Oct. 6, 1925.

1,555,969

A. G. HATCH

KEYLESS LOCK

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Fig. 1.

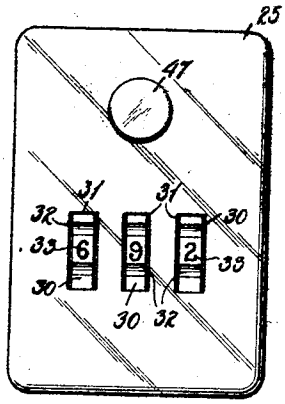



Fig. 2.

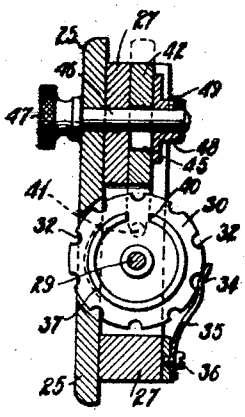



Fig. 3.

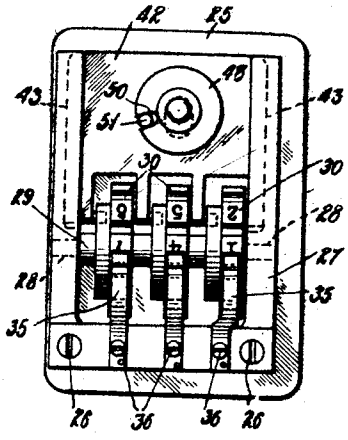



Fig. 4.

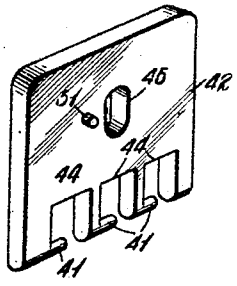



Fig. 7.

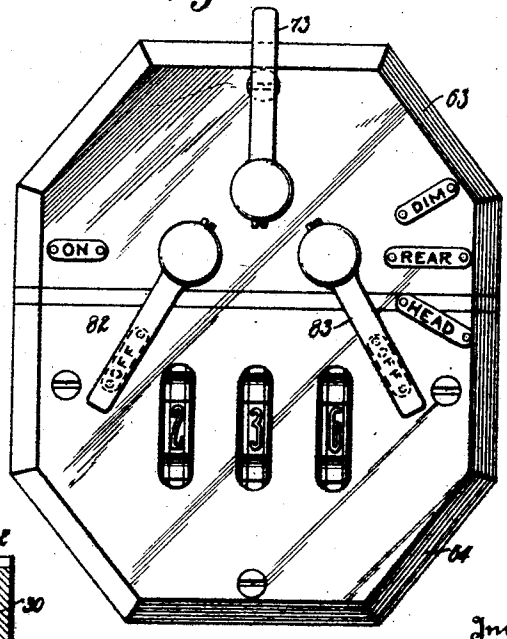



Fig. 5.

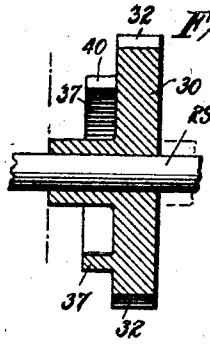
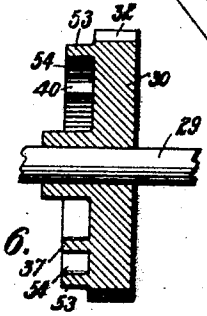



Fig. 6.




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KEYLESS LOCK

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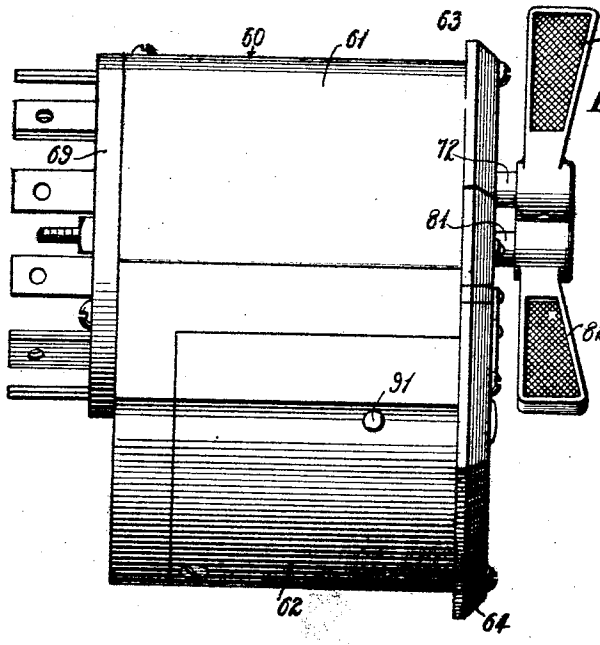
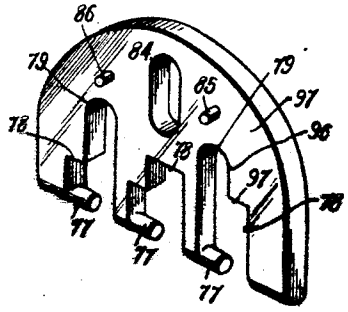



Fig. 6.

