March 4, 1930. C. F. WOLTERS ET AL 1,749,203

APPARATUS FOR AUTOMATICALLY CLOSING AND LOCKING SAFE DOORS

Filed March 5, 1925 8 Sheets-Sheet 1

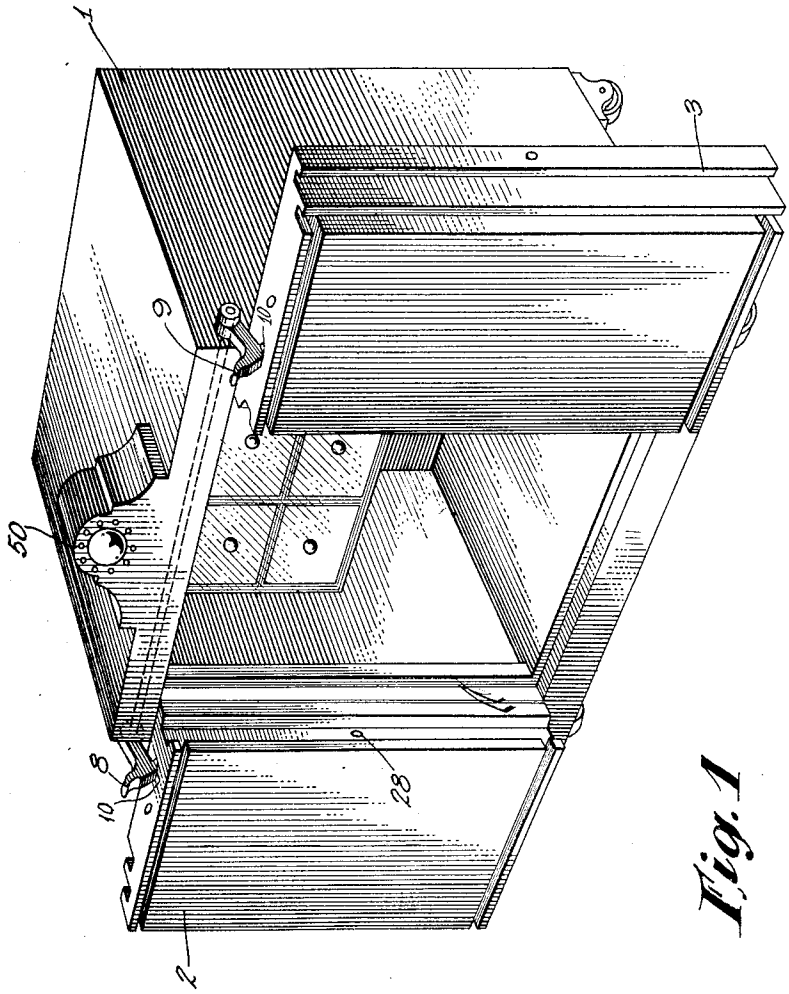


Fig. 1

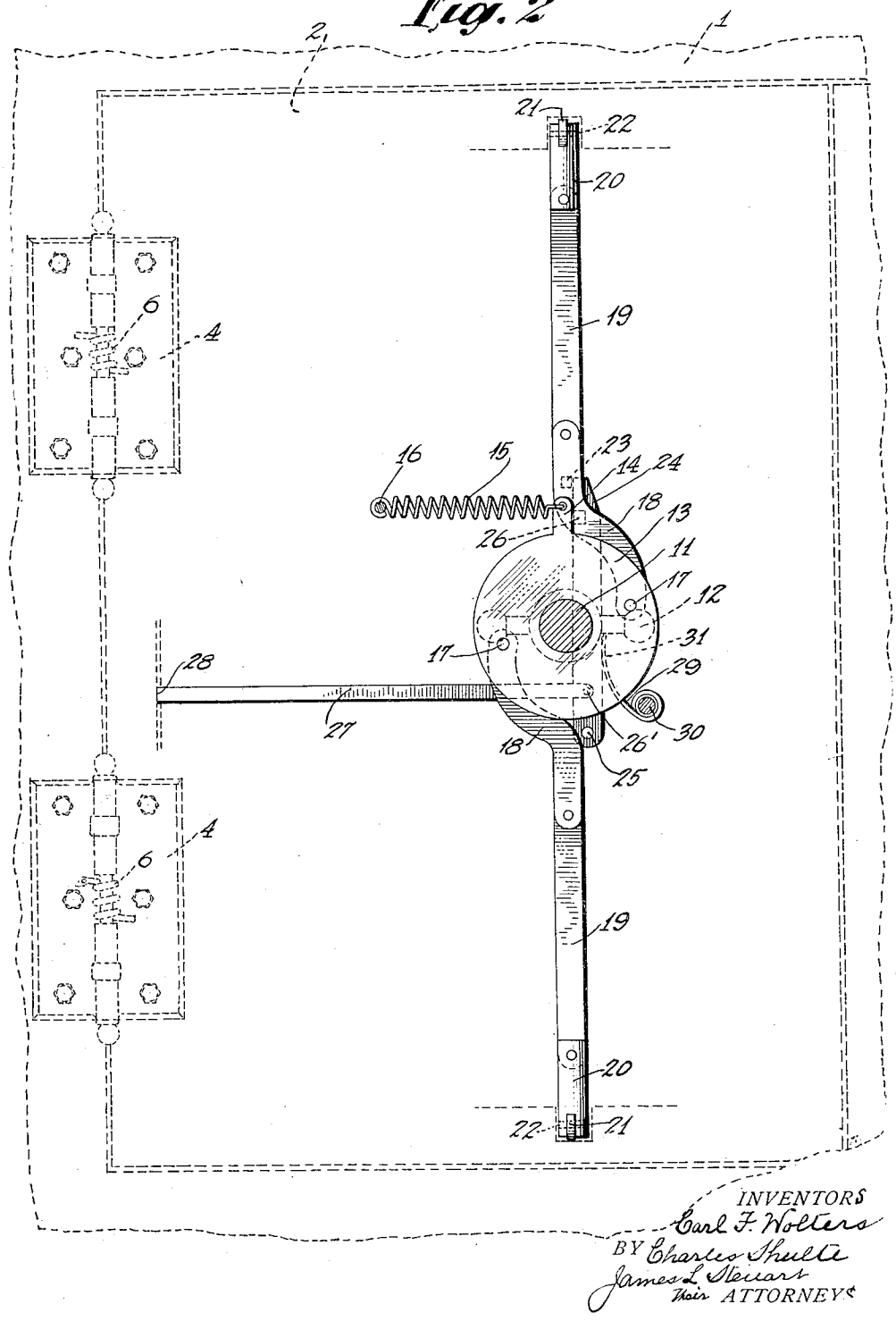
INVENTORS
Carl F. Wolters
Charles Shuette
By James L. Stewart
Their ATTORNEYS.

