

No. 664,582.

Patented Dec. 25, 1900.

J. RIKARD.  
LOCK.

(Application filed Dec. 2, 1899.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

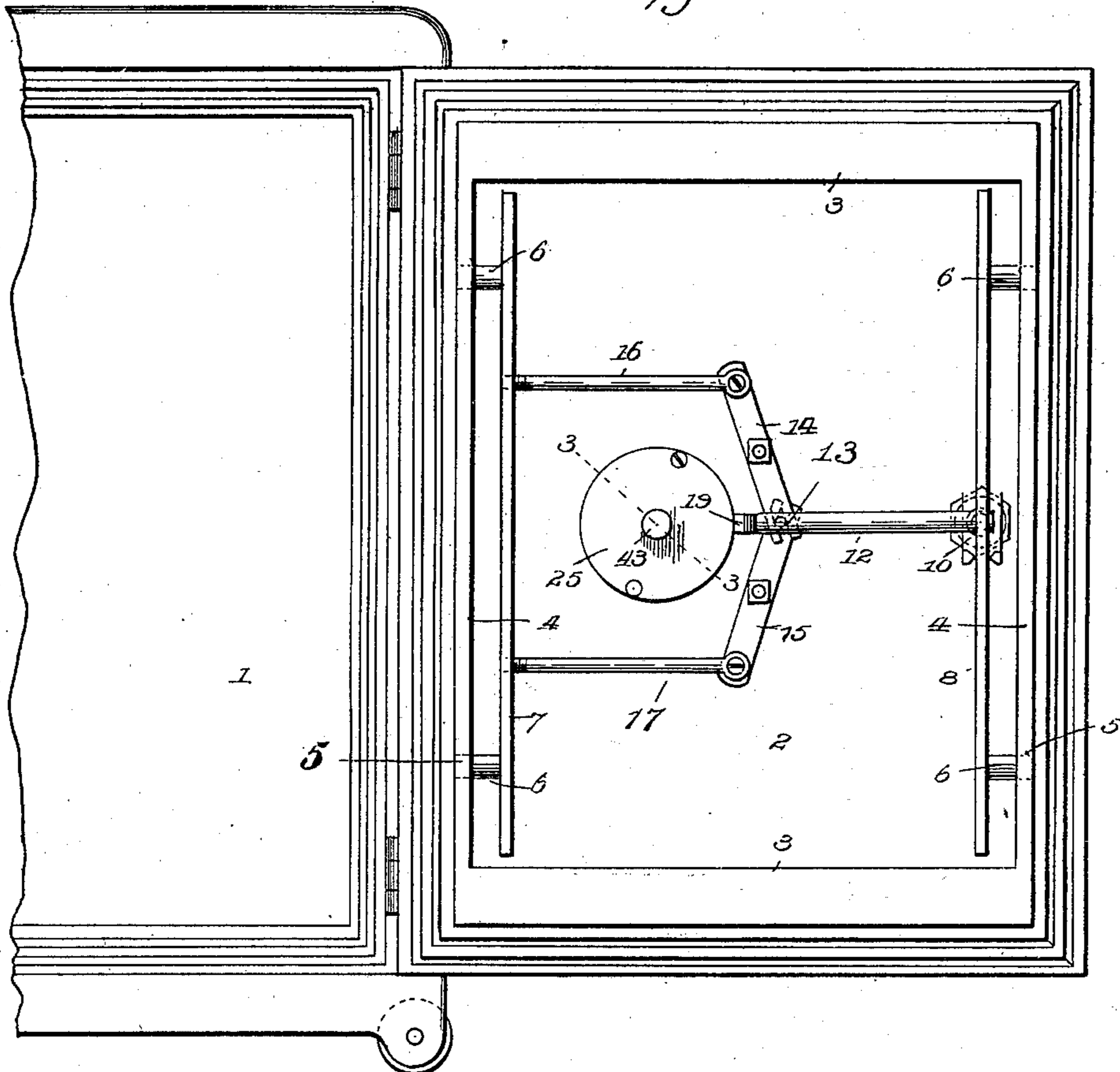
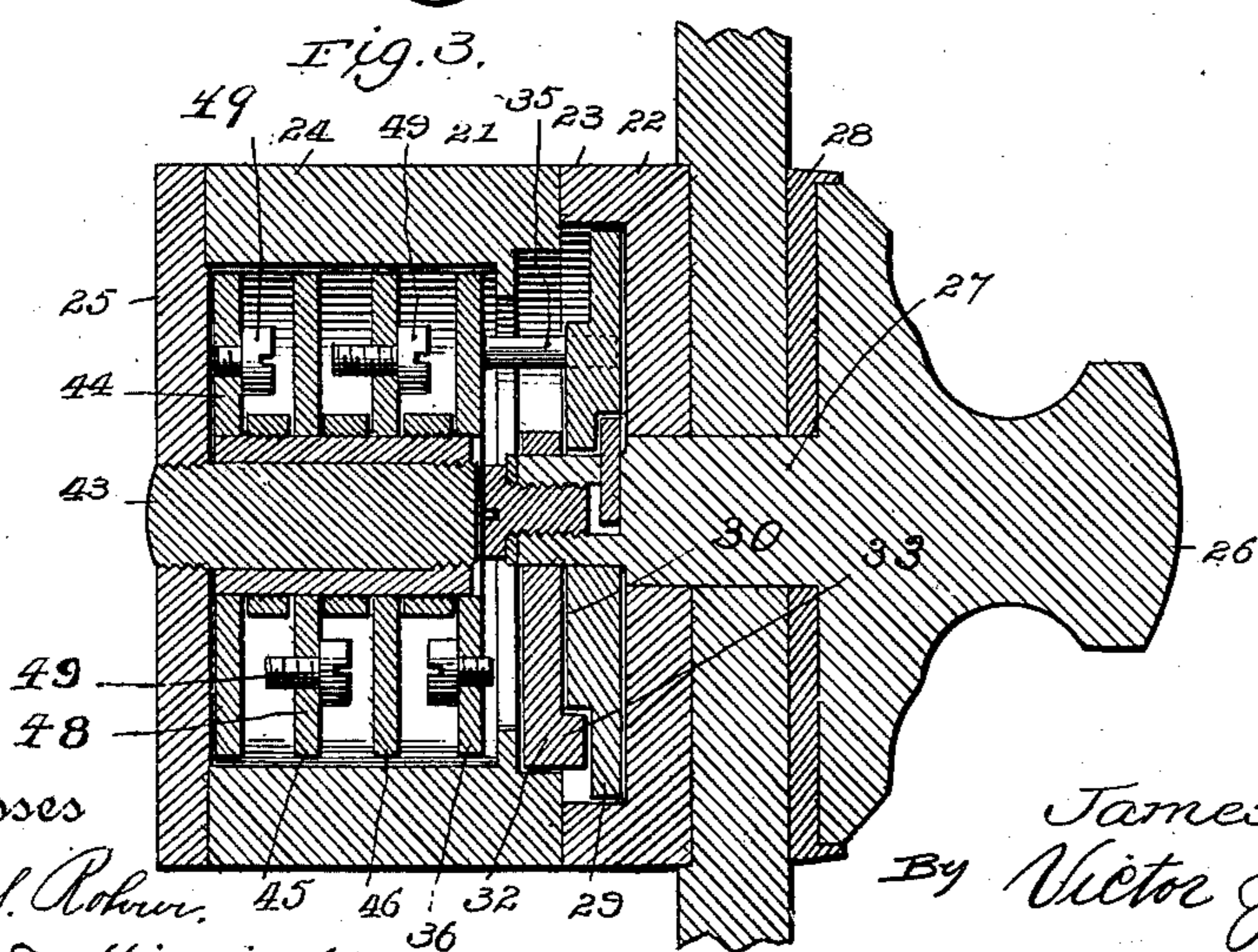


