

No. 869,222

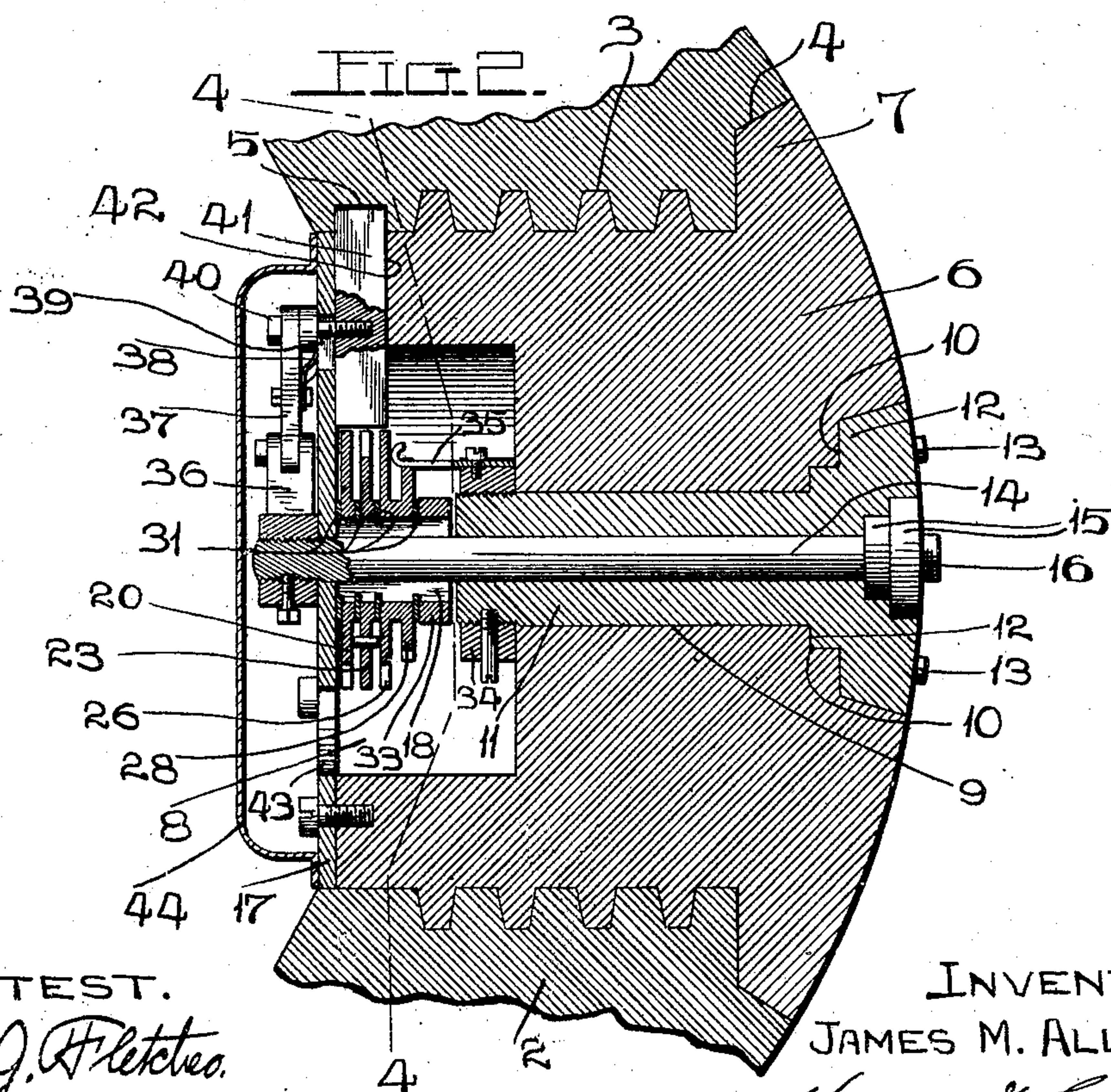
