

No. 679,379.

Patented July 30, 1901.

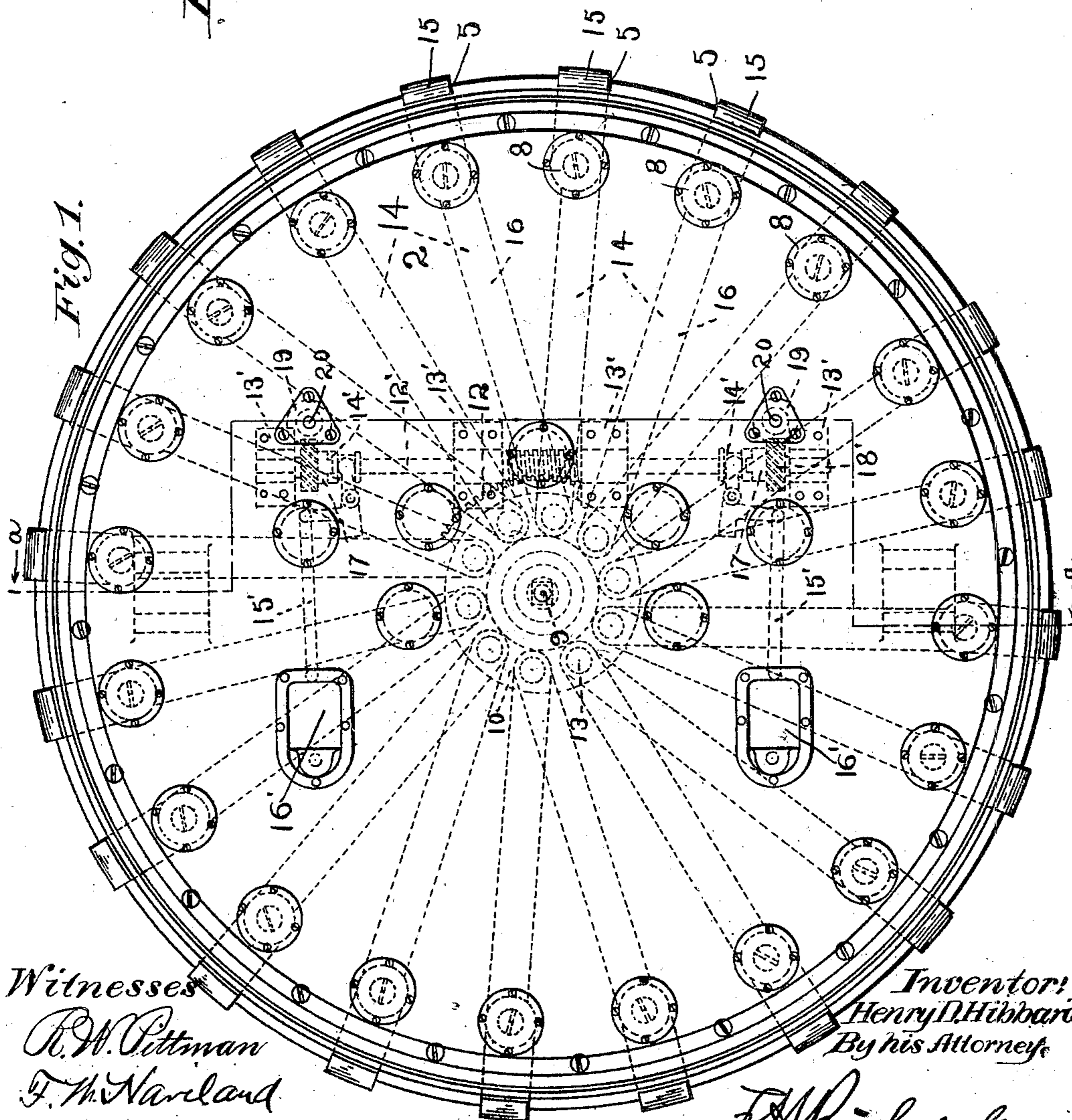
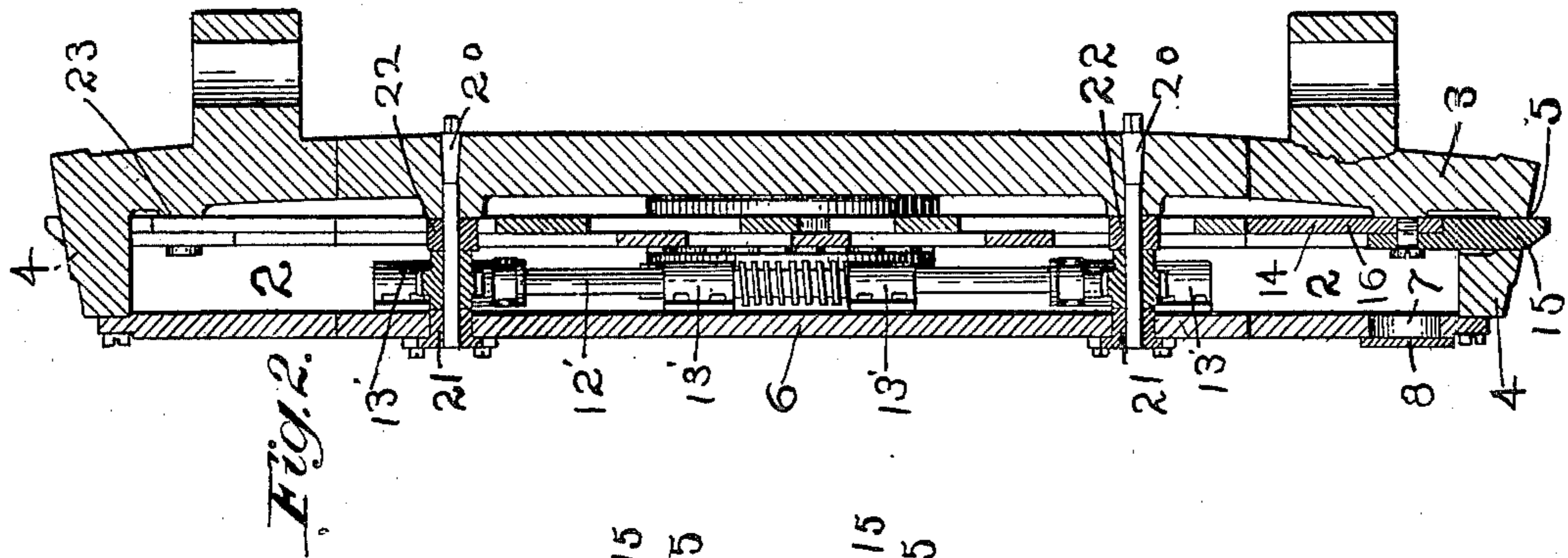
H. D. HIBBARD.

