

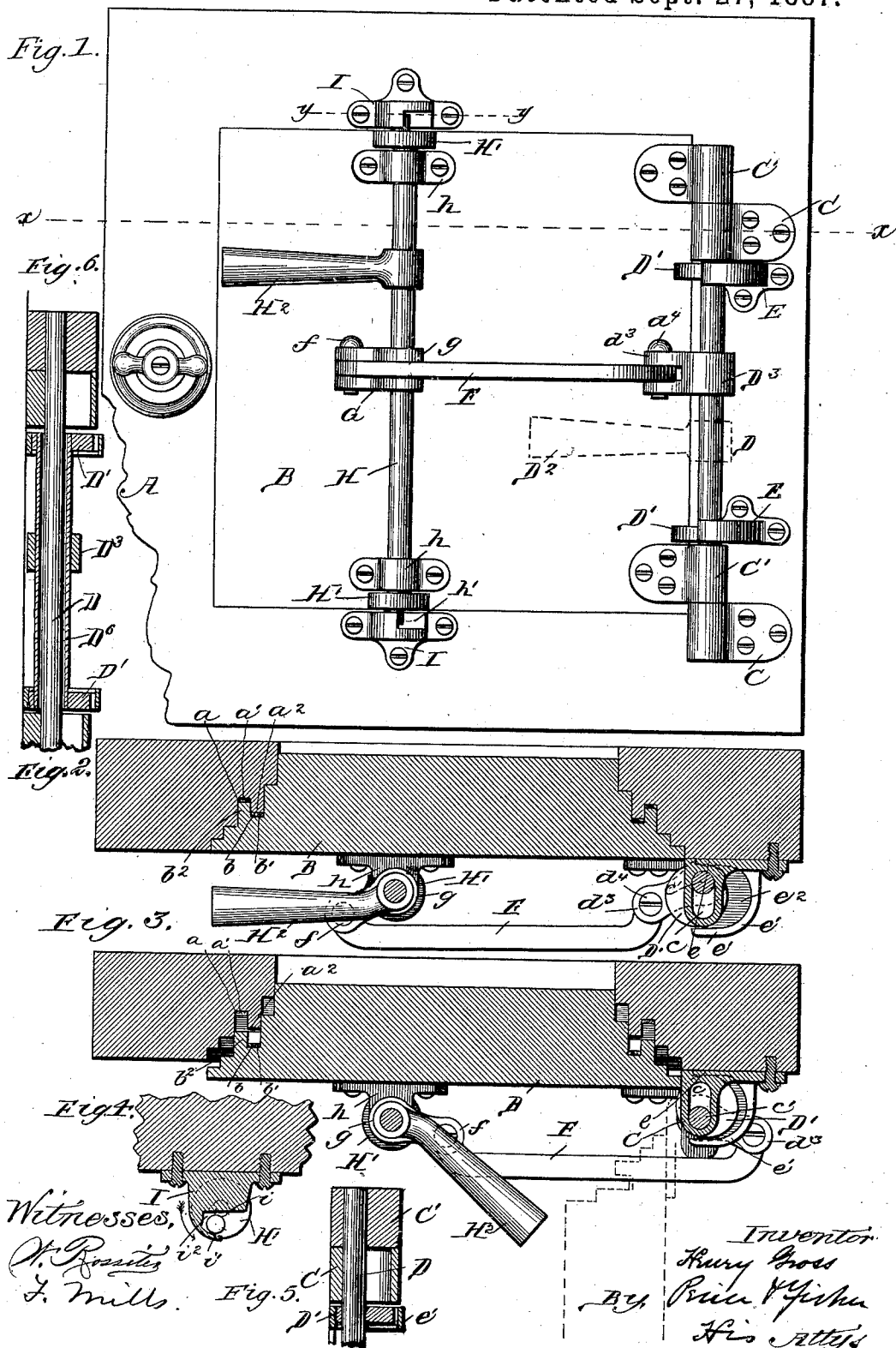
(No Model.)

