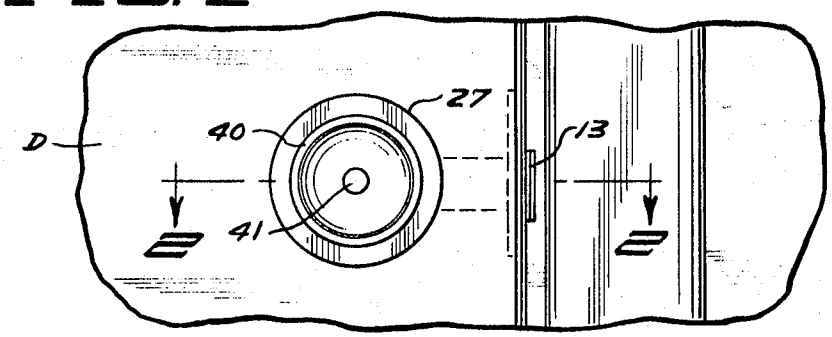
July 22, 1969 F. J. MOORE 3,456,974

SAFETY DOOR LATCH MECHANISM

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FIG. 1



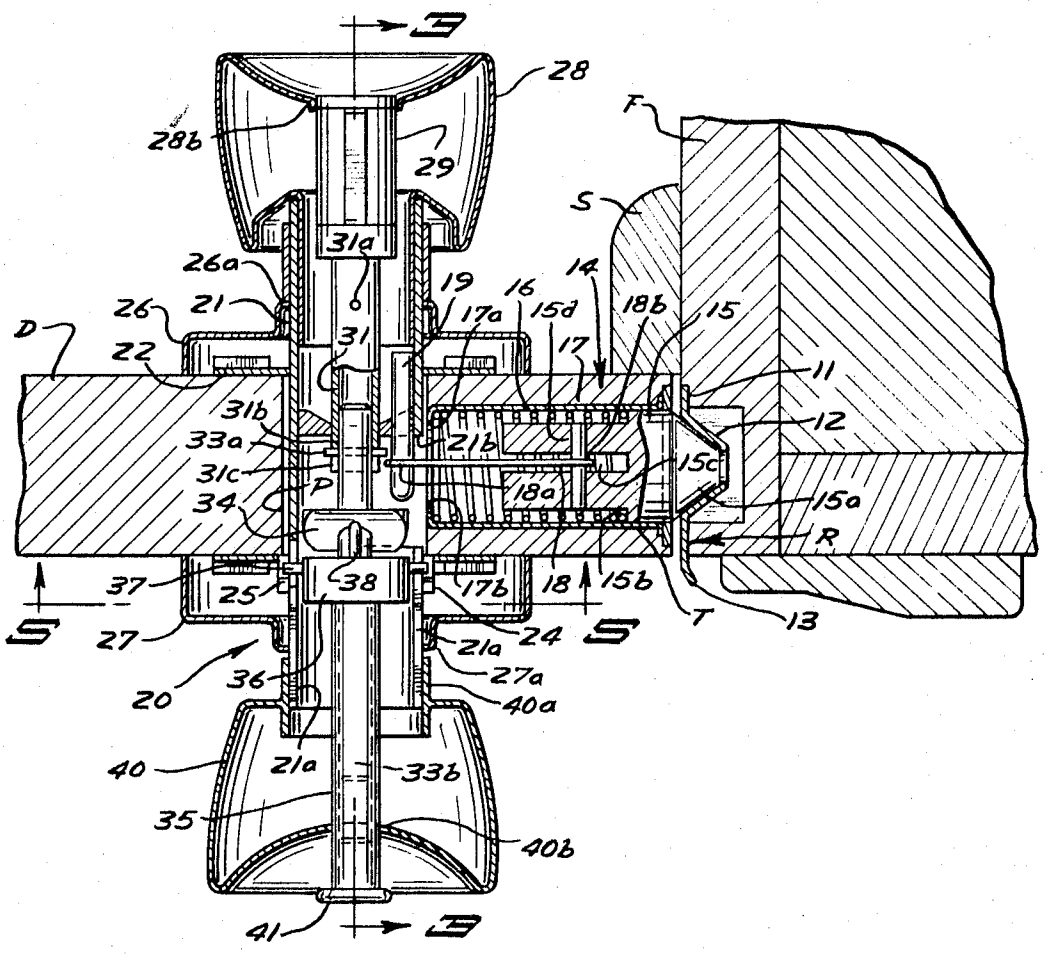


FIG. 2

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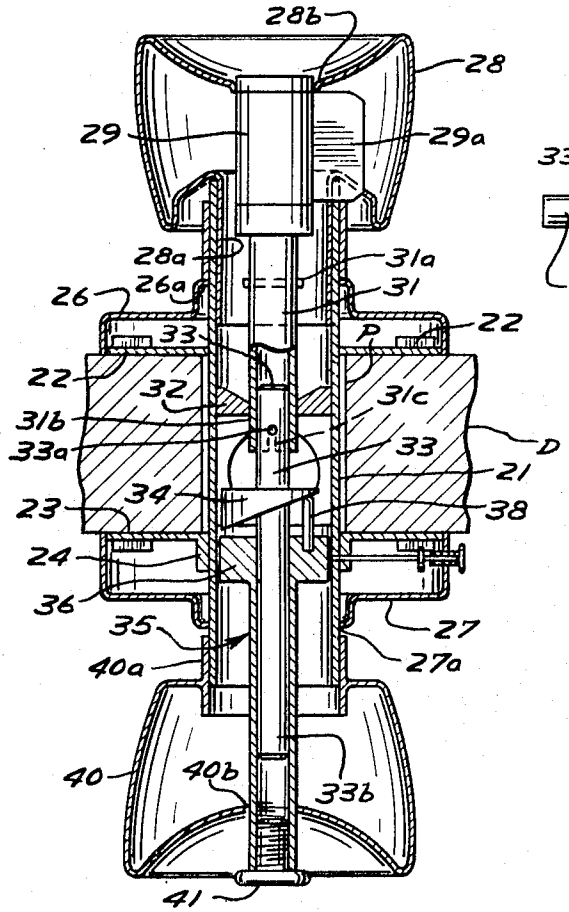
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July 22, 1969 F. J. MOORE 3,456,974

SAFETY DOOR LATCH MECHANISM

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FIG. 3



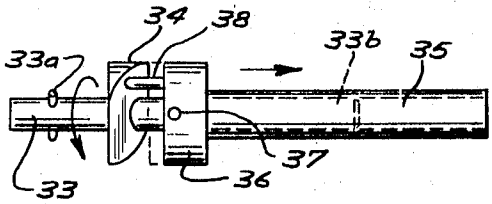


FIG. 4

FIG 7

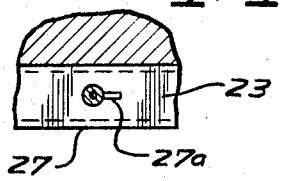
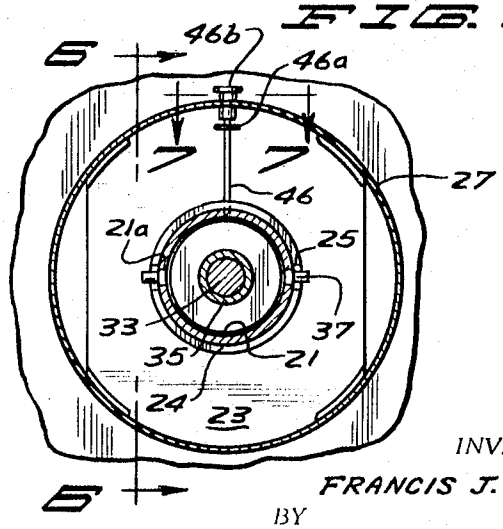


FIG. 5



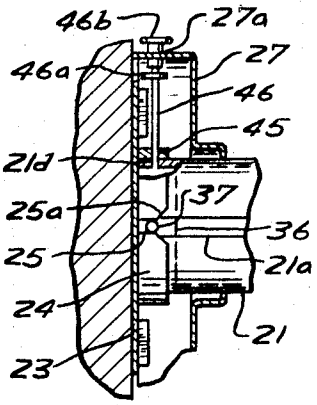


FIG. 6

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3,456,974

SAFETY DOOR LATCH MECHANISM

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Int. Cl. E05b 13/00, 55/04
U.S. Cl. 292—359 3 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to a door latch mechanism arranged for insertion through the width of a door to control and actuate a latch member inserted through the edge of the door. The latch member is frusto conical in shape receivable into a frusto conical latch receiving element on the door frame. The operative portion of the latch includes a first tubular member having a notched periphery to engage with the latch device and includes interiorly thereof a cam mechanism extending longitudinally therethrough with means for actuating the same on either end thereof. The camming rod includes a first locking device engageable to prevent rotation of the tubular actuating member with a camming device for shifting this lock device from locked position from the other end of the tubular member. The entire operating mechanism is carried by the first tubular longitudinal member to permit installation into a door with a minimum aperture being necessary for the door.