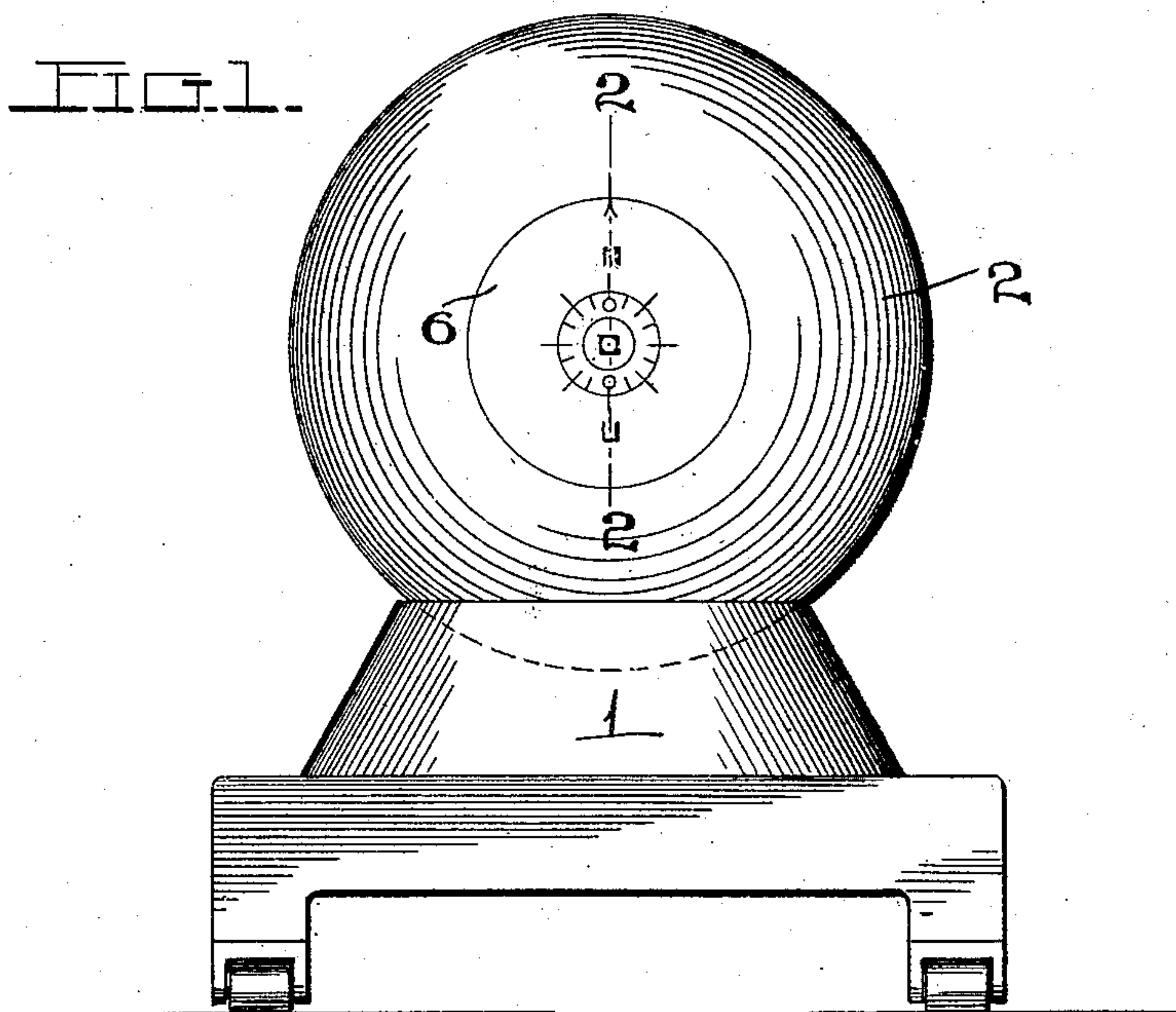
PATENTED OCT. 29, 1907.

