

July 1, 1958

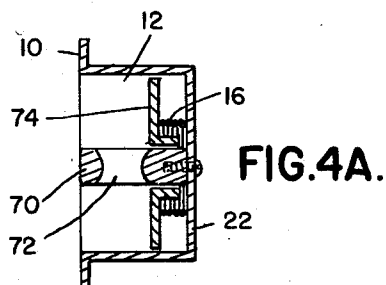
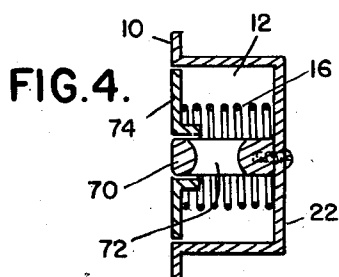
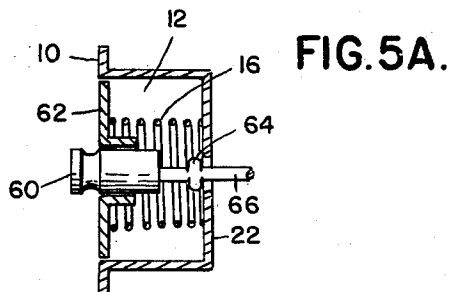
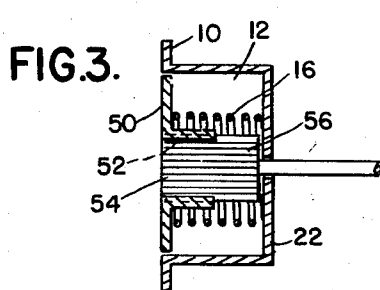
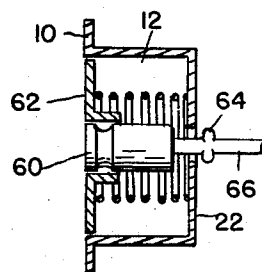
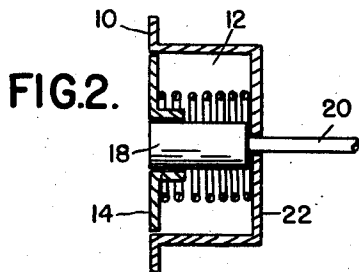
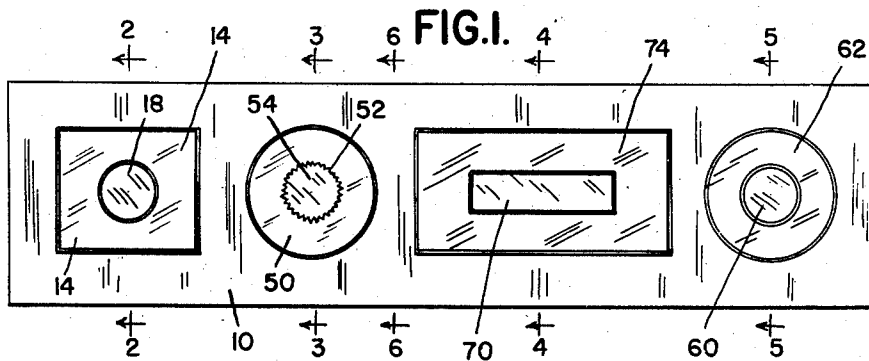
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2,841,031

FLUSH PANEL KNOB CONSTRUCTION

Filed Nov. 10, 1954

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG.6.

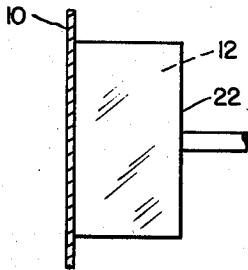


FIG.9.

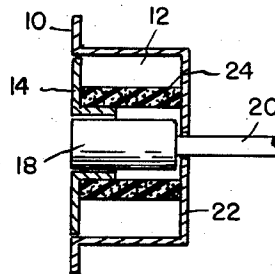


FIG.7.

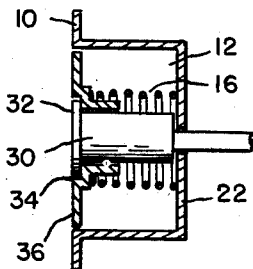


FIG.2A.

