Oct. 31, 1944. H. L. MEKELBURG 2,361,559

HANDLE ATTACHING DEVICE

Filed Oct. 28, 1943

Fig. 1

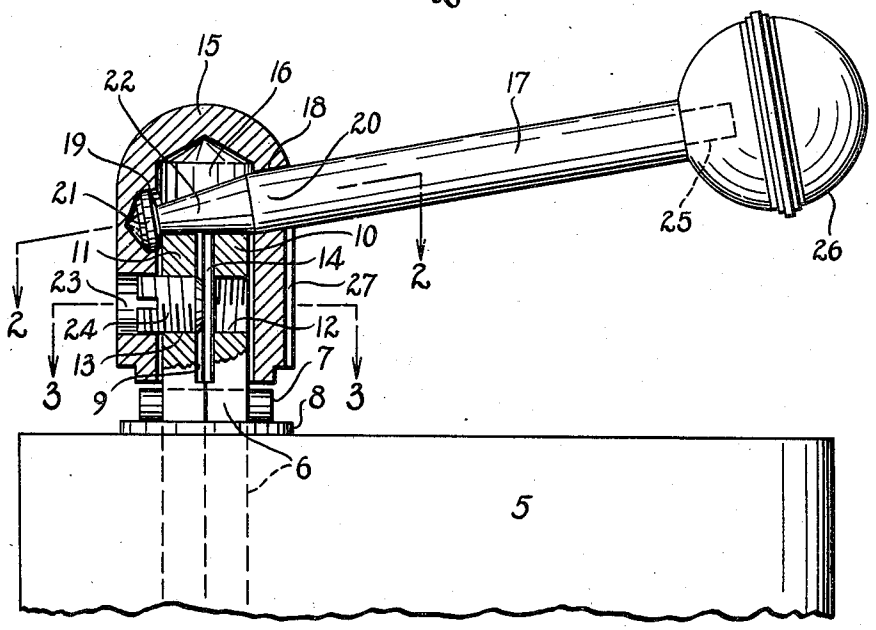


Fig. 2

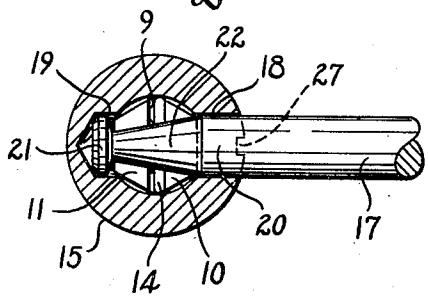


Fig. 3

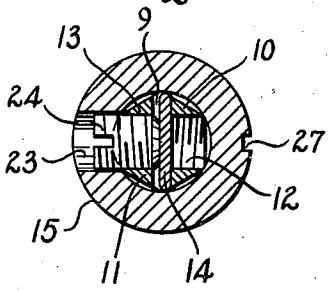
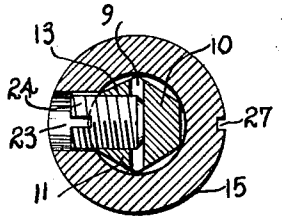


Fig. 4



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HANDLE ATTACHING DEVICE

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12 Claims. (Cl. 287—53)

This invention relates to an improved handle attaching device.

An object of the invention is to provide improved means for attaching a ball-type handle to the hub and shaft of a drum controller or the like.

Another object is to provide for use of a straight handle, while insuring adequate "knuckle" space between the ball and the controller casing.

Another object is to so form and arrange the handle as to minimize the required length of the hub member associated therewith.

Another object is to provide novel means for rotatably mounting the handle with respect to the hub member and the shaft, whereby any tendency toward accidental loosening of the ball with respect to the handle is avoided.

Another object is to provide such a device whose parts may be readily and quickly assembled.

Another object is to provide simple means common to the shaft, the hub and the handle for securing the same in properly assembled relation.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawing illustrates a preferred embodiment of the invention which will now be described, it being understood that the invention is susceptible of embodiment in other forms within the scope of the appended claims.

