

Feb. 5, 1935.

W. C. MILLER

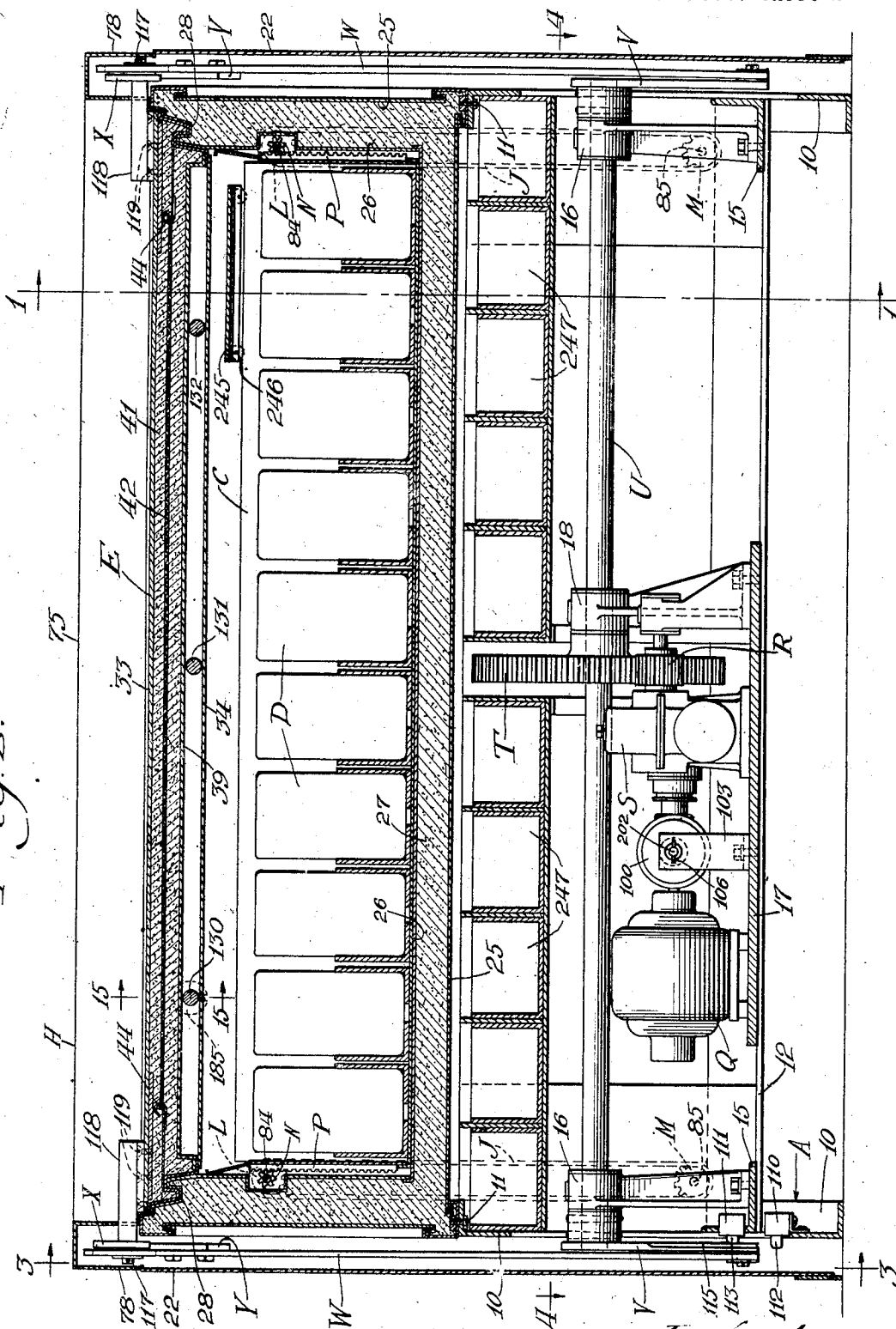
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18 Sheets-Sheet 2

Fig. 2.



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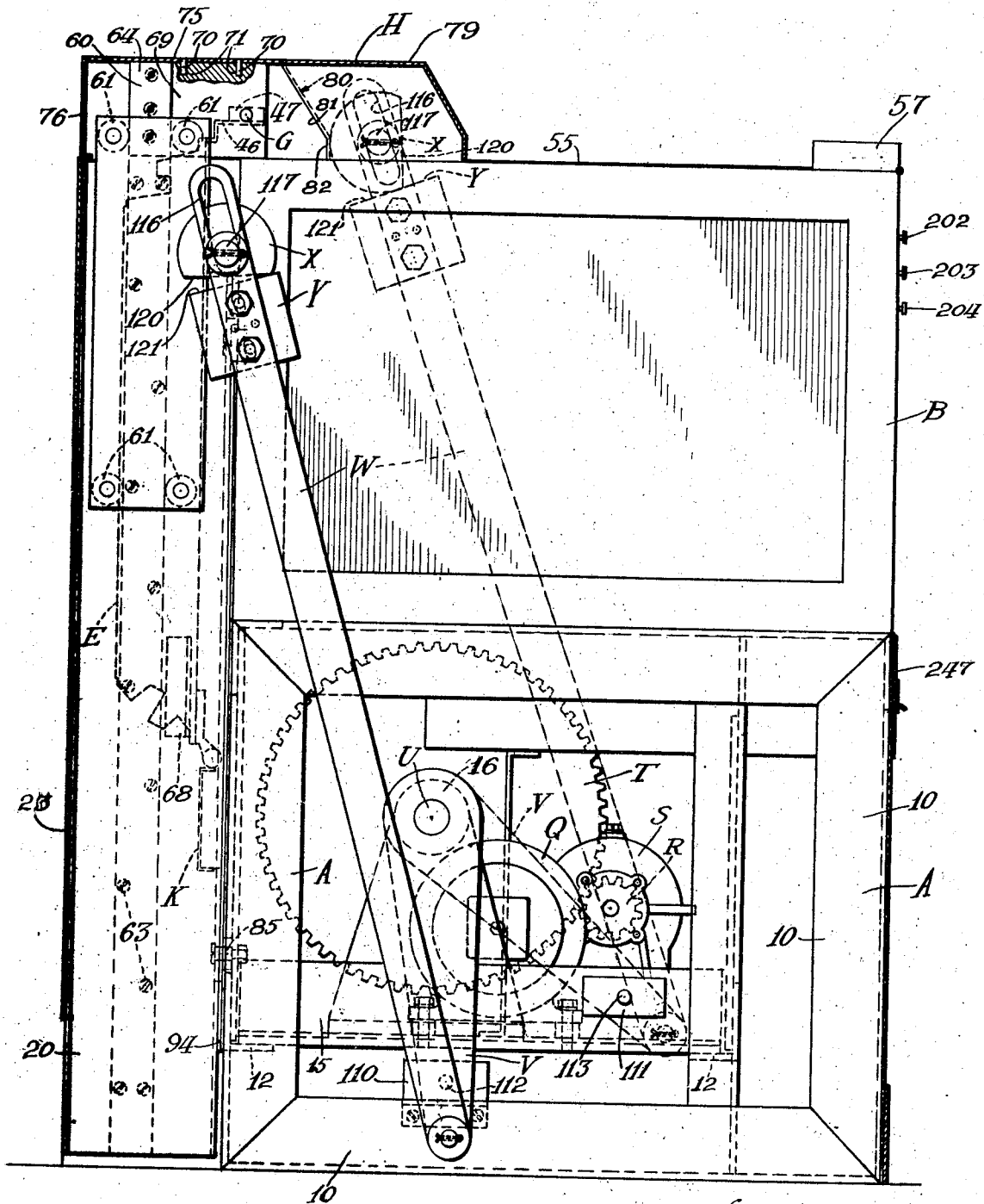
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18 Sheets-Sheet 3.

Fig. 3.



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18 Sheets-Sheet 4

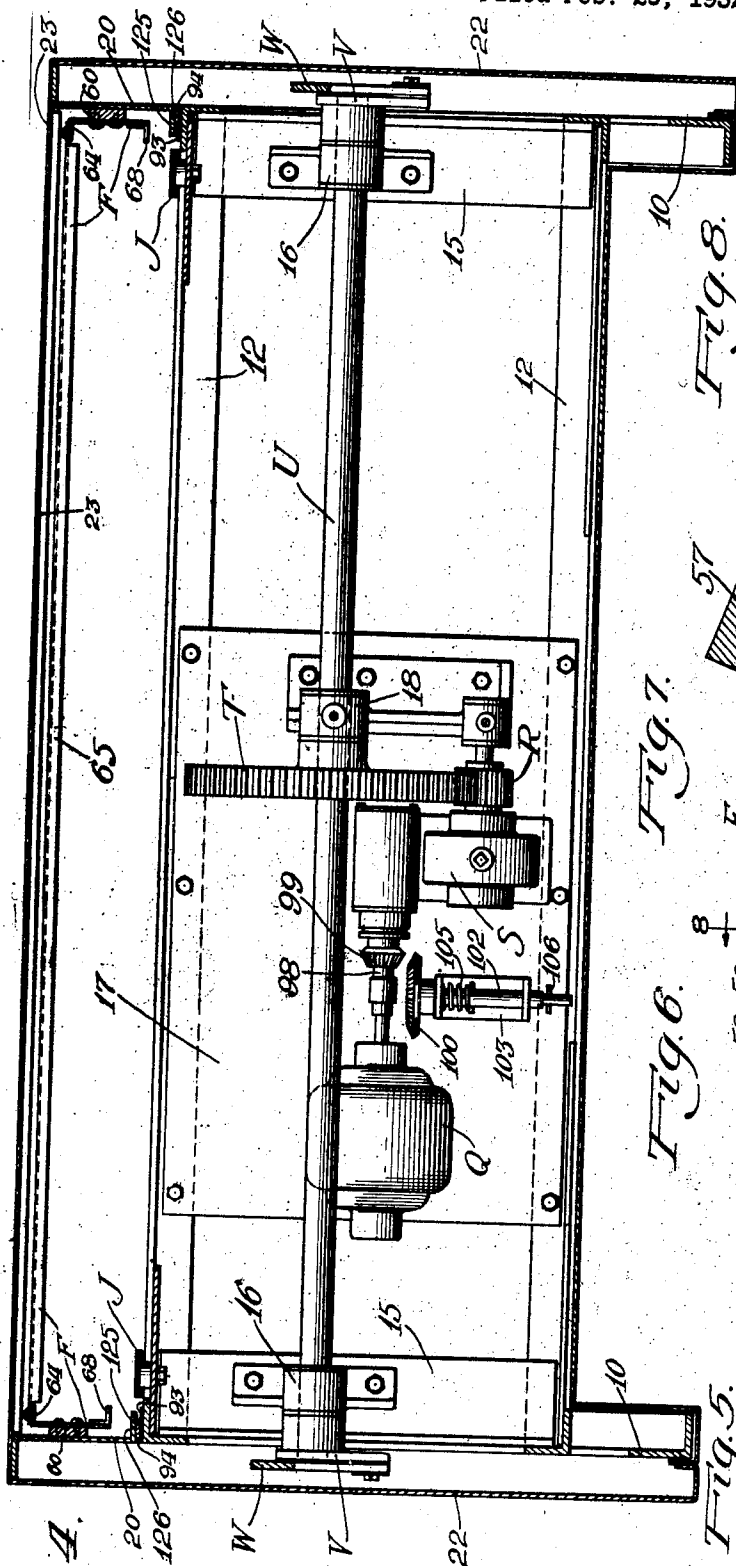


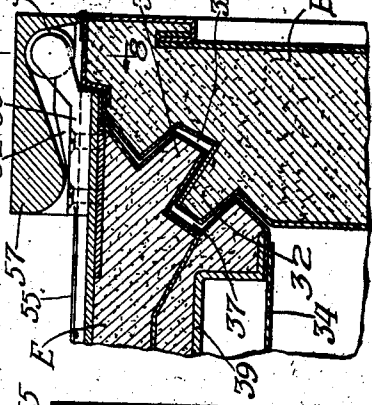
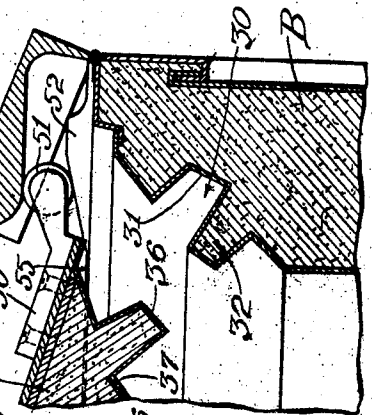
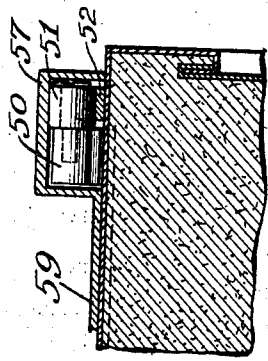
Fig. 4.

Fig. 8.

Fig. 7.

Fig. 6.

Fig. 5.



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18 Sheets-Sheet 5

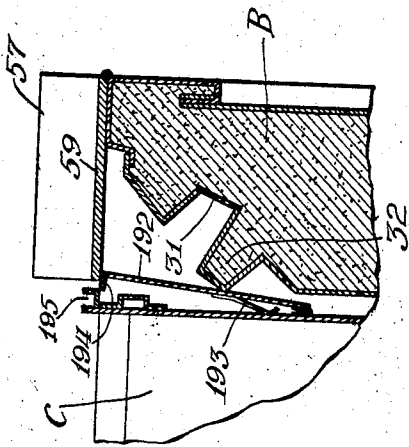
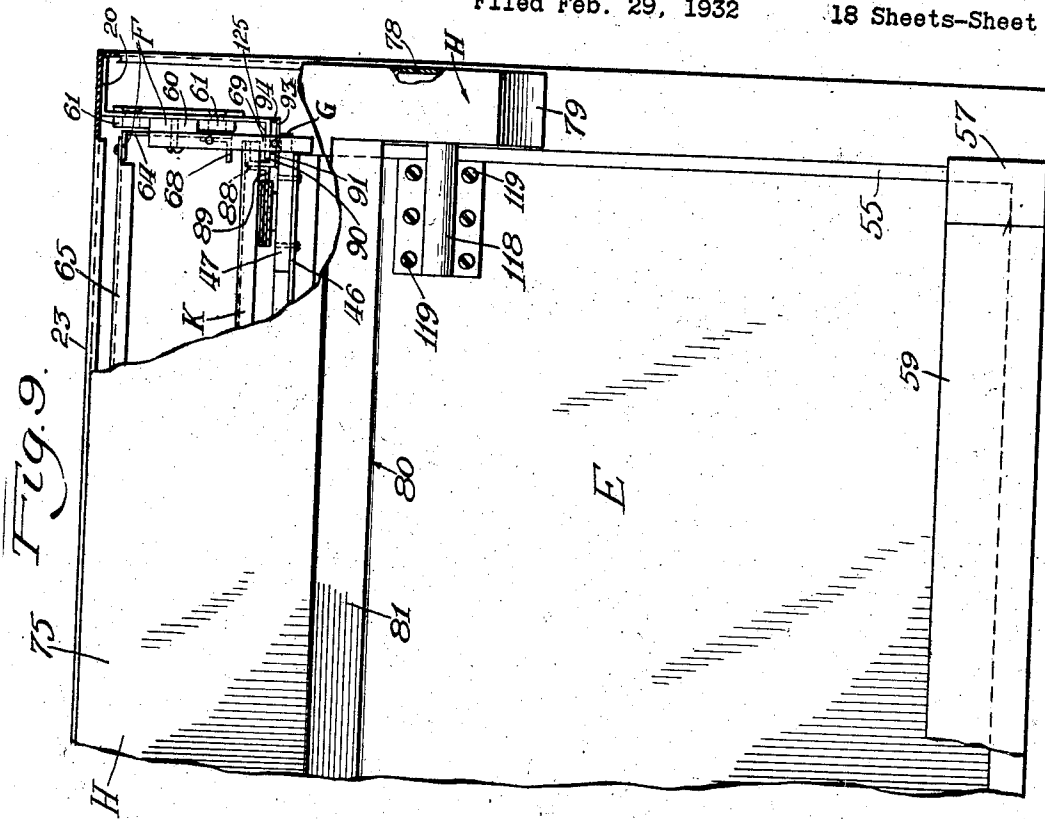
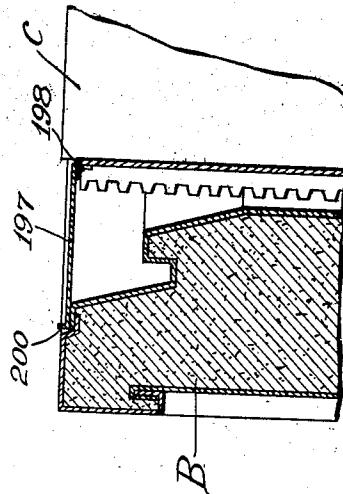


Fig. 11.