March 4, 1930. C. F. WOLTERS ET AL 1,749,203

APPARATUS FOR AUTOMATICALLY CLOSING AND LOCKING SAFE DOORS

Filed March 5, 1925 8 Sheets-Sheet 2

Fig. 2



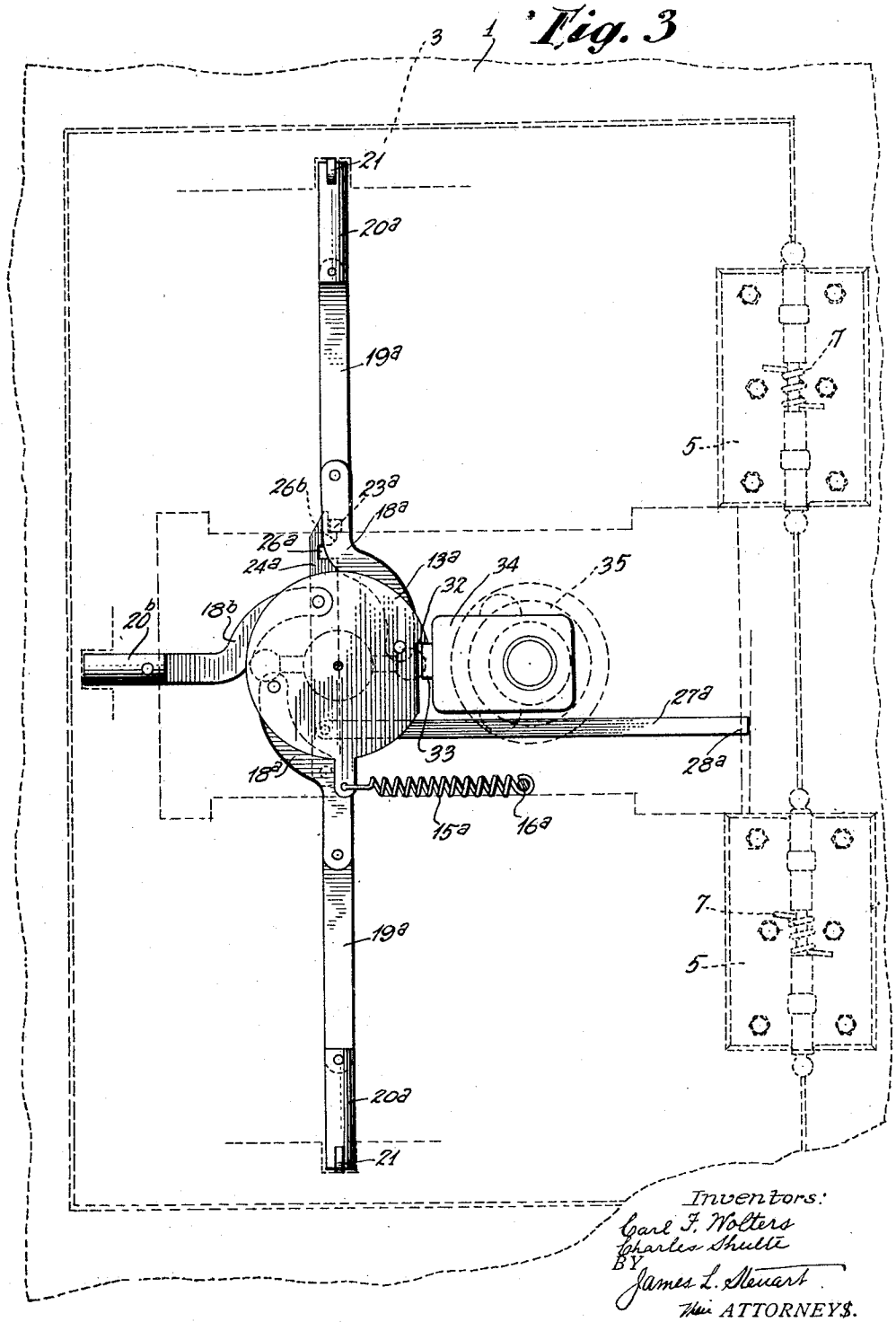
INVENTORS
Carl F. Wolters
BY Charles Shultz
James L. Stewart
Their ATTORNEYS

March 4, 1930. C. F. WOLTERS ET AL 1,749,203

APPARATUS FOR AUTOMATICALLY CLOSING AND LOCKING SAFE DOORS

Filed March 5, 1925 8 Sheets-Sheet 3

Fig. 3



Inventors:
Carl F. Wolters
Charles Shultz
BY
James L. Stewart
Their ATTORNEYS.

March 4, 1930. C. F. WOLTERS ET AL 1,749,203

APPARATUS FOR AUTOMATICALLY CLOSING AND LOCKING SAFE DOORS

Filed March 5, 1925 8 Sheets-Sheet 4

Fig. 4

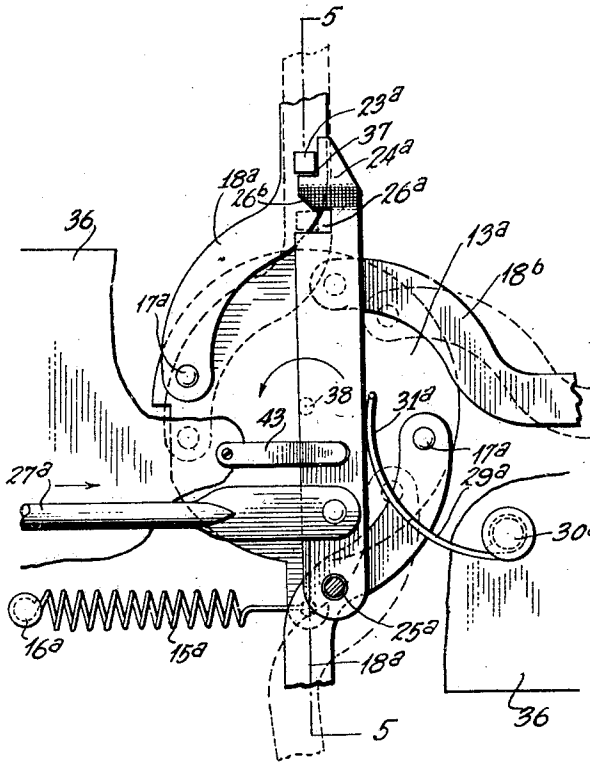


Fig. 5

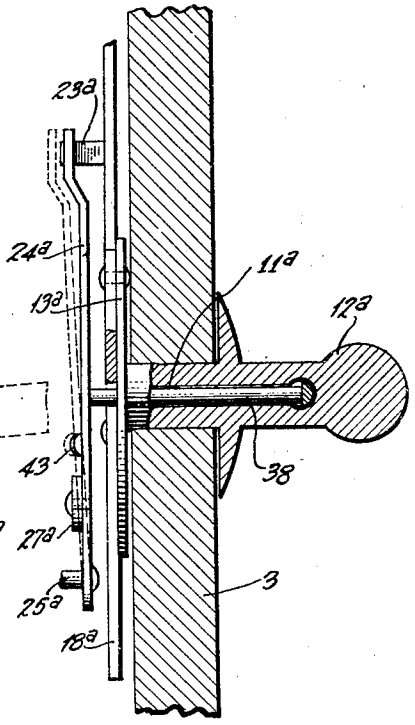
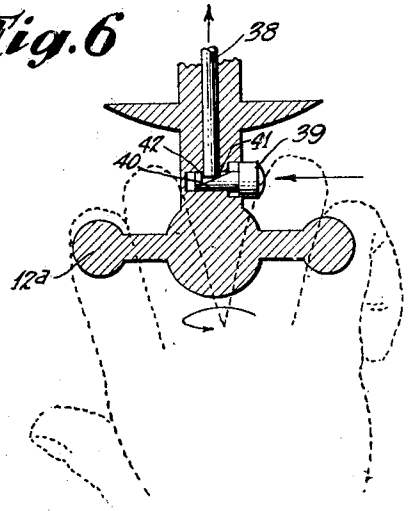


Fig. 6



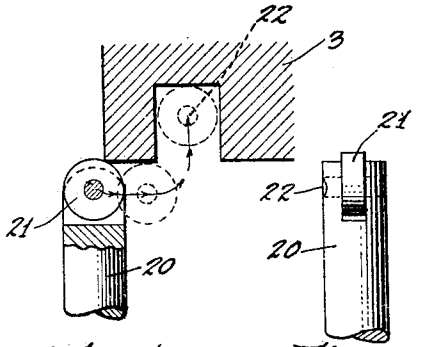


Fig. 7

Fig. 8

Inventors:
Carl F. Wolters
Charles Shuette
BY
James L. Stewart
Their ATTORNEYS.