In the drawing,

Figure 1 is a fragmentary view, partly in side elevation and partly in vertical section, of a drum controller having my improved ball-type handle attaching device associated therewith.

Fig. 2 is a sectional view, on the line 2—2 of Fig. 1; the fragment of the handle being shown in elevation.

Fig. 3 is a sectional view, on the line 3—3 of Fig. 1, and

Fig. 4 is a sectional view similar to Fig. 3, but showing a modified form of my invention.

Referring to the drawing, the numeral 5 designates the enclosing casing of a drum controller of known form having an operating shaft 6 which extends upwardly beyond the upper end wall of casing 5. Shaft 6 is preferably of polygonal form in transverse cross section, the same being shown as of hexagonal cross section. Shaft 6 may be provided with a transverse opening (not shown) to accommodate with a drive fit the intermediate portion of a pin 7 whose projecting ends overlie a flange member or washer 8 at the upper end of casing 5 to assist in positioning shaft 6 with respect to said casing.

Shaft 6 is provided at its upper end with a kerf or slot 9 which preferably extends downwardly from said upper end to a point adjacent pin 7, whereby said upper end of the shaft is in the form of two integral, opposed resilient portions 10 and 11. I prefer to drill and tap an opening extending through both of the shaft end portions 10 and 11, said opening being arranged at a right angle to slot 9, as indicated at 12 and 13. Positioned within slot 9, and preferably of the same width and height as the latter, but of substantially less thickness than said slot is a flat metal plate 14, the purpose of which will be hereinafter described.

15 designates a hub member, preferably formed of a suitable metal such as steel or iron, the same having a downwardly opening cylindrical recess 16 which is adapted to slide or telescope onto the split upper end of shaft 6. However, prior to assembly of hub member 15 with respect to shaft 6 the handle rod 17 is adapted to be properly positioned with respect to said hub member. For this purpose a circular opening 18 is drilled or otherwise formed at a predetermined upward angle within one wall of hub member 15 adjacent the upper end of the latter, and a cavity 19 is also formed in the inner surface of the opposite wall of hub member 15 in axial alinement with said opening 18. The portions 20 and 21 of handle rod 17 are of like cross sectional dimensions and the same are adapted to rotatably bear within opening 18 and cavity 19, respectively.

The intermediate portion 22 of handle rod 17 is machined or otherwise cut away to substantially frusto-conical form (Figs. 1 and 2), whereby clearance is provided between the same and the flat or horizontal upper end of shaft 6. The arrangement is such that when hub member 15 (with handle rod 17 properly positioned therein) is telescoped onto the upper end of shaft 6, the end portion or flange 21 of handle rod 17 will overlap one of the flat side walls of said shaft end, in the manner best illustrated in Fig. 1. By reason of this interlock between flange 21 and shaft 6 outward endwise displacement of handle rod 17 is positively prevented, whereas the assembly is such as to insure relatively free rotatability of handle rod 17 with respect to hub member 15 and shaft 6.

In order to secure hub 15 and shaft 6 against movement relatively to each other, I prefer to provide within hub 15 a circular opening 23 which affords clearance for a set screw 24 which takes into the tapped opening 13 in the portion 11 of the shaft end. The inner end of set screw 24 is

adapted to abut against plate 14, and upon tightening or further inward driving of screw 24 the portions 10 and 11 of the shaft end are caused to spread apart to securely clamp or wedge the shaft end against the peripheral wall of recess 16 in hub member 15. More particularly, as shown in Figs. 2 and 3, such spreading apart of the shaft end portions 10 and 11 results in the vertical edges formed between the several sides thereof biting into or embedding themselves in the peripheral wall of recess 16. The advantages of this arrangement are obvious.

