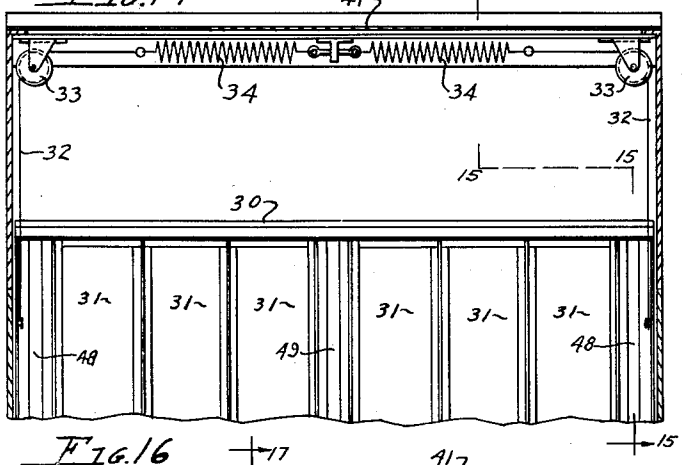


FIG. 15.

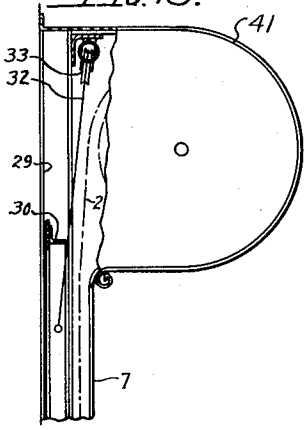


FIG. 16.

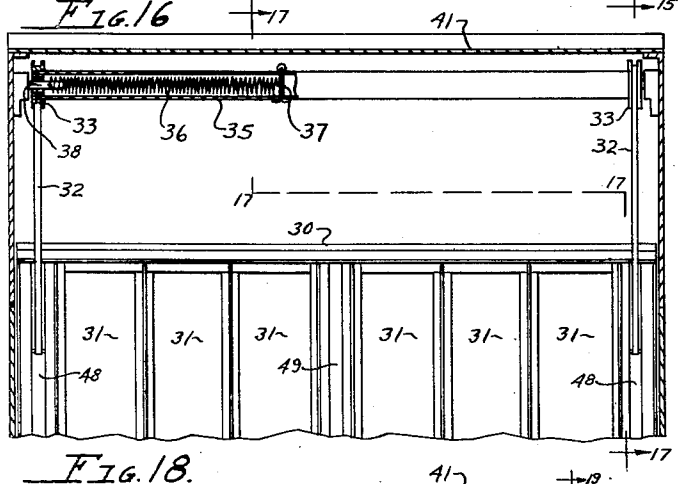


FIG. 17.

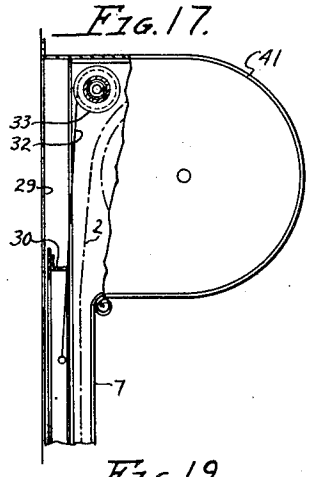


FIG. 18.

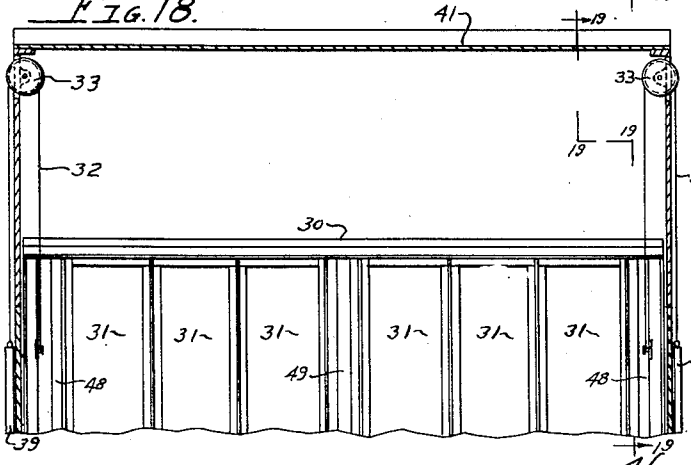
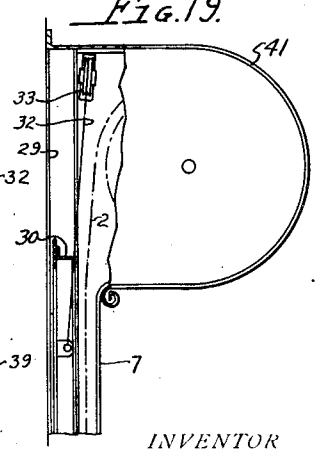


