Jan. 29, 1957 A. PAPINI 2,779,185

COMBINATION LOCK

Filed Feb. 17, 1950 2 Sheets-Sheet 1

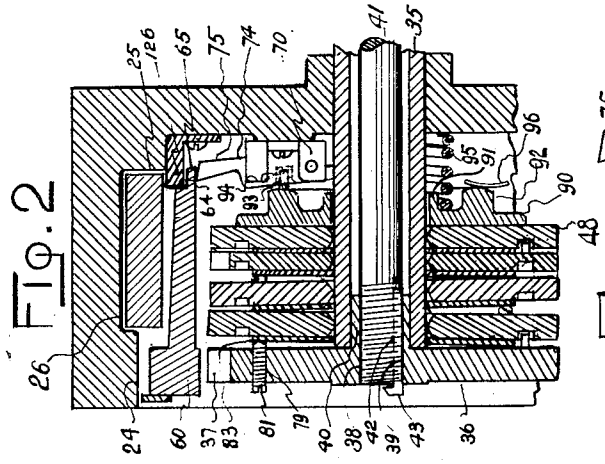


FIG. 2

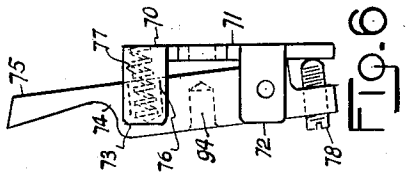


FIG. 6

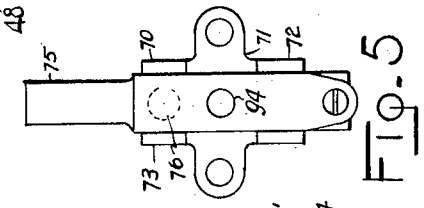


FIG. 5

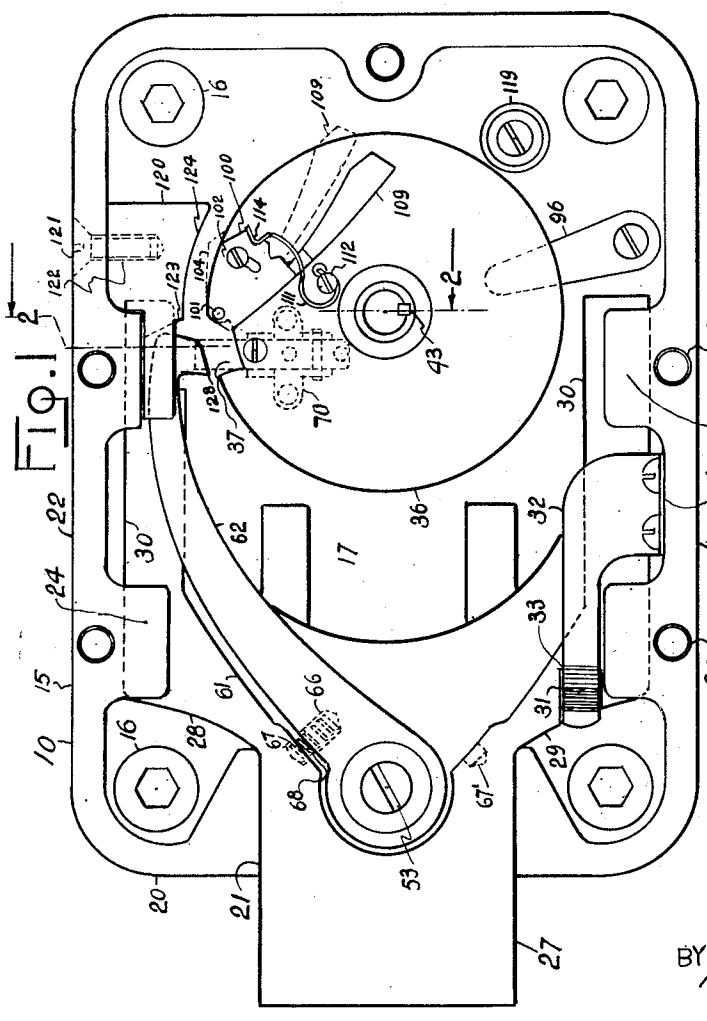


FIG. 1

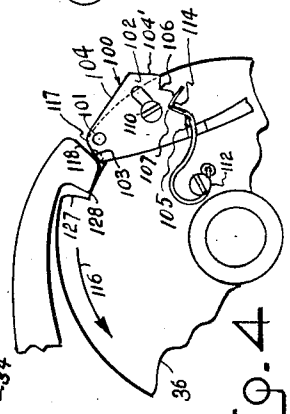


FIG. 4

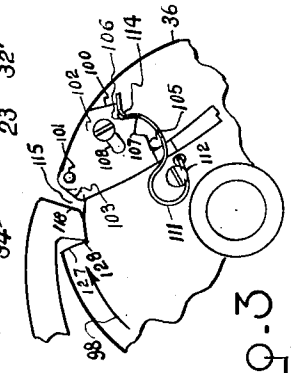


FIG. 3

INVENTOR
ANTHONY PAPINI
BY H. M. Kilpatrick
ATTORNEY

Jan. 29, 1957 A. PAPINI 2,779,185

COMBINATION LOCK

Filed Feb. 17, 1950 2 Sheets-Sheet 2

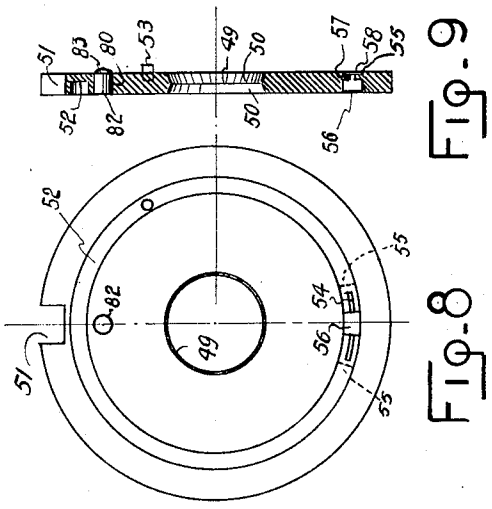


Fig. 9

Fig. 8

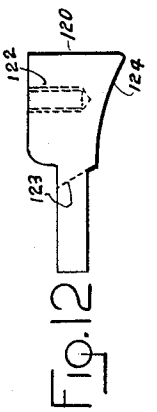


Fig. 12

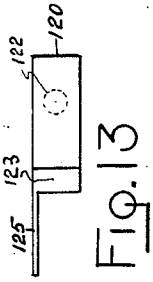


Fig. 13

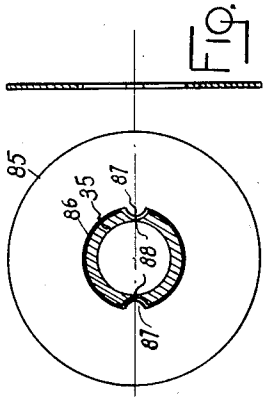


Fig. 11

Fig. 10

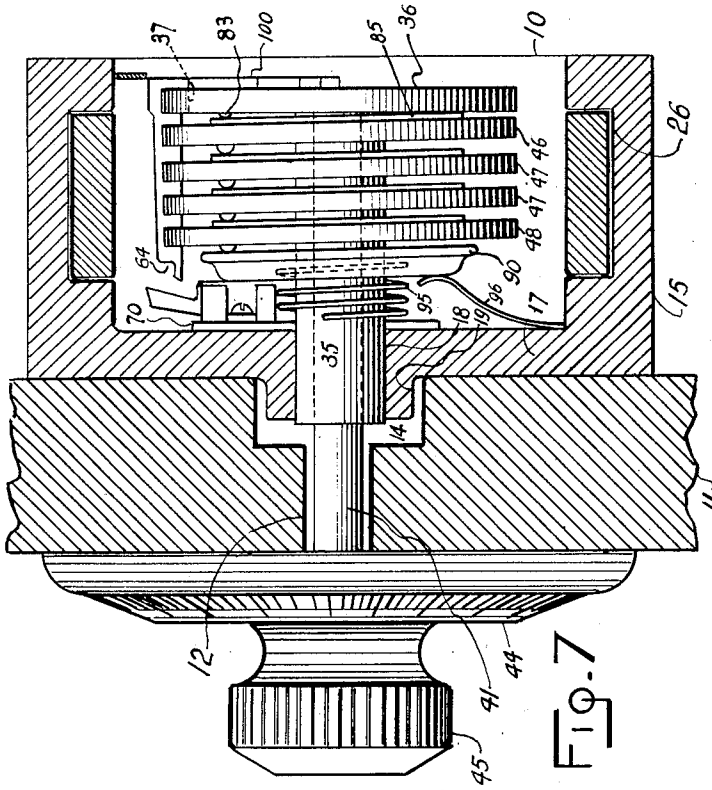


Fig. 7

INVENTOR
ANTHONY PAPINI
BY Wm. Kilpatrick
ATTORNEY

United States Patent Office 2,779,185 Patented Jan. 29, 1957

2,779,185

COMBINATION LOCK

Anthony Papini, Ridgefield, N. J.

Application February 17, 1950, Serial No. 144,620

20 Claims. (Cl. 70—333)

This invention relates to locks and permutation devices and more particularly to combination or permutation locks though it is noted that in some of the claims the invention is not limited to locks.

One object of the invention is to provide an improved permutation device of this kind which cannot be operated by persons not knowing the combination.

To this end, other objects of the invention are to provide an improved device or lock of this kind in which there are no audible clicks or changes of resistance to manipulation to aid experts in determining the combination.

