This invention relates to operating handles that are, in general, applicable to doors and the like of many kinds, but which are especially applicable for operating the control mechanism of doors, windows, windscreens, ventilation regulators and various kinds of interior hardware of vehicles which latter term is intended to include aircraft.

A general trend in the design of automobile passenger bodies of recent years has been to widen the bodies and to displace footboards or to reduce their width. Consequently, door handles projecting outwardly from the vehicles constitute a source of danger to pedestrians and others in the event of collisions or accidents. In fact, projecting door handles have often resulted in pedestrians receiving injuries that would otherwise have been avoided, or have been less serious. More recently such dangers have been relieved to a considerable extent by the employment of flush fitting or disappearing door handles at the outsides of automobiles.

Similar considerations do not, however, appear to have been given to the protection of the occupants of automobiles since recent statistical records disclose that in a relatively high proportion of automobile accidents, serious injuries have been received by passengers solely through being thrown against, or struck by, projecting portions of door, window or other handles that are located within the vehicle. Furthermore there is always a possibility that the clothes of passengers, particularly relatively thin or delicate dresses of lady passengers, may be caught up by the projecting portions of such interior handles and thus suffer serious damage.

One of the objects of the invention is to minimize the risks, both to passengers themselves and to their clothes, at present attendant upon the internal operating handles of automobile bodies. This is achieved primarily by providing handles which are devoid of objectionable projections and which extend as close as is conveniently possible to the trim or inner surface of the vehicle interior.

In particular, it is an object of the invention to provide a handle of the character described and in which a base at the inner end of the handle having means for operatively connecting the handle to the door, window, ventilator or other control mechanism, is devoid of any objectionable projection, but is, on the contrary, substantially flat and adapted to lie approximately flush or contiguous with the trim or adjacent surface of the body.

Another object of the invention is to provide a handle that is adapted to be operatively connected to door, window, ventilator or like control mechanism with the utmost ease and rapidity in order that assembly may be accelerated and incidental labour costs reduced.

Another object is to provide a door or like handle that may be connected to its control mechanism without the necessity of any escutcheon plate or other extraneous parts such as are required with existing handles.

Other objects of the invention are to provide a door or like handle adapted for connection to its control mechanism in such manner that the connecting means is concealed from view; to provide a door or like handle which is capable of being connected to its control mechanism with the handle, when in its normal or zero position, extending at practically any desired angle; to provide a door or like handle adapted for connection to its control mechanism by a self-locking device that is independent of any screws, pins or other manually operable fasteners.

The above and other objects and the advantages arising therefrom will, however, be more readily appreciated from the following description and accompanying drawings which relate by way of example to certain practical embodiments of the invention particularly suitable for application to the window regulators and doors of vehicles:

In the drawings—

Figure 1 is a sectional view showing an operating handle according to the invention applied to mechanism for raising and lowering vertically slidable window panels of a vehicle.

Figure 2 is a cross section on line II—II of Figure 1.

Figure 3 is a cross section on line III—III of Figure 1.

Figure 4 is a perspective view of the handle.

Figure 5 is a perspective view of a socket member of the window control mechanism of Figure 1 with which a boss on the handle co-operates.

Figure 6 is an end elevation of the handle showing a locking device and a release therefor.

Figure 7 is a detail of a part of an automatic locking device embodied in the handle.

Figure 8 is a longitudinal section of a known form of mechanism, modified according to the invention, for raising and lowering vertically slidable window panels of a vehicle.

Figure 9 is a cross section on line IX—IX of Figure 8.

Figure 10 is an end view of Figure 8.

Figure 11 is an end view showing a handle...
according to the invention applied to door control mechanism of a vehicle.

Figure 12 is a longitudinal section of the parts seen in Figure 11.

Figure 13 is a sectional view showing a handle according to the invention applied to the control mechanism of a swinging ventilator panel.

Figure 14 is a sectional view of the handle illustrating a modified form of device for automatically locking the handle to its control mechanism.

Figure 15 is a cross section taken on line XV-XV of Figure 14.

Figure 16 is a view looking in the direction of the arrow in Figure 14.

Figure 17 is a view similar to Figure 14 but illustrating a modification.

Figure 18 is another view similar to Figure 14 but illustrating a further modification.

Figure 19 is a section taken on the line XIX-XIX of Figure 18.

Figure 20 is a sectional view similar to Figure 1 but illustrating another alternative means for connecting the handle to its control mechanism.

Throughout the following description and the accompanying drawings like numerals are employed to indicate like parts.

