July 7, 1942. O. LALONDE 2,289,129

COMBINATION TUMBLER LOCK

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Fig. 1.

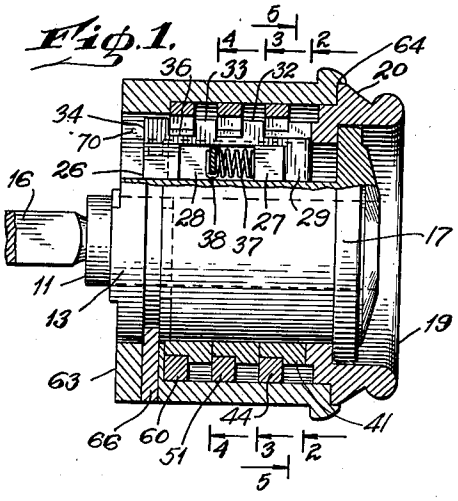


Fig. 6.

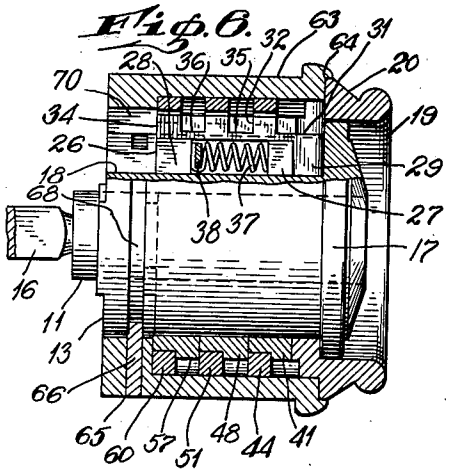


Fig. 2.

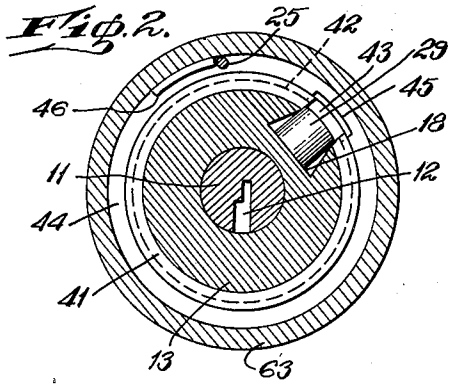


Fig. 3.

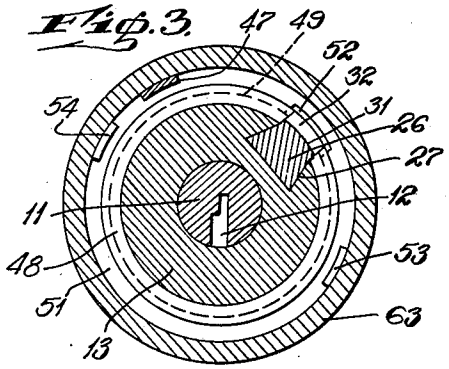


Fig. 4.

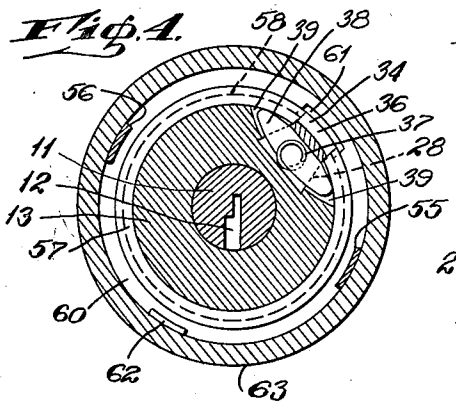
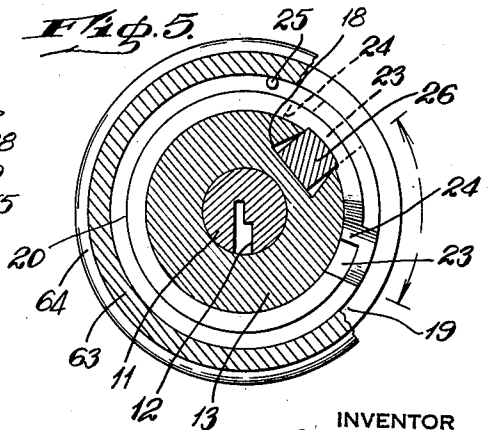


Fig. 5.