Fig. 10.



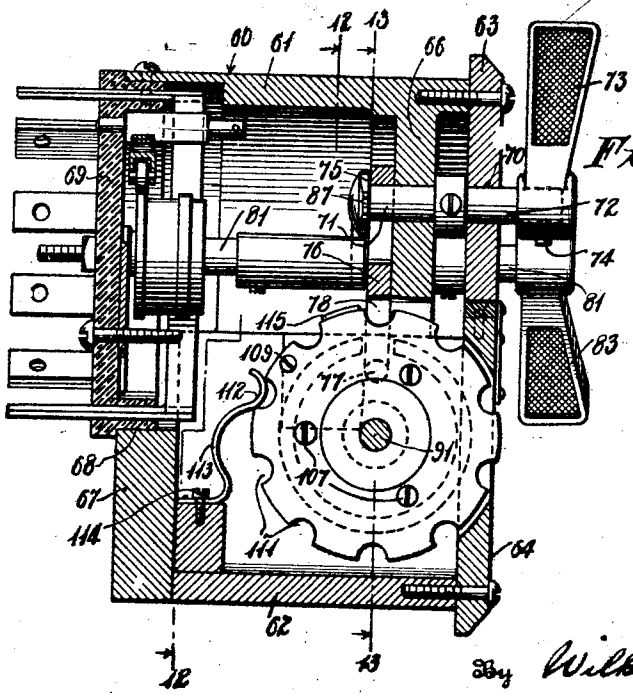




Fig. 9.

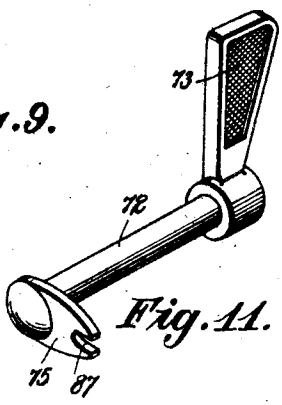



Fig. 11.

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Fig. 12.

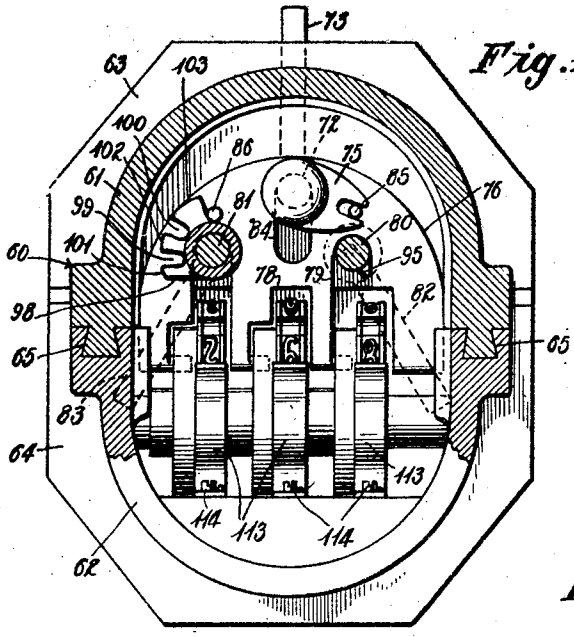



Fig. 14.

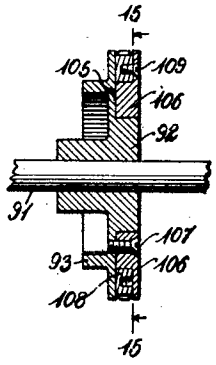



Fig. 15.

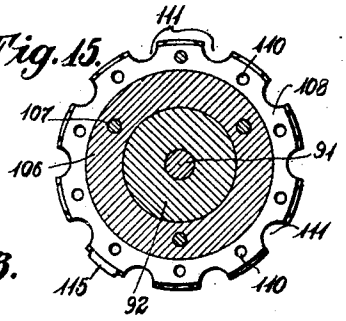



Fig. 13.

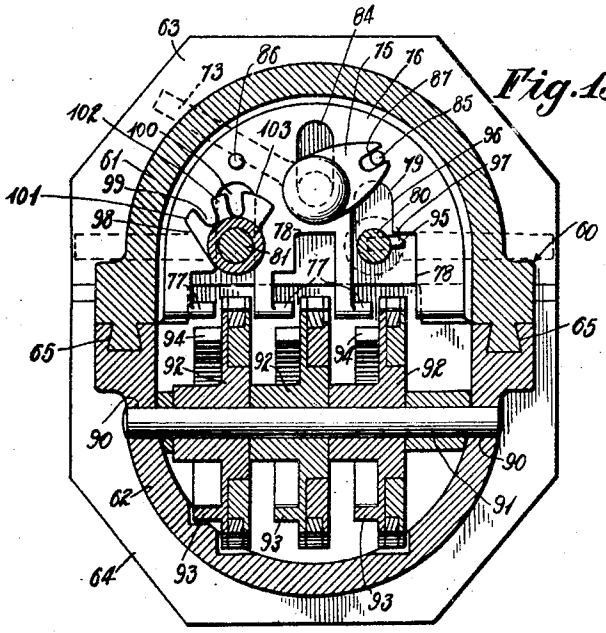
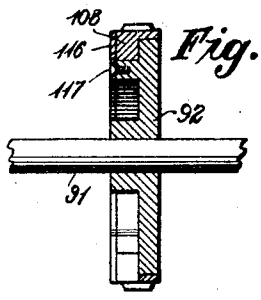



Fig. 16.




