

No. 658,645

Patented Sept. 25, 1900.

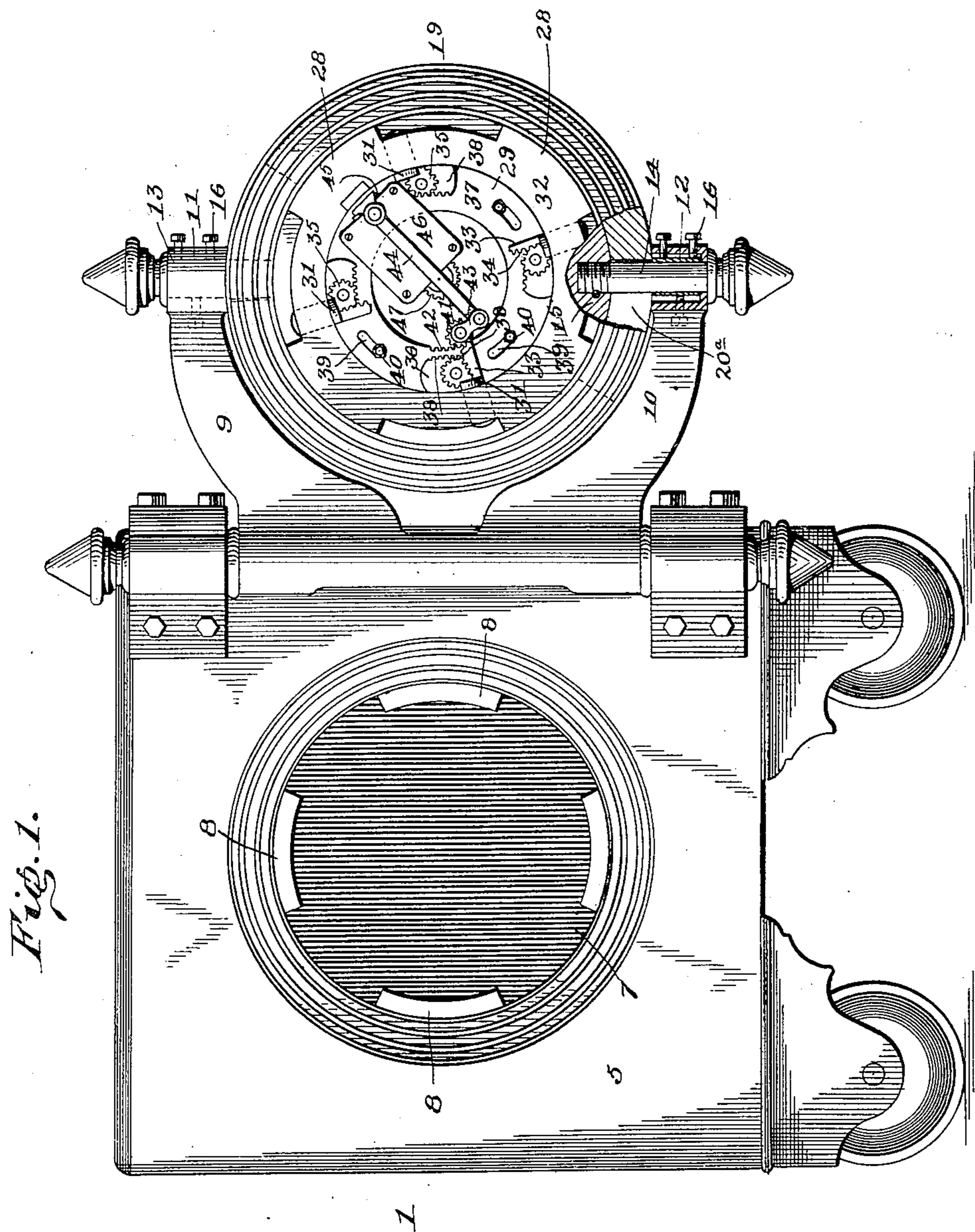
J. T. HOUGH.

SAFE.

(Application filed Dec. 13, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 2.

