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MOLDED KNOB ASSEMBLY

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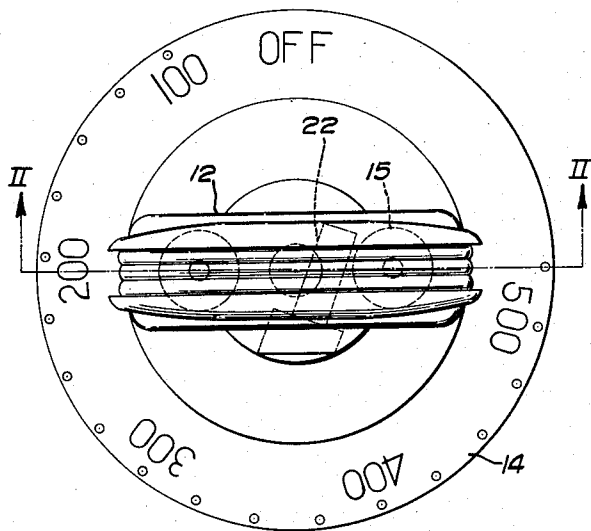


FIG. 1.

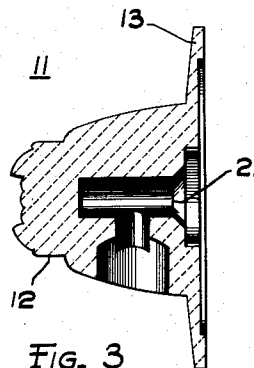


FIG. 3

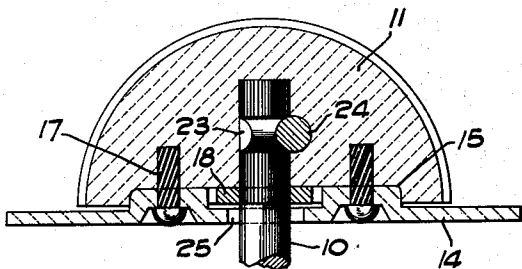


FIG. 2.

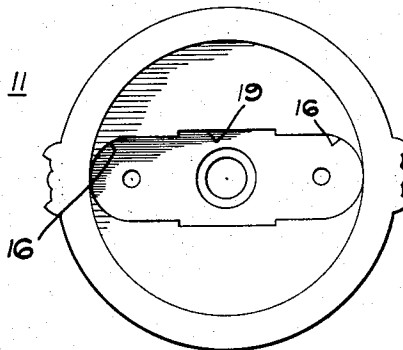


FIG. 4.

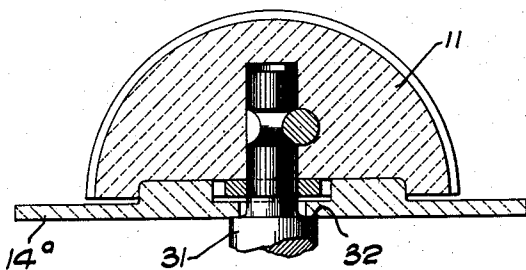


FIG. 5.

WITNESSES:
R. J. Eisinger
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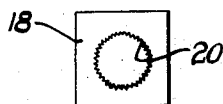


FIG. 6.

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MOLDED KNOB ASSEMBLY

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9 Claims. (Cl. 74-553)

My invention relates to a molded knob assembly, that is, an assembly for mounting a molded actuating knob on a shaft. Such a knob may be used, for example, to actuate the adjusting shaft of a thermostat to adjust the temperature setting of the thermostat.

An object of my invention is to provide an improved assembly of the character set forth.

Another object of the invention is to provide an assembly that may be manufactured at low cost.

A further object is to provide a knob assembly having a colored, translucent dial and which will withstand high temperatures of the shaft on which the knob is mounted.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawing forming a part of this application, in which:

Fig. 1 is a front elevation of a knob assembly incorporating my invention;

Fig. 2 is a horizontal sectional view taken on the line II-II of Fig. 1;

Fig. 3 is a sectional view of the knob;

Fig. 4 is a rear elevation of the knob;

Fig. 5 is a sectional view similar to Fig. 2 showing a modified construction; and,

Fig. 6 is an elevational view of an insert used in both assemblies.

Referring to the drawing in detail, I show a rotatable shaft 10 which is used, for example, to adjust the temperature setting of a thermostat (not shown). A molded knob 11 is attached to one end of the shaft 10 for rotatably actuating the same. Heretofore, an expensive insert, molded in the knob, was employed for mounting the knob on the shaft and for retaining the same against relative rotation. In the assembly comprising my invention, such a molded insert is not required.

