

C. F. GESSERT.  
 Device for Opening Safe-Doors.  
 No. 216,843. Patented June 24, 1879.

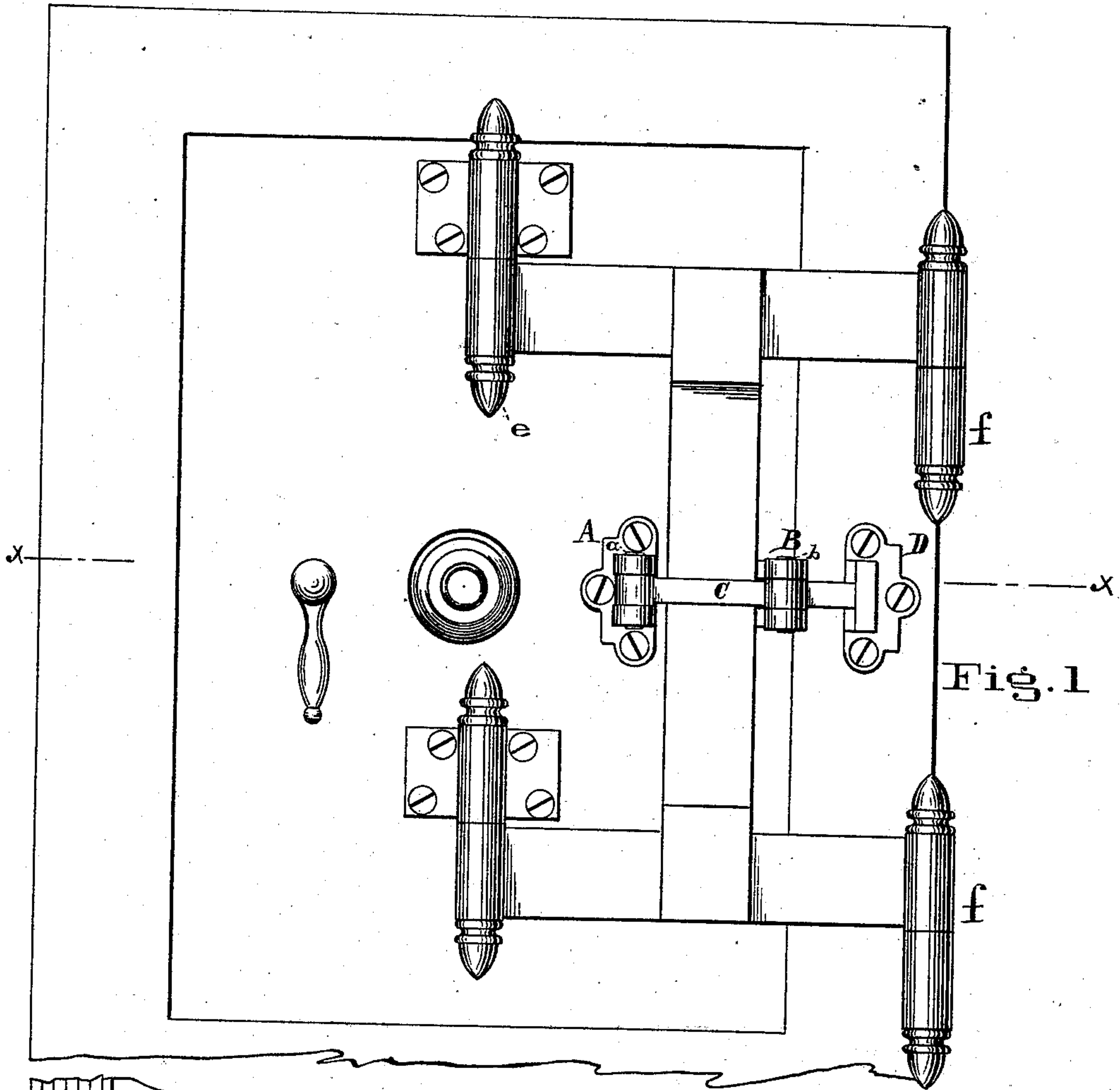


Fig. 1

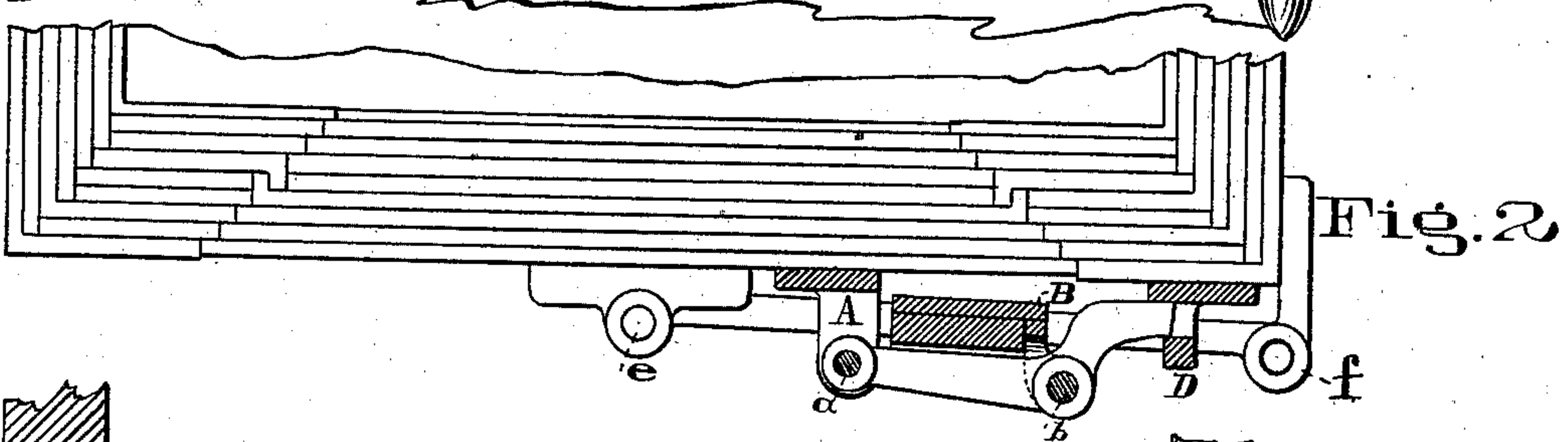


