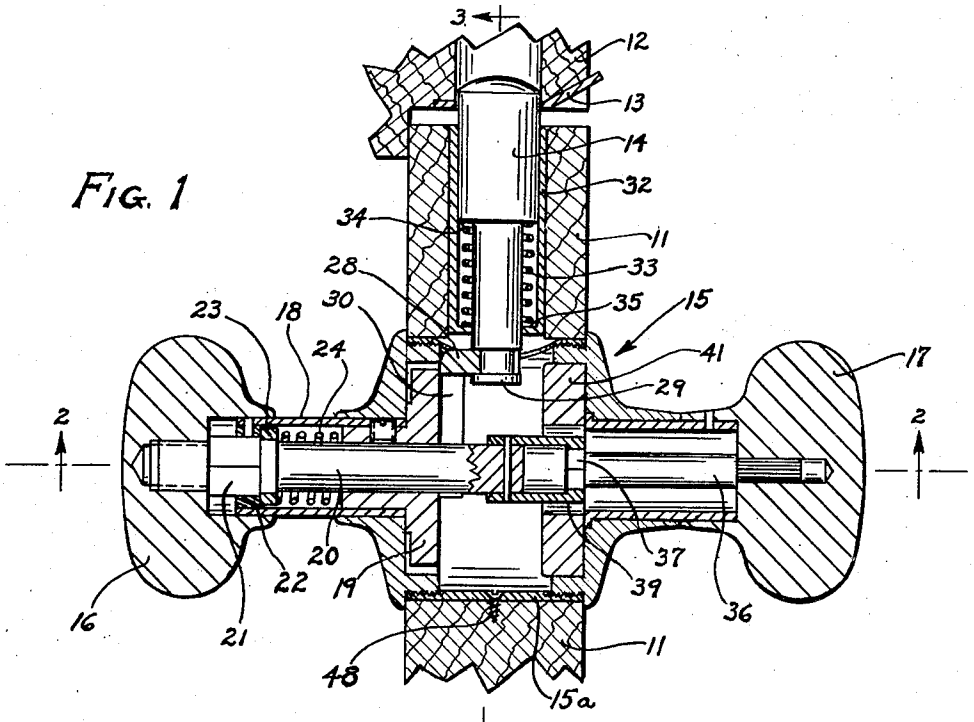
Nov. 7, 1950 D. C. SMITH ET AL 2,529,230