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Fig. 7.

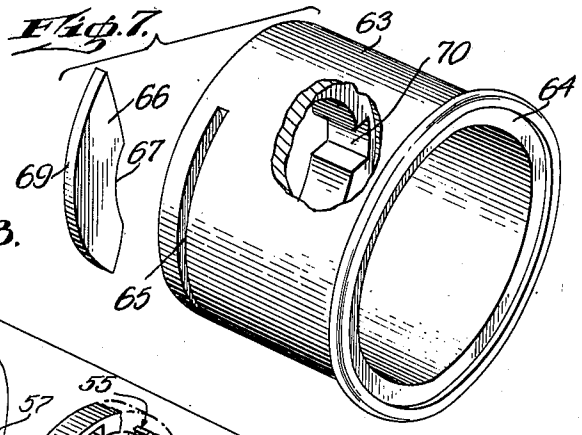
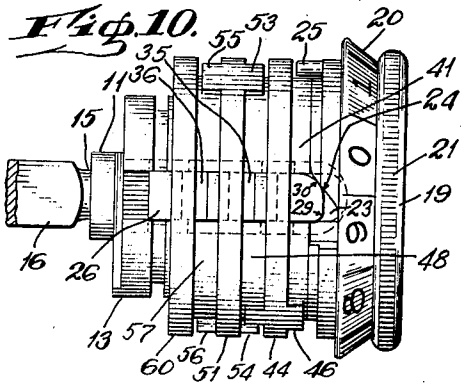


Fig. 8.

Fig. 9.

Fig. 10.



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UNITED STATES PATENT OFFICE

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COMBINATION TUMBLER LOCK

Oscar Lalonde, Bronx, N. Y.

Application December 20, 1940, Serial No. 370,913

20 Claims. (Cl. 70—285)

My invention relates to locks which may be opened either by a key or by a combination, and is capable of general use, such as upon house doors, lockers, lock boxes, or other equipment where the use of such locks is desirable.

The principal object of my invention is to provide an improved arrangement of key and combination operated devices affording a compact, efficient, relatively inexpensive and readily installed mechanism for opening a lock by a key or combination.

Another object of my invention is to provide an improved construction and arrangement of combination operated devices, upon key operated lock opening mechanism, which affords convenient as well as selective opening of the lock either by the key or the combination.

Another object of my invention is to provide a key or combination lock mechanism which enables the use of a standard key operated lock simply by mounting the combination mechanism thereon and an interposing combination controlled connector therebetween.

Another object of my invention is to provide a lock opening mechanism employing standard key operated mechanism with combination mechanism mounted thereon in such manner that the lock may be key opened, by preventing rotation of its barrel, or dial opened by imparting rotation to the barrel.

The invention consists of the construction, combination and arrangement of parts, as herein illustrated, described and claimed.

In the accompanying drawings, forming part hereof, is illustrated one form of embodiment of the invention, in which drawings similar reference characters designate corresponding parts, and in which:

Figure 1 is a longitudinal sectional view of the key and combination operated lock opening mechanism with parts thereof shown in position for opening the lock by the key;

Figures 2 to 5 are transverse, sectional views on the lines 2—2, to 5—5, respectively, of Figure 1, looking in the direction indicated by the arrows;

Figure 6 is a view similar to Figure 1, but showing parts of the key and combination operated lock opening mechanism in position for opening the lock by the combination;

Figure 7 is a detail exploded perspective view of a casing and a key for securing it to a standard key operated lock mechanism;

Figure 8 is a detail exploded perspective view of spacer and tumbler rings forming part of the combination mechanism;

Figure 9 is a detail exploded perspective view of the key operated lock mechanism and a dial, connector, key and spring forming part of the combination mechanism; and,

Figure 10 is a top plan view of the key or combination operated lock opening mechanism shown in Figures 1 and 6.

