

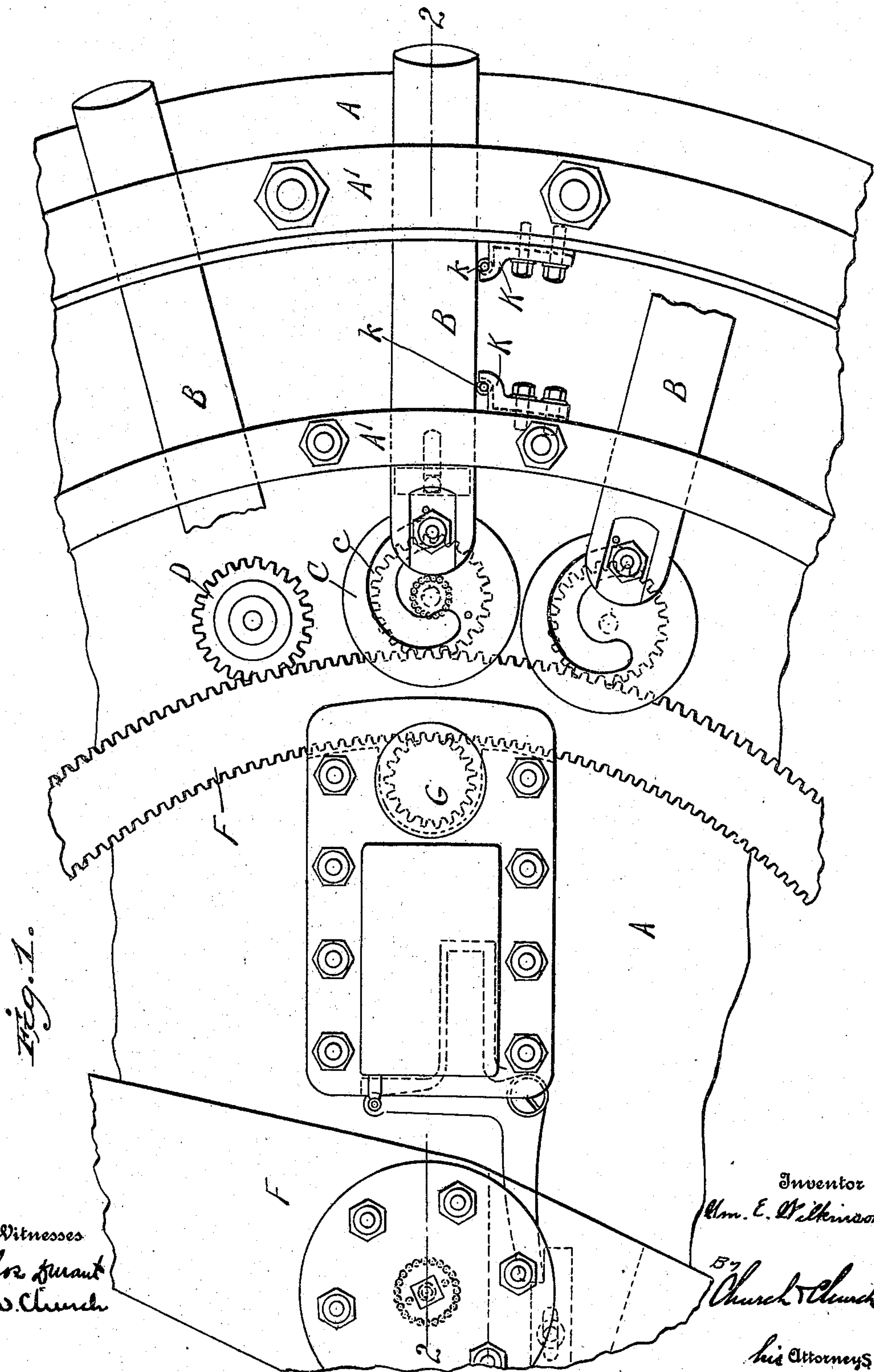
W. E. WILKINSON.
OPERATING MECHANISM FOR BOLTS OF SAFE DOORS.

APPLICATION FILED OCT. 1, 1908.

930,328.

Patented Aug. 3, 1909.