J. M. ALLEN.

SAFE LOCK.

APPLICATION FILED FEB. 28, 1907.

2 SHEETS—SHEET 1.



ATTEST.

H. G. Fletcher.
M. P. Smith.

INVENTOR.

JAMES M. ALLEN.

BY *Alfred H. Longan.*
ATTY'S.

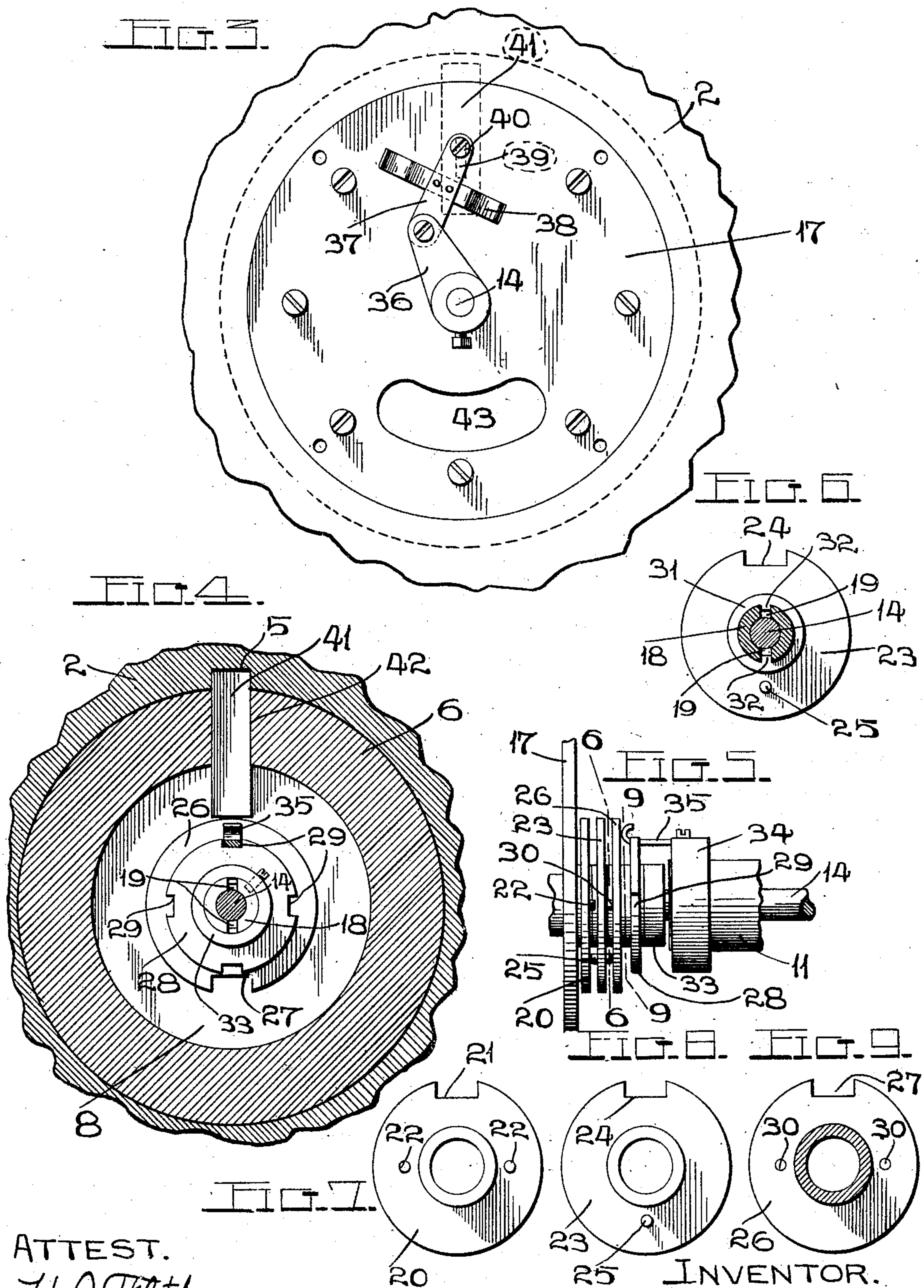
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INVENTOR.
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UNITED STATES PATENT OFFICE.

JAMES M. ALLEN, OF ST. LOUIS, MISSOURI, ASSIGNOR OF TWO-FIFTHS TO CHRISTIAN F. SCHNEIDER, OF ST. LOUIS, MISSOURI.

SAFE-LOCK.

No. 869,222.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed February 28, 1907. Serial No. 359,785.

To all whom it may concern:

Be it known that I, JAMES M. ALLEN, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Safe-Locks, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in safe locks, and the object of my invention is to construct a safe having a screw door, and to provide a simple locking mechanism for said door, which mechanism is operated by means passing through the center of the door, and the outer face of which means lie flush with the face of the door.

