May 28, 1963 M. E. WILLIAMS 3,091,490

DETENT MECHANISM FOR SECURING A KNOB TO A DOOR LATCH

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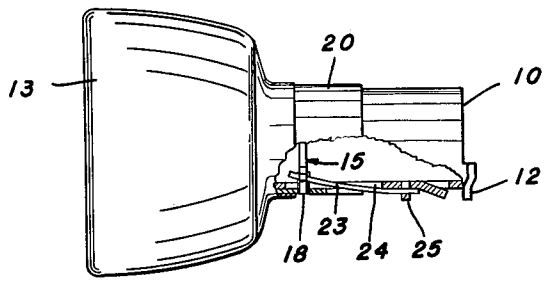


FIG. 1

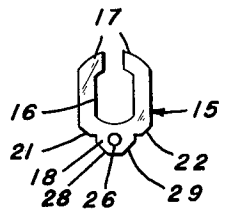


FIG. 4

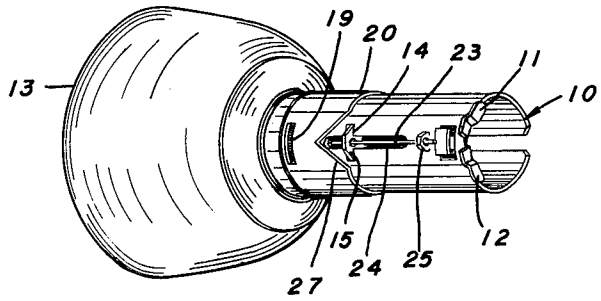


FIG. 2

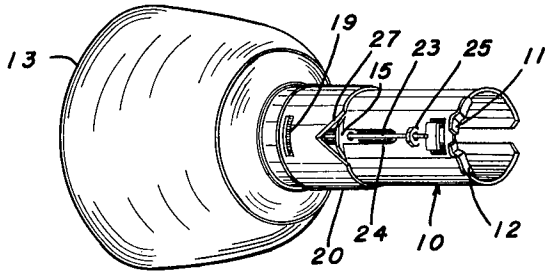


FIG. 3

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DETENT MECHANISM FOR SECURING A KNOB TO A DOOR LATCH

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This invention relates to the construction of door latches, and particularly to the mechanism for detachably securing a knob to the tubular sleeve conventionally used to transfer torque from the knob to the latch for retracting the bolt. It is desirable that this detachable coupling should be engageable with a simple push-on movement, and should be disengageable without the use of special tools other than that normally used for multiple purposes by a workman. The knob, however, must not be disengageable under conditions that would provide unauthorized access to the interior of the latch mechanism.

It is conventional practice to secure a knob in position on a tubular sleeve through the action of a detent mounted for sliding movement with respect to the sleeve in a direction corresponding to a diameter through the sleeve axis. This detent engages an opening in a cylindrical shank extending from the knob, and can usually be released by the manipulation of a screw driver in a manner such as to force the detent inwardly and out of the shank opening. An example of this type of mechanism is shown in Patent Number 2,694,309. This invention provides an improvement on this type of structure, particularly with regard to the engagement of the knob with the detent on installation, and also with regard to the mounting of the spring for biasing the detent to locking position. The several features of the invention will be analyzed in detail through a discussion of the particular embodiment illustrated in the accompanying drawing. In the drawing:

FIGURE 1 presents a fragmentary section in side elevation showing a knob locked in engagement with a knob sleeve.

FIGURE 2 presents a perspective view showing a knob as it is first inserted over the end of the knob sleeve, and prior to the engagement with the retaining detent.

FIGURE 3 illustrates an intermediate position at which the detent is being retracted as the knob is progressively forced into the fully-engaged position shown in FIGURE 1.

FIGURE 4 presents a plan view of the detent itself.

The knob sleeve **10** is a tubular structure normally associated with a conventional door latch mechanism (the remainder of which is not shown in the drawing), and usually carries a pair of roll-back cams of the type shown at **11** and **12** for operating the retractor mechanism of the latch. The primary function of the sleeve **10** is to transfer the manually-supplied torque from the knob **13** to the latch mechanism where it can be converted to forces exerted by the cams **11** and **12**. Except for the portions relating to the support and construction of the detent for retaining the knob **13** in position, the illustrated sleeve **10** is conventional in its construction.

The sleeve **10** is provided with a pair of diametrically opposite slots, one of these being shown at **14**. These slots are parallel to a plane perpendicular to the axis of the sleeve **10**, and receive the detent **15** in sliding engagement. If the amount of the desired sliding movement of the detent **15** exceeds or approaches the thickness of the material of the sleeve **10**, the material of the sleeve **10** adjacent to one or both of the slots **14** may be depressed radially inward with respect to the axis of the sleeve **10**. The interior of the detent **15** is usually cut away as shown

at **16** to provide clearance for operating mechanism which may be confined within the sleeve **10**. The portions **17** and the projection **18** slide within the slots **14**.