In the past various door latch mechanisms have been provided which basically depend upon a one way situation. This is to say that the door latch mechanism itself is tapered in one general direction such that when the door is closed into the door frame the camming surface will force the latch inwardly to permit the latch to pass along a door frame mounted guiding unit into the door latch receptacle. This system is subject to tampering in that it is only necessary to "Celluloid" the door latch in order to force it into retracted position and then open the door. Applicant's design of a frusto-conical latching mechanism will force any material against the side surface thereof to bend and be forced into the frusto-conical recessed portion thereof rather than to permit urging of the latch rearwardly into open position.

It is a further object of applicant's invention to provide a cam locking mechanism for doors which includes a simplified camming device whereby a manual locking device is provided on one side of the door for push-pull operation and a cylinder lock is provided on the other side of the door such that the door may be opened from the cylinder side thereof and may be either locked or opened from the manual operated side thereof.

It is still a further object of applicant's invention to provide a simplified door lock and latching construction which will utilize a relatively small area of the door for mounting the same therein and which permits the mounting of all actuating and actuated portions thereof within a relatively small area.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is a partial side elevation of a typical installation of a door latch embodying applicant's concept illustrated with a door and door frame;

FIG. 2 is a horizontal section taken substantially along line 2—2 of FIG. 1 illustrating the door latch in closed and locked position;

FIG. 3 is a vertical section taken substantially along line 3—3 of FIG. 2;

FIG. 4 is a detailed illustration of the camming portions of the locking mechanism;

FIG. 5 is a vertical section taken substantially along line 5—5 of FIG. 2;

FIG. 6 is a vertical section taken substantially along line 6—6 of FIG. 5 particularly illustrating the dead locking device incorporated in applicant's invention; and

FIG. 7 is a horizontal view taken substantially along lines 7—7 of FIG. 5 illustrating the dead locking feature incorporating applicant's device.

In accordance with the accompanying drawings applicant's door lock device is mounted in a door D by providing a first mounting passage P therethrough and a second passage T extending inwardly from the edge of the door to intersect with the mounting passage P. These are the only apertures which must be provided through a door to positively mount applicant's device therein and it should be noted initially that the size of each of these apertures is relatively small when compared with those door latch devices which are known in the prior art. In order to accommodate this unit into a door frame F the standard door stop S is provided and likewise a door latch receptacle generally designated R is provided to the door frame structure. The receptacle R in the form shown includes a substantially flat plate member **11** having a frusto-conical shaped recess **12** centrally thereof and having a guiding lip **13** on the receiving edge thereof to permit a door latch to normally be received and cammed into the plate **11** while passing over the lip section **13** and thence downwardly by spring pressure to be received into the frusto-conical shaped recess **12**. This door latch receiving mechanism except for the frusto-conical shaped portion **12** will be generally known to those skilled in the art.

The door latching mechanism generally designated **14** includes a generally cylindrical latch portion **15** having a frusto-conical end portion **15***a* to be received into recess **12** and is followed by a shoulder portion **15***b* reduced in diameter from the normal cylindrical portion thereof to provide a shoulder against which a pressure spring **16** may operate. A housing member **17** is provided to be received within passage T and has a shoulder portion **17***a* on the inner end thereof for agreeing abutment with compressible spring member **16** such that the spring **16** will be compressed between shoulder **15***b* and shoulder **17***a*. This inner end of housing **17** is also provided with a passage **17***b* therethrough to permit a linkage member **18** to pass therethrough into the operative and operational section of the mechanism. Linkage member **18** is provided with a loop **18***a* on the inner end thereof for engagement with an actuating pin member **19** while the latch connective end **18***b* of link **18** is received into a slot **15***c* on latch member **15** and a pin **15***d* is designed to pass therethrough for positive connection of the link **18** to the latch member **15** and thus the latch **15** to the operative pin member **19**. It should be obvious that along the length of this link **18** there must be a free lost-motion section such that when the latch member **15** is forced inwardly as by abutment with the plate **13** upon closing the door the operative pin **19** will not cause the door knobs to rotate.

