

United States Patent [19]
Meroni

[11] 3,869,161
[45] Mar. 4, 1975

[54] **PUSH-BUTTON OPERATED SWITCH,
MORE PARTICULARLY FOR DOORS AND
THE LIKE**

[75] Inventor: **Giuliandra Meroni**, Nova Milanese,
Italy

[73] Assignee: **Cicala Establishment**, Vaduz,
Liechtenstein

[22] Filed: **Dec. 8, 1972**

[21] Appl. No.: **313,387**

[30] Foreign Application Priority Data

Mar. 15, 1972 Italy 21872/72
July 27, 1972 Italy 22529/72

[56] References Cited

UNITED STATES PATENTS

224,040 2/1880 Prouty 292/166

1,133,437	3/1915	Holt	292/166
1,150,186	8/1915	Hamm	292/166
1,479,602	1/1924	Hayer	292/166
2,504,483	4/1950	Abraham	292/166
2,547,546	4/1951	Stulpin et al	292/166

FOREIGN PATENTS OR APPLICATIONS

11,901 10/1885 Great Britain 292/166

Primary Examiner—Jordon Franklin

Assistant Examiner—Peter Nerbun

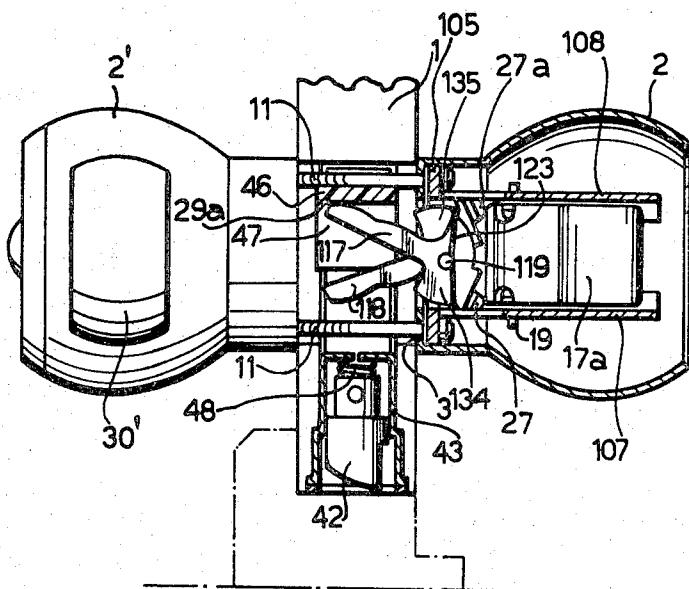
Attorney, Agent, or Firm—Sughrue, Rothwell, Mion, Zinn & Macpeak

[57]

ABSTRACT

This invention provides a door lock having a non-rotatable door knob of hollow construction housing a lock-operating mechanism so arranged that the associated latch can be retracted by depressing a spring-loaded push-button mounted on the knob and projecting laterally outside the circumference of the knob. A complementary operating arrangement may be provided for a knob mounted on the other side of the door.

6 Claims, 22 Drawing Figures



PATENTED MAR 4 1975

3,869,161

SHEET 1 OF 9

Fig. 1

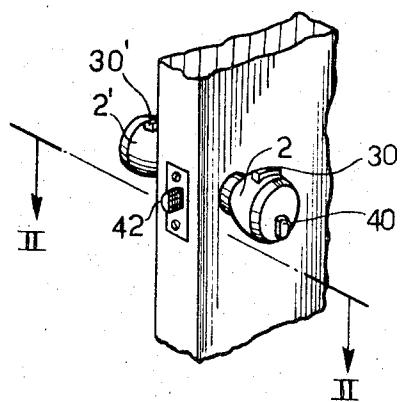
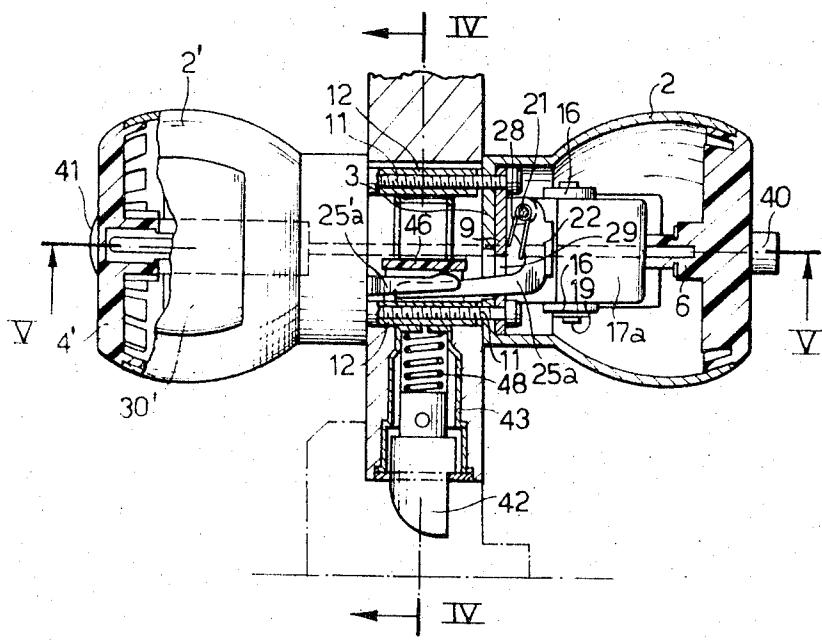