If desired for any reason, the hub member 15, with the handle rod 17 in position, may be assembled with respect to shaft 6 at a rotary angle 180 degrees removed from that shown in Fig. 1. When the parts are so assembled the set screw 24 will be driven into the tapped opening 12 in the other portion 10 of the shaft end; the end of the screw cooperating with plate 14 in the same manner as aforedescribed to effect spreading of end portions 10 and 11 of shaft 6. Where there is no occasion to provide for such alternate manner of assembling hub member 15 and handle rod 17 with respect to shaft 6, the tapped opening 12 in portion 10 of the shaft end may be omitted, in which event the end of screw 24 might be permitted to abut directly against the shaft portion 10, for spreading of the same with respect to portion 11; thus avoiding the necessity for the aforementioned plate 14. Such an arrangement is illustrated in Fig. 4, wherein the corresponding parts are given the same numerals of reference as in Fig. 3; it being noted that the plate 14 of Fig. 3 has been omitted from the device of Fig. 4, and the tapped opening 12 in the portion 10 of the shaft end in Fig. 3 has likewise been omitted from Fig. 4. If desired a set screw somewhat longer than that shown at 24 in Fig. 4 might be substituted for the latter, as will be obvious.

In practice the outer end of handle rod 17 is reduced and threaded, as represented by dotted lines at 25. An enlargement, preferably of ball shape and preferably composed of insulating material, as indicated at 26, is provided with a threaded recess for cooperation with the reduced portion 25 of the handle rod. The ball or knob 26 is preferably screwed very tightly onto said portion 25, and in practice a layer or coating of cement (not shown) is interposed between the cooperating screw threads to substantially reduce the likelihood of accidental loosening of ball 26 with respect to handle rod 17. Moreover, the provision of means affording rotation of handle rod 17 with respect to hub member 15 and shaft 6 still further reduces the likelihood of accidental loosening of ball or knob 26 from said handle rod.

As illustrated in Fig. 1 the angular mounting of straight handle rod 17 affords adequate "knuckle" space between knob 26 and the upper end wall of casing 5, and at the same time the required height or length of hub member 15 is minimized.

In practice the hub member 15 is provided with a vertical groove 27 alined with the axial center of rod 17, the walls of said groove having a layer or coating of paint or the like of a color (such as white) contrasting with the color of hub member 15 for cooperating with suitable legends or indicia (not shown) on the upper end wall of casing 5 to assist in indicating the condition of the circuit or circuits controlled by the drum. It is to be understood, of course, that the handle rod 17 is also adapted to serve as an indicator in conjunction with suitable legends upon said upper end wall of casing 5.

I claim:

1. In a handle construction, in combination, a shaft, a hollow hub member, said hub member having an opening formed in one side wall thereof, a handle rod having an end portion freely insertable into said hub member through said opening, said hub member being adapted to slidably fit onto one end of said shaft, and means including cooperatively engaging shoulders formed on said shaft and said rod to provide a positive interlocking connection therebetween upon assembly of said hub member and said rod with respect to said shaft, whereby endwise displacement of said rod from said hub member is positively prevented.

2. In a handle construction, in combination, a shaft, a hollow metal hub member, said hub member having a circular opening formed in one side wall thereof, the axis of said opening extending upwardly at an angle substantially greater than a right angle with respect to the vertical plane of said side wall, a straight metal handle rod of circular cross section freely insertable into said hub member through said opening, said handle rod having a shouldered inner end engageable with the side of said shaft remote from said opening to positively prevent endwise displacement of said rod upon telescoping of said hub member onto said shaft, and associated means for securing said hub member and said shaft against movement relatively to each other.

3. In a handle construction, in combination, a shaft, a hollow metal hub member, said hub member having a circular opening formed in one side wall thereof, the axis of said opening extending upwardly at an angle substantially greater than a right angle with respect to the vertical plane of said hub wall, a straight metal handle rod of circular cross section freely insertable into said hub member through said opening, said rod having a shouldered inner end engageable with the side of said shaft remote from said opening to positively prevent endwise displacement of said rod upon telescoping of said hub member onto said shaft, associated means for securing said hub member and said shaft against movement relatively to each other, said last mentioned means including a pair of opposed resilient portions at the upper end of said shaft, a metal plate positioned between said resilient portions, at least one of said resilient portions having a tapped opening formed therein, said hub member having an opening alined with said tapped opening, and a set screw threaded into said tapped opening, the inner end of said set screw being engageable with said plate to cause expansion of said upper end of the shaft whereby the latter and said hub member are restrained against movement relatively to each other.

