

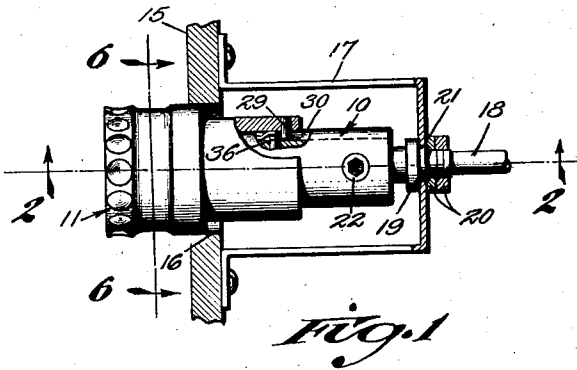
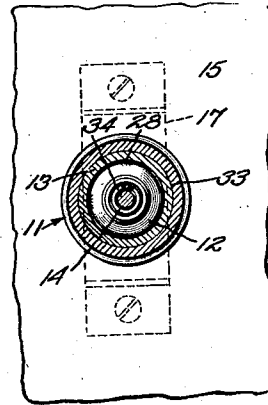
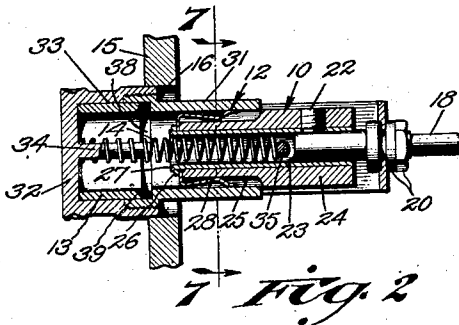
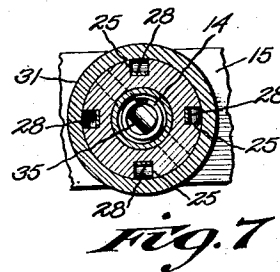
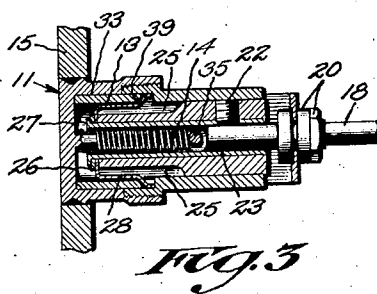
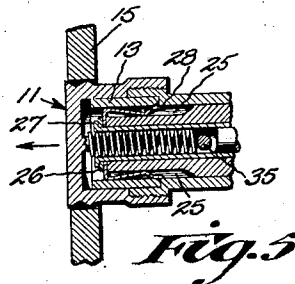
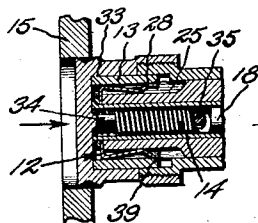
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MANIPULATING DEVICE

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MANIPULATING DEVICE

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7 Claims. (Cl. 292—347)

This invention relates to improvements in manipulating devices and is particularly directed to a flush type control knob or button effective for accomplishing a control function either by axial or rotative movement or both. This improved flush type control knob or depressible button has been designed primarily because of the increasing use of apparatus requiring a control means of this nature which is entirely unobtrusive and which is simple in operation. In many installations such as radio dials or control knobs, push button switches, door handles, and handles and locks for all types of furniture, it is of extreme value to have the manipulating or control device, disposed flush with the wall when not in use so that it is in no way an obstruction and assists greatly in the appearance of the article. The conventional devices of this nature have included release devices and operative parts which because of the nature of the device have been exposed and protruded, thereby destroying the entirely flush aspect of the structure. The present structure is designed to obviate these inherent defects.

Therefore, it is an object of this invention to provide a control knob or button which will be normally disposed flush with the wall and includes an extremely simple and efficient mechanical device for accomplishing the normal disposition of the knob or button in position entirely flush with the wall and does not include any projections or visible actuating or operating means other than the button or knob itself when released.

It is a further object to provide a device of this nature in which the entirely concealed control means or internal mechanism is susceptible to a great variety of uses and installations and which is intended for use in any environment where control can be obtained through a manipulating device of this character.

Other objects and certain advantages will be more fully apparent from a description of the accompanying drawing, in which:

Figure 1 is a side view of the control knob or manipulating means showing it disposed in released or manipulating position.

Figure 2 is a sectional view taken on line 2—2, Figure 1, detailing the internal construction of the control knob or depressible button in released position.

Figure 3 is a sectional view taken similar to Figure 2 but showing the button or knob in its depressed position flush with the wall.

Figure 4 is a sectional view taken similar to

Figure 2, but showing the button fully depressed into the wall during the operation of releasing the same and showing the means active for releasing the detent or catch which holds the button in flush position.

Figure 5 is a sectional view taken similar to Figure 2 but showing the device in a position in its outward travel after release, wherein the floating sleeve is effective for holding the detents out of operation.

