Aug. 25, 1942. W. R. SCHLAGE 2,294,213

DOOR KNOB STRUCTURE

Filed May 8, 1940 2 Sheets-Sheet 1

Fig. 1.

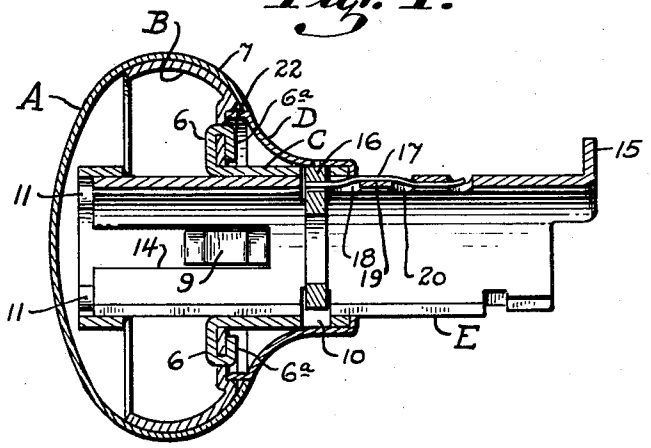
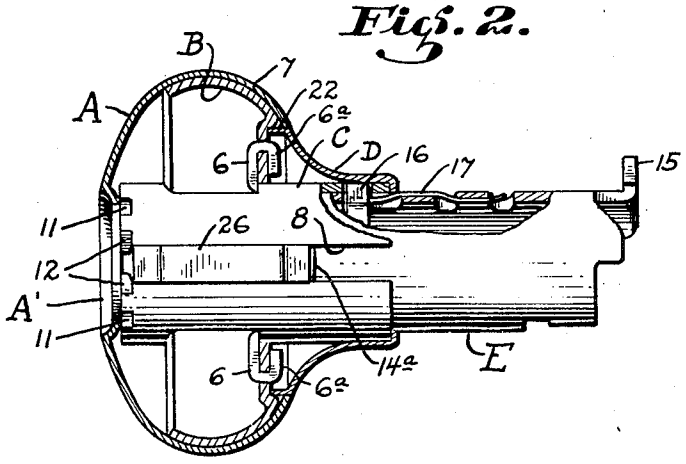


Fig. 2.



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Filed May 8, 1940 2 Sheets-Sheet 2

Fig. 3.

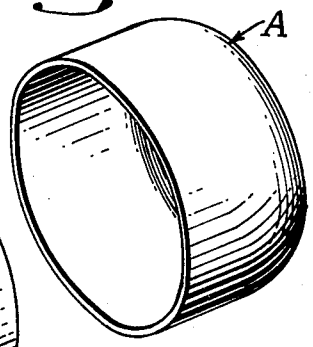


Fig. 4.

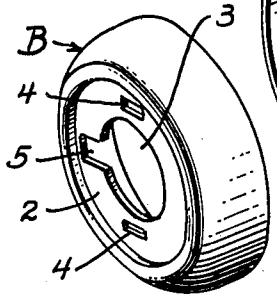


Fig. 5.

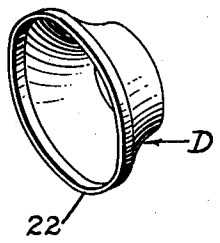


Fig. 6.

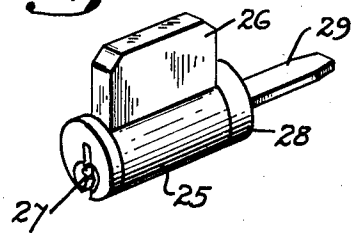


Fig. 7.

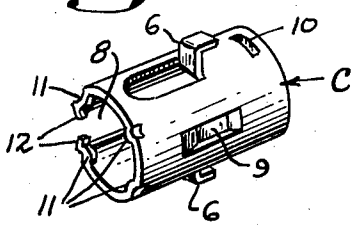


Fig. 8.