H. GROSS.

OPERATING MECHANISM FOR THE DOORS OF SAFES AND VAULTS.

No. 370,472.

Patented Sept. 27, 1887.



UNITED STATES PATENT OFFICE.

HENRY GROSS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CHICAGO SAFE AND LOCK COMPANY, OF SAME PLACE.

OPERATING MECHANISM FOR THE DOORS OF SAFES AND VAULTS.

SPECIFICATION forming part of Letters Patent No. 370,472, dated September 27, 1887.

Application filed March 8, 1887. Serial No. 230,087. (No model.)

To all whom it may concern:

Be it known that I, HENRY GROSS, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Operating Mechanism for the Doors of Safes and Vaults, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

In the manufacture of the better class of safes and vaults it is customary to provide the inclined or "stepped" door frame or jamb with one or more grooves and ribs extending around the same, with which will engage corresponding grooves and ribs formed upon the inclined or stepped edge of the swinging door; and if the channels and ribs of the door-jamb and door at their rear extend at right angles to the plane of the door it is necessary to so hinge the door that it may be moved outward in a straight line before it can be swung open, this movement being obviously necessary in order to free the ribs of the door from engagement with those of the door-jamb. Various forms of hinges have been heretofore devised for the purpose of permitting this straight-line movement of the door in the act of opening and closing the same, and one object of my present invention is to provide an improved form of hinge mechanism for this purpose.

In this class of safes and vaults it is very desirable that a tight joint shall be formed between the swinging door and its jamb, and for this reason it has been heretofore proposed to provide the door with a presser-bar by means of which it could be forced inward, thereby causing the interlocking ribs of the door and door-frame to bear more firmly upon the felt packing within the corresponding channels. A further object of my invention is to provide improved presser-bar mechanism and means whereby the presser-bar and door-hinge may be connected together in such manner as to cause the initial movement of the safe-door to be given uniformly to all parts of the safe-door at the same time.

To this end my invention consists in the novel features of construction hereinafter described, illustrated in the accompanying draw-

ings, and particularly defined in the claims at the end of this specification.

Figure 1 is a face view of a door-jamb and door embodying my improvements. Fig. 2 is a view in transverse section on line *xx* of Fig. 1. Fig. 3 is a similar view on line *xx* of Fig. 1, but showing the parts in the position assumed at the end of the initial outward movement of the door. Fig. 4 is a detail view, in section, on line *yy* of Fig. 1. Fig. 5 is a detail view, in central vertical section, through one of the hinges and the adjacent cam-block. Fig. 6 is a view in vertical longitudinal section of a slightly-modified form of shifting-rod.

A designates the body of the safe or vault wall adjacent the doorway, and B denotes the door. The door-jamb of the safe or vault is of the well-known stepped or inclined form, and is provided with a channel, *a*, adapted to receive a felt packing, *a'*, and with an outwardly-projecting rib, *a''*, extending entirely around the jamb of the door. The correspondingly inclined or stepped edge of the door B is in like manner provided with a channel, *b*, adapted to receive a felt packing, *b'*, and to admit the rib *a''* of the door-jamb, and with a rib, *b''*, adapted to enter the corresponding channel of the jamb.

To the body A of the safe or vault, at the rear of the doorway, is fastened the sections or leaves C of the hinge mechanism, the opposite sections, C', of the hinge mechanism being suitably bolted, as shown, to the rear edge of the door. One set of sections or leaves, C, of the hinge mechanism is provided with long slots *c*, adapted to receive the pivot-pins *c'*, which are suitably connected with the sections C' of the hinge mechanism, and in the construction shown said pivot-pins are formed integral with the shifting-rod D, which extends between the sections C' of the hinge mechanism, although it will be readily understood that these parts may be formed separate, if desired.