March 4, 1930. C. F. WOLTERS ET AL 1,749,203

APPARATUS FOR AUTOMATICALLY CLOSING AND LOCKING SAFE DOORS

Filed March 5, 1925 8 Sheets-Sheet 5

Fig. 10

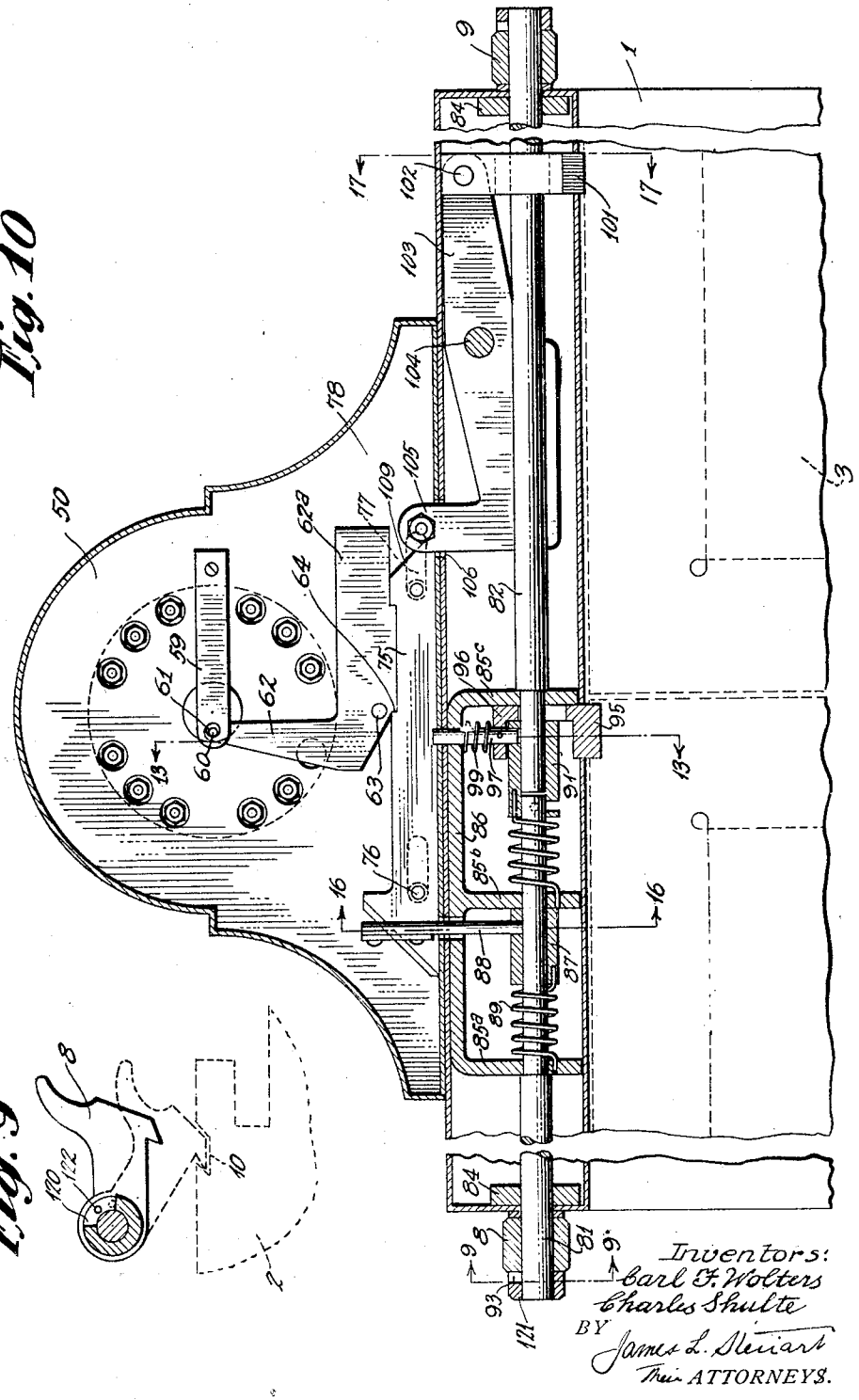


Fig. 9

Inventors:
Carl F. Wolters
Charles Shulte
BY
James L. Stewart
Their ATTORNEYS.

March 4, 1930. C. F. WOLTERS ET AL 1,749,203

APPARATUS FOR AUTOMATICALLY CLOSING AND LOCKING SAFE DOORS

Filed March 5, 1925 8 Sheets-Sheet 6

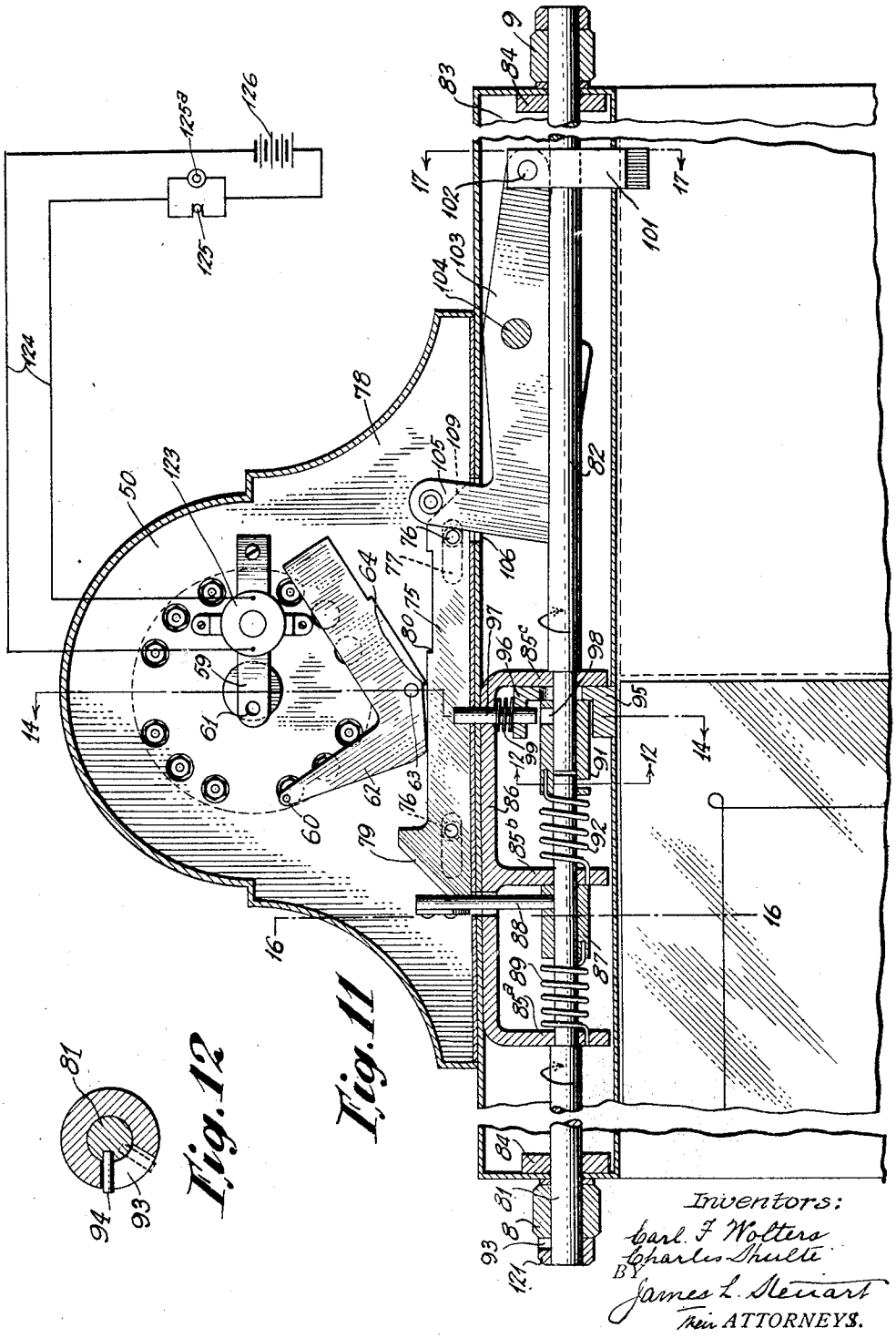


Fig. 11

Fig. 12

Inventors:
Carl F. Wolters
Charles Shultz
BY James L. Stewart
Their ATTORNEYS.

