

E. A. STRAUSS.
SAFE BOLT ACTUATING MECHANISM.

APPLICATION FILED FEB. 20, 1905.

2 SHEETS—SHEET 1.

Fig. 1

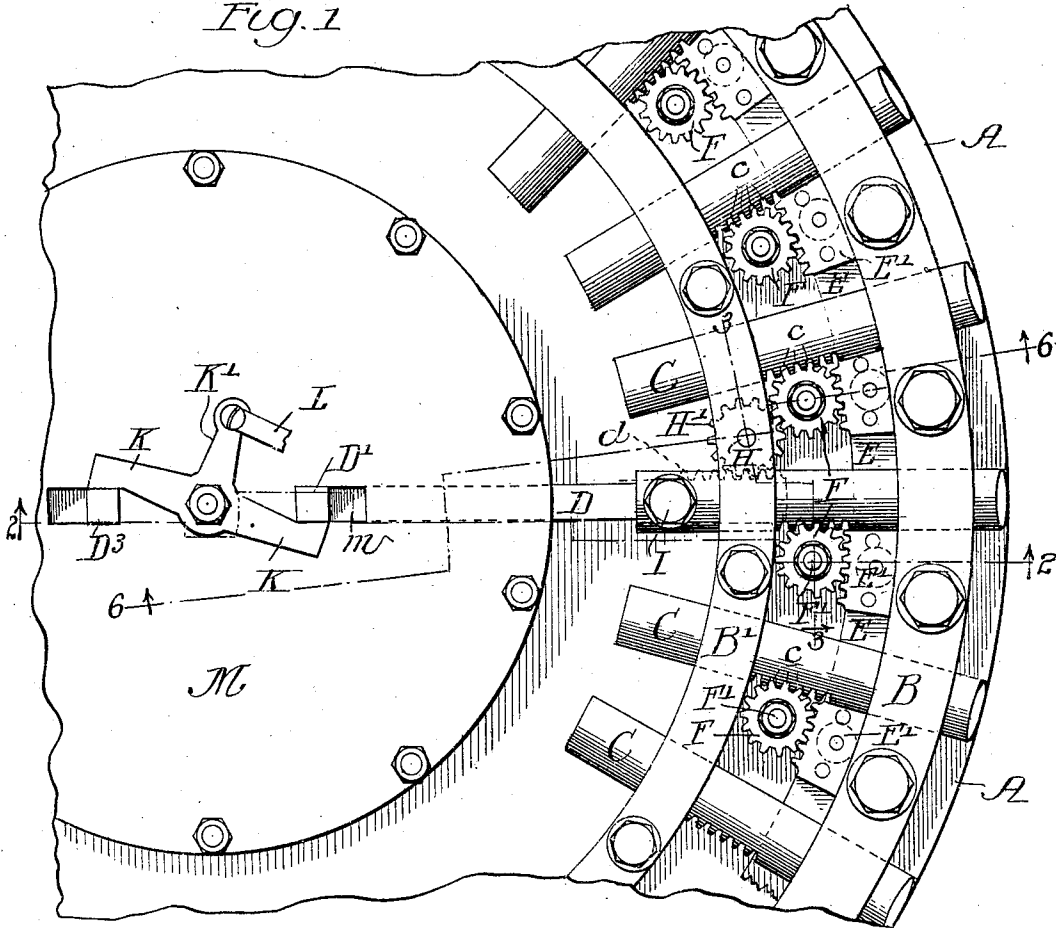


Fig. 2

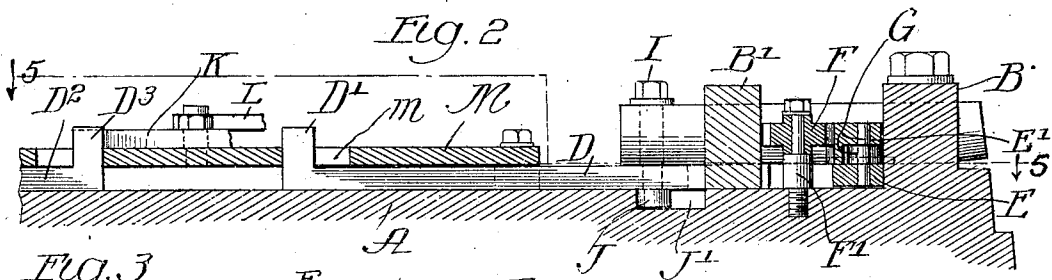
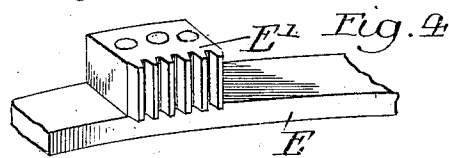
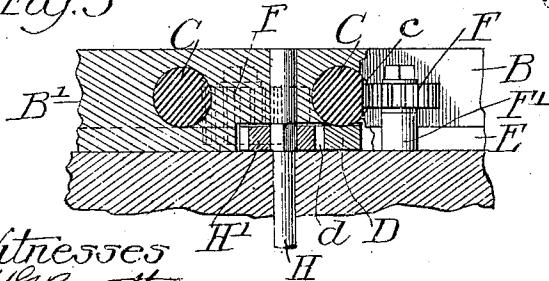


Fig. 3



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No. 827,999.

