No. 880,179. PATENTED FEB. 25, 1908.

B. F. TRIPP.

MECHANISM FOR FORCING DOORS FOR SAFES, &c., TO THEIR SEATS.

APPLICATION FILED FEB. 2, 1906.

3 SHEETS—SHEET 1.

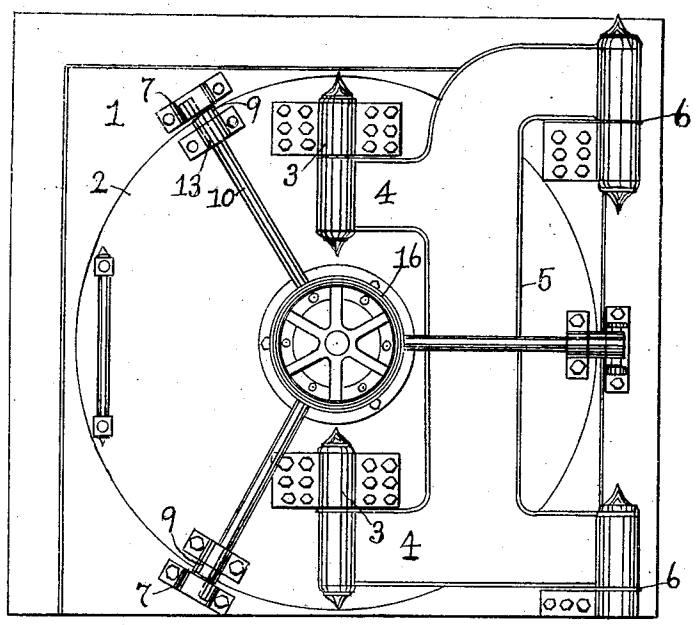


Fig. 1.

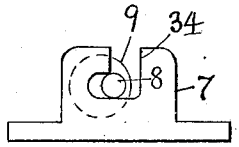


Fig. 2.

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3 SHEETS—SHEET 2.

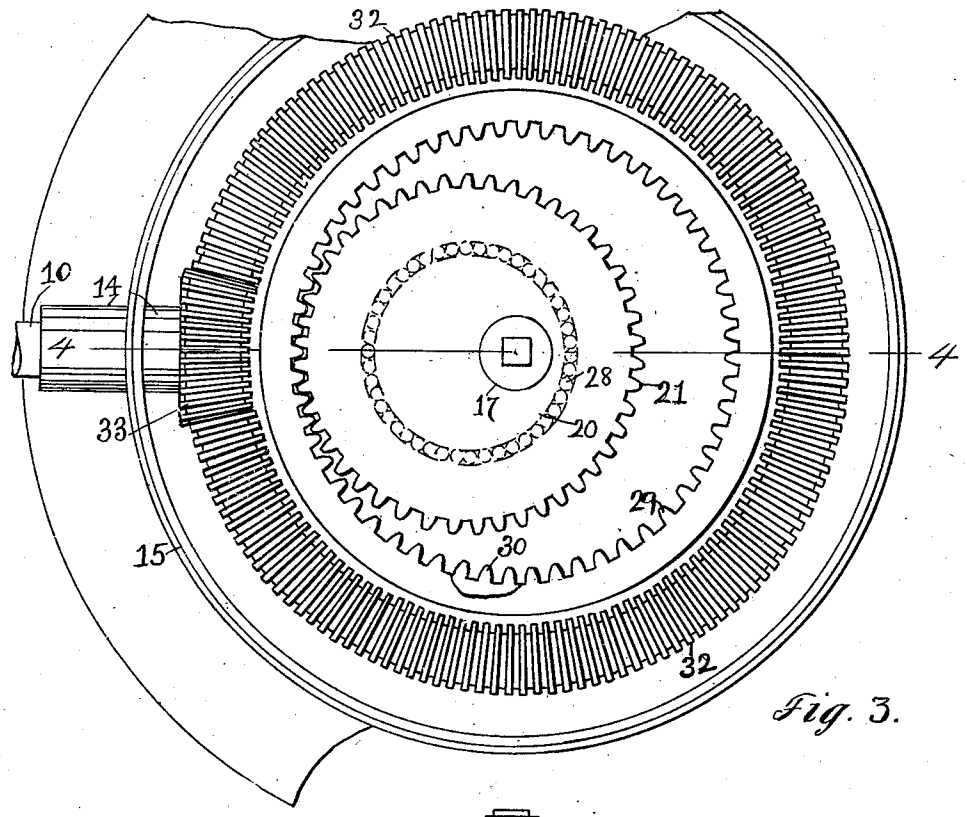


Fig. 3.