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KEYLESS LOCK

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Fig. 17.

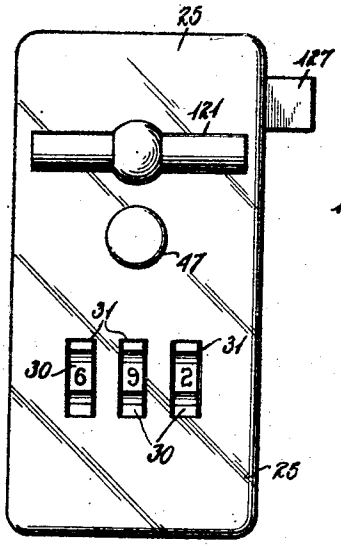



Fig. 18.

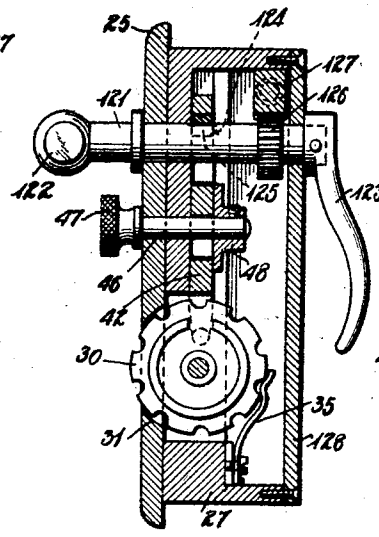



Fig. 19.

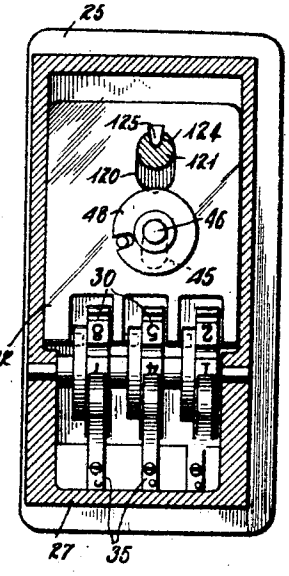



Fig. 20.

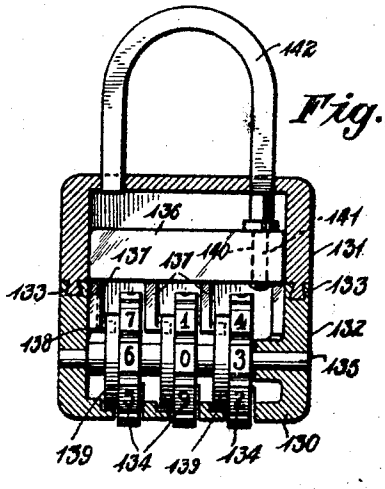



Fig. 21.

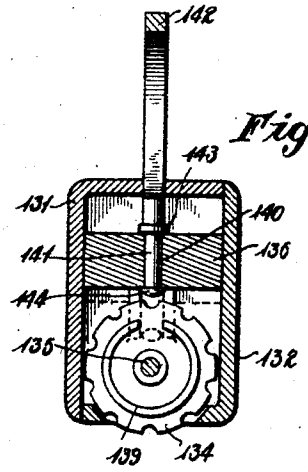
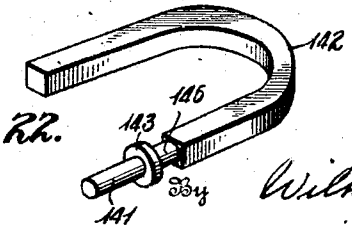



Fig. 22.




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Patented Oct. 6, 1925.

1,555,969

# UNITED STATES PATENT OFFICE.

ALEXANDER GILCHRIST HATCH, OF HONOLULU, TERRITORY OF HAWAII, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO W-H KEYLESS LOCK COMPANY, LIMITED.

## KEYLESS LOCK.

Application filed March 12, 1924. Serial No. 698,718.

*To all whom it may concern:*

Be it known that I, ALEXANDER GILCHRIST HATCH, a citizen of the United States, residing at Honolulu, Territory of Hawaii, have invented certain new and useful Improvements in Keyless Locks, of which the following is a specification.

This invention relates to keyless locks, and has for its principal object to improve the construction of the lock shown and described in the prior U. S. Patent No. 1,373,283, granted March 29, 1921, to Meade Wildrick.

The said prior patent relates to a permutation lock which, as is clearly shown and described therein, is applicable to numerous uses, and the lock constituting the present invention is equally applicable to the various types of locks shown in the said prior patent, as well as to various other uses where a lock of this type may be employed, such for example, as the transmissions, steering wheels, tool kitts, and doors of automobiles; trunks, suit cases, brief cases, and like baggage; safes, lockers, safe deposit boxes, cabinets, and similar containers; desks, desk drawers, and like furniture; and to firearms, such as pistols, etc.