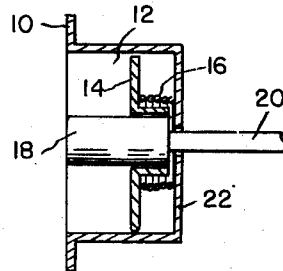


FIG.8.

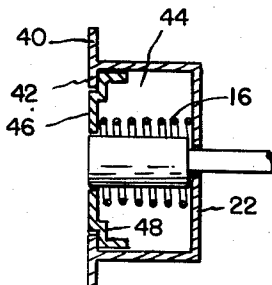
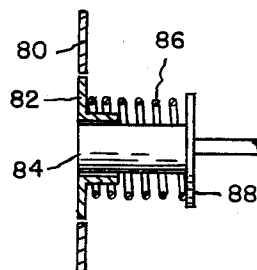


FIG.10.



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FLUSH PANEL KNOB CONSTRUCTION

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21 Claims. (Cl. 74—504)

This invention relates to flush panel construction and more particularly to a construction in which knobs or handles or similar manually or digitally operated parts are employed.

The invention provides for a construction in which knobs or handles are necessary components and are arranged to lie flush with the panel framing into which they are set for use. The knobs or handles are surrounded by a recess panel that recedes under finger pressure into an opening or a recess chamber in the panel construction, against the resilient pressure of a spring or section of foam rubber or similar means, so that the fingers may come into manual manipulating contact and control of the knob or handle, as the case may be. When the fingers are withdrawn from the knob or handle, the recess panel moves forward under the pressure of the spring or other resilient means to assume its initial flush alignment with the outer panel in which it is located.

The invention provides a construction in which knobs or handles may be employed that are flush with the panel in which they are used or required. Simple examples and applications in which the invention serves are television sets, radio sets, automobile dashboards, automobile doors, electrical and gas household appliances of all types, furniture chests and cabinets, and a large host of equipment employing projecting knobs or handles or both.

Some of the problems generally incident to the use of projecting knobs or handles in a television or radio set or other appliances and devices are the difficulty and expense of protecting the device in packing and shipping, the high rate of damage to projecting knobs and handles in transit, storage and use, damage often done to clothing and the person by projecting knobs and handles, and the often unpleasing appearance made by such projections in a beautiful piece of furniture.

At the present time, there is a positive need for improvements in the exterior appearance of various devices, for the reasons above given. These problems are constantly being confronted in the design of appliances and devices, and the invention here disclosed provides a positive structural solution therefor.

The instant invention provides a flush panel construction that includes an opening or recess within which a knob or handle is located. The knob may be movable in a rotative fashion, fixed, or otherwise manipulatable, and the handle may be fixed in place or operative in one manner or another. The common feature in all of these arrangements is that a protecting and finishing plate or panel about the digital end of the knob or handle is movable and shiftable into the opening or recess or recess chamber of the outer panel, so that the knob or handle may be grasped by the fingers. Upon release of the fingers from the knob or handle, the recess panel is urged back into flush alignment with the outer panel by resilient means, such as a coiled helical spring or a form of sponge rubber or the like, located within the opening or recess and bearing upon the recess panel.

Other features of construction will become more ap-

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parent from the description given below. For a visual understanding of the invention, reference may be had to the accompanying drawings made an integral part hereof, and in which:

Fig. 1 is a front elevational view of an outer panel in which various knob and handle arrangements are embodied. The view may also be considered as severable for one or more of the arrangements shown.

Figs. 2 through 6, inclusive, are vertical sectional views taken on the lines 2—2, 3—3, 4—4, 5—5, and 6—6, respectively, of the elevational view of Fig. 1.

Figs. 2a, 4a, and 5a are vertical sectional views similar to Figs. 2, 4, and 5, respectively, showing the recess or protecting panels of the respective arrangements in recessed positions in the flush panel construction.

Fig. 7 is a vertical sectional view similar to Fig. 2, showing a modified form of the recess panel, as it surrounds a flanged knob serving as a forward stop for the recess panel.

Fig. 8 is a vertical sectional view similar to Fig. 2, showing another modified form of the recess panel, as it is arranged within the recess framing which serves as a forward stop for the recess panel.

Fig. 9 is a vertical sectional view similar to Fig. 2, showing the use of foam or sponge rubber, or similar resilient material, in place of a coiled helical spring.

