

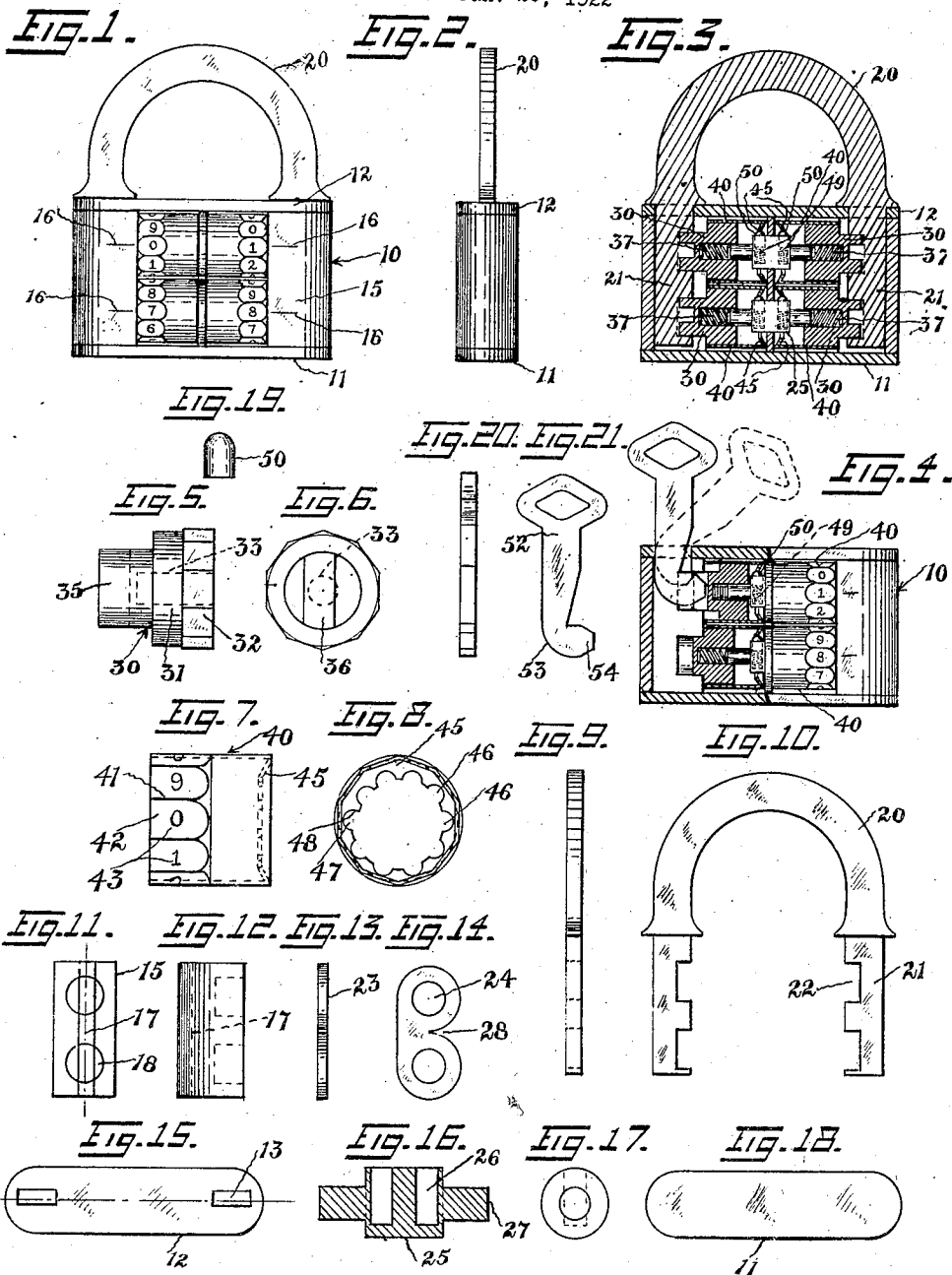
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S. SHALER

COMBINATION PADLOCK

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UNITED STATES PATENT OFFICE.

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COMBINATION PADLOCK.

Application filed January 20, 1922. Serial No. 530,613.

To all whom it may concern:

Be it known that I, SAUL SHALER, a citizen of the United States, residing in Bronx, in the county of Bronx and State of New York, have invented certain new and useful Improvements in Combination Padlocks, of which the following is a specification.

This invention relates to combination padlocks, and particularly to improvements on the lock shown in my United States Letters Patent No. 1,314,431, issued Aug. 26, 1919, for combination padlocks. However, the invention is not limited to padlocks, and in some respects is not limited even to combination locks.