A further object of the invention is to improve the construction of the combination discs or wheels whereby their manufacture may be facilitated and their range of operation increased, without in any way detracting from the effectiveness of the lock.

A further object of the invention is to improve the locking bolt or slide which coacts with the said disc or wheels to control the locking and unlocking movements.

With the above and other objects in view, which will appear as the description proceeds, the invention consists in the novel details of construction, the combinations and arrangements of parts, more fully hereinafter disclosed and particularly pointed out in the appended claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views;

Figure 1 is a front elevational view of one of the simpler forms of the lock constituting the present invention, particularly adapted for use on desk drawers and the like;

Fig. 2 is a central vertical sectional view of the parts shown in Fig. 1;

Fig. 3 is a rear elevational view of the parts shown in Figs. 1 and 2;

Fig. 4 is a detail perspective view of the slidable locking member employed in this form of the present invention;

Fig. 5 is a detail sectional view through one of the locking discs or wheels;

Fig. 6 is a view similar to Fig. 5, of a slightly modified form of wheel;

Fig. 7 is a front elevational view of a somewhat modified form of the lock, particularly designed for controlling the ignition and lighting switches of an automobile;

Fig. 8 is a side elevational view of the parts shown in Fig. 7;

Fig. 9 is a central vertical sectional view of the parts shown in Figs. 7 and 8;

Fig. 10 is a detail perspective view of the slide member or bolt employed in this form of the invention;

Fig. 11 is a detail perspective view of the slide or bolt actuating member;

Fig. 12 is a vertical cross sectional view of this form of the invention, taken approximately on the plane indicated by the line 12—12 of Fig. 9, looking in the direction of the arrows, the parts being shown in the locked positions;

Fig. 13 is a view similar to Fig. 12, taken approximately on the plane indicated by the line 13—13 of Fig. 9, looking in the same direction, the parts being shown in their unlocked positions;

Fig. 14 is a detail cross sectional view through one of the locking wheels emplowed in this form of the invention;

Fig. 15 is a sectional view of the wheel shown in Fig. 14, taken approximately on the plane indicated by the line 15—15 of the said figure, looking in the direction of the arrows;

Fig. 16 is a view similar to Fig. 14, of a somewhat modified form of wheel;

Fig. 17 is a front elevational view of a still further modified form of the invention, especially designed for application to automobile doors and the like;

Fig. 18 is a central vertical sectional view of the parts shown in Fig. 17;

Fig. 19 is a rear elevational view, partly

in section, of the parts shown in Figs. 17 and 18;

Fig. 20 is a vertical sectional view of a padlock embodying the present invention, which may be employed for protecting spare parts, such as tires, wheels, and the like, or in any other desired connection;

Fig. 21 is a similar view, taken at right angles to Fig. 20; and

Fig. 22 is a detail perspective view of the shackle of the padlock.

Referring more especially to Figs. 1 to 6 inclusive, relating to the more elemental form of lock, which as above stated is particularly adaptable for use with desk drawers and the like, the numeral 25 indicates a face plate to the back of which may be secured in any suitable manner, as by the screws 26, a substantially U-shaped casing member 27, which serves to support the grooved portions of the lock mechanism. The upright side members of the U-shaped member 27 are apertured as at 28 to receive the ends of a stationary shaft or rod 29, upon which are rotatably mounted the permutation discs or wheels 38. These said discs or wheels are here shown as three in number, although it will of course be readily appreciated that a greater or less number of wheels may be employed as desired.

The front plate 25 is provided with a suitable number of apertures 31, through which portions of the said wheels 30 may project, as clearly shown in Figs. 1 and 2, so that the said wheels may be turned to set or destroy the combination necessary to control the lock, and the said wheels or discs are each provided upon their peripheries with a plurality of notches or recesses 32, preferably equi-distantly spaced around the said peripheries, which not only serve to provide equal sectors upon the edges of the said wheels for receiving the numbers or other indicia 33, which may be employed thereon in the usual and well known manner, but the said notches also are adapted to receive the bent end portions 34 of suitable detent springs 35, secured to the bottom portion of the U-shaped member 27, as by the screws 36.

One circular face of each of the said wheels is provided with an annular rib or flange 37, concentrically arranged relative to the axis of the wheel and substantially equidistantly spaced between the shaft 29 and the outer circumference of the wheel. The said ribs or flanges 37 are provided at one point with a cut-away portion 40 to permit the passage from one side of the said ribs or flanges to the other of the toes or projections 41 of the locking slide member or bolt 42, which member is slidably mounted in suitable grooves 43 cut in the vertically extending side members of the U-shaped casing 27. The said slide member or bolt 42 is suitably recessed as indicated at 44 to accommodate portions of the wheels 30, and it is further provided with a substantially centrally located elongated slot 45, through which passes an operating rod or shaft 46, which is rotatably journalled in the face plate 25, as will be clear from Fig. 2. The said shaft 46 carries upon the end projecting through the face plate 25, an operating knob or handle 47, and upon its other end it carries a flanged disc 48 which may be detachably secured to the said shaft as by the set screw 49. The said disc 48 is provided at one point on its circumference with a radially extending slot 50, which is adapted to receive a pin or projection 51, carried by the slide member 42, as will be clear from Figs. 3 and 4 of the drawings.