4. In a handle construction, in combination, a shaft, a hollow metal hub member, said hub member having an opening formed in one side wall thereof, a handle rod having an end portion freely insertable into said hub member through said opening, said hub member being adapted to slidably fit onto one end of said shaft, means associated with said shaft and said rod to provide a positive interlocking connection therebetween upon assembly of said hub member therewith, whereby endwise displacement of said rod from said hub member is prevented, and means for retaining said hub member in assembled relation to said shaft, the arrangement being

such that said rod is free to rotate upon its own axis with respect to said hub member and said shaft after such assembly.

5. In a handle construction, in combination, a shaft, a hollow metal hub member, said hub member having an opening formed in one side wall thereof, a straight handle rod having an end portion freely insertable into said hub member through said opening, said hub member being adapted to slidably fit onto one end of said shaft, means including a shoulder formed on said shaft and a cooperatively engaging annular shoulder formed on said rod to provide a rotatable interlocking connection therebetween upon assembly of said hub member and said rod with respect to said shaft, whereby endwise displacement of said rod from said hub member is positively prevented, said rod having a reduced and threaded outer end, and a knob having a threaded recess to provide for removable securement thereof to said threaded end, said rod being also rotatable within said hub opening whereby accidental unthreading of said knob from said rod is prevented.

6. In a device of the character described, in combination, a recessed metal hub member, said hub member having an opening formed in one side wall thereof, a handle rod having an end portion freely insertable through said opening into the hub recess, a shaft, said hub member and rod being assembled as a unit with respect to the end of said shaft, and said rod having an annularly shouldered part thereof in interlocking engagement with one side of said shaft end as an incident to such assembly, whereby outward displacement of said rod with respect to said hub member is positively prevented.

7. In a device of the character described, in combination, a shaft, a recessed hub member, said hub member having a circular opening formed in one side wall thereof, a handle rod having an annularly shouldered end portion freely insertable through said opening into the hub recess, said hub member and rod being assembled as a unit with respect to one end of said shaft, said annularly shouldered end portion of said rod being adapted for positive interlocking engagement with one side of said shaft end as an incident to such assembly, whereby outward displacement of said rod with respect to said hub member is positively prevented, and said parts being so assembled that said rod is freely rotatable upon its own axis with respect to said hub member and said shaft end, for the purpose set forth.

8. In a handle construction, in combination, a metal shaft, a hollow metal hub member, said hub member having a circular opening formed in one side wall adjacent the upper end thereof, said hub member also having a recess formed in the inner surface of the opposite side wall thereof and alined with said opening, a handle rod of circular cross section having portions of normal size respectively rotatably positioned within said wall recess and said wall opening with a portion of reduced size therebetween, said hub member being adapted to fit onto one end of said shaft whereby said shaft end cooperates with said rod portions of normal and reduced size to prevent substantial outward movement of said rod relatively to said hub member while providing for rotary movement of said rod relatively to said hub member, and associated means for securing said hub member and said shaft end against movement relatively to each other.

9. In a handle construction, in combination, a metal shaft, a hollow metal hub member, said hub member having a circular opening formed in one side wall adjacent the upper end thereof, said hub member also having a recess formed in the inner surface of the opposite side wall thereof and alined with said opening, a handle rod of circular cross section having portions of normal size respectively rotatably positioned within said wall recess and said wall opening with a portion of reduced size therebetween, said hub member being adapted to fit onto one end of said shaft whereby said shaft end cooperates with said rod portions of normal and reduced size to prevent substantial outward movement of said rod relatively to said hub member while providing for rotary movement of said rod relatively to said hub member, associated means for securing said hub member and said shaft end against movement relatively to each other, said handle rod having a reduced and threaded outer end portion, and a knob having a threaded recess for cooperation with said threaded end portion, the rotatable mounting of said rod insuring against accidental unthreading of said knob therefrom.