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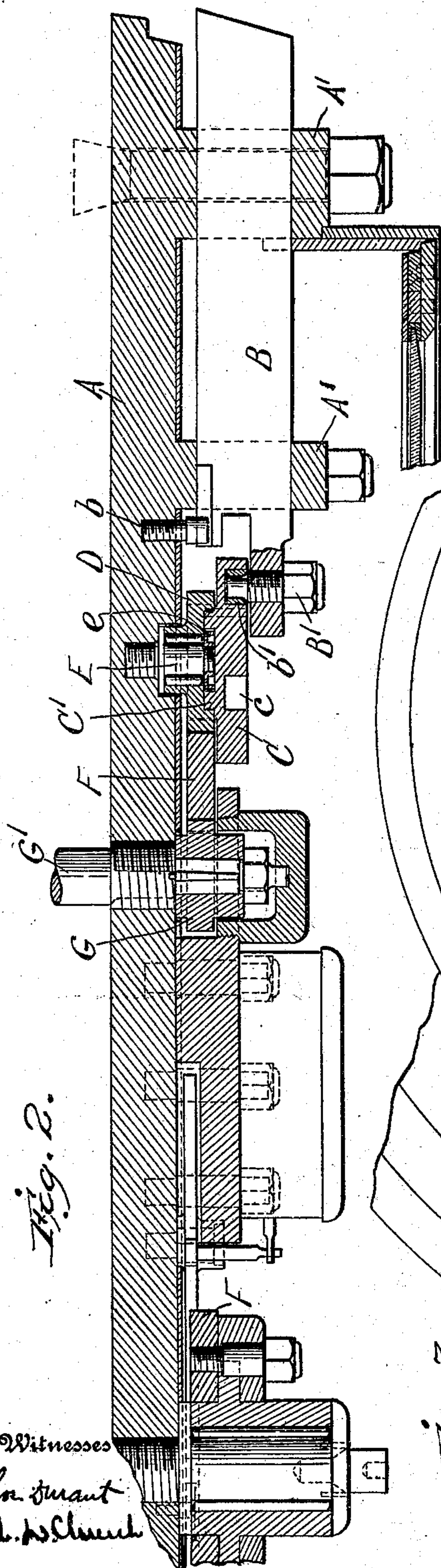


Fig. 2.

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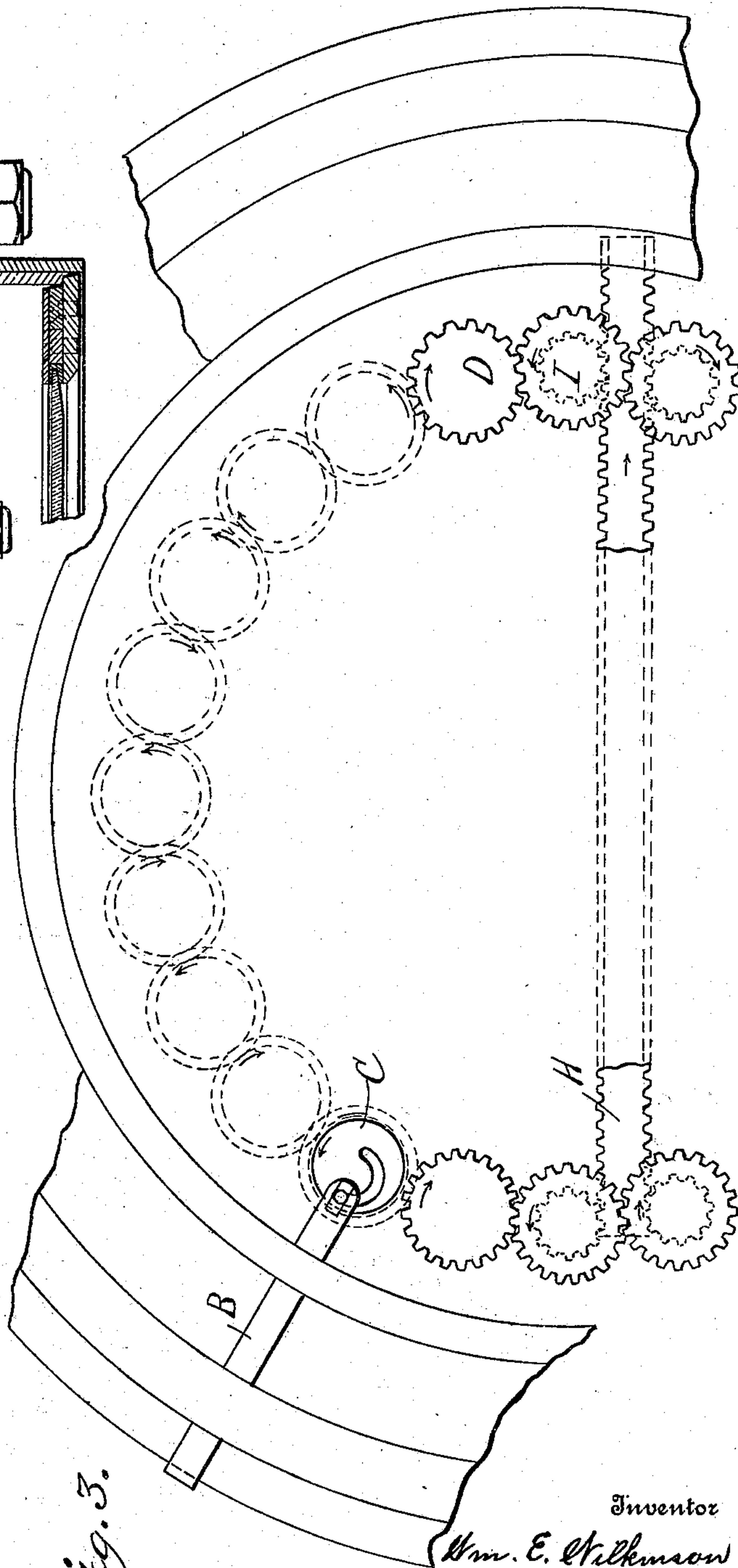