The operation of this form of the invention will be clear from the foregoing but it may be briefly summarized as follows. The parts being in the positions illustrated in Figs. 2 and 3 are unlocked, but with the combination set so that if it is desired to lock the same, it is only necessary to grasp the knurled knob 47 and to rotate the same through a partial revolution, which through the shaft 46, disc 48 and pin and slot connection 50 and 51, will have the effect of raising the slide member or bolt 42 to the position shown in dotted lines in Fig. 2, thereby projecting the upper portion of the said slide above the upper surface of the member 27 and engaging a suitable keeper, not shown. The slide thus acts as a locking bolt, and upon the combination wheels 30 being partially rotated to move the cut-away portions 40 of the ribs 37 out of alignment with the toes 41 of the slide member 42, downward movement of the said slide member will be prevented, due to contact of the said toes with the outer circumference of the said rib.

On the other hand, when it is desired to unlock the parts, the wheels 30 are rotated to the desired combination whereupon arcuate movement of the shaft 46 in a reverse direction will move the slide 42 downwardly, the toes 41 thereof passing through the cut-away portions of the rib 37 until they occupy positions within the inner circumference of the said ribs, as illustrated in Fig. 2.

In the slightly modified form of wheel shown in Fig. 6, in addition to the annular rib 37, the wheel is provided with a second concentric annular rib or flange 53, adjacent its outer circumference, which provides, with the flange 37, an annular groove 54, into which the toes 41 of the slide or bolt 40 are moved when the slide is raised. The said rib 53 may or may not be cut away to permit the passage of the toe 41 of the slide, and when it is not cut away it provides an effective means for preventing the insertion of a thin tool or strip to feel the position of the cut-away portion of the rib 37, and there-

by prevent the picking of the lock. It is also obvious that additional concentric ribs having cut-away portions may be provided, thereby permitting an additional number of combinations to be had with any given number of wheels.

As above stated, the lock constituting the present invention is susceptible of adaptation to numerous uses, with minor changes in the details of its construction, and in Figs. 7 to 16 inclusive I have illustrated the same as applied to a control of the ignition and lighting switches of an automobile or other similar vehicles. In this form of the invention, there is preferably provided a casing or housing 60, which will take the form of two substantially semi-cylindrical hollow complementary castings, 61 and 62, provided respectively with the face plate portions 63 and 64, and slidably connected together as by the dove-tail and groove connections 65, see Figs. 7, 8, 9, 12 and 13. The upper casting 61 is provided with the downwardly extending front wall 66 and with the rear wall 67, which latter is suitably apertured as at 68 to accomodate any suitable switch mechanism 69 for controlling the ignition and lighting circuits of a vehicle.

The upper face plate member 63 and the front wall 66 of the housing member 61 are provided with the axial aligned bores 70 and 71 respectively, to rotatably receive the slide actuating shaft 72, which is provided on its front end with a suitable finger or lever 73, detachably secured thereto as by the set screw 74, and the said shaft carries at its inner end an actuating plate member 75 which may be rigidly secured thereto in any suitable manner, or it may be frictionally mounted on the said shaft 72 so that any attempt to force the lock through the said shaft may be frustrated when the frictional engagement between the member 75 and the shaft 72 is overcome.

Slidably mounted in the upper housing member 61, adjacent the rear face of the wall 66 is a slide member or bolt 76 quite similar in construction to the slide member 42 above described in connection with Figs. 1 to 7 inclusive. The said slide member is provided with suitable toes or projections 77 and with the recesses or cut-away portions 78 to accommodate portions of the combination walls or discs in a manner similar to the slide member 42, and certain of these recesses 78 are extended as indicated at 79 to accommodate operating shafts 80 and 81, rotatably mounted in the face plate 63 and front wall 66 of the housing member 61, and which control the movements of the contact members of the switch 69 in the usual and well known manner. These said shafts may be respectively provided with suitable operating handles or levers 82 and 83, as will be clear from Figs. 7, 8 and 9.

The slide member or bolt 76 is also provided with an elongated slot 84, similar to the slot 45 of the member 42, through which the actuating shaft 72 may pass, as will be readily understood from the drawings. The said slide is also provided with a pair of pins or projections 85 and 86, upon the rear face thereof, the former of which is adapted to be received within the elongated slot 87 with which the actuating plate 75 is provided, whereby oscillatory movements of the said members 75 may be transmitted to the slide 76 and transformed into reciprocating movements of the latter.

The side walls of the lower casing members 62 are apertured as at 90 to receive the ends of a shaft or rod 91 upon which are rotatably mounted the permutation wheels 92. These wheels or discs, as was the case with the wheels or discs in the preceding form are provided with concentrically arranged annular ribs or flanges 93, which are cut away at one point in their circumference, as indicated at 94, to provide for the passage of the toes 77 of the slide member 76 from one side of the said flanges or ribs to the other.