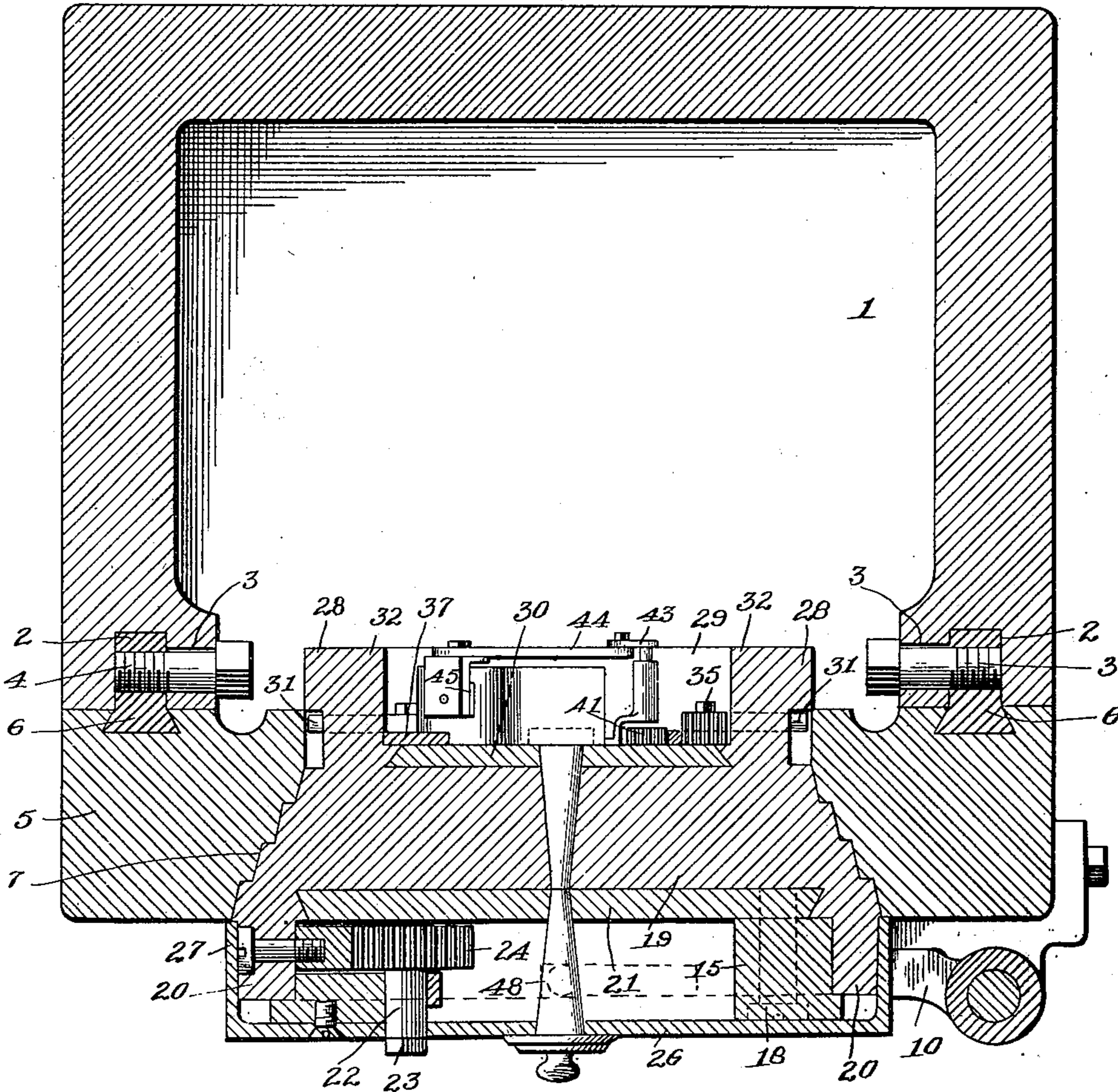


Fig. 3.

