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OPERATING KNOB OR HANDLE FOR SHAFTS AND THE LIKE

Original Filed April 26, 1939

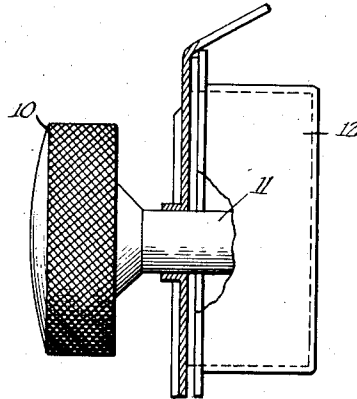


Fig. 1

Fig. 2

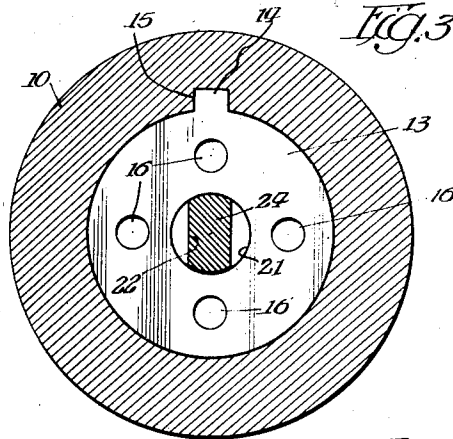
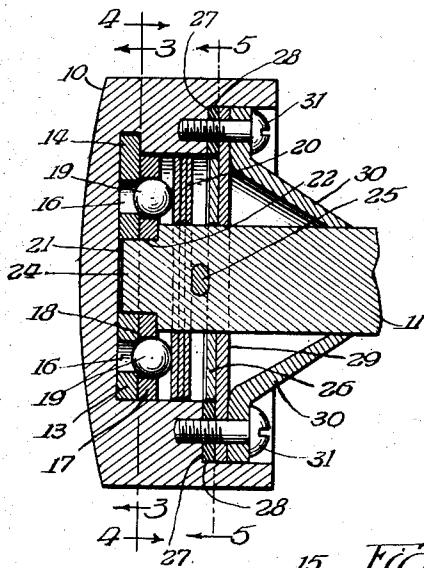


Fig. 3

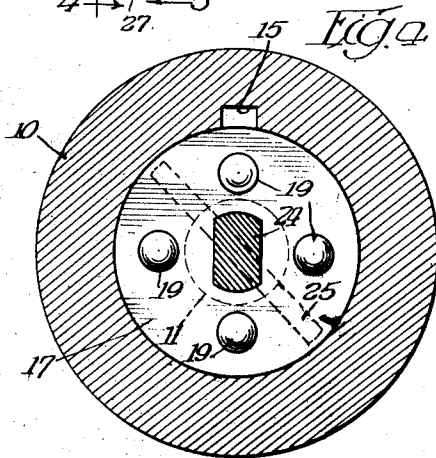


Fig. 4

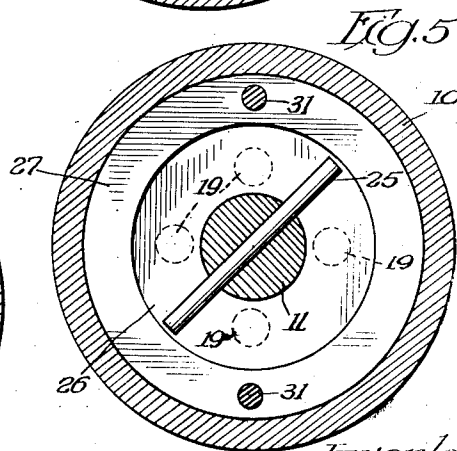


Fig. 5

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OPERATING KNOB OR HANDLE FOR SHAFTS
AND THE LIKE

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Original application April 26, 1939, Serial No. 270,092. Divided and this application September 23, 1940, Serial No. 357,880

8 Claims. (Cl. 74—549)

This application is a division of application Serial #270,092, filed April 26, 1939, and relates more specifically to an operating handle, particularly adapted, though not necessarily limited in use for the mechanism described in the aforesaid application.

One of the objects of the present invention is to provide an improved handle or operating structure which will yield under abnormal conditions with respect to the shaft with which it is connected, so that the mechanism which is to be set into motion by the operation of such shaft will be prevented from becoming damaged.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawing illustrating this invention, and in which

Figure 1 is a view partly in side elevation, partly broken away, and partly in section, showing a handle or knob constructed in accordance with the principles of this invention applied to the operating shaft of a coin control mechanism.

Figure 2 is a vertical sectional view, on an enlarged scale, of a portion of the shaft and the knob or handle attached thereto.

Figure 3 is a detail sectional view taken on line 3—3 Figure 2 looking in the direction of the arrows.

Figure 4 is a detail sectional view taken on line 4—4 Figure 2 looking in the direction of the arrows.

Figure 5 is a detail sectional view taken on line 5—5 Figure 2 looking in the direction of the arrows.

Referring more particularly to the drawing, the numeral 10 designates generally the operating knob or handle which is connected to an operating shaft 11 of a coin control mechanism, the latter being diagrammatically illustrated as at 12.