March 4, 1930. C. F. WOLTERS ET AL 1,749,203

APPARATUS FOR AUTOMATICALLY CLOSING AND LOCKING SAFE DOORS

Filed March 5, 1925 8 Sheets-Sheet 7

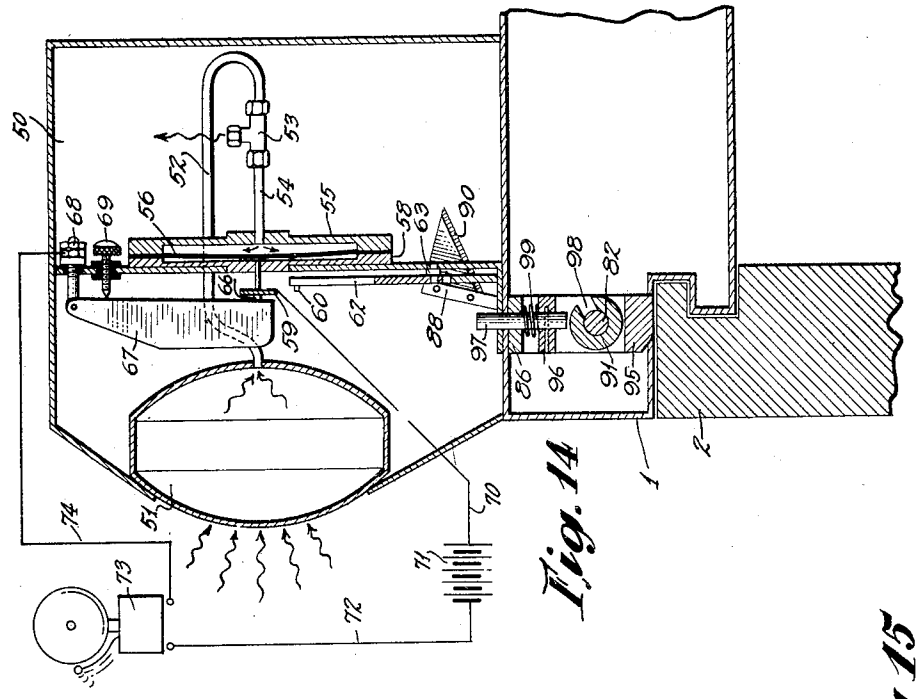


Fig. 14

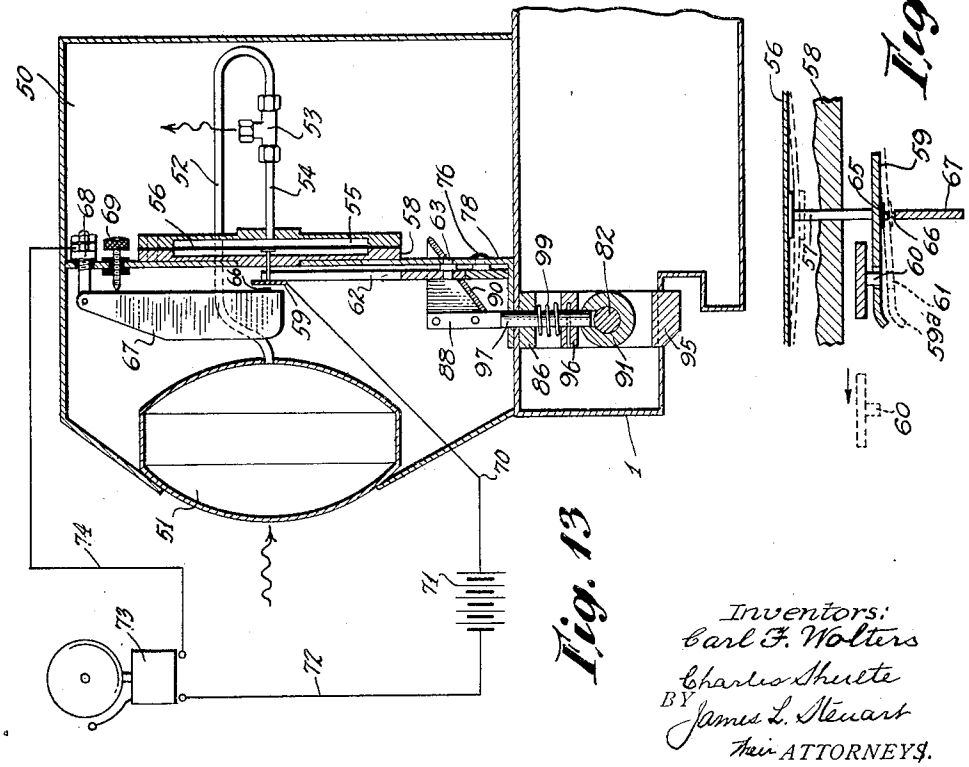


Fig. 13

Fig. 15

Inventors:
Carl F. Wolters
Charles Sheulete
BY James L. Stewart
Their ATTORNEYS.

March 4, 1930. C. F. WOLTERS ET AL 1,749,203

APPARATUS FOR AUTOMATICALLY CLOSING AND LOCKING SAFE DOORS

Filed March 5, 1925 8 Sheets-Sheet 8

Fig. 17

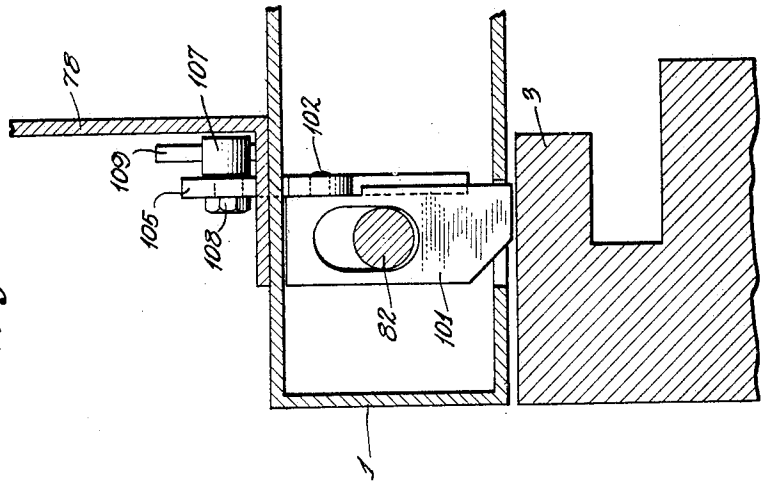
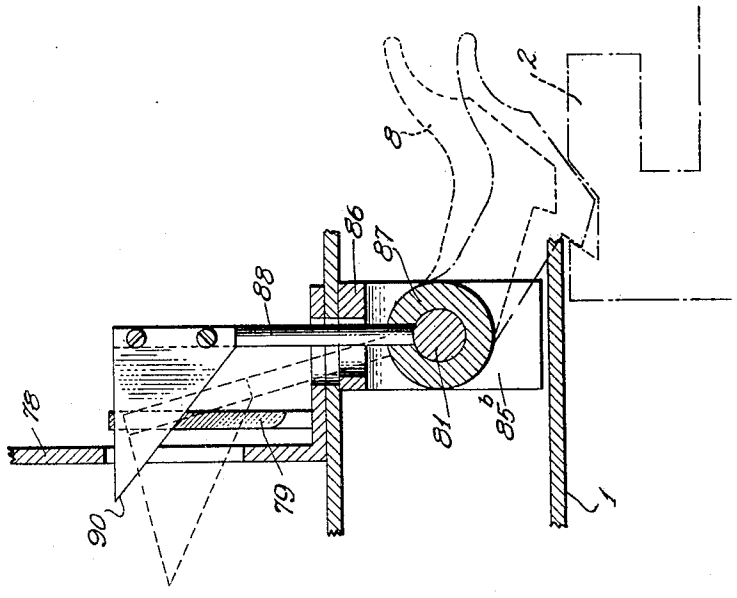


Fig. 16



Inventors:
Carl F. Wolters
Charles Shulte
BY James L. Stewart
Their ATTORNEYS.

Patented Mar. 4, 1930 1,749,203

UNITED STATES PATENT OFFICE

CARL F. WOLTERS AND CHARLES SHULTE, OF MARIETTA, OHIO, ASSIGNORS, BY MESNE ASSIGNMENTS, TO REMINGTON RAND INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

APPARATUS FOR AUTOMATICALLY CLOSING AND LOCKING SAFE DOORS

Application filed March 5, 1925. Serial No. 13,155.