Fig. 3.



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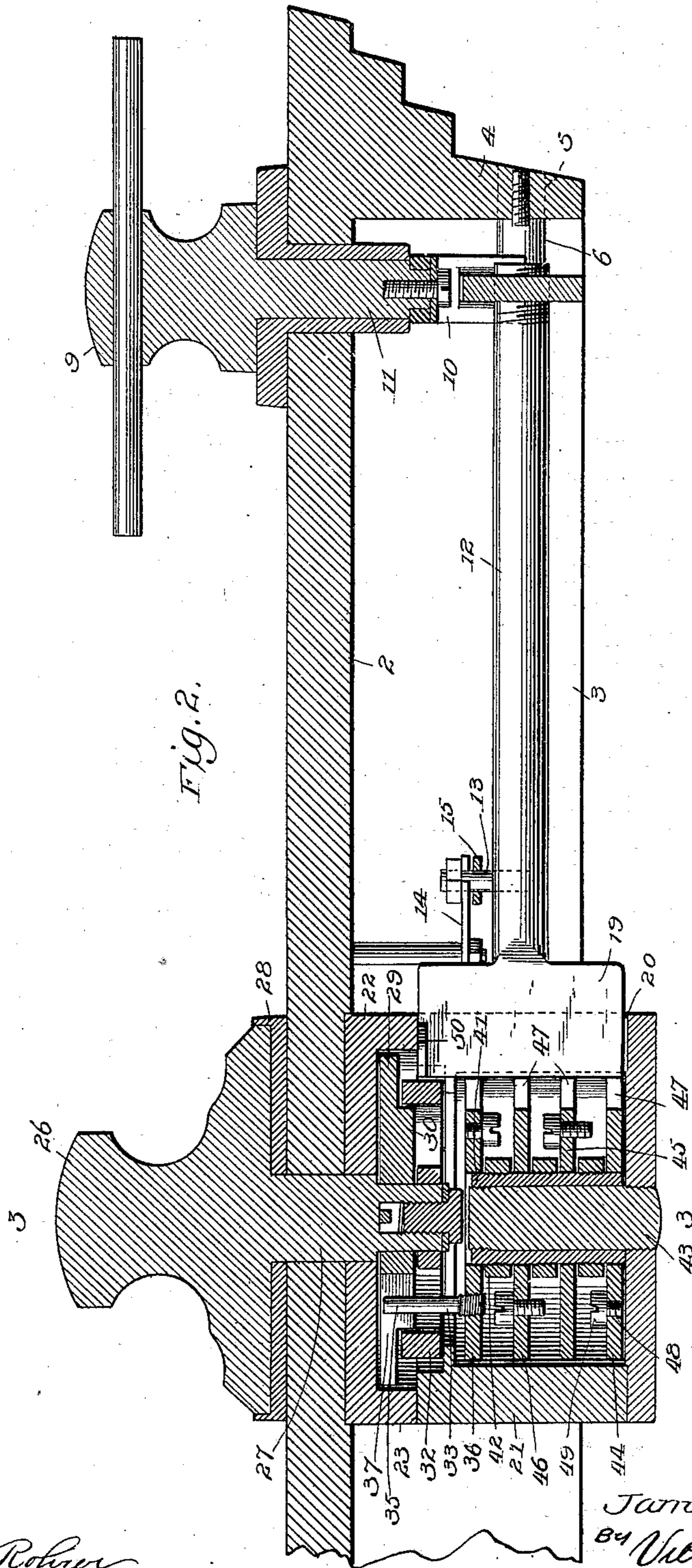
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3 Sheets—Sheet 3.

Fig. 4.