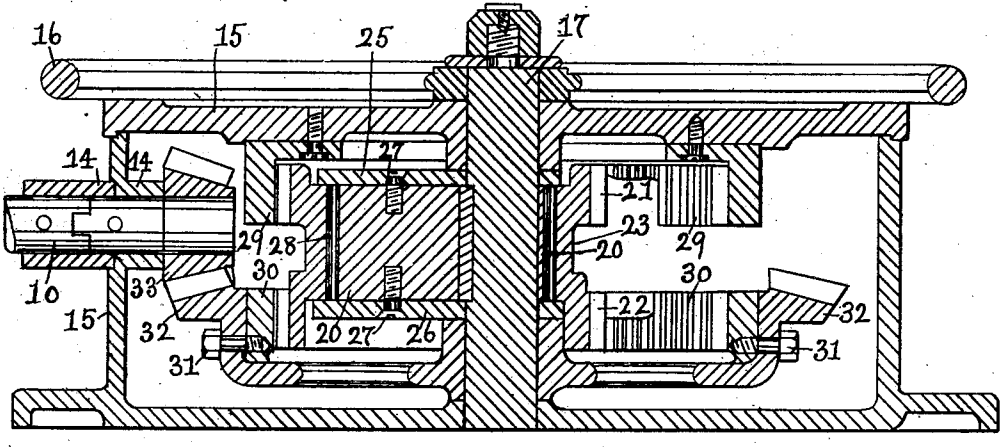


Fig. 4.

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No. 880,179. PATENTED FEB. 25, 1908.

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3 SHEETS—SHEET 3.

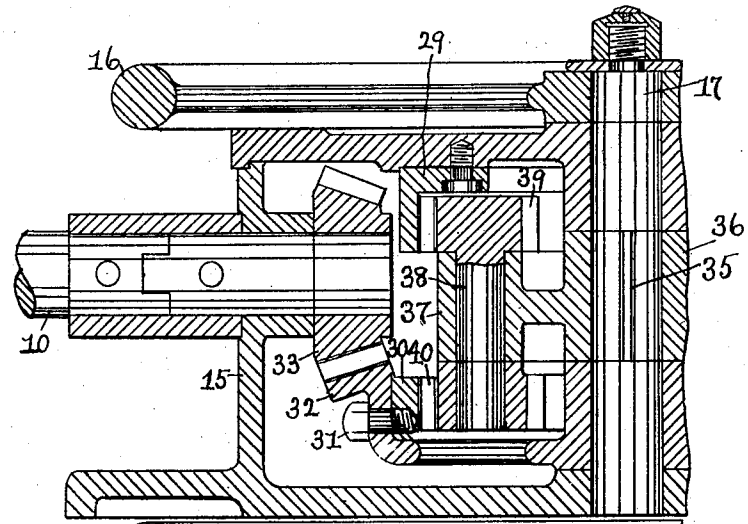


Fig. 5.

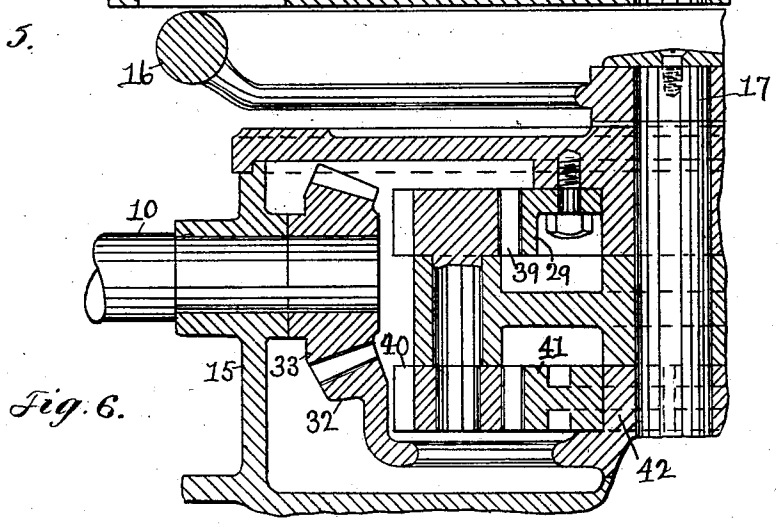


Fig. 6.

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UNITED STATES PATENT OFFICE.

BENJAMIN F. TRIPP, OF MEDFORD, MASSACHUSETTS.

MECHANISM FOR FORCING DOORS FOR SAFES, &c., TO THEIR SEATS.

No. 880,179. Specification of Letters Patent. Patented Feb. 25, 1908.

Application filed February 2, 1906. Serial No. 299,069.

To all whom it may concern:

Be it known that I, BENJAMIN F. TRIPP, a citizen of the United States, residing in Medford, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Mechanism for Forcing Doors for Safes, &c., to Their Seats, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to mechanism for forcing doors to their seats, which is especially designed and adapted for use on heavy doors of vaults, safes and like receptacles.

The invention has for its object to provide mechanism which is durable, substantially inexpensive and with which the door can be forced to its seat with increased power, as will be described. For this purpose, the door is provided with one or more rotatable shafts, which are operated by differential gearing as will be described.

Figure 1 is a front elevation of a vault door provided with a mechanism embodying this invention. Fig. 2, a detail to be referred to. Fig. 3, a plan view on an enlarged scale of the main parts of the differential gearing preferred by me. Fig. 4, a vertical section on the line 4—4, Fig. 3. Figs. 5 and 6, sectional details of modified forms of differential gearing to be referred to.