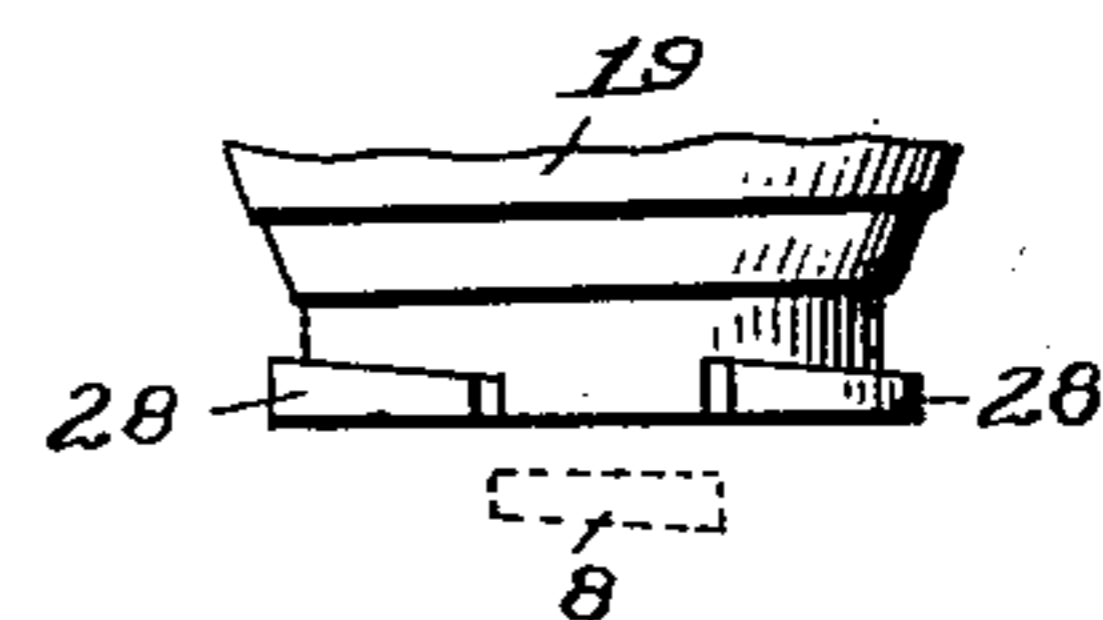
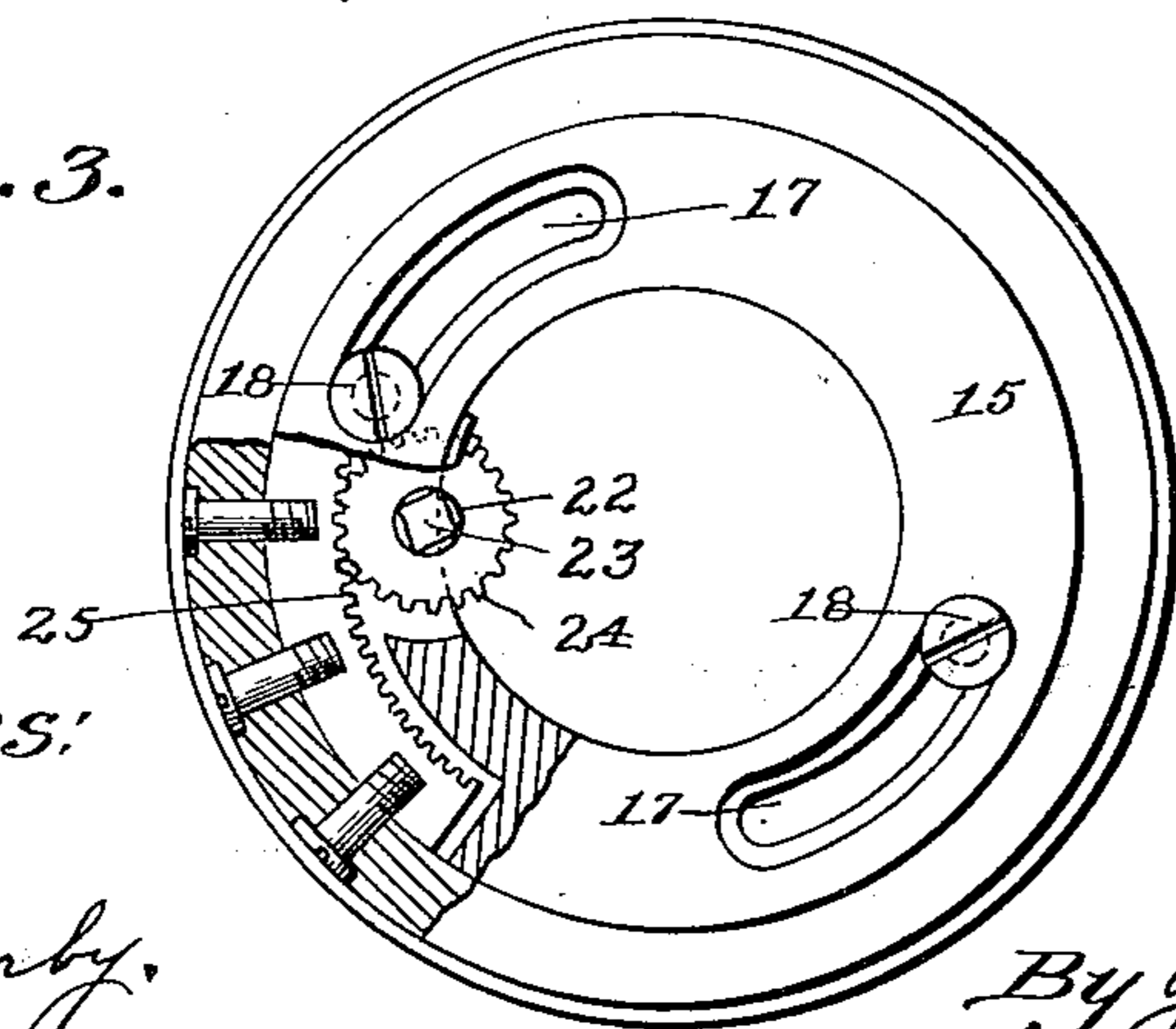


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN THOMPSON HOUGH, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO BENJIMAN S. LAW AND MALICHI G. LESLIE, OF SAME PLACE.