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2 SHEETS—SHEET 2.

Fig. 5

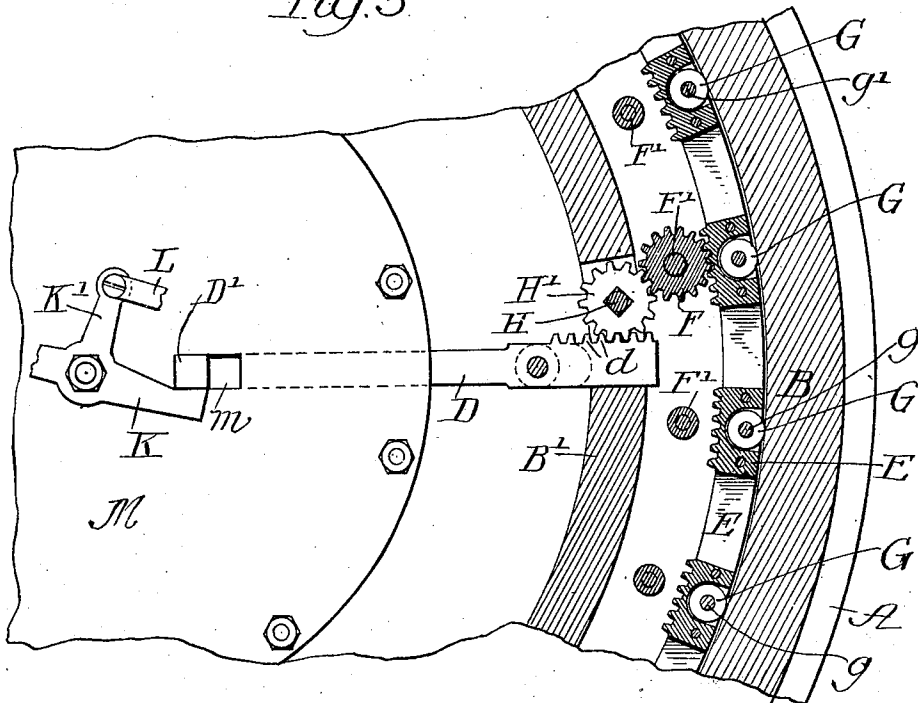
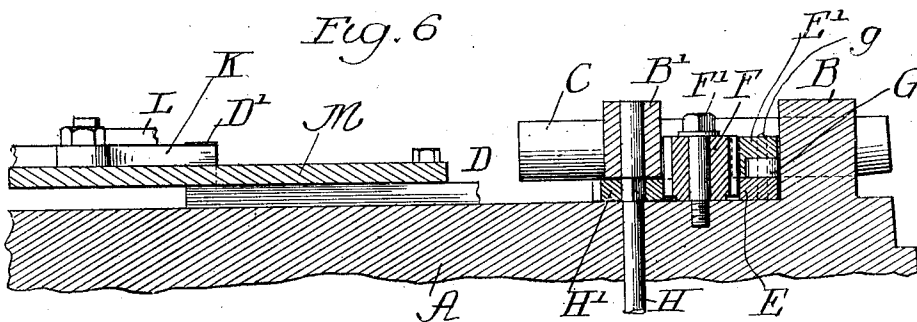


Fig. 6



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UNITED STATES PATENT OFFICE.

EMIL A. STRAUSS, OF CHICAGO, ILLINOIS.

SAFE-BOLT-ACTUATING MECHANISM.

No. 827,999.

Specification of Letters Patent.

Patented Aug. 7, 1906.

Application filed February 20, 1905. Serial No. 246,605.

To all whom it may concern:

Be it known that I, EMIL A. STRAUSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Safe-Bolt-Actuating Mechanism; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in actuating devices for radially-arranged bolts such as are commonly used on circular safe-doors; and it consists in the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is an interior face view of a part of a safe-door provided with radially-arranged boltwork and actuating devices therefor embodying my invention. Fig. 2 is a sectional view taken upon line 2 2 of Fig. 1. Fig. 3 is a detail section taken upon line 3 3 of Fig. 1. Fig. 4 is a perspective view of a part of the bolt-actuating ring with one of the gear-segments attached thereto. Fig. 5 is a detail section taken upon line 5 5 of Fig. 2. Fig. 6 is a sectional view taken upon line 6 6 of Fig. 1.