FIG. 19.



INVENTOR
Hugh C. Armstrong.
BY Toulmin & Toulmin
ATTORNEYS

Patented Dec. 27, 1932 1,892,562

UNITED STATES PATENT OFFICE

HUGH COOKE ARMSTRONG, OF COLUMBUS, OHIO, ASSIGNOR OF ONE-FOURTH TO WILLIAM M. GINDER, OF COLUMBUS, OHIO

ROLLING DOOR WITH GLASS-COVERED OPENING

Application filed March 9, 1931, Serial No. 521,264, and in Canada March 9, 1931.

My invention relates to rolling doors and in particular to an apparatus and method of operation of an apparatus for placing windows in fireproof rolling steel doors.

It is the object of my invention to provide a rolling steel door of articulated slats in which are mounted when the door is in closed position, permanently fixed fireproof windows covering openings in the articulated slats so that the door will have such openings closed by the frames and glass of the windows but will permit full vision through the door.

It is a further object of my invention to provide any number of windows and window sash transversely or in superimposed relationship so that any part or substantially all of the door opening may be seen through according to the number of windows provided, and light is admitted.

It is a further object to provide means of storing the window sash and windows within the compass of the dimensions of the door in a protected place where they will not be injured when the door is in open position and the windows are inoperative.

It is a further object to provide means of counter-balancing such windows independently of the rolling door and the counter-balancing mechanism of the rolling door while at the same time utilizing the rolling door for actuating the windows in cooperation with their counter-balancing mechanism and the counter-balancing mechanism of the door itself.

Referring to the drawings, Figure 1 is a front elevation of the door in closed position with the door counter-balancing mechanism partly broken away showing a single sash installed in parallel relationship to cover a pair of openings in the articulated door.

Figure 2 is a section on the line 2—2 thereof.

Figure 3 is a section on the line 3—3 of Figure 12.

Figure 4 is an elevation of the sash of one of the windows.

Figure 5 is a section on the line 5—5 thereof.

Figure 6 is a detail elevation of a portion of the door showing window openings and the arrangement of the fittings on the articulated slats to prevent the slats moving laterally relative to one another.

Figure 7 is a detail end elevation of one of such fittings.

Figure 8 is a section on the line 8—8 of Figure 1 showing the position of the rolling door and sash when the door is in open position.

Figure 9 is a section on the line 9—9 of Figure 1 showing the door in closed position.

Figure 10 is a section through the door and bottom of the sash to show the locking engagement between the bottom of the sash and the articulated door to hold the sash and the door in locked position when the door and sash are closing the door opening so that the sash is held in position to close the window opening in the rolling door.

Figure 11 is a similar view to Figure 9 showing the use of superimposed telescopically arranged sash.

Figure 12 is a front elevation of the construction shown in Figure 11.

Figure 13 is a section on the line 13—13 of Figure 12 showing the double sash in telescoped inoperative position.

Figure 14 shows partially in section a diagrammatic view in elevation of one form of double spring counterbalancing mechanism for the window sash.

Figure 15 is a section on the line 15—15 of Figure 14.

Figure 16 is a view similar to Figure 14 showing the spring actuated drum and sheave form of counter-balancing mechanism.

Figure 17 is a section on the line 17—17 of Figure 16.

Figure 18 is a view similar to Figure 16 showing the sash attached to pulleys, cables and weights for counter-balancing.

Figure 19 is a section on the line 19—19 of Figure 18.

Referring to the drawings in detail, 1 indicates the structure of the building, a door opening which is closed by the rolling door comprising the articulated slats 2 that are interlocked to form hinges as at 3.