Fig-2



PATENTED MAR 4 1975

3,869,161

SHEET 2 OF 9

Fig.3

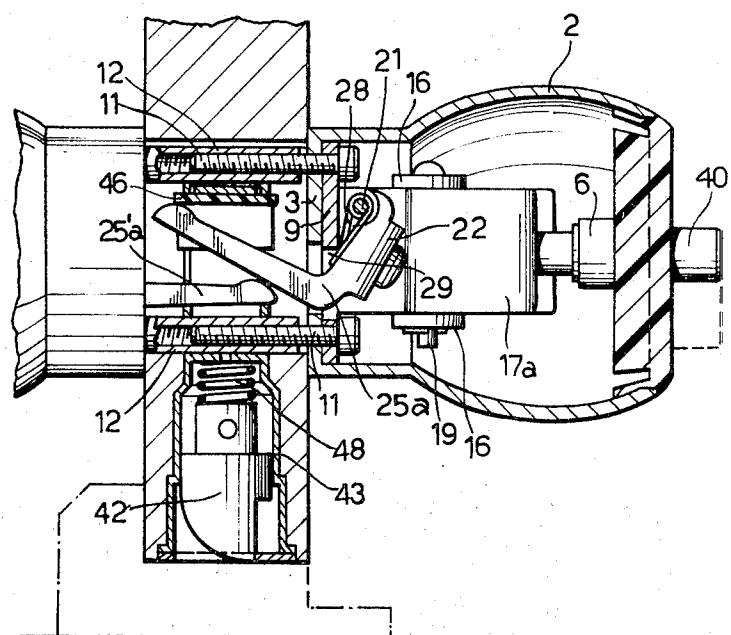


Fig.4

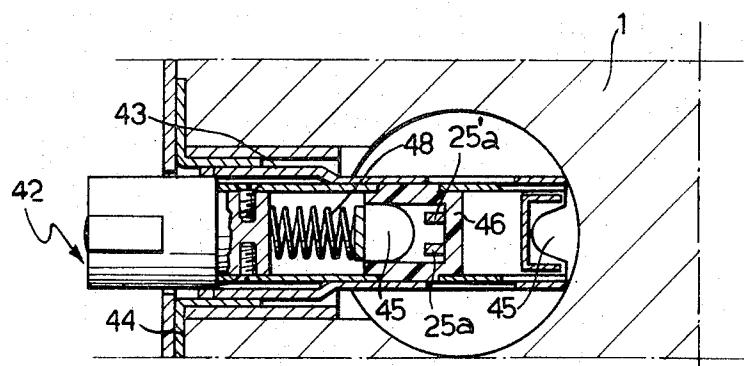


Fig.5

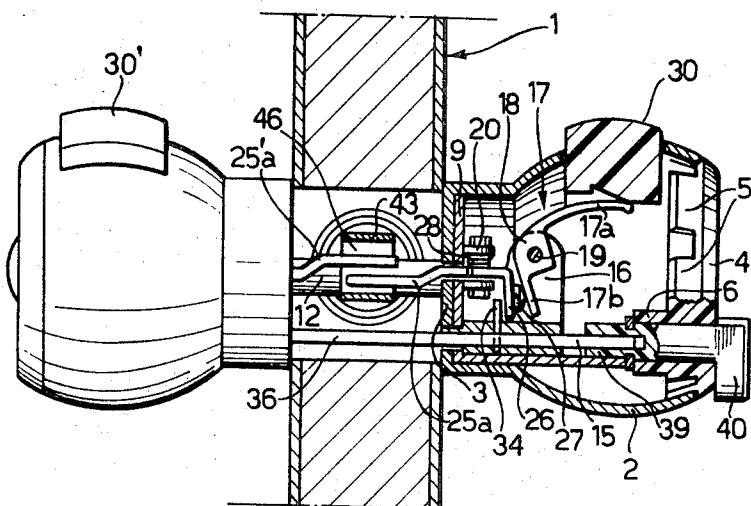
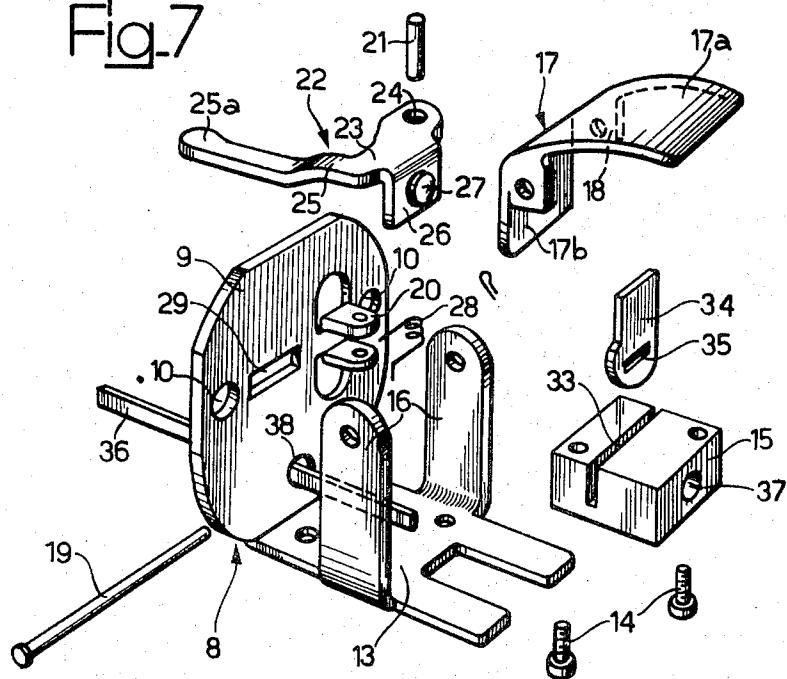