As shown in said drawings, A indicates a safe-door of circular form, B B' two bearing-rings attached to the inner face of the door, one near the outer margin thereof and the other somewhat inside of said margin, and C C a plurality of radially-arranged cylindric bolts, which fit and slide endwise in bearing-apertures formed in the said rings B B'.

D indicates a radial endwise-movable dogging-bar attached to one of the bolts C and extending inwardly toward the center of the door.

M indicates a central supporting-plate adapted to form a support for the dogging devices and for a combination-lock or automatic time-lock which may be employed for controlling the movement of the bolts.

E indicates a bolt-actuating ring which is located between the outer and inner bearing-rings B and B' and extends between the several bolts C C and the face of the door. Said ring is provided with a plurality of gear-segments E' E' E', that extend from the side face of said ring into the spaces between the

bolts. Each of the bolts C C is provided with lateral gear-teeth *c* cut in the side faces of the bolts between the ends of the same and in the space between the two bearing-rings B B'.

F F F indicate gear-pinions which turn on axes perpendicular to the safe-door and located between the guide-rings B B' in the spaces between the bolts, said gear-pinions intermeshing with the lateral gear-teeth *c* on the bolts and also with the gear-segments E'. Said gear-pinions serve to transmit motion from the actuating-ring E to the several bolts, so that by the turning of the ring simultaneously an equal endwise movement is given to all of the bolts for casting or retracting the same.

The gear-pinions F are mounted on the studs F', which are rigidly affixed to the door and project inwardly from the inner face thereof. The said gear-pinions are supported by said studs at a distance from the door necessary to bring them in line with the central axes of the several cylindric bolts. In other words, the said gear-pinions are located midway between the planes of the inner and outer faces of the cylindric bolts, this location of the gear-pinions F enabling the lateral gear-teeth *c* on the bolts to be formed or cut in the convex side faces of the same laterally opposite their central axes.

The gear-segments E' are elevated above the inner face of said actuating-ring E a sufficient distance to bring them in position to intermesh with the said gear-pinions F. Said gear-ring E is located adjacent to one of the bearing-rings B or B', preferably the external ring B, and a plurality of antifriction-rollers G G G are provided to afford an antifriction-bearing between the actuating-ring and the adjacent bearing-ring. Said antifriction-rollers in the construction shown in the drawings are mounted on the actuating-ring and engage the inner face of the bearing-ring B. Said antifriction-rollers are, moreover, located within recesses formed in the inner faces of the gear-segments E' and are mounted on bearing-pins *g*, which extend through said recesses and are engaged at their inner ends with the actuating-ring E and at their outer ends with said gear-segments, as clearly seen in Fig. 2. This location and arrangement of the antifriction-rollers in recesses in the gear-segments has the advantage that the rollers are concealed or covered

by the gear-segments, while said gear-segments, in connection with the actuating-ring to which they are attached, afford rigid supports for both ends of the bearing-pins *g* of said rollers.

H indicates an actuating-spindle which extends through the door and by means of which motion is given to the boltwork from the exterior of the door in casting and retracting the bolts. Said spindle H is provided at the inner face of the door with a gear-pinion H', which intermeshes with gear-teeth *d* formed on one side of the dogging-bar D and also intermeshes with one of the gear-pinions F. When the spindle H is turned, the said gear-pinion H' serves to transmit rotary motion to the gear-pinion F engaged therewith and from the latter to the actuating-ring E, and also serves to give endwise motion directly to the dogging-bar D. The said actuating-spindle H is shown as arranged in line with the inner guide-ring B' and having a bearing at its inner end in said ring, which latter is recessed at its side adjacent to the inner face of the door to receive the pinion H', as clearly seen in Fig. 3.

The dogging-bar D is connected with the inner end of the bolt C, to which it is joined by means of a stud I, having screw-threaded engagement with the bolt and projects beyond the inner face of the same to engage an aperture in the adjacent end of said bar D. In order that the outer end of the said bar may be guided or held from lateral movement and the gear-teeth *d* thereon held in proper intermeshing relation with the actuating-pinion H' without bringing lateral pressure on the bolt C, to which the said bar is connected, said bar carries a guide-roller J, which projects from the inner face of the said bar and engages a radial guide-groove on the door. Said guide-roller is conveniently mounted on the end of the stud I which projects from the inner face of said bar D to receive said roller, and a radial guide-groove J' is preferably formed or sunk in the inner face of the door beneath the outer portion of said bar D.