The bottom of the door is provided with a

transverse strip 4 riveted to the lower articulated slat 2. On this lower bar 4 is mounted a plate 5. Riveted to the slat 2, bar 4 and plate 5 at either end thereof are semi-circular members 6 which form guide bearings engaging the inner walls of the channel guide 7 which guides the lower end of the articulated door in its vertical movement. Angle plates 8 and 9 are riveted on opposite sides of the plate 5 at the bottom thereof. Connected to the bottom of the plate 5 and the angle plates 8 and 9 at either end thereof are additional bearing block members 10 of semi-circular section. They also ride within the trackway 7. The door structure consisting of the articulated slats 2 is wound upon the drum 11, to which the articulated door curtain 2 is attached at 12. Suitable counterbalancing mechanism may be mounted within the cylinder 13, but the nature of the counter-balancing mechanism, of which there are various forms in the art, is not important in this invention. The curtain is actuated through the hand chain 14 engaging the sprocket wheel 15 which carries the pinion 16 that meshes with the gear 17. Upon the actuation of the chain in conjunction with the counter-balancing mechanism, the door is raised and lowered.

This door is provided with window openings 18. The window openings are formed by cutting a portion of the slats 2 as at 19 into short sections and placing on either end of these short sections retaining plates consisting of an attaching plate 20 to the face of the slat with a vertical retaining face 21 extending over the joints 3 of the adjacent slats, thereby preventing lateral movement between the adjacent slats 19. Similar slats are mounted on the ends of the full length slats 2. Thus the articulated door curtain forms window openings.

On the back of the curtain adjacent the openings is mounted a diagonal clamp 22 riveted to one of the slats 2 of the rivet 23, which also passes through a front reenforcing plate 24.

The clamp and plate has a diagonal portion 25 for overlapping a similar diagonal clamp member 26 which is mounted upon the lower part of the window sash 27. When the structure is in closed position this window sash 27 rests upon the bracket 28 mounted within the window sash guide frames 29 on either side of the door opening.

The window sash 27 carries a window frame 30 in which is mounted wire glass 31. As the rolling door and steel window frame sash and wire glass are all fireproof, a tight fireproof construction is provided for closing the door opening.

The sash may be connected at its upper corners to suitable cables 32 passing over pulleys 33. Such cables may be connected to independent springs for counter-balancing purposes such as at 34 in Figures 14 and 15, or the cables may be wound on the pulleys 33 which in turn are mounted on the spring actuated drum 35 which in turn is actuated by the spring 36 as in Figures 16 and 17. The spring 36 is connected at 37 to the drum 35 and to a stationary abutment 38 at its other end. Again, the cables 32 passing over the pulleys 33 may be attached to counter-balancing weights 39 as in Figures 18 and 19.

As will be seen from Figure 8, when the door starts upwardly, the flange 9 on the bottom of the rolling door will engage the bottom of the sash 27 and impart to the sash such movement in conjunction with its counter-balancing mechanism to move it upwardly with the rolling door. During this upward movement the sash is guided in its own track 29 that is parallel to the track 7 which guides the rolling door. The track 29 extends vertically against the wall above the door opening indicated at 40. The sash is thus stored telescopically behind the winding mechanism for the door and within the casing 41 that encases the door actuating mechanism.

No greater heighth is necessary for the total door mechanism as the sash is stored behind the door operating mechanism.

In the event it is desired to use multiple sash or sash of greater depth, all that is necessary is to extend the casing for the sash upwardly, in the event there is sufficient room between the top of the sash when in their uppermost position and the ceiling of the room.

Double sash

When it is desired to use a plurality of superimposed sash, as shown in Figures 11, 12 and 13, the sash are duplicates of one another as heretofore described, there being provided for the upper and second sash which is superimposed, the first or lower sash already described, an additional guideway 42 for the sash 43 carrying its window frame 44 and glass 45. Mounted upon the first mentioned sash 27 is a lifting plate 28^1 that serves to engage the bottom of the sash 47 when the lower sash is elevated by the lifting plate 9 on the bottom of the rolling door. It will be understood that any number of sash may be employed by this system, telescopically arranged one behind the other and preferably within the casing 41.