COMBINED DOOR LATCH AND LOCK

Filed July 10, 1947 3 Sheets-Sheet 1

FIG. 1



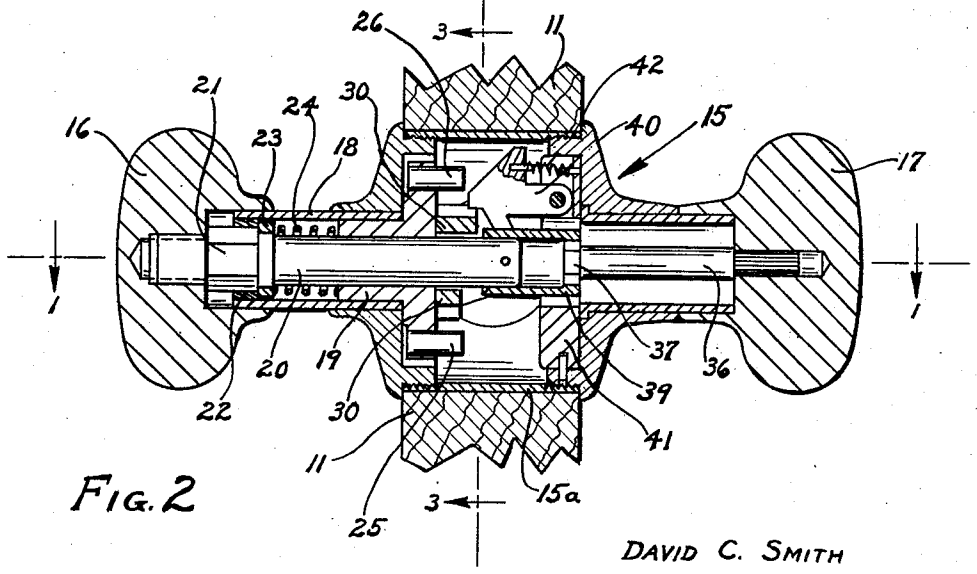


FIG. 2

DAVID C. SMITH
LEROY I. OBLINGER
INVENTORS

BY

Ely & Frye

ATTORNEYS

Nov. 7, 1950 D. C. SMITH ET AL 2,529,230

COMBINED DOOR LATCH AND LOCK

Filed July 10, 1947 3 Sheets-Sheet 2

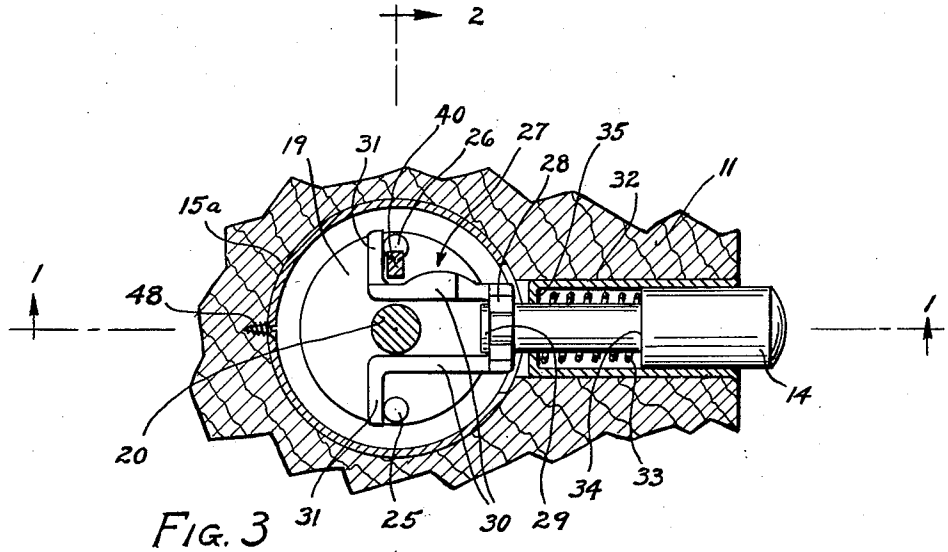


FIG. 3

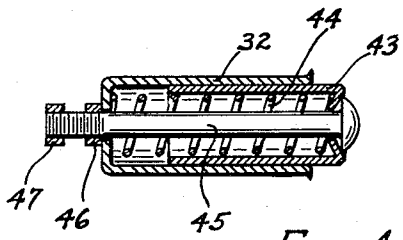


FIG. 4

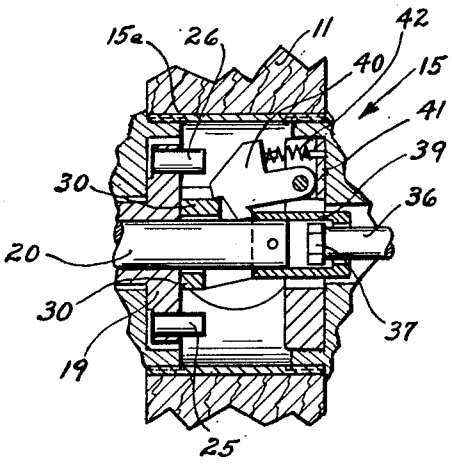


FIG. 5

DAVID C. SMITH
LEROY I. OBLINGER
INVENTORS

BY

Ely & Frye

ATTORNEYS

Nov. 7, 1950 D. C. SMITH ET AL 2,529,230

COMBINED DOOR LATCH AND LOCK

Filed July 10, 1947 3 Sheets-Sheet 3

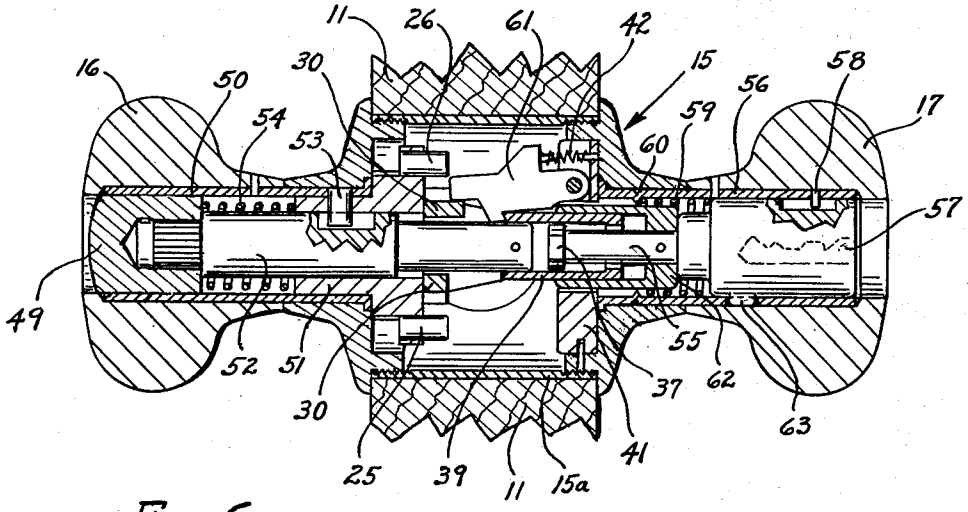


FIG. 6

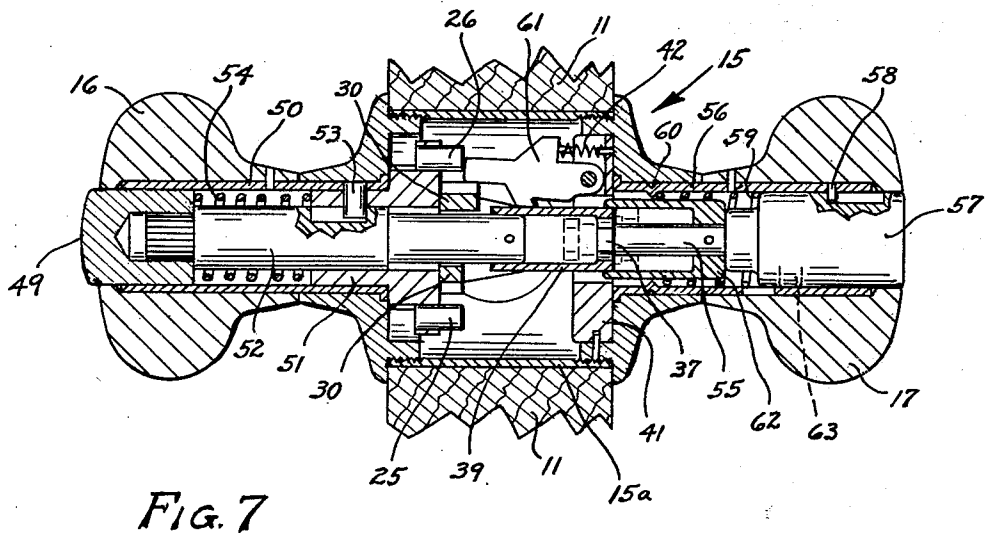


FIG. 7

DAVID C. SMITH
LEROY I. OBLINGER
INVENTORS

BY Ely & Frye

ATTORNEYS

Patented Nov. 7, 1950

2,529,230

UNITED STATES PATENT OFFICE

2,529,230

COMBINED DOOR LATCH AND LOCK

David C. Smith and Leroy I. Oblinger, Toledo, Ohio, assignors of thirty per cent to E. W. Sauers and thirty per cent to A. E. Giesey, both of Cleveland, Ohio

Application July 10, 1947, Serial No. 759,976

4 Claims. (Cl. 70—149)

1

This invention relates to door latches of the type which may be selectively locked and unlocked from one or both sides of the door and are especially suitable for use on doors between rooms of a residence or office, etc., as well as on outside doors. In the case of doors between rooms the door latch according to this invention may be locked from the inside to prevent entry into the room, but may be readily unlocked from the inside to permit the door to be opened from the outside. In the case of outside doors these same features may be provided, but in addition, provision is made for locking the door from the outside to prevent entry even though the door may be opened from the inside at all times. Also, provision is made for opening the door from the outside even though it may have been previously locked from the inside.