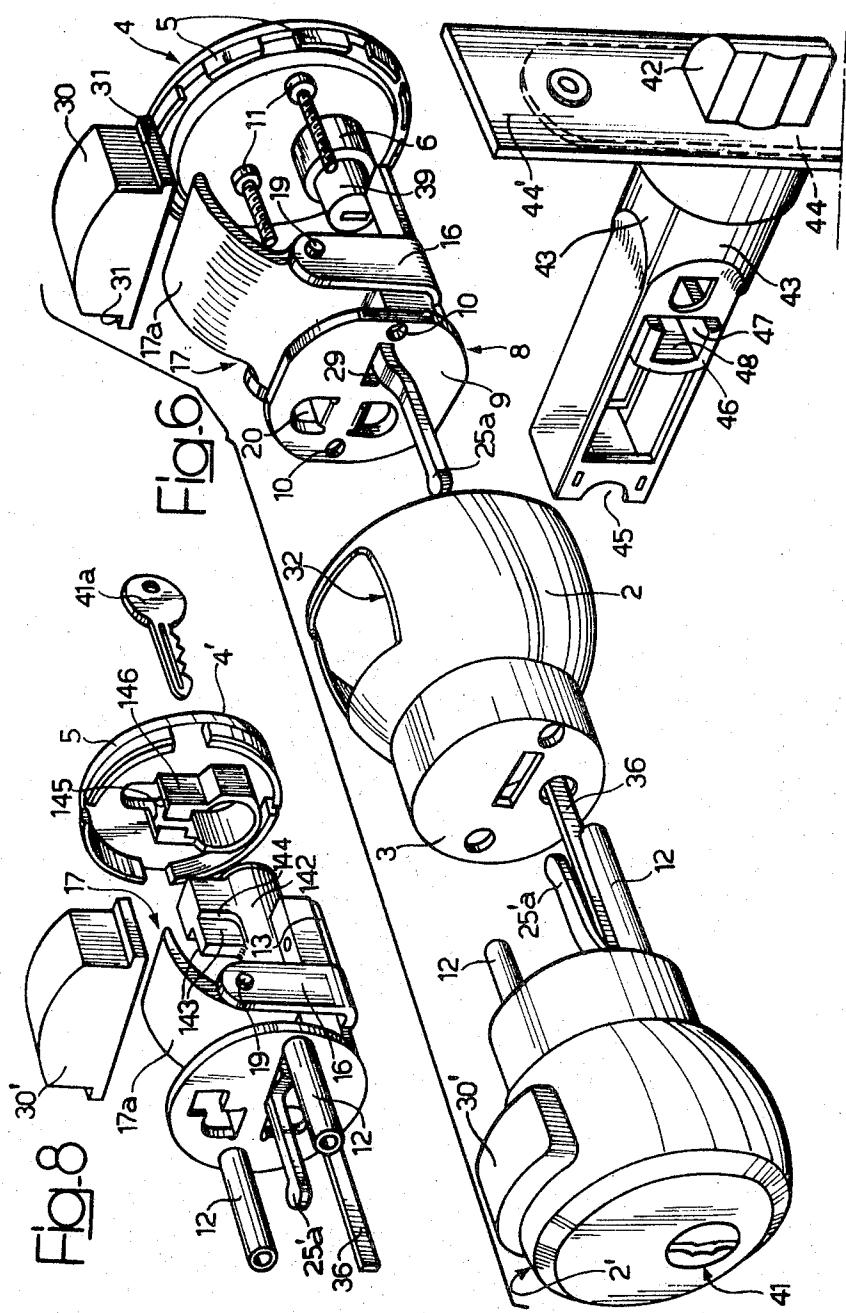
Fig.7



PATENTED MAR 4 1975

3,869,161

SHEET 4 OF 9



PATENTED MAR 4 1975

3,869,161

SHEET 5 OF 9

Fig. 9

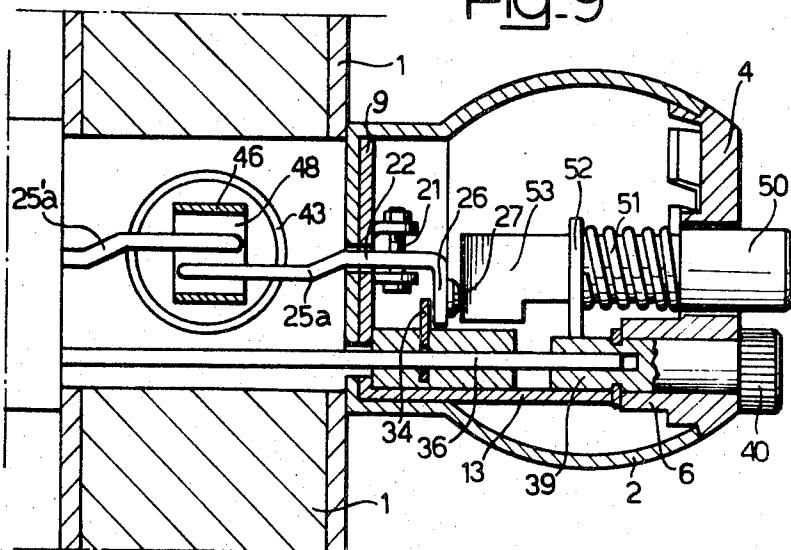
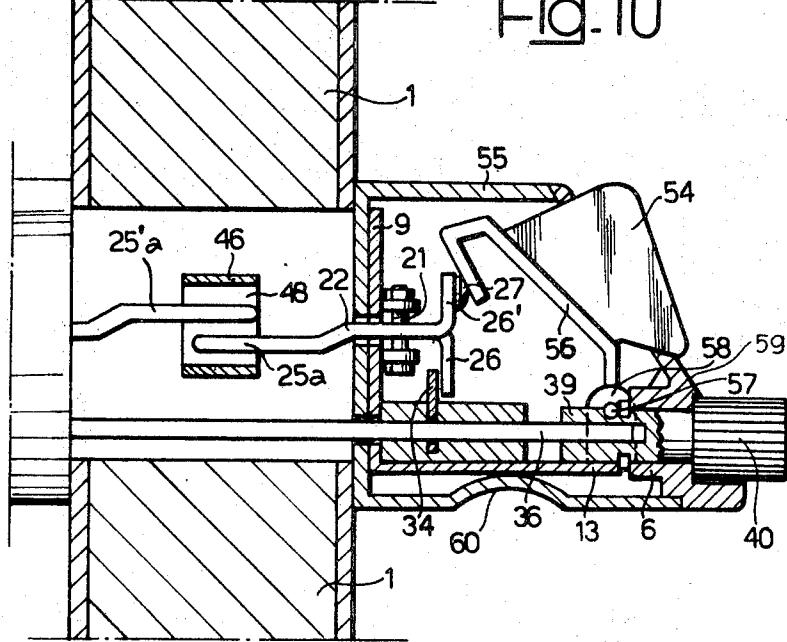


Fig. 10



PATENTED MAR 4 1975

3,869,161

SHEET 6 OF 9

FIG. 11

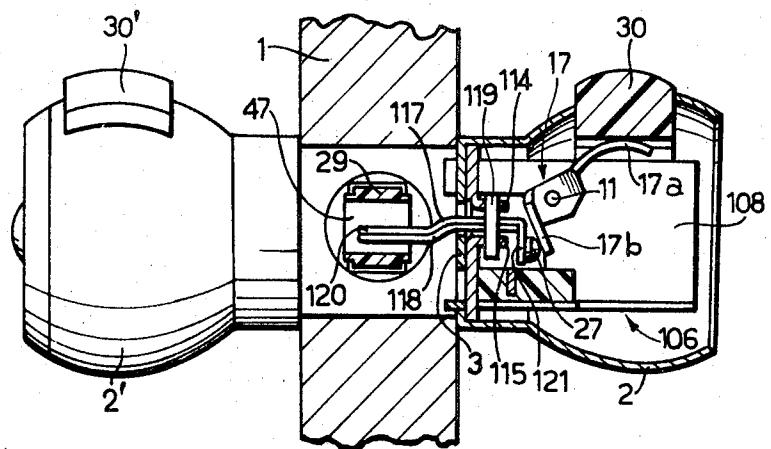
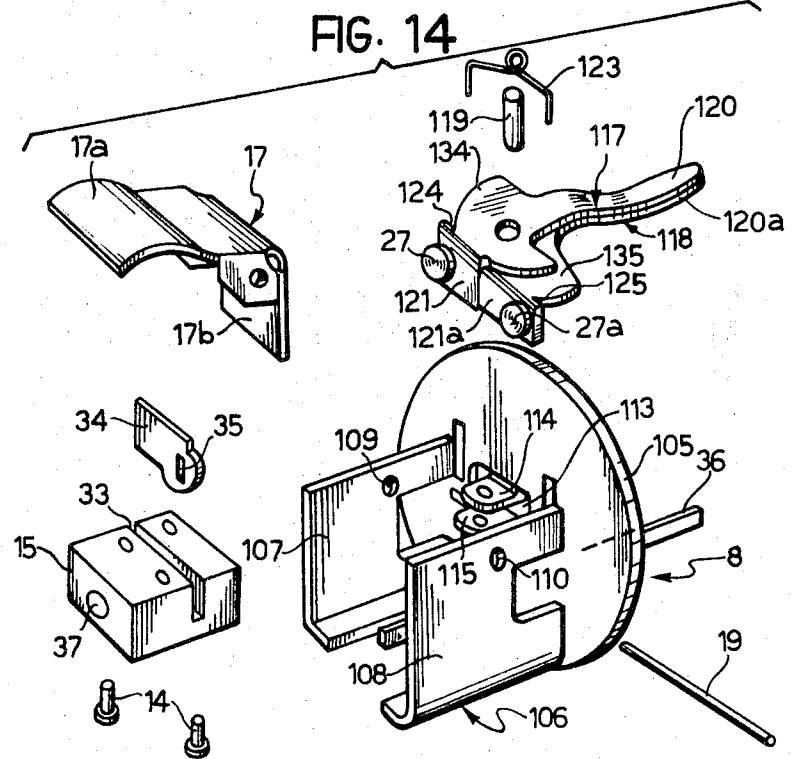