One object of the invention is to provide a lock of this kind in which the combination may be changed by authorized persons, when the lock is unlocked.

Another object of the invention is to provide an apparatus or device of this kind in which the lock may be operated without looking at it, as when in the dark or by blind persons, and in which means are provided to distinguish the front of the lock from the back.

Other objects of the invention are to improve generally the simplicity and efficiency of such devices and to provide a device or apparatus of this kind which is durable, economical to manufacture and operate and which will not get out of order.

For the accomplishment of these and other objects my improved lock comprises, briefly stated, a lock having a top plate, a bottom plate, a center plate, and end members receiving the shanks of a shackle provided with shanks having notches. Center pin blocks carried by the center plate have center pins alined with said notches and carrying outwardly yieldably pressed tumblers rotatable on said pins and each provided with a polygonal portion and a reduced end engageable in one of said notches to lock the shank and provided with a kerf alinable with the shank to release the shank. A sleeve carried on each tumbler has index characters, a polygonal portion engageable with or disengageable from the polygonal portion of the tumbler, and a plurality of notches one of which has a steep wall. An index pin is yieldably pressed into said notches and permits movement in either direction except that at said wall it permits it in only one

direction. A key insertable in the lock when the shank is removed may push back the yieldable tumblers to disengage the polygonal portion of the tumbler from the polygonal portion of the sleeve, to permit the sleeve to be rotated on the tumbler to change the relation of the index characters to the tumbler, thereby to change the combination of the lock.

Other objects of the invention will appear as the description proceeds; and while herein details of the invention are described, the invention is not limited to these, since many and various changes may be made without departing from the scope of the invention as claimed.

In the accompanying drawing, showing by way of example one of many possible embodiments of the invention,

Fig. 1 is a front elevation of my improved lock;

Fig. 2 is an end elevation of the same;

Fig. 3 is a longitudinal vertical sectional view of the lock;

Fig. 4 is a longitudinal vertical sectional view, partly in elevation of the lock showing how the combination is changed;

Figs. 5 and 6 are respectively side and end elevations of the tumbler;

Figs. 7 and 8 are respectively side and end elevations of the index sleeve;

Figs. 9 and 10 are respectively side and edge elevations of the shackle;

Figs. 11 and 12 are respectively front and inner side elevations of the end member of the lock body;

Figs. 13 and 14 are respectively side and edge elevations of the center plate;

Fig. 15 is a plan of the top plate of the lock body;

Fig. 16 is a longitudinal vertical sectional view, of the center pin block, drawn on a larger scale;

Fig. 17 is an end elevation of the center pin block;

Fig. 18 is a plan of the bottom plate;

Fig. 19 is a side elevation of the index pin; and

Figs. 20 and 21 are respectively edge and face views of the key.

The lock body 10 comprises a bottom plate 11, a top plate 12 having shackle-shank receiving slots 13 (Fig. 15) at each end preferably slightly offset from the axis of the

plate. Vertical end members 15 are provided with index pointers 16 on the front face, an inwardly opening groove 17 (Figs. 11 and 12) extending from end to end and also
 5 offset a like amount and alined with said slots 13. Each end member also has upper and lower inwardly disposed axially horizontal approximately cylindrical holes or
 10 recesses 18, wider than and extending into and nearly as deep as said grooves 17 and preferably in center.

The shackle 20 is provided with flat locking shanks 21 (Fig. 10) engageable in and filling said grooves 17 and having notches 22
 15 registerable with and completing said holes 18. A center plate 23 is disposed immediately between said end members and provided with upper and lower openings 24
 20 (Fig. 14) axially alined with said holes and each receiving a center pin block 25 (Fig. 16) fitting in each of said openings and each provided with a bore 26, and oppositely
 25 projected center pins 27, alined with said holes 18. The deep notch 28 of the center plate distinguishes the front of the lock from the back, when operated in the dark. A plurality of tumblers 30 are each formed
 30 with an inner body portion having a cylindrical portion 31 (Fig. 5), a polygonal portion 32 and an axial bore 33 slidably and rotatably received on one of said pins 27. Each tumbler has an outer reduced end portion 35 rotatable in said holes or recesses 18
 35 and provided with a transverse kerf 36 centrally offset a like amount as the slots in the top plate, and registerable with said notches 22 when the tumbler is turned in one direction to permit the withdrawal of the shank. Said kerfs move out of registration with the
 40 notch when the tumbler is turned 180° or any other angle to said registering position, thereby to prevent the withdrawal of the shank. An axial spring 37 compressed in said axial bore yieldably holds the tumbler
 45 in outward position and permits it to be forced inwardly, as presently to be explained.