More specifically stated, an object of the invention is to eliminate an objectionable condition in combination locks now being used, in consequence of which condition audible clicks are produced in the process of opening the locks. Through these clicks, unauthorized persons are able to open safes.

Another object is to provide a combination lock to replace the expensive time locks.

Additional objects of the invention are to effect simplicity and efficiency in such combination locks and to provide a simple lock of this kind which is pick-proof and which is durable, and reliable in operation, and economical to manufacture and easy to install.

Still other objects of the invention will appear as the description proceeds; and while herein details of the invention are described in the specification and some of the claims, the invention as described in the broader claims is not limited to these, and many and various changes may be made without departing from the scope of the invention as claimed in the broader claims.

The inventive features for the accomplishment of these and other objects are shown herein in connection with an improved combination lock which briefly stated, includes a post transverse to the lock bolt and carrying tumblers adapted to wobble on the post, a main cam adjacently rotatively mounted on the post and having alinable peripheral gates and non-rotary spacer disks on the post between the cam and tumblers. A spindle connected fast with the cam and the lock dial serves for rotating the cam.

An arm movably mounted on the bolt carries the fence movable into said gates when alined and projections on said cam and tumblers and engageable with the spacer disks are alinable when the gates are alined to push the tumblers apart to operate a latch adapted to engage the fence to hold it from the gates and adapted to be pushed from the fence by the tumblers when pushed apart when the projections are alined and the gates are alined under the fence, to release the fence to allow the fence to enter the gates.