Any suitable form of dogging device may be employed in connection with the dogging-bar D, the construction illustrated in these parts being as follows: Said bar D is provided at its inner end with a stop-lug D', which projects through a radial slot *m* in the supporting-plate M. Mounted centrally on said supporting-plate are two rigidly-connected dogging-arms K K, one of which is adapted for engagement at its free end with the stop-lug D' on the dogging-bar D, the other end of which is adapted to engage a like lug D² on a corresponding oppositely-arranged dogging-bar D², which may be connected with an opposite bolt on the door in the same manner as the bar D. The dogging-arms K K are shown as provided with a

rigid radial arm K', which is connected with a link L, through the medium of which motion is transmitted to the dogging-arm from a combination-lock or a time-lock. Such combination or time lock may be arranged in any usual or preferred manner, and it is not thought necessary to illustrate the same. It will of course be understood, inasmuch as the dogging-bar D is attached to and moves with one of the bolts C and all of the bolts have operative connection with and are moved by the actuating-ring E, the dogging of the bar D will hold from movement all of the bolts. The drawings illustrate two dogging-bars D and D²; but any other number may be used as desired or preferred, it being of course understood that any number of dogging-arms K may be employed to correspond with the number of dogging-bars present in any particular case.

The bolt-actuating devices described have the advantages of being simple and strong in structure, durable and reliable in operation, and of giving a symmetrical and attractive appearance to the boltwork as a whole.

I claim as my invention—

1. The combination with a safe-door provided with outer and inner bearing-rings, of radially-arranged bolts sliding in said bearing-rings and provided between the rings with lateral gear-teeth, an actuating-ring extending between the bolts and the adjacent face of the door adjacent to one of said bearing-rings, rollers affording an antifriction-bearing between the actuating-ring and the adjacent bearing-ring, said actuating-ring being provided with gear-segments, and gear-pinions intermeshing with the said lateral gear-teeth on the bolts and with said gear-segments.

2. The combination with a safe-door provided with inner and outer bearing-rings, of radially-arranged bolts sliding in the bearing-rings and provided between the rings with lateral gear-teeth, an actuating-ring located between the bearing-rings adjacent to one of the latter and extending between the bolts and adjacent face of the door, said actuating-ring being provided with gear-segments which extend into the spaces between the bolts, gear-pinions located between the rings in the spaces between the bolts and intermeshing with the lateral gear-teeth on the bolts and with the said gear-segments, and rollers affording an antifriction-bearing between the actuating-ring and the adjacent bearing-ring.

3. The combination with a safe-door provided with inner and outer bearing-rings, of radially-arranged bolts provided with lateral gear-teeth, an actuating-ring extending between the bolts and the door adjacent to one of said bearing-rings, and provided with gear-segments, gear-pinions intermeshing with the lateral gear-teeth on the bolts and with

said gear-segments, and antifriction-rollers mounted on the actuating-ring and engaging the adjacent bearing-ring.

4. The combination with a safe-door provided with inner and outer bearing-rings, of radially-arranged bolts provided with lateral gear-teeth, an actuating-ring extending between the bolts and the adjacent face of the door, and provided with gear-segments which extend into the spaces between the bolts, gear-pinions intermeshing with the lateral gear-teeth on the bolts and with said gear-segments, and antifriction-rollers mounted on the actuating-ring, within recesses in the gear-segments thereof, and engaging the adjacent bearing-ring.

5. The combination with a safe-door and radially-arranged bolts provided with lateral gear-teeth, of an actuating-ring extending between the bolts and the adjacent face of the door, and provided with gear-segments, gear-pinions having intermeshing engagement with said lateral gear-teeth on the bolts and with said gear-segments, a radially-arranged dogging-bar attached to the inner end of one of said bolts and extending toward the center of the door, and a pivoted dogging-arm adapted for engagement with said dogging-bar.

6. The combination with a safe-door, a sliding bolt, a dogging-bar attached thereto

and provided with lateral gear-teeth, an actuating-spindle provided with a gear-pinion engaging said gear-teeth, and a guide-roller on said locking-bar, the door being provided with a guide-groove parallel with the bolt with which said guide-roller is engaged.

7. The combination with a safe-door and radially-arranged bolts provided with lateral gear-teeth, of an actuating-ring extending between the bolts and the adjacent face of the door and provided with gear-segments extending into the spaces between the bolts, motion-transmitting gear-pinions having intermeshing engagement with said lateral gear-teeth on the bolts and with the said gear-segments, and an actuating-spindle extending through the door and provided with a pinion which intermeshes with one of said motion-transmitting pinions, and a radial dogging-bar connected with one of the bolts and provided with lateral gear-teeth engaging said pinion on the actuating-spindle.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 17th day of February, A. D. 1905.

EMIL A. STRAUSS.

Witnesses:

C. CLARENCE POOLE,
G. R. NILKINS.