Referring to Fig. 1, 1 represents the casing or frame of a vault, safe or like receptacle, which is provided with a door 2, herein shown as circular in shape and provided with socket pieces 3, which are fitted over suitable pintles, not shown, but which are secured to arms 4 of a frame or carrier 5 vertically hinged at 6 to the casing 1. The door casing 1 is provided with the usual housings 7 (see Fig. 2), for the crank-pins or cams 8 on disks 9 attached to cam shafts 10, which are journaled in bearings 13 attached to the door and in hubs 14 secured to a stationary frame or casing 15 fastened to the door 2. The cam shafts 10 are operated to force the door 2 to its seat or closed position by a hand wheel 16, fast on a shaft 17 having bearings in the stationary casing 15 and operatively connected with the cam shaft 10 by a differential gearing as will be described.

In Figs. 3 and 4, one form or construction of differential gearing is shown which may be preferred by me, and which consists of a circular crank, hub or disk 20 fast on the shaft 17 and eccentrically mounted thereon, two circular gears or pinions 21, 22, carried by said hub or disk so as to revolve therewith, one of said gears as 21 having a different number of teeth from the other gear 22. In the present instance, the gears 21, 22 are shown as made in one piece with a band or ring 23, which encircles the hub or disk 20 and is confined between flanges on the opposite sides of the said hub or disk, which flanges may and preferably will be formed by circular plates 25, 26, fastened to the hub 20 by screws 27. The band or ring 23 may and preferably will be separated from the hub 20 by antifriction rollers 28. The gear or pinion 21 meshes with an internally toothed stationary gear 29 fastened to the top of the casing or frame 15, and the gear or pinion 22 meshes with an internally toothed gear 30 fastened as by screws 31 to a beveled gear 32 loose on the shaft 17 and which meshes with a bevel pinion 33 on the cam shaft 10.

By reference to Figs. 3 and 4, it will be seen that as the main shaft 17 is revolved by turning the hand-wheel 16, the eccentrically mounted hub 20 carries with it the pinions or gears 21, 22, and during a portion of each revolution of the main shaft 17, the gear or pinion 21 is engaged with the stationary gear 29 and is rotated on the hub 20 as a center, which rotation is communicated to the cam-shaft 10 by the pinion 22, gear 30 and bevel gears 32, 33. The rotation of the cam shaft 10 causes the cams or crank-pins 8 to be entered into or withdrawn from their slots 34 in the housings 7 so as to move the door toward or away from its seat.

While the construction of the differential gearing shown in Figs. 3 and 4, may be preferred, it is not desired to limit the invention in this respect, as other constructions or forms of differential gearing may be used to advantage, such, for instance, as shown in Figs. 5 and 6.

In the construction shown in Fig. 5, the main shaft 17 has fastened to it as by the key 35 a hub 36 provided with an arm 37 carrying a shaft 38 provided with a pinion 39, which meshes with the internally toothed stationary gear 29, the shaft 38 having fast on it a second pinion 40 having a different number of teeth from the pinion 39 and which meshes with the internally toothed gear 30.

In the construction shown in Fig. 6, the pinion 39 on the shaft 38 meshes with exter-

nal teeth on the stationary gear 29, and the pinion 40 meshes with external teeth on the gear 41, which, in this case, is fast on the hub 42 of the bevel gear 32. By means of the differential gearing, the door 2 can be forced to its seat or closed position by substantially slight power applied to the hand wheel, which power is materially increased by the differential gearing, so that the door is seated with increased power. Furthermore, the operating mechanism for the door is durable, substantially inexpensive and effective in operation.

Claims:

1. The combination with a door, of mechanism carried by the door for closing the same and comprising a rotatable cam shaft provided with a cam or crank, a housing coöperating with said cam or crank, a main shaft, and differential gearing connecting said main shaft with said rotatable cam shaft, substantially as described.

2. The combination with a door, of mechanism carried by the door for closing the same and comprising a main shaft, differential gearing operatively connected with said main shaft, a rotatable shaft operated by said differential gearing and means coöperating with said rotatable shaft to force the door to its seat, substantially as described.

3. The combination with a door, of mechanism carried by the door for closing the same and comprising a main shaft, differential gearing operatively connected with said main shaft and comprising a hub or disk eccentrically mounted on said main shaft, differential gears loosely mounted on said hub or disk, a stationary gear engaging one of said differential gears, a movable gear engaging the other of said differential gears, and means operated by said movable gear for effecting the closing of said door.

4. The combination with a door, of mechanism carried by the door for closing the same and comprising a main shaft, a hub or disk eccentrically mounted on said shaft, differential gears mounted on said hub, a stationary gear coöperating with one of said differential gears, a rotatable gear coöperating with the other of said differential gears, and a shaft driven by said rotatable gear, substantially as described.

5. The combination with a door, of mechanism carried by the door for closing the same and comprising a main shaft provided with a hub or disk eccentric thereon, differential gears mounted on said hub, a stationary gear coöperating with one of said differential gears, a rotatable gear coöperating with the other of said differential gears, and means driven by said rotatable gear, substantially as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

BENJAMIN F. TRIPP.

Witnesses:
JAS. H. CHURCHILL,
J. MURPHY.