

No. 774,854.

PATENTED NOV. 15, 1904.

H. C. SMITH & B. C. STICKNEY.

AUTOMATIC WINDOW CLOSER.

APPLICATION FILED JULY 15, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

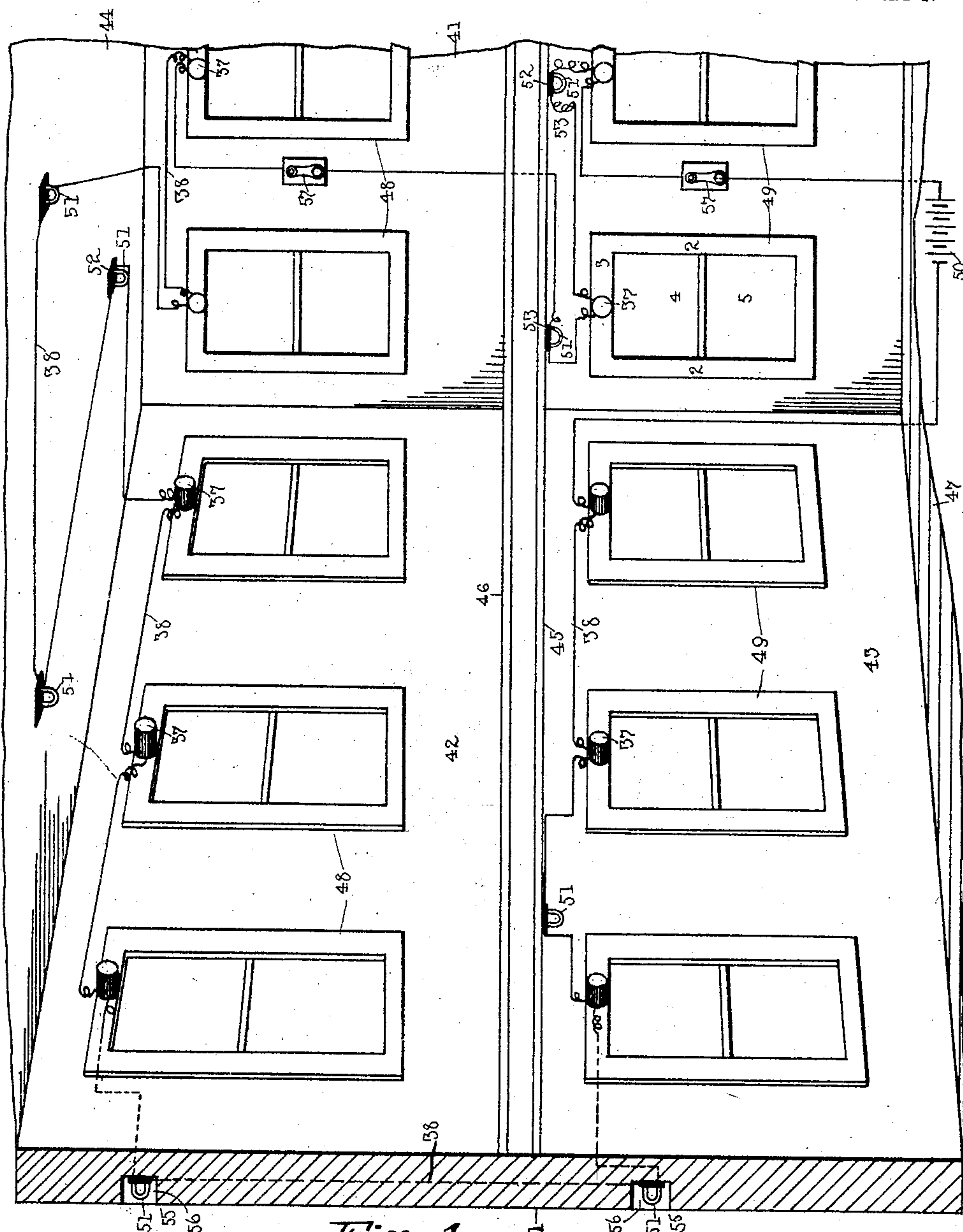


Fig. 1.

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Howard K. Florence

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H. C. Smith  
Burnham C. Stickney

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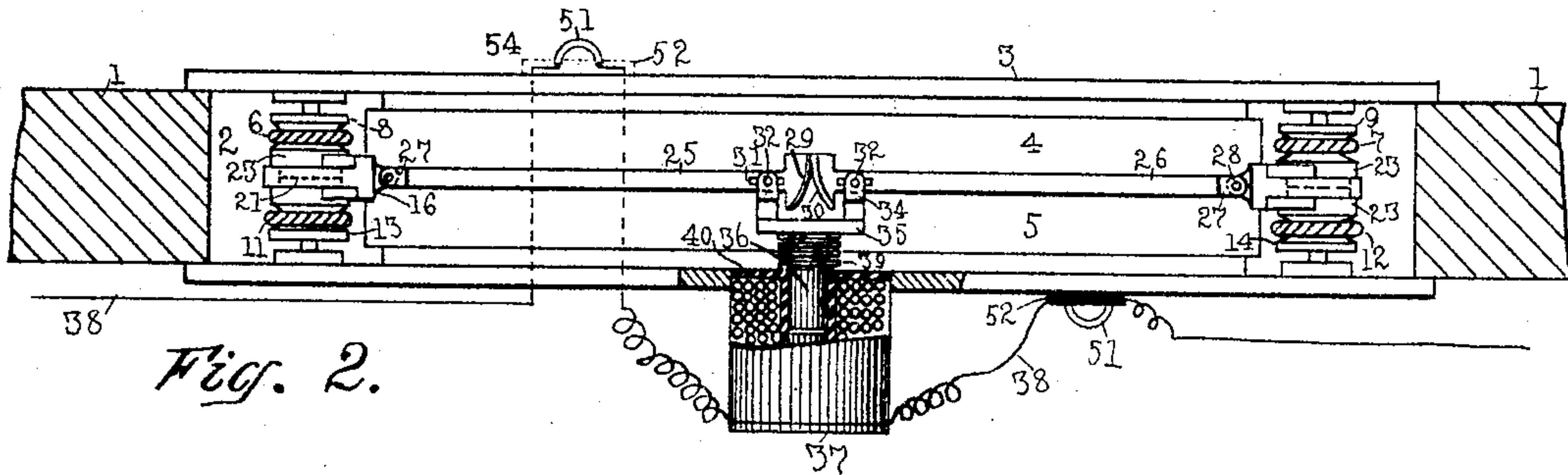