Fig. 10 is a vertical sectional view similar to Fig. 2, showing another modified form of the flush panel construction in which the recess chamber of the outer panel is not required, and in which a simple opening in the outer panel serves to locate the inventive construction.

As shown in several views of the drawing, a flush panel construction embodying several forms of the generic invention provides for an outer panel 10, an opening or recess or recessed chamber 12, a recess or protecting and finishing panel 14, a resilient spring 16, and a manually or digitally manipulatable and operable part, such as a knob or handle, located in the chamber 12, and to be specifically referred to below.

Figs. 1, 2, 2a and 9 show a round rotatable control knob 18 arranged with a shaft 20 passed through a bearing portion of the chamber back wall 22 of the panel recess 12. Upon pressing the panel 14 back into recess chamber 12 with the fingers, control knob 18 may be grasped and rotated according to need. In a radio or television set, such a knob would control means to adjust power, station, sound, etc. In an electrical appliance, such a knob would control means operating an on-off switch, operating speeds, cycles, and a wide variety of functions presently controlled by knobs and handles. Upon release of the knob 18, the panel 14 springs back into its original position substantially in the plane of the digital end of knob 18 and outer panel 10. The flush position of the recess panel 14 may be achieved by means of a spring 16, as in Figs. 2 and 2a, or by an annular ring of sponge rubber 24, Fig. 9; or modifications in the correlated knob, recess panel and outer panel may be provided, as in Figs. 7 and 8.

The spring 16 is provided for most of the constructions shown, wherein upon full free expansion of the spring, the panel 14 is placed flush with the outer panel 10. This requires that the tension, expansion and contraction of spring 16 be carefully controlled, as the flush alignment of panels 10 and 14 is directly controlled by and related to these characteristics of spring 16. Foam or sponge rubber 24 may serve as satisfactorily as a metallic coiled spring in some instances and is here shown as an alternative resilient means.

In order to provide a positive forward stop for recess panel 14, the knob 30 in Fig. 7 is provided with a flange 32 adapted to seat in counterbore 34 of the recess panel 36. Thus, the recess panel 36 will come to a posi-

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tive flush alignment with the outer panel 10 regardless of the excessive expansion of spring 16 urging it against knob flange 32.

Similarly, as an alternative modified construction of the basic construction shown in Figs. 1 and 2, Fig. 8 shows an outer panel 40 provided with a flange 42 projecting over the perimeter of recess 44. Recess panel 46 is arranged with an outer step or recessed flange 48 complementing flange 42, so that upon release of panel 46 it will assume a seated flush position about flange 42, being urged thereto by spring 16.

A second knob construction is shown in Figs. 1 and 3, in which a protecting and finishing recess panel 50 is arranged with serrations 52 about its central bore. A knob 54 having splines 56 about its periphery, complementing the panel serrations 52, is centrally disposed in the panel bore. The recess panel 50 is designed to rotate with knob 54 as it is manually turned on its axis in recess 12. As in the preceding description, panel 50 is urged inwardly by finger pressure so that the splined knob 54 may be grasped by the fingers and manipulated about its axis. Upon release, panel 50 springs back to assume its initial flush alignment with outer panel 10, under urging of spring 16.

The modifications of a flanged knob as in Fig. 7, a flanged outer panel as in Fig. 8, and the use of a foam rubber means as in Fig. 9, are also applicable to the splined knob construction of Figs. 1 and 3.

A third knob construction is shown in Figs. 1, 5 and 5a, in which a push-pull type of knob 60 is arranged in a recess panel 62. The knob 60 shown is merely one of several types of such knobs which may be employed and is considered merely illustrative of the construction. In the form shown, a projecting boss 64 extends concentrically about knob shaft 66, which in the flush position of the digital end of knob 60, Fig. 6, lies beyond the recess back wall 22, and in the pulled out position, Fig. 5a, lies forward of wall 22 and in the recess 12. Knob 60 is operated by urging recess panel 62 against spring 16 until the knob can be gripped by the fingers and pulled forward of the outer panel plane. When knob 60 is to be reset, it is simply pushed inwardly until it lies in the chamber 12 with its digital end adjacent the plane of outer panel 10 as initially aligned.

Here again, the modifications of a flanged knob as in Fig. 7, a flanged outer panel as in Fig. 8, and the use of sponge or foam rubber as in Fig. 9, are applicable to the push-pull knob construction of Figs. 1 and 5.