FIG. 14



PATENTED MAR 4 1975

3,869,161

SHEET 7 OF 9

FIG. 12

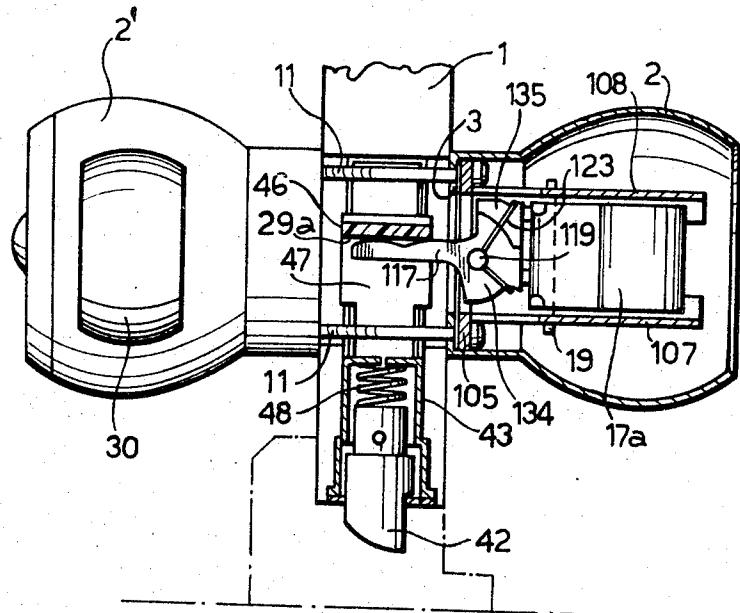


FIG. 15

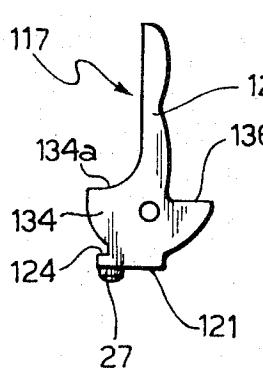
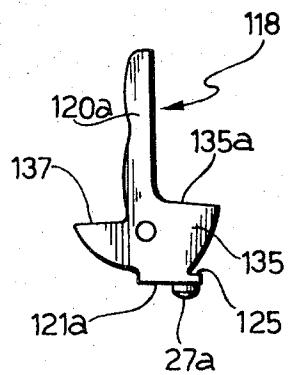


FIG. 16



PATENTED MAR 4 1975

3,869,161

SHEET 8 OF 9

FIG. 13

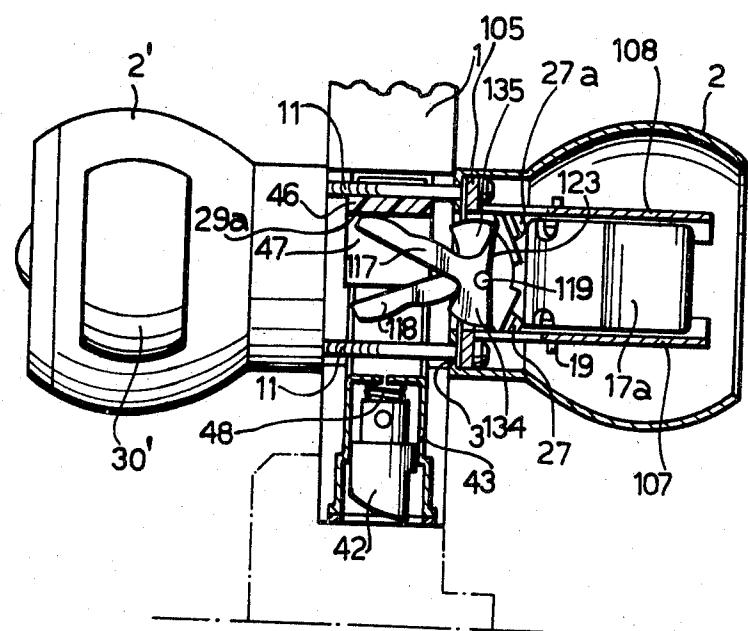
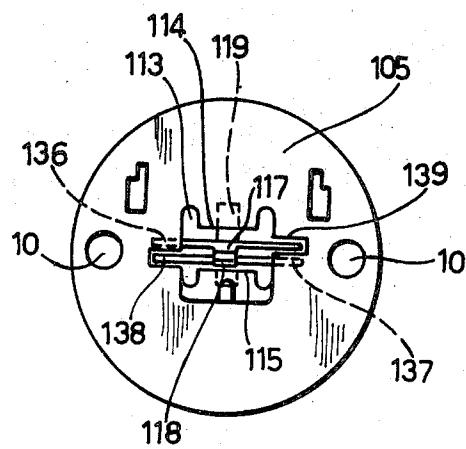