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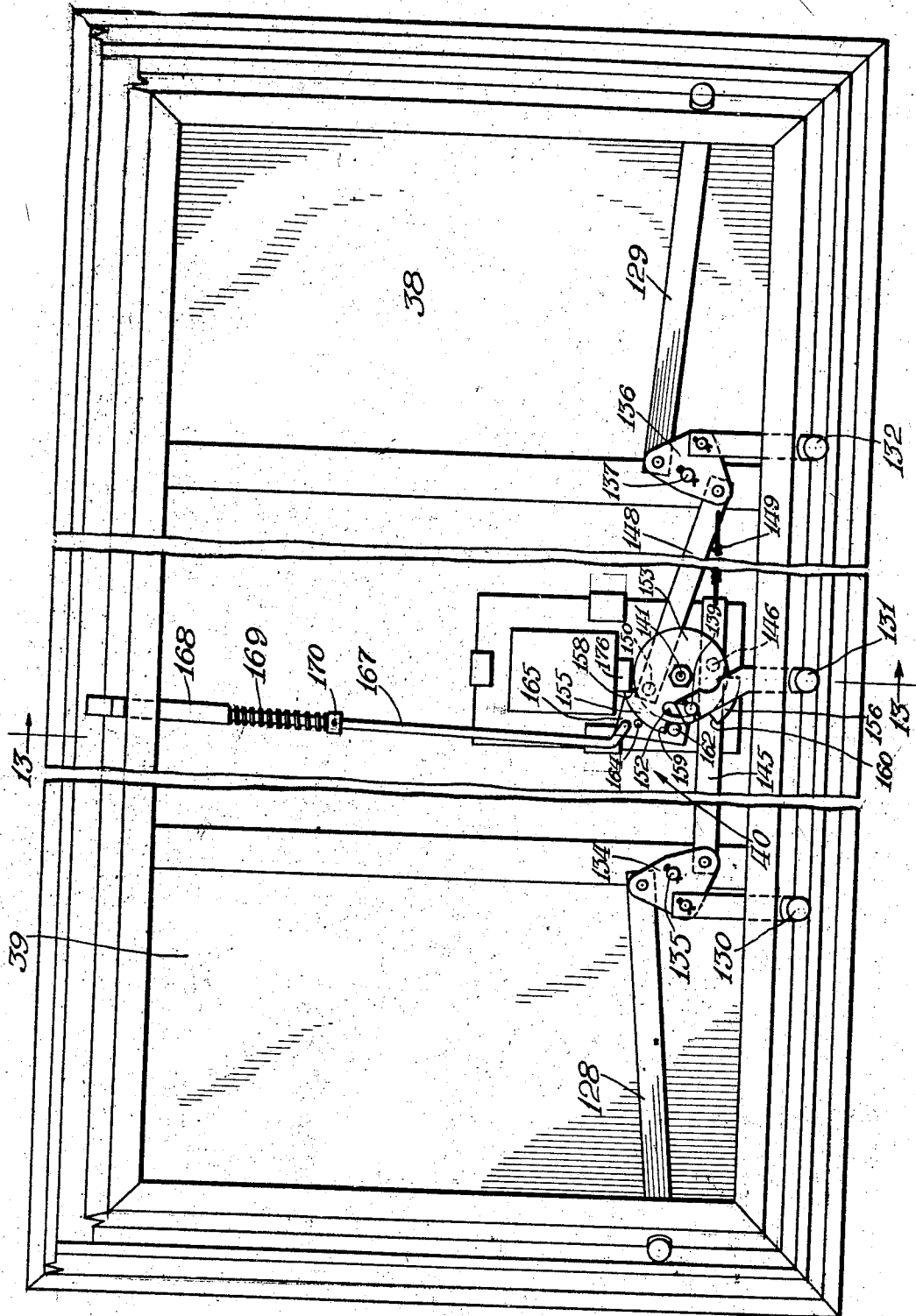
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18 Sheets-Sheet 6



Inventor:
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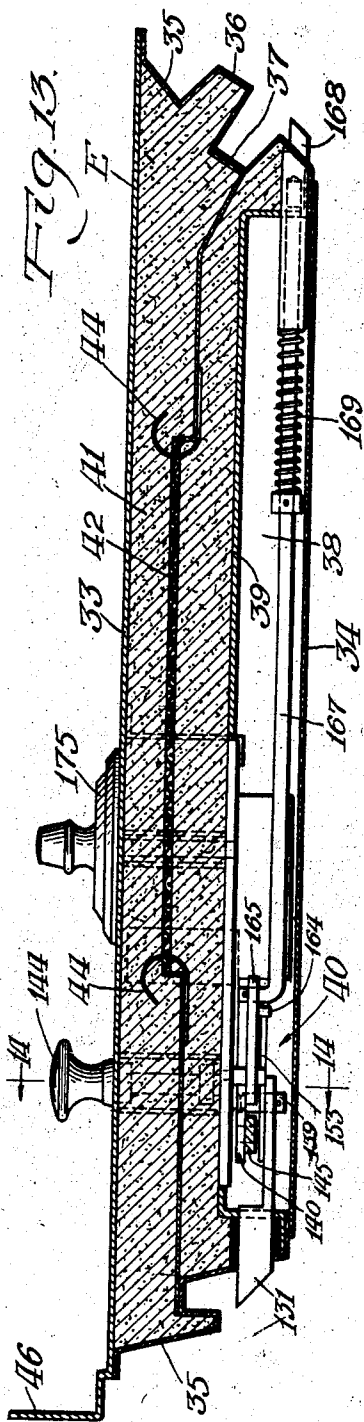
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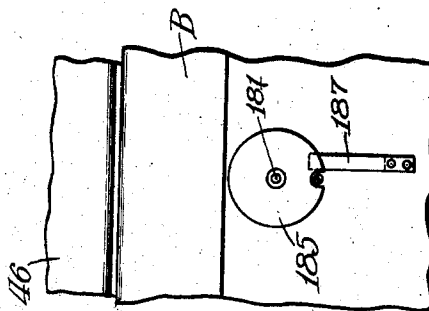
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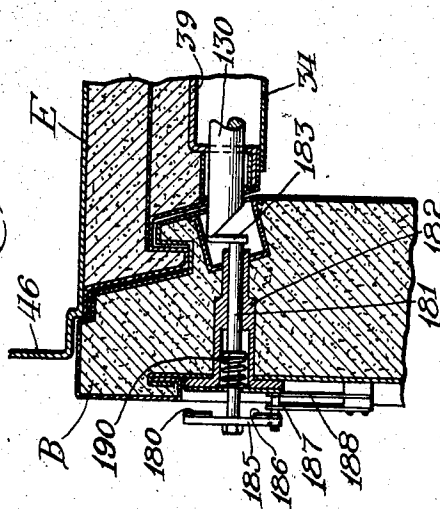
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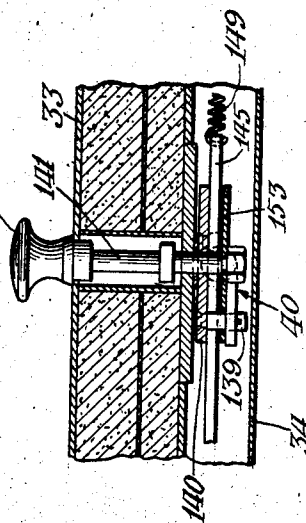
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Feb. 5, 1935.

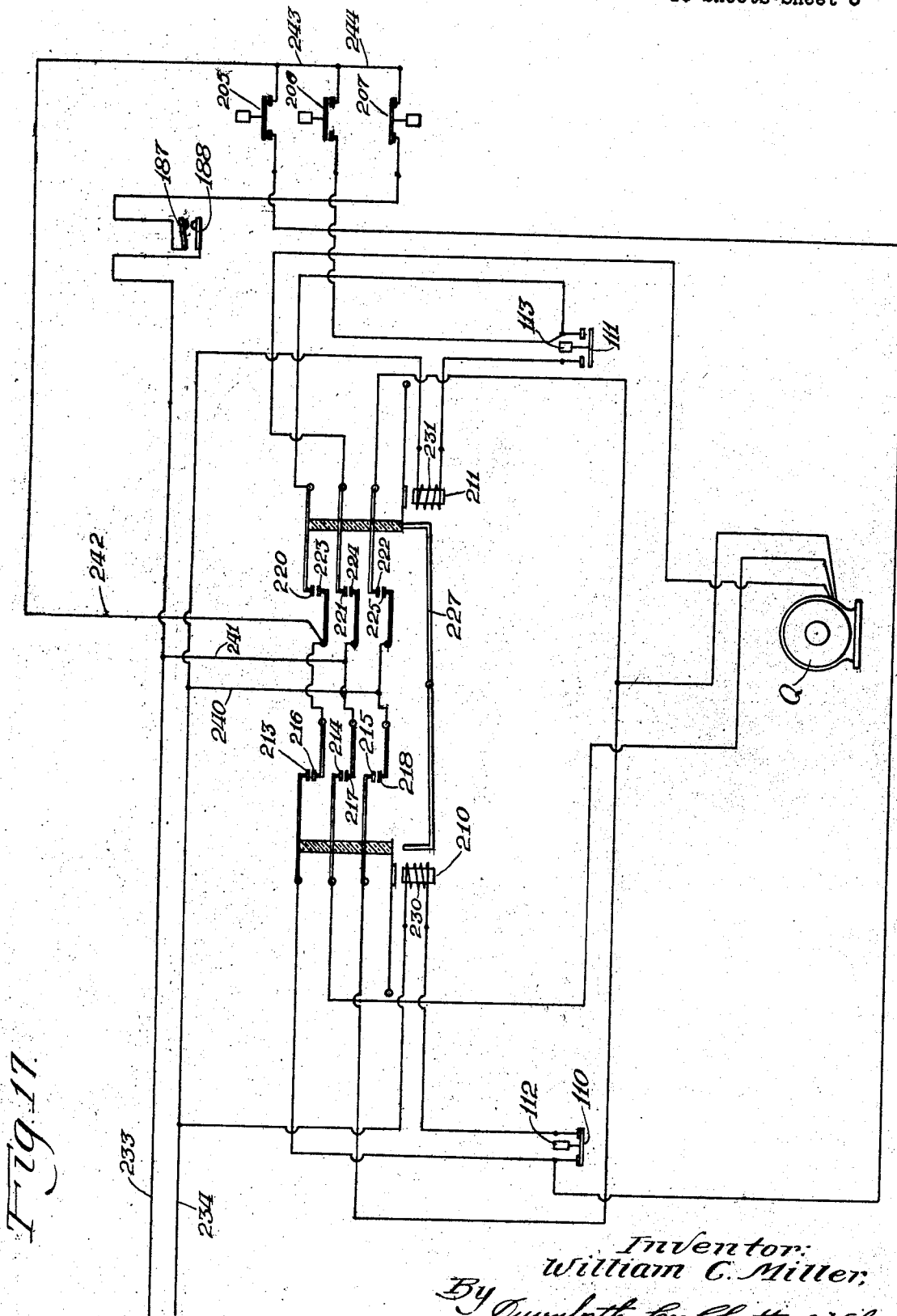
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18 Sheets-Sheet 8



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18 Sheets-Sheet 9

Fig. 18.

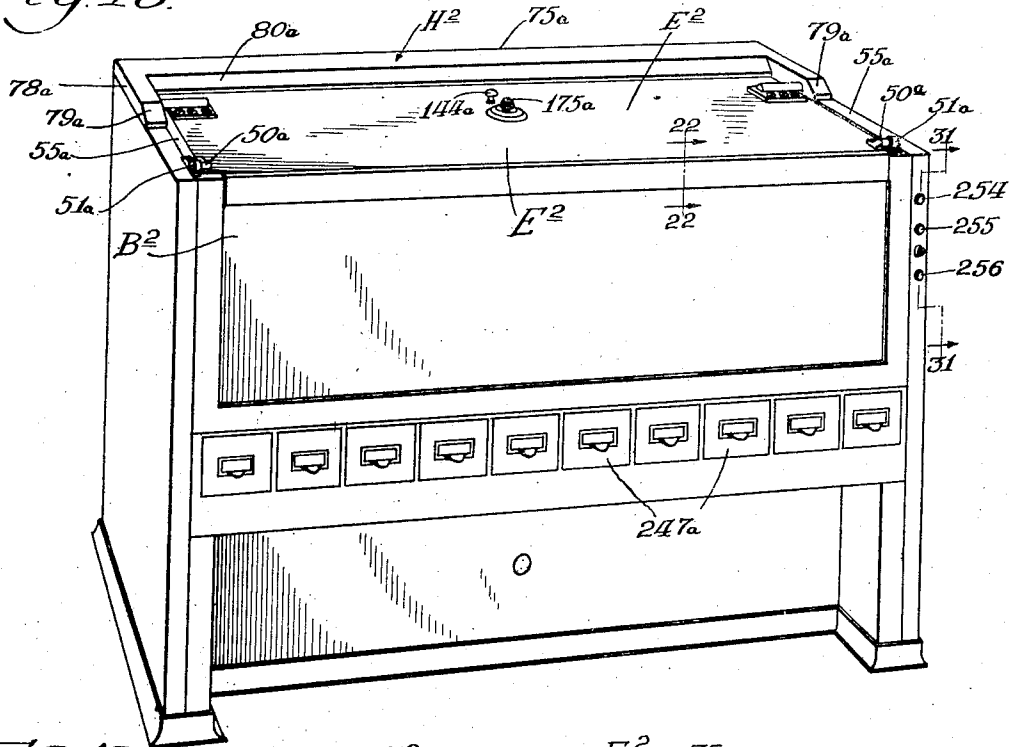
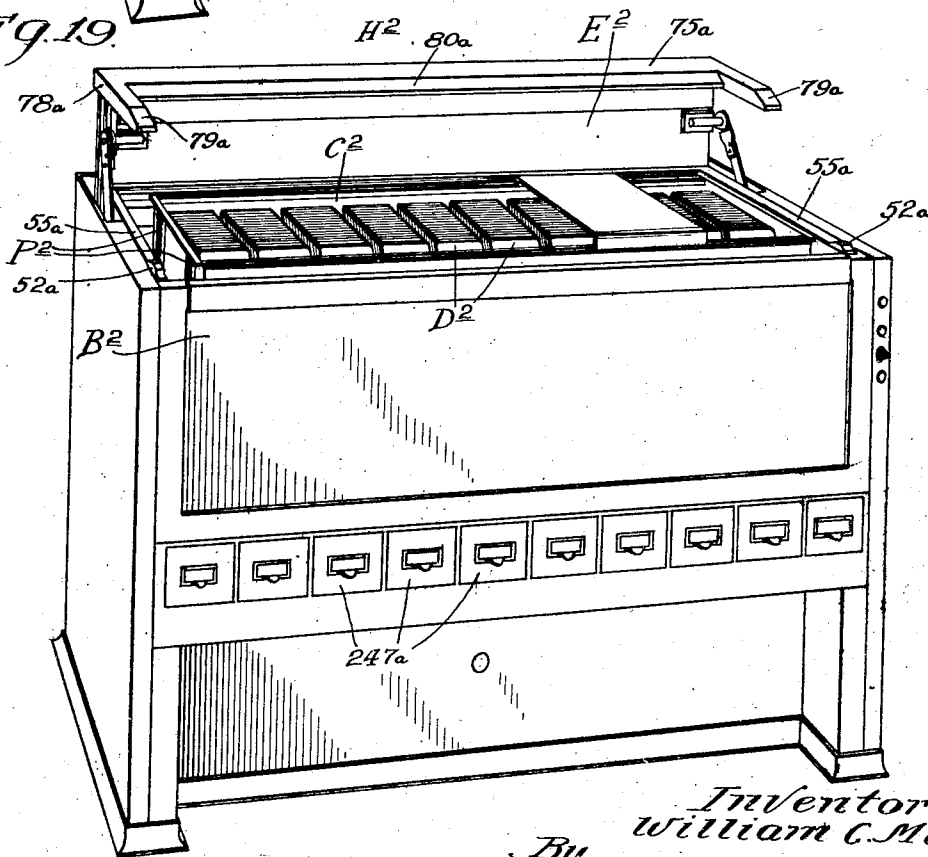


Fig. 19.