Fig. 2

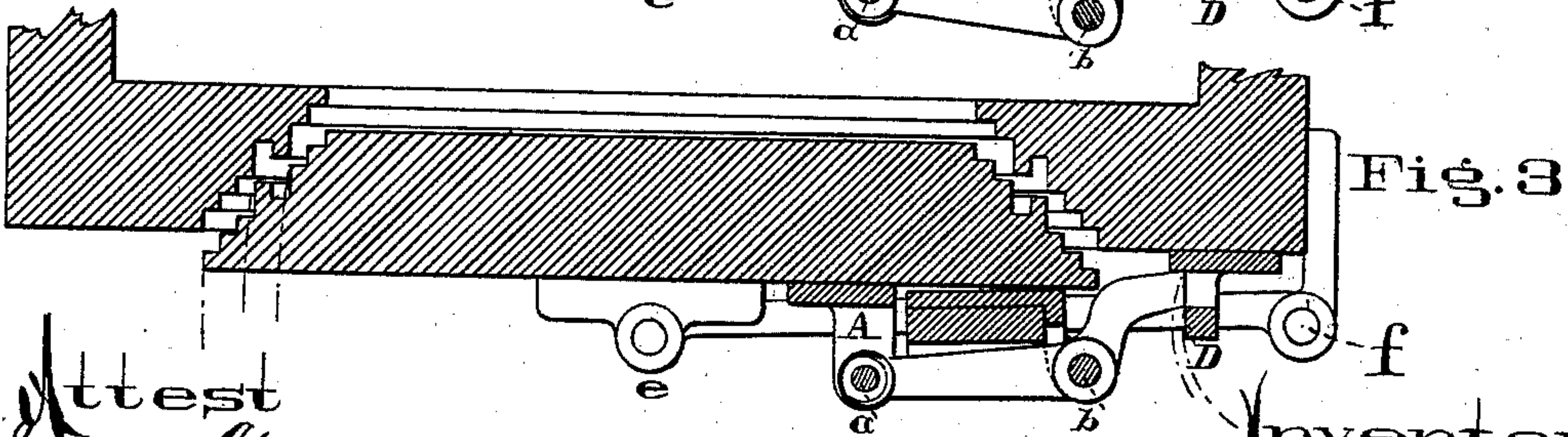
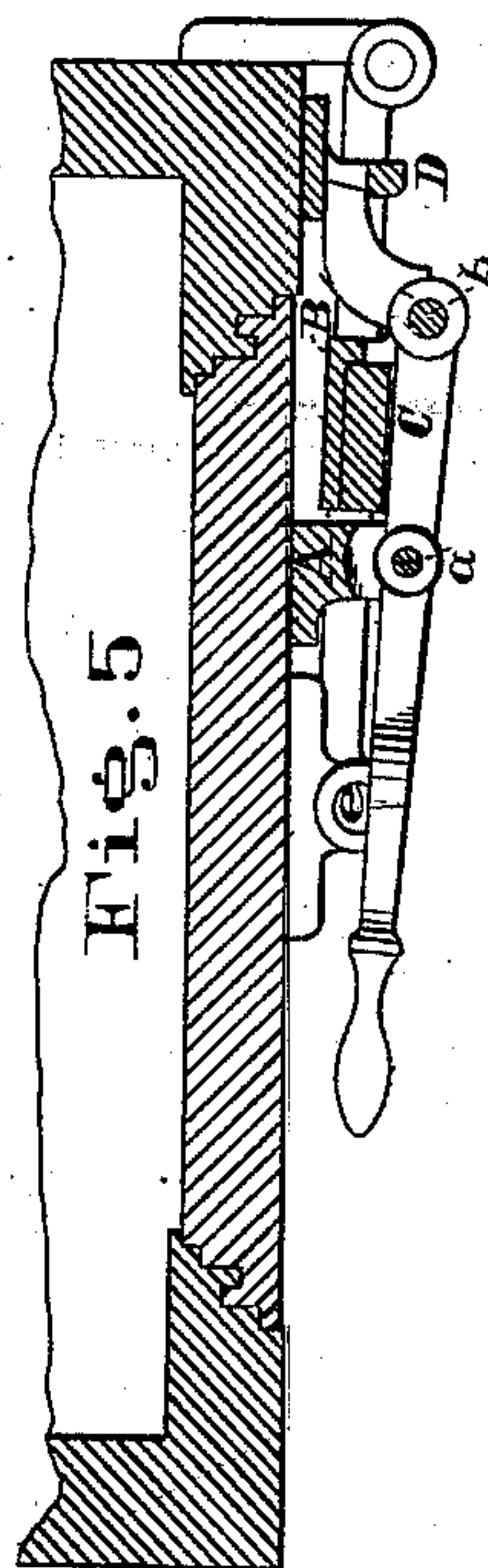