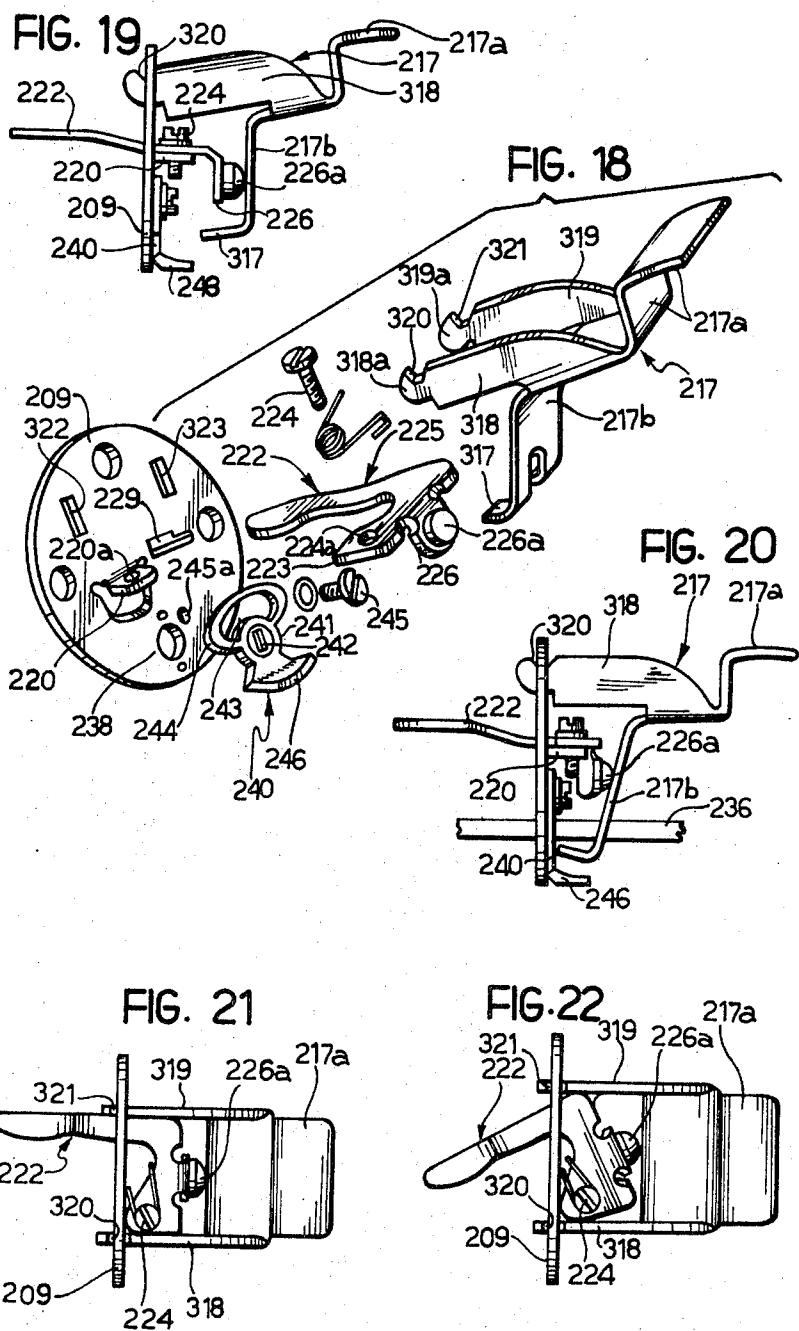
FIG. 17



PATENTED MAR 4 1975

3,869,161

SHEET 9 OF 9



PUSH-BUTTON OPERATED SWITCH, MORE PARTICULARLY FOR DOORS AND THE LIKE

The present invention relates to a lock of the type which is operable by means of a push-button housed in a door knob used for movement of the door.

BACKGROUND OF THE INVENTION

Various door locks are known, the commonest being the type in which a door knob is rotatably mounted on the door and in which partial rotation of the knob against resilient means brings about retraction of a latch. This known type of lock with a rotatable knob, whilst being easy to use, is of complicated construction, and is therefore expensive to manufacture. Moreover, door locks of this type necessitate a locking arrangement operable by means of a key inserted in a keyhole located in a position separate from the door knob.

Another known type of lock uses a rotatable knob which retracts a latch upon rotation of the knob in either direction, against a spring reaction. This type of lock is also of complicated construction, due to the considerable number of parts required for transmission of the rotary movement from the knob to the latch. Moreover, this type of lock also suffers from an installational disadvantage in that it has to be fitted at a height, above the ground such as to allow convenient operation by the user.

A third known type of lock is the one in which a knob is mounted non-rotatably on a door and control of the retraction of a latch is effected by means of a push-button extending axially within the knob. This type of lock also has various disadvantages, both of a structural nature, which make the lock costly to produce, and from the viewpoint of ease of operation since the user has to operate the push-button in general with the thumb. Also this type of push-button lock usually entails the provision of devices for locking the latch, for example by means a key insertable in a keyhole separate from the knob, entailing both constructional difficulties and difficulties of fitting.

OBJECT OF THE INVENTION

An object of the invention is to provide a lock which on the one hand avoids the disadvantages of the types of lock mentioned above and on the other hand combines the advantages of these known locks, as well as adding peculiar advantages of its own.

More particularly, an object of the present invention is to provide a lock which is easy to use, of simple construction, and therefore economical to manufacture, as well as being easy to fit to doors of different thicknesses and to padded doors.

A further object of the invention is to provide a lock in which the devices controlling the latch, and the locking devices for the latter are conveniently re-arranged, allowing a choice of control of the lock by means of a key or control of another nature on either one side or both sides of the door or any other type of control.

Another object of this invention is to provide a lock with push-button control capable of being mounted both on doors which open to the right and doors which open to the left, thus avoiding another disadvantage of locks of known types.

Yet another object of this invention is to provide a lock of the above-mentioned type having structural and functional characteristics which are substantially sim-

plified and which is simple and economical to produce.

A specific object of a preferred embodiment of the invention is to provide a lock in which the position of the push-button is such that it is easily operable without requiring installation at a predetermined height above the ground and without compromising the other constructional and functional requirements of the lock mechanisms.

SUMMARY OF THE INVENTION

According to the present invention there is provided a lock with a push-button control for doors and the like, comprising at least one knob for the movement of the door, a latch, and a control push-button controlling the latch of the lock, wherein the improvement consists in the knob having means of non-rotatable attachment to the door, and means defining an interior cavity a supporting device within the knob cavity, and latch control means mounted on said supporting device, said control means being associated with said push-button, and said push-button being operable from outside the circumference of the knob.

In a preferred embodiment of the invention the lock includes two knobs having means of non-rotatable attachment to opposite sides of the door, and respective said supporting devices for the latch control means, housed in the cavity of each knob and independently thereof, said supporting devices being provided with respective anchorage means adapted to pass through the thickness of the door and interengageable with each other, means operable from outside the lock for locking and unlocking the latch control means, said means for locking and unlocking being located in the cavity of the respective knob.

Preferably the means operable from outside circumference of the knob is movable with respect to the knob in a direction substantially parallel to the plane of the door.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described, by way of non-limiting example, with reference to the accompanying drawings, in which:

FIG. 1 is a diagrammatic perspective view illustrating a lock according to this invention mounted on a door, part only of which is shown;

FIG. 2 is an axial section on an enlarged scale, taken on line II — II of FIG. 1;

FIG. 3 is an enlarged axial section of part of the lock, similar to FIG. 2, showing the lock in the open position;

FIG. 4 is a transverse cross-section on line IV — IV of FIG. 2;

FIG. 5 is a partial axial section taken on line V — V of FIG. 2;

FIG. 6 is an exploded perspective view of the lock;

FIG. 7 is an exploded perspective view, on an enlarged scale of the elements contained in the hollow interior of one of the door knobs to the lock;

FIG. 8 is a further exploded perspective view of the elements contained in the interior of one of the door knobs with particular reference to the locking means for the latch;

Figs. 9 and 10 are diagrammatic axial sections, similar to FIG. 5, of variations of the type and positioning of the control push-button of the lock;

FIG. 11 is a partial axial section of a lock according to a first variant of the invention applied to a door;

FIGS. 12 and 13 are plan views from above and in partial axial section of the lock of FIG. 11 in the position in which the latch is extended and the latch retracted respectively;

FIG. 14 is an exploded perspective view of the mechanism for operating the latch of the lock of FIG. 11;

FIGS. 15, 16, 17 represent constructional details of the lock of FIG. 11;

FIG. 18 depicts in perspective and in separate parts the mechanism for actuating the latch in one embodiment of the lock according to this invention, a lock intended particularly use on interior doors;

FIGS. 19 and 20 are lateral elevational views of the mechanism of FIG. 18 in two positions of operation, and

FIGS. 21 and 22 show the latch operating mechanism of FIG. 18 viewed from above in said two positions of operation.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

With reference to the drawings, reference numeral 1 indicates part of a door on which a lock according to this invention is mounted. The lock has two operating handles in the form of hollow knobs 2,2' symmetrically arranged non-rotatably on the opposite sides of the door and aligned on an axis perpendicular to the plane of the door.

In the following description of the knob 2 it will be understood the other knob 2' has a corresponding internal mechanism.

The knob 2 has a base wall 3 adapted to be placed in contact with one face of the door 1. The knob 2 has an external end wall 4 which may be of plastics material provided on its outer periphery with teeth 5 for releasable snap engagement in the cavity of the knob. A tubular bush 6 projects from the internal face of the end wall 4, the bush 6 defining an eccentrically positioned hole extending parallel to the longitudinal axis of the knob 2.