This invention relates to an apparatus for closing the door or doors of a safe in the event of fire. Safes are usually provided with one or more doors which stand open when access is being had to the interior of the safe. These doors usually remain open during business hours. It is important that, in the event of fire, means should be provided for automatically closing the doors of a safe in the absence of an attendant whose duty it would be to close such doors. In the confusion incident to an alarm of fire, the doors of a safe are liable to be left open and the contents exposed to fire hazard.

One purpose of this invention is, therefore, to provide means for closing the doors of a safe or strong box either automatically upon the occcurrence of a fire in its neighborhood, or upon the sounding of a general fire alarm; or in the course of the operation of a fire alarm system. The double doors must not however be closed simultaneously, but successively and in a given order. The release of the right-hand door, must be preceded by the closing of the left, or the projecting parts associated with the right-hand door will prevent the closing of the left-hand one, and the result will be the same as though neither had been released. Means are therefore provided to bring the left-hand door into a closed and locked position prior to the release of the right-hand door.

It is further proposed in the structure which embodies this invention to provide such a system of locking bolts and operating mechanism that the locking bolts will be projected at the moment the door reaches the closed position, regardless of whether the closing of the door occurs automatically or manually. By this system, the bolts are retained in a withdrawn position so long as the respective door is open; but are released automatically at closing when in a position to register with and enter their allotted sockets in the frame.

Another point of operation of such a system is that the doors should be locked tightly, so that if the safe falls by reason of collapsing floors, the contents will not become exposed to flame or water.

In the provision of a thermostatically operated apparatus to control and determine the actuation of the door closing mechanism, it has further been provided that a gradual rise of temperature in and around the safe shall not cause a release of the doors; but by the application of a device to be hereinafter referred to as a "rate of rise" control, the mechanism is only set into movement upon an abnormally rapid increase of temperature.

A further feature of this invention is the employment of a mechanism operated by the closure of the right-hand door to restore the releasing mechanism to its normal initial position, and ready for operation without manual setting. This is essential to prevent an inexperienced or negligent attendant from leaving the apparatus in a condition in which it cannot automatically effect the closing of the doors.

Another feature is the enclosure of all operative parts, except the door retaining dogs and certain operating bolts and rods, within a protective housing, to prevent tampering or accidental injury. The whole system is thus practically self-contained save for electrical connection to the fire alarm system which in itself is not an indispensable element.

Hereinafter such a safe with double doors will be considered as having the right-hand door to be closed last, but this relation is merely for convenience in setting forth the invention, and may be varied without departing from its spirit.

For the purpose of explaining this invention, we have shown on the accompanying drawings one embodiment thereof in complement of the following description.

Figure 1 is a perspective view of a safe equipped with the apparatus according to this invention;

Figure 2 is a front view showing the locking means for the left-hand door of the safe of Figure 1, with the other elements of the door and safe shown in phantom as dotted lines;

Figure 3 is a corresponding view of the mechanism for the right-hand door;

Figure 4 is a view on a larger scale show-

ing the locking and releasing mechanism for the right-hand door, as seen from the inner side of the door;

Figure 5 is a sectional view on the line 5—5 of Figure 4;

Figure 6 is a horizontal sectional view through the knob shown in Figure 5;

Figure 7 is a detail sectional view showing the locking bolt and the corresponding socket;

Figure 8 is a face view of the end of the locking bolt;

Figure 9 is a detail view showing a retaining dog;

Figure 10 is a sectional view showing the assemblage of the door releasing mechanism in the normal position;

Figure 11 is a corresponding view, with the elements in the releasing position;

Figure 12 is a section on the line 12—12 of Figure 11;

Figure 13 is a section on the line 13—13 of Figure 10 and showing the elements in the normal position;

Figure 14 is a view similar to Figure 13 (and a section on line 14—14 of Figure 11) but showing the elements in the operated position;

Figure 15 is a horizontal section showing the relation of the diaphragm, pin and detent;

Figure 16 is a cross section on the line 16—16 of Figures 10 and 11, showing the flag cam, and

Figure 17 is a section on the line 17—17 of Figure 11.

The safe is represented as comprising the usual box 1 (Fig. 1) having strongly constructed and fireproof walls on five sides and an open front. This front is formed with appropriate grooves and ribs to receive the correspondingly shaped doors 2 and 3. Since, in general, the conformation of such doors and walls to accommodate each other is old and well known, and forms no part of our invention, we shall not describe it further than to state that its purpose is to provide a gas and water-tight joint for the closure. The doors are hingedly mounted upon the box 1 by means of the hinge elements 4, 4 and 5, 5, shown in Figures 2 and 3. These hinges are provided with springs 6, 6 and 7, 7 of sufficient strength to close the doors upon release of any obstructions to the free movement of these doors.

When opened, the doors may be held in a fully opened position by means of the dogs 8 and 9 which are received in cavities 10 in the upper edges of the respective doors, as shown in detail in Figure 9. The left-hand door 2 is provided with an operating shaft 11 passing horizontally through the face thereof. This shaft bears, on the outer face of the door, a turning handle 12 shown in dotted lines in Figure 2. On the inner face of the door or in the space within the walls, this shaft 11 carries rigidly attached thereto an operating plate 13 which has an arm 14 formed integrally therewith to receive one end of a helical spring 15. The other end of the helical spring 15 is attached to the door 2 at 16. It will, therefore, be seen that the spring 15 constantly tends to rotate the plate 13 and therewith the shaft 11 in a counter-clockwise direction in Figure 2.

Pivoted to the plate 13 at points 17, 17 are two link arms 18, 18 which are articulated to the links 19, 19 and thereby serve as operating means for the locking bolts 20, 20 for the left-hand door 2. These locking bolts 20, as shown in Figures 7 and 8, each have an anti-friction roller 21 rotatably mounted in their bifurcated outer ends. The locking bolts 20 and their rollers 21 are adapted to be received within the sockets 22 provided for that purpose in the main box 1.

The tendency of the spring 15 is to rotate the plate 13 and to project the bolts 20 into the extended or operative position. On one connecting link 18 is provided a lug 23 which extends at right angles to the face of the link and into the path of a detent 24 which latter is pivoted at 25 to the door 2. The detent 24 is formed with a notch 26 at a predetermined distance from the pivot point 25. An operating member 27 is pivoted to the detent 24 at 26′ and passes through a suitable channel in the door 2 to the hinge side of the door, and its end 28 projects a slight distance therefrom. A spring 29 is carried by a pin 30, and has its free end 31 in such relation to the detent 24 that the latter is urged against the lug 23.

When the left-hand door 2 is in the closed position, and the locking bolts 20, 20 are extended into the pockets 22, 22 in the box 1, a person may rotate the handle 12 clockwise in Figure 2, thus rotating the plate 13 and retracting the links 18, 18 and 19, 19, and therewith the locking bolts 20, 20. During the movement of the connecting links 18, the lug 23 moves downward along the face of the detent 24, until it comes opposite the notch 26 formed therein. The spring 29 then forces detent 24 to the left as the door is opened; and this detent thus locks the connecting link 18 and therewith the plate 13 against a return movement under the influence of the spring 15. This locking continues so long as the detent 24 is not released.

If the door be closed, either manually or by the springs 6, 6, the outer end 28 of the rod 27 will come into contact with the box wall 1, and be moved to the right in Figure 2. The detent 24 articulated to the rod 27 is thereby forced to rotate about the pivot point 25 a sufficient distance so that the lug 23 is released from the notch 26, and the plate is permitted to rotate in a counter-clockwise direction under the influence of the spring 15.

It is apparent that this release by the detent only occurs at or near the closed position of the door, and that the bolts 20, 20 are projected into the sockets 22, 22 intended to receive them.