The fence has a slight relative movement in the gate of the cam; and a small cam movably mounted on the main cam is positioned to be pressed upon by the fence in the gate during bolt locking movement to cause the small cam to move to an outer position as the main cam rotates to engage and move the fence to a position to be caught and held from the gates by the latch. A roller

mounted in the lock case serves for engaging and restoring the small cam as the main cam rotates.

A guide block mounted on the inner face of the top wall of the case has a beveled end face engageable with the fence in unlocking movement to lower the fence, and has a curved lower face to hold the fence in the gate when in unlocking positions. Said block has a thin front extension engaging and serving to help guide the fence arm when in bolt projected position.

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

Fig. 1 is a side elevation showing the lock with cover wall removed;

Fig. 2 is a fragmental section taken on the line 2—2 of Fig. 1;

Figs. 3 and 4 are fragmental side elevations showing different positions of the main cam small cam and fence;

Figs. 5 and 6 are respectively front and side elevations showing the latch;

Fig. 7 is a fragmental vertical axial sectional view partly in elevation showing the gates and projections alined and the fence in the gates;

Figs. 8 and 9 are respectively side elevation and axial section of a tumbler;

Figs. 10 and 11 are respectively side and front elevation of a spacer disk; and

Figs. 12 and 13 are respectively side elevation and bottom plan of the guide block.