SAFE OR VAULT DOOR BOLTING MECHANISM.

(Application filed Nov. 2, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
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By his Attorney,

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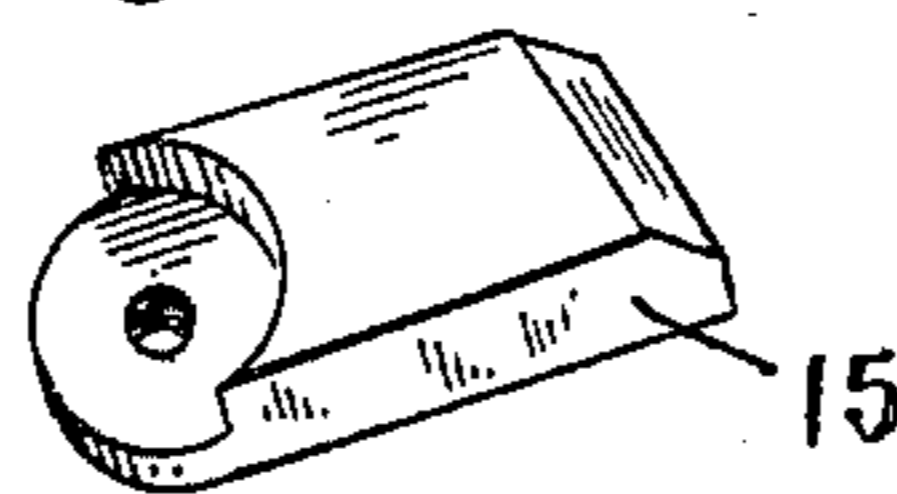
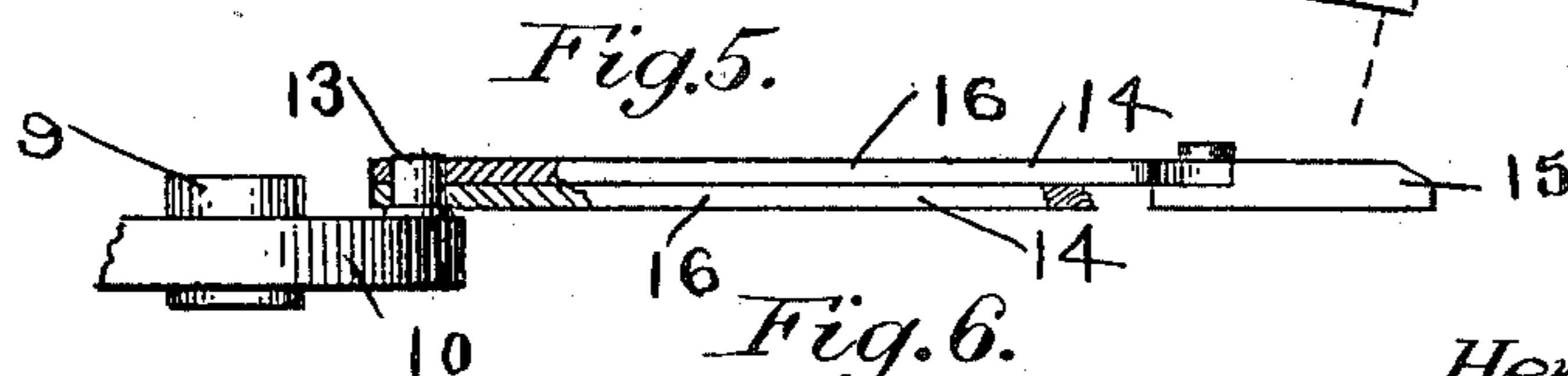