One object of the present invention is to provide a door latch capable of being selectively locked and unlocked from one or both sides of the door.

Another object is to provide a door latch which can be easily and quickly installed in a door.

A further object is to provide a door latch having relatively few parts as compared to door latches of the same general type, and in which the arrangement of parts is such that mechanical failure is reduced to a minimum.

Still another advantage is to provide a door latch, the parts of which can be manufactured economically and simply.

The invention will now be described in detail with reference to the accompanying drawings in which similar reference numerals in the various figures indicate the same elements and in which,

Fig. 1 is a horizontal cross-sectional view of one form of the door latch according to the present invention;

Fig. 2 is a vertical cross-sectional view of the latch shown in Fig. 1 taken along line 2—2;

Fig. 3 is a vertical cross-sectional view of the latch shown in Figs. 1 and 2 taken along line 3—3 of Fig. 2;

Fig. 4 is a cross-sectional view of a modification of the latch bolt shown in Figs. 1 and 3;

Fig. 5 is a partial cross-section of the modification shown in Fig. 2 with some of the elements shown in a different operative position;

Fig. 6 is a vertical cross-sectional view of a modified form of the invention; and

Fig. 7 is a vertical cross-section corresponding to Fig. 6 but showing the elements in a different operative position.

With reference to Figs. 1 and 2 a portion of a door 11 and a portion of the door frame 12 is shown. A keeper plate 13 is provided on the frame in the conventional manner. A latch bolt 14 retractably mounted in the door 11, as further described hereinafter, is adapted to be received in a recess provided in the keeper plate 13 and door frame 12. The latch bolt 14 is connected to a retracting and locking mechanism indicated generally at 15 and contained within a housing 15a. The mechanism 15 is operated by an inner handle or knob 16 and an outer knob 17.

2

The inner knob 16 is slidably mounted on a rotatable hollow shaft 18 which is secured to a circular flanged hub member 19. A spindle 20 is slidably mounted within the hub member and is secured to the knob 16. Spindle 20 is provided with a section 21 having an angular outer surface which may be square or hexagonal or the like. A washer 22 which is secured to the inside of hollow shaft 18 fits around the angular section 21 so that rotational movement of the knob 16 will cause the spindle 20, hollow shaft 18 and hub member 19 to be rotated as hereinafter described. A loose circular washer 23 is provided on a shoulder of spindle 20 and a coil spring 24 is disposed around spindle 20 to cooperate with washer 23 and the hub end of member 19, so as to normally force the knob 16 outwardly. Since spindle 20 is secured to the knob 16 it will slide inwardly through hub member 19 when the knob 16 is pressed inwardly.

The flanged portion of hub member 19 is provided with pins 25 and 26 (as shown in Figs. 2 and 3), which cooperate with a fork member 27 for retracting the latch bolt 14. The fork member 27, as seen best in Fig. 3, comprises a small forked end 28 adapted to cooperate with the head 29 of latch bolt 14, a pair of tines 30 one of which has a raised cam surface on the outer side thereof and a pair of flanges 31 at the ends of the tines. The flanges, tines and the small forked end each lie in planes at right angles to the other parts of the fork member. The flanges 31 bear against the pins 25 and 26 such that when hub member 19 is rotated about its axis the pins will cause the fork member 27 to slide to the left (see Fig. 3) thereby retracting the latch bolt 14. Latch bolt 14 is mounted in a sleeve 32 and is normally urged into the extended position by a spring 33 which cooperates with a shoulder 34 of the latch bolt 14 and an inwardly turned flange 35 of the sleeve 32.