My improved lock **10** is shown in combination with a safe door **11** having a bore **12** therethrough having a counter bore **14** at the inner end. The lock case **15** is secured by corner screws **16** (Fig. 1) to the door and has a main wall **17** having a bore **18** therein surrounded by a boss **19** in said countersink. The outer end wall **20** is provided with a bolt opening **21**, and top and bottom walls **22**, **23** have marginal lugs **24**, **25** forming longitudinal slide ways **26** (Figs. 2 and 7) therebetween. A bolt **27** slidable in said bolt opening **21** has upper and lower diverging legs **28**, **29** in the case having parts **30** slidable in said slide way **26**.

One of the legs, the leg **29**, has a V-shaped recess **31** in its exposed face; and a flat spring **32** having one end **32'** outturned and mounted on the bottom wall **23** has its free end angularly bent as at **33** to form an inwardly projecting part engaged in said recess **31** when the bolt is projected to yieldably hold the bolt projected. A cover wall (not shown) for the case is adapted to be secured by screws in screw holes **34** in the edge face of the upper and lower walls **22**, **23**.

A tubular post **35** force-fitted in said bore **18** of the case and extending to near said cover wall carries a substantially circular main cam **36** having a peripheral gate **37**, a central threaded bore **38** (Fig. 2) provided with a longitudinal key slot **39**, and an inwardly projecting boss **40** around the bore rotatively received in the rear end of the post **35**. A rotary spindle **41** in said post has a threaded and longitudinally slotted end **42** in said threaded bore; and a key **43** in the slots of the spindle and cam serves for fastening the cam and spindle together. To the front end of the spindle are secured the dial **44** and operating knob **45**. A plurality of disk-shaped tumblers **46**, **47**, **48**, having bores **49** (Fig. 9) therethrough beveled as at **50** at both ends and loosely rotatively received on the post near each other and the cam, are each provided with a peripheral gate **51** alinable with each other and the cam gate **37** at a position at the upper part of the tumblers and cam.

The tumblers are respectively provided with shallow annular grooves **52** of the same diameter coaxial with the tumblers and adjacent to the gate and facing toward

the cam; and the cam 36 and each tumbler except the bottom tumbler 48 has a carrier 53 on the face opposite the grooved face and adapted to travel without contact in the adjacent groove 52 as the tumblers and cam are relatively rotated; and each tumbler is provided with a slot 54 therethrough in the groove and a short shallow groove 55 on the face opposite the groove and extending a short distance along the groove, the short groove 55 being concentric with the other groove. A flyer 56 in each groove comprises an approximately rectangular plate lying flat in and slidable in the groove 52, and is provided with a stem 57 on the plate slidable in the slot 54 and a flat head 58 on the stem slidable in the short groove.

Each flyer 56 is adapted to be engaged by the carrier 53 in the associated groove to rotate the tumbler, whereby on reading the dial 44 proper manipulation of the knob 45 in accordance with the combination of the lock will cause the gates 37, 51 to become alined under the fence 60.

The bolt is provided at the inner end of one side with a wide shallow recess 61 extending toward the tumblers receiving a fence arm 62 pivoted on a screw 53 on the bolt and movable in the recess and extending to a position above the gates, when alined in said upper position, and having downwardly offset thereon the laterally projecting fence 60 disposable above all the gates when alined and movable into the alined gates in said position. The free end of the fence is provided with an upper recess 64 forming a tail 65. An upper face of the arm near its pivot and the opposite face of the recess 61 are provided with alined bores 66, 67 receiving a helical spring 68 compressed in said bores for urging the fence into the gates; a similar bore 67' in the other face of the recess is provided to receive the spring when the direction of the bolt thrust of the lock is reversed.

A fulcrum member 70 (Figs. 2 and 5 to 7) comprises an elongated base 71 mounted on the main wall 17 below and alined with the inner end tail or projection 65 of the fence, said base having upturned opposite upward pivot ears 72 near the lower end and opposite spaced guide ears 73 at the upper end. A latch 74 pivoted to and between the pivot ears 72 and guided by the guide ears 73 has an upper extension 75 adapted when the latch is rocked to move from under said end tail of the fence to release the fence and to move under said tail to hold the fence, when raised, out of the gates and out of contact with the tumblers and cam when rotated thus to prevent the fence from causing clicks when gates pass thereunder during rotation of the cam and tumblers.