Fig. 2.

Fig. 3.

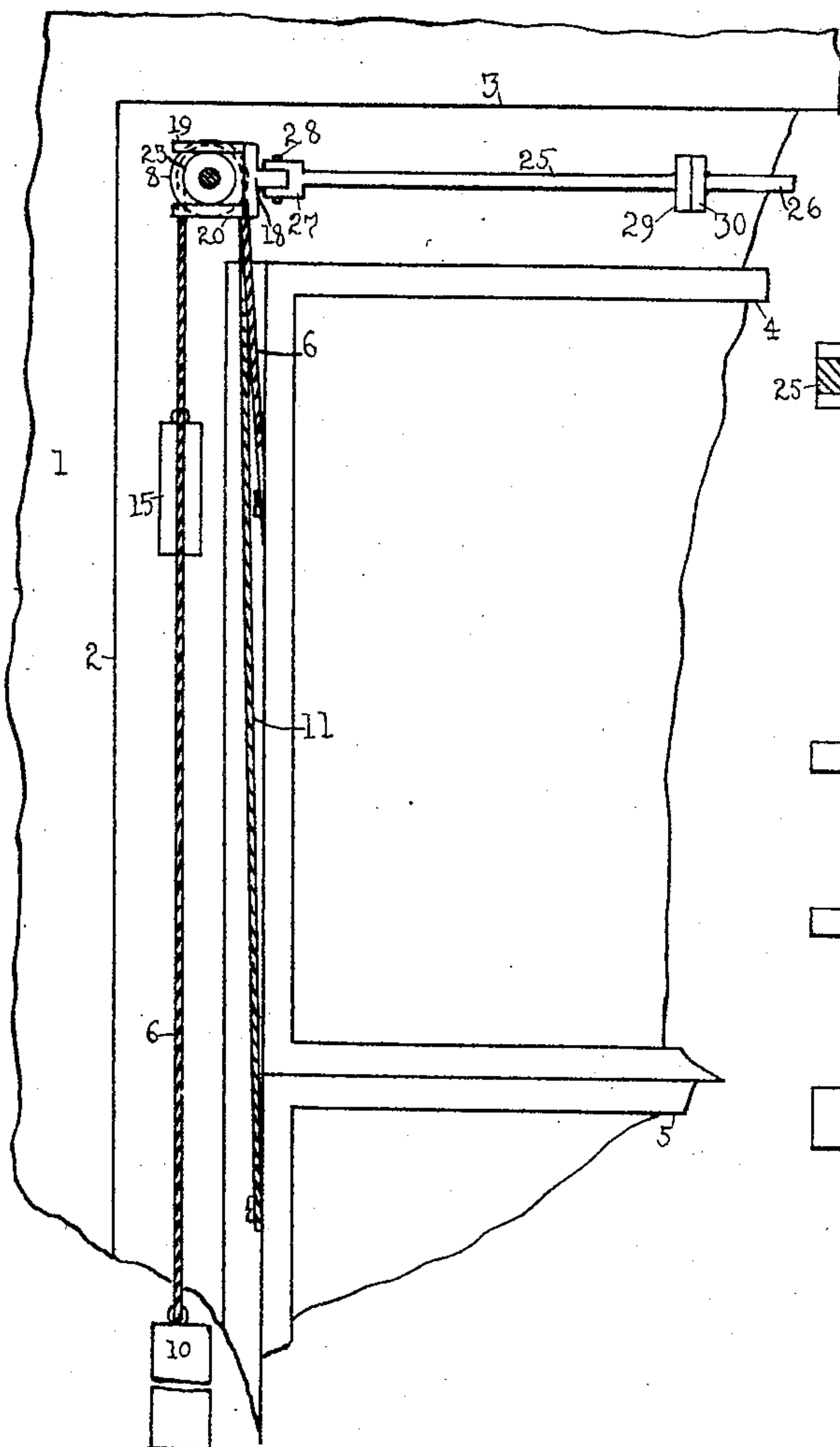


Fig. 4.