The improved operating handle comprises a handle arm 2, the shape and size of which may vary according to the particular purpose of the handle, but which terminates at its inner end in a substantially flat base 3, preferably of shallow disc-like form. When the handle is in operative position, as seen in Figures 1, 12, 13 and 20, the base 3 will lie substantially flush with the trim 5 of the adjacent surface of the vehicle body or other structure to which the handle is applied. It will also be noted that the exposed face 2a of the base 3 is devoid of any objectionable projections. A rib 4 may extend diametrically of such inner face of the base in continuation of the handle arm, but this rib 4 is relatively shallow and obviously does not form an objectionable projection.

Projecting sidewardly from the other face, hereinafter referred to as the outer face 2b, of the base, is a clutch or coupling member 6 adapted to engage and transmit rotary motion to a rotative element 7 of the control mechanism to be operated by the handle. For reasons that will be apparent hereinafter, the clutch member is preferably in the form of a cylindrical boss of considerably less diameter than that of the base 3, and having a series of relatively closely spaced shallow spines or flutings 8 extending lengthwise of its outer surface, while the rotative member 7 of the control mechanism is preferably in the form of a socket, the bore of which is provided with spines or flutings 8 complementary to those of the handle boss 6. It will, therefore, be evident that the handle may be operatively applied to the control mechanism by entering the splined boss lengthwise into the splined socket.

The inner end of the socket 7 is shown substantially flush with the adjacent inner surface of the vehicle body, and a packing 11 of cellular rubber or other suitable resilient material may surround the socket member so that when the handle is placed in operative position, the packing may be compressed to enable the base of the handle to be depressed slightly into the vehicle body, thus bringing the exposed inner face 3a of the base substantially flush with the inner surface of the vehicle body as indicated in Figure 1.

It will be evident that the handle base or disc 2 effectively covers and conceals the socket 7 so that the usual escutcheon plate or ring members required with conventional handles may be eliminated.

By providing the boss and the socket with a relatively large number of spines or flutings it is readily possible during assembly to set the handle in the most convenient angular position with due regard to the advisability of the handle occupying a position that is most suitable for operation and in which it will be at least likely to contact with or impede movement of the driver or passengers or their clothing.

The most suitable angular position for the handle may be tested with merely the outer end of the splined boss projecting into the socket and, upon the best position being selected the boss may be pushed completely home.

Various means may be adopted to lock the handle in operative position, and such means are preferably brought into action automatically upon pushing the splined boss 6 completely home into the splined socket 7. Thus according to Figures 1 to 7 inclusive and as seen more clearly in Figure 3 the boss is provided near its inner end, (i.e., adjacent the base 3) with a laterally extending slot 12 slidably accommodating a detent member such as a plate 13 as a plate 13 is disposed within a pockbet 16 in the boss and bearing against a lug 17 outstanding from the sliding plate, to thereby project one or more tongues 18 at the outer extremity of the locking plate into an annular groove 19 that is formed around the bore of the socket 7.

As seen more clearly in Figures 1, 4 and 7 the extremity of each locking tongue 18 may be curved or chamfered as at 21 while the inner end of the bore of the socket 7 may also be chamfered as at 22 whereby in entering the boss lengthwise into the socket, the tongues 18 by engagement with the chamfer 22 of the socket cause the sliding plate to move inwardly against the influence of spring 14 until the tongues come opposite groove 19 in the socket whereupon the spring 14 re-asserts itself and forces the tongues into groove 18.

The sliding plate 13 may have a reduced shank portion 23 that passes through a hole 24 in the boss 6 and is enlarged or riveted over in order to limit the amount of projection of the locking tongues 18.

In order to permit removal of the handle from the control mechanism, the boss 6 may be provided in its outer face 2b with a radially extending slot 26 into which lug 17 of the locking plate projects. Thus, by inserting a suitable member, such, for example, as a small rod or even a wooden match stick, into the slot the lug may be engaged and pushed inwardly to thereby retract the locking tongues 18 from the groove 19 of socket 7, whereupon the handle may be withdrawn.

A locking arrangement as before described will be found beneficial from several aspects, including that it is automatic in action; is devoid of any extraneous fastening devices, such as screws; can be readily released when so desired and is effectively concealed from view by the handle base 2.

Various modified forms of locking devices which also produce the aforementioned advantages are illustrated in Figures 14 to 19 inclusive. Thus, according to Figures 14, 15 and 16 the locking plate lug 17 of Figures 1, 3, 4, 6 and 7 is replaced by a pin 27 which is riveted to the sliding plate the outer portion of which, in this
instance, constitutes a single tongue 28 that projects into the annular groove 18 of socket 7.

According to Figure 17, the locking plate has a screw pin 29 instead of the lug 17 of Figures 1, 5, 4, 6 and 7, or the riveted pin 27 of Figures 14, 15 and 16. In this case, 18, the spring 14, instead of being disposed in separate pockets in the boss, may be coiled around the reduced inner end portion of the sliding plate 13.