The part of the latch between the guide ears is provided with a bore 76 opening toward the base and receiving a helical spring 77 compressed between the base and inner end of the bore to yieldably hold said upper extension 75 under the tail or end projection 65 of the fence. A set screw 78 passing through the lower end of the latch against the base adjustably limits the outward movement of the extension 75.

Said cam 36 and tumblers 46, 47, 48 are respectively provided with bores 79 (Fig. 2) and 80 (Fig. 9) axially parallel to the post adjacent to the inner edge of the annular groove and carrying fast therein pins 81, 82 having rounded projections 83 projecting toward main wall 17, the pin 81 and bore 79 of the cam being threaded and the pin 81 being slotted for adjusting such pin. Disk-shaped spacers 85 loosely non-rotatively disposed between adjacent tumblers and the cam smaller in diameter than the inner diameter of the groove 52 and slidably engageable by the projection pins 81, 82 are provided with openings 86 loosely received on the post, the edge of each opening being provided with oppositely spaced rounded projections 87 engaging in longitudinal grooves 88 of the post to prevent the projections 83 from rotating adjacent disks or tumblers.

A bottom disk 90 (Figs. 2 and 7) loose on the post 35

between the latch 74 and the adjacent tumbler 48 and engageable by the projection 83 of the adjacent tumbler, and having a boss 91 disposed toward the main wall and loosely engaging the post to allow wobbling has a concentric annular bead 92 spaced from the boss and provided with a projecting pin 93 engageable in a recess 94 of the latch to prevent rotation of the bottom disk. A helical compression spring 95 on the post 35 and boss 91 compressed between the bottom disk 90 and the main wall 17 presses the tumblers together and toward the main cam. A flat spring 96 having one end mounted on the main wall and having its free end engageable with the bead tends to balance the pressure of the latch on the bottom disk.

When the parts of the lock are in normal locked position with the projections 83 unalined the springs 95, 96 and the latch 74 press on the bead of the bottom disk and allow the latch extension 75 to remain under the tail 65 as in Fig. 2; but the projections 83 are so arranged relative to the gates 37, 51 that when the gates are alined as in Fig. 7, the projections are alined as in Fig. 7 and push the adjacent projection carrying parts of the tumblers apart and push the latch 74 from under the tail 65 and allow the fence to drop into the gates as in Fig. 7, thus allowing the lock to be unlocked, by turning knob 45 and dial 44 in the direction of the arrow 98 of Fig. 3, thus causing the main cam to move in the direction of said arrow 98 to the position of Fig. 4 to pull on the fence 60 and arm 62 to withdraw the bolt.

A small retrievable cam 100 pivoted on pivot pin 101 at the side face of the main cam 36 remote from the tumblers and adjacent to the gate 37 at the side of the gate most remote from the bolt 27 when the gate is in upper position, comprises a flat plate 102 disposed flat against the side face of the main cam and has a normal position shown in Fig. 3 and active position as shown in Fig. 4. Said plate has a motive edge 103 normally extending across the adjacent inner corner of the gate 37, an active edge 104, 104' normally registering with the periphery of the main cam, a notched edge 105 remote from the motive edge and having a normally engaged outer notch 106 near said periphery and an inner notch 107 more remote from the periphery, said plate having also a limit slot 108 near the notches and concentric with the pivot point 101 and a tail 109 joining the notched edge remote from the pivot point and normally extending to near said periphery. A screw 110 fast in the main cam and received in the slot limits the small cam movement. A torsional spring 111 anchored on the main cam and clamped under the head of a screw 112 has an inwardly pointed part 114 engageable in one or the other of said notches 106, 107, to yieldably hold the small cam in normal position within the periphery or in a projected position with said active edge 104 and tail 109 projected beyond said periphery as shown by Fig. 4 and the dotted lines of Fig. 1.

The gate of the main cam is wide enough to allow some lost motion between the main cam and fence, and when the fence is in the gates and the main cam moves to withdraw the bolt there is a clearance 115 as in Fig. 3, and the motive edge 103 is not pressed upon when the gates first reach the position of Fig. 4 and the unlocking movement is complete.