To the above purposes, my invention consists in certain novel features of construction and arrangement of parts, which will be hereinafter more fully set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which:—

Figure 1 is a front elevation of a safe provided with a lock of my improved construction; Fig. 2 is an enlarged vertical section taken on the line 2—2 of Fig. 1; Fig. 3 is an elevation of the inner end or face of the safe door; Fig. 4 is a vertical section taken on the line 4—4 of Fig. 2; Fig. 5 is a detail elevation showing the tumbler disks of my improved lock, and parts of the device adjacent thereto utilized for imparting rotary motion to said disks; Fig. 6 is a vertical section taken on the line 6—6 of Fig. 5; Fig. 7 is a face view of the rear one of the tumbler disks; Fig. 8 is a face view of the center tumbler disk; Fig. 9 is a vertical section taken on the line 9—9 of Fig. 5, and being a face view of the forward one of the tumbler disks.

Referring by numerals to the accompanying drawings:—1 designates the base of the safe on which is mounted the body 2, which in the present instance is in spherical form, and formed through the wall of said body is a screw threaded opening 3, there being a shoulder 4 formed at the outer end of said opening adjacent the exterior surface of the body 2. Formed in the wall of the body, adjacent the rear end of the opening 3, is a recess 5, which receives the end of a locking bolt carried by the safe door. Arranged to screw into the opening 3 is a door 6, in the form of a short cylindrical block, the outer face of which is curved to conform to the curvature of the body 2, and formed integral with the forward end of the door is a flange 7; which, when the door is closed, engages against the shoulder 4. Formed in the rear end of the block in the door 6 is a chamber 8, and passing longitudinally through the center of the door is a circular aperture 9, there being shoulders 10 formed at the outer end of said aperture. Arranged for rotation in the aperture 9 is a tubular shaft 11, the rear end of which projects into the cham-

ber 8, and is exteriorly screw threaded. Formed integral with the outer end of this tubular shaft are flanges 12, which engage against the shoulders 10, and formed integral with the outer face of said shaft is a pair of oppositely arranged lugs 13. A shaft 14 is arranged for rotation in the tubular shaft 11, and formed integral with the forward end of said shaft 14 are flanges 15, which bear against corresponding shoulders formed at the forward end of the opening through said tubular shaft 11, and formed integral with the outer face of the shaft 14 is a lug 16. The outer faces of the shafts 11 and 14 lie flush with one another, and are curved to conform to the curvature of the face of the door 6.

Fixed to the rear face of the door, in any suitable manner, is a disk 17, with the inner face and center of which is formed integral a collar 18, which projects into the chamber 8, and the shaft 14 passes through said collar 18, and through a bearing formed in the center of said disk 17. This collar 18 receives the tumbler disks forming a part of the locking mechanism of the safe, and said collar is provided with a pair of oppositely arranged slots 19. Arranged for rotation on the collar 18, adjacent the disk 17, is a tumbler disk 20, provided in its edge with a single notch 21, and projecting from the front face of said disk is a pair of short pins 22, the same being preferably arranged directly opposite one another. A second disk 23 is arranged for rotation on the collar 18, adjacent the disk 20, which disk 23 is provided with a notch 24, and seated in said disk is a pin 25, the ends of which project slightly beyond both the front and rear faces thereof. A third disk 26 is arranged for rotation on the collar 18, in the edge of which disk is formed a notch 27, and formed integral with the hub of said disk 26 is a smaller disk 28, in the edge of which is formed a plurality of notches 29.