In order to protect the mechanism against damage in an attempt to operate the same by the actuation of the knob or handle 10, under predetermined conditions, that is, when the shaft 11 meets with abnormal obstruction or resistance in its rotation, the knob is constructed so as to yield with respect to the shaft and to that end the knob is of a hollow construction and seated therein is a disc 13 which is held against rotation with respect to the knob in any desired or suitable manner such as by means of an ear or projection 14 seated in a recess 15 in the wall

of the knob. This disc may be provided with any desired number of apertures 16.

Engaging and resting against the disc 13 is another disc 17 which is rotatable within the knob or handle, and this disc 17 is provided with any suitable number of apertures 18 therethrough which are adapted to move into and out of registration with the apertures 16 in the disc 13. Balls 19 are provided which are seated in the apertures 18 and project through the disc 17 so that a portion thereof will enter the apertures 16 in the disc 13.

Any desired number of annular spring members 20 engage and rest upon the balls 19. The disc 13 is provided with a circular opening 21 while the disc 17 is provided with an opening 22 registering therewith, but the opening 22 is angular in cross-section as shown more clearly in Figure 4.

The shaft 11 is provided with a reduced extremity 24. The shaft passes through the annular spring member 20 and the reduced extremity 24 passes through the aperture 22 in the disc 17 and is seated in the circular aperture 21 in the disc 13. The portion of the shaft 11 which is seated in the aperture 21 is adapted to rotate in the disc 13 as the latter is held against rotation by the ear or projection 14 seated in the recess 15. An angular portion of the reduced end 24 of the shaft 11 passes through the aperture 22 and causes the disc 17 to be held against rotation when the rotation of the shaft is prevented, and the disc 13 will be rotated with the handle and with respect to the disc 17. During such rotation the springs 20 will yield to permit the balls 19 to move out of the apertures 16 in the disc 13, so that the disc 13 may be rotated. This rotation of the disc 13 may be continued until the balls 19 are in a position to enter other apertures 16 in the disc 13.

Passing through the shaft 11 is a pin 25 which engages and rests against the springs 20 and holds them under tension.

Resting against the pin 25 is an annular member 26 which forms a bearing or surface over which the pin 25 moves.

Resting against an annular shoulder 27 in the knob 10 is an annular member 28 which latter may be of any desired thickness according to the number of spring elements 20 it is desired to employ.

A plate 29 encompasses the shaft 11 and rests against the member 26 and the annular member 28, and a cap member 30 may also be provided, the periphery of which is disposed preferably within the knob 10 and rests against the plate 29.

The parts are held together in any suitable manner, such as by means of fastening bolts 31 which pass through the cap plate 30, the plate 29, the annular member 28 and are screwed into the body of the knob 10.

It will thus be manifest that if the shaft 11 is held against rotation and it should be attempted to rotate the knob or handle 10, the latter will yield with respect to the shaft because the disc 17 will also be held against rotation by the angular portion of the shaft 11 passing therethrough, but the disc 13 being connected with the knob or handle 10 by means of the ear or projection 14 seated in the recess 15, will rotate therewith causing the disc 13 to rotate with respect to the disc 17.

This will cause the balls 19 to be forced out of the apertures 16 in the disc 13 against the stress of the springs 20.

As soon, however, as the apertures 16 in the disc 13 are in alinement with the balls 19, the springs 20 will project the balls 19 into the apertures 16.

The tension of the springs 20 is such that under normal conditions the normal operation of the shaft 11 or rotation of the handle or knob 10, the disc 13 and the disc 17 will be locked together for simultaneous rotation by means of the balls 19.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:

1. In combination, an actuating shaft, a handle for rotating the shaft, a yieldable connection between said handle and the shaft, said connection embodying two discs rotatable one with relation to the other, each of said discs having apertures, means for maintaining one of said discs against rotation with respect to said handle, means for maintaining the other disc against rotation with respect to said shaft, separate elements seated in the apertures in one of said discs and also adapted to be seated in the apertures in the other of said discs when said apertures are brought into registering relation, said elements having free rolling engagement over the surface of one of said discs and also being rotatable with relation to the other of said discs when said discs are relatively rotated, and resilient means operating to exert stress upon said elements in a direction lengthwise of said shaft to cause them to be seated in said apertures.

2. In combination, an actuating shaft, a handle for rotating the shaft, a yieldable connection between said handle and the shaft, said connection embodying two discs rotatable one with relation to the other, each of said discs having apertures, means for maintaining one of said discs against rotation with respect to said handle, means for maintaining the other disc against rotation with respect to said shaft, separate elements seated in the apertures in one of said discs and also adapted to be seated in the apertures in the other of said discs when said apertures are brought into registering relation, said elements having free rolling engagement over the surface of one of said discs and also being rotatable with relation to the other of said discs when said discs are relatively rotated, resilient means operating to exert stress upon said elements to cause

them to be seated in said apertures, said resilient means embodying an annular element separate from the discs, the axis of which element coincides with the axis of said handle and against which annular element the said rotatable elements have a bearing surface.