When it is desired to lock the bolt, the main cam 36 and knob 45 are rotated in the direction of the arrow 116. With the fence still in the alined gates and the bolt retracted, and the small cam 100 still in normal position within the periphery of the main cam, turning movement of the main cam 36 to project the bolt causes the fence to relatively move to take up said clearance 115 and cause said motive edge 103 to be pressed upon by the fence, turning the small cam 100 to project said active edge 104 and tail 109 beyond the periphery as in Figs. 3 and 4; whereupon continued locking movement of the main cam causes the rounded rear corner 117 of the cam

gate to engage the rear cam face **118** of the fence and lift the fence from the gates but not out of contact with the main cam **36**. Further movement of the cam in the direction of the arrow **116** of Fig. 4 brings said active edge **104** to engage the fence and raise it entirely from the main cam and tumblers and raises it high enough to raise the tail **65** of the fence above the latch extension **75** to be caught and held by the latch extension out of contact with the tumblers and main cam. A restoring roller **119** is rotatably mounted in the case in the path of the tail **109** of the small cam, and further rotation of the main cam **36** causes the tail **109** to engage the restoring roller to restore the small cam **100** to normal position.

A guide block **120** (Figs. 1, 12 and 13) mounted on the inner face of the top wall **22** and there secured by a screw **121** in an opening **122** has a beveled inner end face **123** engageable with the fence in unlocking movement to positively lower the fence to the bottom of the gates. Said block has a curved lower face **124** to hold the fence in the gate when in unlocking positions and movements. Said block is provided with a thin front extension **125** engaging one side of the fence arm when the fence is raised and in bolt projected position. A longitudinal guide **126** (Fig. 2) on the upper lug **25** engages in said recess **64** of the fence and cooperates with said thin extension **125** to guide the fence and fence arm.

The operation of the lock will be easily understood from the foregoing. Starting with the lock locked and the bolt **27** projected in its keeper and the projections **83** and gates **37** and **51** unalined and the fence held raised by the latch extension **75**, the knob **45** is turned back and forth in accordance with the combination thus rotating the main cam back and forth causing the fliers **56** to engage the carriers **53** and aline the gates in the well known manner. As the fence is held by the latch extension **75** out of contact with main cam and tumblers, the gates passing under the fence cannot cause any clicks as the gates pass, or any change in the resistance of the parts, such as would aid in determining the combination of the lock by any one not knowing the combination.

When the gates are thus alined by any one knowing the combination, the projections **83** are also alined, thus pushing the upper part of the tumblers, main cam and bottom disk **90** apart, thus pushing back the latch **74** and allowing the fence to fall into the alined gates.

Then the knob **45** and main cam **36** may be turned in the direction of the arrow **98** of Fig. 3, causing the front wall **127** of the cam gate to engage the projection **128** of the fence to draw back the fence and with it the fence arm **62** and bolt **27**, thus unlocking the lock leaving the cam substantially in the position of Fig. 4.

Then, to lock the bolt the cam is moved in the direction of the arrow **116** causing the fence to project the small cam **100** to the position of Fig. 4 there to be held by the projection **114** of the spring **111** until further movement of the main cam moves the active edge **104** of the small cam under the fence to raise the fence to be caught and held raised by the latch extension **75** as hereinbefore explained. Further movement of the cam causes the roller **119** to be engaged by the tail **109** of the small cam to restore the small cam to normal position.

After the lock is closed, the dial is rotated several times in the direction of the arrow **116** to misaline the gates and the projections **83**.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A combination lock comprising a bolt; tumblers and a main cam adjacently coaxially rotatively mounted and having alinable gates; a fence connected to the bolt and movable into said gates when alined; projections on said cam and tumblers alinable when the gates are alined to push the tumblers apart; means to hold the fence from the tumblers and cam and adapted to be operated by the tumblers when pushed apart to allow the fence to enter the gates; and means operated by the cam and fence during bolt locking movement to move the fence from the gates.

2. A combination device comprising a control member; tumblers, and a main cam adjacently coaxially rotatively mounted and having alinable gates; a fence connected to the control member and movable into said gates when alined; projections on said cam and tumblers alinable when the gates are alined to push the tumblers apart; and means to hold the fence from the gates and adapted to be operated by the tumblers when pushed apart to allow the fence to enter the gates.