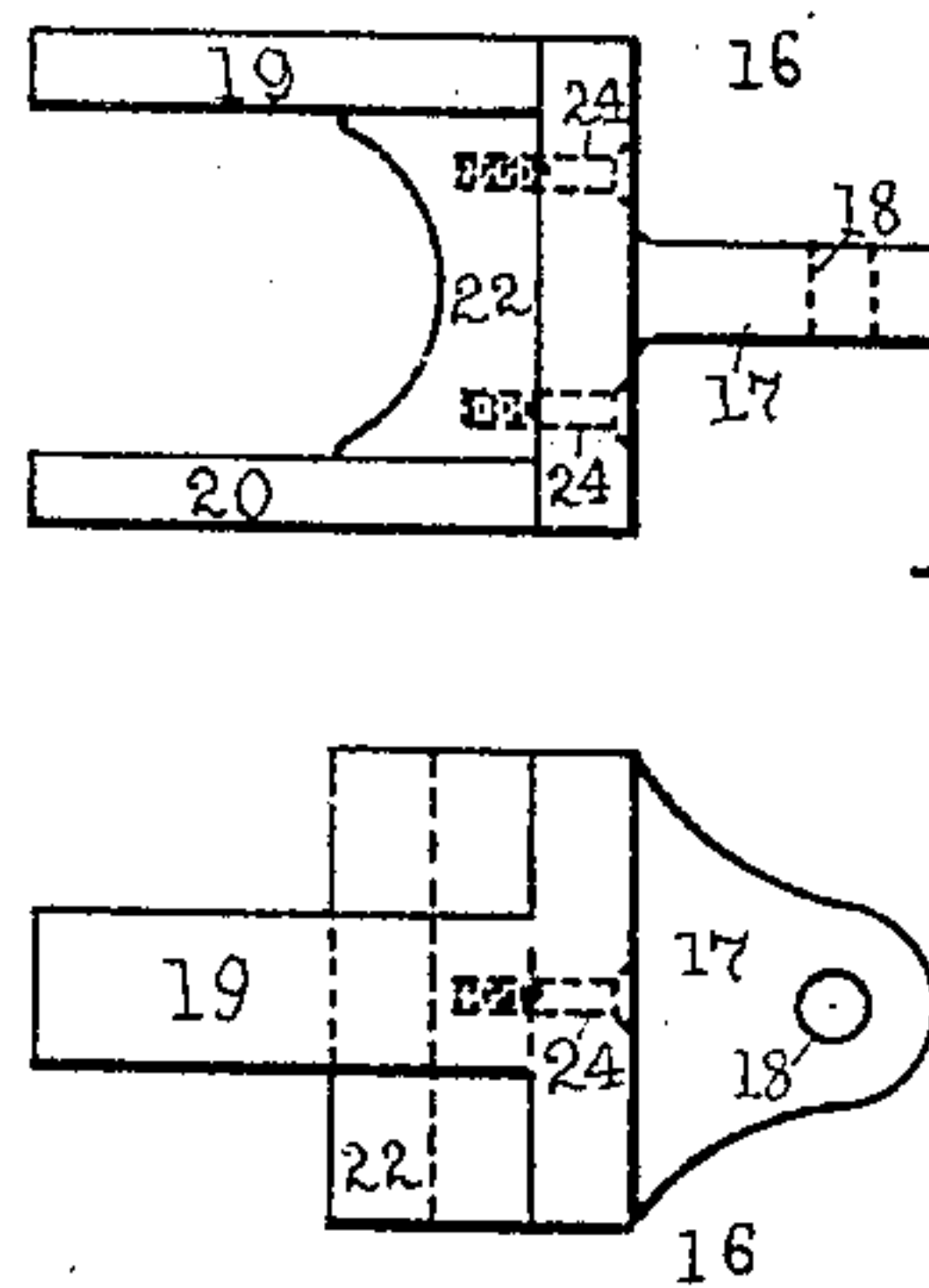
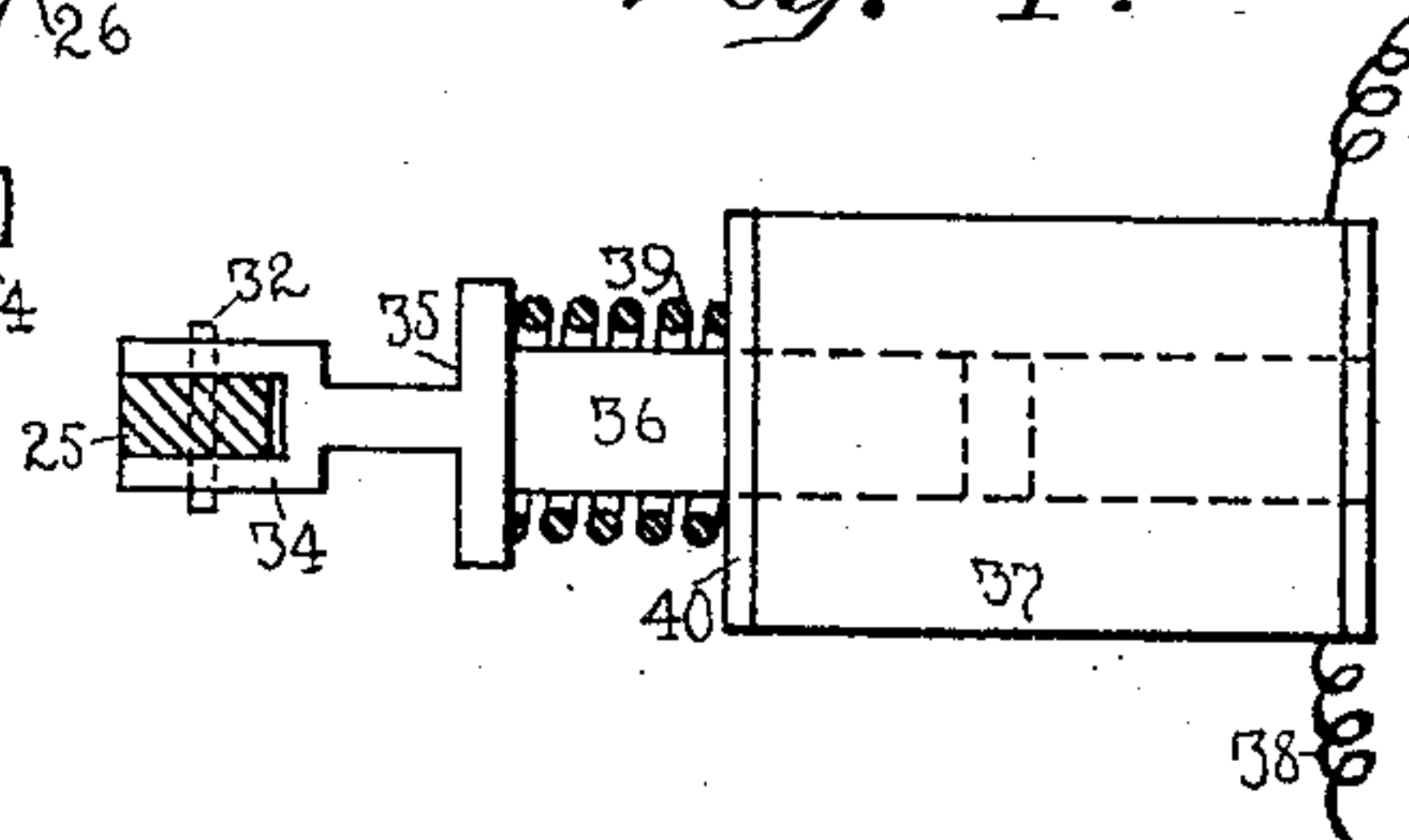