In order that the movements of the slide 76 may control the movements of the shaft 80 to permit or prevent the same, the said shaft is provided with a pin or projection 95, see Figs. 12 and 13, which is adapted to engage and co-act with the side wall 96 of the extended slot 79. That is to say when the ignition switch is in its off position, that the parts as shown in Fig. 12 and the slide member 76 is down in its locked position, the said pin or projection 95 is received within the slot 79 along with the shaft 80, and any attempt to move the switch handle 82 in a counter-clockwise direction, as viewed in Fig. 12, will bring the said projection into engagement with the side wall 96 of the said slot, whereby such movement will be prevented. On the other hand, when the parts have been unlocked and the slide is raised, movement of the said shaft 80 and pin 95 will be permitted, owing to the fact that the lower cut-away portion 78 is of a greater width, as will be readily understood from Figs. 10 and 13.

The difference in width between the cut-away portion 78 and the slot 79 provides a shoulder 97 which is adapted to engage the said pin or projection 95 in case it is attempted to lock the parts with the ignition switch in its on position, with the result that any downward movement of the slide from its position shown in Fig. 13 will cause a rotation of the switch controlling shaft 80 to throw the switch to its off position, thus effectively preventing the locking of the parts with the switch in its on position, and the motor running.

For controlling the movements of the lighting switch shaft 81 a slide is provided with the pin 86, which is adapted to coact with a sector 98, rigidly mounted upon the said shaft 81 and provided with the notches 99 and 100, provided with three teeth or projections, 101, 102 and 103, see Figs. 12 and 13. In the normal locked position of the parts, with the lights off, the pin 86 carried by the slide 76 occupies a position immediately to the right of the tooth 103, as seen in Fig. 12, and when the parts are unlocked and the slide raised, as indicated in Fig. 13, it will be obvious that the shaft 81, together with the sector 98 and the lighting switch parts, may be freely oscillated to any of the various positions adapted to control the lighting circuits, as indicated on the face plates 63 and 64 in Fig. 7.

Should it be desired to lock the car with either the dim lights on or only the rear light on, such action may be accomplished by throwing the switch lever 83 to the proper position, whereupon the lock actuating lever 73 may be moved to lower the slide 76 and the pin 86 will enter into either the groove 100 or the groove 99 of the sector 98, as will be readily understood. The parts will thus be locked with either the dim lights or only the rear light on, as may be desired.

It will be noted that the tooth 103 of the sector 98 is of substantially twice the width of the other teeth 101 and 102, which is to prevent the locking of the car with the bright headlights on. The parts are so designed, constructed and assembled that when the lighting switch occupies the position for lighting the bright headlights, the sector member 98 is so turned that the tooth 103 is in alignment with the pin 86 so that any attempt to lower the slide 76 with the lighting switch in this position, will be prevented, due to the contact of the pin 86 with the outer surface of the said tooth 103.

The operations of the elemental portions of the present lock are substantially identical with those disclosed in connection with Figs. 1 to 6 inclusive, and it is therefore not believed to be necessary to repeat them here, it being understood that when the wheels 92 are set to the required combination the cut-away portions of the ribs 93 are brought into suitable position to permit the toes 77 of the slide 76 to pass therethrough whereby the said slide may be raised or lowered through the medium of the operating shaft 72 and its connections with the said slide.

The form of combination wheel or disc shown in connection with Figs. 7, 8, 9, 12 and 13, is somewhat different from that shown in connection with Figs. 3 to 6 inclusive, in that provision is made whereby the combination of a particular lock may be easily and quickly changed, if desired. The construction of these wheels is best illustrated in Figs. 14 and 15 from which it will be seen that the discs 92 are cut away on the circular faces opposite to the rib or flanges 93, as indicated at 105, to receive an angular retaining member 106, which is rigidly secured to the body portion of the wheel 92 by the screws 107. The said retaining member 106 is in turn cut away adjacent its outer circumference to provide an angular groove or recess for the reception of the indicia bearing ring 108, which is seated in the said recess or groove, and which may be maintained in any angular desired position therein by screws 109.

The said indicia bearing ring 108 is provided with threaded holes 110, suitably spaced around its circumference to receive the screw 109, only one such screw being employed but being adapted to enter into any of the said holes which may be brought into register therewith. It is thus possible, by merely removing the screw 109 and shifting the angular position of the indicia bearing ring 108 to provide any new relation between the said ring 108 and the cut-away portion 94 of the flange 93, thereby effectively changing the combination necessary to unlock the parts. After the ring 108 has been shifted, the screw 109 may be replaced engaging the new hole 110 brought into register therewith.

As was the case in the preceding form, the circumference of the wheels is provided with the equi-distantly spaced notches or recesses 111, thereby dividing the said circumference into suitable sectors, and the said recesses 111 are engaged by the bent ends 112 of the detent springs 113 when suitably secured, as by the screws 114 in the lower casing member 62, see Figs. 9 and 12.