The operative section of the mechanism is generally designated **20** and includes a first tubular latch actuating section **21** mounted for rotative movement within passage P on a pair of flange elements **22–23** which flanges are arranged on respective sides of the door D. Flange element **23** is provided with a longitudinally extending rim portion **24** which as illustrated in FIG. 6 is provided with a pair of diametrically opposed longitudinally arranged locking slot members **25—25** having diverging guide-in surfaces **25***a* on the outwardly extending end thereof. A pair of cover plates designated respectively **26–27** are provided to normally overlie and cover the journaling members **22–23** and the outwardly extending portions thereof

26*a*–27*a* are likewise provided of a proper shape to serve as a proper journaling surface for the tubular latch actuating member **21**.

A first actuating knob **28** is provided in fixed relation to the tubular actuator **21** through a longitudinally extending flange portion **28***a* and a pasasge **28***b* is provided completely therethrough for the mounting of what is commonly known as a cylinder lock **29** therein. This cylinder lock **29** as commonly known provides a stationary stop **29***a* and a rotatable barrel **31** which barrel **31** is connected to the lock unit **29** through an additional pin **31***a*. This barrel member **31** is guided within the tubular actuating structure **21** through an inwardly projecting radial flange **32** and the end **31***b* of this barrel structure **31** is provided with a pair of guide slots **31***c* arranged in diametrically opposed position for housing and guiding a pinned connective rod and cam carrying element **33** therein. In the form shown the cam carrying rod element **33** is provided for slideable movement within a central aperture of the hollow barrel **31** by a radially extending pin **33***a* received into slot **31***c* to permit limited oscillation of the rod **33** therein. The opposite end **33***b* of rod **33** extends longitudinally through the tubular actuating shaft **21** for slideable engagement internally of a locking rod designated **35**. Rod and cam carrying member **33** also carries a beveled cam **34** intermediate the ends thereof which cam **34** is a single plane cam as particularly illustrated in FIG. 3 with its actuating camming surface arranged in opposed relation to the cylinder lock **29**.

Locking rod **35** includes a generally tubular rod member arranged for slideable movement over the extending end **33***b* of the rod and camming member **33** and is provided with a cylindrical boss **36** on the inward end thereof arranged for longitudinal sliding with tubular structure **21**. A pair of pins **37**—**37** are arranged in radially extending, diametrically opposed relation on the enlarged cylindrical portion **36** and the tubular member **21** is provided with a pair of diametrically opposed slots **21***a*—**21***a* to permit the cylindrical block to be received therein and slide longitudinally therewithin. Extending pins **37** are arranged to meet with the receiving locking slots **25** on rim **24** when in their innermost or locking location.

A second cam follower **38** is provided on the enlarged cylindrical portion **36** and extends longitudinally parallely up to the camming rod member **33** to normally abut with the cam device **34** for operation thereagainst. Locking rod **35** extends outwardly through the end of the tubular structure **21** and through a second actuating knob member **40**. A capturing element **41** may be threadably received into the end of locking rod **35**. Knob **40** is removably received upon the tubular actuating member **21** and this may be accomplished through set screws or the like which may pass through a cylindrical flange portion **40***a* arranged generally centrally of the knob **40**. As illustrated in FIGS. 2 and 3 a passage **40***b* is formed in the outward extending end of the knob to permit the locking bar **35** to pass therethrough.

As illustrated in FIG. 2 an arcuate passage **21***b* is defined in a peripheral surface of tubular actuating member **21** to permit the link **18** to pass internally into the tubular member **21** and be fastened to an operating pin member **19**. Pin member **19** is fixedly attached to the inner wall of the tubular member **21** such that when the tubular member **21** is rotated the shifting of pin member **19** will pull the link **18** inwardly thus pulling the latch member **15** into the housing **17** against the pressure of spring **16**.

Operation of the device to this point should be clearly understood when the locks are not being utilized. This is to say that either of the knobs **28** or **40** when rotated will rotate the attached tubular actuating member **21** and thence the attached pin **19** to pull inwardly on the link **18** thus retracting the latch member **15**. The lost motion connection in link **18** will also permit the latch **15** to be pushed into retracted position without rotation of either of the knobs such as when the door is swung into closed position.