Fig. 5.

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# UNITED STATES PATENT OFFICE.

HENRY COLLIER SMITH, OF NEW YORK, N. Y., AND BURNHAM C. STICKNEY, OF ELIZABETH, NEW JERSEY; SAID STICKNEY ASSIGNOR TO SAID SMITH.

## AUTOMATIC WINDOW-CLOSER.

SPECIFICATION forming part of Letters Patent No. 774,854, dated November 15, 1904.

Application filed July 15, 1903. Serial No. 165,644. (No model.)

*To all whom it may concern:*

Be it known that we, HENRY COLLIER SMITH, a resident of the borough of Manhattan, New York, State of New York, and BURNHAM C. STICKNEY, a resident of Elizabeth, county of Union, State of New Jersey, citizens of the United States, have jointly invented certain new and useful Improvements in Automatic Window-Closers, of which the following is a specification.

This invention relates principally to means for automatically closing windows, doors, scuttles, and the like in case of fire either in or near a building.

Heretofore individual windows have been rendered self-closing by fire in the immediate vicinity; but the present improvements provide for the closing of either one or more windows when the fire is remote therefrom either at the middle of the room or upon another story or upon the opposite side of the building and exterior thereto. Not only windows, but doors and everything closable throughout the building, may be quickly and automatically closed throughout the building whenever a fire occurs in any part thereof, thus preventing the possibility of a draft of air to the flames and materially checking the fire, while fire near a building, whether near a window or remote therefrom, is equally effective in closing the windows, &c. Provision is also made for closing the windows, &c., manually through the same apparatus, whereby the operation of a handle may cause all the windows in a building to close, thus proving a great convenience, besides being an easily-made test of the efficiency of the apparatus.

Other objects and advantages will hereinafter appear.

In the drawings forming part of this specification, Figure 1 is a perspective showing the interior of a building having several stories with several windows in each story and provided with our present improvements in one form thereof. Fig. 2 is a sectional plan showing the window-closing mechanism in the head of a window. Fig. 3 is a fragmentary sectional elevation illustrating means for con-

trolling the sash movements. Fig. 4 is a detail of a solenoid and its connections used for controlling the sashes. Fig. 5 shows side elevation and plan of a brake used for adjacent sash-pulleys, whereby normally the windows are prevented from closing.

In the several views like parts are identified by like signs.

Referring to Figs. 2 to 5, inclusive, 1 designates a side wall of a building; 2, the stile of a window-frame; 3, the head thereof, and 4 and 5 the upper and lower sliding sashes, respectively, mounted in said frame. The upper sash is provided at its sides with cables or flexible connections 6 and 7, running over pulleys 8 and 9 and attached to counterbalances 10, which are heavy in disproportion to the sash, so as to be capable of pulling the same up to the top of the window. The lower sash 5 is provided with cables 11 and 12, running over the pulleys 13 and 14, and attached to inferior counterbalancing - weights 15, whereby said sash may drop and carry up said weights. At each side of the window its head contains a brake 16, comprising a head 17, having a perforation 18, and upper and lower prongs 19 and 20, projecting from said head and forming a fork which bestrides hubs 21, projecting from adjoining faces of the pulleys and contiguous to each other, whereby the brake is supported and guided. The brake also comprises a transverse shoe 22, projecting from both sides of the head and curved to fit friction rims or treads 23, formed upon the pulleys. The shoes may be formed separately from the heads and attached thereto by screws 24. The perforation 18, which forms the point from which the brake is actuated, is located centrally of the brake in line with the prongs and between the pulley-treads, so that by pressure applied at said point 18 the shoe may be caused to bear evenly upon the pulleys. Rods 25 and 26 are forked at their outer ends at 27 to receive said heads 17, being connected thereto by pivots 28, and at their inner ends are formed with coacting rockers or knuckles 29 and 30, forming a toggle, whereby the rods may be thrust outwardly to set the brakes.