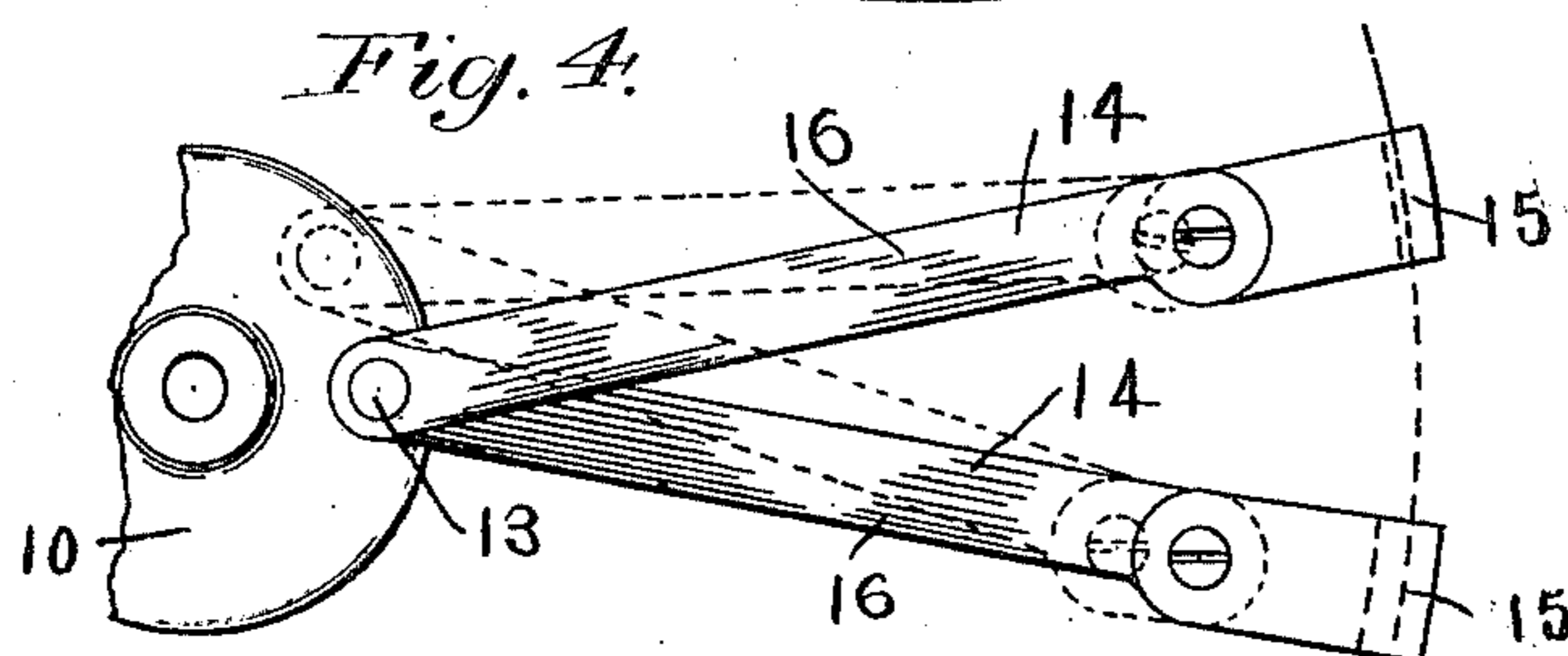
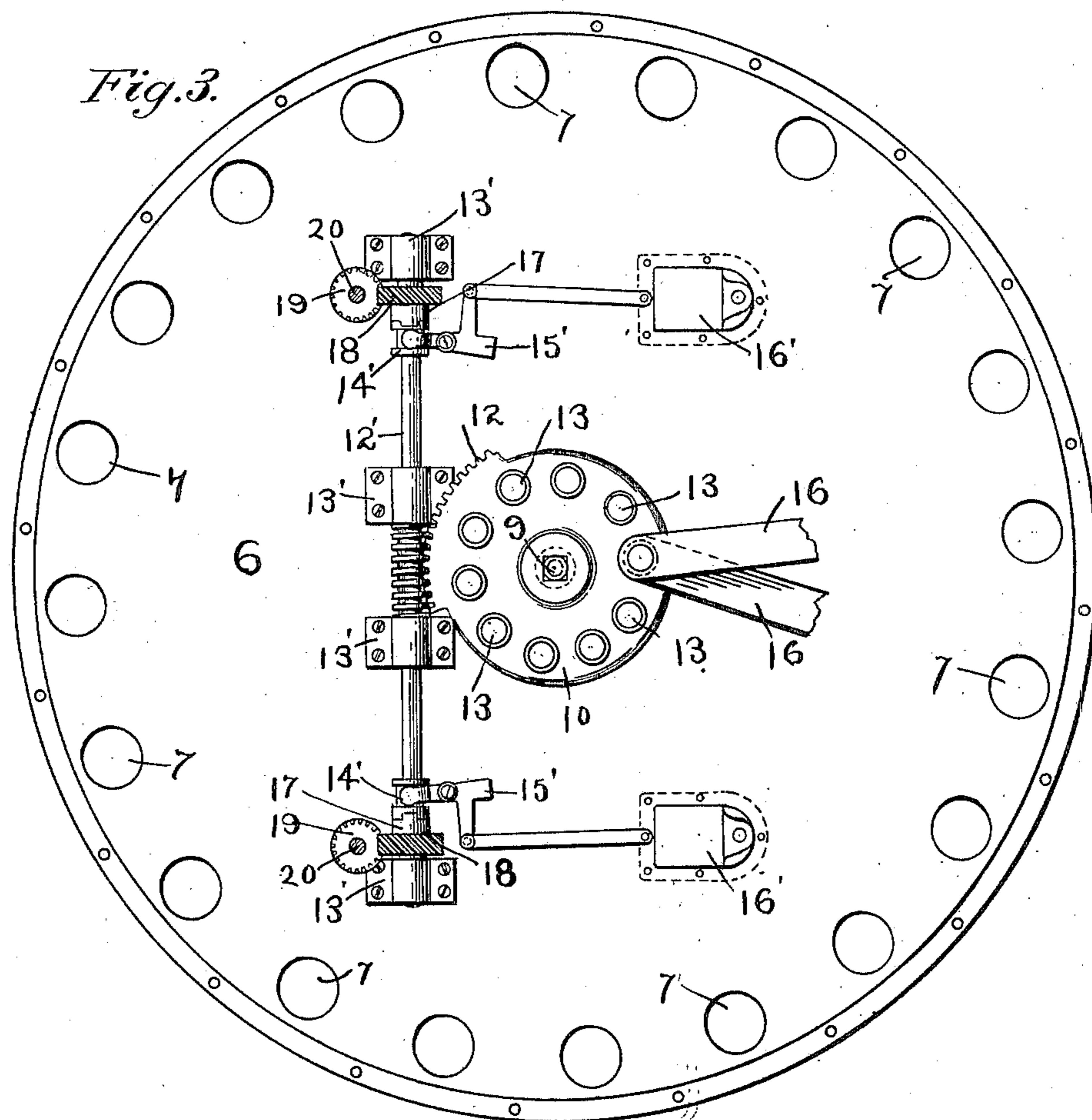
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## SAFE OR VAULT DOOR BOLTING MECHANISM.