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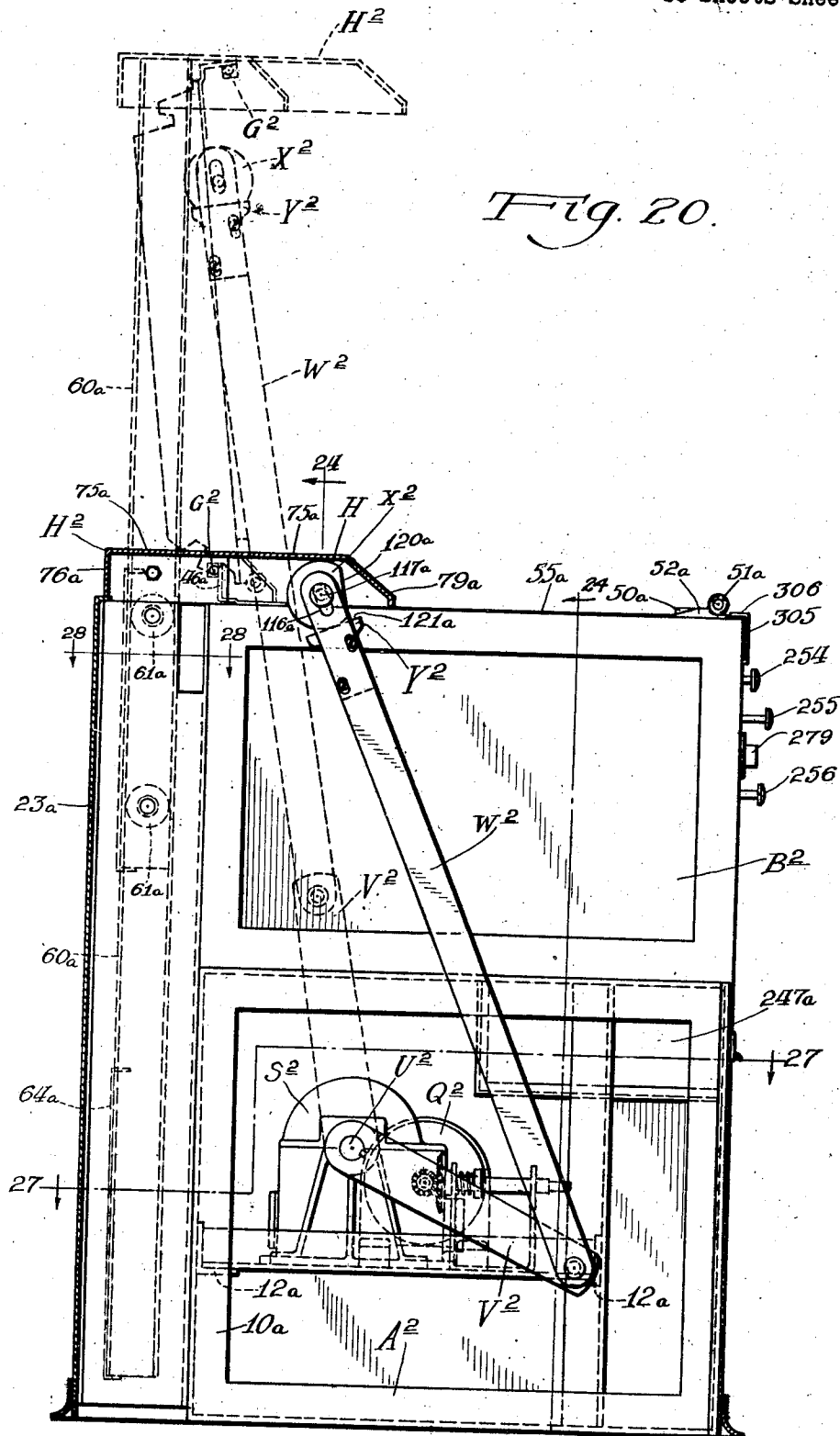
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18 Sheets-Sheet 10



24
Inventor:
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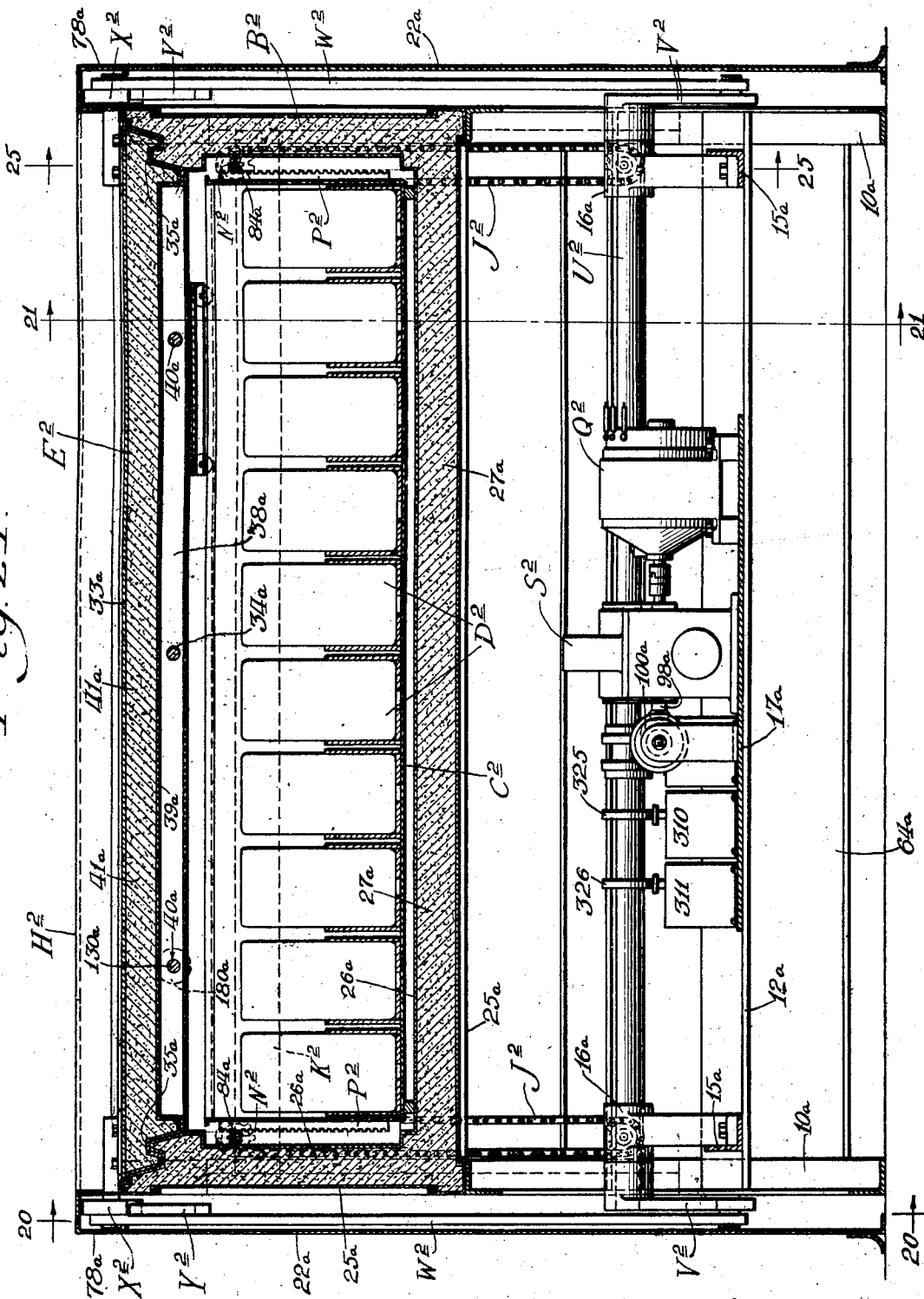
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18 Sheets-Sheet 12

Fig. 24.



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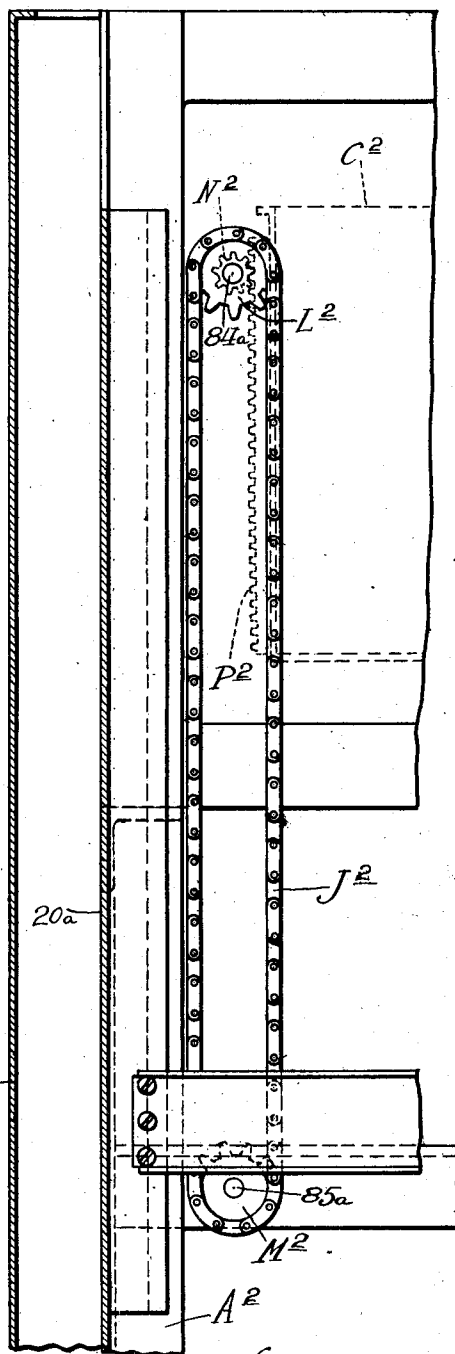
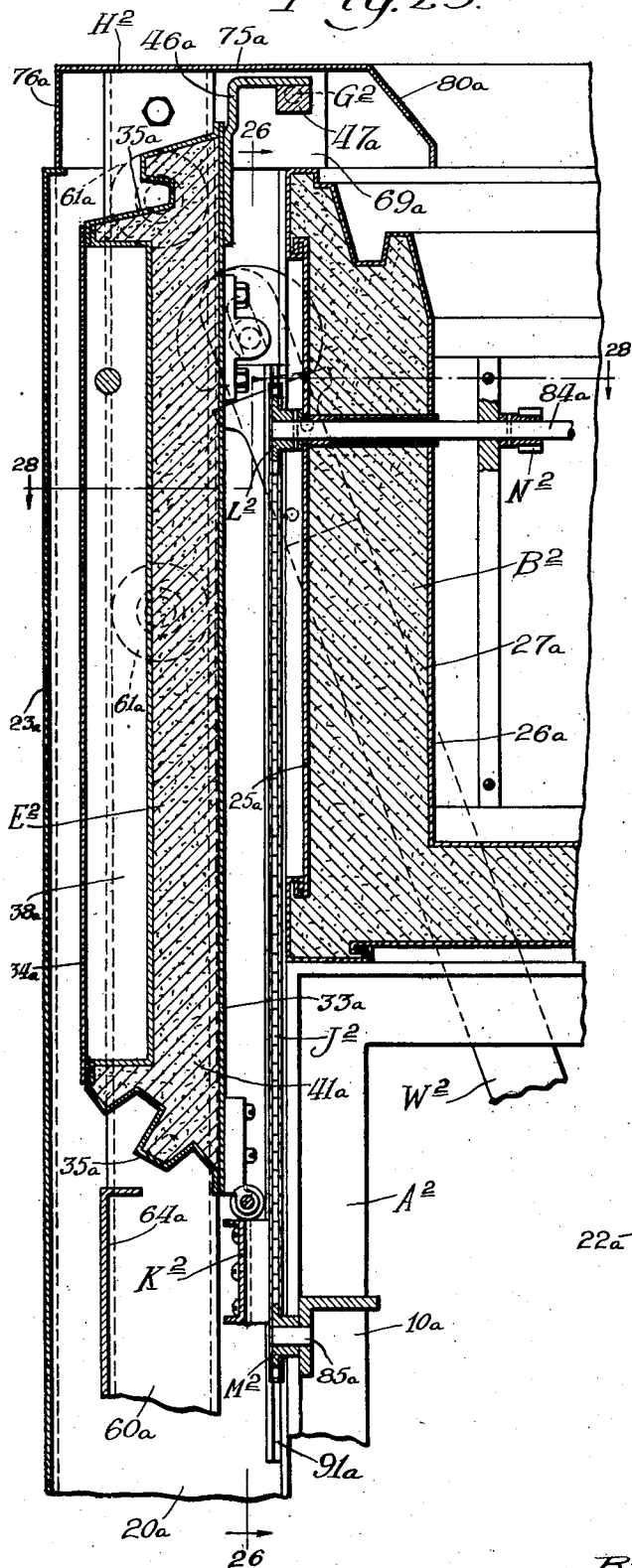
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18 Sheets-Sheet 13

Fig. 25.

Fig. 26.



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18 Sheets-Sheet 15

Fig. 28.

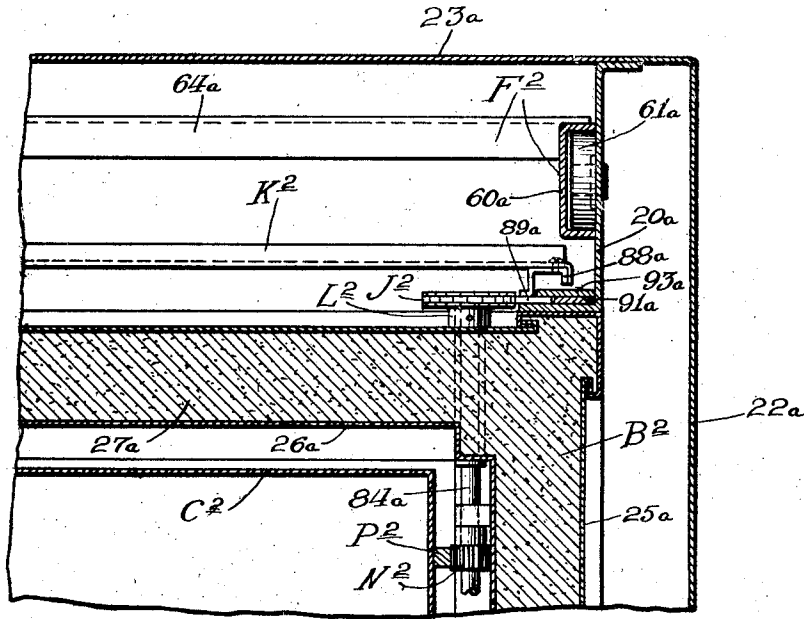


Fig. 29.