3. A combination lock comprising a bolt; a post transverse to the bolt; tumblers adapted to wobble on the post and a main cam adjacently rotatively mounted on the post and having alinable peripheral gates; non-rotary spacers on the post between the cam and tumblers; means for rotating the cam; an arm movably mounted on the bolt and carrying a fence movable into said gates when alined; projections on said cam and tumblers alinable when the gates are alined to engage adjacent tumblers to push the tumblers apart; and a latch adapted to engage the fence to hold it from the gates and adapted to be pushed from the fence by the tumblers when pushed apart, when the gates are alined under the fence, to release the fence to allow the fence to enter the gates.

4. A combination lock comprising a bolt; a post transverse to the bolt; tumblers adapted to wobble on the post and a main cam adjacently rotatively mounted on the post and having alinable peripheral gates; means for rotating the cam; an arm movably mounted on the bolt and carrying a fence movable into said gates when alined; projections on said cam and tumblers alined when the gates are alined to push the tumblers apart; a latch adapted to engage the fence to hold it from the gates and adapted to be pushed from the fence by the tumblers when pushed apart, when the gates are alined under the fence, to release the fence to allow the fence to enter the gates; said fence having relative movement in the gate of the cam; a small cam movably mounted on the main cam and positioned to be pressed upon the fence in the gate during said relative movement during bolt locking movement to cause the small cam to move to an outer position; said small cam being so located that the small cam may engage the fence as the main cam rotates to move the fence to a position to be caught and held from the gates by the latch; and means for engaging and restoring the small cam as the main cam rotates.

5. A lock comprising a bolt; a stationary post transverse to the bolt; a main cam rotatively mounted on the post and having a peripheral gate; a dial operatively connected to the cam; tumblers adapted to wobble on the post and each provided with a peripheral gate; non-rotary disks on the post between the tumblers and cam; interengageable carriers and flyers on the tumblers and cams; a fence arm pivoted on the bolt and carrying a fence movable into said gates when alined; a latch adapted to hold the fence from the gates; alinable projections on said cam and tumblers near the gates aadpted to be alined when the gates are alined to push the tumblers and cam apart; a disk movable on the post and engageable with the latch and the projection of the adjacent tumbler and adapted when the projections are alined to push the latch to release the fence; and a small cam pivoted on the main cam and having a motive part normally at the adjacent part of the cam gate and adapted to be pressed upon by the fence in the gate, to cause the small cam to move from a normal position and project beyond the periphery in position as the cam rotates to engage and raise the fence to be caught by the latch; and means for restoring the small cam to normal position.

6. In combination, movably mounted disk shaped members having alinable gates; a fence movable into said gates when alined; a latch for holding the fence from the gates; means operated by the members when the gates are alined to cause the latch to release the fence; a

retrievable cam pivoted on one of said members and having a normal position in which it is adapted to be pressed on by the fence in the gate to cause the cam to move to an abnormal position in which it may engage the fence and push it from the gates to a position to be caught by the latch.

7. In a combination lock, in combination, a main cam having a gate; a fence biased to move into said gate; a latch for holding the fence from the gate; and a retrievable cam pivoted on said main cam and having a normal position in which it is adapted to be pressed on by the fence in the gate to cause the retrievable cam to move to a position in which, on rotation of the main cam, to engage the fence and push it from the gate to a position to be caught by the latch.

8. A combination as in claim 7 comprising means engageable by the retrievable cam on further rotation of the main cam member to restore the retrievable cam to normal position.

9. In combination, movably mounted disk shaped members having alinable gates; a fence biased to move into said gates when alined; a latch for holding the fence from the gates; means operated by the members when the gates are alined to cause the latch to release the fence; a retrievable cam pivoted on one of said members and having a normal position in which it is adapted to be pressed on by the fence in the gate to cause the retrievable cam to project beyond the periphery of the member, thereby on rotation of the cam-carrying member, to engage the fence and push it from the gates to a position to be caught by the latch.

10. In combination, a plurality of coaxially rotatively mounted tumblers having alinable gates; projections on side faces of the tumblers alinable when the gates are being alined to push the tumblers apart; a fence movable into the gates when alined adjacent to the fence; and a latch to hold the fence from the tumblers and pushed by the tumblers when pushed apart to release the fence and to allow the fence to enter the gates.