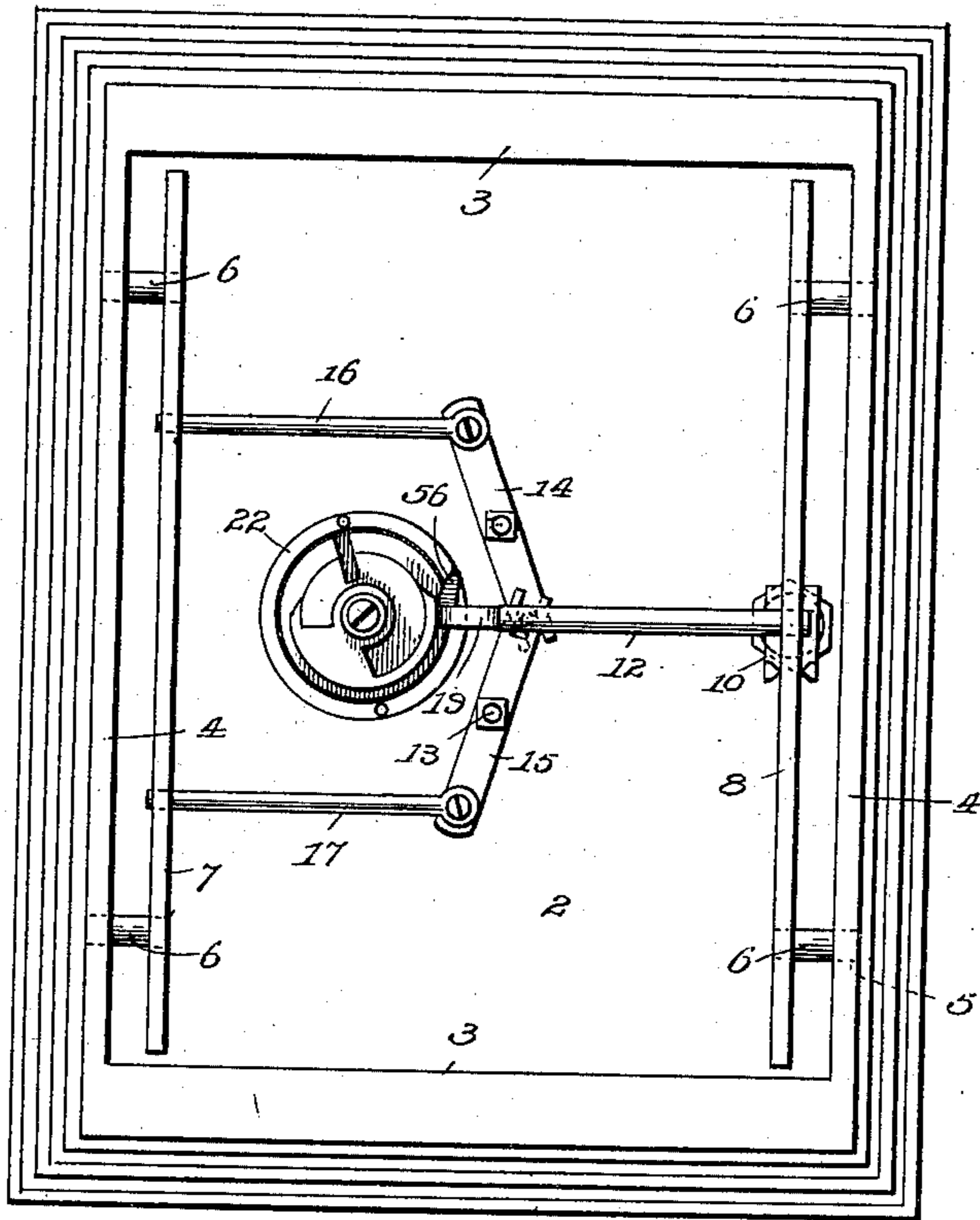


Fig. 5.