3. In combination an actuating shaft, a handle for rotating the shaft, a yieldable connection between said handle and the shaft, said connection embodying two discs rotatable one with relation to the other, each of said discs having apertures, means for maintaining one of said discs against rotation with respect to said handle, means for maintaining the other disc against rotation with respect to said shaft, separate elements seated in the apertures in one of said discs and also adapted to be seated in the apertures in the other of said discs when said apertures are brought into registering relation, resilient means operating to exert stress upon said elements to cause them to be seated in said apertures, said resilient means embodying an annular element the axis of which coincides with the axis of said handle and against which annular element the first said elements have a bearing surface, the first said elements comprising balls having free rolling engagement over the surface of one of said discs and also being rotatable with relation to the other of said discs when said discs are relatively rotated, said balls also having rolling engagement with said annular element when said discs are rotated with relation to the other, said balls being disposed within the confines of the peripheries of said discs and said annular element.

4. In combination, an actuating shaft, a handle for rotating the shaft, a yieldable connection between the said handle and shaft, said connection embodying aligned elements disposed in close proximity to each other, the proximate faces of said elements being of substantial area and each being provided with spaced open recesses, one of said elements being connected with the handle for rotation therewith and with respect to the other element, the other of said elements being connected with said shaft for rotation therewith and with respect to the first said element, separate elements disposed between said faces and seated in the recesses in both faces when said recesses are in registering relation, said separate elements being movable out of the recesses in one of said faces and being maintained in the recesses in the other of said faces when the first said elements are rotated one with respect to the other, means operating to exert stress upon said separate elements to cause them to be seated in said recesses, the last said means embodying a resilient disc, the said separate elements contacting and moving over said disc, and means for maintaining said disc under tension.

5. In combination with an actuating shaft, a handle for rotating the shaft, a yieldable connection between the said handle and shaft, said connection embodying a disc connected to the handle for rotation therewith, a second disc in abutment with the first said disc and connected with the shaft for rotation therewith, the first said disc having laterally opening recesses within the confines of the periphery thereof, a plurality of balls carried by the second said disc and projecting beyond the lateral face thereof to enter the recesses in the first said disc, said balls projecting beyond both lateral faces of the second said disc and adapted to leave the recesses in the first said disc when the discs are relatively rotated, and a yieldable surface separate from the

discs and operating upon the balls to move them into the recesses of the first said disc, said balls having free rolling engagement over the surface of one of said discs and also being rotatable with relation to the other of said discs when said discs are relatively rotated.

6. In combination with an actuating shaft, a handle for rotating the shaft, a yieldable connection between the said handle and shaft, said connection embodying a disc connected to the handle for rotation therewith, a second disc in abutment with the first said disc and connected with the shaft for rotation therewith, the first said disc having laterally opening recesses within the confines of the periphery thereof, a plurality of balls carried by the second said disc and projecting beyond the lateral face thereof to enter the recesses in the first said disc, said balls projecting beyond both lateral faces of the second said disc and adapted to leave the recesses in the first said disc when the discs are relatively rotated, a yieldable surface separate from the discs and operating upon the balls to move them into the recesses of the first said disc, said balls having free rolling engagement over the surface of one of said discs and also being rotatable with relation to the other of said discs when said discs are relatively rotated, and a pin passing through said shaft and contacting said surface for maintaining the latter under tension.

7. In combination with an actuating shaft, a handle for rotating the shaft, a yieldable connection between the said handle and shaft, said connection embodying a disc connected to the handle for rotation therewith, a second disc in abutment with the first said disc and connected with the shaft for rotation therewith, the first said disc having laterally opening recesses within the confines of the periphery thereof, a plurality of balls carried by the second said disc and projecting beyond the lateral face thereof to enter the recesses in the first said disc, said balls pro-

jecting beyond both lateral faces of the second said disc and adapted to leave the recesses in the first said disc when the discs are relatively rotated, a yieldable surface separate from the discs and operating upon the balls to move them into the recesses of the first said disc, said balls having free rolling engagement over the surface of one of said discs and also being rotatable with relation to the other of said discs when said discs are relatively rotated, a pin passing through said shaft and contacting said surface for maintaining the latter under tension, and an abutment against which said pin operates, whereby the handle will be maintained against detachment from said shaft.

8. In combination with an actuating shaft, a handle for rotating the shaft, a yieldable connection between the said handle and shaft, said connection embodying a disc connected to the handle for rotation therewith, a second disc in abutment with the first said disc and connected with the shaft for rotation therewith, the first said disc having laterally opening recesses within the confines of the periphery thereof, a plurality of balls carried by the second said disc and projecting beyond the lateral face thereof to enter the recesses in the first said disc, said balls projecting beyond both lateral faces of the second said disc and adapted to leave the recesses in the first said disc when the discs are relatively rotated, a yieldable surface separate from the discs and operating upon the balls to move them into the recesses of the first said disc, said balls having free rolling engagement over the surface of one of said discs and also being rotatable with relation to the other of said discs when said discs are relatively rotated, and a conical shield secured to and projecting from said handle and encompassing the shaft.

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