According to Figures 18 and 19, the locking plate 12 is retractive by means of a rod 31 which is pivoted or similarly connected at one end to a transverse lug or web 32 at the outer end of the boss 6 and passes freely through a hole in the sliding plate, the free end of the rod 31 projecting into the slot 26 formed in the outer face of the base.

Figure 20 illustrates a modified form of locking means which possesses the advantages of concealment from view, which is not automatic in operation. According thereto a spindle, 33 of the control mechanism extends within a bore of the boss 6 and is provided near its inner end with an annular groove 34 into which the inner end of a screwed pin 35 may project, the passage for this screwed pin being formed in the handle base 3.

Returning to Figures 1 and 2, it will be noted that the handle is there shown as applied to a mechanism suitable for raising and lowering window panels and comprising a clutch plate 38 fast with a pinion 37 that is free upon spindle 33 and meshes with a quadrant gear (not shown) operatively connected to one or more arms cooperating with the sliding plate. This mechanism, is, in general of well known form, but is modified in accordance with the present invention primarily by the provision of the split plate 7 in place of the usual clutch plate for co-operating with plate 36 and the usual relatively long spindle that projects a considerable distance inwardly from the inner surface of the vehicle body in order to receive a socket like member at the inner end of a conventional operating handle.

Such improvements to the control mechanism are the subject of a co-pending application Serial No. 176,361, filed Nov. 24, 1937, to which the reader is referred for a more complete description of the improvements. It is however pointed out that in order to accommodate the inner end of spindle 33 and a surrounding inwardly projecting boss 39 of the socket 7, the outer end portion of the splined boss 8 is provided with a recess or bore 48.

An operating handle with locking means similar to the embodiment of Figures 1 to 7 is shown applied to latch control mechanism of a door in Figures 11 and 12. In this case the splined boss 6 of the handle projects into a splined socket 41 which may be supported by a mounting plate 42 and usually projects into the interior of a window frame arm 43 to which a connecting rod 46 for the door latch (not shown) is attached. A spring 47 may be coiled around socket 41 and have its ends connected respectively to a lug 48 of the socket and a lug 49 of the mounting plate, in order mutually to maintain the latch in a projected position.

Referring to Figure 13 the splined boss 6 of the handle is shown inserted into a splined socket 51 that is applied to a well known form of regulator or control mechanism for pivoted window panels. In such mechanism the worm spindle 52 usually projects into the interior of the vehicle to receive a socket at the end of the conventional operating handle. In accordance with the present invention however the worm spindle is relatively short and has attached thereto, as by means of a pin 53, the splined socket 51 which in all material respects is similar to the socket of the previous figures. With the exception that the splined boss 8 and the handle arm 2 are shown as being relatively short this embodiment is precisely similar to the other embodiments and consequently no further description is necessary.

Having now described by invention, what I claim as new, and desire to secure by Letters Patent is:

1. A handle assembly for a vehicle body having an inner layer of trim, comprising a handle terminating at its inner end in an enlarged relatively thin base having a flat surface adapted to lie substantially flush with the inner face of said trim, said base having an integral cylindrical boss of materially less diameter adapted to project through an aperture in the trim and provided with preformed longitudinal splines and intervening grooves, a handle-driven member adapted at the opposite face of said trim and also having preformed longitudinal splines and intervening grooves adapted to mate with the corresponding splines and grooves of said boss, said mating splines and grooves adapted to releasably interfit in a locality outwardly of said trim and said handle base, and means for releasably locking said boss and member together.

2. A handle assembly according to claim 1, in which said locking means cooperates with said base and member at one side of said trim and is accessible for release at the opposite side.

3. A handle assembly according to claim 1, in which said driven member has a socket into which said boss slides and releasably fits.

4. A handle assembly according to claim 1, in which said driven member has a socket to receive said boss and comprises a clutch element of a window regulator and a clutch housing enclosing at least in part the splined portions of said boss and member.

5. A handle assembly for a window regulator mechanism, comprising a clutch having a housing and a driven clutch member therein provided with a socket having preformed longitudinal splines and intervening grooves, a handle having at its inner end an integral escutcheon provided with a flat surface from which projects integrally a cylindrical boss provided with preformed longitudinal splines fitting the grooves of said socket at a point interiorly of said clutch housing, and means for releasably locking said boss and member together.

