June 14, 1932. S. ASTER 1,863,537

COMBINATION LOCK

Filed Nov. 7, 1930 3 Sheets-Sheet 1

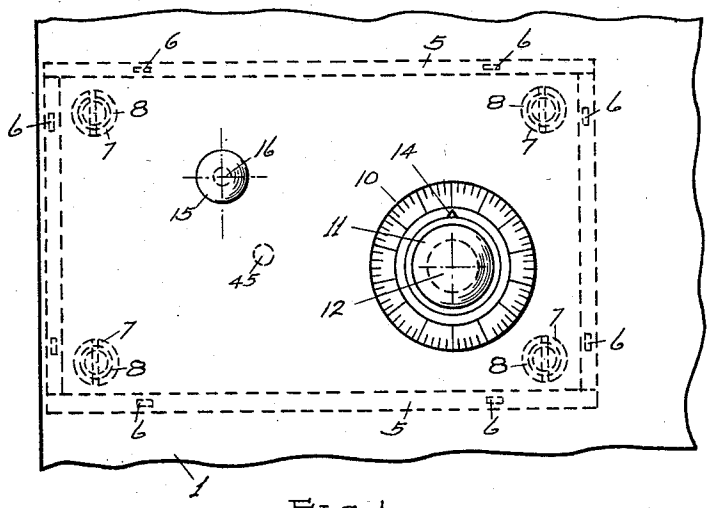


FIG. 1

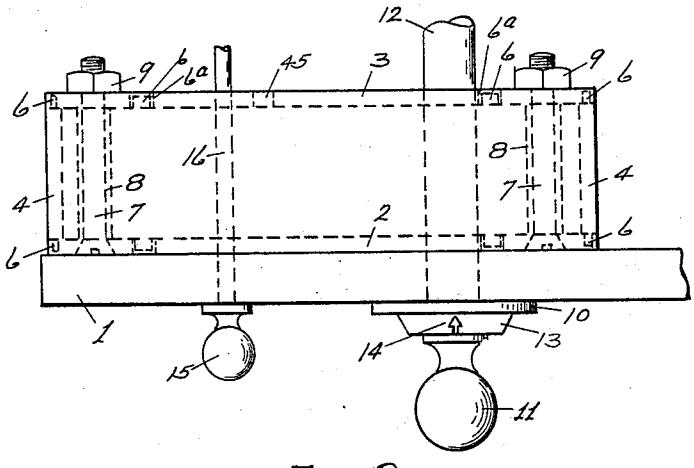


FIG. 2

Witnesses
Rudolph L. Stiles
Thomas P. Payne

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June 14, 1932. S. ASTER 1,863,537

COMBINATION LOCK

Filed Nov. 7, 1930 3 Sheets-Sheet 2

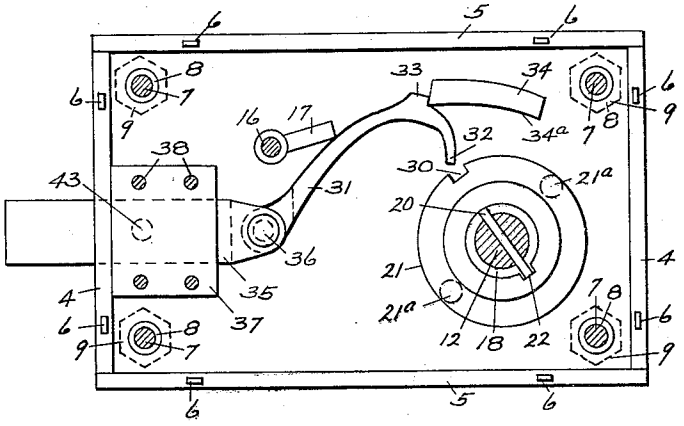


FIG. 3.

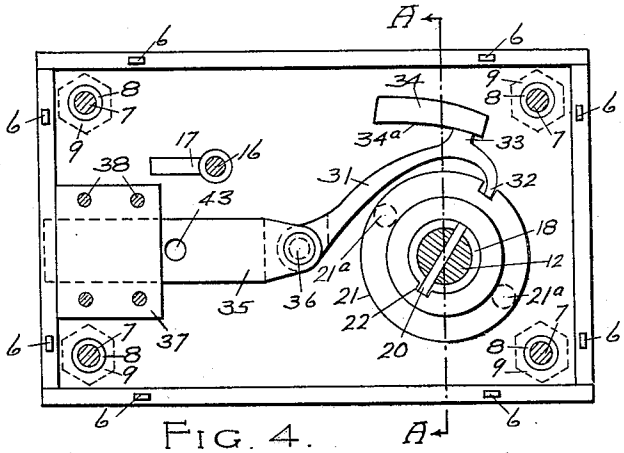


FIG. 4.