SAFE.

SPECIFICATION forming part of Letters Patent No. 658,645, dated September 25, 1900.

Original application filed May 9, 1899, Serial No. 716,131. Divided and this application filed December 13, 1899. Serial No. 740,185. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMPSON HOUGH, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Safes, of which the following is a specification.

My invention relates to safes for banks and the like, the object of the same being to provide improved means for mounting and operating the door and an improved construction of boltwork for the door.

The details of the invention will be more fully set forth hereinafter and the novel features thereof will be defined in the claims.

In the drawings forming part of this specification, Figure 1 is a front elevation of the safe with the door in its open position. Fig. 2 is a central horizontal sectional view of the same with the door closed. Fig. 3 is an elevation, partly in section, of the front of the door with the face-plate removed; and Fig. 4 is a detail view.

Like reference-numerals indicate like parts in the several views.

I have shown the casing of the safe made up of a body 1, having a groove 2 therein, with lateral openings 3 3 leading into said opening for the reception of securing-screws 4, and a front plate 5, having a ring or tongue 6, extending around its inner surface, which fits within the groove 2 and receives the threaded ends of the screws 4. This particular construction of casing is preferred by me and forms the subject of a separate patent, No. 649,455, dated May 15, 1900, and of which the present application is a divisional part; but it is obvious that any other form of casing may be substituted therefor so far as the features claimed in this application are concerned.

The front plate 5 is formed with a circular door-opening 7 of gradually-decreasing diameter from its outer surface inwardly, the walls of said opening being formed with annular stepped projections or shoulders, as shown. At the extreme inner ends of the opening 7 said plate 5 is formed with segmental lugs or projections 8 8, which are of equal length and are separated from each other by

spaces of the same length as the lugs themselves. The said lugs project inwardly toward the center of the opening 7 and are wedge-shaped, as shown, in longitudinal section—that is to say, the inner wall or surface of each of said lugs is inclined to the plane of the surface of the plate 5.

Hinged to the front plate 5 of the safe-casing is a door-supporting bracket made up of upper and lower arms 9 and 10, respectively. The said arms are provided at points in a vertical line with the center of the door-opening 7 with sockets which receive bearings 11 12 for vertically-extending pivots 13 14, secured at their upper and lower ends, respectively, to the ring 15. The said bearings may be adjusted laterally in said arms by means of set-screws 16 or other analogous devices. The ring 15 is provided with segmental slots 17, through which pass the screws 18, by means of which said ring is attached to the door 19. The said door is preferably made of the same hard material of which the body 1 and front plate 5 are constructed and is a solid block formed on its exterior circular surface with stepped projections or shoulders, the counterparts of the stepped projections or shoulders in the walls of the door-opening 7, so that said door may be seated in said opening and form a close impervious joint. The outer surface of the door 19 is recessed, as shown, forming an annular ring or flange 20, within which the ring 15 is seated and against which said ring is adapted to bear. The said ring or flange 20 is formed with segmental slots 20^a for the passage of the pivots 13 14 there-through. The screws 18 extend through the slots 17 in the ring 15, and the threaded ends thereof engage threaded openings in a soft-metal plate or disk 21, dovetailed into the door 19 at the bottom of the recess in said door. Mounted in bearings in the ring 15 and fitting within the recess in the outer surface of the door 19 is a shaft 22, having a polygonal end 23 for the engagement of a key or wrench and carrying a pinion 24, which meshes with segmental rack-teeth 25 on the flange 20 of the door. It will be observed that by turning the shaft 22 the pinion 24 will

be rotated and the motion of the latter will be transmitted to the door 19, causing the latter to be rotated. The degree of rotation will be limited by the length of the slots 17, through which the screws 18 pass. Fitting over the ring 15 and inclosing the recess in the door 19 is a covering or face-plate 26, which is formed with an annular flange 27, embracing the flange 20 on the door, the said face-plate being secured to the ring 15 by screws, as shown, or by any suitable means. The inner end of the door 19 is provided with outwardly-extending segmental lugs or projections 28, which when the door is first introduced into the opening 7 are adapted to pass between the lugs 8 on the front plate 5. When said door is turned, however, by the means heretofore described, said lugs 28 will pass behind the lugs 8 and prevent outward movement of said door. The said lugs 28 are wedge-shaped in longitudinal section, so that when they are turned to pass behind the lugs 8 the inclined walls of the two sets of lugs will be brought into engagement with each other, with the result that the door is drawn inwardly into the opening 7, and close contact between said door and the front plate 5 is effected. The lugs 8 and 28, therefore, serve not only to prevent outward movement of the door when they are brought into engagement with each other, but to clamp the door to its seat in the door-opening 7.