Referring to the drawings, 11 indicates the key plug of a standard key operated lock opening mechanism which is of well known construction and operation and therefore need not be described in detail herein.

It might be pointed out, however, that the key plug 11, having the usual key opening 12, is journaled in a barrel 13 containing the usual tumbler pins (not shown) positioned in openings in the barrel 13 and retained therein by small plugs 14 or the like. When a key of proper configuration is inserted in the opening 12, the tumbler pins are disconnected from the plug 11 whereupon, by turning the key, the plug 11 is likewise turned to open the lock proper (not shown). For this purpose the plug 11 has connected therewith, as by a universal joint 15, a square shaft 16 which, in turn, is connected with the lock proper in any suitable manner.

The barrel 13 has formed thereon at the front end thereof an annular head 17 from which extends longitudinally of the barrel and through the rear end thereof, a dove-tail slot 18 machined in said barrel, in accordance with my invention, to receive a part of the combination operated lock opening mechanism hereinafter described. Rotatably mounted on the barrel 13 against the head 17 thereof is a dial ring 19 having an annular beveled portion 20 provided therearound with a scale including the usual graduated marks and numbers herein shown as comprising the series 0 to 9, inclusive.

The dial ring 19 is further provided with a knurled or roughened annular portion 21 for turning it and said ring has secured thereto in any suitable manner and projecting rearwardly therefrom an annular shouldered seat 22. Cut or otherwise suitably formed in the seat 22 of dial ring 19 is a recess 23 provided at one side thereof with a cam 24. Projecting rearwardly from the shouldered seat 22 of the dial ring 19 and secured thereto in any suitable manner in spaced relation with the recess 23. is a tumbler engaging and rotating pin 25 for operating the first of a series of tumbler rings hereinafter described. In accordance with my invention, the tumbler rings

and the dial ring 19 are employed in conjunction with a connector 26, when the lock is opened by the combination instead of a key, and said connector is preferably constructed and arranged as follows.

Secured to or formed integrally with the connector 26, is a front tenon 27 and a rear tenon 28 in spaced relation therewith. The connector 26 is positioned in the dove-tail slot 18 of barrel 13 through the open, rear end thereof, the tenons 27, 28 being fitted in said slot and said connector being adapted for sliding movement along the slot in opposite directions, as hereinafter described. The connector 26 is provided on the forward end thereof with a rounded nose 29 and a cam 30 and at the top 31 thereof with transversely extending ridges 32, 33, 34, and grooves 35, 36. therebetween.

Connector 26 is urged toward the dial ring 19 by a small coil spring 37 disposed between the tenons 27, 28. One end of this spring bears against the tenon 27 and the opposite end of said spring bears against or is secured to a stop key 38. This stop key 38 extends transversely of the dove-tail slot 18 and for adjustment of the tension of spring 37, said key is secured in one of the other of pairs of slots 39, 39, and 40, 40, formed in the barrel 13 at opposite sides of the slot 18. The key 38 may be disposed through a coil of the spring 37 instead of abutting the end thereof.

Fitted on the barrel 13 and bearing against the shouldered seat 22 of dial ring 19 is a spacer ring 41, provided with an annular shouldered seat 42. A slot or opening 43 is formed in spacer ring 41 enabling it to be moved into position past connector 26 which thus prevents rotation of said ring on barrel 13.