A rotatable index sleeve 40 (Fig. 7) on each tumbler is provided with a polygonal
 50 outer end portion 41 slidably receiving the polygonal portion of the tumbler and forming flat index faces 42 each bearing an index character 43 adapted to be alined with the adjacent index pointer. The inner end of
 55 each sleeve is formed with an inwardly turned flange 45 provided with a series of shallow curved index notches 46 progressively approaching the periphery of the sleeve, thereby to provide the end notch 47
 60 nearest the periphery and preferably at the zero-position, with one steep wall 48. An index spring 49 (Fig. 3) in said index bore 26 yieldably presses an impulse index pin 50 (Fig. 19) into one of said notches 46, 47.
 65 Said pin is constructed and positioned to

cam in either direction from one notch to another except when stopped by said steep wall 48 in said zero-position, whereby the position of the sleeves may be determined without looking at the lock, as when in the
 70 dark. Other positions may be determined by turning the sleeves from the zero-position and counting the impulses of the impulse pin.

For changing the combination I provide
 75 a flat combination changing key 52 having a curved hooked end 53 (Figs. 4 and 21) forming a laterally turned bit 54 adapted, when the shank 21 is removed, to enter the lock through said slot 13 and groove 17 and
 80 engage in one of said kerfs 36 and push back the tumbler against the axial spring 37 to disengage the polygonal portion 32 of the tumbler from the polygonal portion 41 of the sleeve, to permit the sleeve to be rotated
 85 on and relative to the tumbler to change the relation of the index characters 43 to the tumbler, thereby to change the combination of the lock.

The operation of the lock is obvious from
 90 the foregoing and is very simple. When the lock is locked some or all of the kerfs 36 will be out of alinement with the shanks, whereupon the reduced ends 35 will engage the lower edges of the notches 22 and hold
 95 the shanks 21 and shackle 20 in place.

When it is desired, to unlock the lock the sleeves 40 are engaged between the thumb
 100 and fingers and moved until the proper characters 43 are turned to aline with the index pointers 16, whereby the kerfs 36 become alined with the shanks and permit the removal of the shanks and shackle, thus unlocking the lock.

If the lock is to be unlocked in the dark,
 105 or otherwise without looking at it, the lock is turned forward as indicated by the notch 28 and the sleeves 40 are all turned reversely until stopped in zero-position by the impulse pin 50 against the steep wall 48.
 110 Then each sleeve is turned forward the required number of spaces, as determined by counting the impulses of the pin 50 as it cams from one notch to another.

When the combination is to be changed,
 115 the shank being removed, the key 52 is inserted, as in Fig. 4 and the bit pressed into the kerf to push back the tumbler against the axial spring to disengage the polygonal portion of the tumbler from the polygonal
 120 portion of the sleeve, to permit the sleeve to be rotated on the tumbler to change the relation of the index characters to the tumbler, thereby to change the combination of the lock. Each sleeve is thus rotated until the
 125 desired character 43 alines with the pointer 16. The characters thus alined are noted or recorded, and thus constitute the new combination. Thus it will be seen that a new combination is in this manner automatically
 130

indicated on the lock while the tumblers are disposed in unlocked position.

The cylindrical and polygonal portions of the sleeve 40 are of such size relative to the tumbler, that when the tumbler is pushed inwardly, as above explained, the said portions of the sleeve respectively receive the polygonal and cylindrical portions of the tumbler just snugly enough to provide a good rotative fit between the tumbler and sleeve, permitting easy relative rotation of the parts without looseness, and furnishing bearing surfaces whereby the sleeve and tumbler mutually coact to furnish bearings for each other and hold each other in alinement.

I claim as my invention:

1. In combination, a lock body comprising end members having shank-receiving grooves and cylindrical holes intersecting the grooves; a shackle provided with shanks engageable in said grooves and having notches registerable with said holes; a center plate disposed between said end members and provided with upper and lower openings axially alined with said holes; center pin blocks fitting in each of said openings and each provided with oppositely projected center pins alined with said holes; and tumblers rotatable on said pins and each provided with a reduced end engageable in one of said holes and provided with a transverse kerf.

2. In combination, a lock body comprising end members having shank-receiving grooves and cylindrical holes intersecting the grooves; a shackle provided with shanks engageable in said grooves and having notches registerable with said holes; a center plate carried in said body; center pins carried by said plate and alined with said holes; and pressed tumblers rotatable on said pins and each provided with a reduced end engageable in one of said holes and provided with a kerf alinable with the groove.