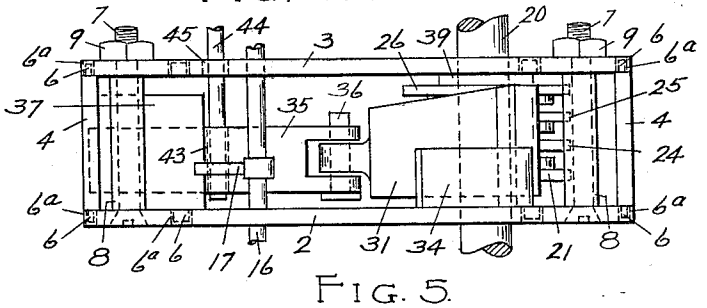


FIG. 5.

INVENTOR.

Witnesses

Stanley Aster

June 14, 1932. S. ASTER 1,863,537

COMBINATION LOCK

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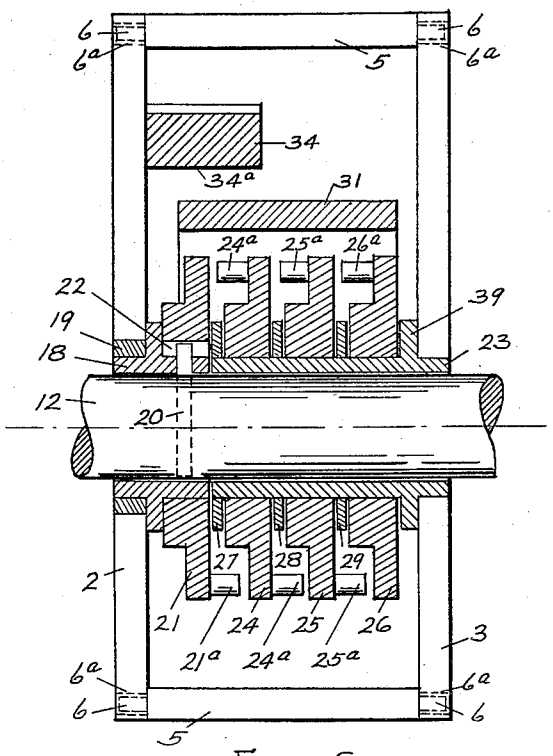


FIG. 6

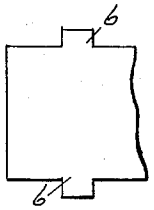


FIG. 10

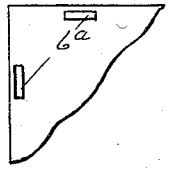


FIG. 11

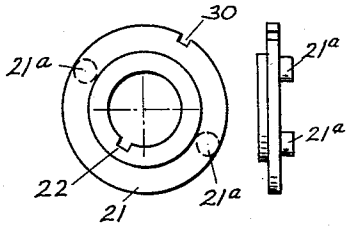


FIG. 7 FIG. 7a

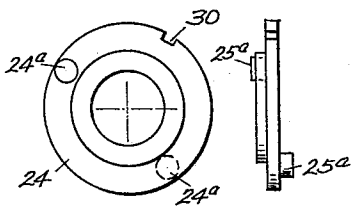


FIG. 8 FIG. 8a

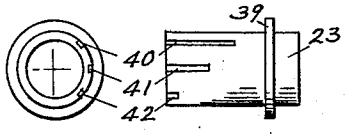


FIG. 9. FIG. 9a

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WITNESSES:

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Patented June 14, 1932 1,863,537

UNITED STATES PATENT OFFICE

STANLEY ASTER, OF PHILADELPHIA, PENNSYLVANIA

COMBINATION LOCK

Application filed November 7, 1930. Serial No. 494,036

My invention relates to an arrangement of a series of circular disks mounted parallel and all operated independently by a single operating shaft to give any desired combination for operating the lock and controlling its operation. At the same time, it is impossible to operate the lock in the absence of the correct combination by the old method of listening for the dog dropping into the tumblers to find the combination; or to force the lock to open by driving out the operating shaft from which the disks are operated.

In the accompanying drawings:—

Figure 1 is a fragmentary side elevation of a door showing the lock applied.

Figure 2 is a top plan view of an edge portion of the door showing the lock applied and with parts broken away.

Figure 3 is a side elevational view of the lock removed and showing the bolt of the lock in extended position.

Figure 4 is a similar view showing the bolt in a retracted position.

Figure 5 is a plan view of the lock with parts removed showing the bolt in retracted position.

Figure 6 is an enlarged transverse sectional view of the lock cut on the line A—A of Figure 3.

Figure 7 is a side elevational view of a master disk used in the lock.

Figure 7*a* is an edge elevation of said disk.

Figure 8 is a side elevation of a cooperating disk used in the lock.

Figure 8*a* is an edge elevation of the disk shown in Figure 8.

Figure 9 is an end view of a bearing sleeve used in the lock.

Figure 9*a* is a side elevational view of said sleeve.

Figure 10 is a fragmentary plan view of the end portion of a top and bottom plate used in the lock.

Figure 11 is a fragmentary side elevational view of a corner portion of a front or rear casing plate used in the lock.