Fig. 3.

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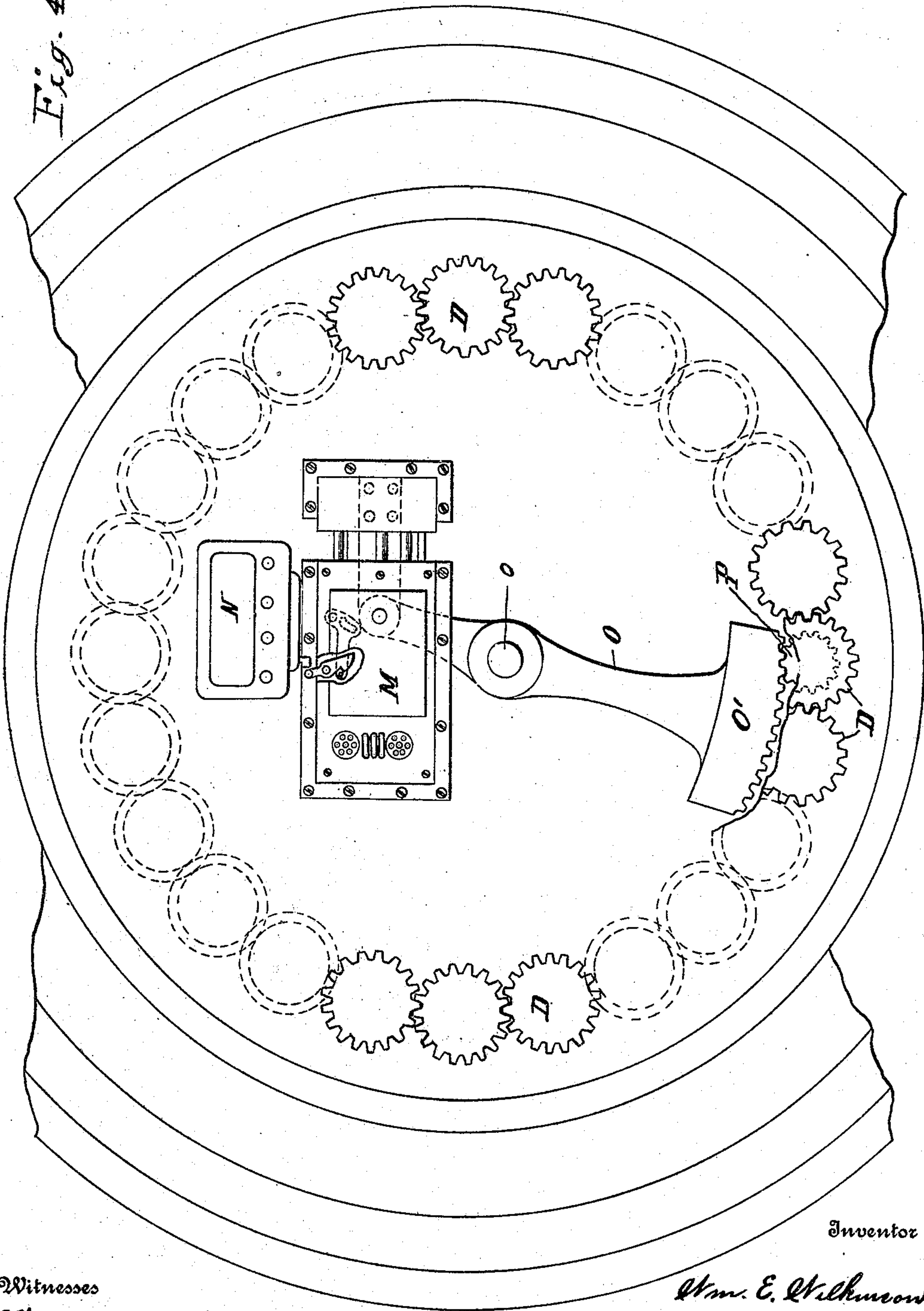
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Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM E. WILKINSON, OF YORK, PENNSYLVANIA, ASSIGNOR TO YORK SAFE & LOCK COMPANY, OF YORK, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