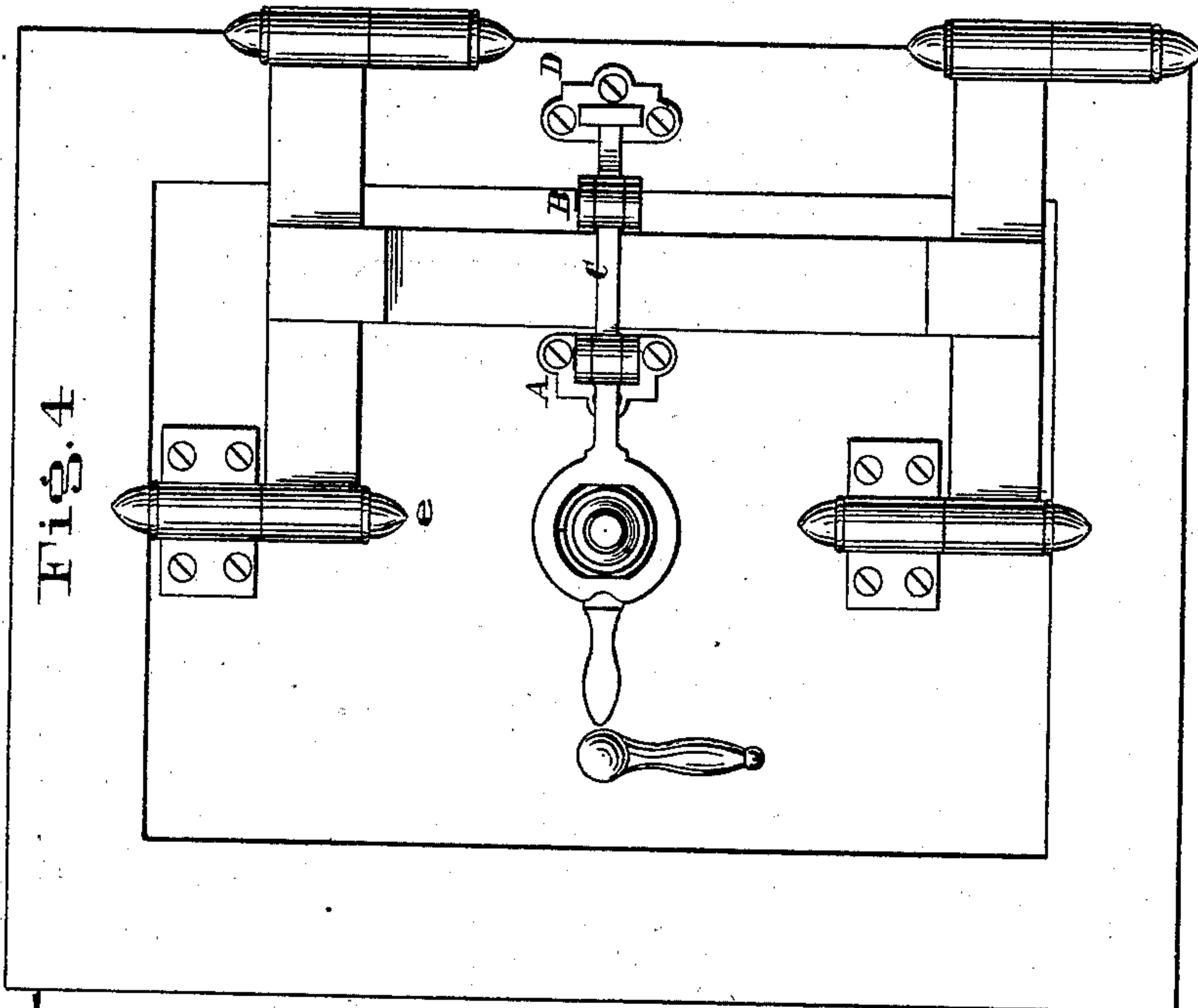
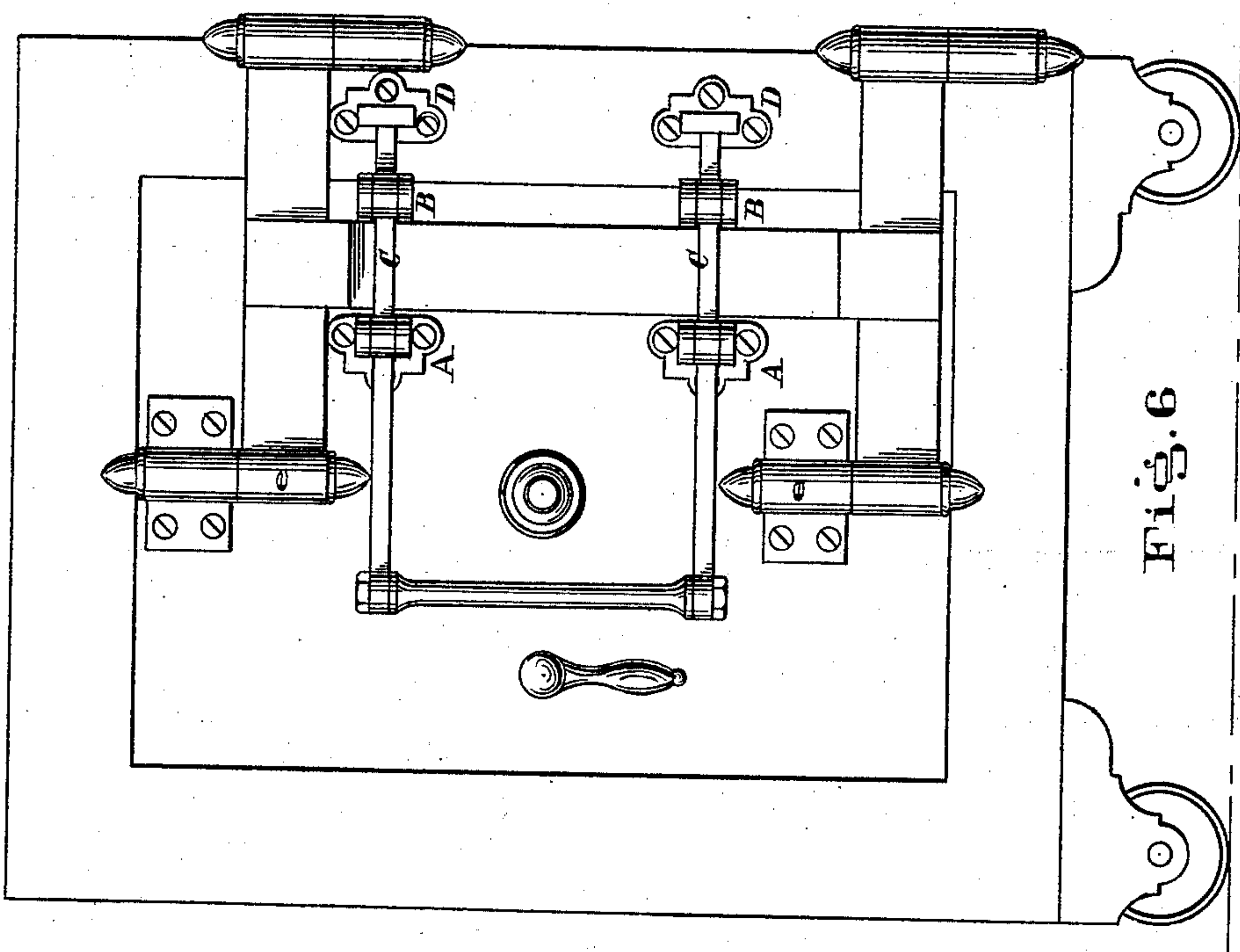