The door to which the lock is applied is indicated at 1 in Figures 1 and 2 of the drawings. The lock consists of a casing made up of a front plate 2, a rear plate 3, side plates 4 and top and bottom plates 5. The plates 5 are provided with extensions 6 which are received in recesses 6*a* provided in the plates 2 and 3. Bolts 7 pass transversely through the plates 2 and 3 and tubular spacer members 8 are mounted upon the said bolts and interposed between the said plates. Nuts 9 are screwed upon the bolts and hold the parts of the casing together.

A graduated dial 10 is mounted upon the face of the door 1 and a shaft 12 is journaled in said dial and passes transversely through the casing of the lock. A knob 11 is fixed to the outer end of the shaft 12 and the said knob is provided with a beveled surface 13 having a pointer 14. An auxiliary shaft 16 passes through the front and rear plates of the casing and an auxiliary knob 16 is mounted upon the said shaft 16. A cam lever 17 is mounted upon the shaft 16. A collar 18 passes through the plate 2 and the shaft 12 passes through said collar. The collar 18 is journaled in a bearing ring 19 and a key pin 20 passes through the shaft 12 and the collar 18 and enters a slot 22 provided at the center of a master disk 21 which is mounted upon the collar 18. The master disk 21 is provided with a contact point 21*a*. A bearing sleeve 23 passes through the casing plate 3 and the shaft 12 is journaled in the said bearing sleeve. Disks 24, 25 and 26 are journaled for free rotation upon the bearing sleeve 23 and the said disks are provided with contact points 24*a*, 25*a* and 26*a*, respectively. Spacing washers 27, 28 and 29 are mounted upon the bearing sleeve 23 at the sides of the disks and serve to hold the disks in proper spaced relation. Each of the said disks is provided with a peripheral notch 30. A dog 31 is provided at one end with a tooth 32 and at its intermediate portion with an upwardly disposed part 33. A curved guide plate 34 is located above the dog and is provided with a curved holding surface 34*a* against which the upper surface of the part 33 may contact, as best shown in Figure 4 of the drawings and when the tooth 33 is in the notches 30 of the disks. A drawbolt 35 is slidable through the end plate of the casing and is connected with the dog 31 by means of the

pivot pin 36. A block 37 is located interiorly of the casing and the bolt 35 passes through the block. The block is secured to the casing by means of rivets 38. The bearing sleeve 23 is provided with a flange 39 which bears against the inner side of the plate 3, as shown in Figure 6. The inner end of the sleeve 23 is provided with keyways 40, 41 and 42, as best shown in Figures 9 and 9*a* of the drawings. The bolt 35 is provided with a hole 43 which may register with a hole 45 in the plate 3 and a pin 44 may be passed through the said holes when they are in alignment with each other.

The operation of the lock is as follows:

With the disks set for any specific combination, the knob 11 is turned to the left, whereby the pointer 14 on the beveled surface 13 moves around the dial plate 10 to the required number. The master disk 21, collar 18 and the operating shaft 12, all being keyed together by the pin 20, turn in the bearing 19 and bring the contact points 21*a* against the corresponding points 24*a* on the disk 24. Thus the said disk is turned on the sleeve 23 and the disks 25 and 26 will follow in the same manner. The first number of the combination will bring the disk 26 to a position so that the notch 30 is under the tooth 32 of the disk 31. When the shaft 12 is turned in a reverse direction, the disk 26 is left stationary and then by rotating the disks 21, 24 and 25, the second disk 25 is brought to a position so that its notch 30 is also under the tooth 32 of the dog 31.

By repeating this operation, the notch of the disk 24 is finally brought under the tooth of the disk. The dog 31 has its shoulder 33 bearing against the edge of the guide plate 34, as shown in Figure 3, and when the notches are in alignment with each other, the dog drops down so that the tooth enters the notches of all of the disks, locking them together. By turning the knob 11 to the right, the upper surface 33 will pass under the lower surface 34*a* of the guide plate 34, holding the tooth 32 in position and withdrawing the bolt 35. Thus the parts are moved to the positions as shown in Figures 4 and 5 of the drawings. The auxiliary knob 15 which is mounted upon the shaft 16 and which in turn carries the cam lever 18 is used to bring a slight pressure on the dog 31 to push the same into position when necessary and when not in use, the cam 17 may be turned back to the position as shown in Figures 4 and 5 of the drawings. When the knob 11 is turned to the left, the disks push the dog back into the position as shown in Figure 3 and by spinning or swftly rotating the shaft 12, the positions of all of the disks are upset, thereby requiring proper resetting before the lock can be opened.

Claim:

A lock comprising a casing, a bolt slidable therein, a dog pivoted to the bolt and provided at its free end with a tooth and an intermediate curved part having at its upper edge a shoulder, a guide plate attached to the casing and having an edge adapted to be engaged by the edge of the shoulder and the under surface, adapted to engage the upper end of the shoulder, a knob shaft journaled in the casing, a master disc fixed to the knob shaft and provided with a peripheral notch, a sleeve loosely mounted upon the shaft, spaced discs loosely mounted upon the sleeve and provided with peripheral notches, said notches adapted to receive said tooth and the width of the tooth being equal to the combined breadth of the discs and the space between them.

STANLEY ASTER.