OPERATING MECHANISM FOR BOLTS OF SAFE-DOORS.

No. 930,328.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed October 1, 1908. Serial No. 455,680.

To all whom it may concern:

Be it known that I, WILLIAM E. WILKINSON, a citizen of the United States, residing at York, York county, Pennsylvania, have
5 invented certain new and useful Improvements in Operating Mechanism for Bolts of Safe-Doors; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had
10 to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to bolt operating mechanism for use in connection with safe
15 doors, the mechanism of the present invention being especially well adapted for use in connection with round doors having radially arranged bolts.

The objects of the invention are to provide an operating mechanism which will
20 simultaneously project or withdraw a large number of bolts smoothly and easily with the expenditure of a minimum effort on the part of the operator.

A further object of the invention is to provide a mechanism with which each bolt
25 will be separately held in its adjusted position whereby the wrecking of one bolt or its retaining devices will not disturb the efficiency of the remaining bolts.

A further object of the invention is to provide an operating mechanism with which
35 pressure or power applied to any one or more of the bolts will not be effective to move the remaining bolts.

The invention consists in certain novel details of construction and combinations
40 and arrangements of parts all as will be now described and pointed out particularly in the appended claims.

In the accompanying drawings: Figure 1 is an elevation of a section of the inner side
45 of a circular safe door embodying the present improvements. Fig. 2 is a section on the line 2—2, Fig. 1. Fig. 3 is an elevation partly broken away of a door illustrating a modification. Fig. 4 is a similar view illustrating another modification particularly adapted for use with an "automatic
50 device".

Similar letters of reference indicate the same parts in all of the views.

The letter A indicates the inner plate of a
55 circular safe door, and in accordance with preferred practice it is provided with an-

nular rings or projections A', having bearings therein for the radially arranged bolts B. Each bolt while movable longitudinally in its bearings, is held against rotation by a key formed by the head of a screw b, and
60 each bolt at its inner end is connected with the bolt operating mechanism, said operating mechanism and its connections with the bolts embodying the novel features of the present application. At the inner end each
65 bolt is preferably reduced in cross section and is provided with a transverse pin or projection B', having on its inner end an anti-friction roller b', said roller being adapted to work in a snail or cam groove c in the
70 face of a snail or cam wheel C. For imparting rotation to the snail or cam wheels C each is mounted upon a pinion D journaled preferably by means of an antifriction bearing on a stud E mounted in the door
75 plate A. As a convenient construction the studs E are secured in the door plate by screw threads or otherwise and have their outer ends threaded for the reception of a pinion retaining nut e. The pinion retain-
80 ing nut e is located within a recess in the face of the pinion, and said recess is threaded for the reception of a projection C' of the cam or snail wheel, the latter thus inclosing the pinion retaining nut, thereby giving the
85 appearance of a solid structure and protecting both the bearing and the securing means against displacement or access of dust. In the preferred arrangement, the axis of each bolt B intersects the axis of its pinion and
90 cam wheel, and the curve of the snail groove is such that pressure longitudinally of the bolt does not tend to rotate the wheel in either direction, whereby the bolts will be held in their adjusted positions, each inde-
95 pendently of the other.