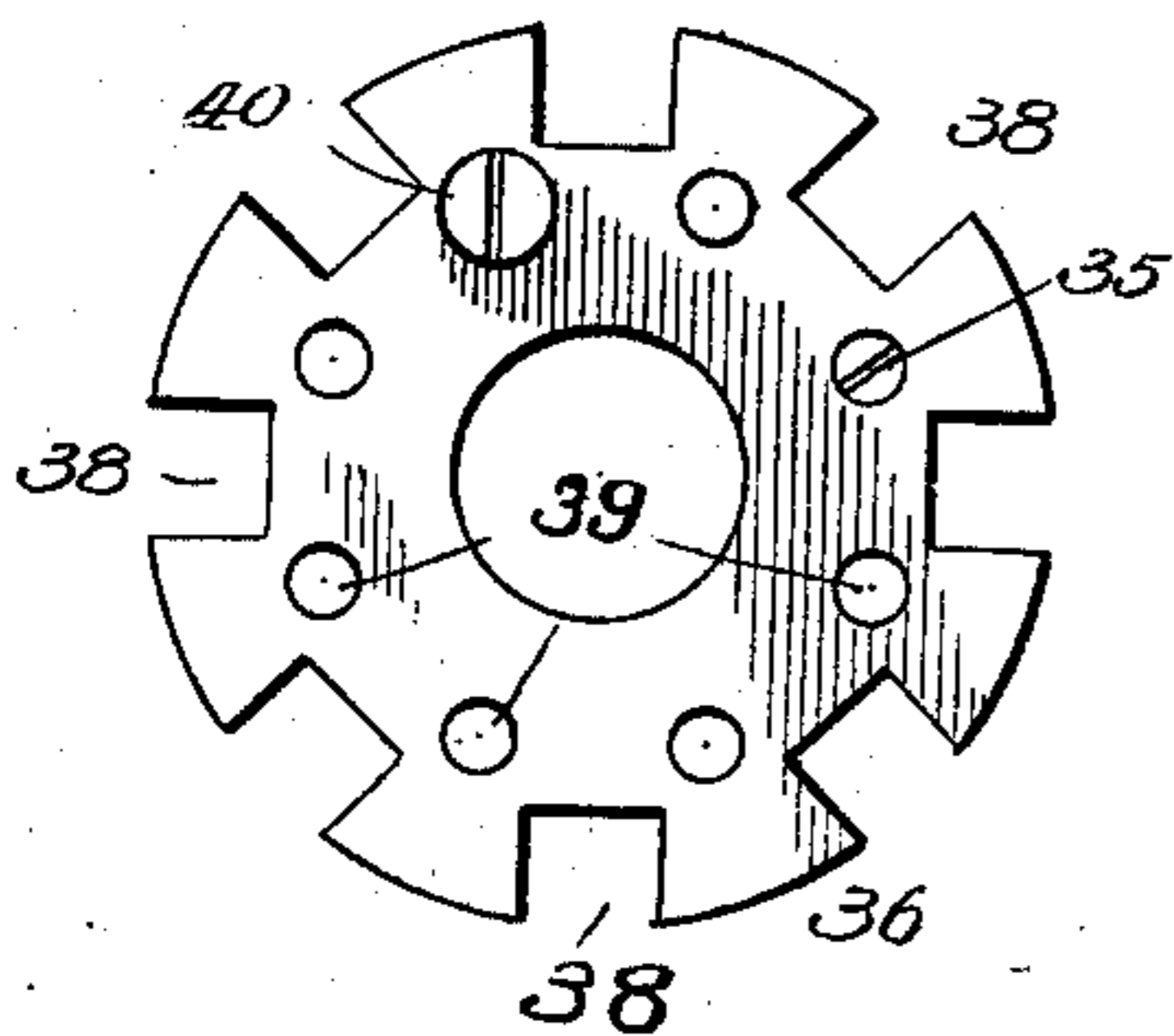


Fig. 6.