Positioned over the barrel 13 and fitted upon the seat 22 of spacer ring 41 is a tumbler ring 44 having an arch 45 formed in the inner periphery thereof. This arch 45 enables tumbler ring 44 to pass over connector 26 when said ring is placed in position over barrel 13, and said arch has a further and primary function hereinafter set forth. Tumbler ring 44 is provided at the front side thereof with a wide lug 46 and at the rear side with a narrow lug 47. The wide lug 46 bears against the shouldered seat 22 of dial ring 19 and is in alignment with pin 25 so as to be engaged thereby to rotate the tumbler ring 44 when said dial ring is rotated.

Fitted upon the barrel 13 and bearing against tumbler ring 44 within the rearwardly projecting narrow lug 47 thereof is a spacer ring 48 provided at the rear side thereof with an annular shouldered seat 49. A slot or opening 50 is formed in spacer ring 48 thereby enabling it to be moved into position past connector 26 which thus holds said ring against rotation on barrel 13, as in the case of the spacer ring 41.

Positioned over the barrel 13 and fitted upon the seat 49 of spacer ring 48 is a tumbler ring 51 having an arch 52 formed in the inner periphery thereof. This arch 52 enables tumbler ring 51 to pass over connector 26 when said ring is placed in position over barrel 13 and, as in the case of arch 45 of tumbler ring 44, the arch 52 has a further and primary function hereinafter set forth.

Tumbler ring 51 is provided at the front side thereof with diametrically disposed lugs 53 and 54 aligned with lug 47 of tumbler ring 44 and bearing against the rear side of the latter. It will thus appear that when dial ring 19 is rotated and pin 25 is engaged with the wide lug 46 to rotate tumbler ring 44, the narrow lug 47 on said ring will engage one or the other of lugs 53, 54 on tumbler ring 51 so that the latter is also rotated. Tumbler ring 51 is provided at the rear side thereof with diametrically disposed lugs 55 and 56 for a purpose hereinafter described.

Fitted upon the barrel 13 and bearing against tumbler ring 51 within the rearwardly projecting lugs 55, 56 thereof is a spacer ring 57 provided at the rear side thereof with an annular shouldered seat 58. A slot or opening 59 is formed in spacer ring 57, thereby enabling it to be moved into position past connector 26 which thus holds said ring against rotation, as in the case of spacer rings 41 and 48.

Positioned over barrel 13 and fitted upon the seat 58 of spacer ring 57 is a tumbler ring 60 having an arch 61 formed in the inner periphery thereof. This arch 61 enables tumbler ring 60 to pass over connector 26 when said ring is placed in position over barrel 13 and, as in the case of arches 45 and 52 of tumbler rings 44 and 51, the arch 61 has a further and primary function hereinafter set forth. Tumbler ring 60 is provided at the front side thereof with a lug 62 disposed in alignment with lugs 55 and 56 of tumbler ring 51 and bearing against the rear side of the latter. It will thus appear that when tumbler ring 51 is rotated as above described, one or the other of lugs 55 and 56 will engage lug 62 of tumbler ring 60 and rotate the same.

The dial ring 19, the connector 26, and the tumbler rings 44, 51 and 60, mounted on barrel 13 as before described, comprise combination mechanism by which plug 11 and shaft 16 may be operated to open the lock. This combination mechanism, and the key operated lock opening mechanism housed in barrel 13, are enclosed in a casing 63 fitted over the barrel 13, the connector 26, and the several described spacer and tumbler rings. Casing 63 is provided with an annular shouldered seat 64 for the dial ring 19, and said casing and the parts therein may be arranged in a suitable opening in the door, box, or other place of installation, the casing there being held stationary by any suitable means for this purpose, and the square shaft 16 being connected with the lock proper in the usual manner.

In order to hold the casing 63 and parts therein in proper relative positions and also, in accordance with my invention, to provide under certain circumstances for rotation of the barrel 13, the casing 63 is provided with an arcuate slot 65 in which is fitted a flat stop key 66 of similar configuration. This key 66 has an inner, arcuate bearing portion 67 engaged in an annular groove 68 formed in the barrel 13. The key 66 is removably positioned in slot 65 and has an outer, arcuate portion 69 flush with the casing 63.