The knob 11 comprises a relatively flat handle portion 12 and a circular or disc portion 13. In the illustrated embodiment, there is included a translucent plate or dial 14 whose marginal portion projects beyond the periphery of the disc portion 13 and bears indicia indicating the temperature to which the thermostat is adjusted. The plate 14 is fixed against rotation relative to the knob 11 by means of circular bosses 15 formed thereon and recess portions 16 formed in the knob 11, said bosses being received and closely fitted in said recess portions. The plate 14 may be secured to the knob by drive screws 17 extending through openings in the bosses 15.

The assembly includes an insert member 18,

shown in Fig. 6, which may be a simple stamping. The insert member 18 is arranged to be interlocked against rotation relative to the knob 11, and in the illustrated embodiment it has a square periphery. The knob 11 is formed with a recess portion 19 on the back thereof which closely engages two opposite sides and the four corners of the insert member 18.

The insert member 18 is formed with a shaft opening 20, through which the shaft 10 extends as shown in Fig. 2. The edge of the opening 20 and the end portion of the shaft extended there-through are finely knurled longitudinally of the shaft so as to permit the insert to slide longitudinally on the end portion of the shaft and to interlock the insert member and the shaft against relative rotation. The knob 11 is formed with an opening 21 into which the end of the shaft extends, and an opening 22, disposed tangentially of the opening 21, is also formed therein. The shaft is formed with an annular groove 23, and a self-tapping screw 24 is inserted in the opening 22 to engage the groove 23 and retain the knob 11 on the shaft 10 against movement longitudinally of the shaft.

The plate 14 is also formed with an opening 25 through which the shaft 10 extends, and as shown in Fig. 2, there is a clearance between the shaft and the edge of the opening. The purpose of this clearance is to prevent overheating of the plate 14, as when the assembly is used in connection with the thermostat of an electric roaster, in which case the shaft 10 may be heated to a considerable extent. The knurling on the shaft 10 may also be disposed so as to hold the insert member 18 in spaced relation to the plate 14, as shown on Fig. 2, to prevent transmission of heat.

To assemble the parts, the insert member 18 is first inserted in the recess portion 19, and the plate 14 is then positioned against the back of the knob, the bosses 15 being inserted in the recess portions 16. The drive screws 17 are then driven in to fasten the plate 14 to the knob. The knob and the shaft 10 are positioned in proper angular relation, whereupon the end of the shaft is inserted through the opening 25 in the plate 14 and the knurled opening 20 in the insert member 18, and into the opening 21 in the knob 11. The screw 24 is then inserted to complete the assembly.

The insert member 18 being interlocked with the shaft against relative rotation by the knurling, and the knob 11 being interlocked with the insert member against relative rotation by the rectangular form thereof, it will be apparent that

the shaft 10 may be rotated by actuating the knob 11.

The purpose of finely knurling the end of the shaft 10 and the opening 20 in the insert member 18 is to enable the knob and dial to be accurately positioned in proper angular relation to the shaft 10 when mounting the same thereon, inasmuch as it is not possible to predetermine the position of the shaft 10.

The assembly described above is particularly suitable where a colored, translucent dial is desired. Suitable materials for such a dial will not stand the high temperatures encountered in an electric roaster. With the two-piece assembly described above, the knob itself can be made of a different temperature resisting material, for example, a suitable resinous condensation product, such as "Bakelite" or "Micarta." By providing clearance between the shaft and the opening of the dial, the transmission of heat from the shaft to the dial is sufficiently retarded, so that a satisfactory assembly is provided.

In Fig. 5 I show a modified form of assembly in which the shaft 31, which is to be actuated, is not subjected to high temperature. In this case, it is not necessary to provide clearance between the shaft and the opening 24 in the plate. The shaft is formed with a shoulder 32, the end portion of the shaft being of lesser diameter than the remainder of the shaft. In this case, the plate 14a is held between the shoulder 32 and the knob 11, it not being necessary to provide the drive screws 17.

The shoulder 32 may also be used when the plate 14a is not used. In this case the insert member 18 may be held between the shoulder 32 and the knob 11. Alternately, it may be held between the knob 11 and the end of the knurling.

Further modifications may be made in my molded knob assembly invention without departing from the spirit and scope thereof and I, therefore, desire that only such limitations shall be imposed thereon as are indicated in the appended claims.