In order to prevent the backward turning movement of the door 19 after the lugs 28 have been brought into engagement with the lugs 8, I have provided an improved construction of locking mechanism, the same being mounted in a circular recess 29 in the inner face of the door 19. In the bottom of said recess is secured a plate 30, of soft metal, to which said locking mechanism may be readily attached. The said locking mechanism consists of a plurality of bolts 31, extending radially through openings in the annular flange 32, on which the lugs 28 are formed, the stems 33 of said bolts being provided with rack-teeth 34, meshing with pinions 35, as clearly shown. The said pinions are mounted on the base-plate 30 and are located within slots 36 in a ring 37 and mesh with rack-teeth 38 in the walls of said slot. Said ring 37 is further provided with segmental slots 39, through which extend the screws 40, by means of which said ring is attached to the base-plate 30. The ring 37 is capable of a limited degree of rotary movement, which is imparted to it by a pinion 41, which meshes with rack-teeth 42 on the inner surface of said ring. To the pinion 41 is connected a crank-arm 43, attached to a link 44, connected to the bolt 45 of an ordinary time or combination lock. The particular form of lock employed is immaterial. I have shown in the drawings a lock-casing 46 and one of the pinions 47 thereof, which is actuated by a spindle 48, leading

to the outside of the door 19, as shown. In lieu of said spindle, however, any other equivalent mechanism may be substituted.

The operation of the locking mechanism described is as follows: If the lock employed be a time-lock and the time arrives when it may be actuated or if the lock employed be a combination-lock and the combination has been worked, the bolt 45 will be projected outwardly, carrying with it the link 44, which operates to rock the crank 43, attached to the pinion 41. As the pinion 41 is turned it will rotate the ring 37 by its engagement with the rack-teeth 42 thereon. This action will turn the pinions 35, which are in mesh with the rack-teeth 38, and said pinions will operate the bolts 31, throwing them outwardly into locking position or drawing them inwardly into unlocking position, according to the direction of movement of the bolt 45. When in locking position, the bolts 31 engage shoulders formed by the lugs 8 at the rear or farther end of said lugs and backward movement of the door 19 will be prevented.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the body of a safe having a circular door-opening therein, a circular door adapted to fit and turn in said opening, having a recess in its outer surface forming an annular flange, and interlocking devices on said body and door, of a fixed ring on which the door is supported, located within said recess and inclosed by said flange, a pinion mounted on said ring, a shaft for operating said pinion, and rack-teeth on the inner surface of said flange with which said pinion engages, as and for the purpose set forth.

2. The combination with the body of a safe having a circular door-opening therein, a circular door adapted to fit and turn in said opening, having a recess in its outer surface forming an annular flange, and interlocking devices on said body and door, of a fixed ring on which the door is supported, located within said recess, inclosed by said flange and provided with segmental slots, attaching devices for said ring extending through said slots and secured to said door, a pinion mounted on said ring, a shaft for operating said pinion, and rack-teeth on the inner surface of said flange, with which said pinion engages, as and for the purpose set forth.

3. The combination with the body of a safe having a circular door-opening therein and segmental lugs leading inwardly from the sides of said opening, of a door adapted to fit and rotate in said opening having a recess in its inner surface forming an annular flange which is provided with segmental lugs adapted to interlock with the lugs in said opening, locking-bolts carried by said door extending through radial openings in said flange and adapted to engage the shoulders formed by

the ends of the lugs in said door-opening, a
ring seated in said recess, capable of a limited
degree of rotation and provided with slots
having rack-teeth along one edge thereof,
5 rack-bars on the inner ends of said locking-
bolts, pinions engaging said rack-bars and
the rack-teeth in said slots, a stationary pin-
ion engaging rack-teeth along the inner edge
of said ring, a crank-arm connected with said
10 stationary pinion for rotating it, and a lock-

bolt connected with said crank-arm for lock-
ing the latter, as and for the purpose set forth.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

JOHN THOMPSON HOUGH.

Witnesses:

CHAS. H. HAYS,
B. H. SMYERS.