The operation of the standard lock opening mechanism in the barrel 13 is effected by the key therefor which, for the lock opening operation, is inserted in the key opening 12 to release the tumblers (not shown) in barrel 13 from the plug 11. Thereupon the key is turned in the proper direction to rotate plug 11 and square shaft 16 and thus open the lock proper (not shown) connected with said shaft. Under these conditions, the connector 26 is positioned as shown in Figure 1 of the drawings, from which it will be noted that the rear end portion of said connector is disposed in a slot 70 in the rear of the fixed non-rotatable casing 63 so as to prevent rotation of barrel 13. When the lock is opened,

the door or other closure upon which it is installed may be opened, whereupon the spring of the lock, upon closing of the door or other closure, returns the plug 11 and square shaft 16 to their original, inoperative positions.

Assuming now that it is desired to open the lock by the combination mechanism instead of the key, the dial ring 19 is rotated in proper directions to successively bring certain numbers of a predetermined combination thereof opposite a suitable mark (not shown) on the shouldered seat 64 of casing 63. Prior to such rotation of the dial ring 19, and for operation of the lock by the key, the connector 26 has been moved by the dial ring to the inoperative position shown in Figure 1 of the drawings, so that tumbler ring 44 is free to rotate on spacer ring 41 over the top 31 of connector 26; tumbler ring 51 is free to rotate on spacer ring 48 through groove 35 of the connector 26, and tumbler ring 60 is free to rotate on spacer ring 57 through groove 36 of said connector.

With the form of embodiment of my invention illustrated in the accompanying drawings, and when the combination mechanism employed to open the lock, dial ring 19 is first turned counter-clockwise to bring the first of a predetermined combination of numbers opposite the mark. This results in engagement of pin 25 (Figures 2 and 10) with the right-hand side of wide lug 46 of tumbler ring 44, and in counterclockwise rotation of said ring. The left-hand side of narrow lug 47 of tumbler ring 44 thereupon engages the right-hand side of lug 54 of tumbler ring 51, which ring is thus rotated counter-clockwise to engage the left-hand side of its lug 55 with the right-hand side of the lug 62 of tumbler ring 60. The tumbler ring 60 is thus rotated counter-clockwise to bring its arch 61 into alignment with connector 26.

Dial ring 19 is then turned clockwise to bring the second of the predetermined combination of numbers opposite the mark. This results in engagement of pin 25 with the left-hand side of wide lug 46 of tumbler ring 44, thus producing clockwise rotation of said ring and engagement of the right-hand side of its narrow lug 47 with the left-hand side of lug 53 of tumbler ring 51. Clockwise movement is thus imparted to tumbler ring 51, and its arch 52 is brought into alignment with the connector 26.

Dial ring 19 is again turned counter-clockwise to bring the third of the predetermined combination of numbers opposite the mark. This again results in engagement of pin 25 with the right-hand side of the wide lug 46 of tumbler ring 44 which ring is thus rotated counter-clockwise so that its arch 45 is brought into alignment with the connector 26. The arches 61, 52, 45, of tumbler rings 60, 51, 44, now being aligned with the connector 26, dial ring 19 is turned clockwise until recess 23 thereof is aligned with said connector.

Thereupon the spring 37 moves the connector 26 to the right, as viewed in Figures 1 and 6 of the drawings, so that the rear end of the connector passes out of the slot 70 of casing 63, and the rounded nose 29 of said connector enters said recess. Dial ring 19 and barrel 13 are thus connected together through the medium of the connector 26, and plug 11 and barrel 13 are, of course, connected by the tumbler pins (not shown) in said barrel. It will thus appear that, under these conditions, by further clockwise rotation of dial ring 19, the barrel 13, plug 11, and square shaft 16 will be likewise rotated and thus open the lock.