Similar counter-balancing mechanism may be provided for this sash as indicated in Figures 14 to 19 inclusive.

Extension of sash across the door curtain

As will be seen in Figures 4 and 5, the window sash extends completely across the curtain and into the guides 42 and 29. The windows themselves and the window frames are sufficient to close the window openings in the

door but the sash extend completely across the curtain and into the guides for the sash. The sash are provided with end plates 48 and center plates 49 which may be of any width to fill in the spaces between the windows. While this is not essential, yet it provides reenforcement for the window sash.

I desire to comprehend within my invention such modifications as may be clearly embraced within my claim and the scope of my invention.

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

1. In combination, a rolling door having a window therein and a closure mounted independent of the door operated by the door for closing the window.

2. In combination, a rolling door having a window therein, said rolling door comprising a plurality of articulated slats and a closure mounted independent of the door and operated by the door to close the opening.

3. In combination, a rolling door having an opening therein, said rolling door comprising a plurality of articulated slats, said opening extending vertically more than the heighth of a single slat and a closure mounted independent of said door and operated thereby.

4. In combination, a rolling door having a window opening and a window mounted independent of the door for closing said opening and operated thereby.

5. In combination, a rolling door having a window opening and a window mounted independent of the door for closing said opening, and means to retain said window in closing position for the window opening when the door is in closed position and means for operating the said window by the door.

6. In combination, a rolling door having a window opening and a window mounted independent of the door for closing said opening, means to retain said window in closing position for the window opening and the door when the door is in closed position, and means for moving said window by operation of said door.

7. In combination, a rolling door having a window opening and a window mounted independent of the door for closing said opening, means to retain said window in closing position for the window opening and the door when the door is in closed position, and means on said door for moving said window with said door, and means for separately storing said door and said window.

8. In combination, a rolling door having a window opening therein, a window sash and window mounted independent of the door for closing said opening, means for guiding said door and said window relative to one another and means for operating said window by said door.

9. In combination, a rolling door having a window opening therein, a window sash and window mounted independent of the door for closing said opening, means for guiding said door and said window relative to one another, said window and door being relatively movable with respect to one another and means for operating said window by said door.

10. In combination, a rolling door having a window opening therein, a window sash and window mounted independent of the door for closing said opening, means for guiding said door and said window relative to one another, said window and door being relatively movable with respect to one another, and means for moving said window by said door when said door is moving into its inoperative position.

11. In combination, a rolling door having a window opening therein, a window sash and window for closing said opening, means for guiding said door and said window relative to one another, said window and door being relatively movable with respect to one another, and means for moving said window by said door when said door is moving into its inoperative position, and means for storing said window in inoperative position when so moved.

12. In combination, a rolling door having a window opening, a window for closing said opening comprising a frame and glass, means on said door for moving said window into position to close said window opening in the door when the door is closed, and means on said door for engaging said window to move it into inoperative position when the door is open.

13. In combination, a rolling door having a window opening, a window for closing said opening comprising a frame and glass, means on said door for moving said window into position to close said window opening in the door when the door is closed, and means on said door for engaging said window to move it into inoperative position when the door is open and means for independently guiding said door and said window in substantially parallel relationship.

14. In combination, a rolling door having a window opening, a window for closing said opening comprising a frame and glass, means on said door for moving said window into position to close said window opening in the door when the door is closed, and means on said door for engaging said window to move it into inoperative position when the door is open, means for independently guiding said door and said widow in substantially parallel relationship, and means on said window guiding means of telescopically storing said window behind the door when the door is in inoperative position.

15. In combination, a rolling door having

a window opening, means for raising and lowering the door, and a window for closing said window opening movable parallel to said door from window opening closing position in the door when the door is closed, to storage position by operation of said door when the door is open, said window and door being relatively movable to one another.

16. In combination, a rolling door having a window opening, means for raising and lowering the door, a window for closing said window opening movable parallel to said door from window opening closing position in the door when the door is closed, to storage position when the door is open, said window and door being relatively movable to one another, and means on said door for causing said window to move with it.