6. A control mechanism of the character described, comprising a rotatable socket member constituting a driving element and positioned on the outer side of inner surface of a vehicle body, a rotary handle adapted to be positioned on the inner side of said body-surfacing material, said handle having a relatively thin escutcheon-forming base having a flat outer surface adapted to lie substantially flush with said surfacing material, a boss projecting axially from the base of said handle through an aperture in said surfacing material and adapted to enter into said socket, means on said boss and socket for causing said socket to rotate with said boss, means on the outer side of said surfacing material for locking said boss in said socket against axial removal, and means operable from
the inner side of said surfacing material for releasing said locking means. 7. A control mechanism of the character described, comprising a rotatable socket member having a recess and constituting a driving element and positioned on the outer side of inner surfacing material of a vehicle body, a rotary handle adapted to be positioned on the inner side of said body-surfacing material, said handle having a relatively thin escutcheon-forming base having a flat outer surface adapted to lie substantially flush with said surfacing material, a boss projecting outwardly from the base of said handle through an aperture in said surfacing material and adapted to enter into said socket, means on said socket for causing said socket to rotate with said boss, means carried by said boss on the outer side of said surfacing material adapted to engage said recess in said socket for locking said boss in said socket against axial removal, and means operable from the inner side of said surfacing material for releasing said locking means. 

8. A control mechanism of the character described, comprising a rotatable socket member having a recess and constituting a driving element and positioned on the outer side of inner surfacing material of a vehicle body, a rotary handle adapted to be positioned on the inner side of said body-surfacing material, said handle having a relatively thin escutcheon-forming base having a flat outer surface adapted to lie substantially flush with said surfacing material, a boss projecting outwardly from the base of said handle through an aperture in said surfacing material and adapted to enter into said socket, means on said boss and socket for causing said socket to rotate with said boss, spring-pressed means carried by said boss on the outer side of said surfacing material and adapted to engage said recess in said socket for locking said boss in said socket against axial removal, and means operable from the inner side of said surfacing material for releasing said locking means. 

9. A control mechanism of the character described, comprising a rotatable socket member constituting a driving element and positioned on the outer side of inner surfacing material of a vehicle body, a rotary handle adapted to be positioned on the inner side of said body-surfacing material, said handle having a relatively thin escutcheon-forming base having a flat outer surface adapted to lie substantially flush with said surfacing material, a boss projecting outwardly from the base of said handle through an aperture in said surfacing material and adapted to enter into said socket, means on said boss and socket for causing said socket to rotate with said boss, a spring-pressed detent member radially displaceable in the portion of said boss adapted to enter said socket, said socket having an annular groove formed therein to receive said detent for locking said boss in said socket against radial displacement, and means accessible from the inner side of said surfacing material for displacing said detent from the groove in the socket to permit removal of the boss from the socket. 

10. A control mechanism of the character described, comprising a rotatable socket member constituting a driving element and positioned on the outer side of inner surfacing material of a vehicle body, a rotary handle adapted to be positioned on the inner side of said body-surfacing material, said handle having a relatively thin escutcheon-forming base having a flat outer surface adapted to lie substantially flush with said surfacing material, a boss projecting outwardly from the base of said handle through an aperture in said surfacing material and adapted to enter into said socket, means on said boss and socket for causing said socket to rotate with said boss, a spring-pressed detent member radially displaceable in the portion of said boss adapted to enter said socket, said socket having an annular groove formed therein to receive said detent for locking said boss in said socket against radial displacement, and means accessible from the inner side of said surfacing material for displacing said detent from the groove in the socket to permit removal of the boss from the socket.
jecting outwardly from the base of said handle through an aperture in said surfacing material and adapted to enter into said socket, means on said boss and socket for causing said socket to rotate with said boss, a spring-pressed detent member radially displaceable in the portion of said boss adapted to enter said socket, said socket having an annular groove formed therein to receive said detent for locking said boss in said socket against radial displacement, and means extending inwardly from said detent member to the inner side of the surfacing material to permit actuation of said detent from the inner side of said surfacing material, the base of said handle having a port providing access to said detent extension.

14. An operator handle of the character described, terminating at its inner end in an enlarged relatively thin base having a flat side, an integral cylindrical boss of materially less diameter than the base, extending axially from the flat side of said base, for cooperating with a driven member, a locking element carried by said boss for locking the boss to said driven member, and a concealed groove in said base to provide access to said locking element.

15. An operator handle of the character described, terminating at its inner end in an enlarged relatively thin base having a flat side, an integral cylindrical boss of materially less diameter than the base, extending axially from the flat side of said base, for cooperating with a driven member, said base having a concealed groove extending from the periphery thereof toward the axis thereof, a locking element carried by the boss for locking the boss to said driven member, and an actuating tongue on said locking element projecting into said groove to enable said locking element to be actuated through said groove from the exterior of said base.

16. An operator handle of the character described, terminating at its inner end in an enlarged relatively thin base having a flat side, an integral cylindrical boss of materially less diameter than the base, extending axially from the flat side of said base, for cooperating with a driven member, said base having an open slot in the flat face of the base extending radially from the periphery thereof to said boss, a locking element carried by said boss for locking the boss to said driven member, and an actuating tongue on said locking element projecting into said slot to enable said locking element to be actuated by inserting an implement into said slot from the outer periphery of said base.

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