(Application filed Nov. 2, 1900.)

(No Model.)

**2 Sheets—Sheet 2.**



*Witnesses*

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# UNITED STATES PATENT OFFICE.

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## SAFE OR VAULT DOOR BOLTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 679,379, dated July 30, 1901.

Application filed November 2, 1900. Serial No. 35,198. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY D. HIBBARD, a citizen of the United States, residing in Plainfield, in the county of Union, and State of New Jersey, have invented certain new and useful Improvements in Safe or Vault Door Bolting Mechanism, of which the following is a specification.

This invention relates to bolting mechanism for safe or vault doors, one object of the invention being to provide improved bolt mechanism therefor.

A further object of the invention is to provide an improved organization of bolt mechanism in which an increased number—as, for instance, double the ordinary number—of bolts may be used around the periphery of the door without proportionately increasing the area over which the inner ends of the bolts are distributed, the present invention being an improvement over that shown and described in my contemporaneously-pending application, Serial No. 16,402, filed May 12, 1900, now Patent No. 662,435, dated November 27, 1900.

In the drawings accompanying and forming part of this specification, Figure 1 is a rear view of a door with this improved bolting mechanism shown in dotted lines. Fig. 2 is a sectional view taken in line *a a*, Fig. 1. Fig. 3 is a view of the inner side of the back plate with the bolt-actuating mechanism located thereon, all the bolts being removed with the exception of the inner ends of a pair thereof. Fig. 4 illustrates the action of the bolts when shifted into and out of their locking positions. Fig. 5 is an edge view of the parts shown in Fig. 4, and Fig. 6 is a perspective view of one of the bolt-heads.

Similar characters of reference indicate corresponding parts in the different figures of the drawings.