Figure 6 is a sectional view taken on line 6—6, Figure 1, showing further details of the button or knob.

Figure 7 is a sectional view taken on line 7—7, Figure 2, illustrating the mounting of the multiple detent spring which controls the position of the button.

The entirely concealed release mechanism of this improved knob or manipulating means is readily applicable to either a rotatable or a stationary rod or support. It is equally applicable to devices which make use solely of the translative or depressive movement of the knob for operation of subsidiary parts such as in the operation of an electric switch. The improved mechanism, for these purposes, includes a detent carrier or core 10 fixed against translative movement and a knob or button 11 mounted for translative or axial movement in relation to the detent carrier 10. Preferably the detent 12 in the carrier cooperates with shoulders in the internal bore of the knob and a detent element or dog 13 is carried by the knob 11 and actuated therewith for displacing the detent 12 depending on the amount of depression of the knob. A spring 14 is used for constantly urging the knob outwardly to position of manipulation being effective for this purpose when the detent is released.

The drawing, in this instance, shows this control structure applied through a panel 15 with relation to which the outer end of the button 11 is adapted to be normally disposed in flush position. The control unit including the detent carrier and the button is supported through an aperture 16 in the panel 15 and in a U-shaped bracket 17 secured against the rear face of the panel. A shaft section 18 is rotatively mounted in the bracket 17 for the present purpose and is maintained against axial displacement by means of a shoulder 19 thereof engaged against the inside of the bracket and a pair of nuts 20 engaged against the outer side of the bracket and screw-threaded on the shaft, against a shoulder 21 of the shaft, the space between the shoulders 19

and 21 providing for the necessary clearance or spacing between the shoulder 19 and the nuts 20, 20, permitting free rotative movement of the shaft in relation to the bracket.

8 The detent carrier 10 is fixed to the shaft 18 against either rotative or axial displacement by means of a set screw 22. The detent carrier assembly consists of an internal sleeve 23 rigidly secured in a main body 24. The main body of the detent carrier is longitudinally slotted as at 25 at the knob carrying end thereof, these slots extending to points intermediate the length of the body. There are four slots in the present instance providing recesses for four detent members although it will be understood that the number of detents used is entirely arbitrary.

The multiple detent element 12 is in the nature of a washer lying against the end of the body 24 of the detent carrier and secured there-
20 against by a washer 26 and a swaged or outwardly flanged outer end 27 of the internal sleeve, this washer including four inwardly extending detent members 28 lying in the slots 25 respectively. These detent members have their extreme ends offset outwardly to provide the necessary detent shoulders. The detent element is formed of spring material and its respective members are formed so as to normally protrude radially from the slots 25.

30 The knob or button 11 in the present instance is formed in two pieces for the purpose of assembly as to certain internal parts which will be hereinafter described. This button 11 is mounted for axial movement on the detent carrier 10 and traversing the aperture 16 in the panel and is mounted in splined relation for rotation with the detent carrier by means of a radially disposed inwardly extending pin 29 thereof which engages in a longitudinal groove
40 30 in the outer face of the detent carrier. The two sections of the knob are a sleeve 31 slidably mounted on the detent carrier and a thimble 32 screw-threaded on the sleeve portion 31 and fitting through the mentioned aperture in the panel, this thimble being the manipulating means or knob proper and including peripheral irregularities permitting convenient gripping of the same.

This assembly of parts provides a closed outer face 32 for the knob and an enlarged or counter-bored portion 33 apart from the general bore which slidably mounts the knob assembly on the detent carrier. A central stud 34 extends axially inwardly from the outer face of the dial and the spring 14 is disposed under compression about this stud and between the knob and a cross pin 35 disposed in the internal bore of the sleeve 23 of the detent carrier, this spring providing the necessary outward pressure on the knob automatically urging it into position of use. A pin 36 extended radially from the detent carrier into the spline groove 30 of the carrier provides an abutment for the pin 29 limiting outward movement of the knob.

65 Within the counterbore 33, the shiftable or floating sleeve 13 is mounted for limited travel between the respective ends of the mentioned bore. As shown in Figure 2 there is sufficient clearance between the end of the sleeve 13 and the adjacent end of the counterbore 33 to provide an annular internal groove 38 into which the detents may engage. The floating sleeve 13 has an internal bore corresponding to the internal bore of the knob beyond the counterbore and is therefore free to slide upon the detent carrier.

For a full understanding of the operation of the floating sleeve and its co-action with the detents, the following description of the operation of the device will be given. Assuming that the control device is in the position shown in Figure 2 and is in use wherein as disclosed in the present structure, the knob may be readily rotated for accomplishing some function through the rotatable shaft, 18, the rotative coupling between the knob 11 and detent carrier 10 occurring through the splined connection heretofore mentioned. As the knob is compressed or depressed into the panel on its splined connection, the detent members 28 will ultimately be released from their confined positions below the periphery of the detent carrier and will snap radially into the annular recess 38 afforded by the clearance between the inner end of the floating sleeve 13 and the adjacent end of the counterbore 33. If it should occur that the sleeve is lying against the mentioned shoulder, the detent members in view of their rounded offset portions engaging the chamfered adjacent end 39 of the floating sleeve, will force the sleeve outwardly and provide the annular groove which is needed for release.