Inside the knob 2 there is arranged a supporting device 8 (FIG. 7) constituted by a transverse base plate 9, arranged against the base wall 3 parallel to the door face and by a lower support plate 13 integral with the base plate 9. In one of the knobs, 2, the base plate 9 is provided with a pair of orifices 10 for the passage of two fixing screws 11 intended to be screwed into internally-threaded tubes 12 fixed to the supporting device of the other knob 2', thereby clamping the two supporting devices to the opposite faces of the door 1. By adjusting the screws 11 in threaded tubes 12 it is possible to adapt the lock easily to doors of different thicknesses without any modification to the component parts.

Two upstanding parallel stirrups 16 are formed integrally on opposite sides of the lower support plate 13, the stirrups 16 having holes at their ends in which a pivot pin 19 carrying a cranked primary lever 17 (FIGS. 1 to 8) is supported, the lever 17 having lateral apertured lugs 18 in which the pivot pin 19 engages. The primary lever 17 has an upper curved arm 17a and a shorter lower arm 17b which faces towards the base plate 9.

Two inwardly projecting parallel lugs 20 are cut out from the base plate 9. A secondary actuating lever 22 is freely rotatable about a vertical pivot pin 21 carried by the lugs 20. The secondary lever 22 is crank-shaped and has a short arm 23 provided with a hole 24 through

which the pivot pin 21 passes and a longer arm 25 at right angles to the arm 23. The arm 25 extends through the thickness of the door 1, terminating in a rounded end portion 25a situated in a plane different from the plane of the remainder of the arm 25. From the short arm 23 an appendage 26 projects perpendicularly, having on one face a stud 27 of material such as plastics with a low friction coefficient. The studs 27 face towards the short arm 17b of the primary lever 17. The end portion 25a of the long arm 25 passes through a slot 29 in the base plate 9 of the support 8 and into a space cut out of the door, so as to operate a movable latch as will be described hereinafter. The upper arm 17a of the primary lever 17 cooperates with a control push-button 30 movably mounted in an aperture 32 in the wall of the knob 2. The button 30 is provided with projections 31 which engage behind the upper wall of the knob 2 and prevent dis-engagement of the button 30 from the knob. In the example illustrated in each knob 2, 2' the respective control push-buttons 30, 30' are both arranged in the top walls of the knobs: it will, however, be self-evident that the push-button could alternatively be arranged in any other radially projecting positions around the longitudinal axes of the respective knobs.

The cranked secondary lever 22 is acted upon by a spiral spring 28 which urges the lever 22 into a repose position, shown in FIG. 2, in which the rear appendage 26 of the lever 22 rocks the primary lever 17 in such manner as to push the push-button 30 radially outwardly from the knob 2. By depressing the push-button 30 by hand the primary lever 17 is rocked in a clockwise direction, as viewed in FIG. 5, causing corresponding rotation of the cranked secondary lever 22 about the vertical pivot pin 21 so as to move the end portion 25a and retract the latch.

The displaced end portion 25a of the lever arm 25 so formed as to allow the end portion 25a to lie side-by-side, without interference, with the corresponding end portion 25'a of the secondary lever of the mechanism associated with the other knob 2', the two end portions being displaced symmetrically in opposite directions, enabling adaptation of the lock to doors of different thicknesses or padded doors.

Each latch control means is provided with a lock to prevent opening of the doors to each support device 8 there is fixed a block 15 for example of plastics material, fixed by means of screws 14 or other equivalent means, to the lower support plate 13: the block 15 has a transverse channel 33 in which a plate 34 having an elongated through slot 35 is mounted rotatably. A locking rod 36 of rectangular cross section which passes through holes 38 in the base plate 9 of each of the two support devices 8 and through holes in the base walls 3, 3' of the two knobs 2, 2'. The rod 36 passed through a respective bore 37 in each block 15, and is coupled to each respective plate 34 located within each of the two knobs by engagement in the respective slots 35 of the plates 34. Alternatively, a plate may be provided in only one of the knobs for engagement by the rod 36. In the example depicted in FIG. 5 there is provided a small hollow cylinder 39 which is rotatably mounted in the bush 6 integral with the outer end wall 4 of the knob 2. One end of the locking rod 36 is inserted into the hollow cylinder 39. One end of the cylinder 39 projects outwardly of the knob 2 and carries an external appendage 40 in the form for example of a small

knob operable manually to rotate the rod 36 about its longitudinal axis and thereby also rotate the two plates 34 into the path of oscillation of the appendage 26 of the two crank levers 22, preventing operation of the push-button 30.

The other knob 2 may be provided with a barrel lock 41 having a key 41a (FIG. 6) by means of which the same angular displacement of the locking rod 36 may be effected from the outside of the door.

With particular reference to FIG. 8 the lock 41 has a barrel 142 fixed, by screws or equivalent means, to the bottom support plate 13 of the support 8. The barrel 142 is provided with two lateral recesses which define lateral shoulders 144. The shoulders 144 are engageable with respective dogs 145 projecting laterally inwardly from fins 146 provided on the internal face of the respective front wall 4'. Once the front wall 4' has been fitted in position the engagement of the dogs 145 with the shoulders 144 prevents easy removal of the front wall 4', thereby guaranteeing security of the lock 41. Manual control of the rod 36 may be effected by any other means already known, such means being associated with one or both of the knobs 2 and 2'.

When the locking means, constituted by the rod 36, the two plates 34 and the control devices connected thereto, is caused to pass from the unlocked or repose position to the locking position, shown in FIG. 5, each plate 34 is located, as stated above, behind the appendage 26 of the cranked lever 22, preventing angular movement of the lever 22 by means of the lever 17 and the push-button 30. When on the other hand the two plates 34 are returned to the repose position, they are retracted into the channels 33 of the respective blocks 15, allowing actuation of the two levers 17 and 22.

With particular reference to FIG. 6, a latch 42 is mounted for movement axially in a casing 43 which can be inserted into a blind hole made in the free edge of the door parallel to its principal faces. The casing 43 has at one end a face-plate 44 which lies flush with the edge of the door and at the other end has seats 45 through which pass the threaded tubes 12 which contain the anchoring screws 11, the said tubes extending transversely with respect to the longitudinal axis of the casing 43. In the case in which the screws 11 and the tubes 12 are replaced by other equivalent fixing devices, the seats 45 can be dispensed with.

The latch 42 carries at its inner or rear end a moulded slide 46 consisting for example of plastics material having a low coefficient of friction with respect to the casing 43. The slide 46 has a lateral through slot 47 in which engage, on opposite sides, the end portions 25a and 25'a of the respective cranked secondary levers 22. The end portions 25a and 25'a are partially superimposed in the said slot 47, to an extent dependent upon the thickness of the door. When one of the push-buttons 30 or 30' is depressed the respective end portion 25a or 25'a of the cranked secondary lever 22 bears against the rear plane face 48 of the slot 47 and retracts the latch 42, permitting opening of the door. Upon release of the respective push-button 30 or 30' the spiral spring 28, acting on the lever 22, and an internal spring 49 acting on the latch 42, cause the movable parts to return to the normal position of closure of the lock (FIG. 2).