What I claim is:

1. A knob and shaft assembly comprising a shaft, a knob mounted thereon, a key member separate from said knob for preventing relative rotation between said knob and said shaft, said knob having a recess in which said key member is disposed, said recess and said key member being formed to prevent relative rotation therebetween, said knob and said key member having aligned shaft openings in which said shaft extends, the edge of the shaft opening in said key member and the portion of the shaft extending through said last-mentioned opening being formed to permit relative movement between said shaft and said key member longitudinally of the shaft and to prevent relative rotation therebetween, means independent of said shaft for retaining said key member in said recess in said knob, and means acting directly between said knob and said shaft for restraining relative movement therebetween longitudinally of said shaft.

2. A knob and shaft assembly comprising a shaft, a knob mounted thereon, a key member separate from said knob for preventing relative rotation between said knob and said shaft, said knob having a recess in which said key member is disposed, said recess and said key member being formed to prevent relative rotation therebetween, said knob and said key member having aligned shaft openings in which said shaft extends, the edge of the shaft opening in said key member

and the portion of the shaft extending through said last-mentioned opening being knurled longitudinally of the shaft to permit relative movement between said shaft and said key member longitudinally of the shaft and to prevent relative rotation therebetween, means independent of said shaft for retaining said key member in said recess in said knob, and means acting directly between said knob and said shaft for restraining relative movement therebetween longitudinally of said shaft.

3. A knob and shaft assembly comprising a shaft, and a knob, a plate member and a key member having aligned shaft openings in which said shaft extends, said plate member interlocking with said knob to prevent relative rotation therebetween and having a peripheral portion projecting beyond the knob, said key member being disposed between said knob and said plate member, said knob and said key member being formed to prevent relative rotation therebetween, the shaft opening in said key member and the portion of the shaft extending therein being formed to prevent relative rotation therebetween, said shaft having a recess in a portion thereof disposed within said knob, and means extending in said knob and in said recess to prevent relative longitudinal movement between said knob and said shaft.

4. A knob and shaft assembly as set forth in claim 3, wherein the portion of the plate member adjacent the shaft opening is disposed in spaced relation to said shaft.

5. A knob and shaft assembly as set forth in claim 3, wherein the portion of the plate member adjacent the shaft opening is disposed in spaced relation to said shaft and to said key member.

6. A knob and shaft assembly comprising a shaft; a plate member, a key member and a knob having openings in which said shaft extends, said plate member having a boss thereon, said knob being formed with a recess or recesses in which said key member and said boss are received, said recess or recesses, said key member and said boss being formed to prevent relative rotation therebetween, the edge of the shaft opening in the key member and the portion of the shaft extending therethrough being formed to prevent relative rotation therebetween, means for securing said plate member to said knob, and means for restraining relative movement between said knob, said plate member, said key member and said shaft.

7. A knob and shaft assembly comprising a shaft having a shoulder formed thereon and an end portion of reduced diameter, a knob, a key member separate from the knob, and a plate member having aligned shaft openings in which said end portion of the shaft extends, said plate member being retained between said shoulder and the knob and having a peripheral portion extending beyond said knob, said plate member and said key member being formed to prevent rotation relative to the knob, the shaft opening in the key member and the portion of the shaft extending therein being formed to prevent relative rotation therebetween, and means engaging said shaft and said knob for preventing relative movement therebetween longitudinally of the shaft.

8. A knob and shaft assembly comprising a shaft, and a knob, a plate member and a key member having aligned shaft openings in which said shaft extends, said plate member interlock-

ing with said knob to prevent relative rotation therebetween and having a peripheral portion projecting beyond the knob, said key member being disposed between said knob and said plate member, said knob and said key member being formed to prevent relative rotation therebetween, the shaft opening in said key member and the portion of the shaft extending therein being formed to prevent relative rotation therebetween, and means for restraining relative movement between said knob and said shaft longitudinally of said shaft.

9. A knob and shaft assembly comprising a shaft having a shoulder formed thereon and an

end portion of reduced diameter, a knob, a key member separate from the knob, and a plate member having aligned shaft openings in which said end portion of the shaft extends, said plate member being retained between said shoulder and the knob, said plate member and said key member being formed to prevent rotation relative to the knob, the shaft opening in the key member and the portion of the shaft extending therein being formed to prevent relative rotation therebetween, and means engaging said shaft and said knob for preventing relative movement therebetween longitudinally of the shaft.

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