As the detent members or dogs snap into position in this groove the operator senses that the knob is in caught or set position. At this time the dial is in the flush position shown in Figure 3 and outward movement of the dial under the action of the spring 14 is prevented by the engagement of the ends of the detent extensions 28 with the side of the annular groove or in other words, the end of the counterbore. The floating sleeve 13 contained in the knob is the principal control element accomplishing the release as will be apparent from the ensuing description.

In releasing the knob, the operator further depresses or countersinks the same into the recess or bore of the panel. This further depression due to the cam engagement between the rounded portions of the detents and the chamfered end of the floating sleeve will carry the sleeve over the detents depressing them into their respective grooves below the periphery of the detent carrier and holding them in this position for release. For this purpose the internal bore of the floating sleeve is of a diameter which fits snugly and slides smoothly over the detent carrier. The mechanism is then in a position shown in Figure 4. This further depression abuts the knob against the end of the detent carrier and further inward movement is prevented. Thereupon the operator releases the knob and the spring 14 acts to move the same outwardly.

Since the detents are exerting an outward pressure on the floating sleeve 13 at this time, the floating sleeve is bound to or secured on the detent carrier against longitudinal or axial displacement and will continue to be until the inner end thereof abuts the adjacent end of the counterbore 33, (see Figure 5), thereby taking up the annular groove which was previously effective for receiving the detents. The floating sleeve thus bridges this space and the detents are then within the internal bore of the knob mounting sleeve and cannot spring outwardly. Due to this action wherein the floating sleeve is retained upon the detents until the sleeve is carried off by the knob, the entire knob is then free to travel outwardly over the detents maintaining them in a depressed state and permitting full release to the position shown in Figure 2.

Having described my invention, I claim:

1. A control device, comprising, an element, a 150

knob mounted for translative movement on said element, a detent mounted in said element, said knob including a recess adapted to be engaged by said detent in one position of translative movement of the knob on said element, and a control sleeve mounted within the knob and adapted to move within the recess and over the detent, said control sleeve adapted to become frictionally engaged over the detent and thereby close the groove for releasing the knob from normal detent secured position.

2. A control device, comprising, a support element, a spring urged knob mounted for axial movement on said support element, a detent mounted in said support element, said knob including a recess adapted to be engaged by said detent in depressed position of translative movement of the knob on said support element, and a floating element mounted within the knob and adapted to prevent operation of the detent during spring return movement of the knob.

3. A control device, comprising, an element mounted for rotative movement, a spring urged knob translatively mounted on said element in splined connection therewith, circumferentially arranged detents mounted in said element, said knob including an annular internal groove adapted to be engaged by said detents in one position of depressed movement of the knob on said element, and a control sleeve mounted within the knob and adapted to move over the detents when the knob is further depressed and to close up the groove upon spring urged movement of the knob for releasing the knob from detent secured position.

4. An extensible knob, comprising, concentrically disposed members constituting a sleeve and a core relatively axially movable for knob extensibility, one or more yielding dogs carried by one of said members for engagement with the other for locking said members in a retracted position, and a floating collar mounted between said members movable by one of said members for releasing the dogs.

5. A control device, comprising, an element

mounted for rotative movement, a spring urged knob translatively mounted on said element in splined connection therewith, a detent mounted in said element, said knob including an internal recess adapted to be engaged by said detent in one position of depressed movement of the knob on said element, and a control sleeve mounted within the knob and adapted to move over the detent when the knob is further depressed and to block the recess upon spring urged movement of the knob for permitting movement of the knob from detent secured position.

6. An extensible knob, comprising, a support element, a knob slidably mounted on said support element, detents circumferentially arranged in said support element and effective radially therefrom, said detents maintained in inoperative position by said knob at its slidably mounted portion, said knob having an enlarged bore portion, a floating sleeve slidably mounted in said enlarged bore portion and of less length than the length of the enlarged bore portion, the internal diameter of the floating sleeve being of the same dimension as the bore of the slidable portion of the knob, and a spring disposed under compression between the support element and the knob, whereby the clearance between the end of the floating sleeve and the end of the enlarged bore portion of the knob provides a detent recess and said floating sleeve takes up said recess when engaged over the detents for rendering the detents inoperative.

7. In a device of the class described, a knob, an axial mounting for said knob adapting the knob to be moved longitudinally on said mounting, spring means on the mounting urging said knob axially in one direction, a latch member adapted to secure said knob against said urging means, and release means between the latch member and knob fully effective by moving said knob axially and non-rotatively on its mounting against the urging means slightly beyond the latched position.

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