The right-hand door 3 is provided with a similar shaft and plate 13^a which is adapted, in like manner and by like means, to control the connecting links 18^a, 18^a, 18^b, the links 19^a, 19^a, and the locking bolts 20^a, 20^a. It will be noted that with the right-hand door, an additional locking bolt 20^b is provided to lock the two doors, with respect to each other. The plate 13^a is under the influence of a spring 15^a tending constantly to rotate it in a clockwise direction in Figure 4. In a manner similar to that described in connection with Figure 2, this plate is held against such rotation by a lug 23^a formed on the upper connecting link 18^a and operating in conjunction with the detent member 24^a having the notch 26^a formed on its edge. For door 3, the notch has a rectangular bottom, and a partly beveled locking surface as shown at 26^b. A rod 27^a is pivotally connected to the detent 24^a and has its outer end 28^a extending beyond the hinge side of the door. So far, the elements are similar to and operate in the same manner as the corresponding elements described and shown for the left-hand door 2, except that detent 24^a need only be moved far enough to the right for the lug 23^a to begin to ride on the beveled surface 26^b, whereupon the spring 15^a will complete the removal of the detent 24^a from the path of lug 23^a.

The plate 13^a has a notch 32 provided at such a position that the locking bolt 33 of a combination lock 34 may be projected into the notch to prevent the clockwise rotation of the plate 13^a. The method of operating the combination lock may be any of the well known means, such as the graduated knob 35 on the outer face of the door and shown in dotted lines in Figure 3.

In Figure 4, the operating mechanism is shown from the opposite side and the guard or stiffening plate 36 on the interior face of the door has been shown broken away to display the elements of the mechanism. The detent 24^a has the notch 26^a as shown, and also a notch 37 near its upper end, and in such a position as to lock the upper connecting link 18^a against downward movement after it has once been projected upward. This notch need not be so deep as notch 26^a, since the detent 24^a is prevented from entire return by the engagement of rod 27^a against the door frame. The detent 24^a is likewise provided with a spring 29^a mounted on a stud 30^a on the door 3, and having its free end 31^a in such relation to the detent 24^a as to urge the upper end of the latter into engagement with the lug 23^a. As shown in Fig. 5, the detent 24^a is pivotally mounted at 25^a to the plate 36 or any other suitable part of the door. This detent may move by rotation about the pivot 25^a in a plane parallel to the face of the door, and it also has the possibility of movement in a plane perpendicular to the face of the door by reason of the looseness of the pivot 25^a. The two end positions which it may occupy in this latter movement are shown respectively in full and dotted lines in Figure 5. It will be understood that, when the connecting links 18^a have been projected and the door locked, the detent 24^a moves into a position beneath the lug 23^a and prevents the retraction of the connecting links 18^a, 18^b by a rotation of the plate 13^a. In order to make it possible for a person to open the door again from the exterior by means of the handle 12^a, the latter is provided with an axially extending pin 38 which passes through the axis of the operating shaft 11^a and projects beyond the rear face of the plate 13^a into engagement with the detent 24^a. As shown in Figure 6, a button 39 is provided in a borehole cut into the stem of the handle 12^a and is adapted to make a movement in this hole parallel to the face of the door 3. A pin 40 formed integrally with the button 39 has an inclined cam surface 41 formed thereon for engagement with the corresponding end of the pin 38. A movement of the button 39 toward the left in Figure 6, will cause a movement of the pin 38 to the left in Figure 5. The lug 42 on the pin 40 prevents an extraction of the button 39 without the dismounting of the pin 38. A flat spring 43 is secured to the stiffening plate 36 and assists the return of the detent 24^a from the dotted line to the full line position in Figure 5; and likewise serves as a return spring for the button 39.

The method of operation of this portion of the device is as follows: If a person desires to open the safe when the locking bolts have been projected and the combination lock has been withdrawn, the button 39 is forced to the left in Figure 6, thus moving the pin 38 to the left in Figure 5, and pushing the detent 24^a against the action of spring 43 into the position shown in dotted lines in Figure 5, in which it no longer is in engagement with the lug 23^a to prevent the movement downward of the connecting link 18^a. The handle 12^a may now be turned to rotate the plate 13^a in a counter-clockwise direction in Figure 4, thus retracting the connecting links 18^a and therewith the locking bolts, as already set forth in regard to Figure 2. Upon release of the button 39, the pin 38 returns and therewith the detent 24^a. The lug 23^a is again received within the notch 26^a, and the locking bolts are held in the retracted position and the plate 13^a is prevented from rotation under the influence of spring 15^a. It will be noted that if the door be not opened, the lug 23^a will either ride under the detent 24^a or against its beveled surface 26^b, and

the locking bolts 20^a, 20^b will be projected; in other words, the door is always locked when closed, and it is not necessary to "try" the handle.

If the door be now closed, the rod 27^a will be forced towards the right in Figure 4, by the engagement of its outer end 28^a with the wall of box 1. The detent 24^a will be rocked towards the right in Figure 4, thus releasing the lug 23^a from the notch 26^a, and permitting the locking bolts to be projected under the influence of spring 15^a. After the bolts have reached their projected position, the detent 24^a again moves to the left under the action of spring 29^a, and the lug 23^a will be held by the surface 37 of the detent 24^a as at the beginning.

At the top of the box 1 is provided a housing 50 for the releasing mechanism for the safe doors. As shown in Figure 10, this housing is hollow, and contains the several elements to be hereinafter enumerated. On the outer face of this housing as shown in Figure 13 is a hermetically sealed metal chamber 51 with its front face exposed to the air of the room, and having a pipe 52 in communication therewith. This pipe 52 is connected to a "rate of rise" regulator 53 which will be more closely described hereinafter. A second tube 54 leads from this regulator to a chamber 55 which has a diaphragm 56 tensed across the same. The diaphragm chamber 55, the pipes 52 and 54, and the chamber 51 therefore form a closed system, subject to the adjustment by the regulator 53.

This "rate of rise" regulator 53 contains an element which permits the passage of a fluid at a certain specified maximum rate, such for example, as shown in United States Patents No. 1,208,177 to E. A. Lowe, dated December 12, 1916; No. 1,269,556 to E. A. Lowe, dated June 11, 1918; No. 1,303,082 to E. A. Lowe, dated May 6, 1919; No. 1,401,914 to E. A. Lowe, dated December 27, 1921; No. 1.404,534 to E. A. Lowe, dated January 24, 1922. If the temperature within the room in which the safe is contained rises slowly due to heating from a radiator or by reason of the diurnal or seasonal variations, as represented by the wavy arrow in Figure 13, the expansion of the fluid in chamber 51 occasioned thereby will be relieved through the regulator 53, as denoted by the similar arrow. If, however, the temperature rise occurs at a greater rate, say five times as rapidly, as denoted by the five wavy arrows in Figure 14, the expansion within the chamber 51 is no longer compensated by the regulator 53 as denoted by the single wavy arrow issuing from the regulator 53 in Figure 14. The compression of the fluid within the enclosed system heretofore described therefore causes the diaphragm 56 to be distended and to be moved toward the left, as shown in Figure 14. This diaphragm 56, in its movement, bears against the pin 57 slidably mounted in the cover 58 for the diaphragm housing 55. The pin in its movement, as shown in detail in Figure 15, forces a detent member 59 outward and releases a pin 60 which had theretofore been retained by a hole 61 in the detent member 59. This pin 60 is mounted on the upper end of a weighted crank lever 62 (Figs. 10 and 11) pivoted to the housing 50 at 63 and having on its lower face a projection 64. The pin 60 is shown within the hole 61 of the detent 59 in Figure 10; and it is shown in the released and operating position in Figure 11. It will be understood that the operation of the devices to be hereinafter described is determined from the release of the pin 60 by the detent 59, and the actuation of the pin 57 as determined by the diaphragm 56.

The detent 59 as shown in Figures 13, 14 and 15 has associated therewith a contact point 65 adapted to cooperate with a similar contact 66 carried by a weight 67 which is pivoted on an insulated bolt 68 in the housing 50. The gap between the contacts 65, 66 may be adjusted by the insulating set screw 69. A conducting wire 70 leads from the detent 59 to the battery 71 and thence by a conductor 72 to the alarm bell 73, and by conductor 74 to the insulated bolt 68, and thus to the other contact 66. When the diaphragm moves the detent upward in Figure 15, the contacts 65, 66 are closed, and the alarm 73 is sounded as indicated in Figure 14.