The engagement of the detent springs 113 with the notches or recesses 111 of the permutation wheels, not only serves to retain the said wheels in any desired set positions, but it also serves to facilitate the operation of the wheels by the sense of touch and sound rather than by the sense of sight, since each time the spring snaps into one of the recesses it can be felt by the fingers and the sound thereof heard.

In order to further facilitate the setting of the wheels without seeing them, as for example in the event that the dash lamp of the automobile should burn out, one of the indicia, preferably the zero, carried by the indicia ring 108, is raised above the others, as indicated at 115, in Figs. 9 and 15, so that if it is impossible to see the wheels, they may be rotated until the raised character is felt, and then the wheel turned the required number of notches to bring up the desired character.

In Fig. 16 there is shown a still further modified form of permutation wheel in

which the indicia bearing ring 108 instead of being rigidly secured to the body 92 of the disc, is accurately machined to fit thereon with a frictional engagement, which engagement, of course, should be sufficient to prevent the slipping of the said ring under ordinary circumstances, when operating the combination. However, should it be desired to change the combination by suitably holding the body 92 of the wheel, the position of the ring 108 relative thereto might be changed to produce any desired new relation of the parts. A suitable retaining ring 116 is secured to the body member 92, as by the screws 117 and is provided in this form to retain the ring 108 upon the body 92.

In Figs. 17, 18 and 19 there is shown a form of the invention as applied to a door lock, such for example as a lock employed upon automobile doors. This form is quite similar to that shown and described in Figs. 1 to 6 inclusive, except that the slide member or bolt 42 is somewhat elongated and is provided with a second elongated slot 120, above the slot 45, which slot 120 accommodates the bolt actuating shaft 121, which is suitably journalled in the face plate 25 and is provided with the usual handles 122 and 123 for oscillating the same. The said shaft 121 is also provided with a keyway 124, which is adapted to be entered by a key or projection 125, provided at the upper extremity of the slot 120, so that when the slide 42 is down, the said key 125 will be positioned in the said notch and rotation of the shaft 121 will thereby be prevented.

The shaft 121 may also carry a suitable gear wheel 126, the teeth of which may mesh with a companion shaft, cut on the under surface of the locking bolt 127, which is slidably mounted on the casing in a manner similar to that disclosed in the said prior Patent No. 1,373,283, to Wildrick.

In this instance the back of the casing may be closed by a suitable plate 128, shown in Fig. 18. The other details of the lock are substantially the same as the form shown in Figs 1 to 6 inclusive, and it is not believed to be necessary to repeat them here.

In Figs. 20, 21 and 22, the application of this particular form of lock to a padlock is shown. In this form there is provided a two part casing 130, the respective parts 131 and 132 of which are slidably connected together, as by the dove-tail and groove connection 133. The permutation wheels 134 are rotatably mounted upon the shaft 135 on the lower casing member 132, in the same manner as in the forms heretofore described, while the upper member 131 is machined to form a guide for a sliding block 136, which takes the place of the flat slide members, 42 and 76, hereinbefore described. The said block 136 is provided with depending fingers 137 having angularly disposed projections 138, corresponding to the projections or toes 41 and 77 of the forms previously described, for engaging the ribs 139 of the wheels 134.

The said block is bored as at 140 to pivotally receive the turned end 141 of the shackle member 142, the major portion of which is squared in cross section, as is clearly illustrated. The said turned end 141 may be provided with a rigid flange or collar 143 engaging the upper surface of the block 136 and the lower projecting end of the said turned portion 141 may be peened or heated over, as indicated at 144, to retain the shackle member in position in the block.

When the combination wheels 134 are set to the required combination, the block member 136 may be pulled upwardly from the positions shown in Figs. 20 and 21, its projections 138 passing through the cut-away portions of the flanges 139, the same as in the preceding forms. As the shackle member 142 rises the lower squared portions of the shackle member will be withdrawn from the casing, whereupon the said shackle member may be turned within the block to facilitate the disengagement of the lock.

It will thus be seen that in all forms of the invention there is provided a lock of the so-called keyless type in which a plurality of permutation discs are provided, the said discs having annular projecting ribs provided with cut-away portions to permit the passage from one side of said ribs to the other of projections or toes carried by a slide member, which slide member may be employed in various ways to control the movements of automobile switches and other members. As has heretofore been stated, it is obvious that this particular form of lock may be applied to various other uses, such as those hereinbefore enumerated, and in fact any use where a combination lock is desirable.

It is obvious that those skilled in the art may vary the details of construction as well as the arrangement of parts without departing from the spirit of the invention, and therefore it is not wished to be limited to the above disclosures except as may be required by the accompanying claims.

What is claimed is:

1. In a keyless lock, a slidably mounted locking bolt having a plurality of spaced legs each provided with an angularly extending toe, and a plurality of axially aligned solid discs co-operatively rotatably mounted relative to said bolt, each having an annular rib on one face, said ribs being provided with a cut-away portion to permit the passage of said toes therethrough, said bolt being slidable transversely of the axis of said discs.