17. In combination, a rolling door having a window opening, means for raising and lowering the door, a window for closing said window opening movable parallel to said door from window opening closing position in the door when the door is closed, to storage position when the door is open, said window and door being relatively movable to one another, and means on said door for closing said window to move with it, one of said means being adapted to lock said window in engagement with the window opening in the door when the door is closed.

18. In combination, a rolling door, means to roll said door, said door having a window opening, a window frame and glass adapted to close said opening, and means to guide said window sash and glass vertically in parallel relationship to said door when the door is closing the door opening, and means for storing said window frame and glass behind the rolled door when the door is open.

19. In combination, a rolling door having a window opening, a window frame and glass of sufficient size to close said opening, means on said window frame extending to adjacent the edge of said door, means for guiding said window frame parallel to said door, means for guiding the edges of said door, means for rolling said door, and means on said door for engaging with said window to move it in window opening closing position and to move said window into storage position.

20. In combination, a rolling door having a window opening, a window frame and glass of sufficient size to close said opening, means on said window frame extending to adjacent the edge of said door, means for guiding said window frame parallel to said door, means for guiding the edges of said door, means for rolling said door, and means on said door for engaging with said window to move it in window opening closing position and to move said window into storage position, and counter-balancing means for said window frame and glass independent of the rolling means for the door.

21. In combination, a rolling door, means to counter-balance and roll said door, said door having a window opening, a window independent of the door for closing said window opening when the door is in closed position, means to store said window, independent guiding means for said window and said door and counter-balancing means for said window independent of the counter-balancing means of the door and means for operating said window by said door.

22. In combination, a rolling door, means to counter-balance and roll said door, said door having a window opening, a window for closing said window opening when the door is in closed position, means to store said window, independent guiding means for said window and said door and counter-balancing means for said window independent of the counter-balancing means of the door, and means on said door to cause said window to travel with the door into closing position.

23. In combination, a rolling door, means to counter-balance and roll said door, said door having a window opening, a window for closing said window opening when the door is in closed position, means to store said window, independent guiding means for said window and said door and counter-balancing means for said window independent of the counter-balancing means of the door, and means on said door to cause said window to travel with the door into closing position, and means on said door for causing said window to travel with the door into inoperative position.

24. In combination, a rolling door, means to counter-balance and roll said door, said door having a window opening, a window for closing said window opening when the door is in closed position, means to store said window, independent guiding means for said window and said door and counter-balancing means for said window independent of the counter-balancing means of the door, and means on said door to cause said window to travel with the door into closing position, and means on said door for causing said window to travel with the door into inoperative position, said respective means being alternately operative on said window.

25. In combination, a rolling door, means to counter-balance and roll said door, said door having a window opening, a window for closing said window opening when the door is in closed position, means to store said window, independent guiding means for said window and said door and counter-balancing means for said window independent of the counter-balancing means of the door, and means on said door to cause said window to travel with the door into closing position, and means on said door for causing said window to travel with the door into inoperative position, said respective means be-

ing alternately operative on said window, and said window and door being alternately movable with respect to one another between the engagement of said alternately operative means between the door and window.

26. In combination, a rolling door having a window opening less than the entire width of the door, a window sash carrying a window extending beyond the width of the door, the window portion in said sash being substantially equal to the width of the window and the door, means to guide the edge of said door, means to guide the edge of said sash.

27. In combination, a rolling door having a window opening less than the entire width of the door, a window sash carrying a window extending beyond the width of the door, the window portion in said sash being substantially equal to the width of the window and the door, means to guide the edge of said door, means to guide the edge of said sash, and means on the door for closing the sash and window over the window opening in the door when the door is closed.

28. In combination, a rolling door having a window opening less than the entire width of the door, a window sash carrying a window extending beyond the width of the door, the window portion in said sash being substantially equal to the width of the window and the door, means to guide the edge of said door, means to guide the edge of said sash, and means on the door for closing the sash and window over the window opening in the door when the door is closed, and means on the door adjacent the window opening in the door for drawing the sash and its window into closing position for the window opening in the door and retaining in such position.

29. In combination, a rolling door having a window opening less than the entire width of the door, a window sash carrying a window extending beyond the width of the door, the window portion in said sash being substantially equal to the width of the window and the door, means to guide the edge of said door, means to guide the edge of said sash, and means on the door for closing the sash and window over the window opening in the door when the door is closed, and means on the door adjacent the window opening in the door for drawing the sash and its window into closing position for the window opening in the door and retaining in such position, and means on the bottom of the door for engaging the bottom of the sash as the door is opened to move the window sash and window into inoperative position.