The locking projection **18** extends radially outward a sufficient amount to engage the opening **19** in the cylindrical shank **20** which is fixed with respect to the knob **13**. The opening **19** may be a pierced hole or any conveniently-shaped discontinuity capable of receiving a portion of the projection **18**. The shoulders **21** and **22** abut the inside surface of the sleeve **10**, and serve as a stop limiting the outward movement of the detent **15** under the urging of the spring wire **23**. An axial slot **24** is provided in the sleeve **10** intersecting the slot **14**, illustrated in the drawing. This axial slot provides clearance for the deflection of the spring wire **23** during the movement of the detent **15**. The spring wire **23** is held in position through engagement with the loop **25** of material preferably lanced from the sleeve **10**. On assembly, the spring wire **23** is inserted through the hole **26** in the detent **15**, and through the loop **25**. The loop may then be deformed somewhat to secure the spring in position. It is noteworthy that this construction permits the use of a completely straight piece of steel wire for the spring **23**, which requires nothing more than a cut-off operation in the manufacture of this component. It is notorious that the tolerances in bending of spring steel wire are very difficult to maintain, and this arrangement eliminates a very troublesome problem.

The knob shank **20** is provided with a preferably V-shaped notch **27** axially opposite the opening **19**. The surfaces **28** and **29** of the detent **15** form an outwardly-converging end to the projection **18**, and cooperate with the edges of the shank **20** which form the notch **27** to retract the detent **15** as the knob is axially shoved into engagement with the sleeve **10**. As a result of the tapering conformation of the notch **27**, the engagement of the sleeve **20** takes place with the surfaces **28** and **29**, rather than with the exposed transverse face of the detent **15**. FIGURE 3 illustrates the result of this engagement, and the axial movement of the knob into the assembled position will result in retracting the detent **15** inwardly to the point where it will slide underneath the shank **20** until it can snap into engagement with the opening **19**. This locked condition is shown in FIGURE 1. Removal of the knob is accomplished by inserting a screw driver at the opening **19** and engaging the end of the projection **18** so that it can be pushed radially inward to the point where the knob can be withdrawn.

The particular embodiments of the present invention which have been illustrated and discussed herein are for illustrative purposes only and are not to be considered as a limitation upon the scope of the appended claims. In these claims, it is my intent to claim the entire invention disclosed herein, except as I am limited by the prior art.

I claim:

1. In a latch mechanism having a knob and a sleeve normally receiving said knob for transferring torque from said knob to said latch mechanism and supporting said knob, said sleeve having an axially-extending slot in the periphery thereof and an outwardly-extending circumferentially disposed loop opposite the end of said slot, a system for detachably securing said knob to said sleeve comprising: a shank member normally fixed with respect to said knob and engageable axially with said sleeve, said shank member having an opening in the wall thereof and a notch axially aligned with said opening providing cam surfaces diverging to increased width to the end of said shank; detent means slidably mounted in said sleeve for movement transversely to the axis of said sleeve at a position intersecting said slot, said detent means having a hole and stop means limiting the out-

ward movement thereof, and also having a projecting portion of substantially uniform thickness tapering outwardly with respect to said sleeve to reduced width in a plane normal to the axis of said sleeve and receivable in said opening, said projecting tapering portion extending substantially radially from the periphery of said sleeve for engagement with said cam surfaces in the position of said detent determined by said stop means; and biasing means urging said detent toward said position, said biasing means including an initially straight piece of wire disposed adjacent said slot and engaging said detent hole and loop in said sleeve.

2. In a latch mechanism having a knob and a sleeve normally receiving said knob for transferring torque from said knob to said latch mechanism, a system for detachably securing said knob to said sleeve comprising: a shank member normally fixed with respect to said knob and engageable axially with said sleeve, said shank

member having a discontinuity in the wall thereof and a notch axially aligned with said discontinuity providing cam surfaces diverging to increased width to the end of said shank; detent means slidably mounted in said sleeve for movement transversely to the axis of said sleeve and having a projecting portion of substantially uniform thickness tapering outwardly with respect to said sleeve to reduced width in a plane normal to the axis of said sleeve to define edges engageable with said cam surfaces and receivable in said discontinuity; and biasing means urging said detent toward engagement with said discontinuity.

References Cited in the file of this patent

UNITED STATES PATENTS

2,801,123	Kubik et al.	July 30, 1957
2,842,389	Muttart	July 8, 1958
2,850,313	Check et al.	Sept. 2, 1958