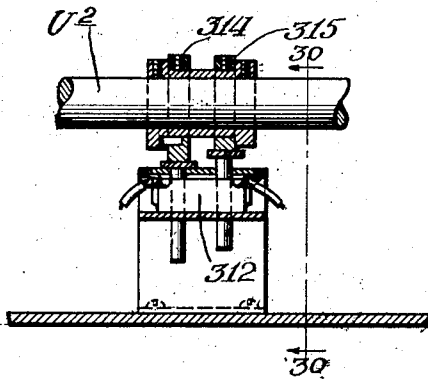
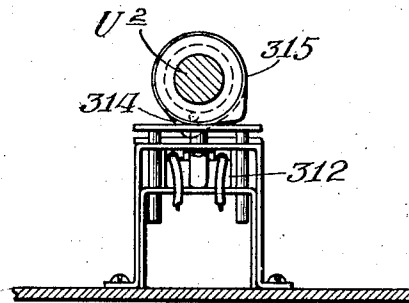


Fig. 30.



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Filed Feb. 29, 1932

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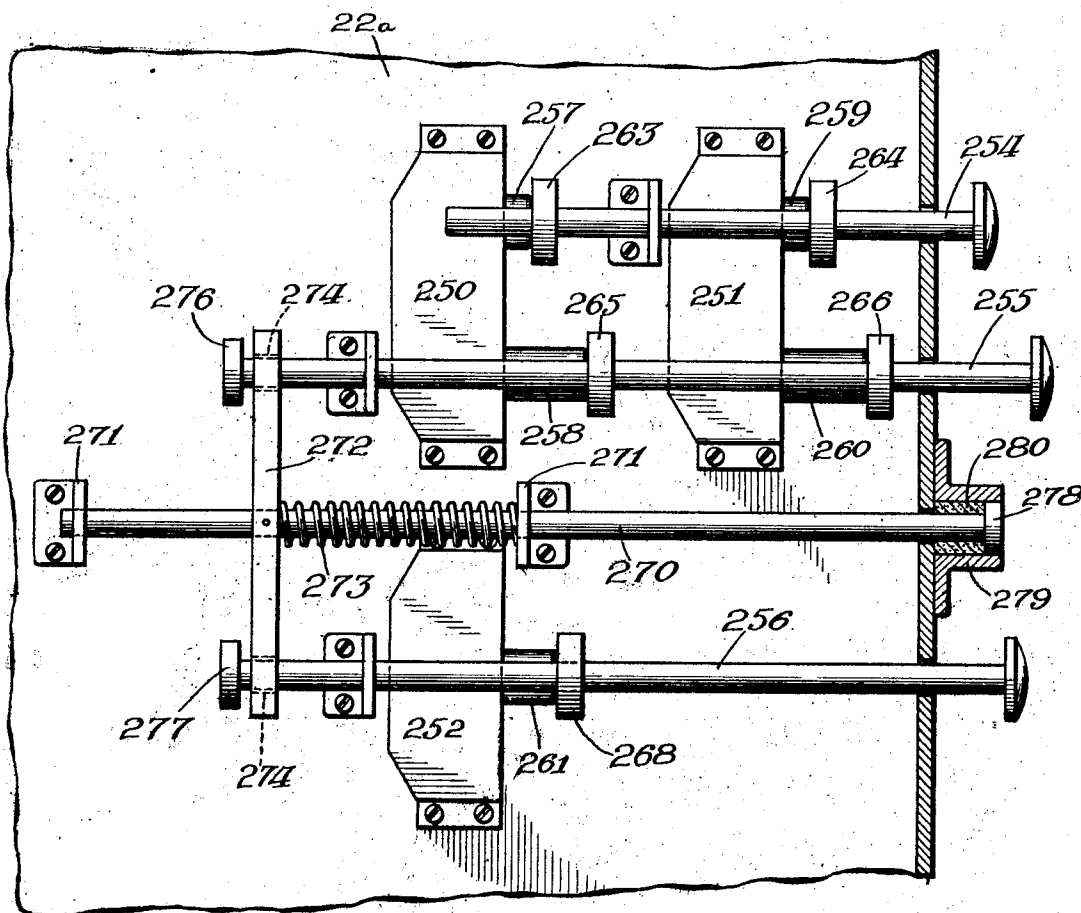


Fig. 31.

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18 Sheets-Sheet 18

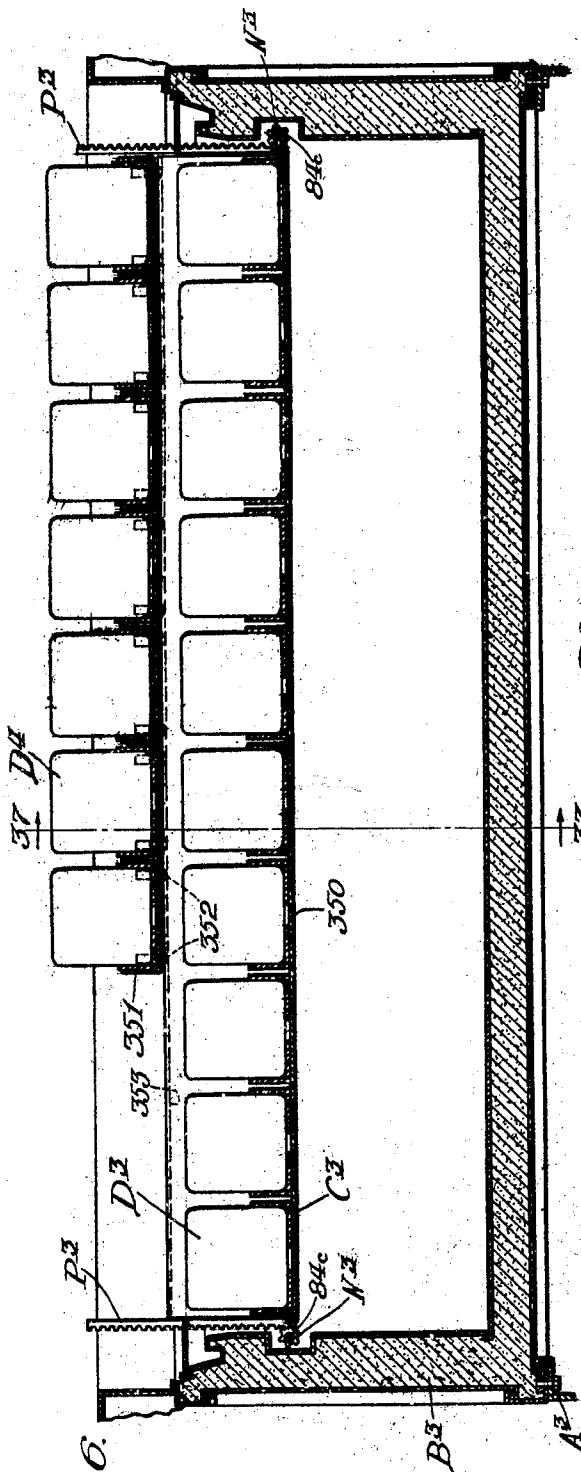


Fig. 36.

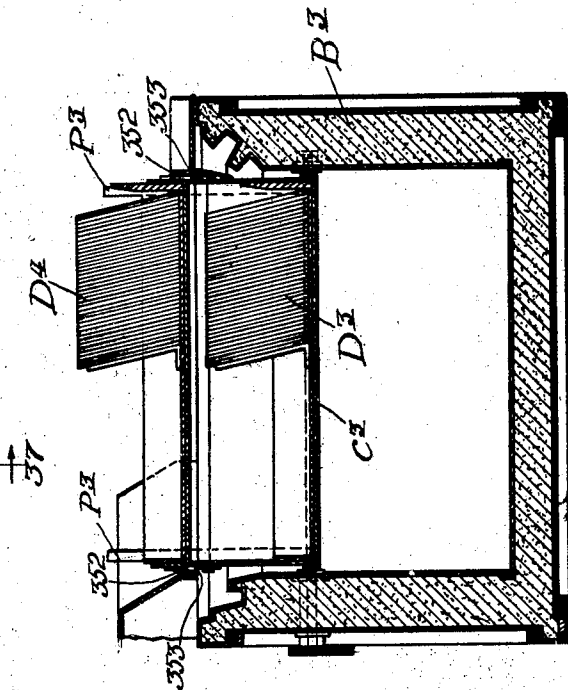


Fig. 37.

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UNITED STATES PATENT OFFICE

1,990,300

RECEPTACLE

William C. Miller, Canton, Ohio, assignor to
Diebold Safe & Lock Co., a corporation of
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Application February 29, 1932, Serial No. 595,897

39 Claims. (Cl. 109—1)

The invention relates to receptacles and is particularly adapted to be embodied in safes, filing devices and other receptacles adapted to hold valuables, records, or the like.

One form of the invention is embodied in a filing device which comprises a fire-proof housing or safe-body. The fire-proof housing or safe-body has an opening in its top and is provided with a thermally insulated door therefor, the door being provided with tongues and grooves which extend around all of its edges and are engageable with corresponding tongues and grooves in the door jamb of the housing so that heat cannot readily penetrate into the housing to destroy or injure the contents. The back edge of the door is pivoted to a vertical slide mounted in back of the housing or safe-body. Means driven by a motor co-operates with the slide to raise the door out of the opening in the housing and to dispose it in a vertical position behind the housing with its front edge lowermost. Improved means controlled by boltwork in the door is provided for controlling the operation of the motor. The door controls an article-holder or filing means movably mounted in the housing, the construction being such that when the door is opened it lifts the filing means into a position wherein it is convenient to the operator. When the door is closed, the filing means gravitates into its lowermost position. Means is provided to prevent pencils, etc., from dropping into the grooves of the door jamb of the housing as articles of this character would prevent the door from closing. Means is also provided for lifting the hands or arms of the operator out of the path of the door when it moves into its closed position, the last mentioned means being controlled by rollers on the door, which rollers also co-operate with cams on the housing during the initial opening movement or final closing movement of the door to disengage or engage, respectively, the tongue on the front edge of the door from or with, as the case may be, the corresponding groove in the door jamb.

A second form of the invention is embodied in a filing device which comprises a fire-proof housing, or safe-body, a thermally insulated door therefor, a vertical slide, and means co-operating with the slide and actuated by an electric motor for opening and closing the door in substantially the same manner as the door is opened and closed in the first described form of the invention. The door in said second form of the invention likewise controls filing means movably mounted in the housing. However, the second form comprises means for controlling the motor so that the arms

of the operator will not be severely injured if the operator fails to withdraw them in time when the door is closing. The construction in the second form of the invention also varies considerably from that of the first form as far as other means for controlling the motor is concerned. These and other variations in the two constructions are described in detail below.

Devices embodying the invention are particularly adapted to be employed as filing devices in banks, insurance companies, etc., where records of deposits, withdrawals, payments, etc., are kept on cards which are filed numerically or alphabetically. Thus, the bank teller may have the complete file in his cage and make reference to it whenever necessary or an insurance company may keep the records of its policies in a convenient place where the clerks may readily refer to them. In the event of a fire or any other emergency, the door will close if a push button is depressed. In other words, the operator need only depress the push button momentarily and then leave the device to close automatically. In the second form of the invention, fusible means is also provided for controlling the electrical motor so that in case of fire, the fusible means will fuse and cause the door to move into its closed position.

The preferred embodiments of the invention are preferably provided with fire-proof housings, or safe-bodies, but it will be readily understood that some features of the invention may be embodied with advantage in housings which are not fire-proof. For instance, the invention may be embodied in any filing device, or the like, to provide a door which will be disposed in back of the housing when the device is in use. This is advantageous as the door will not obscure the vision if it lies behind the housing.

Other objects and advantages of the invention will become apparent as the following detailed description progresses, reference being had to the accompanying drawings, wherein:

Figure 1 is a transverse vertical section taken through a device which embodies the invention, the section being taken on line 1—1 of Fig. 2.

Figure 2 is a section taken on line 2—2 of Figure 1.

Figure 3 is a section taken on line 3—3 of Figure 2.

Figure 4 is a section taken on line 4—4 of Figure 2.

Figure 5 is an enlarged fragmentary plan view of one corner of the device.

Figure 6 is a section taken on line 6—6 of Figure 5.

Figure 7 is a view taken on the same line as Figure 6, but illustrates the parts in changed positions with respect thereto.

Figure 8 is a section taken on line 8—8 of Figure 6.

Figure 9 is a fragmentary plan view, partly broken away, of the device.

Figure 10 is an enlarged fragmentary section taken substantially on the same line as Figure 1, but showing the illustrated parts in changed positions with respect to each other.

Figure 11 is an enlarged fragmentary section taken substantially on the same line as Figure 2, but showing the illustrated parts in changed positions with respect to each other.

Figure 12 is a bottom plan view of the door or closure member for the improved device, the bottom plate of the door or closure member having been removed to illustrate the boltwork.

Figure 13 is a section taken on line 13—13 of Figure 12.

Figure 14 is a section taken on line 14—14 of Figure 13.

Figure 15 is an enlarged section taken on line 15—15 of Figure 2.

Figure 16 is a front elevation of the mechanism shown in Figure 15.

Figure 17 is a diagram of the circuit which controls the operation of the device illustrated in Figures 1 to 16, inclusive.

Figure 18 is a perspective view of a device which embodies another form of the invention.

Figure 19 is a perspective view of the device shown in Figure 18, the door or the closure member of the device being shown in a position which it assumes when it is being opened.

Figure 20 is a transverse vertical section taken through the device shown in Figure 18, the section being taken on line 20—20 of Figure 24.

Figure 21 is a section taken on line 21—21 of Figure 24.

Figure 22 is an enlarged section taken on line 22—22 of Figure 18.

Figure 23 is a section taken on line 23—23 of Figure 22.

Figure 24 is a section taken on line 24—24 of Figure 20.

Figure 25 is an enlarged fragmentary section taken on line 25—25 of Figure 24, the door or closure member of the device being shown in its fully opened position in Fig. 25.

Figure 26 is a fragmentary section taken on line 26—26 of Figure 25.

Figure 27 is a plan section taken on line 27—27 of Figure 20.

Figure 28 is an enlarged fragmentary section taken on line 28—28 of Figure 20.

Figure 29 is an enlarged section taken on line 29—29 of Figure 27.

Figure 30 is a section taken on line 30—30 of Figure 29.

Figure 31 is an enlarged section taken on line 31—31 of Figure 18.

Figures 32 to 35, inclusive, are diagrams of the electrical circuit which controls the operation of the device illustrated in Figures 18 to 31, inclusive, the diagrams being arranged to illustrate changes which occur therein during the operation of the device.

Figure 36 is a fragmentary longitudinal section taken through a device which embodies another form of the invention, and

Figure 37 is a section taken on line 37—37 of Figure 36.

Referring for the present to Figures 1 to 17, inclusive, wherein a preferred embodiment of the invention is illustrated, the reference character A designates a fabricated frame; B, a fireproof housing or safe-body which is supported in the frame A; C, an article-holder or receptacle movably mounted in the housing B; D, a plurality of removable filing devices carried by the tray or receptacle C; E, a door or closure member for closing the open top of the housing B; F, a fabricated slide mounted in the frame A (see Figures 1 and 4); G, pins which pivot the door or closure member E to the fabricated slide F (see Figures 1 and 3); H, a housing member detachably mounted on the upper end of the fabricated slide F; J, a plurality of sprocket chains carrying a fabricated bar K which is engaged by the door or closure member E when it moves into its opened position (see Figures 1, 3 and 9); L and M, upper and lower sprocket wheels, respectively, for the sprocket chains J; N, pinions constrained to rotate with the sprocket wheels L; P, racks which are secured to the ends of the tray or receptacle C and mesh with the pinions N (see Figure 2); Q, a motor which drives a pinion R through reduction gearing S; T, a gear meshing with the pinion R and fixed to a shaft U which extends longitudinally of the device beneath the housing B (see Figures 2 and 4); V, a plurality of crank arms fixed to the ends of the shaft U; W, a plurality of links which have their lower ends pivoted to the free ends of the crank arms V, the upper ends of the links W having pin and slot connections with the door or closure member E; X, a plurality of cam members fixed with respect to the door or closure member E; and Y, a plurality of cam members which are fixed to the links W and co-operate with the cam members X.

The frame A may be of any suitable construction. In this instance it comprises rectangular frames 10 which are formed from angle-iron and are aligned with the ends of the housing B, the housing B being secured to the rectangular frames 10 by bolts 11, or the equivalent (see Figures 1 and 2). Extending between the rectangular frames 10 are a pair of angle-irons 12 and an angle-iron 13 (see Figures 2 and 4). A pair of plates 15 extend between the angle-irons 12 at the end thereof and support bearing brackets 16 for the shaft U. Disposed between the plates 15 and secured to the angle-irons 12 is a plate 17 upon which the motor Q and the reduction gearing S are mounted. The plate 17 also carries a bearing bracket 18 which journals the shaft U intermediate its ends.