Assembly of the lock on the door is particularly simple, necessitating only the provision of (a) a transverse hole in the door for housing the tubes 12 and screws 11

which interconnect the two knobs, and for housing the end portions 25a, 25'a of the levers 22, 22' and (b) a mortice in the free edge of the door parallel to the faces of the door for housing the casing 43 of the latch 42.

5 The lock may have many variations as regards the form and dimensions of the knobs 2 and 2', since the support devices 8 and the means mounted thereon may be housed in knobs of any desired form. The end walls 4 and 4' are also made, for example, of plastics material and make it possible to obtain particular chromatic effects in combination with the push-buttons 30 and 30', which may also be of plastics material. The lock also lends itself to eccentric mounting on padded doors.

10 The positioning of the projecting ends of the push-buttons operable from outside the circumference of the knobs, and the direction of movement of the push-buttons, may also be varied, while the other characteristics of the lock remain unchanged.

15 For example referring to FIG. 9 a variant of the lock 20 is shown in which the push-button 50 is movable along the longitudinal axis of the knob 2, that is, perpendicular to the plane of the door 1 and acted upon a spring 51 reacting against a shoulder 52 fixed to or integral with the supporting device 8. The inner end 53 of the push-button 50 bears directly against the appendage 26 of the cranked secondary lever 22, to effect operation of the lock as described previously. The plate 34 is shown in FIG. 9 in its locking position.

25 An alternative variant, shown in FIG. 10, has a push-button 54 housed in a hollow knob 55 of different form from the knobs 2 and 2': the push-button 54 acts in a direction which is inclined with respect to the plane of the door 1. The push-button 54 is operatively associated with a lever 56 pivoted at 57 to a pair of ears 58 30 provided on the supporting device 8. The lever 56 acts upon an appendage 26' of the secondary lever 22 with the interposition of an anti-friction contact stud 27. The secondary lever 22 has another appendage 26 in 35 which this example cooperates with the movable plate 34 of the locking mechanism.

40 The knob 55 has an outer port 59 which in the illustrated embodiment is inclined to the axis of the knob and is provided with a lower recess 60 for engagement by a finger when the knob is gripped.

45 FIGS. 11 - 17 show a first variant of a lock according to this invention. The lock can be fitted equally well to doors which open to the right or to the left. In the description which follows the same reference numbers are used for those parts of the lock of this variant which correspond to parts of lock shown in FIGS. 1 to 8.

50 In this first variant each of the hollow knobs 2 and 2' houses a supporting device 8 which is constituted by a transverse base-plate 105 adapted to be mounted in close contact with the base wall 3 of the respective knob, and by a support element 106 shaped essentially like a stirrup of transverse U-section and upstanding from the base-plate 105. The lateral walls 107 and 108 of the stirrup like support element 106 are near their upper edges traversed by through holes 109, 110 respectively. A pivot pin 19 providing a pivotal support of the first cranked lever 17 engages in the holes 109, 110. The base-plate 105 is provided centrally with a rectangular aperture 113 and two brackets 114, 115 are formed in the base-plate 105 on opposite sides of the aperture 113, the brackets 114, 115, being formed, for example, by partial cutting and successive folding of the cutout portions along their non-cut sides.

Between the brackets 114 and 115 there are pivoted and freely rotatable two actuating levers 117, 118 both of which are articulated to a vertical pivot pin 49 associated with the said brackets 114, 115. Each of the levers 117, 118 is essentially of cranked form and has a longer arm 120, 120a extending through the aperture 113 of the base-plate 105 and into an aperture in the door 1. Each lever 117, 118 also has a shorter arm 121, 121a which is perpendicular to the longer arm 120, 120a and projects towards the base of the stirrup-shaped support element 106, each shorter arm 121, 121a being in practice parallel to the base plate 105. On the face of each shorter arm 121, 121a facing away from the base plate 105 there are provided studs 27, 27a of synthetic plastics material with a low coefficient of friction.

The levers 117, 118 are superimposed like a pair of scissors, the common pivot axis of which coincides with the pivot pin 119 on which both levers are mounted. The levers 117, 118 are biased towards a closed position of substantial coincidence by a spring 123 associated with the pivot pin 119 the ends of the spring engaging in small notches 124, 125 provided respectively on the external edges of the said levers 117, 118. The top arm 17a of the lever 17 cooperates with the push-button 30.

Under repose conditions, the action of the spring 123 prevails so that the levers 117, 118 are closed, that is, the levers 117, 118 are superimposed and parallel to each other whilst the short arms 121, 121a of the levers are reciprocally in close contact and aligned parallel to the base-plate 105.

Under these conditions, the studs 27, 27a of the cranked levers 117, 118 which are spaced from the axis of the pivot pin 119, FIG. 14, displace the lever 17 into the position shown in FIG. 11 and the lever 17 in turn displaces the push-button 30 upwards so that it projects out of the knob 2. Again, in the repose position, the longer arms 120, 120a of the levers 117, 118 which extend through the aperture 113 in the plate 105, are engaged in a slot 47 formed in a slide 46 associated at the rear with the latch 42 and movable therewith.

By depressing the push-button 30 the lever 17 is rotated anti-clockwise as viewed in FIG. 11 so that its short arm 17b presses on the studs 27 and 27a of the levers 117, 118. By virtue of this pressing action and the displacement of the studs 27, 27a with respect to the axis of the pivot pin 119 of the levers 117, 118 the two levers 117, 118 tend to be spread apart so that their longer arms 120, 120a open in scissors fashion.

With reference to FIGS. 11 and 12, and assuming that pressure is exerted on the push-button 30 of the knob 2 (relatively to which the door 1 opens to the right), the abovementioned spreading-out of the levers 117, 118 causes retraction of the slide 46, with consequent retraction of the latch 42. This retraction results from the action of the longer arm 120 of the top lever 117 on the rear wall 29a of the slot 47 in the said slide 46. Upon cessation of the pressing action on the push-button 30 the spring 48 returns the latch 42 to its extended position of closure.

If pressure is exerted on the push-button 30' of the knob 2' (relatively to which the door 1 opens to the left) the abovementioned scissors-like spreading-out of the longer arms 120, 120a of the pair of levers 117, 118 again brings about retraction of the slide 46 and consequently of the latch 42; in this case the retraction is due

to the longer arm 120a of the lower lever 118 of the pair of levers 117, 118.

The lock may therefore be applied equally well to doors opening to the right and doors opening to the left, without making modifications in the positioning of the component parts or varying the configuration of these parts. The lock of FIGS. 11 - 17 may also be provided with locking arrangements as described for the lock of FIGS. 1 to 8.