3. In combination, a lock body; a shackle having shanks receivable in said body and provided with notches; center pins alined with said notches; a plurality of tumblers, each formed with a body portion having a cylindrical outer end portion, a polygonal inner end portion, an axial bore slidably and rotatably received on said pins, and reduced end outer portion rotatable in said holes and provided with a transverse centrally offset kerf registerable with said notches when the tumbler is turned in one direction to permit the withdrawal of the shank and out of registration with the notch when the tumbler is turned 180° or any other angle to said registering position to prevent the withdrawal of the shank; an axial spring compressed in said axial bore for yieldably holding the tumbler in outward position; and a sleeve on each tumbler having index characters and a polygonal portion engageable

with or disengageable from the polygonal portion of the tumbler.

4. In combination, a lock body carrying index pointers and comprising end members having shank-receiving grooves and cylindrical holes intersecting the grooves; a shackle provided with shanks engageable in said grooves and having notches registerable with said holes; center pins alined with said holes; outwardly yieldably pressed tumblers rotatable on said pins and each provided with a polygonal portion and a reduced end engageable in one of said holes and provided with a kerf alinable with the groove; and a rotatable index sleeve on each tumbler and each provided with a polygonal outer end portion slidably receiving or disengageable from the polygonal portion of the tumbler and forming flat index faces each bearing an index character adapted to be alined with the adjacent index pointer.

5. In combination, a lock body; a shackle having shanks receivable in said body and provided with notches; rotatable tumblers having their ends engageable in said notches to prevent the removal of the shanks, and having kerfs alinable with the shanks to permit their removal; index sleeves carried on the tumblers and rotatable thereon for changing the combination and lockable therewith for preventing such change; said sleeves having inwardly turned flanges provided with a series of shallow index notches, one of which has one steep wall; and an index pin yieldably pressed into said notches and permitting movement in both directions except at said wall.

6. In combination, a lock body; a shackle having shanks receivable in said body and provided with notches; rotatable tumblers having their ends engageable in said notches to prevent the removal of the shanks, and having kerfs alinable with the shanks to permit their removal; index sleeves carried on the tumblers and rotatable thereon for changing the combination and lockable therewith for preventing such change; the inner end of each sleeve being formed with an inwardly turned flange provided with a series of index notches progressively approaching the periphery of the sleeve, the end notch, nearest the periphery and preferably at the zero position, being provided with one steep wall, and an index pin yieldably pressed into said notches and permitting movement in both directions except at said wall.

7. In combination, a lock body; a shackle having shanks receivable in said body and provided with notches; a center plate disposed intermediately of said body; center pin blocks carried by said plate and each provided with transverse bores, and oppositely projected center pins alined with said notches; tumblers rotatable on said pins and

tumbler for locking the member; an index sleeve lockable with or unlockable from the tumbler; and a key for disengaging the sleeve from the tumbler.

5 15. In a lock, the combination of, a case; a locking member insertible in said case; a plurality of members arranged for providing a combination for locking the locking member in the case or unlocking it there-
10 from; the cooperative relation of said members to each other being alterable for changing said combination; and a key for altering the cooperative relation of said members to each other to change said combination;
15 the key being dependent for operation upon removal of the locking member from the case.

16. In a lock, the combination of, a case having openings therein; a locking member
20 insertible in said openings; a plurality of members arranged for providing a combination operable from the exterior of the case for locking the locking member in said openings or unlocking it therefrom; the coopera-
25 tive relation of said members to each other being alterable for changing said combination; and a key insertible in said openings for altering the cooperative relation of said members to each other to change said combi-
30 nation when said locking member is removed from said openings.

17. In a lock, the combination of, a case; a locking member insertible in the case; a
35 tumbler for locking said member; an index sleeve lockable with or unlockable from the tumbler; and a key insertible in the case for disengaging the index sleeve from the tumbler.

18. In a lock, the combination of, a case
40 having openings therein; a locking member insertible in said openings; tumblers for locking said member in said openings; index sleeves lockable with or unlockable from the tumblers; and a key insertible in said open-
45 ings for disengaging the index sleeves from the tumblers when the locking member is removed from said openings.