The frame A also comprises Z-shaped vertically extending members 20 secured to the back portions of the rectangular frames 10 and extending from a point adjacent the surface upon which the frame is standing to a point substantially flush with the top surface of the housing B (see Figures 1 and 4).

The ends of the frame are preferably covered by sheet metal panels 22, the rear of the frame being preferably covered by a removable sheet metal panel 23. The panel 23 is reinforced by bent sheet metal members 24 (see Figure 1).

The housing B comprises an outer fabricated sheet metal shell or casing 25 and an inner fabricated sheet metal shell or lining 26 the outer and inner shells 25 and 26, respectively, being spaced from each other and the space between them being filled with a thermally insulating

plastic material 27. The upper ends of the sheet metal shells 25 and 26 are formed into door jamb members. The door jamb members at the ends of the housing B are designated by the reference character 28, the door jamb member along the top of the rear wall of the housing member B being designated by the reference character 29 and the door jamb member extending along the front wall of the housing B being designated by the reference character 30 (see Figures 1 and 2). It will be noted that the door jamb members 28, 29 and 30 are provided with tongues and grooves to accommodate corresponding tongues and grooves provided upon the door or closure member E. Thus, the front wall of the housing B is provided with a deep groove 31 and a tongue 32 of corresponding height, the tongue and groove 31 and 32 being inclined with respect to the planes of the door E and the front wall of the housing B.

The door E is also formed from sheet metal and comprises a top wall 33, a bottom plate 34 and bent sheet metal members 35 at its edges, which bent sheet metal members 35 provide the tongues and grooves on the door as described above. Along its front edge, the door E is provided with a tongue 36 adapted to rest in the groove 30 when the door is in its closed position, the tongue 32 of the housing B being then received by a groove 37 provided along the front edge of the door E.

Secured within the door E and forming a compartment 38 directly above the bottom plate 34 is a bent sheet metal member or partition wall 39. The compartment 38 accommodates boltwork which is designated generally by the reference character 40 (see Figure 12). The space between the sheet metal member 39 and the top wall 33 is preferably filled with a thermally insulating plastic material 41 and this material is preferably reinforced by a wire mesh 42 which is secured to hook members 44 mounted on the bent sheet metal members 35 (see Figure 1).

The top wall 33 of the door is provided with an upwardly projecting flange 46 along its rear edge, the flange 46 being secured to blocks 47 which are formed integral with the pivot pins G (see Figures 1, 3 and 9).

At the corners of its front edge, the door E is provided with bracket members 50 which carry rollers 51 adapted to ride over cam members 52 when the door is pulled out of engagement with the front wall of the housing B. The cam members 52 are mounted on the side walls of the housing B (see Figures 1 and 5 to 8, inclusive). Figures 6 and 7 illustrate how the rollers 51 ride up on the cams 52 when the door E is pulled backwards. It will be noted that this construction permits the tongues 32 and 36 to be withdrawn from the grooves 37 and 31, respectively. After the rollers 51 have been pulled over the cam members 52 they will ride on track portions 55 formed upon the top edges of the walls at the ends of the housing B.

Hinged to the front wall of the housing B and aligned with the cam members 52 are cam members 57 which are angularly displaced by the rollers 51 when the door E is drawn backwards (see Figures 6, 7 and 8). The construction of the cams 57 is such that when the door E is moved forward to its closed position the rollers 51 will angularly displace the cam members 57 from the position in which one is shown in Figure 6 to the position in which it is shown in Figure 7. However, when the door is in its closed position the cam members 57 will return to the position wherein they are

shown in Figure 6. Extending between the cam members 57 and secured thereto is a plate 59 which serves as an arm rest when one is working on the files contained in the filing devices D which are carried by the tray or receptacle C. The construction is such that if one places the hands on the plate 59 when the door is moving into its closed position, the plate 59 will raise the hands out of the path of the door so that they will not be caught between the forward edge of the door and the front wall of the housing B.

The fabricated slide F comprises vertically disposed bars 60 slidably journaled between rollers 61 carried by the Z-shaped members 20. (See Figures 1, 4 and 9). Secured to the inner surface of each of the bars 60 by screws 63 is a bent plate 64 and extending between the bent plates 64 and secured thereto are bent sheet metal members 65 which are reinforced by bent sheet metal members 66. It will be readily understood that the bars 60, the members 64 and the members 65 can be displaced as a unit in the frame. Each member 64 carries an angle-iron 68 intermediate its ends. The purpose of this construction will presently appear.

Secured to the upper end of each of the vertically disposed bars 60 is a bracket member 69 in which the pivot pins G are journaled. The housing member H rests upon the upper edges of the brackets 69 and is provided with pins 70 which fit loosely in holes 71 drilled in the brackets 69. (See Figure 3.) The pins 70 prevent lateral displacement of the housing member H with respect to the brackets 69, but it will be readily understood that if the housing member H is moved from the position wherein it is shown in dotted lines in Figure 1 to the position wherein it is shown in full lines in Figure 1 or Figure 3 and one's hands are caught between the housing member H and the top E of the housing B, the pins 70 will permit the housing member H to be displaced upwardly with respect to the brackets 69. This will prevent any serious injury to the hands.

The housing member H is preferably stamped from sheet metal and comprises a top wall 75, a back wall 76 and end walls 78. At its ends, the housing member H is provided with forwardly extending portions 79 which cover the connections between the links W and the door E when the door is in its closed position. The housing member H is provided with a front wall 80 intermediate the forwardly extending portions 79, which front wall 80 comprises an inclined portion 81 and a vertically disposed portion 82 at the bottom end of the inclined portion. (See Figure 1.) It will be noted that the vertically disposed portion 82 of the front wall 80 is aligned with the back wall of the inner lining or shell 26 of the housing B. This construction is advantageous as it prevents pencils, etc., from falling into the groove formed in the back wall of the housing B, which groove receives a tongue on the door E when the door is in its closed position. It may be mentioned at this point in the description that the housing H is in the position wherein it is shown in full lines when the door is in its fully closed position or in its fully opened position.

The sprockets L are fixed to shafts 84 which are rotatably journaled in the housing B. The sprockets M are rotatably journaled upon stud shafts 85 mounted in the rectangular frames 10. (See Figures 1 and 2.) The pinions N are fixed to the shafts 84. It will be noted that there are two pinions N on each of the shafts 84 and that each of the pinions N meshes with a separate

rack P. The construction is such that when the door E is moved from its closed position to its fully opened position, the rollers 51 on the door engage bar K carried by the sprocket chains J and displace the sprocket chains in such manner that the sprockets L rotate the shafts 84 and cause the pinions N to elevate the tray or receptacle C to a position wherein its upper edges are substantially flush with the top of the housing B. (See Figures 1 and 3.) When the door is returned to its closed position, the weight of the receptacle C and its contents causes it to move downwardly until it rests on the bottom wall of the housing B. This downward movement of the receptacle C causes the shafts 84 to rotate the sprockets L in such manner that the sprocket chains J return the bar K to its uppermost position.

The bar K is attached to the sprocket chains J by means comprising bent bars 88 fixed to the ends of the bar K. (See Figure 9.) Lugs 89 secured to the sprocket chains J are also secured to the bent bars 88. The bent bars 88 have integral lugs 90 which ride in grooves 91 formed between the Z-shaped members 20 and vertically disposed plates 93. The plates 93 are secured to and spaced from the Z-shaped members 20 by means comprising blocks 94.

Referring now to Figure 4, it will be noted that the shaft of the motor Q is coupled to a shaft 98 of the reduction gearing S and that the shaft 98 carries a bevel gear 99. The bevel gear 99 may be engaged by a bevel gear 100 fixed to a shaft 102 which is journaled in a bracket 103 mounted on the plate 17. A spring 105 disposed around the shaft 102 yieldingly urges the shaft 102 into a position wherein the gear 100 does not engage the gear 99. The outer end of the shaft 102 is provided with a transversely extending pin 106, the construction being such that a suitable crank may be applied to the shaft 102 to engage the pin 106 and then rotate it to rotate the gear 100 which may be urged into engagement with the gear 99 against the action of the spring 105. This means of rotating the shaft 98 is provided so that the device may be operated if the motor Q fails for any reason. When the shaft 98 is rotated, the reduction gear S drives the pinion R which drives the gear T. The rotation of the gear T is imparted to the shaft U which oscillates the crank arms V from the position in which one of them is shown in full lines in Figure 3 to the position wherein it is shown in dotted lines in the same figure. When the crank arms V are in the dotted line position (Figure 3), the door E is in its closed position. Then if the crank arms are angularly displaced in a counterclockwise direction (Figure 3) to bring them into the full line position (Figure 3) the door E will be displaced from its closed position to its fully opened position. When the door is in its fully opened position it lies between the back panel 23 and the back wall of the housing B. When the door is to be displaced from its fully opened position to its closed position, the crank arms V are angularly displaced in a clockwise direction (Figure 3).

The electrical circuit associated with the motor Q is shown diagrammatically in Figure 17 and it will be noted that it comprises electrical switches 110 and 111 which are hereinafter called limit switches. As shown in Figure 3, the limit switches 110 and 111 are mounted on one of the rectangular frames 10 and comprise push buttons 112 and 113, respectively, which are engaged and displaced by one of the crank arms V when the

door is moved from one of its positions to another. As indicated at 115 in Figure 2 the arm, which is engageable with the limit switch buttons 112 and 113, is rounded to provide a cam surface which will engage the switch buttons 112 and 113 and cause them to be displaced to open the switches. The arrangement is such that when the door E is opened and the crank arms V assume the position wherein one of them is shown in full lines in Figure 3, the left hand crank arm V (Figure 2) will displace the limit switch button 112 of the limit switch 110 during its final movement and open the switch 110 so that the motor Q will cease to operate. Then if the operator wishes to close the door E, the circuit is closed at another point and the last mentioned crank arm V moves into the dotted position (Figure 3) and displaces the limit switch button 113 to open the switch 111. The motor again ceases to operate, the door being then in its closed position.

As stated above, the door E is connected to the links W by pin and slot connections. Thus, as shown in Figures 2, 3 and 9, the upper end of each link W is provided with an elongated slot 116 through which a pin 117 projects, the pins 117 being secured in brackets 118 which are secured to the door E by screws 119, or the equivalent. (See Figure 9.) The cams X are secured to the brackets 118 and are thus constrained to move with the door E.

If the door E is to be opened, the circuit for the motor Q is closed as hereinafter described and the links V travel from the positions indicated by dotted lines in Figure 3 to the position indicated by full lines in the same figure. When the links W travel upwardly during their initial movement, the cam members Y are urged against the cam members X, the two cam members being in the relative positions indicated by dotted lines in Figure 3. Then as the links continue to move upwardly, the back portion of the door is raised above the front portion thereof so that the door is inclined more and more to the horizontal. This is illustrated by dotted lines in Figure 1 where the door E is shown in an intermediate position. When the door E is displaced in this manner from its closed position, its front edge is drawn away from the front wall of the housing B, the front edge of the door being raised at the same time by the rollers 51 which travel on the cams 52. This, as explained above, permits the tongues 32 and 36 to be withdrawn from the grooves 37 and 31, respectively. After the rollers 51 have passed over the cams 52 they ride upon the track portions 55 provided along the top surfaces of the end walls of the container B. The upward movement of the rear edge of the door E continues until flat surfaces 120 on the cams X are brought into engagement with flat surfaces 121 on the cam members Y. The door E is then raised bodily away from the housing B and the rollers 51 are lifted from the track portions 55. During this upward movement of the door E, the slide F also travels upwardly due to the pivotal connection which is provided between the door E and the slide F by the pivot pins G. The flat surfaces 120 and 121 of the cam members X and Y, respectively, remain in engagement while the crank arms V pass through dead center. After the crank arms V have passed through dead center, the flat surfaces 120 tilt on the flat surfaces 121 so that when the crank arms have reached their lowermost position at the end of the door opening operation the flat surfaces 120 and 121 will occupy the relative

positions wherein they are illustrated in full lines in Figure 3. When the flat surfaces 120 and 121 occupy positions resembling the one illustrated in full lines in Figure 3, the door E tends to swing in a counterclockwise direction (Figure 3) around the pivot pins G as its center of gravity is to the left (Figure 3) of the pivot pins G. This tendency of the door E to swing in a counterclockwise direction (Figure 3) causes the rollers 50 to ride down along the inside surfaces 125 of flanges 126 of the Z-shaped members 20. (See Figures 4 and 9). As described above, the door E engages and displaces the bar K during its downward movement and causes the tray or receptacle C to be elevated to a position wherein its upper edges are substantially flush with the top surface of the housing B.

It will be noted that the top plate 33 of the door E extends over the side edges of the door. These overhanging portions of the top plate 33 engage the outside surfaces on the free legs of the angle members 68 during the downward movement of the door E when it is being brought into its fully opened position and also during the upward movement of the door when it is being closed. The construction is such that when the door is first brought into alignment with the bars 60 during the closing movement or when the door is about to pass out of alignment with the bars 60 during its opening movement it has a slight tendency to swing in a clockwise direction around the pivot pins G. The angle-irons 68 prevent such movement. It is understood, of course, that during the closing and opening movements of the door E, it and the fabricated slide F are carried solely by the links W when the rollers 51 are not travelling upon the track portions 55.

The boltwork 40 comprises bolts 128, 129, 130, 131 and 132. (See Figures 12, 13 and 14.) The bolts 128 and 129 work through the side edges of the door E and the bolts 130, 131 and 132 work through the back edge thereof. The inner surfaces of the housing B are provided with suitable recesses to receive the outer ends of the bolts so that they may lock the door in its closed position. The bolts 128 and 130 have their inner ends pivoted to a plate 134 which is pivoted upon a pin 135 carried by the door E. The bolts 129 and 132 have their inner ends pivoted to a plate 136 which is pivoted on a pin 137 carried by the door E. The inner end of the bolt 131 is pivoted upon a pin 139 which is secured to a disc 140 journaled on a pin 141 rotatably journaled in the door E. (See Figure 14.) The pin 141 projects through the top plate 33 of the door E and is provided with a knob 144 whereby the pin may be angularly displaced.

A link 145 has one end pivoted to the bolt 134 and has its other end pivoted to the disc 140 by a pin 146. The last mentioned end of the link 145 is connected to a link 148 by a spring 149. One end of the link 148 is pivoted to the plate 136 and the other end thereof is pivoted to the disc 140 by a pin 150. It will be noted that the pin 139 associated with the bolt 131 projects through an arcuate slot 152 provided in a disc 153 which is constrained to rotate with the pin 141. The disc 153 comprises radially extending lugs 155 and 156. The lug 155 provides shoulders 158 and 159 upon the disc 153 and the lug 156 provides a shoulder 160 thereon. The shoulders 159 and 160 co-operate with a pin 162 to limit angular displacement of the disc 153. The shoulder 159

also co-operates with a pin 164 which projects from a plate 165 pivoted on the pin 162. The pin 162 is mounted on the door E. The construction is such that the plate 165 may be angularly displaced to bring the pin 164 into engagement with the shoulder 159 when the disc 153 has been rotated in a clockwise direction, (Figure 12) a distance sufficient to draw the bolts 128 to 132, inclusive, into their unlocked positions.

Pivoted to the plate 165 is one end of a push rod 167 which has its other end slidably journaled in a bolt-like member 168, the arrangement being such that the rod 167 and the bolt-like member 168 may be telescoped against the action of a spring 169 disposed around the rod 167 and interposed between the member 168 and a collar 170. Collar 170 is secured to the rod 167. When the door E is brought into its closed position, the member 168 is pushed inwardly by the door jamb on the housing B. This heavily compresses the spring 169 so that the rod 167 tends to rotate the plate 165 in a clockwise direction (Figure 12) around the pin 162. Then if the knob 144 is rotated to rotate the disc 153 in a clockwise direction (Figure 12) the plate 165 will be angularly displaced to bring the pin 164 into engagement with the shoulder 159. The spring 169, when compressed in the manner described above, will hold the pin 164 in place against the shoulders 159 and prevent counterclockwise rotation (Figure 12) of the disc 153. Of course, when the door E is opened, the member 168 is brought into the position wherein it is shown in Figure 12 by the spring 169. When the member 168 is in this position, the spring 169 is not sufficiently compressed to hold the pin against the shoulder 159 to prevent counterclockwise rotation of the disc 153 (Figure 12).