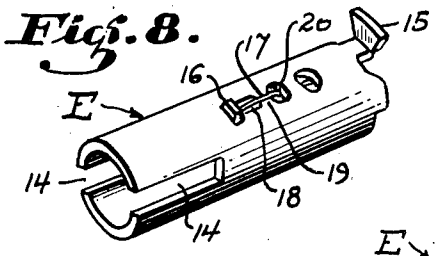
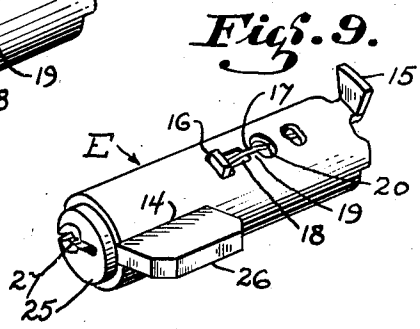


Fig. 9.



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UNITED STATES PATENT OFFICE

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DOOR KNOB STRUCTURE

Walter R. Schlage, Burlingame, Calif., assignor to Schlage Lock Company, San Francisco, Calif., a corporation of California

Application May 8, 1940, Serial No. 333,959

3 Claims. (Cl. 292—347)

This invention relates to a door knob structure.

In my former Patent No. 1,853,782, issued April 12, 1932, I disclosed a door knob made from sheet metal by die forming operations. The knob consists of inner and outer shell sections telescoped with relation to each other and assembled by spinning the outer section over the inner section. These two sections form a hollow knob and the inner section is provided with a shank portion to permit the knob to be applied to the end of a spindle and to be secured thereto.

In order that a rigid connection might be made between the knob and spindle, an internal annular shoulder was formed on the outer shell section of the knob to receive the end of the spindle. Hence a definite relationship between the end of the spindle, the shank, the fastening means, etc., was required, as any slight variation in spacing between these parts would prevent the required alignment or registration of parts and render assembly of the parts difficult. In other words, the required spacing or relationship between the several parts depended upon the proper uniting or assembly of the two knob sections; and this, in actual practice, proved so difficult that the position of the end of the spindle with relation to the outer section of the knob, and the location of the knob securing means, had to be determined and located after the knob sections were united and assembled.

The present invention relates to a knob structure of a similar type, that is, a knob formed from sheet metal by die forming operations. The invention comprises a knob which consists of three main parts, to-wit, an outer shell, an inner shell, and a tubular shank member. The shank member functions as an anchor on which the shell sections are assembled and united in a fixed position, and is further provided with the required stops, slots, securing means, etc., to receive a spindle and to maintain a proper relationship between the knob parts and the spindle upon which it is mounted.

The knob structure is shown by way of illustration in the accompanying drawings, in which

Fig. 1 is a longitudinal vertical section of the knob, showing it applied to a door knob spindle;

Fig. 2 is a similar section, also showing the knob applied to a door knob spindle, but in addition thereto, showing a spindle which is provided with a cylinder lock;

Fig. 3 is a perspective view of the outer shell section of the knob before it is telescoped over the inner section and united therewith;

Fig. 4 is a perspective view of the inner shell section of the knob;

Fig. 5 is a perspective view of a separable section of the knob;

Fig. 6 is a perspective view of a standard form of pin tumbler cylinder lock;

Fig. 7 is a perspective view of the tubular knob shank;

Fig. 8 is a perspective view of a door knob spindle; and

Fig. 9 is a similar view of a door knob spindle showing a pin tumbler cylinder lock mounted in the outer end thereof.

Referring to the drawings in detail, and particularly to Fig. 1, A, B, C, and D indicate the several parts forming the knob structure. The part A will hereinafter be referred to as the outer shell section of the knob; the part B will be known as the inner shell section of the knob; the part C will be known as the tubular knob shank; and the part D will be known as the separable knob section.

The parts A and B are formed from sheet metal by die punching and forming operations, and when formed and ready for assembly will assume the shape shown in Figs. 3 and 4. The part B has an inner wall section **2** in which is formed a central opening **3**, a pair of radially disposed openings **4—4**, and a slot **5**. The part B is slipped over the tubular shank C and engages a pair of lugs **6—6** formed thereon, which enter through the openings **4—4**. These lugs are then bent over, as shown at **6a**, and the inner section is thus rigidly secured and anchored to the tubular shank. The part A (see Fig. 3) is then slipped over the inner section B, and it is united therewith by spinning or pressing the portion **7** thereof downwardly over the inner section, thereby uniting the shells and forming a hollow sheet metal knob.