19. In a lock, the combination of, a lock-
50 ing member insertible in the lock; means for locking said member in the lock and unlock-
ing it therefrom; means for operating said locking means and having visible characters thereon for indicating the position of the
55 locking means relative to said member when said means for operating is operated; en-
gagement means providing a zero stop ap-
60 purtenant to said operating means; and im-
pulsive means engaging said engagement means for permitting operation of said oper-
ating means in one direction to said zero
stop for causing the locking means to un-
lock said member and providing indication
by said characters of the position of the
locking means relative to said member when
65 said means for operating is so operated and

for permitting operation from said zero stop
of said means for operating in direction re-
verse to the first direction for causing the
locking means to unlock said member and
providing indication by impulses of the im- 70
pulsive means of the position of the locking
means relative to said members when said
means for operating is so operated.

20. In a lock, the combination of, a lock-
75 ing member insertible in the lock; means for locking said member in the lock and un-
locking it therefrom; rotatable means for
operating said locking means; the rotatable
means having visible characters thereon for
80 indicating the position of the locking means
relative to said member when the rotatable
means is rotated and having means for en-
gagement providing a zero stop; and impul-
sive means engaging said engagement means
85 for permitting rotation of the rotatable
means in one direction to said zero stop for
operating the locking means to unlock said
member and providing indication by said
characters of the position of the locking
90 means relative to said member when the
rotatable means is so rotated, and for per-
mitting rotation of the rotatable means from
said zero stop in direction reverse to the first
direction for operating the locking means to
95 unlock said member and providing indi-
cation by impulses of the impulsive means
of the position of the locking means relative
to said member when the rotatable means is
so rotated.

21. In a lock, the combination of, a lock-
100 ing member insertible in said lock; tum-
blers for locking said member in the lock
and unlocking it therefrom; rotatable sleeves
for locking the tumblers to said member and
unlocking them therefrom, the tumblers be- 105
ing rotated by rotation of said sleeves; the
sleeves having visible characters thereon for
indicating the positions of the tumblers rela-
tive to the locking member when the sleeves
are rotated; the sleeves having on their in- 110
teriors a series of indentations one of which
provides a zero stop; and spring actuated
pins engaging said indentations for permit-
ting rotation of the sleeves in one direction
to said zero stop for unlocking the tumblers 115
from said member and providing indication
by said characters of the positions of the
tumblers relative to said member when the
sleeves are so rotated, and for permitting
rotation of the sleeves from said zero stop
120 in direction reverse to the first direction for
unlocking the tumblers from said member
and providing indication by impulses of the
pins of the positions of the tumblers relative
to said member when the sleeves are so ro- 125
tated.

22. In a lock, the combination of, a lock-
ing member insertible in said lock; tum-
blers for locking said member in the lock
and unlocking it therefrom; rotatable sleeves 130

for locking the tumblers to said member and unlocking them therefrom, the tumblers being rotated by rotation of said sleeves; the sleeves having visible characters thereon for indicating the positions of the tumblers relative to the locking member when the sleeves are rotated; the sleeves having on their interiors a series of curved indentations one of which has a steep wall providing a zero stop; and spring actuated pins engaging said indentations for providing step by step rotation of the sleeves in one direction to said zero stop for unlocking the tumblers from said member and providing indication by said characters of the position of the tumblers relative to said member when the sleeves are so rotated, and for providing step by step rotation of the sleeves from said zero stop in direction reverse to the first direction for unlocking the tumblers from said member and providing indication by impulses of the pins of the positions of the tumblers relative to said member when the sleeves are so rotated.

23. In combination, a pad-lock body open at the front and rear; a locking member therein; a tumbler movable to locking engagement with or disengagement from said member and provided with an index member engageable from the front and rear of the lock; and a transverse center plate carried by the lock and having its front and rear edges exposed, the rear edge being straight and the front edge being deeply

notched for distinguishing the front from the back of the lock.

24. In a lock, a transverse member carried by the lock and having its front and rear edges exposed, the exposed rear edge being straight and the exposed front edge being notched for distinguishing the front from the back of the lock.

25. In a lock, the combination of, rotatable index sleeves exposed at the front and rear of the lock and operable from either front or rear of the lock; and a transverse member for supporting the sleeves arranged between ends of the sleeves and having its front and rear edges exposed, the rear edge being straight and the front edge being notched for distinguishing the front from the back of the lock.

26. In a lock, the combination of, rotatable and laterally movable tumblers having kerfs in one of the ends thereof; index sleeves on the tumblers, the tumblers being laterally movable in the sleeves; and a key having a curved outer edge and forming a laterally turned bit for engaging the kerfs of the tumblers to move the tumblers laterally in the sleeves for permitting rotation of the sleeves for changing the combination of the lock.

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Witnesses:

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