The spring 149 tends to force the bolts 128 to 132, inclusive, into their locked positions. It will be noted that the outer ends of the bolts and the bolt-like member 168 are beveled so that the door jamb of the housing B may force them into their unlocked positions during the final closing movement of the door. However, as soon as the door has been brought into its fully closed position, the spring 149 will restore the bolts 128 to 132, inclusive, to their locked positions although the bolt-like member 168 remains in a position wherein it compresses the spring 169. The arcuate slot 152 in the disc 153 permits the bolt 131 to be urged into its unlocked position by the door jamb of the housing B without causing the disc 153 to be angularly displaced. The door E is provided with a combination lock 175 having a bolt 176 engageable by the shoulder 158. When the lock 175 is in its locked condition, the bolt 176 is extended as illustrated in Figure 12 and prevents rotation of the disc 153 in a clockwise direction (Figure 12).

If it is assumed that the door E is in its closed position and that the combination lock 175 is in a locked condition, it is readily understood that if one wishes to open the door E, it is first necessary to unlock the combination lock 175 and then rotate the knob 144 to rotate the disc 153 in a clockwise direction (Figure 12) so that it angularly displaces the pin 139 in the same direction. The disc 140 is constrained to rotate with the pin 139 and therefore the bolts 128, 129, 130 and 132 will be retracted as well as the bolt 131 which is secured to the pin 139. As explained above, the pin 164 engages the shoulder 159 on the disc 153 and holds the disc in a position wherein it holds the bolts 128 to 132, inclu-

slive, in their retracted positions. Then if the circuit for the motor Q is closed, the above described apparatus which operatively connects the motor with the door E will function to bring the door to its fully opened position. As soon as the door E leaves the door jamb of the housing B, the spring 169 forces the bolt-like member 168 outwardly and the spring 149 functions in such manner that the pin 164 is driven out of engagement with the shoulder 159 and the bolts 128 to 132, inclusive, are forced into their fully extended or locking positions with respect to the door. The lock 175 is preferably restored to a locked condition during the initial opening of the door E. Then when the door is returned to its closed position and the bolts again engage the recesses provided for them in the housing B, the door will be locked to the housing and cannot be opened until one operates the combination lock to unlock it.

As best shown in Figure 15, the bolt 130 controls a switch device 180 which comprises a pin 181. The pin 181 is slidably journaled in a sleeve 182 which is secured in the back wall of the housing B. The inner end of the pin 181 is provided with a head 183 engageable by the bolt 130. A disc 185 secured to the outer end of the pin 181 carries an insulating block 186 adapted to engage and displace a spring contact member 187 so that it will engage a spring contact member 188. A spring 190 disposed in the sleeve 182 yieldingly urges the pin 181 to the right (Figure 15) so that the insulating block 186 will cause the contact 187 to engage the contact 188. However, when the door E is in its closed position and the bolt 130 projects therefrom, the bolt 130 holds the pin 181 in a position wherein the insulating block does not hold the contact 187 in engagement with the contact 188. When the latter condition obtains, the circuit for the motor Q cannot be closed and therefore one is prevented from starting the motor when the bolts are engaged with the housing B. If the motor is to be set in operation to open the door, it is first necessary to retract the bolts 128 to 132, inclusive.

It may be mentioned at this point in the description that the slots 116 in the links W are of such length that if a pencil or any other object prevents the door from closing, the links W may continue to move to the position wherein they are illustrated by dotted lines in Figure 3 and the door will not be crushed or will not crush the object lying between it and the housing B.

Referring now to Figure 10 which shows the upper edge of the front wall of the housing B, the tray or receptacle C is shown in its uppermost position, the position it assumes when the door is in its fully opened position. Hinged to the front wall of the receptacle C is a plate 192 which extends substantially from one end of the tray to the other. A leaf spring 193 secured to the plate 192 yieldingly urges the plate in a clockwise direction (Figure 10) around its pivotal axis. It will be noted that when the receptacle C is in its uppermost position, the plate 192 rests against the tongue 32 and its free edge is aligned with the free edge of the plate 59 extending between the cam members 57. The plate 192 is provided with an inwardly projecting flange 194 which closes the space between the free edge of the plate 59 and a track 195 extending along the front wall of the tray or receptacle C. This construction prevents one from dropping a pencil, or the like, into the groove 31 so that it will prevent the door E from closing.

Figure 11 is a section taken through the upper portion of one of the end walls of the housing B. The tray or receptacle C is shown in its uppermost position. Plates 197 are secured to the end walls of the receptacles C by hinges 198. When the receptacle C moves to its upper position, the plates 197 gravitate into positions wherein they close the spaces between the end walls of the receptacle C and the end walls of the housing B. This prevents one from dropping pencils, or the like, into the grooves provided in the door jambs along the end walls of the housing B. When the receptacle C returns to its lower position, the plates 197 are forced back into positions wherein they are aligned with the end walls of receptacle C. It will be noted that the plates 197 have upturned flanges 200 along their free edges, which flanges 200 will prevent pencils, or the like, from rolling off the plates into the grooves in the door jamb.

In Figure 1, push buttons 202, 203 and 204 are shown. These push buttons control switches 205, 206 and 207, respectively, which are illustrated diagrammatically in Figure 17.

Referring now to Figure 17 which shows the electrical circuit including the switches 110, 111, 205, 206 and 207 described above as well as the spring contact members 187 and 188 and the motor Q, it will be noted that the apparatus for controlling the door E includes relays 210 and 211. The relay 210 controls contacts 213, 214 and 215 adapted to engage contacts 216, 217 and 218, respectively. The relay 211 controls contacts 220, 221 and 222 adapted to engage contacts 223, 224 and 225, respectively. When either of the relays 210 and 211 is energized, it causes its movable contacts to engage the corresponding stationary contacts. A mechanical interlocking device is illustrated diagrammatically at 227. The inner locking device 227 prevents either of the relays 210 and 211 from closing its contacts while the contacts of the other relay are closed. The relays 210 and 211 comprise windings 230 and 231, respectively. The circuit includes the mains 233 and 234 which are connected to any suitable source of electrical energy. The main 233 is connected to the spring contact member 188 and to the contacts 217 and 224. The main 234 is connected to the contacts 218 and 225 and, also, one terminal of the winding 231, the other terminal of this winding being connected to one terminal of the limit switch 111 which has its other terminal connected to the contact 220 and to one terminal of the switch 206. The other terminal of the switch 206 and one terminal each of the switches 205 and 207 are connected to the contacts 216 and 223. The other terminal of the switch 207 is connected to the spring contact member 187 and the other terminal of the switch 205 is connected to one terminal of the switch 110 and to the contact 213. The other terminal of the switch 110 is connected to one terminal of the winding 230 which has its other terminal connected to the main 234. The contact 214 is connected to one terminal of the motor Q, another terminal of the motor Q being connected to the contact 221. A third terminal of the motor Q is connected to the contact 222 and to the contact 215. The circuit is illustrated in the condition it assumes when the door E is locked in its closed position.

The conductor which connects the contacts 218 and 225 to the main 234 is identified by the reference character 240. 241 designates which conductor connects the main 233 with the contacts

217 and 224 and 242 designates the conductor which connects the contacts 216 and 223 with one terminal of the switch 205. 243 designates the conductor which connects the last mentioned terminal of the switch 205 to a terminal of the switch 203. 244 designates the conductor which connects the last mentioned terminal of the switch 206 to the terminal of switch 207.

The operation of the above described apparatus is substantially as follows: When the door E is locked in its closed position and the circuit is in the condition illustrated in Figure 17, the combination lock 175 must first be unlocked if it is desired to open the door E. The knob 144 must then be rotated so that the pin 164 will engage the shoulder 159 of the disc 153 and hold the bolts 128 to 132, inclusive, in their retracted positions. The bolt 130 then permits the spring contact 188 to engage the spring contact 187. Then if the push button switch 205 is closed momentarily, current will flow as follows: from the main 233 through the contacts 188 and 187 (these contacts close when bolt-work is unlocked), the switch 207, the conductors 244 and 243, the switch 205, the switch 110, the winding 230, and then to the main 234. The winding 230 energizes the relay 210 and it causes the contacts 213, 214 and 215 to engage contacts 216, 217 and 218, respectively. A current then flows as follows: from the main 233, through the contacts 188 and 187, the switch 207, conductors 244, 243 and 242, the contacts 213 and 216, the switch 110, and through the winding 230 back to the main 234. The circuit just described is a holding or stick circuit and it keeps the relay 210 energized until the circuit is opened at the switch 110 or the switch 207. So long as the relay 210 remains energized a current flows as follows: from main 233, through the conductor 241, the contacts 214 and 217, the motor Q, the contacts 215 and 218, and thence through the conductor 240 to the main 234. The motor Q then causes the door E to move to its fully opened position whereupon the switch 110 is opened. Meanwhile the switch 111 has closed. The motor stops when the switch 110 is opened. The mechanism is now adjusted so that if the switch 206 is closed momentarily the motor Q will operate in the reverse direction to close the door E. In explanation, if the switch 206 is closed momentarily, a current will flow as follows: from the main 233 through contacts 188 and 187, the switch 207, the conductor 244, the switch 206, the switch 111, and then through the winding 231 to the main 234. This current energizes the relay 211 and a holding or stick-circuit is closed through which current flows as follows: from the main 233, through the contacts 188 and 187, the switch 207, the conductors 244, 243 and 242, the contacts 220 and 223, the switch 111 and thence through the winding 231 to the main 234. Simultaneously a current causes the motor Q to operate. This current flows as follows: from the main 233, through the conductor 241, the contacts 221 and 224, the motor Q, the contacts 222 and 225, and thence through the conductor 240 to the main 234. When the switch 111 is opened the motor Q ceases to operate and the door E is in its closed position. The switch 110 is closed during the initial portion of the door closing operation.

During the opening and closing movements of the door E the switch 207 may be opened momentarily to open the stick circuits for the relays 210 or 211, respectively, so that the door will stop in an intermediate position. Subse-

quently the door may be made to close or open from its intermediate position by closing the switch 205 or the switch 206, respectively, for a moment.

The device illustrated in Figures 1 to 17, inclusive, is particularly adapted to be employed by banks, insurance companies, etc., as a means for safeguarding their records. The device may be left open during the day time so that the records are readily accessible, but in the event of fire, holdups, etc., the device may be closed by momentarily pushing the button which sets the apparatus in operation in closing the door. It is readily understood that the device is not limited to use in connection with records, etc., as it may be employed to hold valuables of any kind. The housing B is preferably fireproof so that the device may be subjected to intense heat for a relatively long period of time, during which time the records or valuables will be protected from the heat.

If the device is employed as a file for records such as cards, etc., the records are preferably filed in the filing devices D. These filing devices D move up and down with the tray or receptacle C and are in convenient positions for the operator when the door is in its fully opened position. A small table 245 provided with rollers 246 is adapted to travel in the tracks 195 extending along the front and back walls of the tray or receptacle C. This is for the convenience of the operator or filing clerk as records may be withdrawn from the file and placed on the table for reference.

A plurality of drawers 247 are preferably provided beneath the housing B. (See Figures 1 and 2.) These drawers are not thermally insulated and may be utilized to hold records, etc., which are not particularly important.

Referring now to Figures 18 to 35, inclusive, wherein another form of the invention is illustrated, the reference character A² designates a fabricated frame; B², a fire-proof housing; C², a tray or receptacle movably mounted in the housing B²; D², a plurality of removable filing devices carried by the tray or receptacle C²; E², a door or closure member for the housing B²; F², a fabricated slide mounted in the frame A²; G², pins which pivot the door or closure member E² to the fabricated slide F²; H², a housing member detachably mounted on the upper end of the fabricated slide F²; J², a plurality of sprocket chains carrying a bar K² which is engaged by the door E² when it moves into its open position (see Figure 21); L² and M², upper and lower sprocket wheels, respectively, for the sprocket chains J²; N², pinions constrained to rotate with the sprocket wheels L²; P², racks which are secured to the ends of the tray or receptacle C² and mesh with the pinions N²; Q², an electric motor, which drives a shaft U² through reduction gearing S² (see Figure 27); V², a plurality of crank arms fixed to the ends of the shaft U²; W², a plurality of links which have their lower ends pivoted to the free ends of the crank arms V², the upper ends of the links W² having pin and slot connections with the door E²; X², a plurality of cam members fixed with respect to the door E² or closure member; and Y², a plurality of cam members which are secured to the links W² and co-operate with the cam members X².

It will be noted that there is a close resemblance between the parts of the device shown in Figures 18 to 35, inclusive, and the parts of the device shown in Figures 1 to 17, inclusive. There-

fore it will not be necessary to give a detailed description of all of the construction shown in Figures 18 to 35, inclusive, as one may refer to the description of Figures 1 to 17, inclusive.

5 The frame A² resembles the frame A described above as it comprises rectangular frames 10a which are formed from angle-iron and are aligned with the ends of the housing B². The housing is rigidly secured to the rectangular frames 10a.
10 Extending between the rectangular frames 10a are a pair of angle-irons 12a to which are secured a plurality of bars 15a and a plate 17a. (See Figure 27.) The bars 15a support bearing brackets 16a which journal the shaft U². The motor Q² is mounted on the plate 17a.
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The frame A² also comprises Z-shaped vertically extending members 20a which resemble the Z-shaped members 20 described above. The members 20a are secured to the back portions of the rectangular frames 10a and extend from a point adjacent the surface upon which the frame A² is standing to a point substantially flush with the top surface of the housing B². The ends of the frame are preferably covered by sheet metal panels 22a, the rear of the frame being preferably covered by a removable sheet metal panel 23a.
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The housing B² comprises an outer fabricated sheet metal shell or casing 25a and an inner fabricated sheet metal shell or lining 26a, the shells 25a and 26a being spaced from each other. The space between the shells is filled with a thermally insulating plastic material 27a. The upper ends of the sheet metal shells 25a and 26a are formed into door jamb members. These door jamb members are preferably identical in construction with corresponding door jamb members of the device shown in Figures 1 to 17, inclusive, and are provided with tongues and grooves to accommodate tongues and grooves provided upon the door E².
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The body portion of the door E² is preferably identical in construction with the door E described above. The door E² comprises a top plate 33a, a bottom plate 34a and bent sheet metal members 35a at its edges, which members 35a provide tongues and grooves on the door as described above.
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Within the body portion of the door is a bent sheet metal member or partition wall 39a which forms a compartment 38a. The compartment 38a accommodates boltwork 40a which is identical in construction with the corresponding boltwork 40 of the device shown in Figures 1 to 17, inclusive. The boltwork 40a is identical with the boltwork 40 shown in Figure 12 and reference may be made to this figure of the drawings when the construction of the device shown in Figures 18 to 35, inclusive, is to be considered. The space between the sheet metal member 39a and the top wall 33a is preferably filled with thermally insulating plastic material 41a.
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The top wall 33a of the door E² is provided with an upwardly projecting flange 46a along its rear edge, the flange 46a being secured to blocks 47a which are formed integral with the pivot pins C². (See Figures 20, 21 and 25.)