The shifting-rod D is provided with suitable cam mechanism whereby, when this rod is turned, the position of the pivot-pins will be changed within the slots of the sections or leaves C; and in the construction shown this cam mechanism consists of two eccentric cams,

D', affixed to the shifting-rod D adjacent the upper and lower sections of the hinge mechanism, and adapted to bear successively upon the inner and outer faces or flanges, *e* and *e'*, of the cam blocks or bearings E, that are suitably attached to the door-frame or wall of the safe or vault adjacent the rear edge of the door. These cam-blocks E are preferably formed, as shown, with outer faces or flanges, *e'*, and with side ribs or flanges, *e''*, which partially inclose the eccentric cams D' of the shifting-rod D.

From the construction as thus far defined it will be seen that when the shifting-rod D is turned for imparting an outward movement to the safe-door a partial revolution is given to the eccentric cams D', which, by reason of their bearing against the faces *e* of the cam-blocks E, will cause the sections C' of the hinge mechanism to move outwardly, carrying with them the rear edge of the door, and this initial outward movement of the door will be sufficient to free the interlocking ribs and grooves at the rear edge of the door-frame and door, so as to permit the door to be subsequently swung open.

It is obvious that when the shifting-rod D is moved in opposite direction the eccentric cams D' will bear against the outer faces, *e'*, of the cam-blocks E, and will thus cause the rear edge of the door to be thrust inwardly. The turning of the shifting-rod D can be effected in any suitable way—as, for example, by a handle, D², (shown by dotted lines in Fig. 1;) although the preferred manner of effecting the shifting movement of this bar will be accomplished by the mechanism hereinafter explained.

As the shifting-rod D is connected directly with the sections C' of the hinge mechanism, it is obvious that the outward movement given to this rod by the eccentric cams D' will cause a simultaneous and uniform outward movement of the sections C' of the hinge mechanism, and consequently will cause a like uniform movement along the entire rear edge of the door. This positive connection between the sections C' of the hinge mechanism is a feature of importance, as it avoids all danger of any irregular movement of the door, which is liable to occur in constructions in which the sections of the hinge mechanism that carry the pivot-pins are not positively and directly connected.

Upon the shifting-rod D is fixed the short yoke D³, to the arm *d'* of which will be pivotally joined, as at *d*, the rear end of the connecting-bar F, the front end of this bar being joined in like manner, as at *f*, to the arms *g* of the yoke G, that is keyed to the presser-bar H. This presser-bar H is journaled within suitable bearings, *h*, attached to the face of the door, and at its upper and lower ends is provided with disks H', from the outer faces of which project the eccentrically-arranged pins *h'*, adapted to bear against suitable blocks,

I, attached to the top and bottom edges of the door frame or jamb. These blocks I, as clearly shown in Fig. 4, are formed with the inner bearing-surfaces, *i*, and with the outer bearing-surfaces, *i'*, forming the intermediate space or seat, *i''*, wherein the eccentric-pins *h'* can work. The presser-bar H is also furnished with a suitable handle, H², keyed thereto in convenient position to enable said bar to be operated when the door is to be opened or closed.

From the foregoing construction it will be seen (assuming the parts to be in the position shown in Figs. 1 and 2) that when it is desired to open the safe-door it is only necessary to swing outward the handle H² of the presser-bar into the position shown in Fig. 3 of the drawings. As the handle H² is thus swung outwardly, it will turn the presser-bar H and its connected disks H' in such manner as to cause the eccentric-pins *h'* to bear against the inner bearing-surfaces *i* of the blocks I, and hence to force outwardly the safe-door, and at the same time the connecting-bar F will cause a similar movement of the shifting-rod D of the hinge mechanism, thereby causing the eccentric cams D' of this shifting-rod to bear against the inner faces, *e*, of the cam-blocks E, and thrust outwardly the rear portion of the safe-door; and since the presser-bar and the shifting-rod of the hinge mechanism are connected together, so as to move in unison, it will be seen that the entire body of the safe-door will be moved uniformly outward at the same time until the parts assume the position shown in Fig. 3 of the drawings. After the safe-door has received its initial outward movement, as shown in Fig. 3, it can be readily swung open, as shown by the dotted lines, Fig. 3, so as to permit access to the safe, the pivot-pins and sections of the hinge mechanism during this swinging operation acting like ordinary hinges. When the safe-door is to be closed, it will be swung inward until the parts assume the relative position shown in Fig. 3, at which time the ribs and grooves upon the stepped or inclined edge of the door will be directly opposite the corresponding parts of the door-jamb; and if, now, the handle H² of the presser-bar be turned to the position shown in Figs. 1 and 2, such movement of the handle will impart to the disks H' a partial revolution, thereby causing the eccentric-pins *h'* of said disks to bear against or ride upon the outer bearing-surfaces, *i'*, of the blocks I, and to force inwardly the door until its ribs and grooves interlock with those of the door-jamb, and at the same time the turning of the shifting-rod D of the hinge mechanism, by reason of its connection with the presser-bar, will cause the eccentric cams D' to bear against the outer faces, *e'*, of the cam-blocks E, and to force inwardly the sections C' of the hinges. It will thus be seen that the entire body of the safe-door is caused to move inward in unison, so that all danger of jamming or breaking the ribs or grooves is effectually prevented.