Fig. 3

Attest  
 James Moore  
 Geo. J. Murray

Inventor  
 Charles F. Gessert

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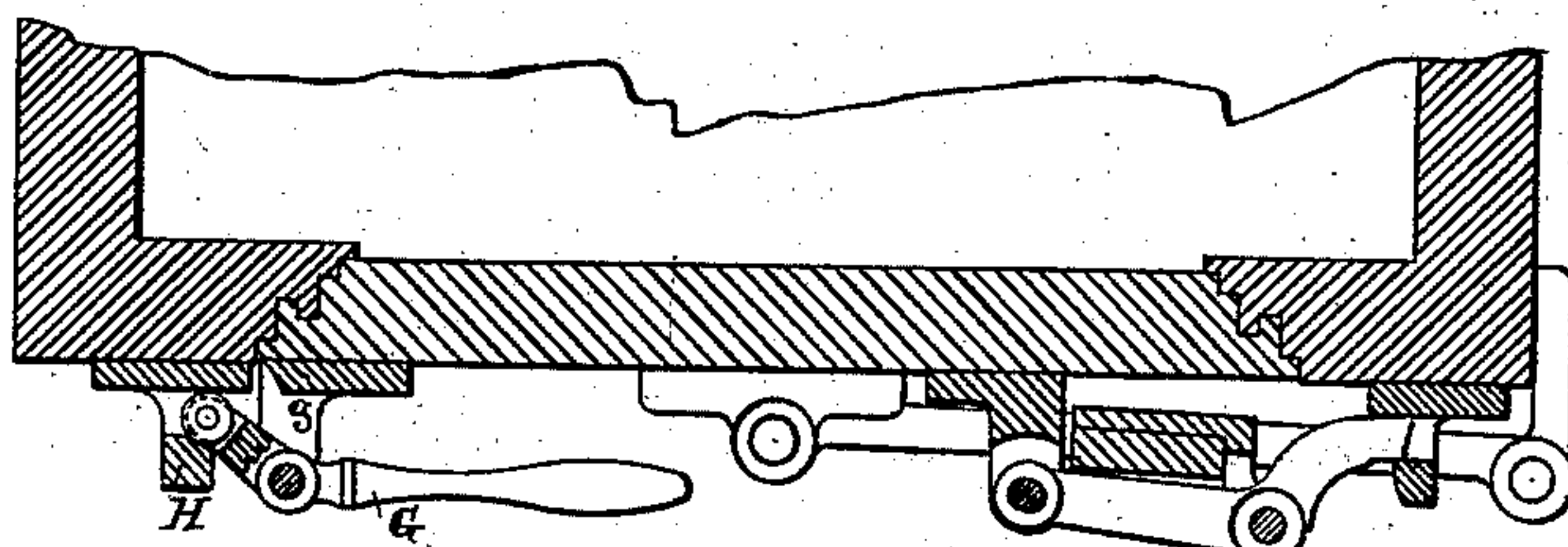
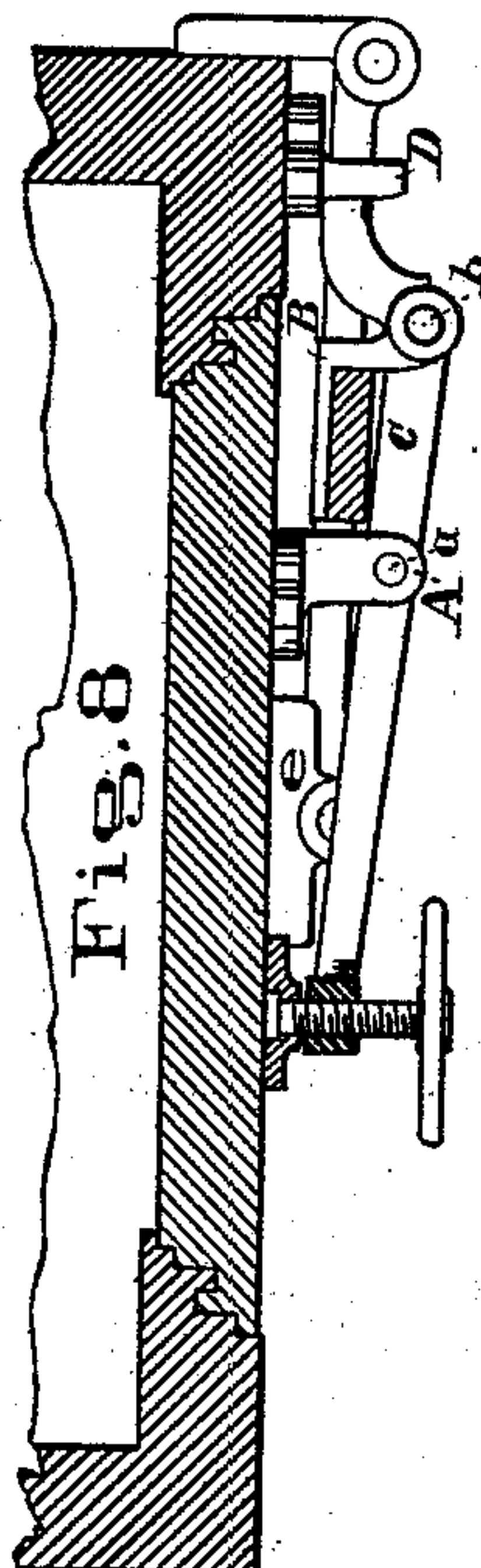
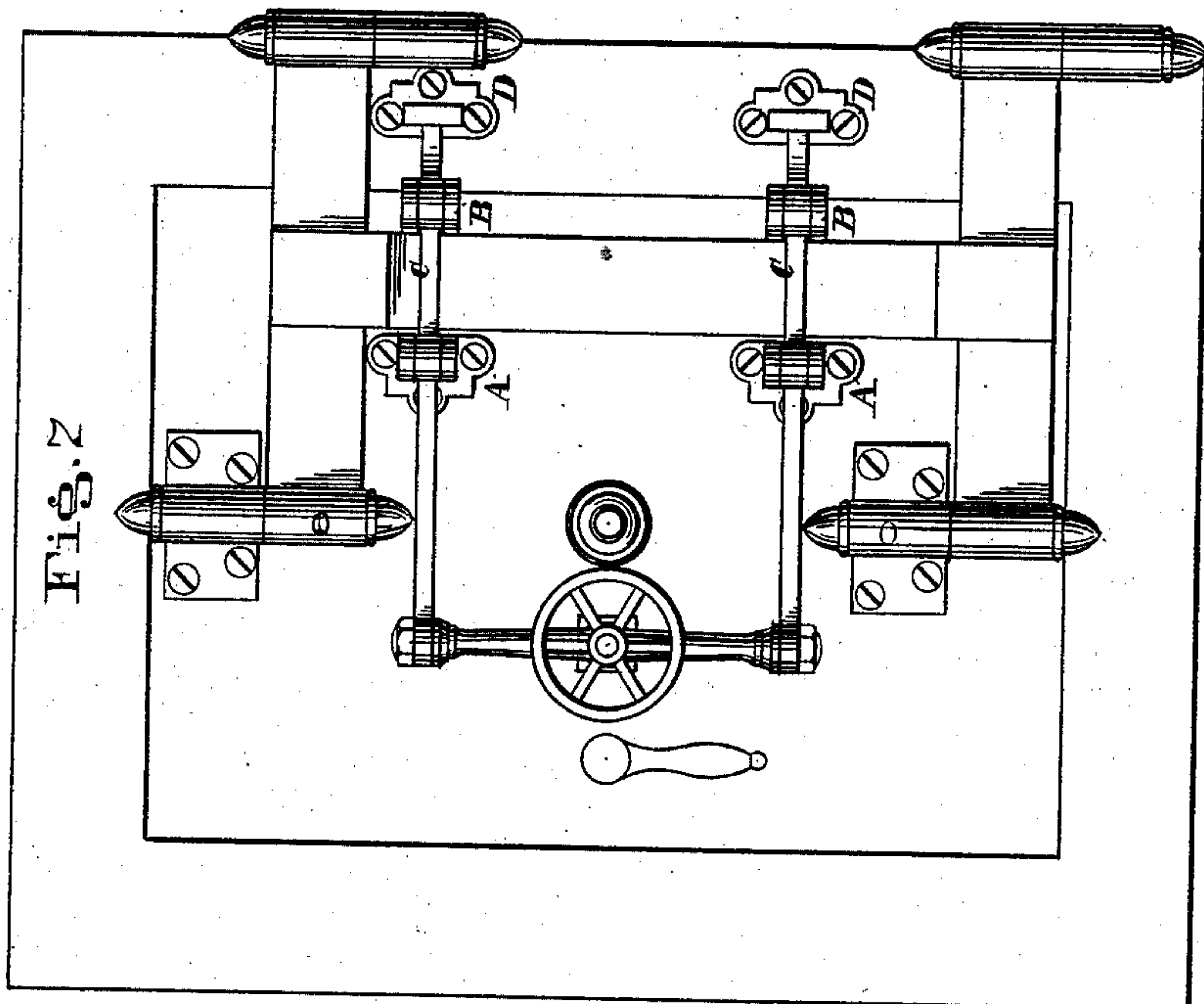