At the corners of its front edge, the door E² is provided with bracket members 50a which carry rollers 51a adapted to ride over cam members 52a when the door is displaced toward the back of the housing B² to disengage it from the front wall of the housing. The cam members 52a are mounted on the side walls of the housing B². (See Figures 18 and 19.) The rollers
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51a and the cam members 52a have the same functions as the rollers 51 and cam members 52, described above. After the rollers 51a have been pulled over the cam members 52a, they will ride on track portions 55a formed upon the top edges of the walls at the ends of the housing B².
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The slide F² comprises vertically disposed channel members 60a adapted to slide up and down on rollers 61a mounted on the Z-shaped members 20a. (See Figures 20, 21, 27 and 28.) The lower ends of the channel members 60a are connected to each other by a sheet metal beam 64a. Secured to the upper ends of the vertically disposed channel members 60a are bracket members 69a in which the pivot pins C² are journaled. The housing member H² rests upon the upper edges of the brackets 69a and is detachably secured thereto in the same manner as the housing H described above is secured to its corresponding brackets 69.
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The housing member H² is preferably stamped from sheet metal and comprises a top wall 75a, the back wall 76a and end walls 78a. (See Figures 18, 19, 20 and 24.) At its ends, the housing H² is provided with forwardly extending portions 79a which cover the connections W² and the door E² when the door is in its closed position. The housing member H² is provided with an inclined front wall 80a intermediate the forward extending portions 79a, which front wall 80a has the same function as the front wall 80 described above.
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The sprockets L² are fixed to shafts 84a which are rotatably journaled in the housing B². Sprockets M² are rotatably journaled upon said shafts 85a mounted in the frame A. (See Figures 21, 25 and 26.) The pinions N² are fixed to the shafts 84a. It will be noted that there are two pinions N² on each of the shafts 84a and that each of the pinions N² meshes with a separate rack P². The construction is such that when the door E² is moved from its closed position to its fully opened position, the rollers 51a on the door E² engage the bar K² which is carried by the sprocket chains J². Bar K² is displaced downwardly and as it is connected to the sprocket chains J², the sprocket chains are advanced in such manner that the sprockets L², the shafts 84a and the pinions N² co-operate to elevate the tray or receptacle C² to a position wherein its upper edges are substantially flush with the top of the housing B². When the door E² is returned to its closed position, the weight of the receptacle C² and its contents causes it to move downwardly until it rests upon the bottom wall of the housing B². This downward movement of the receptacle C² causes the shaft 84a to rotate the sprockets L² in such manner that the sprocket chains J² return the bar K² to its uppermost position.
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The bar K² is attached to the sprocket chains J² by means comprising bent bars 88a secured to the ends of the bar K². (See Figure 28.) Lugs 89a secured to the sprocket chains J² are also secured to the bent bars 88a. The lugs 89a ride in grooves 91a formed between the Z-shaped members 20a and vertically disposed plates 93a.
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Referring now to Figure 27, it will be noted that the shaft of the motor Q² is coupled to a shaft 98a of the reduction gearing E² and that the shaft 98a carries a bevel gear 99a. The bevel gear 99a may be engaged by a bevel gear 100a secured to a shaft 102a which is journaled in a bracket 103a mounted on the plate 17a. A
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spring 105a disposed around the shaft 102a yieldingly holds the shaft 102a in a position wherein the gear 100a does not mesh with the gear 99a. This construction is preferably identical with the construction of the means shown in Figures 1 to 17, inclusive, for manually operating the device shown in those figures and it may be operated in the same manner. Therefore, the shaft U² may be rotated either through the medium of the motor Q² or through the medium of the bevel gears 99a and 100a. When the shaft U² is rotated, this motion is translated and imparted to the links W² by the crank arms V². The device shown in Figures 18 to 35, inclusive, operates in substantially the same manner as the device shown in Figures 1 to 17, inclusive, and while a different electrical circuit is employed and there is some difference in details of construction, it will be readily understood that the crank arms V² are oscillated in substantially the same manner as the crank arms V described above. Thus, the crank arms V² travel from the position illustrated by full lines in Figure 20 to the position illustrated by full lines in Figure 21 and back again to complete a full cycle of operations for opening and closing the door E². When the door E² is in its closed position, the crank arms V² occupy the position illustrated by full lines in Figure 20. Then when the motor Q² is set in operation, the crank arms V² are displaced in a counter-clockwise direction (Figure 20) until they reach the position illustrated by full lines in Figure 21, whereupon the door E² is in its fully opened position as illustrated in the same figure. When the motor is reversed, the door E² returns to its closed position and the crank arms V² return to the position illustrated by full lines in Figure 20. An intermediate position of the door E is illustrated by dotted lines in Figure 20. This is the position the door assumes when it has been raised as high as the links W² can raise it. It will be noted that the slide F² travels up and down with the door E² in the same manner as the slide F described above travels with its corresponding door E.

The cams X² and Y² are secured to the door E² and to the links W², respectively. They are preferably identical in construction with the cams X and Y described above and function in the same manner. The upper ends of the links W² are provided with slots 116a through which pins 117a secured to the door E² project. The construction is such that when the door E² is displaced from its closed position to its fully opened position, the cams X² turn with the door E² so that they rotate with respect to the cams Y² until flat surfaces 120a on the cams X² rest on flat surfaces 121a formed on the cam members Y². This is illustrated by dotted lines in Figure 20.

Then as the door descends into the space between the housing B² and the back panel 23a the flat surfaces of the cam members X² tilt on the flat surfaces of the cam members Y². This is illustrated in Figure 21. The flat surfaces 120a and 121a co-operate to hold the door E² in predetermined positions with respect to the links W² after the rollers 51a leave the tracks 55a.

The boltwork 40a comprises a bolt 130a which co-operates with a switch device 180a preferably identical with the switch device 180 described above. (See Figure 24.) The switch device 180a like the switch device 180, is open whenever the door with which it is associated is locked in its closed position. Therefore, the door E²

must be unlocked before the motor Q² can be started. As shown in Figure 18, the door E² is provided with a combination lock 175a identical with the combination lock 175. The door E² is also provided with a knob 144a identical with the knob 144 and adapted to control the boltwork 40a in the same manner as the knob 144 controls the boltwork 40.

As shown in Figures 31 to 35, inclusive, the electrical circuit comprises electrical switches 250, 251 and 252 which are manually operated. Associated with the switches 250 and 251 are push rods 254 and 255 and associated with the switch 252 is a push rod 256. The push rods are shown in Figures 18 and 19. The construction is such that the push rod 254 is displaced to the left (Figure 31) when one wishes to open the door E², the push rod 255 is displaced to the left when one wishes to close the door E² and the push rod 256 is displaced to the left under certain conditions when one wishes to reverse the direction in which the door E² is travelling.

The switch 250 is provided with two push buttons 257 and 258, the switch 251 being provided with similar push buttons 259 and 260, the switch 252 is provided with a single push button 261. The construction of the switches 250 and 251 is such that if one push button of either switch is depressed, the other push button of the switch will be forced outwardly. In Figure 31, the push rod 254 has been displaced to the left so that collars 263 and 264 secured to the push rod have depressed the push buttons 257 and 259, respectively. Now, if the push rod 255 is displaced to the left (Figure 31), the push buttons 258 and 260 will be depressed by collars 265 and 266, respectively, which are carried by the push rod 255. When the push buttons 258 and 260 are depressed in this manner, the mechanism (not shown) of the switches 250 and 251 causes the push buttons 257 and 259 to move outwardly so that the push rod 254 is displaced to the right (Figure 31).

The push rod 256 may be displaced to the left (Figure 31) so that a collar 268 secured to the push rod will depress the push button 261. However, the construction of the switch 252 is such that if the force applied to the push rod 256 to displace it to the left (Figure 31) is removed, the push button 261 will move outwardly and restore the push rod 256 to its original position.

The switches 250, 251 and 252 are secured to the inside surface of the right-hand end wall 22a (Figures 18 and 19). The outer ends of the push rods 254, 255 and 256 are arranged as shown in Figures 18 and 19 so that they are readily accessible to the operator. Disposed between the push rods 255 and 256 is a push rod 270 slidably journaled in brackets 271 secured to the inner surface of the last mentioned sheet metal wall 22a. Interposed between one of the brackets 271 and a bar 272 fixed to the push rod 270 is a compression spring 273 which is normally under tension. The inner ends of the push rods 255 and 256 project through holes 274 provided in the ends of the bar 272, the push rods 255 and 256 being provided with heads 276 and 277, respectively, which will be engaged by the bar 272 when it is displaced to the left (Figure 31). The outer end of the push rod 270 projects from the front surface of the improved device and is provided with a head 278 slidably journaled within a collar 279. The collar 279 is secured to the front surface of the improved device. A fusible element 280 is disposed within the collar 279 and

normally prevents displacement of the push rod 270 to the left (Figure 31) by the action of the spring 273. However, if the temperature in the room rises a relatively small amount over normal room temperature, the element 280 will fuse and the spring 273 will displace the push rod 270 and the bar 272 to the left (Figure 31) so that the bar will engage the heads 276 and 277 and displace the push rods 255 and 256, to the left (Figure 31). As hereinafter explained, if the door E^2 is in its open position when the element 280 fuses, displacement of the push rods 255 and 256 to the left (Figure 31) will close a circuit for the motor Q^2 so that the motor will actuate the mechanism which closes the door.

As illustrated diagrammatically in Figures 32 to 35, inclusive, the switch 250 is a 4 point double pole reversing switch with terminals 284, 285, 286 and 287. The switch 251 is a 3 point single pole changing switch having terminals 289, 290 and 291. The switch 252 is a 2 pole switch having terminals 293 and 294.

As shown in Figures 31 to 35, inclusive, and in Figures 22 and 23, the circuit associated with the motor Q^2 comprises a switch device 300 which is disposed in a chamber 301 formed in the upper portion of the front wall of the housing B^2 . The switch device 300 comprises spring contact members 302 and 303 which normally engage each other. A pin 304 slidably journaled in the front wall of the housing B^2 is attached to a U-shaped member 305 which extends along the entire length of the front wall of the housing B^2 . The U-shaped member 305 comprises a leg 306 which projects over the upper front edge of the housing B^2 and it is readily understood that when the operator is referring to the records disposed in the housing B^2 , the operator's arms will extend over the leg 306. The springs 307 secured to the U-shaped member 305 tend to hold it in the position wherein it is shown in Figures 22 and 23. However, if the U-shaped member 305 is depressed by the arms of the operator against the action of the springs 307, the pin 304 will be displaced downwardly to disengage the spring contact member 302 from the spring contact member 303. If the door E^2 is being closed and the operator's arms are in the path of the door, the operator may depress the U-shaped member 305 to disengage the contact member 302 from the contact member 303 whereupon, as hereinafter explained, the motor Q^2 will cease to operate and the operator will not be injured.

In addition to the switch devices described above, the circuit for the motor Q^2 comprises switch devices 310, 311 and 312.

The switch device 312 is a 3 point single pole changing switch which is operated by cams 314 and 315 fixed to the shaft U^2 . The switch 312 comprises terminals 316, 317 and 318.

The switch 311 comprises terminals 320 and 321. As shown in Figures 24 and 27, the switches 310 and 311 are actuated by cams 325 and 326, respectively, which are secured to the shaft U^2 . The cam 326 is adapted to open the circuit between the terminals 320 and 321 whenever the door E^2 moves into its fully closed or its fully opened position, the circuit being normally closed between the terminals 320 and 321. The cam 325 is adapted to open the switch 310 in the event the switch 311 fails to open when the door E^2 has been brought into its fully opened or closed position, the timing of the switch 310 being delayed with respect to the timing of the switch 311. In

other words, the switch 310 is employed as a safeguard against failure of the switch 311.

As shown in Figures 32 to 35, inclusive, the switch device 180a is in series with the switch device 300. The switch device 188 comprises spring contact members 187a and 188a which are identical with and for the same function as the spring contact members 187 and 188 described in connection with the device illustrated in Figures 1 to 17, inclusive.

The circuit is connected to mains 330 and 331 which are connected to any suitable source of electrical energy. The main 330 is connected to the spring contact member 187a, the spring contact member 188a being connected to the spring contact member 302. The spring contact member 303 is connected to one terminal of the winding of the motor Q^2 , the other terminal of said winding being connected to the terminal 289 which is also connected to the terminal 293. The terminal 294 is connected to the terminal 321, the terminal 320 of the same switch being connected to the main 331 through the switch 310. The terminal 320 is also connected to the terminal 316 of the switch 312 which has its other terminals 317 and 318 connected to the terminals 290 and 291, respectively, of the switch 251. The terminals 284 and 285 of the switch 250 are connected to the brushes (not shown) of the motor Q^2 . The terminals 286 and 287 are connected to the winding of the motor Q^2 and constitute leads from the winding to the brushes through the pole changing switch 250.

Figure 32 illustrates diagrammatically the condition of the circuit when the door is in its fully closed position. The contact member 187a is disengaged from the contact member 188a. The contact member 302 is engaged with the contact member 303. The switch 310 will be closed unless, during the previous closing operation of the door E^2 , the switch 311 failed to open. The circuit is also closed between the terminals 316 and 317, between the terminals 284 and 286, between the terminals 285 and 287 and between the terminals 289 and 291. The switch 252 is open.

Now if the door E^2 is to be opened, the combination lock 175a is unlocked and the knob 144a is rotated to retract the bolts 128a to 132a, inclusive. When the bolt 130a is retracted, the spring contact member 187a engages the spring contact member 188a. With the circuit in this condition, the push rod 254 is then displaced to the left (Figure 31) whereupon the switch 250 is actuated to connect the terminals 284 and 285 to the terminals 287 and 286, respectively, and the switch 251 is actuated to connect the terminal 289 to the terminal 290. The circuit is then in the condition illustrated in Figure 33 so that current flows as follows: from the main 331, through switch 310, the terminal 320, the terminal 316, the terminal 317, the terminal 290, the terminal 289 to the winding of the motor Q^2 , and thence through the spring contact members 303, 302, 188a and 187a to the main 330. The motor Q^2 then rotates in the proper direction to effect the opening of the door E^2 . It is understood, of course, that the switch 311 is closed during the initial opening movement of the door.

During the final opening movement of the door E^2 , the cams 314 and 315 actuate the switch 312 in such manner that the circuit is opened between the terminals 316 and 317 and closed between the terminals 316 and 318. At the same time the switch 311 is opened. The circuit is illustrated in this condition in Figure 34. Now

if it is desired to close the door E², the push rod 255 must be displaced to the left (Figure 31) so that the switches 250 and 251 will be actuated. The terminals 284 and 285 of the switch 250 will be connected to the terminals 286 and 287, respectively, and the terminal 289 of the switch 251 will be connected to the terminal 291 thereof. The circuit will then be in the condition illustrated in Fig. 35. Current will then flow as follows: from the main 331, through the switch 310, the terminals 320, 316, 318, 291 and 289 to the winding of the motor Q² and thence through the spring contact members 303, 302, 188a and 187a to the main 330. It will be noted that the leads from the winding to the brushes (not shown) of the motor Q² are now reversed with respect to the condition which it obtained when the door was being opened. (See Figure 33.) The motor Q² will now operate to close the door E² and it is readily understood that the switch 311 will be closed during the initial closing movement of the door. During the final closing movement of the door, the cams 314 and 315 actuate the switch 312 to disconnect the terminal 316 from the terminal 318 and connect it to the terminal 317. Also, during the final closing movement of the door, the switch 311 is opened. The circuit is then in the condition illustrated in Figure 32.

From the above description, it will be understood that the switch 311 is always closed when the door is opening or closing, the switch 311 being opened when the door comes to rest in either its closed or fully opened position. This arrangement permits one to stop the door in an intermediate position and reverse its direction of travel. Thus, if the door is being opened the circuit will be in the condition illustrated in Figure 33 with the exception that the switch 311 will be closed as soon as the door moves out of its fully closed position. With the circuit in this condition, the push rod 255 may be displaced to the left (Figure 31) so that the terminals 284 and 285 of the switch 250 will be connected to the terminals 286 and 287 thereof, respectively, and the terminal 289 of the switch 251 will be connected directly to the terminal 290. This will open the circuit for the motor as the switch 312 remains in the condition wherein its terminal 316 is connected to the terminal 317. The door will then stop in an intermediate position. If one wishes to continue the opening movement of the door, it is only necessary to displace the push rod 254 (Figure 31) whereupon the circuit will be restored to the condition wherein it is illustrated in Figure 33 (the switch 311 being closed, however). But if it is desired to reverse the direction in which the door is travelling, one may displace the push rod 256 to the left, (Figure 31) and hold it in its displaced position as long as it is desired and while the push rod 256 is so held, a current will flow as follows: from the main 331 through the switch 310, the switch 311, the switch 252, the terminal 289, the winding of the motor Q², and thence through the spring contact members 303, 302, 188a and 187a to the main 330. If the operator continues to hold the push rod 256 depressed until the door returns to its closed position, the cam 326 will open the switch 311 and the motor will stop. The circuit may be operated similarly if it is desired to stop the door and reverse its direction of travel when it is moving from its fully opened position to its closed position.