11. A combination lock comprising adjacent rotatively mounted tumblers and a main cam having alinable peripheral gates; a fence biased for movement into said gates when alined; projections on said cam and tumblers alinable when the gates are being alined to push the tumblers apart; a bottom disk engaged by the projection of the tumbler most remote from the cam; a latch adapted to engage the fence to hold it from the gates and adapted to be pushed from the fence by said bottom disk when the tumblers are pushed apart, when the gates are alined under the fence, to release the fence to allow the fence to enter the gates; said latch having a socket adjacent to said disk; and a pin fast on the disk and received in said socket to prevent rotation of the disk.

12. In combination, substantially coaxial rotatively mounted adjacent tumblers having alinable gates; a fence biased to move into said gates when alined; a latch to hold the fence from the gates; alinable projections on the side faces of adjacent tumblers and alinable when the gates are being alined to cause movement apart of the tumblers; and means set in operation by said movement when the gates become alined, to cause the latch to release the fence to allow the fence to enter the gates.

13. In combination, substantially coaxial rotatively mounted adjacent tumblers having alinable gates; a fence movable into said gates when alined; means including interengaging parts on adjacent tumblers for causing the end tumblers to effect relative axial movement in one direction when the gates are being alined and in the opposite direction when the gates are being disalined; and means set in operation by one of said movements when the gates become alined, to urge the fence to enter the gates.

14. In combination, a plurality of coaxially rotatively mounted tumblers having alinable gates; a fence movable into said gates when alined adjacent to the fence; projections on side faces of the tumblers near the peripheries thereof alinable when the gates are being alined to push apart one set of alined parts of their peripheries when the gates are alined adjacent to the gate and to allow the tumblers to move close together at another set of alined parts of their peripheries when the gates are thus alined; and means set in operation by one of said sets of parts when the gates are alined to urge the fence to enter the gates.

15. In combination, movably mounted tumblers having alinable gates; a fence movable into said gates when alined; means including parts on adjacent tumblers for causing the tumblers to effect relative movement in one direction when the gates are being alined and in the opposite direction when the gates are being disalined; and means influenced by said movement when the gates become alined to bring about movement of the fence into the gates.

16. In combination, movably mounted tumblers having alinable gates; a fence movable into said gates when alined; means including interengaging parts on adjacent tumblers for causing the end tumblers to effect relative movement transverse to their planes of movement in one direction when the gates are being alined and in the opposite direction when the gates are being disalined; and means set in operation by said movement when the gates become alined to cooperate with the fence to bring about movement of the fence into the gates.

17. In a combination lock, a plurality of coaxially rotatively mounted tumblers having alinable gates; a fence movable into said gates when alined; projections on side faces of the tumblers alinable when the gates are being alined to push the tumblers apart; non-rotary spacers between the tumblers on which the projections ride; and means influenced by movement of the tumblers when pushed apart to bring about movement of the fence into the gates.

18. In combination, coaxially rotatively mounted tumblers and an end cam having alinable gates; a fence movable into the gates when alined; projections on side faces of the tumblers and cam alinable when the gates are being alined to push the tumblers apart; the projection on the cam being adjustable to vary the amount of its projection; and means influenced by movement of the tumblers when pushed apart to bring about movement of the fence into the gates.

19. In combination, substantially coaxial rotatively mounted adjacent tumblers and an end cam having alinable gates; means including a light spring for pressing the tumblers toward the cam; a fence movable into said gates when alined; alinable projections on the side faces of the tumblers and cam alinable when the gates are being alined to effect movement of the tumblers from the cam, and means influenced by said movement when the gates become alined to bring about movement of the fence into the gates.

20. In combination, a fence; a plurality of coaxially rotatively mounted tumblers having gates alinable to receive the fence; projections on side faces of the tumblers alinable when the gates are being alined to push the tumblers apart to one position; means to push the tumblers together to another position when the projections are not alined; and means influenced by movement of the tumblers when moved to one of said positions to bring about movement of the fence into the gates.

References Cited in the file of this patent

UNITED STATES PATENTS

132,936	Sullivan	Nov. 12, 1872
1,074,029	Williams	Sept. 23, 1913
1,887,797	Borzin	Nov. 15, 1932
1,928,853	Doenges	Oct. 3, 1933