From the foregoing it will be seen that when knob 16 is rotated, the motion will be translated through spindle 20, angular washer 22, hollow shaft 18, hub member 19, pins 25 and 26, fork member 27 to the latch bolt 14.

Outer knob 17 is secured to a secondary spindle 36, having an angular head 37 at its inner end. This head 37 normally constitutes a driving member which cooperates with a complemental angular shaped open end of a tubular driven member 39 secured to the end of spindle 20. The

head or driving member 37 and driven member 39 normally are engaged so that any rotation of secondary spindle 36 will cause rotation of spindle 20 and vice versa. However, when knob 16 is pressed inwardly, i. e. to the right when viewing Fig. 1, the spindle 20 and driven member 39 will also move to the right so that member 39 will become disengaged from head 37. It will thus be seen that head 37 and member 39 constitute a clutch mechanism by which knob 17 may be disconnected from the mechanism for retracting the latch bolt. The position of the clutch mechanism when disengaged is shown in Fig. 5.

In order to lock the clutch in its disengaged position a pawl 40 is provided. This pawl is pivotally mounted on a plate 41 which is secured within the housing 15a. A spring 42 urges the pawl downwardly against the outer surface of member 39 as shown in Fig. 2. When the clutch mechanism is disengaged by sliding spindle 20 and member 39 to the right, the pawl will engage the end of member 39 to prevent its return to the normal position as shown in Fig. 5. However, when knob 16 is rotated and the fork member 27 is moved by pins 25 or 26 (see Fig. 3) the cam surface on one of the tines 30 referred to above will bear against a small projection of pawl 40, thus raising the pawl 40 from the position shown in Fig. 5 to that shown in Fig. 2, thereby releasing member 39 and spindle 20 so they will spring back to their normal position under the action of spring 24.

In operation, the latch bolt 14 can normally be retracted by merely turning either knob 16 or knob 17, but when it is desired to prevent retraction by rendering knob 17 inoperative, thus locking the door on that side, it is only necessary to press knob 16 inwardly so as to disengage member 39 from the angular head 37. Pawl 40 will engage the member 39 and thus keep knob 17 inoperative until knob 16 is rotated to open the door from the inside at which time pawl 40 will be released by the cam surface on one of the tines 30 and the knob 16 will return to its normal position and member 39 will re-engage the head 37 as shown in Figures 1 and 2.

The latch bolt 14 as shown in Figs. 1 and 3 is of solid metal but if desired a latch bolt as shown in Fig. 4 may be used. This latch bolt comprises a tubular sleeve 43 adapted to slide within sleeve 32. The outer end of sleeve 43 is pinched in to provide a bearing surface for spring 44 and an abutment for a bolt 45. Spring 44 bears against the inner flanged end of sleeve 32, thus normally projecting the latch bolt outwardly. The bolt 45 is provided with a threaded end on which a nut 46 is securely fixed so as to limit the outward movement of sleeve 43. Another nut 47 is securely fixed to the end of bolt 45 to correspond with and serve the same function of head 29 for cooperating with the small forked end 28 of fork member 27. The latch bolt shown in Fig. 4 has the advantage over latch bolt 14 of permitting the use of a longer spring 44 for projecting sleeve 43 and the further advantage of permitting the use of a longer sleeve 43 compared to the length of latch bolt 14, thereby reducing the possibility of the latch bolt canting in sleeve 32 and becoming immovable therein.

Door latches of the type described herein may be more easily and quickly installed than previously known locks. It is first necessary to bore a hole transversely of the door to receive the retracting and locking mechanism 15 and then a smaller hole to receive sleeve 32 and the latch bolt. The internally threaded housing 15a is then inserted in the first mentioned bore and secured in place by conventional means such as a screw 48. Sleeve 32 is fitted into the smaller bore and secured in place by friction or a fastening means. The latch bolt assembly is inserted in sleeve 32 and depressed while the fork member 27 is inserted and the small forked end engaged with the head 29. Outer knob 17 including plate 41, pawl 40 and associated parts is screwed into position in housing 15a. Next inner knob 16 and associated elements including the hub member 19 and spindle 20 are inserted, adjusted so that member 39 will engage head 37 and then screwed into housing 15a. The lock is thus completely assembled and ready for use.