Operation of the lock device which consists basically of the locking rod **35**, cam carrying rod **33** and the cylinder lock **29** with its associated tubular structure **21** is as follows. When it is required to lock the door it is necessary to actuate the lock from the inside or the push pull side of lock rod **35**. Normally of course the cylinder lock **29** will be arranged outside of the area to be locked. Upon pushing rod **35** inwardly the pins **37** will be received into the locking slots **25** on flange **24** as illustrated in FIG. 6. This of course will prevent rotation of the knobs and the attached tubular member as the pins **37** pass not only into the locking slot **25** but likewise are arranged in slots **21***a* within the tubular structure. When it is desired to unlock the door from the inside it is only necessary to pull the locking pin rod **35** outwardly to release the pins **37** from their respective locking slots **25**. When it is desired to unlock the door from the outside or cylinder side of the door and the pins **37** are in their normal locking slots **25**, insertion of the proper key into cylinder lock **29** will permit rotation of the cylinder lock **29** and thence will provide rotation of the barrel member **31** and cam **34** and rod **33** will be rotated as particularly illustrated in FIG. 4. Rotation of this cam **34** will, as illustrated in FIG. 4 drive the cam follower **38** longitudinally therealong and will drive the pin members **37** from the locking slots **25**. The locking pins **37** again being guided for such longitudinal movement by the passages **21***a*. Complete rotation of the cylinder lock **29** to permit retraction of the key will return the cam surface **34** to its normal position which will again permit the lock rod **35** to be pushed into closing position.

A dead locking device is also provided with this unit and this particular device is illustrated in FIGS. 5, 6 and 7. As illustrated in these figures, an additional aperture **45** is provided within longitudinally extending flange **24** and an aperture **21***b* is provided in the actuating tubular portion **21**. These apertures are in normally aligned position when the tubular actuator **21** is in its normal position with the latch extending outwardly. A locking rod device **46** is provided to extend through the cover plate **27** and particularly through an aperture **27***a* therein. This aperture **27***a* is a key shaped aperture such that it is possible to retract the rod **46** and shift the same along the periphery of the cover plate **27** to maintain the rod in an upward direction without removing the locking end thereof from the aperture **45** in the longitudinal flange **24**. A stop member **46***a* may be provided to prevent complete removal of this pin **46** and a small hand grasping portion **46***b* may be provided on the end thereof to assist in lifting and locating this positive locking unit. This locking unit is completely independent of the other locking portions of the device and as such may actually serve as a dead bolt type lock in that even if the key is utilized in the outside of the door this lock member **46** will prevent rotation of the tubular member **21** and thus maintain the latch **15** in its extended position.

It should be obvious that applicant has provided a new and unique simple system for providing a locking mechanism for door latches which is simple in construction and positive in its operation. Likewise the lock provided herein is a dual safety lock mechanism in that the shape of the latch prevents slipping of the latch and the dead lock combination will permit positive locking of the unit, against even key opening.

It will, of course, be understood that various changes may be made in the form, details, arrangements and proportion of parts without departing from the scope of the invention, which generally stated consists in the matter set forth in the appended claims.

What is claimed is:

1. A door latch unit including:

(a) a latch retaining section arranged to be received into the edge of a door having a latching element slidably arranged therein;

(b) a tubular rotatable actuating member mounted for rotation through the width of the door having an access slot formed through the periphery thereof arranged to be aligned with said latching element;

(c) means connecting said latching element to said actuating member for retraction of said element upon rotation of said actuating member;

(d) a flange secured to one side of the door and having at least one slot therein extending longitudinally with said actuating member;

(e) said actuating member having at least one longitudinal extending slot therein arranged to be aligned with said slot in said flange;

(f) a locking rod longitudinally slidable from one end of and with respect to said actuating member having means thereon to commonly engage both of said slots to prevent rotation of said actuating member and having a passage formed longitudinally therein;

(g) a camming rod extending from the other end of and with respect to said actuating member and telescoping with said locking rod to position the same in cam responsive position when said locking rod engages both of said slots; said locking rod having a longitudinally extending member thereon to engage with the camming surface of said camming rod for actuation thereby;

(h) handle means on the respective ends of said actuating member.

2. The structure set forth in claim 1 wherein said locking rod is arranged internally of said actuating member with at least one radially extending pin thereon for engagement with both of said slots.

3. The structure set forth in claim 1 and a key lock member arranged on the end of the actuating member opposite said locking rod receiving end and telescoping with said camming rod for actuation thereof while permitting longitudinal movement of said camming rod and locking rod.

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U.S. Cl. X.R.

70—146, 216