A basic flush handle construction is shown in Figs. 1, 4 and 4a, in which a handle grip 70 is arranged flush with outer panel 10. A finger opening 72 is provided behind grip 70 in recess chamber 12. A recess panel 74, urged into flush alignment with outer panel 10 by spring 16, surrounds the digital end of handle grip 70. Protecting and finishing panel 74 is urged inwardly by finger pressure until grip 70 may be grasped by the fingers. Upon release of handle grip 70, recess panel 74 assumes its initial flush alignment with outer panel 10. Although handle grip 70 is shown as an elongated grip, it is to be understood that it may take other forms such as a round knob or an oval or irregularly shaped knob or finger grip. Handle grip 70 is arranged in fixed form, being secured to the recess rear wall 22 by suitable means.

The modifications of a flanged handle grip comparable to the flanged knob as in Fig. 7, a flanged outer panel as in Fig. 8, and the use of sponge or foam rubber as in Fig. 9, are also applicable to the flush handle construction of Figs. 1 and 4.

In Fig. 10, the flush panel construction comprises an outer panel 80 having an opening in which is located a protecting and finishing panel 82 which is movable inwardly of the panel 80. A knob 84, having a rotatable movement, is mounted on a base (not shown). Panel 82 is shiftable against a spring 86 which is backed up against a flange 88 at the proximal end of knob 84. In

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this construction, the panel 80 is not provided with a recess chamber as in the above described arrangements.

It will be observed that the panel recess chambers above described serve as guide recesses, or as a guide and spring operating recess, or as a support for functional and operating parts or various combinations of these functions.

In all of the constructions and arrangements here disclosed, the common features of construction include an outer panel, an opening or recess in the outer panel in which is mounted, fixedly or movably, a digitally gripped part having its digital end arranged adjacent the plane of the outer panel, and a movable recess or protecting panel arranged around the operating part's digital end shiftable inwardly of the opening or recess, the recess panel being urged into flush alignment with the outer panel by resilient means contained within the recess or opening.

It will be apparent that the protecting and finishing or recess panels shown are merely illustrative of basic forms which they may take, these forms being modifiable according to particular applications. The splined knob 54 may be modified so that only a single longitudinal spline is arranged on its outer periphery. The handle grip 70 may not be completely cut through with a finger opening 72, but may have merely upper and lower finger depressions. The outer panel 10 has been shown as a single element for several of the forms of finger gripped operating parts as a simple means of illustrating the inventive construction. It may be reduced to individual or coupled units of construction without departing from the essence of the invention. The recess chamber 12 may be arranged for a single or multiple knobs and/or handles. Various other changes and variations within the skill of those in the art to which the invention pertains are to be understood as encompassed within the invention and the appended claims.

We claim:

1. In a device having a manually or digitally operated part, an enclosing panel having an opening, an operating part having a projecting end terminating in said opening, spaced apart from the perimeter of said opening and adjacent the outer plane of said panel, and a protecting and finishing plate movably mounted in the compass of said opening around said projecting end and in the plane of said outer panel, said plate being shiftable inwardly to permit grasping of said operating part.

2. In an apparatus having manually operable controls, an outer panel having an opening, an operating part mounted for movement relative to said panel having a projecting end spaced apart from the perimeter of said opening and terminating in said opening adjacent the plane of said panel, and a protecting and finishing plate movably mounted in the compass of said opening around said projecting end and in the plane of said outer panel, said plate being shiftable inwardly to permit manual manipulation of said operating part.

3. A flush panel construction comprising an outer panel, a recess chamber in said outer panel, an inwardly shiftable recess panel arranged flush with said outer panel, resilient means in said recess chamber urging said recess panel into flush alignment with said outer panel, and an operating part in said recess chamber terminating at its outer end substantially flush with said outer and recess panels, said recess panel mounted in said chamber around said outer end of said part, the exterior panel surfaces of said outer panel, recess panel and operating part being substantially flush aligned and presenting a substantially continuous uniplanar outer appearance.