The door or other closure may now be opened, after which the dial 19 is released and the spring of the lock returns the parts of the lock opening mechanism to their original positions, wherein the connector 26 is disposed in alignment with the slot 70 of casing 63. Thereupon the dial ring 19 is turned counter-clockwise causing the cam 24 thereof to engage the cam 30 of the connector 26 and move it to the left (Figures 1 and 10) through the arches 45, 52, 61, of the tumbler rings and into the slot 70 of the stationary casing 63.

The barrel 13 is thus again locked against rotation, and through further counter-clockwise rotation of the dial ring 19, the pin 25 and lugs of the several tumbler rings co-operate to rotate them so that their arches 61, 52, 45, are moved out of alignment with the connector 26, thus unsetting the combination. Upon closing and locking of the door or other closure, in the usual manner, the same may be again unlocked and opened, either by the key or the combination, as previously described.

From the foregoing it will appear that the present invention provides a novel construction and arrangement of parts, efficient in operation and readily installed, particularly with a standard key operated lock opening mechanism, and while I have herein disclosed with more or less particularity one form of embodiment of my invention, it is to be expressly understood that the same is not limited to said form of embodiment or otherwise than by the terms of the appended claims.

Having thus fully described the invention, what is claimed as new and desired to be secured by United States Letters Patent is:

1. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operating means including a barrel and a key operated lock opening plug therein normally connected therewith, the combination with the barrel, of a lock opening mechanism rotatably mounted on the barrel and comprising tumbler rings and a dial for setting and unsetting said rings, and a block movable longitudinally in said barrel through said rings to connect the barrel with the dial upon setting of the tumbler rings whereby to rotate the barrel and the plug by the dial to open the lock.

2. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operating means including a barrel and a key operated lock opening plug therein normally connected therewith, the combination with the barrel, of a fixed casing for the barrel, lock opening mechanism rotatably mounted on the barrel and comprising tumbler rings within the casing and a dial for setting, unsetting said rings, and a key-like block movable longitudinally in said barrel, rings and casing for alternatively connecting the barrel with the dial and the casing upon setting and unsetting of the tumbler rings whereby to rotate the barrel and the plug by the dial to open the lock or rotate the plug only by the key to open said lock.

3. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operating means including a key operated lock opening plug, the combination of a tumbler barrel housing the plug normally connected thereto and provided with a longitudinally extending slot, lock opening mechanism rotatably

mounted on the barrel and comprising tumbler rings and a dial for setting and unsetting said rings, and means arranged between the barrel and the tumbler rings and movable along said slot when the tumbler rings are set for connecting the barrel with the dial to rotate the barrel and the plug by said dial to open the lock.

4. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operating means including a barrel and a key operated lock opening plug therein normally connected therewith, the combination with the barrel, of lock opening mechanism rotatably mounted on the barrel and comprising tumbler rings and a dial for setting and unsetting said rings, and a spring pressed longitudinally slidable connector element intermediate said barrel and tumbler rings to connect the barrel with the dial upon setting of the tumbler rings whereby to rotate the barrel and the plug by the dial and open the lock.

5. In a lock adapted to be operated either by a key or a combination and having tumbler type lock opening means including a key operated lock opening plug, the combination of a tumbler barrel housing the plug normally connected thereto and provided with a longitudinally extending slot, spacer rings mounted on the barrel and having openings aligned with the slot thereof, lock opening mechanism rotatably mounted on the barrel and the spacer rings and comprising tumbler rings and a dial for setting and unsetting said tumbler rings, a connector mounted on the barrel in its longitudinally extending slot and the spacer ring openings, and means for moving the connector along said slot into engagement with the dial upon setting of the tumbler rings, whereby to rotate the barrel and the plug by the dial and open the lock.

6. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operating means including a barrel and a key operated lock opening plug therein normally connected therewith, the combination with the barrel, of a plurality of tumbler rings rotatably mounted on the barrel, a dial for setting and unsetting the tumbler rings, and a connector movable longitudinally of the barrel when said rings are set whereby to engage the dial and enable rotation of the barrel and the plug by said dial to open the lock.

7. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operating means including a barrel and a key operated lock opening plug therein normally connected therewith, the combination with the barrel, of a plurality of tumbler rings rotatably mounted on the barrel and provided at predetermined points with arches faced toward said barrel, a dial for setting and unsetting the tumbler rings, and a connector movable longitudinally of the barrel through said arches when said rings are set whereby to engage the dial and enable rotation of the barrel and the plug by said dial to open the lock.

8. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operating means including a barrel and a key operated lock opening plug therein normally connected therewith, the combination with the barrel, of a plurality of tumbler rings rotatably mounted on the barrel and provided at predetermined points with arches faced toward the barrel and interengageable ring setting and unsetting lugs, a dial for setting and unsetting the tumbler rings to move their arches into and out of alignment, and a connector movable longitudinally of the barrel through said arches when said rings are set and the arches are aligned, whereby to engage the dial and enable rotation of the barrel and the plug by said dial to open the lock.

9. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operating means including a key operated lock opening plug, the combination of a tumbler barrel on the plug normally connected thereto and having an exteriorly disposed longitudinally extending slot, a plurality of tumbler rings rotatably mounted on the barrel and provided at predetermined points with arches faced toward said barrel, a dial for setting and unsetting the tumbler rings to align and disalign their arches relative to the slot in the barrel, and a connector in said slot movable therealong through said arches upon alignment thereof whereby to engage the dial and enable rotation of the barrel and the plug by said dial to open the lock.

10. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operating means including a key operated lock opening plug, the combination of a tumbler barrel on the plug normally connected thereto and having an exteriorly disposed longitudinally extending slot, a plurality of tumbler rings rotatably mounted on the barrel and provided at predetermined points with arches faced toward said barrel and interengageable ring setting and unsetting lugs, a dial for setting and unsetting the tumbler rings to align and disalign their arches relative to the slot in the barrel, and a connector in said slot movable therealong through said arches upon alignment thereof whereby to engage the dial and enable rotation of the barrel and the plug by said dial to open the lock.

11. In a lock adapted to be operated either by a key or a combination and having tumbler type lock operated means including a key operated lock opening plug, the combination of a tumbler barrel on the plug normally connected thereto and having an exteriorly disposed longitudinally extending slot, a plurality of tumbler rings rotatably mounted on the barrel and provided at predetermined points with arches faced toward said barrel, a dial for setting and unsetting the tumbler rings to align and disalign their arches relative to the slot in the barrel, and a spring and cam controlled connector in said slot movable therealong through said arches upon alignment thereof whereby to engage the dial and enable rotation of the barrel and the plug by said dial to open the lock.

12. In a lock operating mechanism, the combination of a barrel provided longitudinally thereof with an exteriorly disposed slot, axially aligned tumbler rings and a dial for setting and unsetting them rotatably mounted on said barrel, and means in said slot movable therealong in opposite directions when the rings are set to thereby connect said dial with and disconnect the same from the barrel.

13. In a lock operating mechanism, the combination of a barrel provided longitudinally thereof with an exteriorly disposed slot, axially aligned tumbler rings and a dial for setting and unsetting them rotatably mounted on said barrel, said tumbler rings being provided at predetermined points with arches aligned and disaligned relative to the barrel slot when the rings are set and unset, and means in said slot mov-

able therealong in opposite directions through said arches when the rings are set to thereby connect said dial with and disconnect the same from the barrel.