The tubular shank is best shown in Figs. 1 and 7. It may be formed from tubing or from flat sheet metal which is afterward formed into a tube. It is provided with two radially extending lugs **6—6**. A slot is formed therein, as shown at **8**, which extends from end to end, a key-way member **9** is formed by forcing a portion of the metal inwardly, and openings **10—10** are formed in the inner end to receive knob securing means hereinafter to be described. It should also be noted that the outer end of the tubular shank is provided with stop lugs **11**, and on opposite sides of the slot **8** are formed inturned fingers **12**, the function of which will hereinafter be described.

The particular type of door knob spindle em-

ployed in this instance is best illustrated in Figs. 1 and 8. It is tubular in cross section, and may be of any length desired. Its exterior diameter is such that the tubular shank C may telescope over the outer end thereof and fit it snugly. A pair of opposed slots 14 are formed in the outer end of the spindle, a radially extending rollback member 15 is formed in the opposite end of the spindle, and a spring actuated latch 16 is also mounted on the spindle to permit the knob to be secured against endwise removal from the spindle, as will hereinafter appear.

The spring actuated latch is nothing more or less than a small plate of approximately rectangular shape which is perforated to receive one end of a spring 17. This spring passes out through an opening 18 formed in the spindle, then passes over the exterior surface at the point 19, and then back into the spindle through an opening 20. No claim per se is made on this structure, as it has been disclosed and claimed in former patents issued to me.

With the knob parts united and assembled as shown in Fig. 1, the knob may be slipped over the outer end of the spindle indicated at E; and when this is done, the knob will be forced inwardly until the stop lugs 11 engage the outer end of the spindle. When this engagement is made, the spring actuated latch 16 will align with the opening 10 formed in the shank, and the spring will thus urge it outwardly into said opening, thereby securing the knob and shank against endwise removal.

As the knob is applied to the spindle, care must be taken that the key member 9 formed on the shank aligns with one or another of the slots 14, as it would otherwise be impossible to force the tubular shank over the outer end of the spindle. Furthermore, this key member insures alignment of the opening 10 with the spring actuated latch, and it also secures the knob of the spindle against rotational movement about the spindle. The stop lugs 11 insure a pre-determined position between the knob shank and the spindle in a longitudinal direction, thereby causing registration of the spring latch in the opening 10. But this alignment alone is not sufficient for the simple reason that if the key member 9 was not provided, the shank and knob might be rotated so that the opening 10 was not in radial alignment with the latch. Such radial alignment, however, is assured by the key member 9 and one or the other of the slots 14.

There are two openings such as shown at 10, so that the spring latch may enter either of them. Similarly, there are two slots 14 so that the key member 9 may enter either of them. This duplicate arrangement of openings 10 and slots 14 is to permit change in position of the spindle so that it may be used on both right and lefthand mounted door locks.

The removable section D of the knob is merely provided to increase the general artistic outline and appearance of the knob proper. This member is really nothing more nor less than the ferrule, the inner end of which is spun or expanded to form an annular flange 22 which enters into the knob under the shoulder formed by the spun-over section 7 of the outer shell A. Besides improving the appearance of the knob, the member D functions as a cover for the securing means, or, in other words, the latch 16, and it also covers and conceals the lugs 6 whereby the inner section of the knob is secured to the shank.

In some instances a pin tumbler form of cylinder lock is mounted in the outer end of the spindle E. Illustration thereof is made in Figs. 2 and 9, the cylinder lock being best illustrated in Fig. 6. This lock consists of a cylindrical body 25 having an extension 26 formed thereon which carries the pin tumbler. A key opening 27 is formed in the outer end of the housing 25. A rotatable collar 28 is disposed at the opposite end, and this is provided with a driver blade 29 which is rotated by the key actuated core of the lock.