4. A flush panel construction comprising an outer panel, a recess chamber in said panel having back, top, bottom and side walls, a recess panel movably mounted in and substantially covering said recess chamber and flush aligned with said outer panel, resilient means in said recess chamber between said back wall and said

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recess panel, and a manually operating part in said recess chamber terminating at its outer end adjacent the outer plane of said outer and recess panels, said recess panel mounted in said chamber around said outer end of said part, the exterior panel surfaces of said outer panel, recess panel and operating part being substantially flush aligned and presenting a substantially continuous uniplanar outer appearance.

5 A flush panel construction comprising an outer substantially uniplanar panel, a recessed chamber in said panel, a recess panel movably mounted in and substantially covering said chamber, shiftable into said chamber, and arranged flush with said outer panel, resilient means in said chamber urging said recess panel into flush alignment with said outer panel, and a manually or digitally operated part in said chamber terminating at its outer end adjacent the outer plane of said outer and recess panels and located within the perimeter of said recess chamber, the exterior panel surfaces of said outer panel, recess panel and manually operated part being flush aligned and presenting a substantially continuous uniplanar outer appearance.

6 The flush panel construction defined in claim 5, in which said resilient means comprises a coiled helical spring.

7 In a device having a manually or digitally operated part, an outer panel having an opening, an operating part having its outer end terminating in said opening substantially adjacent the outer plane of said panel and spaced apart from the perimeter of said opening, a protecting and finishing panel movably mounted in the compass of said opening around said outer end of said part, substantially flush with said outer panel and shiftable inwardly to permit grasping of said operating part, and resilient means in said opening behind said protecting panel urging said panel into flush alignment with said outer panel.

8 In a device having a manually or digitally operated part, an outer substantially uniplanar panel having an opening therein, an operating part in said opening mounted for movement relative to said panel and having its digital end spaced apart from the perimeter of said opening and terminating in said opening substantially adjacent the plane of said panel, a protecting and finishing panel movably mounted in the compass of said opening around said digital end of said part, substantially aligned with the plane of said outer panel and shiftable inwardly to permit grasping of said operating part, and resilient means in said opening bearing on said protecting panel and urging said panel toward flush alignment with said outer panel.

9 In an appliance having a manually or digitally operated knob, an outer substantially uniplanar panel having a recessed chamber therein, a digitally operated knob in said chamber mounted for movement relative to said panel having its digital end terminating in said chamber substantially adjacent the plane of said panel, a recess panel movably mounted in said chamber around said digital end of said knob, substantially aligned with the plane of said outer panel and shiftable inwardly to permit grasping of said knob, and resilient means in said chamber bearing on said recess panel and urging said recess panel toward flush alignment with said outer panel and said knob's digital end.

10 In an appliance having a manually or digitally operated knob, an outer panel having an opening, a digitally operated rotatable knob in said opening mounted for rotative movement and having its digital end spaced apart from the perimeter of said opening and terminating in said opening substantially adjacent the plane of said panel, a protecting and finishing panel movably mounted in the compass of said opening around said digital end and in the plane of said outer panel, said protecting panel being shiftable inwardly to permit manual

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manipulation of said knob, and resilient means in said opening bearing on said protecting panel and urging said panel toward flush alignment with said outer panel.

11 A flush panel construction comprising an outer panel having a recess chamber, a recess panel movable in said chamber and arranged flush with said outer panel, resilient means in said chamber bearing on said recess panel urging said recess panel into flush alignment with said outer panel, and a manually operable, rotatable means in said chamber arranged flush with said outer and recess panels and located within the perimeter of said recess panel, the exterior panel surfaces of said outer panel, recess panel and rotatable means being flush aligned and presenting a substantially continuous uniplanar outer appearance.

12 In a device having manually operated controls, an outer panel having a recessed chamber, a manually operated rotatable splined knob in said chamber mounted for rotative movement and having its digital end terminating in said chamber adjacent the plane of said panel, a recess panel movably mounted in said chamber around said digital end of said splined knob, substantially aligned with the plane of said outer panel and shiftable inwardly to permit grasping of said splined knob, and resilient means in said chamber bearing on said recess panel and urging said recess panel toward flush alignment with said outer panel.

13 A flush panel construction comprising an outer panel having a recess chamber, a panel substantially covering said chamber, movable in said chamber and arranged flush with said outer panel, resilient means in said chamber bearing on said recess panel urging said recess panel into flush alignment with said outer panel, and a manually operable splined part in said chamber arranged flush with said outer and recess panels and located within the perimeter of said recess panel, said recess panel having serrations complementing said splined part and closely adjacent thereto, the exterior panel surfaces of said outer panel, recess panel and splined part being flush aligned and presenting a substantially continuous uniplanar outer appearance.