Slidably mounted in the housing 50 is the cam member 75, having lugs 76, 76 passing through slots 77 in the interior wall 78 of the housing 50 to limit the movement of sliding member 75. The upper face of this cam member 75 has a notch 80 therein to receive the projection 64 on the lower face of the crank lever 62. When the projection 64 is within the notch 80, the sliding member 75 is held against movement.

Rotatably mounted in the upper wall of the box 1 are two shafts 81 and 82 (Figs. 10 and 11) in axial alinement. These shafts are preferably mounted within the housing 83 forming a portion of the upper part of the box 1 by means of suitable bearings 84 and the intermediate stirrup bearings 85^a, 85^b, 85^c, formed in the E-shaped member 86. The dog 8 is loose on the shaft 81, and the dog 9 is loose on the shaft 82. The sleeves 121 and 87 are keyed to the shaft 81, the former engages a pin 122 on the dog 8 and the latter has an upstanding staff 88 mounted thereon. A helical torsion spring 89 is wrapped about the portion of the shaft 81 and has its respective ends received in the bearing plate 85^a and in an aperture of the sleeve 87. This torsion spring 89 tends constantly to move the staff 88 in a counterclockwise direction in Figure 16, from the position shown in full to the position shown in dotted lines.

The staff 88 carries at its upper end a flag

cam 90 in frictional contact with the cam surface 79 of the sliding member 75. The spring 89 therefore constantly tends to move the sliding member 75 to the right in Figure 10 by the cooperation of the cam surfaces of 90 and 79, but is prevented therefrom by the presence of the pin 60 in the hole 61 of the detent member 59 as shown in Figure 10.

Keyed to the shaft 82 is a sleeve 91 having its end extending over and embracing the adjacent end of the shaft 81. A torsion spring 92 is mounted around the shaft 81 and has its ends held by the second bearing plate 85^b and the aperture in the sleeve 91. A segmental peripheral slot is formed in the portion of the sleeve 91 which surrounds the end of the shaft 81 as shown in cross section in Figure 12, at 93. A pin 94 is secured in the shaft 81 and is adapted to move within the said slot 93.

A rider 95 extends downward through the wall of the housing 83 into the path of the left-hand door 2. This rider 95 is adapted to be moved upward under the impact of the door when the latter reaches substantially its closed position. The rider 95 is formed with a lug 96 thereon, to slidably receive a pin 97. The rider 95 is guided upon the shaft 82 and by the passage of the pin 97 through the holes in the E-shaped member 86, the housing 83 and the housing 50 for rectilinear movement at right angles to the shaft 82. A hole 98 is provided in the sleeve 91 at such a position as to receive the pin 97 when the dog 9 engages and retains the door 3. A spring 99 is provided to assure the engagement of the pin 97 in the hole 98 so long as the door 2 is not in contact with the rider 95. Likewise mounted over the shaft 82 and projecting downward through an aperture in the housing 83 is a cam 101 which is adapted to be moved upward upon impact with the right-hand door 3, when the latter approaches its closed position. This cam 101 is pivotally mounted at 102 on the end of a lever 103 which is pivoted at 104 in the housing 83. The other end 105 of this lever 103 extends upward through an aperture 106 into the housing 50, and carries at its upper end a roller 107 mounted on a pivot bolt 108, in operative position relative to the inclined cam surface 109 formed on the right-hand end of the sliding member 75. It will be seen that as the door 3 closes, the cam 101 is forced upward to rock the lever 103 about its pivot 104, and thus pull the roller 107 downward and by means of the cam 109, force the sliding member 75 toward the left. When the sliding member 75 has reached the end of its movement, the crank lever 62 rocks about its pivot 63 under the influence of the weighted end 62^a and the projection 64 drops into the notch 80 and locks the sliding member against return movement. During this movement of the lever 62, the pin 60 strikes against the obliquely bent end 59^a of the detent 59 and forces the detent outward until the pin 60 snaps into the hole 61 in the detent member 59.

The method of operation of this mechanism, after the detent 59 has released the pin 60, is as follows: The crank lever 62 rocks counter-clockwise in Figure 10 about its pivot 63 into the position shown in Figure 11. The flag cam 90, under the influence of the torsion spring 89 is rocked into the dotted line position shown in Figure 16, and during its movement, bears against the cam 79 and thus forces the sliding member 75 toward the right and into the position shown in Figure 11. Since the staff 88, the sleeve 87, the shaft 81 and the dog 8 are operatively secured together, the dog 8 is lifted out of the notch 10 in the top edge of the door 2, and into the position shown in full lines in Figure 9. The door 2 is therefore released, and is closed by the action of its hinge springs 6, 6. As this door reaches the end of its travel and is nearly in the closed position, the cam 95 is driven upward by impact, and the pin 97 withdrawn from the hole 98 in the sleeve 91. The shaft 82 has therefore been held against movement by the presence of this pin 97 in the hole 98, but is now permitted to rotate in the direction shown by the arrow in Figure 11, under the action of the torsion spring 92. In this manner, the dog 9 is lifted out of the corresponding socket 10 in the upper edge of the right-hand door 3, and the door 3 is closed by the action of its hinge springs 7, 7. As this door reaches the end of its travel, it strikes against the cam 101 and rocks the lever 103, and by the action of the roller 107 and the cam 109, restores the sliding member 75 to its original left-hand position against the action of the torsion spring 89, and the member 75 is then locked in such position by the entry of the pin 60 into the hole 61 as already described. In this movement of the sliding member 75, the cam surface 79 rides against the flag cam 88 and forces the latter to rotate along with the shaft 81 connected therewith; this shaft 81 is thereafter held against movement by the engagement of projection 64 in the notch 80. During this movement of shaft 81, the pin 94 is moved with it, and the shaft 82 with its adjoined members is returned to the original position against the action of spring 92 until the pin 97 is forced downward by spring 99 into the hole 98 then presented beneath it. When the doors are opened again, the door 3 is necessarily opened first, and then the door 2. The dog 9 swings upwardly against the action of spring 92, until it can slip downward into the corresponding socket 10 in the top of door 3; the hole 98 being made oblong peripherally of the sleeve 91 to permit this movement. The shaft 81 has already been locked against movement by the presence of the projection

64 in the notch 80, but the dog 8 is permitted to rock upward a sufficient distance to permit it to again engage in the notch 10, by means of the cut-away sector 120 in the sleeve 121 rigidly attached to the shaft 81 as heretofore referred to, and the small pin 122 on the dog itself. The whole mechanism has now been restored to the initial position.

In order to actuate the mechanism and to close the safe in the event of a general fire or burglar alarm being sounded in the building, an electro-magnet 123 is mounted within the housing 50 and in operative relation to the detent 59. This detent is formed of steel or iron and upon the energization of electro-magnet 123, is retracted into the position shown in dotted lines in Figure 15, and the sequence is the same as before. For the purpose of illustration, there is shown in Figure 11 a pair of conductors 124 forming part of a fire alarm system, with the fusible or frangible circuit-closing element 125 and the battery 126. It will be understood that upon the occurrence of a conflagration in the building, the element 125 will close the circuit, and permit the battery 126 to energize the electro-magnet 123. This circuit may also be closed by any general fire alarm device which has here been represented as a push-button 125^a.

As already described, the respective doors 2 and 3, upon closing, are immediately locked by the projection of their locking bolts 20, 20 and 20^a, 20^a, 20^b, immediately following the contact of the operating rod 27 or 27^a, respectively, on the walls of the box 1. In case of a general conflagration in which the building is gutted, the safe is locked and the doors will not be burst open by a fall following the collapse of a floor.

Although a preferred form of embodiment of the invention has been described in detail in the present specification, it will be understood that the invention is by no means limited thereto, nor to safes alone (for it may be used with vault doors), but that any modifications or changes of elements or application may be made within the scope of the appended claims.