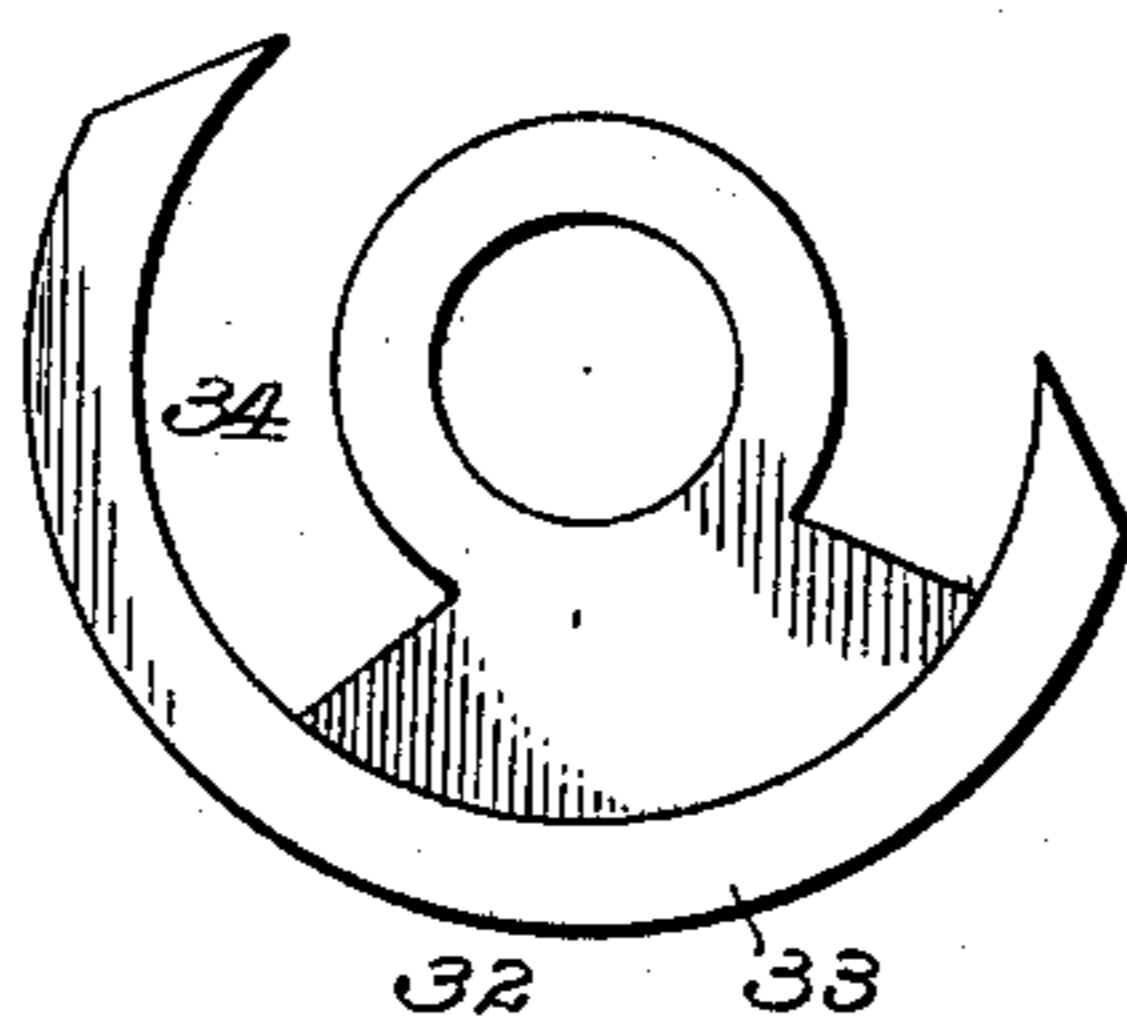
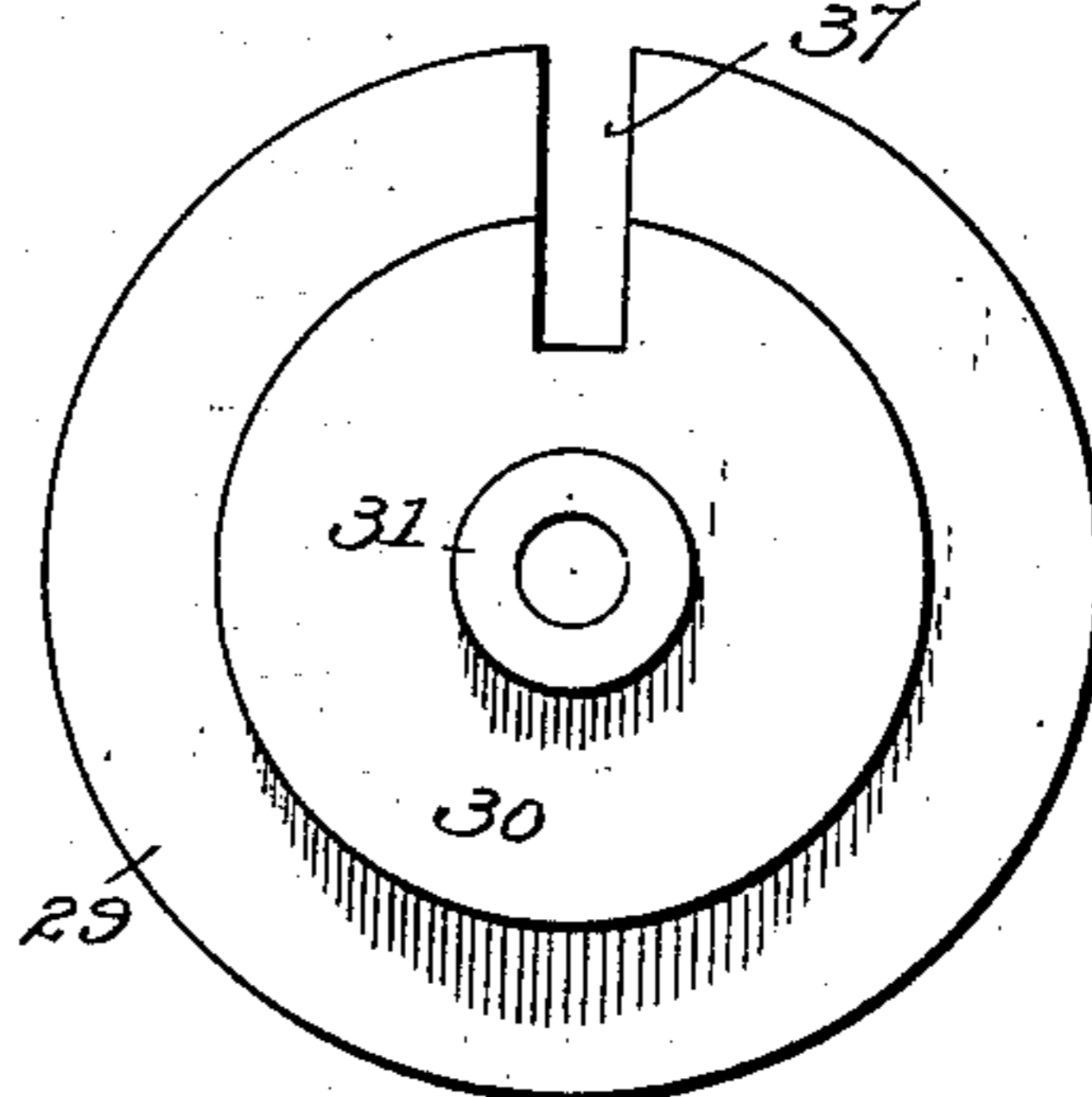


Fig. 7.



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# UNITED STATES PATENT OFFICE.

JAMES RIKARD, OF LEXINGTON, SOUTH CAROLINA.

## LOCK.

SPECIFICATION forming part of Letters Patent No. 664,582, dated December 25, 1900.

Application filed December 2, 1899. Serial No. 739,040. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES RIKARD, a citizen of the United States, residing at Lexington, in the county of Lexington and State of South Carolina, have invented certain new and useful Improvements in Locks, of which the following is a specification.