14 In a device having manually or digitally operated controls, an outer panel having a recessed chamber, a manually operated part mounted in said chamber and movable on an axis substantially normal to the plane of said outer panel, said part having its digital end terminating in said chamber adjacent the plane of said outer panel, a recess panel movably mounted in said chamber around said digital end, substantially aligned with the plane of said outer panel and shiftable inwardly to permit grasping of said part, and resilient means in said chamber bearing on said recess panel and urging said recess panel toward flush alignment with said outer panel.

15 The construction defined in claim 14, in which said manually operated part has its digital end movable outwardly of said chamber and beyond the plane of said outer panel along said axis.

16 A flush panel construction comprising an outer panel, a recess chamber in said outer panel, a recess panel movable in said chamber, resilient means in said chamber bearing on said recess panel urging said recess panel into flush alignment with said outer panel, and a manually operable part in said chamber having its digital end arranged flush with said outer and recess panels and located within the perimeter of said recess panel, said part being arranged to have its digital end move out of and to return into said chamber, the exterior panel surfaces of said outer panel, recess panel and operable part being flush aligned and presenting a substantially continuous uniplanar outer appearance.

17 In a device having manually or digitally operated controls, an outer panel having a recessed chamber, a manually operated control knob mounted for movement relative to said panel having its digital end terminating

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in said chamber adjacent the plane of said outer panel, said knob having a flange at said digital end, a protecting and finishing panel movably mounted in said chamber around said flanged digital end, said panel having a counterbored section complementing and seating said flanged digital end therein, said panel being shiftable inwardly to permit grasping of said control knob, and resilient means in said chamber bearing on said protecting panel and urging said protecting panel toward flush alignment with said outer panel.

18. A flush panel construction comprising an outer panel having a recess chamber, a recess panel movable in said chamber and arranged flush with said outer panel, resilient means in said chamber bearing on said recess panel urging said recess panel into flush alignment with said outer panel, and a manually operable part in said chamber having its digital end flush with said outer and recess panels and located within the perimeter of said recess panel, said part having a flange at its digital end, said recess panel having a counterbored seat complementing said flange and seating said flange therein, the exterior panel surfaces of said outer panel, recess panel and flanged part being flush aligned and presenting a substantially continuous uniplanar outer appearance.

19. In a device having manually or digitally operated controls, an outer panel having a recessed chamber, said outer panel having a flange extending in the plane of said panel over the peripheral outer edge of said chamber, a manually operated control part mounted for movement relative to said panel having its digital end terminating in said chamber adjacent the plane of said outer panel, a protecting and finishing panel movably mounted in said chamber around said digital end, shiftable inwardly to permit manual manipulation of said control part and having a peripheral recessed stepped flange complementing and seating said outer panel flange therein, and resilient means in said chamber bearing on said protecting panel and urging said protecting panel toward flush alignment with said outer panel.

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20. A flush panel construction comprising an outer panel having a recess chamber, said outer panel having a flange in the plane of said panel extending over the peripheral outer edge of said chamber, a recess panel in said chamber arranged flush with said outer panel and shiftable into said chamber, said recess panel having a peripheral stepped flanged edge complementing said outer panel flange and seating said flange therein, resilient means in said chamber bearing on said recess panel urging said recess panel into flush alignment with said outer panel, and a manually operable part in said chamber having its digital end arranged flush with said outer and recess panels and located within the perimeter of said chamber, the exterior panel surfaces of said outer panel, recess panel and operable part being flush aligned and presenting a substantially continuous uniplanar outer appearance.

21. A flush panel construction comprising an outer panel having an opening, a recess panel movable in said opening and arranged flush with said outer panel, resilient means in said opening bearing on said recess panel urging said recess panel into flush alignment with said outer panel, and a manually operated part in said opening having its digital end arranged flush with said outer and recess panels and located within and spaced from the perimeter of said opening, said recess panel covering the space encompassed by said opening between said outer panel and said digital end of said operating part and being inwardly shiftable about said operating part, the exterior panel surfaces of said outer panel, recess panel and manually operated part being flush aligned and presenting a substantially continuous uniplanar outer appearance.

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