30. In combination, a rolling door having a window opening, a window sash having a window for closing said opening, and means on the door adjacent the lower edge of said window opening in the door adapted to engage the bottom of the sash and to retain the sash and its window in closing position for the window opening in the door.

31. In combination, a rolling door having a window opening, a window sash having a window for closing said opening, means adjacent the lower edge of said window opening in the door adapted to engage the bottom of the sash and to retain the sash and its window in closing position for the window opening in the door, and means on the bottom of the rolling door adapted upon upward movement of the door to come into engagement with the bottom of the sash for moving the sash upwardly.

32. In combination, a rolling door having a window opening, a window sash having a window for closing said opening, means adjacent the lower edge of said window opening in the door adapted to engage the bottom of the sash and to retain the sash and its window in closing position for the window opening in the door, and means on the bottom of the rolling door adapted to engage the bottom of the sash for moving the sash upwardly, and means for storing said sash and window and means of rolling said door.

33. In combination, a rolling door having a window opening, a window sash having a window for closing said opening, means adjacent the lower edge of said window opening in the door adapted to engage the bottom of the sash and to retain the sash and its window in closing position for the window opening in the door, and means on the bottom of the rolling door adapted to engage the bottom of the sash for moving the sash upwardly, and means of storing said sash and window and means of rolling said door, either means being arranged one behind the other.

34. In combination, a rolling door having a window opening, a window sash having a window for closing said opening, means adjacent the lower edge of said window opening in the door adapted to engage the bottom of the sash and to retain the sash and its window in closing position for the window opening in the door, and means on the bottom of the rolling door adapted to engage the bottom of the sash for moving the sash upwardly, and means of storing said sash and window and means of rolling said door, either means being arranged one behind the other within a common casing.

35. In combination, a rolling door having a window opening, a plurality of window sash and windows adapted to be arranged one above the other to close said opening when the door is in its closed position and means for operating said plurality of window sash and windows by said door.

36. In combination, a rolling door having a window opening, a plurality of window sash and windows adapted to be arranged one above the other to close said opening

when the door is in closed position, and means of storing said sash telescopically one behind the other when the door is in its inoperative open position and means for operating said plurality of window sash and windows by said door.

37. In combination, a rolling door having a window opening, a plurality of window sash and windows adapted to be arranged one above the other to close said opening when the door is in closed position, and means of storing said sash telescopically one behind the other when the door is in its inoperative open position, means on said door for engaging one of said sash to move it to its operative position, and means on the said sash for engaging the other of the sash to move it successively into operative position.

38. In combination, a rolling door, having a window opening, a plurality of sash arranged one above the other when the door is closed for closing said opening, and a common means on said door for engaging the bottom of one of said sash for elevating all of the sash in inoperative position and means on the bottom of the sash for engaging the bottom of the next adjacent sash above whereby the means on the bottom of the door will move all of the sash into inoperative position.

39. In combination, a rolling door having a window opening, a plurality of sash carrying windows arranged in superimposed relationship for closing said opening when the door is closed, means adjacent the bottom of the window opening in the door for engaging the lower sash, and means on the lower sash for engaging the upper sash to move the upper sash downwardly; and means on the bottom of the rolling door adapted to engage the bottom of the lower sash to move it upwardly, and means on the bottom of the lower sash to engage the bottom of the upper sash to move it upwardly.

40. In combination, a rolling door having a window opening, a plurality of sash carrying windows arranged in superimposed relationship for closing said opening when the door is closed, means adjacent the bottom of the window opening in the door for engaging the lower sash, and means on the lower sash for engaging the upper sash to move the upper sash downwardly; and means on the bottom of the rolling door adapted to engage the bottom of the lower sash to move it upwardly, and means on the bottom of the lower sash to engage the bottom of the upper sash to move it upwardly, and parallel guide means for said door and said sash adapted to guide them in parallel planes.

In testimony whereof, I affix my signature.

HUGH COOKE ARMSTRONG.