2. In a keyless lock, a casing; a shaft mounted in said casing; a plurality of solid

discs revolubly mounted on said shaft, each disc being provided on one face with an annular rib having a cut-away portion, each disc having indices around its entire periphery; a locking bolt slidably mounted in said casing, for movement substantially transversely of the axis of said shaft; having depending legs entering between adjacent discs, each leg having angularly projecting toes adapted to engage said ribs to prevent movement of said bolt when said discs are in certain positions, and to pass through said cut-away portions when said discs are moved to certain other positions; projections carried by said bolt for controlling the movements of the device to be locked; and manual means for sliding said bolt.

3. In a keyless lock, a casing; a plurality of solid discs revolubly mounted in said casing, each disc being provided on one face with an annular rib having a cut-away portion; a locking bolt slidably mounted in said casing parallel to and substantially in alignment with the axis of said discs, and having depending legs entering between adjacent discs, said bolt being radially movable relative to said discs, said legs having projecting toes adapted to engage one side of said ribs to prevent movement of said bolt when said discs are in certain positions, and to pass through said cut-away portions when said discs are moved to certain other positions; and mearns for sliding said bolt.

4. In a keyless lock, a casing; a plurality of solid discs revolubly mounted in said casing, each disc being provided on one face with an annular rib having a cut-away portion; a locking bolt slidably mounted in said casing parallel to and substantially in alignment with the axis of said discs, and having depending legs entering between adjacent discs, said legs having projecting toes adapted to engage one side of said ribs to prevent movement of said bolt when said discs are in certain positions, and to pass through said cut-away portions when said discs are moved to certain other positions; a shaft oscillatably mounted in said casing; and connections between said shaft and said bolt for moving the latter.

5. In a keyless lock, a casing; a plurality of solid discs revolubly mounted in said casing, each disc being provided on one face with an annular rib having a cut-away portion; a locking bolt slidably mounted in said casing parallel to and substantially in alignment with the axis of said discs, and having depending legs entering between adjacent discs, said legs having projecting toes adapted to engage one side of said ribs to prevent movement of said bolt when said discs are in certain positions, and to pass through said cut-away portions when said discs are moved to certain other positions; a shaft oscillatably mounted in said casing; and connections between said shaft and said bolt for moving the latter, said connections comprising a projection carried by said bolt and a slotted actuating member frictionally mounted on said shaft with its slot receiving said projection.

6. In a keyless lock for automobile switches, a casing; a plurality of solid discs revolubly mounted in said casing, each provided on one face with an annular rib having a cut-away portion; a locking bolt slidably mounted in said casing, provided with depending legs entering between adjacent discs, said legs having angularly projecting toes adapted to engage said ribs to prevent movement of said bolt when said discs are in certain positions, and to pass through said cut-away portions when said discs are moved to certain other positions, said bolt also having a recess and a shoulder; means for reciprocating said bolt; an oscillatable switch operating shaft passing through said recess; and a projection carried by said shaft adapted when said bolt is in its locked position to engage the walls of said recess to prevent oscillation of said shaft, and when said bolt is in its unlocked position to be engaged by said shoulder whereby the switch will be moved to its off position by movement of said bolt to locked position.

7. In a keyless lock for automobile switches, a casing; a plurality of solid discs revolubly mounted in said casing, each provided on one face with an annular rib having a cut-away portion; a locking bolt slidably mounted in said casing, provided with depending legs entering between adjacent discs, said legs having angularly projecting toes adapted to engage said ribs to prevent movement of said bolt when said discs are in certain positions, and to pass through said cut-away portions when said discs are moved to certain other positions, said bolt also having a recess; means for reciprocating said bolt; an oscillatable switch operating shaft passing through said recess; a toothed member carried by said shaft; and a projection on said bolt adapted to enter spaces between said teeth when said switch is in certain positions, and to engage the top of one of said teeth when said switch is in another position.

8. In a lock, the combination with a lock-controlling member, movable from an effective to an ineffective position, and vice versa, of a plurality of permutation wheels mounted for rotation about aligned axes extending crosswise with respect to the direction of movement of said lock-controlling member, each of said wheels having a part disposed in the path of movement of a part of said lock-controlling member and preventing effective movement thereof except when said wheel is set in a predetermined position in which its obstructing portion is rendered ineffective, and each of said

wheels being independently rotatable without limit when said lock-controlling member is in either its effective or its ineffective position.

9. A lock comprising a casing, a lock-controlling member so mounted therein as to be movable from an effective to an ineffective position, and vice versa, and a plurality of permutation wheels mounted in said casing with their axes of rotation in alignment, said wheels having indicia-bearing parts accessible through slots in said casing so as to be independently settable and other parts lying the paths of movement of parts of said lock-controlling member and preventing effective movement thereof except when set in a predetermined relation, said movement-obstructing parts comprising a plurality of lugs, extending from said lock-controlling member, and a plurality of externally accessible slotted circular abutment elements, one on each wheel, each extending into the path of movement of one of said lugs, said wheels being independently rotatable without limit when said lock-controlling member is in either of its two positions but preventing effective movement of said member from one position to the other except when so set as to bring the slots in their abutments in registration with said lugs, thereby permitting said lugs to pass through said slots to the opposite sides of the respective abutments as the lock-controlling member is moved from either of its two positions to the other.

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