Various means may be provided for imparting simultaneous rotation to the pinions and cam wheels, thus in Figs. 1 and 2 a relatively large operating ring or wheel F is
100 provided with peripheral teeth adapted to mesh with the pinions and rotary movement is imparted to the operating wheel F by a pinion G, having an operating shaft G' extending through the safe door for the appli-
105 cation of a handle or power mechanism of any suitable character.

In Fig. 3 a modified arrangement of the mechanism for imparting rotation to the pinions and cam wheels is illustrated, thus
110

instead of employing a single large operating wheel the pinions are caused to mesh together, forming a complete circle of intermeshing gears, and in this instance if a cam wheel is applied to each pinion it is obvious that the direction of the snail groove must be reversed in adjacent wheels, but if the cam wheels are applied to alternate pinions, then the cam or snail grooves are similarly arranged in all of the cam wheels. It is also obvious that with this modified arrangement of operating mechanism the pinions should be of such diameter that the cam wheels will not project beyond the pitch lines in case each pinion carries a cam wheel. For operating a circular arrangement of intermeshing pinions and in order to avoid lost motion, a rack bar H may be conveniently extended transversely across the inner face of the door and made to mesh with smaller pinions I, indicated by dotted lines in Fig. 3, and motion may be imparted to the rack bar H by any suitable mechanism for rotating the pinions in one direction or the other. In the modified arrangement of operating mechanism, twenty-four pinions are preferably employed; where a rack bar is employed it extends across the inner face of the door at a point slightly below the center line. This arrangement not only insures a uniform distribution of the locking bolts, but permits of the use of a single rack bar passing between adjacent pinions at opposite edges of the door. In the arrangement illustrated in Fig. 4 the intermeshing pinions are operated by an "automatic device" indicated at M and are adapted to carry the snail cam wheels as heretofore described in connection with Figs. 1 and 2. The "automatic device" when released by the time lock N is adapted to swing the segment lever O on its center o, and through the engagement of the toothed segment O' with the pinion P carried by one of the pinions D. The "automatic device" itself may be of any well known type or of any preferred construction adapted to move the segmental lever so as to rotate the pinions and cam wheels to operate the bolts. Inasmuch as the doors of the character to which the present invention is particularly applicable are very large and the locking

bolts are of a size to correspond with the dimensions of the door, said bolts are liable to create considerable friction in their bearings. To overcome this friction and cause the bolts to move with greater freedom, it is preferred to mount on the rings A' way or bearing brackets K adapted to support antifriction rollers L, the latter in turn constituting the supports for the bolts B. Conveniently, the antifriction rollers L may have reduced bearing pintles at the ends for coöperation with the ways of the brackets K, whereby the bolts may be given a considerable movement with a very short movement of the rollers, and at the same time all bearing surfaces will make rolling contact.

Having thus described the invention, what I claim as new and desire to secure by Letters-Patent, is:

1. The combination with the door and series of bolts mounted in bearings thereon, of an operating mechanism for said bolts embodying a separate wheel for each and every bolt, each wheel having a snail cam thereon, and projections on the bolts coöperating with the respective cams, substantially as described.

2. The combination with the door and the series of radially disposed bolts mounted in bearings thereon to move longitudinally, of a series of wheels, one for each bolt, a snail cam on each wheel, projections on the bolts coöperating with the respective cams, and means for simultaneously rotating said wheels to project or retract the bolts, substantially as described.

3. The combination with a circular door having bolt bearing projections thereon, and radially arranged bolts mounted in bearings in said projections, of a series of wheels, one for each bolt mounted on axes intersecting the axes of the bolts and each wheel having a snail cam groove therein, projections on the bolts for coöperating with the respective cams, and means for simultaneously rotating the wheels to project or retract the bolts longitudinally.

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