Claims:

1. In a safe having double doors, means to hold each of said doors in the open position, means to release and close the left-hand door, means actuated upon the closure of said left-hand door to release and close the right-hand door, and means actuated upon closing of the right-hand door to restore said door holding means to its original position.

2. In a safe having double doors, means to retain each door in the open position, means to close each door upon its release by said retaining means, said means for one door only being actuated upon the closure of the other door, and means actuated upon closing of said one door to restore said door holding means to its original position.

3. In a safe having double doors, means to close each of said doors, a pair of shafts, a dog mounted for movement with each shaft and each adapted to normally retain a door in the open position, a spring tending to move each of said dogs to release its respective door, a stop to hold each of said dogs against such movement, means to release one of said stops and close one of the doors, and a rider actuated upon the closing of said door to release the other of said dogs.

4. In a safe having double doors, a dog to hold each of said doors in the open position, a shaft carrying each of said dogs, said shafts being in axial alinement, a spring to rotate each of said shafts to release said dogs, a stop to hold each of said shafts against movement, and means to release each of said stops.

5. In a safe having double doors, a dog to hold each of said doors in the open position, a shaft carrying each of said dogs, said shafts being in axial alinement, a spring to rotate each of said shafts to release said dogs, a stop to hold each of said shafts against movement, means to release each of said stops, and a uni-directional driving connection between said shafts.

6. In a safe having a door, a shaft, a dog pivoted about said shaft and adapted in normal position to hold said door open, a permissive driving connection between said shaft and said dog, means to rotate said shaft and lift said dog, and means to lock said shaft against rotation whereby said permissive connection allows said dog to move independently of said shaft when the door is opened and solidly with said shaft when the latter is actuated.

7. In a safe, a door normally held in open position, means to close said door, a detent, means to release said detent, means to move said detent upon release, a first cam, a second cam operative with the first cam, means to actuate said cams upon movement of said detent, and means associated with said second cam to release said door upon actuation of said cam.

8. In a safe, a door normally held in open position, means to close said door, a detent, means to release said detent, means to move said detent upon release, means actuated upon the movement of said detent to release said door, and means actuated upon the closing of said door to restore the detent to its original position.

9. In a safe, a door normally held in open position, means to close said door, a detent, means to release said detent, means to move said detent upon release, a first cam, a second cam operative with the first cam, means to actuate said cams upon movement of said detent, means associated with said second cam to release said door upon actuation of said

cam, and means actuated upon the closing of said door to restore said detent and cams to their original positions.

10. In a safe having double doors adapted to close in sequence, means tending to close said doors individually, means for normally holding the doors in open position, spring actuated means, normally held in restraint, for individually disengaging the holding means from each door, means to release the spring actuated means of the primary door for door releasing operation, and means operated by the closing of said door to release the spring actuated means of the secondary door for operation, whereby the holding means for said secondary door is released and said door permitted to close.

11. In a safe having double doors, means tending to close said doors individually, means to hold each door in open position, means to release the holding means of the left hand door to permit said door to close, and spring actuated means, normally held in restraint and released for operation upon the closure of the left hand door, to release and close the right hand door.

12. In a safe having double doors, means tending to close said doors individually, holding members for securing the doors in open position, means to release the left hand door to permit the closing of said door, a rider actuated by the left hand door upon closing, spring actuated means, normally held in restraint and released by operation of the rider, for releasing the right hand door, to permit said right-hand door to close.

13. In a safe having double doors, means tending to close each of said doors, a pair of shafts, a dog associated with each shaft and each of which dogs is adapted to retain one door in open position, a spring tending to move each of said shafts to release one dog from its cooperating door, a stop to hold each shaft in restraint, means to release one of the shafts for movement to permit the release and closing of one of the doors, and a rider actuated upon closing of said door to release the other shaft to permit the other door to close.

14. The combination with a safe having double doors and door closing mechanism, of thermostatic means adapted to be actuated by excessive heat to cause one of said doors to close, means actuated by the closure of said first door to cause the closure of a second door, and means operated on the closure of said second door to restore said closing mechanism to the original position thereof ready for a second door closing operation.

15. The combination with a safe having double doors resiliently urged to closed position and normally held in open position, heat sensitive means adapted to cause the closure of one of said doors, and means actuated by the closure of said first door to cause the closure of the second door, the opening of said doors being adapted to automatically restore the door mechanism into condition for a second door closing operation.

16. In a safe having double doors constructed to be closed in sequence, means automatically locking each door as it is moved into closed position, means for holding the doors in open position, means for releasing said holding means, and means operable upon release of said holding means for closing said doors in sequence.

17. In a safe having double doors constructed to be closed in sequence, means automatically locking each door individually as it is brought into closed position, individual means for holding the doors in open position, means for releasing the holding means of the door to be closed first, means operable as said door is closed and locked for releasing the other door, and means for closing said doors when released.

18. In a safe having double doors constructed to be closed in sequence, means automatically locking each door individually as it is brought into closed position, separate means for holding each door in its open position, thermostatically controlled means for releasing the holding means of the door to be closed first, means operable as said door is closed and locked for releasing the holding means of the other door, and means for automatically closing said doors when released by their respective holding means.

19. In a safe having double doors constructed to be closed in sequence, means automatically locking each door individually as it is brought into closed position, individual means for holding the doors in open position, means for releasing the holding means of the door to be closed first, means operable as said door is closed and locked for releasing the other door, means for closing said doors when released, and means for restoring each of said holding means to its original position for holding the doors open.

20. In a safe having a door normally actuated to closed position, a member for engaging and holding said door open, means for normally operating said member to disengage it from said door, a slide member operated independently by said operating means, and means for controlling the sliding movement of said slide member to control the operation of the first-mentioned member and release of said door.

21. In a safe having a door normally actuated to closed position, a member for engaging and holding said door open, operating means for normally disengaging said member from the door, a second member for preventing operation of said operating means in one position and adapted for operation thereby into another position, and a

detent for controlling operation of said second member by said operating means.

22. In a safe having a door normally actuated to closed position, a member for engaging and holding said door open, operating means for normally disengaging said member from the door, a second member for preventing operation of said operating means in one position and adapted for operation thereby into another position, a detent for controlling operation of said second member by said operating means, and means for retaining the detent in position to hold said second member against operation by said operating means, and adapted to control the release and operation thereof.

23. In a safe having a door normally actuated to closed position, a member for engaging and holding said door open, operating means for normally disengaging said member from the door, a second member for preventing operation of said operating means in one position and adapted for operation thereby into another position, means for retaining said second member in the first mentioned position, and means for operating said second member in the second mentioned position to restore it to the first mentioned position and for resetting said operating means.

24. In a safe having doors normally actuated to closed position, a member for engaging and holding each door open, operating means for normally disengaging each member from its respective door, a second member for preventing operation of the operating means for one of the first mentioned members in one position and adapted for operation thereby into another position, means for preventing operation of the others of said first mentioned members by their respective operating means, means for controlling the operation and movement of the second member adapted to control the release of one door, and means for operating the means normally preventing actuation of the others of said members subsequent and successively with respect to the operation of said second member whereby said doors will be closed in sequence.

25. In a safe having a pair of doors normally actuated to closed position, a member for engaging and holding each door open, operating means for normally disengaging said members from said doors, a second member for preventing operation of said operating means in one position and adapted for operation thereby into another position, means for controlling operation of said second member, and means for controlling operation of said door engaging and holding members so that said doors will be released and permitted to close in sequence.

26. In a safe having a pair of doors normally actuated to closed position, a member for engaging and holding each door open, operating means for normally disengaging said members from said doors, a second member for preventing operation of said operating means in one position and adapted for operation thereby into another position, means for controlling operation of said second member, means for controlling operation of said door engaging and holding members so that said doors will be released and permitted to close in sequence, and means for operating said second member upon the closing of said doors into the first mentioned position and for setting said door holding members in position to engage and retain said doors in open position upon the subsequent opening thereof.

Signed at Marietta, Ohio, this 2nd day of March, 1925.

CARL F. WOLTERS.
CHARLES SHULTE.