At its inner end each rod has a longitudinal slot 31, and these slots are engaged by pins 32, formed upon a double yoke, each member of said yoke being formed with a fork 34 for receiving the rod. The head 35 of the yoke is fixed to the outer end of a core 36 of a solenoid 37, forming part of an electric circuit 38, whereby when the coil is energized the core is drawn into the coil, thereby through the yoke 33 pulling the rods toward the solenoid and by means of the knuckle action causing the rods to thrust endwise to set the brakes. The circuit being constantly closed, the brakes are caused to bear upon the pulley-treads with a pressure that is even for all the pulleys. A compression-spring 39, coiled about the core between the yoke-head and the frame 40 of the solenoid, serves to oppose the action of the solenoid and to release the brakes when the circuit is broken. The window frame and sashes may be of fireproof construction, and the glass may have wire embedded therein.

At Fig. 1 is illustrated a building whereof are seen the side and front walls 1 and 41, the building having two stories 42 and 43, whose ceilings are designated as 44 and 45 and floors as 46 and 47, respectively. Each wall in the upper story 42 is provided with a plurality of windows 48 and each wall in the lower story with windows 49. At the head of each window is seen a solenoid 37, all of the solenoids being included in the circuit 38, which includes a battery or other source of energy 50 and is normally closed. By this means all of the brakes are kept constantly set, so that enough frictional opposition is produced to the movements of the pulleys and sashes to enable any sash to remain at any position to which it may be slid, notwithstanding the disproportion of its counterbalances. When, however, there is an interruption of the circuit, all of the coils 37 are deenergized and by the springs 39 all of the brakes are released, thereby closing all the windows. This failure of the circuit may arise because of fire or from unforeseen causes; but a maximum of safety is assured, because preferably the electric current is not depended upon for closing the windows, but for enabling them to remain open, and in case of failure of the current from any cause no harm is done and no danger incurred. In the circuit is included a series of loops 51, made of material fusible at low temperature—that is, at about  $140^{\circ}$ , more or less—and capable of conducting an electric current—as, for instance, certain kinds of solder. The loops are placed remote from one another and in series in the circuit, and each is attached at its ends to the adjoining ends of consecutive lengths of wire forming the circuit and is preferably supported upon a base 52, of insulating material, whereby it may be attached to wall, ceiling, window-frame, or other part. At the upper part of

Fig. 1 the fuses are seen placed remote from one another and remote from the windows, and it will be understood that the presence of sufficient heat in the vicinity of any one fuse to cause its softening and rupture enables the circuit to be broken and all the windows on both stories to be closed, even though the other fuses are not affected by the heat. Thus should a fire start in the center of the room the windows would close and by cutting off the supply of air would check the progress of the blaze. The fuses may be placed directly over each window, as seen at the lower right-hand part of Fig. 1 at 53, so that if by chance an outside fire should enter through an open window it would by melting the fuse break the circuit and cause not only that window but also all the windows in the building to close, and the invention also includes the closing of doors, scuttles, and other apertures by the same circuit. At Fig. 2 is illustrated at 54 how a fuse may be included in the circuit and disposed outside the window either upon the head or sill of the same, and at Fig. 1 at 55 are shown fuses placed in niches in the walls remote from any window, the niches protecting the devices from the weather and the provision of fuses exterior to the building at points remote from the windows being an important advantage. Upon each story is provided a circuit-breaking switch 57, whereby the circuit may be broken at any time to test the apparatus. Upon closing the switch the coils are reenergized and all the brakes again set. It will be perceived that a switch may be placed in the office of the superintendent of a building, whereby he may close all of the windows in the building each night, this being a great convenience. It will be observed that at each window an electromagnetic device is common to both brakes for controlling them and preventing normally the closing of the sashes or rendering the sash-closing means ineffective, that thermotic means placed at one window effect the closing of all the windows in the building, whether upon the same or another story, that at Fig. 1 the fuses are shown located near the ceiling at points remote one from another, and that means are provided for closing all the windows either manually by operating the switch or automatically by the action of undue heat upon a fuse. By the use of the term "window" or the term "sash" in the claims we mean to include equivalent devices—such as doors, shutters, scuttles, &c., which are intended for constant employment in these capacities—that is, which may be and usually are closed and opened at will and which sometimes stand partly open or wide open or just ajar—and it will be seen that the windows or equivalent devices are constantly under the control of the thermotic closing appliances at all positions to which they may be opened or adjusted.



Variations may be resorted to within the scope of our invention—as, for instance, use may be made of a circuit that is not closed—and other thermotic means may be used, particularly in connection with an electric current.

Portions of our improvements may be used without others.

Having thus described our invention, we claim—

10 1. The combination with a window adjustable at will to any desired position and means tending constantly to close the same, of an electromagnetic device constantly effective to oppose the window-closing movement at all positions to which the window may be adjusted, and to maintain the window in any adjusted position.

20 2. In a window, the combination with a pair of sashes which when open tend constantly to close, said sashes being adjustable independently of one another to any desired position, of a single electromagnetic device which is constantly effective to oppose the sash-closing movements and maintain the sashes in any position to which they may be adjusted.

30 3. In a window, the combination with a sliding sash, adjustable at will to any desired position, of a disproportionate counterbalance tending constantly to close the sash, and means, including an electromagnetic device, controlling said sash and counterbalance at all positions to which they may be adjusted and effective to maintain the sash at any position to which it may be adjusted.

35 4. The combination of a sash which is so mounted that it may be opened to different positions or closed at will, of means inclusive of a disproportionate counterbalance for causing said sash to close from any position to which it may be opened, and an electromagnetic device controlling said closing means.

40 5. The combination with a plurality of windows each having a sash, the several sashes being each adjustable independently of the others to various positions at will, of means including disproportionate counterbalances for causing all of said sashes to close from any positions to which they may have been opened, and an electric circuit including means for controlling said closing means.