Fig. 9

Attest  
 James Moore  
 Geo. Murray

Inventor  
 Chas. F. Gessert



# UNITED STATES PATENT OFFICE.

CHARLES F. GESSERT, OF CINCINNATI, OHIO.

## IMPROVEMENT IN DEVICES FOR OPENING SAFE-DOORS.

Specification forming part of Letters Patent No. **216,843**, dated June 24, 1879; application filed February 3, 1879.

*To all whom it may concern:*

Be it known that I, CHARLES F. GESSERT, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Fire and Burglar Proof Safes, of which the following is a specification.

The object of this invention is to provide a simple and convenient means for operating doors of safes and vaults, to withdraw them from and force them into their casings in a straight line, so as to insure a perfectly tight joint between the door and its framing.

Heretofore in heavy fire and burglar proof safes and vaults the edges of the doors and casings of which are formed into steps or tenons and grooves, which prevent the door from being swung into or out from the casing in the arc of a circle, the doors have been started from their casings either by a cam and lever attachment arranged upon the hinge edge of the door, by which this edge was first started out to permit the door to swing back upon its hinges, or by levers extending across the front of the door and over the edge of the frame, the levers being journaled or pivoted to the face of the door and having their fulcrums upon the hinge and lock edges of the casing.

The first of these modes is objectionable because it is difficult to apply the same amount of force simultaneously to both edges of the door to withdraw it, and hence it is necessary to leave some play between the door and jamb to avoid locking the parts.

The second mode is objectionable because the devices extend across the center of the door, the most desirable position for the lock-dial, and it cannot be used upon double overlapping doors, so that in large safes, in which two doors are usually required, it is necessary to employ a center stile, which greatly increases the expense and makes a weaker structure.

An objection common to both modes is that it requires two independent operations to open or close the door.

The invention consists in coupling the door and the bar of the crane-hinge together by a lever, one end of which extends over the hinge edge of the door into a bearing secured upon the frame, the points or bearings of the lever being so arranged as to guide the door per-

pendicularly to the casing so long as the overlapping end of the lever is engaged by its fulcrum upon the casing.

In the accompanying drawings, in which similar letters of reference indicate like parts in the different figures, Figure 1 is a front view of a safe to which my improvements are attached. Fig. 2 is a transverse section taken in the line *x x*, showing the door closed, and Fig. 3 is a similar view taken in the same plane, showing the door withdrawn from its casing in a position ready to be swung open upon its hinges or to be carried in a straight line into its casing by pushing against the face of the door. Figs. 4 to 8, inclusive, illustrate various means of operating my device. Fig. 9 is a transverse section of a safe, showing an actuating lever secured to the lock edge to open and close heavy doors.

The invention as illustrated in Figs. 1, 2, and 3 will be first described.

A and B are two lug-plates, the one secured to the face of the door and the other to the vertical brace of the crane-hinge, the lugs from each projecting up to furnish bearings for the lever C, which is secured between said lugs by pins *a* and *b*, passing through them and the lever. D is a perforated lug secured upon the hinge side of the door-frame to receive the short arm of lever C and serve as its fulcrum to force the door out or in in a straight line, so long as it is engaged by the lever. The parts are snugly fitted, so that all must move simultaneously.