My present invention relates to improvements in combination or permutation locks for safe, vault, or other doors, and has for its object the production of a lock embodying a series of permutable tumblers assembled in a predetermined arrangement by the manipulation of a knob upon the face of a dial and reinforced by a safety-drop or gravity-tumbler, which even if the tumblers are properly aligned will prevent the drawing of the bolt unless the manipulator knows the entire combination. To the accomplishment of this general object and others subordinate thereto my invention consists in the construction and arrangement of parts hereinafter to be described.

Referring to the drawings, Figure 1 is an elevation of a safe-door provided with my locking mechanism. Fig. 2 is a central vertical section through the lock and door. Fig. 3 is a horizontal sectional view on the line 3-3 of Fig. 1. Fig. 4 is an elevation of the safety-tumbler and its supporting part, illustrated in connection with the safe-door and boltwork; and Figs. 5, 6, and 7 are detail views of the tumbler-actuator, safety-tumbler, and drop-supporting disk.

Referring to the numerals of reference designating corresponding parts in the several views, 1 indicates a fragment of a safe of any construction and design provided with a heavy door 2, upon the inner face of which the boltwork and lock are located. If the door is constructed of laminated steel plates, it is recessed for the reception of the boltwork; but I have illustrated my invention in connection with a single-plate door which carries a frame in which the moving parts are mounted. This frame comprises end blocks 3, extending across the inner face of the door adjacent to its top and bottom, and side plates 4, parallel with the vertical edges of the door. Each plate is provided with one or more bolt-openings 5, through which project the bolts 6 of the oppositely-disposed bolt-

frames, comprising said bolts, and bolt-plates 7 and 8, by which they are carried. The bolts at the opposite sides of the door must be thrown and retracted simultaneously by the rotation of a handle 9 upon the outer face of the door, and I therefore connect the bolt-plate 8 with a crank 10 on the inner end of the spindle 11 of the handle and operatively connect the bolt-frames by mechanism which makes them interdependent. To this end I provide a latch-bar 12, extending toward the center of the door from the middle of the bolt-plate 8 and having a stud 13 projecting from its inner side. This stud is straddled by the bifurcated contiguous ends of a pair of medially-pivoted levers 14 and 15, to the outer free ends of which are pivoted a pair of horizontal rods 16 and 17, projecting from the bolt-plate 7, adjacent to its opposite ends. The pintles of the levers may project from the face of the door or from a base-plate secured thereto, as desired.

Now it will be seen that by the rotation of the handle 9 in the proper direction all of the bolts will be thrown or retracted simultaneously, and I shall therefore proceed now with a description of the permutation or combination lock which I employ to prevent the retraction of the bolts except by the manipulation of the lock in accordance with a prearranged plan or combination of manipulations of a knob outside of the door.

The latch-bar 12 is formed at its inner end with an elongated flattened head 19, passed through an elongated slot 20 in one side of the lock-casing 21, in which are arranged the tumblers controlling the movements of the latch-bar. This casing comprises a centrally-apertured disk 22, bolted to the door and having a peripheral flange 23, to which is bolted a casing-cylinder 24, closed by a face-plate 25.

26 indicates the knob upon the outer face of the door, provided with a dial and having its spindle 27 passed through the center of a dial-socket 28 and through the opening in the disk 22. A drop-supporting disk 29 is keyed upon the inner end of the spindle 27 and is formed with a circular projection and with a hollow boss 31, upon the latter of which is loosely mounted a segmental drop or safety-tumbler 32, having a peripheral flange 33 fitting snugly against the periphery of the

projection 30. The drop or tumbler 32 is provided with elongated curved recesses 34 for the reception of an elongated stud 35, extending from a rotary tumbler-actuator 36 and projecting into a recess 37 in the disk 29. By this arrangement the disk 29 and actuator 36 are both rotated by the rotation of the knob, while the safety-tumbler is retained by gravity in a position to prevent the retraction of the latch-bar except when the stud 35 engages it and effects its rotation in either direction. It will be noted, however, that in its normal position the tumbler 32 guards the slot in the side of the casing and that when it is rotated in the manner just described it will gravitate to its normal position as soon as it has been urged over and beyond its axis.