In the present instance the door 2, which may be of any desired shape, but shown herein as circular, comprises a body 3, having a rearwardly or inwardly extending peripheral flange 4, provided with the desired number of bolt apertures or openings 5 for the passage of the bolt-heads. Secured to this flange is a back plate 6, which is adapted to support the locking mechanism, said plate being pro-

vided with a number of openings 7, by means of which the proper assemblage of the various parts may be accomplished, these openings being closed by suitable cover-plates 8. Mounted on a stud or bearing 9, secured to the back plate 6, is a rocking member or plate 10, having a part thereof provided with worm-teeth 12. This rocking plate is provided with a series of pins or studs 13, which in the present instance correspond in number to one-half the number of the bolts carried by the door. Each of the bolts 14 may comprise a head or bolt proper, 15, and a shank 16, pivotally connected or hinged together, or the bolt may consist of one piece, the inner end of such shank being located on a pin of the rocking plate. The inner ends of each pair of bolts of the series overlap and are located on the same pin or pivot, whereby an increased number of bolts may be located around the periphery of the door without unduly increasing the area over which the inner ends of such bolts are located. In my prior construction referred to the bolt-openings 5 in the flange were shown as tapered to permit the lateral movement of the bolts during the shifting thereof, and this will be the formation when each of the bolts is made as one member. In the present instance, however, the bolt-openings are shown with their side faces straight, whereby the bolt-heads move in a straight path, the hinge connection between such heads and their shanks permitting lateral movement of such shanks on the rocking of the plate 10. For rocking this plate, thereby to shift the bolts into and out of their locking position, a worm-shaft 12' is mounted in suitable bearings 13' on the back plate. For rotating this worm-shaft suitable actuating mechanism is provided controlled by suitable combination-locks, such mechanism preferably being in duplicate. Splined adjacent to each end of the worm-shaft 12' is a clutch member 14', with which one end of a counterbalanced pivoted lever 15' is in engagement, such lever being in operative connection with a combination-lock 16', by means of which it is shifted. A loosely-mounted clutch member 17 is located on said shaft adjacent to each splined clutch member. Each of these loosely-mounted clutch members carries a worm-gear

18, in mesh with a corresponding gear 19, located on a spindle 20, projecting at the outer face of the door and mounted in bearings 21 and 22, located one at each side of said gear 19, one of said bearings being carried by the back plate.

By providing duplicate combination-locks and actuating mechanisms the bolts may be operated by one lock should the other for any reason become inoperative, whereby the necessity of opening the safe by force is avoided.

In use when either one of the combination-locks is properly operated the proper clutch-shifter 15' will be moved to shift a splined clutch member 14' into engagement with a loosely-mounted clutch member 17, whereupon on the rotation of a spindle 20 by the crank usually provided for that purpose the worm-shaft 12' will be rotated to rock the rocking plate and thereby shift the bolts into or out of engagement with the jamb of the doorway, the bolt-heads moving in a straight path, while the shanks thereof are moved laterally, whereby a toggle action of the bolts is secured. When the door is made of "un-machineable" metal, by which is meant metal that cannot be practically worked by cutting or boring tools—such, for instance, as manganese steel—raised surfaces 23 are provided for the bolts to work upon, whereby the necessity of grinding a large area of metal is avoided, this feature being more particularly described in my prior application above referred to.

When a large number of bolts is desired, especially in large doors, it is necessary that the lateral movement of such bolts shall not interfere with the proper location of the spindles and other parts, and by locating the inner ends of each pair or set of bolts on the same pivot room is thus provided for the proper location of such necessary elements.

I claim as my invention—

1. The combination with a safe or vault door, of a series of laterally-swinging, longitudinally-sliding bolts having their inner ends located in sets, each set having a common pivot; and means for shifting said pivots in a curvilinear path, thereby to shift the bolts.

2. The combination with a safe or vault door, of a series of laterally-swinging, radially-sliding bolts all assembled to project toward the central portion of the door, said bolts being located in sets, each set having their inner ends overlapping; and means for shifting said bolts.

3. The combination, with a circular safe or vault door, of a series of bolts assembled about the door to project radially from the central portion thereof, each pair of bolts having their ends overlapping, and means for shifting said bolts.

4. The combination with a safe or vault door, of a series of laterally-swinging, radially-sliding bolts assembled to project around

the door and located substantially equidistant around such door, all the bolts projecting toward the central portion of the door and having their inner ends located in sets, the inner ends of each set having a common pivot; and means for shifting said bolts.