10. In a handle construction, in combination, a shaft of polygonal form in transverse cross section, said shaft having a slot extending inwardly a substantial distance from the outer end thereof to provide a pair of opposed resilient end portions, a metal hub member having a downwardly opening cylindrical recess for telescoping thereof onto said opposed end portions, at least one of said end portions having a tapped opening formed therein at substantially a right angle to said slot, said hub member having a clearance opening registerable with said tapped opening, a set screw freely insertable through said clearance opening and threaded into said tapped opening, the inner end of said set screw acting within said slot to effect spreading of said opposed end portions, whereby the edges formed by the peripheral sides of said shaft will be forced into the cylindrical wall of said hub recess to thereby prevent movement of said hub member relatively to said shaft, said hub member having a second opening formed therein adjacent the upper end of said cylindrical recess, and a handle rod having an inner shouldered end overlapping one side of said shaft and an intermediate portion overlying the upper end of said shaft in close proximity thereto, said rod being rotatable within said second opening but being restrained by said shouldered end against substantial endwise displacement with respect to said shaft.

11. In a handle construction, in combination, a metal shaft of polygonal form in transverse cross section, said shaft having a slot extending inwardly a substantial distance from the outer end thereof to provide a pair of opposed resilient end portions, a metal hub member having a downwardly opening cylindrical recess for telescoping thereof onto said opposed end portions, at least one of said end portions having a tapped opening formed therein at substantially a right angle to said slot, said hub member having a clearance opening registerable with said tapped opening, a set screw freely insertable through said clearance opening and threaded into said tapped opening, the inner end of said set screw acting within said slot to effect spreading of said opposed end portions, whereby the edges formed by the peripheral sides of said shaft will be forced into the cylindrical wall of said

hub recess to thereby prevent rotary or longitudinal movement of said hub member relatively to said shaft, said hub member having a second opening formed therein adjacent the upper end of said cylindrical recess, a handle rod having an inner shouldered end overlapping one side of said shaft and an intermediate portion overlying the upper end of said shaft in close proximity thereto, said rod being rotatable within said second opening but being restrained by said shouldered end against substantial outward displacement with respect to said shaft, said rod having a reduced and threaded outer end portion, and a molded insulating ball having threaded and cemented engagement with the outer end portion of said rod.

12. In a handle construction, in combination, a metal shaft of polygonal form in transverse cross section, said shaft having a slot extending inwardly a substantial distance from the outer end thereof to provide a pair of opposed resilient end portions, said end portions having alined tapped openings formed therein at substantially right angles to said slot, a metal plate positioned within said slot and adapted to overlie the inner ends of said alined openings, a metal hub member having a downwardly opening cylindrical recess for telescoping thereof onto said opposed end portions, said hub member having a clearance opening registerable with one or the other of said alined openings, a set screw insertable through said clearance opening and threaded into the tapped opening adjacent thereto, the inner end of said set screw acting against the plate within said slot to effect spreading of said opposed end portions, whereby the edges formed by the peripheral sides of said shaft will be forced into the cylindrical wall of said hub recess to thereby prevent movement of said hub member relatively to said shaft, said hub member having a second opening formed therein adjacent the upper end of said cylindrical recess, the axis of said last mentioned opening extending at a predetermined upward angle with respect to the plane of the lower end of said hub member, the wall of said hub recess having a cavity alined with said last mentioned opening, a straight metal handle rod of circular cross section having an inner shouldered end located within said cavity and overlapping one side of said shaft and an intermediate portion of frusto-conical shape overlying the upper end of said shaft, said rod being rotatable with respect to said hub member but being restrained by said shouldered end against substantial outward displacement with respect thereto, and an enlargement removably attached to the outer end of said rod.

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