The tumbler-actuator 36 is provided with a series of peripheral recesses 38, of sufficient size to receive the head of the latch-bar, and with a corresponding series of numbered and threaded openings 39 for the reception of an adjustable stud 40. The actuator is revolvably mounted upon the circular offset 41 of a spacing-disk 42, screwed upon the end of a post 43, extending axially from the face-plate 25. This post serves as a journal for a series of rotary tumblers 44, 45, and 46, suitably spaced by other spacing-disks and each provided with a single peripheral recess 47 and a circular series of numbered and threaded apertures 48 for the reception of a beaded stud 49, carried by each disk and of sufficient length to cause the engagement of each stud with the head of the stud in the adjacent disks when said disks are rotated.

If desired, one end of the head 19 of the latch-bar may be provided with a guide-flange 50, movable in a slot in the casing.

The operation of my lock is as follows: Supposing the studs in the actuator and tumblers to be inserted in the aperture in the actuator and in the apertures in the tumblers 44, 45, and 46, the knob is turned clockwise until all of the studs are in engagement and the actuator and tumblers move in unison, two or three turns of the knob being necessary for this purpose. The dial is then stopped with a predetermined number opposite a notch cut in the rim of the dial-socket. In this position the peripheral recess of the tumbler 44 will be opposite the slot in the casing. The knob is now reversed, and the studs are brought into contact with the opposite side of the succeeding stud until all of the rotary elements are connected with the exception of the tumbler 44. The movement is then continued until the recess in the tumbler 45 is aligned with the slot. In like manner the knob is turned alternately in opposite directions a given distance in accordance with a prearranged combination determined by the holes within which the several studs are located until the apertures of the several tumblers are in alinement and opposite the slot in the casing. The knob is then finally turned back a predetermined distance, causing the drop

or safety-tumbler to be drawn back, and the bolts may be retracted by turning the handle and causing the head of the latch-bar to enter the casing and the recess in the tumblers and actuator. When it is desired to again lock the door, the bolt may be thrown by simply turning the handle without touching the knob; but as soon as the head of the latch-bar has been withdrawn the safety-tumbler or drop will swing back to its normal position, and any effort to throw it back by a person not acquainted with the combination will throw the tumblers out of alinement and will necessitate the reworking of the combination.

From the foregoing it will be seen that I have devised a novel permutation-lock provided with a safety device which will automatically prevent the retraction of the bolt without necessity for disalining the tumblers; but while the present embodiment of the invention appears at this time to be preferable I do not limit myself to the structural details defined, but reserve the right to effect such changes, modifications, and variations as may come properly within the scope of the protection prayed.

Therefore, what I claim, and desire to secure by Letters Patent, is—

1. A permutation-lock comprising a casing, a series of rotary tumblers each provided with a peripheral recess and an adjustable stud, a rotary actuator provided with a series of peripheral recesses and with an adjustable stud, a gravity-actuated safety-tumbler and a knob in operative relation with the actuator.
2. A permutation-lock comprising a slotted casing, a latch-bar, a series of tumblers each provided with a peripheral recess, and an adjustable stud, a safety-tumbler, an actuator intermediate of the safety-tumbler and the series of tumblers and operatively related thereto and means for rotating the actuator.
3. A permutation-lock comprising a slotted casing, a latch-bar, a series of rotary tumblers, a spindle within the casing, a tumbler-supporting disk carried thereby, a safety-tumbler loosely carried by said disk and a rotary actuator provided with oppositely-extending studs engaging the disk and one of the series of tumblers, said safety-tumbler being located in the path of one of said studs.
4. The combination with a boltwork comprising a series of bolts and a latch-bar, of a permutation-lock comprising a casing slotted to receive the latch-bar, a combination-knob, a series of rotary tumblers, a gravity-actuated safety-tumbler and an actuator intermediate of the knob and tumblers.
5. The combination with a support as for instance a door, of a boltwork comprising two sets of bolts, intermediate connecting mechanism, and a headed latch-bar, a spindle provided with a crank operatively connected with the boltwork, and a permutation-lock comprising a slotted casing, a series of rotary tumblers therein, a gravity-actuated safety-tumbler normally guarding the slot in

the casing, an actuator in operative relation with all of the tumblers, and a knob operatively connected to the actuator.

6. A permutation-lock comprising a series  
5 of rotary tumblers provided respectively with a peripheral recess and a circular series of apertures, a stud with one aperture of each tumbler, a segmental safety-tumbler, an actuator provided with a series of peripheral  
10 recesses and a circular series of apertures and a pair of studs projecting oppositely from the actuator and operatively related with the

safety-tumbler and the adjacent tumbler of the series, means for rotating the actuator and a slotted casing.

In testimony whereof I affix my signature  
in presence of two witnesses. 15

JAMES <sup>his</sup> X RIKARD.  
mark

Witnesses:

F. E. DREHER,  
S. B. GEORGE.