10 FIGS. 15, 16 and 17 illustrate in detail some structural details of the lock according to this first variant of the invention. More particularly, in FIGS 15 and 16 the levers 117 and 118 are shown separately in plan. It will be seen that the levers 117, 118 have flat portions 134, 15 135 respectively, the edges of which include shoulders 136, 137 which abut under repose conditions against the base-plate 105 FIGS. 14 and 17. The outer edges of the flat portions 134, 135 also include respective re-entrant notches 124, 125 adjoining the lines of fold of the respective shorter arms 121, 121a of the cranked levers 117, 118, in which notches 124, 125 the opposite ends of the spring 123 engage. FIG. 17 shows a frontal and external view of the stirrup element 106 and the plate 105. In this Figure the shape of the aperture 113, is designated by a thickened line. The edges of the aperture 113, adjacent the sides from which the brackets 114, 115 project are formed with respective slots 138, 139 which are arranged symmetrically on opposite sides of a diameter of the base-plate 105 and are dimensioned so as to allow rotation of the levers 117, 118. In fact the presence of the slots 138, 139 allows respective tongues 134a and 135a on the flat portions 134, 135 of the said levers 117, 118 to pass through the plate aperture 113.

35 In FIGS. 18 to 22 show a second variant of a lock according to the invention, which being simplified, may with advantage be applied to interior doors.

According to this variant a circular base-plate 209 bears against the base wall 3 of each knob. The base-plate 209 is formed with a single centrally disposed brackets 220, projecting perpendicularly to the base-plate 209 into the internal cavity of the knob (not shown). The bracket 220 pivotally supports in a freely rotatable manner a cranked lever 222 having a longer arm or finger 225 which passed through an aperture 229 provided centrally in the base-plate 209.

The shorter arm 223 of the lever 222 is pivotally connected to the bracket 220 by a screw 224 which passes through a hole 224a in the arm 223 and engages by a screwing action in a threaded hole 220a in the bracket 220. The longer arm or finger 225 of the cranked lever 222, is adapted to engage in the manner previously described, with the latch of the lock.

55 The cranked lever 222 is provided in a central position on its shorter arm 223 with an integrally formed tongue 226, bent at right angles to the arm 223 and in practice parallel to the base-plate 209, from which it is spaced by a distance practically equal to the height of the bracket 220 above the base-plate 209. On the face of the tongue 226 turned towards the interior of the knob there is provided a stud 226a or raised portion advantageously made of synthetic plastics material having a low coefficient of friction with respect to those parts with which it comes into contact.

60 65 The operating mechanism of the lever 222 is essentially constituted by a lever indicated generally 217. The lever 217 has an essentially cranked conformation,

with a top part 217a which cooperates with a push-button (not shown) mounted in the knob, as previously described. The other part 217b of the lever 217 projects downwards and terminates in two folded lips 319 which face towards the base-plate 209. This part 217b of the lever 217 is constantly in contact with the stud 226a of the lever 222.

The lever 217 is provided in an intermediate position between the two parts 217a and 217b, with a pair of parallel spaced apart arms 318, 319 which are formed with hooked ends 318a, 319a respectively, moulded with respective notches 320, 321 which face towards the push-button, that is, upwards in the position of use. The notches 320, 321 are practically equal in width to the thickness of the base-plate 209 and advantageously are delimited by flanks which diverge from the bottom of each notch. The hooked ends 318a and 319a are adapted to engage releasably in respective rectangular through slots 322, 323 provided in the top portion of the plate 209. Each engagement, by virtue of the dimensions of the notches 320 and 321 and the divergence of the flanks of the latter, is a pivotal engagement so that the notches 320 and 321 define the fulcrum of the lever 217.

By pressing on the push-button, not shown, the top part 217a of the lever 217 is depressed, and the lever 217 is rocked around the fulcrum defined by the notches 320 and 321 so that the part 217b of the lever presses against the stud 226a of the lever 222, causing the latter to rotate about its pivot pin 224, and thereby moving the larger arm or finger 225 to retract the latch of the lock.

The lock of FIGS. 18 - 20 is provided with a locking arrangement indicated generally by 240, to lock releasably the actuating mechanism for the finger lever 222. This locking arrangement is constituted by a plate like element 240 rotatably mounted on the plate 209 in a position diametrically opposed to the portion in which the slot 322, 323 are formed. This plate like element 240 is centrally traversed by a rectangular orifice 242 aligned with a hole 238 in the base-plate 209. The plate like element 240 is provided with an upper arcuate slot 243 the centerline of which is an arc of a circle having as centre the centre of the orifice 242. Rotation of the plate like element 240 about the centre of the orifice 242 is guided by the engagement of a stem 245 in the arcuate slot 243, the stem 245 being attached to or integral with the plate 209. Advantageously the stem 245 is constituted by a screw which is screwed into a threaded orifice 245a in the base-plate 209. The plate like element 240 has a lower appendage 246 bent through 90° and projecting into the interior of the knob a distance equal to the distance between the plate 209 and the lips 317 of the lever 217 when the latter is in the repose position.

In the rectangular of orifice 242 of the element 240 a locking rod 236 of conjugate cross section engages. The locking rod 236 is rotatable about its longitudinal axis to cause rotation of the plate like element 240 so as to move the appendage 246 from its lowermost position shown in FIG. 18 to a locking position in which it

is interposed between the base-plate 209 and one of the lips 317 of the lever 217, thus preventing rocking movement of the latter around its fulcrum point and preventing actuation of the finger lever 222.

5 I claim:

1. A door latch mechanism of the type having a push-button control comprising a latch movably mounted in a door, at least one hollow knob having a central axis, means for non-rotatably securing said knob to a door with said central axis disposed perpendicular to the door, supporting means secured within said knob, latch control means pivotally mounted on said supporting means and operatively engaged with said latch, aperture means in said knob, a push-button movably 10 mounted in said aperture for movement substantially transverse to said central axis and disposed in operative engagement with said latch control means, said latch control means being comprised of a pair of substantially scissors-like levers mounted on a common pivot 15 carried by said supporting means, one end of each of said levers being operatively associated with said push-button and the other end of each of said levers being operatively engaged with said latch and resilient means 20 engaging said levers to oppose spreading out of the levers.

2. A door latch mechanism as set forth in claim 1, further comprising an additional lever pivotally mounted on said supporting means intermediate said push-button and said one end of each of said levers to 25 spread apart the ends of said scissors-like levers upon depression of said push-button.

3. A door latch mechanism as set forth in claim 1, further comprising a second substantially identical door knob non-rotatably connected to said first mentioned knob and adapted to be disposed on the opposite side of the door with the central axis thereof aligned with the central axis of the first mentioned knob, said second knob having a push-button, supporting means and latch control means constructed and arranged similar to the corresponding means in said first mentioned knob for operating said latch and locking means for selectively locking and unlocking said latch control means.

4. A door latch mechanism as set forth in claim 3, 35 wherein said locking means is comprised of a rod rotatably mounted in at least one of said knobs for rotation about an axis parallel to said central axis of said knob, a locking element connected to said rod and adapted to be rotated by said rod between a first locking position to prevent pivotal movement of said latch control means and a second unlocking position, and means externally of said knob for rotating said rod.

5. A door latch mechanism as set forth in claim 1, 45 wherein said latch control means is comprised of a further lever pivotally mounted on said support device and interposed between the end of the push-button within the knob and said scissors-like levers.

6. A door latch mechanism as set forth in claim 1, 55 wherein said push-button is movable in a plane parallel 60 to the plane of the door.

* * * * *