As shown in Figures 18, 19 and 20, a plurality of drawers 247a are provided beneath the hous-

ing B². These drawers 247a are similar in construction to the drawers 247 described above and are provided for the same purpose.

Obviously, the device illustrated in Figures 18 to 35, inclusive, may be utilized in substantially the same manner and for the same purposes as the device illustrated in Figures 1 to 17, inclusive.

Another form of the invention is illustrated in Figures 36 and 37. In this instance, the invention is embodied in a filing device which, with the exception of the article-holder or tray corresponding to the article-holder or tray C described above, is preferably identical in construction with the device shown in Figures 1 to 17, inclusive. Thus, the device shown in Figures 36 and 37 comprises a frame A³ which is preferably identical in construction with the frame A described above; a safe-body or fireproof housing B³ which is preferably identical in construction with the safe-body or fireproof housing B described above; and an article-holder or filing device C³. The safe-body B³ is provided with a door (not shown) which is identical in construction with the door E described above and is adapted to effect the elevation of the article-holder or filing device C³ when it is moved into its fully opened position. Journaled in the safe-body B³ are shafts 84c which are driven in the same manner and have the same function as the shafts 84 described above. The pinions N³ fixed to the shafts 84c mesh with racks P³ secured to the end walls of the article-holder or filing device C³. It will be noted that the article-holder C³ is in the form of an open-top receptacle. The construction is such that when the door (not shown) for the safe-body B³ moves into its fully opened position, the pinions N³ displace the racks P³ and the article-holder or file device C³ upwardly into the position wherein they are shown in Figures 36 and 37. However, when the door (not shown) is returned to its closed position, the racks P³ and the article-holder or filing device C³ gravitate to their lowermost position wherein the filing device rests upon the bottom wall of the safe-body B³.

In the devices shown in Figures 1 to 17, inclusive, and in Figures 18 to 35, inclusive, the filing devices D and D² are arranged in a single horizontal row in each instance. In Figures 36 and 37, two horizontal rows of filing devices D³ and D⁴ are shown, the filing devices D⁴ being disposed above the filing devices D³. The filing devices D³ are supported on the bottom wall 350 of the article-holder C³. The filing devices D⁴ are removably mounted in relatively small trays 351 provided with rollers 352 which ride in tracks 353 formed on the article-holder or filing device C³. It will be noted that each tray 351 is of such size that the filing device D⁴ fits snugly therein.

The filing devices D⁴ are preferably identical in construction with the filing devices D³, but by preference, a smaller number of filing devices D⁴ are utilized than filing devices D³. The arrangement is such that one may readily inspect the records, or the like, in the filing devices D³ if the trays 351 are displaced along the tracks 353 to uncover the particular filing device D³ which holds the records to be inspected. It will be also understood that one may transfer any or all of the filing devices D⁴ to the lower row and replace them with a corresponding number of the filing device D³. Records which must be inspected frequently are preferably placed in the upper row of filing devices.

It will be noted that in all of the embodiments

of the invention described above, the devices may be employed as desks or tables when the doors are in their closed positions. When the doors are in their fully opened positions an unobstructed view is had by the people working in the vicinity of the devices.

The preferred embodiments of the invention are operated by power driven mechanisms so that heavy thermally insulated doors may be employed to afford a high degree of protection against fires. These doors preferably gravitate into their closed positions during the final closing movements thereof. Such action of the door is obtained through the medium of the pin and slot connections between the doors and the links W and W². Of course, when the doors are not in their completely closed positions, all or part of the weight of the doors is carried by the links through the medium of the cam members Y and Y².

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as possible, in view of the prior art.

I claim:

1. A safe-structure comprising: a safe-body open at its top and provided with thermally insulated and substantially vertical walls; a door providing a top wall for said safe-body; a vertically movable article-holder normally housed in said safe-body; and mechanism for displacing said article-holder and moving said door from its closed position to a position beside the outer side of one of said vertical walls of said safe-body.

2. A safe-structure comprising: a safe-body open at its top and provided with thermally insulated and substantially vertical walls; a door providing a top wall for said safe-body; a vertically movable article-holder normally housed in said safe-body; mechanism adapted to move said door from its closed position to a position beside the outer side of one of said vertical walls of said safe-body; and means actuated by said door for displacing said article-holder relative to said safe-body.

3. A safe-structure comprising: a safe-body open at its top and provided with thermally insulated vertical walls; a door providing a top wall for said safe-body; mechanism adapted to move said door from its closed position to a position beside the outer side of one of said vertical walls of said safe-body and vice versa; and a power device for actuating said mechanism to effect both the opening and closing operations.

4. A safe-structure comprising: a safe-body open at its top and provided with thermally insulated and substantially vertical walls; a door providing a top wall for said safe-body; a vertically movable article holder normally housed in said safe-body; power driven mechanism adapted to move said door from its closed position to a position beside the outer side of one of said vertical walls of said safe-body; means actuated by said door for displacing said article-holder relative to said safe-body; and means controlled by said power driven mechanism for stopping it when said door moves into said position beside said last-mentioned vertical wall.

5. In combination in a device of the character

set forth: a safe-body; a bodily shiftable closure forming a top therefor; power driven mechanism adapted to elevate said closure and position it in a plane behind the plane of the rear wall of the safe-body and cause it to descend under power control to a position behind said safe-body; and means controlled by said power driven mechanism for stopping it when said door reaches said position behind said safe-body.

6. In combination in a device of the character set forth: a safe-body; a bodily shiftable closure forming a top therefor; a vertically movable article-holder in said safe-body; mechanism adapted to elevate and position said closure in a plane in back of the plane of the rear wall of the safe-body and cause it to descend under power control to a position behind said safe-body; and mechanism engaged by and utilizing the counterbalancing effect of said closure during its descending movement to elevate said article-holder.

7. A safe-structure comprising: a safe-body open at its top; a door providing a top wall for said safe-body; boltwork carried by said door and engageable with said safe-body to lock the door thereto; means including an electrical motor for opening and closing said door; a circuit for said motor; and means controlled by said boltwork for holding said circuit open when said boltwork is in its locked condition.

8. A safe-structure comprising: a safe-body open at its top; a door providing a top wall for said safe-body; boltwork carried by said door and engageable with said safe-body to lock the door thereto; means including an electrical motor for opening and closing said door; a circuit controlled by said boltwork for operating said motor; means controlled by said door-opening and closing means and adapted to open said circuit at the ends of the opening and closing movements of the door.

9. A safe-structure comprising: a safe-body having a door opening therein; a door for said opening; mechanism including an electric motor for opening and closing said door; a movable article holder in said safe-body, the movements of said article holder being controlled by said door, a circuit for said motor, and fusible means adapted to adjust said circuit to close said door when said fusible means is subjected to an abnormal temperature.

10. A safe-structure comprising: a safe-body open at its top and provided with a substantially vertical back wall; a door providing a top wall for said safe-body; and mechanism to guide said door from its closed position above said safe-body and to lower said door with its front edge lowermost to a position behind said back wall.

11. A safe-structure comprising: an open-topped safe-body; a bodily shiftable closure therefor normally forming a top wall for said safe-body; a vertically movable article-holder mounted in said safe-body; closure-carrying mechanism adapted to elevate and carry said closure rearwardly and dispose it in a vertical position and then permit it to descend under control to a position behind said safe-body; and means actuated during the descent of said closure serving to elevate said article-holder.

12. A device of the kind described comprising: a frame; a safe-body mounted in said frame and provided with an opening in its top; a bodily shiftable closure forming a top wall for said safe-body; a vertically movable slide mounted in said frame, said closure being pivoted to said slide;

and mechanism adapted to elevate said closure above said safe-body and to dispose it in the plane of said slide.

13. A device of the kind described: a frame; a safe-body mounted in the frame and provided with a door-opening; a slide movably journaled in said frame; a door for said opening pivoted to said slide; and power driven means operatively connected to said door at a point spaced from the slide and adapted to open and close said door, said slide serving to guide said door during its movements.

14. A device of the kind described comprising: a safe-body having an opening therein; a door for said opening and power driven means having a lost motion connection with said door and adapted to open and close said door.

15. A safe-structure comprising: a safe-body having a door jamb in the top thereof, said door jamb being provided with a groove; an outwardly opening door for said opening, said door being provided with a tongue engageable with said groove; and movably mounted means controlled by said door to cover said groove when said door is opened.

16. A safe-structure comprising: a safe-body having a door jamb in the top thereof, said door jamb being provided with a groove; a door for said door jamb, said door being provided with a tongue engageable with said groove; a vertically movable article-holder normally disposed in said safe-body; mechanism adapted to open said door and to elevate said article-holder and means carried by said article-holder and adapted operative to cover said groove when the article-holder is raised to elevated position whereby objects are prevented from falling into said groove when said door is in its open position.

17. A safe-structure comprising: a safe-body open at its top; a door providing a top wall for said safe-body; links having pin and slot connections with said door; cam devices fixed to said door; members carried by said links and engageable by said cam devices; and means co-operating with said links and adapted to displace them to lift said door out of its closed position.

18. A safe-structure comprising: a safe-body open at its top; a door providing a top wall for said safe-body; links having pin and slot connections with said door; cam devices fixed to said door; members carried by said links and engageable by said cam devices; and means including power driven means co-operating with said links and adapted to disengage said door from said safe-body and lift and suspend the door.

19. A device of the kind described comprising: a frame; a safe-body open at its top and mounted in the frame; a door forming a top wall for said safe-body; a vertically movable slide journaled in said frame; means pivoting said door to said slide; links having pin and slot connections with said door; cam devices fixed to said door; members carried by said links and engageable by said cam devices; and means for displacing said links to open and close said door.

20. A device of the kind described comprising: a frame; a safe-body open at its top and mounted in said frame; a vertically movable slide journaled in said frame; a door pivoted to said slide and forming a top wall for said safe-body; said door and said safe-body having interengaging tongues and grooves; cam members on said safe-body; means secured to said door and co-operating with said cam members to disengage said tongues and grooves during the initial opening

movement of said door; and means operatively connected to said door and co-operating with said slide for opening and closing said door.

21. A device of the kind described comprising: a frame; a safe-body open at its top and mounted in said frame; a vertically movable slide journaled in said frame; a door pivoted to said slide and forming a top wall for said safe-body; said door and said safe-body having interengaging tongues and grooves; cam members on said safe-body; means secured to said door and co-operating with said cam members to disengage said tongues and grooves during the initial opening movement of said door; and means having a lost motion connection with said door and co-operating with said slide for opening and closing the door.

22. A device of the kind described comprising: a frame; a safe-body open at its top and mounted in said frame; a vertically movable slide journaled in said frame; a door pivoted to said slide and forming a top wall for said safe-body; means operatively connected to the side edges of said door and co-operating with said slide to open and close said door; and a housing member carried by said slide to cover the connections between said door and the means for opening and closing it.

23. A device of the kind described comprising: a frame; a safe-body open at its top and mounted on said frame; a door providing a top wall for said safe-body; an electric motor mounted in said frame beneath said safe-body; reduction gearing driven by said motor; a shaft driven by said reduction gearing; a link operatively connected to said door; and means driven by said shaft to displace said link to open and close said door.

24. A device of the kind described comprising: a frame; a safe-body mounted on the frame; a vertically movable slide journaled in the frame; a door pivoted to said slide and providing a top wall for said safe-body; an electric motor mounted in said frame; reduction gearing operatively connected to said motor; a shaft; means operatively connecting said shaft to said reduction gearing; a link operatively connected to said door; and means actuated by said shaft to displace said link to open and close said door.

25. A safe-structure comprising: a safe-body open at its top; an outwardly opening door providing a top wall for said safe-body; means for opening and closing said door; and means extending along the front wall of the safe-body and actuated by the door for pushing the hands of the operator out of the path of the door when the door moves into its closed position.

26. In a device of the character set forth: a frame; a safe-body mounted in the frame and provided with a door opening; a door for said opening; an electric motor mounted in said frame; a shaft; reduction gearing operatively connecting said motor with said shaft; means actuated by said shaft for opening and closing said door; an electric circuit for said motor, said circuit including switches for controlling said motor; and cams driven by said shaft for controlling said switches.

27. A device of the character set forth comprising: a frame; a safe-body mounted on the frame and provided with a door opening therein; a door for said opening; an electric motor mounted in said frame; a shaft; reduction gearing operatively connecting said motor to said shaft; a crank arm on said shaft; a link connect-

ing said crank arm to said door whereby angular displacement of said crank arm will cause the link to open and close said door; and an electric circuit including switches for said motor; said switches being actuated by said crank arm.

28. A safe-structure comprising: a safe-body; a door for said safe-body; boltwork carried by said door and engageable with said safe-body to lock the door thereto; means including an electric motor for opening and closing said door; a circuit for said motor; and means controlled by said boltwork for holding said circuit open when said boltwork is in its locked condition.

29. A safe-structure comprising: a safe-body having a door jamb in the top thereof, said door jamb being provided with a groove; an outwardly opening door for said opening, said door being provided with a tongue engageable with said groove; and a guard covering said groove when said door is opened and displaced by said door in the closing movement thereof.

30. A safe-structure comprising: a safe-body having thermally insulated vertical walls and a door-opening in its top; a bodily-shiftable thermally insulated door seated in said door opening; a vertically movable tray normally housed within said safe-body; and door-opening and tray-elevating mechanism operative to lift said door from closed position to upright position and lower it to idle position adjacent one of said vertical walls and to cause said tray to be elevated during the movement of said door to idle position.

31. A safe-structure comprising: a safe-body; a door therefor equipped with locking mechanism; means, including an electric motor, for opening and closing said door, said motor having a circuit; a switch in said circuit controlled by said locking mechanism; and means for breaking said circuit during the final portions of the door movement to either closed position or idle position.

32. A safe-structure comprising: a safe-body having fire-proof bottom walls and side walls and having an upwardly presented door-opening; a bodily liftable fire-proof door seated in said opening; a vertically movable tray-unit normally housed within said safe-body; and actuating mechanism through the medium of which said door and tray-unit are actuated.

33. A safe of the character set forth compris-

ing: a safe-body having a door-opening in its top; a door seated in said opening and providing a top wall; and vertically movable actuating means connected with one edge of said door operative to lift and suspend the door and lower it with the opposite free edge downward to a re-ceded position adjacent a vertical wall of the safe-body.

34. A safe as specified in claim 33, in which said actuating means comprises an upright slide to which said door is hinged.

35. A safe as specified in claim 33, in which said free edge of the door has sliding contact with the safe-body in passing from closed position to upright position, and vice versa.

36. In a structure of the character set forth: a safe-body; a power-driven lift mounted at the rear of said safe-body; a door seated in an opening in the top of said safe-body and hinged to said lift, said lift being operative to suspend said door and lower it adjacent the rear wall of the safe-body; and a vertically movable article-holder normally housed within said safe-body.

37. A safe-structure comprising: a safe-body having substantially vertical walls and a door-opening in its top; a door removably seated in said door-opening; and door-elevating and guiding means, including vertically movable members disposed outside of one of the vertical walls of the safe and hingedly connected with said door.

38. A safe-structure comprising: a safe-body having vertical walls and a door-opening in its top; a door seated in said opening; and door lifting and lowering mechanism connected with said door serving to move the door to elevated position in a plane outside of one of said vertical walls and lower it in said plane to position outside such vertical wall.

39. In combination, in a device of the character set forth: a safe-body; a closure forming a top therefor; lifting and lowering mechanism serving to elevate said closure and position it in a substantially vertical plane rearwardly of the rear wall of the safe-body and then lower it in said plane to a position back of said rear wall; and an electric motor serving to actuate said mechanism, said motor having a circuit equipped with circuit-controlling means.

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