Figs. 6 and 7 illustrate a modified form of the present invention. This modification includes the principal features of the form shown in Figs. 1 to 5 as well as the feature that the outer knob is provided with a key actuated lock for locking the door from that side regardless of the condition of the locking mechanism associated with the inner knob 16. This modification is especially suitable for use on outside doors. According to this modification the door may be opened always by the inner knob 16 even though it has been locked by a key on the outside. However, when the door has been locked from the inside, to prevent opening from the outside by merely turning knob 17, it is nevertheless possible to open the door from the outside by the use of the key actuated lock.

According to Figs. 6 and 7 a minor variation is shown with respect to the inner knob 16. In this modification a projecting button 49 is provided for actuating the clutch mechanism instead of the slidably mounted knob 16 shown in Figs. 1 and 2. Knob 16 is secured to a rotatable hollow shaft 50 which is secured to a flanged hub member 51. A spindle 52 is slidably mounted within the hollow shaft 50 and hub member 51 and is splined thereto by means of pin 53 so that knob 16, shaft 50, hub member 51 and spindle 52 will rotate together. Spindle 52 is provided with a button 49 at its outer end, which normally projects a slight distance beyond the knob 16 as shown in Fig. 7. A coil spring 54 is disposed about the spindle 52 between the end of the hub member 51 and the inner edge of the button 49 to normally force the button outwardly.

The hub member 51 is provided with pins 25 and 26 as in the first modification for actuating the fork member 27, of which only the tines 30 are seen in Figs. 6 and 7. The operation of the latch bolt 14 by knob 16 in Figs. 6 and 7 corresponds with the operation of the device shown in Figs. 1 and 2. The inner end or head of spindle 52 is provided with a tubular driven member 39 of the clutch mechanism and this member normally engages an angular head or driving member 37 of a secondary spindle 55.

Outer knob 17 is securely mounted on a hollow shaft 56 and a conventional key-actuated lock 57, for example, of the tumbler type is disposed within and splined to the shaft 56 by pin 58 to permit longitudinal sliding movement therein. The lock 57 is operable by a key shown in dotted lines in Fig. 6. A coil spring 59 is disposed within the shaft 56 between detent 60 in the hollow shaft 56 and the inner end of the lock 57 so as to normally project it outwardly as shown in Fig. 7. The secondary spindle 55 is secured to the lock 57 and is provided with an angular head 37, which

cooperates with the tubular member 39 to form a clutch mechanism as described hereinbefore.

In order to lock the door from the inside so that it cannot be opened from the outside, the pawl 61 similar to pawl 40 is provided. This pawl 61 is pivotally mounted on plate 41 which is secured to the housing 15a as in the prior modification. A spring 42 urges the pawl 61 downwardly against the outer surface of member 39 as shown in Fig. 7, so that when button 49 is depressed and member 39 is disengaged from the head 37 by sliding it to the right as shown in Fig. 6, the pawl will engage the end of member 39 to prevent its return to the normal position, thus rendering knob 17 inoperative. As with the first modification, the pawl 61 may be released by merely turning knob 16 to open the door. Pins 25 and 26 will be turned, thus driving fork member 27 (see Fig. 3) to the left and the cam surface on one of the tines 30 will raise pawl 61, thus releasing member 39 to slide back to its normal position of engagement with head 37, as shown in Fig. 7.