14. In a lock operating mechanism, the combination of a barrel provided longitudinally thereof with an exteriorly disposed slot, axially aligned tumbler rings and a dial for setting and unsetting them rotatably mounted on said barrel, said tumbler rings being provided at predetermined points with interengageable ring setting and unsetting lugs and arches aligned and disaligned relative to the barrel slot when the rings are set and unset, and means in said slot movable therealong in opposite directions when the rings are set to thereby connect said dial with and disconnect the same from the barrel.

15. In a lock operating mechanism, the combination of a barrel provided longitudinally thereof with an exteriorly disposed slot, axially aligned tumbler rings and a dial for setting and unsetting them rotatably mounted on said barrel, and spring and dial controlled means in said slot movable therealong in opposite directions when the rings are set to thereby connect said dial with and disconnect the same from the barrel.

16. In a lock operating mechanism, the combination of a barrel provided longitudinally thereof with an exteriorly disposed slot, axially aligned tumbler rings and a dial for setting and unsetting them rotatably mounted on said barrel, means in said slot movable therealong in opposite directions when the rings are set to thereby connect said dial with and disconnect the same from the barrel, a spring for engaging said means with a recess in the dial, and cams on the dial and said means for disengaging the latter from said recess.

17. In a lock operating mechanism, the combination of a barrel provided longitudinally thereof with an exteriorly disposed slot, spacer rings mounted on the barrel and having openings aligned with the barrel slot, tumbler rings rotatably mounted on the spacer rings and having arches aligned and disaligned relative to the barrel slot when said tumbler rings are set and unset, a dial for setting and unsetting the tumbler rings, and a connector arranged in the barrel slot for connecting and disconnecting action relative to the dial through the openings and arches in the spacer and tumbler rings.

18. In a lock operating mechanism, the combination of a barrel provided longitudinally thereof with an exteriorly disposed slot, spacer rings mounted on the barrel and having openings aligned with the barrel slot, tumbler rings rotatably mounted on the spacer rings and having arches aligned and disaligned relative to the barrel slot when said tumbler rings are set and unset, the tumbler rings having interengageable ring setting and unsetting lugs, a dial for setting and unsetting the tumbler rings and having a pin to engage one of said lugs, and a connector arranged in the barrel slot for connecting and disconnecting action relative to the dial through the openings and arches in the spacer and tumbler rings.

19. In a lock operating mechanism, the combination of a barrel provided longitudinally thereof with an exteriorly disposed slot, spacer rings mounted on the barrel and having openings aligned with the barrel slot, tumbler rings rotatably mounted on the spacer rings and having arches aligned and disaligned relative to the barrel slot when said tumbler rings are set and unset, a dial for setting and unsetting the tumbler rings, and a connector arranged in the barrel slot for connecting and disconnecting action relative to the dial through the openings and arches in the spacer and tumbler rings, said connector having grooves in which the tumbler rings may rotate and ridges to pass in and out of the tumbler ring arches, a spring housed in the barrel slot and connector for engaging the latter with a recess in the dial when the tumbler rings are set, and cam means on the dial and the connector for disengaging the latter from said recess.

20. In a lock operating mechanism, the combination of a barrel provided longitudinally thereof with an exteriorly disposed dove-tail slot, spacer rings mounted on the barrel and having openings aligned with the barrel slot, tumbler rings rotatably mounted on the spacer rings and having arches aligned and disaligned relative to the barrel slot when said tumbler rings are set and unset, a dial for setting and unsetting the tumbler rings, and a connector arranged in the barrel slot for connecting and disconnecting action relative to the dial through the openings and arches in the spacer and tumbler rings, the connector having spaced tenons fitted in said barrel slot and said connector being provided with grooves in which the tumbler rings may rotate and ridges to pass in and out of the tumbler ring arches when they are aligned with the barrel slot, a spring housed in the barrel slot between the connector tenons for engaging the connector with a recess in the dial when the tumbler rings are set, and cam means on the connector and on the dial adjacent its recess for disengaging said connector therefrom.

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