Seated in the disk 26 and projecting rearwardly therefrom is a pair of pins 30, which are preferably arranged opposite one another; and said pins, together with the pins 22, are so seated in their respective disks as that they will engage with the extended ends of the pin 25 carried by the center disk. Interposed between the hubs of the disks 20, 23, and 26, and arranged on the outer faces of the disks 20 and 28 are thin washers 31, which are provided with lugs 32, which extend into the slots 19, thus preventing said washers from turning, and said washers in turn preventing the disks from frictionally engaging one another during their operation. Detachably fixed upon the rear end of the collar 18 is a ring 33, which maintains the disks and interposed washers in operative position upon said collar 18. Fixed upon the screw threaded end of the tubular shaft 11 is a ring 34, and fixed to the exterior thereof is a rearwardly projecting leaf spring 35, which is normally engaged in one of the apertures 29 formed in the disk 28. The rear end of the shaft 14 projects through the disk 17, and fixed on

the extending end thereof is a short arm 36, to the outer end of which is pivotally connected a link 37, to the under side of which is fixed a leaf spring 38, which yieldingly bears on the outer surface of the disk 17. Formed through the disk 17 is a slot 39, and fixed in the outer end of the link 37, and passing through this slot, is a pin 40, which engages a locking bolt 41, which operates through an opening 42 in the rear side of the door 6, and when moved outwardly to its limit of movement is adapted to engage in the recess 5. Formed through the lower portion of the disk 17 is a hand hole 43, through which access may be had to the mechanism within the chamber 8. Removably fixed to the rear side of the disk 17, and inclosing the mechanism carried thereby is a housing plate 44, which prevents articles on the interior of the safe from coming in contact with the exposed portion of the locking mechanism.

The safe is closed by screwing the door 6 into the opening 3, and said door is locked by partially rotating the shaft 14, which action moves the arm 36 and link 37 to elevate the bolt 41 so that the outer end thereof engages in the recess 5, after which the combination is displaced by rotating the tubular shaft 11 in either direction to move the disks 20, 23, and 26 so that the notches in the edges thereof are out of alignment; and when this action takes place, the bolt 41 cannot be withdrawn until the notches are again brought into alinement immediately beneath the lower end of the locking bolt.

To unlock the door, the person having the combination engages the lugs 13 with the thumb and fingers, and rotates the tubular shaft 11, and the spring 35 carried by the ring 34 will correspondingly rotate the disks 26 and 28 upon the collar 18, until one of the pins 30 carried by said disk 26 engages with the end of the pin 25 projecting from the front face of the disk 23. This disk 23 will now rotate with the disk 26 until that portion of the pin 25 projecting from the rear face of said disk engages one of the pins 22, thus picking up or imparting a corresponding rotary motion to the disk 20; and the rotation is continued until the notch 21 in said disk 20 is brought into a position immediately beneath the lower end of the locking bolt 41. The first step or movement of the combination being thus completed is followed by a reversal of the rotary motion imparted to the tubular shaft 11, and following this reversal, the disks 26 and 28 are correspondingly moved until the opposite one of the pins 30 from the one previously engaged picks up or engages the pin 25, and thus correspondingly rotates the disk 23 in order to bring the notch 24 into a position immediately below the lower end of the locking bolt, and in alinement with the notch 21; and during this reverse rotary motion, the disk 20 will not be affected or moved, owing to its position between two of the washers 31, one of which prevents frictional engagement between the hubs of the disks 20 and 23. After this second step of the combination has been accomplished, the rotary motion of the shaft 11 is reversed, and the disk 26 is brought into position with the notch 27 immediately beneath the lower end of the locking bolt, and in alinement with the notches 21 and 24, during which movement the disk 23 remains stationary. This completes the third movement of the combination, and the locking bolt is now withdrawn by imparting rotary motion to the shaft 14

by grasping the lug 16, with the thumb and finger, or with a suitable tool which action moves the arm 36 and link 37, drawing the pin 40 downwardly through the slot 39, and consequently moving the locking bolt 41 downwardly, and causing its lower end to enter the alined notches 24, 21, and 27, and withdrawing its outer end from the recess 5. The spring 38 frictionally engages the face of the disk 17 in order to prevent free movement of the locking bolt.

It will be readily understood that the number of disks on the collar 18 may be varied, as desired, and that the pins fixed in said disks may be varied or arranged at different distances apart.

The disks 20 and 26 are each provided with a pair of pins 22 and 30, in order that when unauthorized persons attempt to manipulate the combination and depend on feeling or sound to indicate the position of the tumblers, the duplicate pins will give a false report, as being arranged directly opposite one another, they will contact with the pins 25 carried by the disk 23 every half revolution of said disks, and thus confuse the person endeavoring to pick out or work the combination.