It will be readily understood that the precise details of construction and arrangement of parts above described may be varied by the skilled mechanic without departing from the spirit of my invention. So, also, it will be understood that my improved form of presser-bar mechanism and shifting-rod and cams may be employed with other suitable construction of hinge mechanism, and the hinge mechanism may be used with other suitable devices for opening and closing the door.

In Fig. 6 of the drawings I have illustrated a modified form of shifting-rod particularly designed for use in connection with the heavier class of safe and vault work, in which the rotation of the pivot-pins of the hinges when turning the shifting-rod would be somewhat difficult. In this modified construction, as in the construction hereinbefore described, the eccentric cams D' are carried by the shifting-rod D , but a tubular sleeve, D^6 , which encircles the shifting-rod D , has the eccentric cams D' and the yoke D^3 affixed thereto, and the sleeve is held upon the rod in a manner free to turn; hence, when the sleeve D^6 is turned by means of the yoke D^3 , it will simply move around the shifting-rod D without turning the pivot-pins c' , as in the construction hereinbefore described; but in this construction the shifting-rod will be moved by the cams in outward direction, and as this rod is connected directly to the sections C' of the hinge mechanism it is obvious that the outward movement of this rod will cause the uniform and simultaneous outward movement of both of the sections C' of the hinge mechanism and consequently of the entire rear edge of the door. The advantage, therefore, of extending the shifting-rod D between the sections C' of the hinge mechanism is accomplished in this construction, as in that before described, with the additional advantage that the wear upon the pivot-pins and hinges incident to the turning of the shifting-rod is avoided.

Having thus described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the door-frame and the door, of operating mechanism comprising a hinge formed of two sets of leaves or sections rigidly fixed to the door-frame and the door, respectively, one set of said leaves or sections being slotted and the other set being provided with pivot-pins, a shifting-rod extending between and connecting the hinge-sections carrying the pivot-pins, and eccentric cams through which said shifting-rod passes, whereby the turning of the shifting-rod will effect a simultaneous and uniform outward movement of the rear edge of the door, substantially as described.

2. The combination, with the door-frame and the door, of operating mechanism comprising a hinge having leaves or sections, one set of which is slotted and the other set of which is provided with pivot-pins, a shifting-rod extending between and connecting the hinge-sections carrying the pivot-pins, a tubular sleeve upon said shifting-rod, and suitable cam mechanism and turning mechanism attached to said sleeve, whereby said sleeve may be turned independently of the shifting-rod, substantially as described.

3. The combination, with the door-frame and the door, of operating mechanism comprising a hinge having leaves or sections, one set of which is provided with pivot-pins and the other set of which is provided with slots to receive said pivot-pins, a shifting-rod having cams thereon, said rod being connected with the leaves or sections of the hinge attached to the door, a presser-bar in connection with the shifting-rod, and suitable cam mechanism for moving the ends of said presser-bar, substantially as described.

HENRY GROSS.

Witnesses:

GEO. P. FISHER, Jr.,
JAMES H. PEIRCE.