45 6. The combination with a plurality of windows each having a plurality of sashes, each sash being adjustable at will to different positions independently of the other sashes, of means including disproportionate counterbalances for causing all of said sashes to close from any positions to which they may have been opened, and an electric circuit including means controlling said closing means; each sash being provided with means normally effective to retain it in any position to which it may be adjusted.

50 7. The combination with a plurality of windows, each provided with a sash and a counterbalance, of an electric circuit including means

for controlling all of said counterbalances at all positions to which said sashes may be opened; each of said sashes being adjustable independently of the others to various open positions.

70 8. The combination with a plurality of windows, one provided with a window-sash and sash-closing means, said sash being adjustable to different positions and provided with automatically-operating means for holding it stationary in any position to which it may be adjusted, of thermotic means at another window for effecting the closing of said sash from any position to which it may have been opened.

80 9. The combination with a plurality of windows provided with sashes and sash-closing means, each sash being adjustable independently of the others to different positions, and each sash being also provided with automatically-operating means for holding it stationary in any position to which it may be adjusted, of thermotic means at one window for effecting the closing of all of said sashes from any positions to which they may have been opened.

90 10. The combination with a plurality of windows, provided with sashes and sash-closing means, each sash being adjustable independently of the others to different positions, and each sash being also provided with automatically-operating means for holding it stationary in any position to which it may be adjusted, of thermotic means at each window for effecting the closing of all of said sashes from any positions to which they may have been opened.

100 11. The combination with a plurality of windows, provided with sashes and sash-closing means, each sash being adjustable independently of the others to different positions, and each sash being also provided with automatically-operating means for holding it stationary in any position to which it may be adjusted, of thermotic means for effecting the closing of all of the sashes simultaneously from any positions to which they may have been opened.

110 12. The combination with a plurality of windows, one having a movable sash and sash-closing means, of thermotic means exterior to another window for closing said sash from any position to which it may be opened, said sash being provided with means normally effective to maintain it in any position to which it may be adjusted.

120 13. The combination with a plurality of windows, each having a movable sash and sash-closing means, of thermotic means exterior to each window effective to close all of the sashes at all of the windows; each sash being provided with means normally effective to maintain it in any position to which it may be adjusted.

125 14. In a building having a plurality of windows, each having a sash movable at will to any desired position independently of the sashes in the other windows, means, including thermotic devices set at different points 130



upon the exterior of the building, for closing all of the sashes simultaneously from any positions to which they may have been opened; each sash being provided with means normally effective to maintain it in any position to which it may be opened.

15. The combination with a plurality of windows, each having a sash movable at will to any desired position independently of the sashes in the other windows, of means, including thermotic devices mounted both exteriorly and interiorly of the windows, for closing all of the sashes simultaneously from any positions to which they may have been opened; each sash being provided with means normally effective to maintain it in any position to which it may be opened.

16. The combination with a window provided with a vertically-sliding sash, said sash being adjustable at will to any desired position, of means, including a thermotic device placed at the upper portion of the room and remote from said window, for closing said sash from any position to which it may have been opened; said sash being provided with means normally effective to maintain it in any position to which it may be opened.

17. The combination with a set of windows, each provided with a pair of vertically-sliding sashes, each sash adjustable at will independently of the others to any desired position, of means, including a thermotic device placed near the ceiling of the room and remote from said windows, for closing all of said sashes from any positions to which they may have been opened; said sashes each being provided with means normally effective to maintain it in any position to which it may be opened.

18. The combination with a set of windows, each provided with a vertically-sliding sash, said sash being adjustable at will to any desired position, and sash-closing means of a plurality of thermotic devices placed near the ceiling of the room and remote from one another and also remote from the windows, and means for enabling the heating of any one of said thermotic devices to close all the windows; each sash being adjustable independently of the others and provided with means normally effective to maintain it in any position to which it may be opened.

19. The combination with a window having a vertically-sliding sash, said sash being adjustable at will to any desired position, and sash-closing means, of a thermotic device placed without the window, a thermotic device placed at the upper portion of the room and remote from said window, and means for enabling the moderate heating of either of said thermotic devices to close said sash from any position to which it may be opened; said sash being provided with means normally effective to maintain it in any position to which it may be opened.

20. The combination with a plurality of win-

dows each having a pair of vertically-sliding sashes, each sash being adjustable at will to any desired position independently of the other sashes, and sash-closing means, of thermotic devices placed without the windows, thermotic devices placed at the upper portion of the room remote from one another and from said windows, and means for enabling the moderate heating of any of said thermotic devices to close all of said sashes simultaneously from any positions to which they may have been opened; each sash being provided with means normally effective to maintain it in any position to which it may be opened.

21. In a building having a plurality of stories, and a plurality of windows in each story, each window being provided with a sliding sash, each sash being adjustable at will to any desired position independently of the other sashes, and sash-closing means, the combination with thermotic devices placed exteriorly of the windows in one story, of means for enabling the moderate heating of any of said thermotic devices to close the sashes in both stories; each sash being provided with means normally effective to maintain it in any position to which it may be opened.

22. In a building having a plurality of stories, and a plurality of windows in each story, each window being provided with a sliding sash, each sash being adjustable at will to any desired position independently of the other sashes, and sash-closing means, the combination of thermotic devices placed remote from one another near the ceiling in each story, and means for enabling the moderate heating of any of said thermotic devices to effect the closing of all the sashes in all the stories from any positions to which they may have been opened; each sash being provided with means normally effective to maintain it in any position to which it may be opened.