It was previously stated that the spindle E was provided with two slots 14—14. One of them will always function to receive the key member 9 of the tubular shank, and one of them will serve as a receptacle for the housing extension 26 of the key actuated cylinder lock, as shown in Figs. 2 and 9. The lock is inserted in the outer end of the spindle, as shown in Fig. 9, before the knob is slipped over the spindle, but when the knob is slipped over the spindle the fingers 12—12 at the end of the slot 8 will engage the outer end of the housing 26, and the spindle proper will at the same time engage the stop lugs 11. The extension 26 of the cylinder lock will also extend through the slot 8 of the tubular shank, and the inner end of one of the slots 14 will engage the opposite or inner end of the housing 26, as shown at 14a (see Fig. 2), thereby rigidly securing the key actuated cylinder lock both with relation to the spindle and the tubular shank when the knob has been applied. Where a cylinder lock is applied or inserted as described, a central opening A' is formed in the shell section A to permit introduction of a key for actuation of the lock, and when it is inserted, the core of the lock will rotate and so will the collar 28 and the driver blade 29. This blade will actuate a key spindle not here shown, and this in turn actuates a rollback member whereby the door lock is opened by means of the key. The other rollback member 15 functions only when the knob spindle E is rotated.

In the structure here shown, it will be noted that there must be a predetermined rotational position between the spindle E and the tubular shank, C, as one or another of the slots 14 in the spindle must register with the key member 9 of the shank, and the latch 16 must register with one or another of the openings 10 formed in the shank. Also there must be a definite position between the spindle and the tubular shank in the longitudinal direction to permit registration between one or another of the openings 10 and the latch 16, and such longitudinal positioning of the parts is also essential to secure the key actuated cylinder lock when this is employed.

All of these positions are readily attained and secured by the provision of a structure such as here disclosed. Furthermore, a simple method has been provided for securing the knob to the shank and for receiving and supporting the separable section D of the knob. The distance between the outer end of the shank, the outer end of the spindle, and the inner surface of the shell section A is not of any great importance, particularly in the structure shown in Fig. 1. Hence the operation of spinning the section 7 of the shell over the inner section B will not have to be a precision operation. Neither is this of great importance where a central opening A' is provided in the outer shell section, as that opening is only employed when a cylinder type of lock is required, and whether the end of the cylinder lock projects more or less outwardly through the

opening A' is immaterial. All the required fixed relationships are maintained in the structure of the tubular shank, and it is this feature which simplifies and reduces the cost of the assembly.

While this and other features of my invention have been more or less specifically described for purposes of illustration, it is to be understood that various changes may be resorted to, all within the scope of the appended claims.

Having thus described and illustrated my invention, what I claim and desire to secure by Letters Patent is:

1. A door knob structure comprising an inner shell section, an outer shell section secured thereto and forming with the inner section a hollow knob, an end wall in the inner shell section having a central opening formed therein, a pair of slots formed in the end wall, one on each side of the central opening, a tubular shank member having one end extending through said central opening into the hollow knob and having its opposite end extending exteriorly of the knob, a pair of radially extending lugs on the shank, said lugs being bent at right angles at their outer ends to pass through the pair of slots formed in the end wall, and said right angular ends adapted to be bent inwardly after passing through the slots to secure the tubular shank to the end wall of the knob.

2. A door knob structure comprising an inner shell section, an outer shell section secured thereto and forming with the inner section a hollow knob, an end wall in the inner shell section having a central opening formed therein, a pair of slots formed in the end walls, one on each side of the central opening, a tubular shank member having one end extending through said central opening into the hollow knob and having its opposite end extending exteriorly of the knob, a pair of radially extending lugs on the shank, said lugs being bent at right angles at their outer ends to pass through the pair of slots formed in the end wall, said right angular ends adapted to be bent inwardly after passing through the slots to secure the tubular shank to the end wall of the knob, and a separable knob section carried by the exterior end of the shank and forming a cover to conceal the securing lugs.

3. A door knob structure comprising an inner shell section, an outer shell section secured thereto and forming with the inner section a hollow knob, an end wall in the inner shell section having a central opening formed therein, a pair of slots formed in the end wall, one on each side of the central opening, a tubular shank member having one end extending through said central opening into the hollow knob and having its opposite end extending exteriorly of the knob, a pair of radially extending lugs on the shank, said lugs being bent at right angles at their outer ends to pass through the pair of slots formed in the end wall, said right angular ends adapted to be bent inwardly after passing through the slots to secure the tubular shank to the end wall of the knob, said shank adapted to telescope over and receive the end of a door knob spindle, and stop lugs formed in the inner end of the shank to engage the spindle and to insure a predetermined position between the knob and the spindle when the knob is applied to a spindle.

WALTER R. SCHLAGE.