In order to properly proportion the parts of my device and determine the points of attachment necessary to insure a perpendicular movement of the door, it should be understood that the device combined with the crane-hinge is a compound lever, the hinge being a lever of the second class, its fulcrum being the hinge-pintles *f*, upon the edge of the safe, the power being applied to the pintle *e*, and the weight the power applied to lever C, through pin *b*. C is a lever of the third class, its fulcrum the lug D, and its weight that part of the door opposite journal-pin *a*.

• It is evident that if two points in different vertical planes of the door are caused to move at the same speed the door will always move perpendicularly to its frame. It is therefore



only necessary to so proportion the arms of the levers that the points opposite the pins *a* and *e* shall have the same momentum when force is applied to move the door.

As shown in the drawings, the levers are proportioned to each other as two is to one, and the long and short arms of each lever bear the same proportion to each other, so that the ends *a* and *e* of the levers must always move the same distance, while the short arm of lever C engages its fulcrum. For instance, the point *e* in moving three inches moves point *b* one inch; but point *b* moving one inch moves point *a* three inches; so the points *e* and *a* moving through the same space simultaneously carry the door out or close it parallel to the front of the safe.

It will be seen that in attempting to open the door in the usual manner my device will automatically force the door to move out perpendicularly to the frame until the face of the door strikes the lug-plate B. (See Fig. 3.) At this time the end of lever C will be disengaged from its fulcrum and the door will begin to swing upon its hinges. When swinging the door closed it will, when it reaches the position shown in Fig. 3, bring the end of the lever C upon the plate D and automatically close straight into its casing.

An inferior modification of my device would be to reverse the position of lever C, and place its fulcrum upon the lock edge of the door-frame. This form would be inconvenient when only one lever is to be used, as it would be in the way of the lock-dial.

It is evident to any one familiar with link and lever movements that there may be many modifications of my device which will accomplish the same purpose without departing from the principle of my invention, the essential feature of which consists in so coupling the double hinge and the door by a link or lever which has a bearing upon the casing that any motion applied to withdraw the door from or close it into its casing will automatically and simultaneously move both vertical edges of the door in the same plane a sufficient distance to permit the door to swing upon its hinges or to close it perpendicularly into its casings.

For all ordinary safes my device, as represented in Figs. 1, 2, and 3, will answer every purpose; but for heavy doors it will be found best in some cases to duplicate the device and provide an auxiliary means to assist in the operation of opening and closing the door. These auxiliary devices are represented com-

bined with my device for guiding the door in Figs. 4 to 9, inclusive, and will now be described.

Fig. 4 is an elevation, and Fig. 5 a transverse section, of a safe, showing the lever C extended. A portion of the extension is formed into a ring to afford access to the lock-dial, the extension terminating in a handle. Fig. 6 is an elevation of a safe, in which the guiding device is duplicated, and the extended ends of the levers C are here united by a hand-bar. Fig. 7 is an elevation, and Fig. 8 a transverse section, of a safe, in which the device represented in Fig. 6 is operated by a hand-wheel and screw. The screw is tapped through the bar and swivel-jointed to the door, as seen in Fig. 8. Fig. 9 shows an actuating-lever, G, journaled in lug *g*, which is secured to the door near the lock edge. The end of the lever extends over the edge of the door, and has its fulcrum in a lug, H, (similar in shape to lugs D,) which is secured upon the door-frame. To avoid friction the short arm of the lever G is furnished with a friction-roller.

In the drawings I have shown the lug B secured to the vertical brace which unites the bars of the two hinges; but, as this brace forms no part of the hinge, it is evident that if the lug be secured instead to the arm or bar of the hinge the operation of my device would be precisely the same.

I claim—

1. The combination, with the door and casing of a safe or vault, of a device consisting of a double hinge, a link coupled to said hinge and the door, said link having a bearing on the safe outside of the door to compel a parallel movement of the door to withdraw it from or close it into its casing, substantially as specified.

2. In a safe or vault, the combination of lugs A B D and lever C, to withdraw the door from or close it into its casing in a plane perpendicular to the front of the safe or vault, said parts being constructed and combined to operate as set forth.

3. In combination with the door-guiding device, composed of lever C and lugs A, B, and D, a lever-arm for operating the same, said lever being an extension of lever C, substantially as specified.

CHAS. F. GESSERT.

Witnesses:

GEO. J. MURRAY,  
JAMES MOORE.