5. The combination, with a safe or vault door having a rearwardly-extending flange provided with bolt-openings, of a series of bolts carried by said door; a rocking plate having a part thereof formed as a worm and carrying a series of pins corresponding in number to one-half the number of bolts, the inner ends of each pair of bolts being located on the same pin; a worm-shaft in engagement with said rocking plate; and means for rotating said worm-shaft.

6. The combination, with a safe or vault door having a rearwardly-extending flange provided with bolt-openings, of a series of bolts carried by said door; a rocking plate having a part thereof formed as a worm and carrying a series of pins corresponding in number to one-half the number of bolts, the inner ends of each pair of bolts being located on the same pin; a worm-shaft in engagement with said rocking plate; means for rotating said worm-shaft and comprising clutch mechanism; and a combination-lock for controlling the operation of said clutch mechanism.

7. The combination, with a safe or vault door, of a series of bolts assembled to project radially from the central portion thereof with a plurality at each side of the door, said bolts being located in sets, each set having their inner ends overlapping, and means embodying worm-gearing for shifting said bolts.

8. The combination with a safe or vault door, of a series of laterally-swinging, radially-sliding bolts all assembled to project toward the central portion of the door, with a plurality at each side of the door and having their inner ends located in sets, each of said bolts comprising a head and a shank hinged together; a rocking plate having a series of pins, each set of shanks being located on the same pin; and means for shifting said rocking plate thereby to swing the shanks while shifting the bolt-heads radially.

9. The combination, with a safe or vault door having boltways, of a series of bolts each comprising a head located in one of said ways and a shank hinged to said bolt-head; a rocking plate carrying a series of pins, each pair of shanks of a pair of bolts being located on the same pin; means for shifting said rocking plate thereby to actuate the shanks laterally while shifting the bolt-heads in a straight line, said means comprising a worm-shaft; means for rotating the same; and means for controlling the operation of said rotating means.

10. The combination, with a safe or vault door having boltways, of a series of bolts each comprising a head located in one of said ways and a shank hinged to said bolt-head; a rock-

ing plate carrying a series of pins, each pair of shanks of a pair of bolts being located on the same pin; means for shifting said rocking plate thereby to actuate the shanks laterally while shifting the bolt-heads in a straight line, said means comprising a worm-shaft; means for rotating the same and embodying clutch mechanism; and a combination-lock for controlling the operation of said clutch mechanism.

11. The combination, with a safe or vault door having a rearwardly-extending flange provided with bolt-openings, of a series of bolts comprising bolt-heads working in said openings and shanks hinged to said bolt-heads; a rocking plate having a part thereof formed as a worm and provided with a series of pins for engaging the inner ends of the bolts, each pair of bolts of the series being located on the same pin; a worm-shaft for rocking said plate thereby to shift the bolts; means for rotating said shaft and embodying a spindle; and a combination-lock for controlling the rotation of said shaft.

12. The combination, with a safe or vault door, of a series of bolts located thereon, and duplicate actuating means embodying worm-gearing for operating said bolts.

13. The combination, with a safe or vault door, of a series of bolts located thereon, and duplicate actuating means for actuating said bolts, each of said actuating means comprising gearing and clutch mechanism.

14. The combination, with a safe or vault door, of a series of bolts supported thereby; a rocking plate for shifting said bolts; a worm-shaft in engagement with said rocking plate; and duplicate actuating means for controlling the operation of said worm-shaft.

15. The combination, with a safe or vault door, of a series of bolts supported thereby; a rocking plate for shifting said bolts; a worm-shaft in engagement with said rocking plate; duplicate actuating means for controlling the operation of said worm-shaft, each of said actuating means including clutch mechanism; and a combination-lock for controlling such clutch mechanism.

16. The combination, with a safe or vault door having a rearwardly-extending flange provided with bolt-openings, of a series of bolts carried by said door; a rocking plate having a part thereof formed as a worm and carrying a series of pins corresponding in number to one-half the number of bolts, the inner ends of each pair of bolts being located on the same pin; a worm-shaft in engagement with said rocking plate; and duplicate means for rotating said worm-shaft.