23. In a building having a plurality of stories and a plurality of windows in each story, each window being provided with a vertically-sliding sash, each sash being adjustable at will to any desired position independently of the other sashes, and sash-closing means, the combination of thermotic devices placed remote from one another exteriorly of the building, thermotic devices placed remote from one another near the ceiling in each story, and means for enabling the moderate heating of any of said thermotic devices to effect the closing of all the sashes in all the stories; each sash being provided with means normally effective to maintain it in any position to which it may be opened.

24. The combination with a window having a sash movable at will to various open positions, and sash-closing means, of an electric circuit including a thermotic device, and also including means for effecting the closing of said sash from any position to which it may be opened.



25. The combination with a window having a sash movable at will to various open positions and provided with means tending constantly to effect the closing of said sash, at all open positions of the latter, of an electric circuit including a part fusible at moderate temperature, and also including an electromagnetic device for rendering said closing means ineffective.

26. The combination with a pair of sliding sashes, each movable at will independently of the other to various open positions, means being provided whereby each sash tends constantly to close, of an electric circuit including a single electromagnetic device for controlling both of said sashes, and also including a thermotic device which is effective at moderate temperature to effect such operation of said magnetic device as to cause both sashes to close from any position to which they may have been opened.

27. The combination with a sliding sash, of a counterbalance for closing the same, and a closed electric circuit including a part fusible at low temperature and also including an electromagnetic device effective at all positions to which said sash may be opened, for preventing the closing of the sash by the counterbalance.

28. The combination with a vertically-sliding sash and a disproportionate counterbalance therefor, of an electric circuit including a thermotic device operable at moderate temperature and also including a device normally effective to maintain said sash at all positions to which it may be opened.

29. The combination with a sash of means, including a disproportionate counterbalance, for causing the sash to close, electromagnetic means for maintaining the sash in its different open positions, and an electric circuit including said electromagnetic means and also including a thermotic device effective at moderate temperature to release said sash from any position to which it may have been opened.

30. The combination with a plurality of windows each having a vertically-sliding sash, of sash-closing means, including disproportionate counterbalances, and an electric circuit including means for maintaining all of the sashes in the different positions to which they may have been opened, and also including a plurality of thermotic devices effective at moderate temperature to release the sashes.

31. The combination with a plurality of windows, each provided with a vertically-sliding sash and means for closing the sash, of an electric circuit including at each window both a thermotic device and means for controlling said sash-closing means; each sash being provided with means normally effective to maintain it in any position to which it is opened, and being adjustable at will to any desired position.

32. The combination with a plurality of windows, each provided with a vertically-sliding

sash, and each sash being adjustable at will independently of the others to any desired position, of means for closing the sashes from any positions to which they may have been opened, and an electric circuit including at each window thermotic devices in series upon both the exterior and interior of the window, and also including at each window means controlling said sash-closing means; each sash being provided with means effective to maintain it in any position to which it may be opened.

33. In a building having a plurality of stories, and a plurality of windows in each story, the combination with vertically-sliding sashes in the windows, each sash being adjustable at will independently of the others to any desired position, of means for closing the sashes from any positions to which they may have been opened, and an electric circuit including thermotic devices placed exteriorly of the windows in one story, and also including at each window in both stories means for controlling said sash-closing means.

34. In a building having a plurality of stories and a plurality of windows in each story, each window being provided with a pair of sliding sashes and each sash being adjustable at will to any desired extent independently of the other sashes, of means for closing the sashes from any positions to which they may have been opened, and an electric circuit including thermotic devices placed remote one from another exteriorly of the building, and also including thermotic devices placed remote one from another near the ceiling in each story, and also including means at each window in each story for controlling said sash-closing means; each sash being provided with means normally effective to maintain it in any position to which it may be opened.

35. The combination with a plurality of windows, each provided with a vertically-sliding sash, each sash being adjustable at will independently of the others to any desired position, of means operable either manually or automatically for closing all of the sashes from any positions to which they may have been opened; each sash being provided with means normally effective to maintain it in any position to which it may have been opened.

36. The combination with a plurality of windows, each provided with a vertically-sliding sash, each sash being adjustable at will to any desired extent independently of the other sashes, of means for closing the sashes from any positions to which they may have been opened, and an electric circuit provided with a circuit-breaking switch and including a series of thermotic devices and also including at each window means for controlling said closing means; each sash being provided with means normally under the control of said circuit and effective to maintain the sash in any position to which it may be opened.

37. The combination with a disproportion-



ately-counterbalanced window-sash, of a brake therefor, and an electromagnetic device for controlling said brake.

38. The combination with a pair of disproportionately-counterbalanced window-sashes, of a brake for each of said sashes, and an electromagnetic device common to said brakes for controlling the same.

39. The combination with a disproportionately-counterbalanced window-sash, of a brake therefor, and an electromagnetic device which when the current is on moves the brake to effective position.

40. The combination with a disproportionately-counterbalanced window-sash, of a pair of brakes therefor, and an electromagnetic device common to said brakes for controlling the same.

41. The combination with a pair of disproportionately-counterbalanced sliding window-sashes, of a pair of brakes for each of said sashes, and an electromagnetic device common to all of said brakes for controlling the same.

42. The combination with a window-sash, of disproportionately-counterbalancing means therefor including a flexible connection and a pair of pulleys, a brake for each pulley, and an electromagnetic device for controlling the brakes.

43. The combination with a pair of window-sashes, of disproportionately-counterbalancing means therefor including weights, pulleys and flexible connections, brakes for all of said pulleys, and an electromagnetic device common to all of said brakes for controlling the same.