The combination can be easily and quickly changed by shifting the disk 26 a part of a rotation in either direction, and allowing the spring 35 to engage in one of the notches 29. The outer face of the tubular shaft 11 is provided with suitable indicating marks, through the medium of which the combination is worked out, there being corresponding marks formed on the face of the door 6, adjacent the edge of the opening in which the outer end of the tubular shaft is positioned.

The outer ends of the shafts 11 and 14 are provided with flanges which are arranged in corresponding recesses and bear against corresponding shoulders in order that said shafts cannot be driven through the safe door; and this arrangement also reduces to a minimum the liability of an explosive in liquid or powder form from being forced through the interstices between the outer shaft and the door 6. The outer surface of the door 6 is flush with the exterior of the body of the safe, and there are no projections on said door upon which tools might be fastened which could be used by unauthorized persons in opening the door.

I claim:—

1. The combination with a safe, comprising a hollow body and door therefor, of a tubular shaft passing through the door, a cylindrical bearing arranged at the inner end of the door, a series of tumbler disks arranged for rotation on said bearing, in the edges of which disks are formed notches which are adapted to coincide, means carried by the tubular shaft for engaging one of the disks, a locking bolt carried by the door, the lower end of which is adapted to engage in the notches in the disks, a shaft passing through the tubular shaft, and a connection from said shaft to the locking bolt.

2. The combination with a safe, constructed with a hollow body and door therefor, of a locking bolt arranged on the inside of the door for engaging the body of the safe to lock the door, a series of tumbler disks independently arranged for rotation on the inside of the door, in the edges of which disks are formed notches, which when alined, are adapted to receive the lower end of the locking bolt, pins projecting from the faces of the disks which are adapted to contact with one another when the disks are rotated, a tubular shaft passing through the door for imparting rotary motion to the disks, and a shaft arranged in the tubular shaft for actuating the locking bolt.

3. The combination with a safe, comprising a hollow

body and door therefor, of a tubular shaft passing through the door, a cylindrical bearing arranged at the inner end of the door, a series of tumbler disks arranged for rotation on said bearing, in the edges of which disks are formed notches which are adapted to coincide, means carried by the tubular shaft for engaging one of the disks, a locking bolt carried by the door, the lower end of which is adapted to engage in the notches in the disks, a shaft passing through the tubular shaft, a connection from said shaft to the locking bolt, and annular shoulders formed integral with the outer ends of the shaft and tubular shaft which occupy corresponding recesses formed in said tubular shaft and the door.

4. The combination with a safe constructed with a hollow body and door therefor, of a locking bolt arranged on the inside of the door for engaging the body of the safe to lock the door, a series of tumbler disks independently arranged for rotation on the inside of the door, in the edges of which disks are formed notches, which when aligned, are adapted to receive the lower end of the locking bolt, pins projecting from the faces of the disks which are adapted to contact with one another when the disks are rotated, a tubular shaft passing through the door for imparting rotary motion to the disks, a shaft arranged in the tubular shaft for actuating the locking bolt, and shoulders formed integral with the outer ends of the shaft and tubular shaft which occupy corresponding recesses formed in said tubular shaft and the door.

5. The combination with a safe, comprising a body and door therefor, there being a chamber formed on the inside

of the door, of a detachable plate closing said chamber, a collar integral with the center of said plate and extending into the chamber, a plurality of tumbler disks independently mounted for rotation on the collar, in the edges of which disks are formed notches adapted to coincide, a locking bolt carried by the door and adapted to engage in a recess formed in the body of the safe, means passing through the door for imparting rotary motion to the disks, and means passing through the door for actuating the locking bolt.

6. The combination with a safe, comprising a body and door therefor, there being a chamber formed on the inside of the door, of a detachable plate closing said chamber, a collar integral with the center of said plate and extending into the chamber, a plurality of tumbler disks independently mounted for rotation on the collar, in the edges of which disks are formed notches adapted to coincide, a locking bolt carried by the door and adapted to engage in a recess formed in the body of the safe, a tubular shaft passing through the door, an adjustable connection between the inner end of said tubular shaft and one of the disks, and a shaft passing through the tubular shaft and through the collar for actuating the locking bolt.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

JAMES M. ALLEN.

Witnesses:

M. P. SMITH,

E. L. WALLACE.