17. The combination, with a safe or vault door having a rearwardly-extending flange provided with bolt-openings, of a series of bolts comprising bolt-heads working in said openings and shanks hinged to said bolt-heads; a rocking plate having a part thereof formed as a worm and provided with a series of pins for engaging with the inner ends of

the bolts, each pair of bolts of the series being located on the same pin; means for rocking said plate thereby to shift the bolts and comprising a worm-shaft and duplicate actuating means, said duplicate actuating means comprising a pair of spindles each carrying a gear; clutch mechanism carrying a gear in mesh with said spindle-gear; and a combination-lock for controlling the operation of such clutch mechanism.

18. The combination, with a safe or vault door having a rearwardly-extending flange provided with bolt-openings, of a series of bolts comprising bolt-heads working in said openings and shanks hinged to said bolt-heads; a rocking plate having a part thereof formed as a worm and provided with a series of pins for engaging the inner ends of the bolts, each pair of bolts of the series being located on the same pin; and means for rocking said plate thereby to shift the bolts and comprising a worm-shaft and duplicate actuating means.

19. The combination, with a safe or vault door, of a series of bolts carried thereby; a rocking plate connected with the inner ends of said bolts and having a part of its periphery formed as a worm; a worm-shaft carrying a gear; means for rotating said worm-shaft and embodying a spindle projecting at the outer side of said door; and a gear located on said spindle and in mesh with said worm-shaft gear, said spindle being supported in bearings located at each side of its gear.

20. The combination, with a safe or vault door, of a series of bolts carried thereby; a worm-wheel connected with said bolts; a worm-shaft in mesh with said worm-wheel; a pair of clutch members mounted on said shaft, and carrying a gear having spirally-formed teeth; a spindle carrying a gear having similarly-formed teeth in mesh with said clutch-member gear; and means for controlling the operation of said clutch members.

21. The combination, with a safe or vault door, of a series of bolts carried by said door and having their inner ends located in sets, each set pivoted at the same point; and means embodying clutch mechanism for shifting said bolts.

22. The combination with a safe or vault door, of a series of laterally-swinging, longitudinally-sliding bolts carried by said door and having their inner ends located in sets, each set pivoted at the same point; and means embodying gearing for shifting said bolts.

23. The combination, with a safe or vault door, of a series of bolts carried by said door and having their inner ends located in sets, each set pivoted at the same point; and means embodying worm-gearing for shifting said bolts.

24. The combination, with a safe or vault door, of a series of bolts carried by said door and having their inner ends located in sets, each set pivoted at the same point; and

means embodying clutch mechanism and worm-gearing for shifting said bolts.

25. The combination with a safe or vault door, of a series of bolts carried by said door and sliding into and out of their bolting position and having their inner ends located in sets, each set pivoted at the same point, the movement of said bolts being lengthwise from such pivotal point.

26. The combination, with a safe or vault door, of a series of bolts carried thereby, and duplicate actuating means embodying clutch mechanism for operating said bolts.

27. The combination, with a safe or vault door, of a series of bolts assembled about the door to project radially from the central portion thereof; and duplicate actuating means for said bolts.

28. The combination, with a safe or vault door, of a series of bolts assembled about the door to project radially from the central portion thereof with their inner ends located in sets, each set located on the same pin; and duplicate actuating means for said bolts.

29. The combination, with a safe or vault door, of a series of bolts assembled about the door to project radially from the central portion thereof, and duplicate actuating means embodying worm-gearing for said bolts.

30. The combination, with a safe or vault door, of a series of bolts assembled to project radially from the central portion of the door and duplicate actuating means embodying clutch mechanism for operating said bolts.

31. The combination with a safe or vault door, of a series of bolts carried by said door and having their inner ends located in sets, each set pivoted at the same point; and bolt-actuating means comprising gearing and duplicate clutch mechanisms; and means comprising a pair of combination-locks for controlling the actuation of said bolt-actuating means.

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