44. The combination with a pair of window-sashes, of disproportionately-counterbalancing means for each sash, including flexible connections and a pair of pulleys over which said connections run, a pair of brakes, each whereof is adapted to control two pulleys, one pulley for each sash, and a single electromagnetic device for said pair of brakes for controlling the same.

45. The combination with a window-sash, of a pulley at each side thereof, a flexible connection extending from the sash over each pulley, disproportionate counterbalancing means attached to said connections, a brake at each pulley, a pair of rods pivoted to said brakes and forming a toggle, and means for operating said toggle to apply the brakes.

46. The combination with a window-frame, of a pair of sliding sashes mounted therein, a pulley at each side of each sash, flexible sash connections extending over the pulleys, and disproportionate counterbalances attached to said connections, a brake at each side of the window and constructed and mounted to bear with substantial evenness upon the two pulleys there located, a pair of rods pivoted to said brakes and forming a toggle, and means for operating said toggle to apply the brakes.

47. The combination with a disproportion-

ately-counterbalanced window-sash, of a brake therefor, and an electric circuit including a solenoid for applying said brake.

48. The combination with a pair of disproportionately-counterbalanced window-sashes, of a brake for each of said sashes, and an electric circuit including a solenoid provided with means for applying both of said brakes.

49. The combination with a pair of disproportionately-counterbalanced window-sashes, of a pair of brakes for each of said sashes, and an electric circuit including a solenoid provided with means for applying all of said brakes.

50. The combination with a window-sash, of a pulley at each side thereof, a flexible connection extending from the sash over each pulley, disproportionate counterbalancing means attached to said connections, a brake at each pulley, a pair of rods pivoted to said brakes and forming a toggle, and an electric circuit including a solenoid provided with means for operating said toggle.

51. The combination with a window-frame, of a pair of sliding sashes mounted therein, a pulley at each side of each sash, flexible sash connections extending over the pulleys, disproportionate counterbalances attached to said connections, a brake at each side of the window and constructed and mounted to bear upon the two pulleys there located, a pair of rods pivoted to said brakes and forming a toggle, and an electric circuit including a solenoid provided with means for operating said toggle to set the brakes.

52. The combination with a sash of an electrically-controlled disproportionate counterbalance therefor.

53. The combination with a plurality of windows each provided with a pair of sliding sashes and counterbalancing means therefor, each sash being adjustable at will independently of the others to any desired position, of an electric circuit including a single electromagnetic device at each window for controlling all the counterbalances there located.

54. The combination with a plurality of windows, each having a disproportionately-counterbalanced window-sash, of a brake for each sash, and an electric circuit including electromagnetic means at each window for controlling its brake.

55. The combination with a plurality of windows, each having a pair of disproportionately-counterbalanced window-sashes, of a brake for each sash, and an electric circuit normally closed and including means for setting all the brakes.

56. The combination with a plurality of windows, each having a disproportionately-counterbalanced sash mounted for sliding movement, of a brake for each sash, and a closed electric circuit provided with a circuit-breaking switch and including electromagnetic means at each window for applying the brakes.



57. The combination with a plurality of windows, each having a disproportionately-counterbalanced window-sash, of a brake for each sash, and an electric circuit including electromagnetic means at each window for controlling its brakes, and also including a plurality of thermotic devices effective at low temperature and remote one from another.

58. The combination with a plurality of windows, each having a pair of disproportionately-counterbalanced sashes mounted for sliding movement, of a brake for each sash, and a closed electric circuit including electromagnetic devices at each window for applying the brakes, and also including a plurality of fusible devices effective at low temperature and remote one from another.

59. The combination with a window-sash, of disproportionate counterbalancing means therefor including a cable and a pair of pulleys, a brake for each pulley, and an electric circuit including a device for controlling said brakes and also including in series a plurality of fusible devices effective at low temperature.

60. The combination with a pair of window-sashes, of disproportionate counterbalancing means therefor including weights, pulleys and cables, brakes for said pulleys, and an electric circuit including an electromagnetic device common to all of said brakes for controlling the same, and also including in series a plurality of thermotic devices effective at low temperature.

61. The combination with a plurality of windows, each provided with a disproportionately-counterbalanced sash, of a brake for each sash, and an electric circuit including a solenoid at each window provided with means for controlling the brake, and also including a series of thermotic devices effective at low temperature.

62. The combination with a plurality of windows, each provided with a pair of disproportionately-counterbalanced sashes, of a brake for each sash, and a closed electric circuit including a single solenoid at each window provided with means for setting all the brakes there located, and also including a series of devices fusible at low temperature.

63. The combination with a window-sash, of a pulley at each side thereof, a cable extending from the sash over each pulley, disproportionate counterbalancing means attached to said cables, a brake at each pulley, a pair of rods connected to said brakes and forming a toggle, and an electric circuit including a solenoid provided with means for operating said toggle, and also including a series of thermotic devices effective at low temperature.

64. In a building having a plurality of stories, and a plurality of windows in each story, the combination with sashes in the windows of an electric circuit including thermotic devices placed exteriorly of the windows in one story, and also including sash-closing means at the windows in both stories.

65. In a building having a plurality of stories and a plurality of windows in each story, an electric circuit including thermotic devices placed remote one from another exteriorly of the building, and thermotic devices placed remote one from another near the ceiling in each story, and window-closing devices at all the windows in all the stories.

Signed at New York, N. Y., this 13th day of July, 1903.

H. COLLIER SMITH.

BURNHAM C. STICKNEY.

Witnesses:

J. R. FRITH,

HOWARD N. FLORANCE.