When it is desired to lock the door from the outside by means of the key-actuated lock 57 it is necessary to depress lock 57 to the position shown in Fig. 6 so that the bolt 63 will engage in the opening provided in the hollow shaft 56. The lock 57 is thus immovable within the shaft 56. In this position (see Fig. 6) the spindle 55 and the head 37 are to the left of their normal position, so that the head 37 is no longer engaged with tubular member 39. Since, therefore, the clutch is in its disengaged position, it will be impossible to retract the latch bolt 14 by means of knob 17 until the lock 57 has been released from its depressed position by means of a key. Nevertheless, the door can still be opened from the inside by turning knob 16, since the position of lock 57, spindle 55 and head 37 will in no way affect the operation of latch bolt 14 by knob 16.

To permit opening the door from the outside by the use of a key in lock 57 even when the button 49 is depressed as shown in Fig. 6, a sleeve member 62 secured to and disposed around spindle 55 is provided. This sleeve member 62 will strike a projection on pawl 61 when the lock 57 is depressed beyond its normal locked position. In Fig. 6 the lock mechanism is locked in position by the bolt 63. This bolt will be retracted when the lock 57 is actuated by a key, thus releasing the lock 57 for slidable movement within hollow shaft 56. The lock can then be depressed further against the action of spring 59 so that the sleeve member 62 will raise pawl 61 thus releasing member 39 which will return to its normal position. When the pressure on lock 57 is released the lock and the spindle 55 will return to their normal position as shown in Fig. 7 so that member 39 and head 37 will become engaged and the door can be opened by turning knob 17 in the usual manner.

It will be clear that the slidable knob 16 and associated parts shown in Figs. 1 and 2 serve exactly the same purpose and function as the button 49 and associated parts shown in Figs. 6 and 7 so that these arrangements may be used interchangeably in the modifications shown.

It is to be understood, of course, that the specific elements and exact arrangement of parts shown in the drawings are given by way of illustration and that various modifications and equivalents will be obvious to one skilled in the art. The scope of the present invention is defined by the appended claims.

What is claimed is:

1. A door latch for a door comprising a retractable latch bolt, means including a fork member for retracting said bolt, means adapted to be operable from the inner side of the door for actuating said retracting means, means including clutch means for normally permitting operation of said actuating means from the outside of the door to retract said latch bolt, means adapted to be operable from the inner side of the door for disengaging said clutch means to render the latch inoperable from the outer side of the door, and means for holding the clutch in the position of disengagement, said fork member being adapted to release said holding means to permit re-engagement of said clutch means when said retracting means are actuated, depressible key-actuated means for the outer side of the door for disengaging said clutch means to render said latch inoperable from the outer side of the door, means operable by further depressing said key-actuated means for releasing said holding means when said holding means is holding the clutch in the position of disengagement so that said clutch means will be engaged after said key-actuated means is released, thus permitting the operation of said retracting means from the outside of the door.

2. A door latch as claimed in claim 1 wherein the means for releasing said holding means by said key-actuated means comprises a sleeve member slidably actuated by said key-actuated means.

3. A door latch as claimed in claim 1 wherein said clutch means includes a driven member and wherein said holding means includes a pawl for engaging said driven member to hold said clutch in the position of disengagement, said pawl being disengageable from said driven member by said fork member or by said releasing means.

4. A door latch for a door comprising a retractable latch bolt, means including a fork member for retracting said bolt, means adapted to be operated from the inner side of the door for actuating said retracting means, means including clutch means having parts normally in operative engagement for operating said actuating means from the outside of the door to retract said latch bolt, said clutch means including a driven member, means adapted to be operated from the inner side of the door for disengaging said parts of the clutch means to render the latch inoperable from the outer side of the door, means for holding the parts of the clutch means in position of disengagement and including a pawl for engaging said driven member to hold said clutch means in the position of disengagement, and means on said fork member to release said holding means to permit re-engagement of said clutch means when said retracting means are actuated from the inner side of the door.

DAVID C. SMITH.
LEROY I. OBLINGER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,090,772	Wilson	Mar. 17, 1914
1,902,343	Shaw	Mar. 21, 1933
2,123,808	Schneider	July 12, 1938
2,176,297	Dials	Oct. 17, 1939