July 8, 1958 J. YOUNG ET AL 2,842,010

FLUSH PANEL CRANK CONSTRUCTION

Filed March 22, 1955

FIG.1.

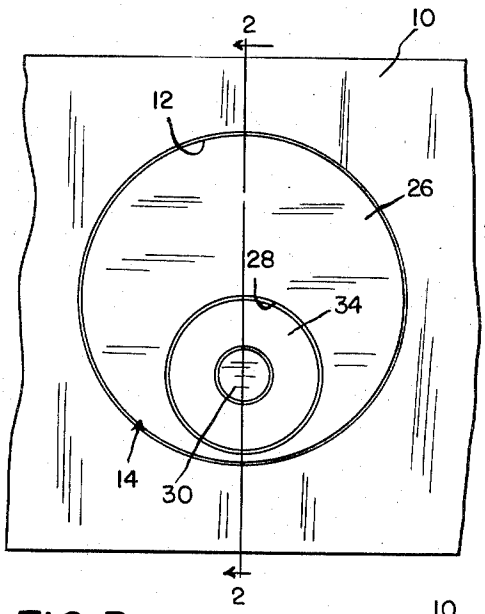


FIG.2.

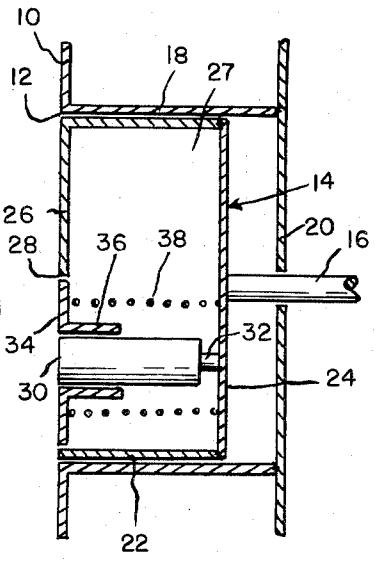


FIG.3.

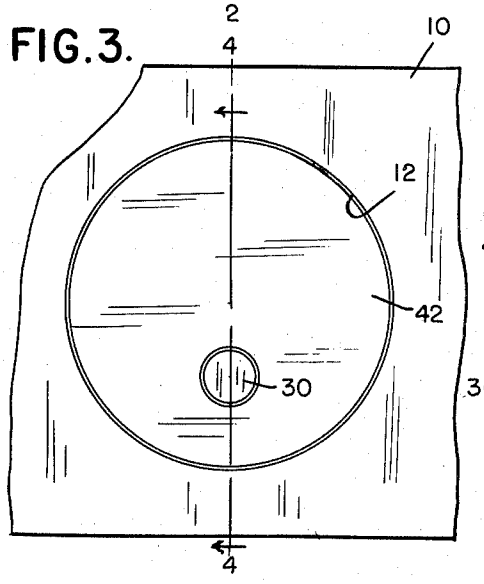
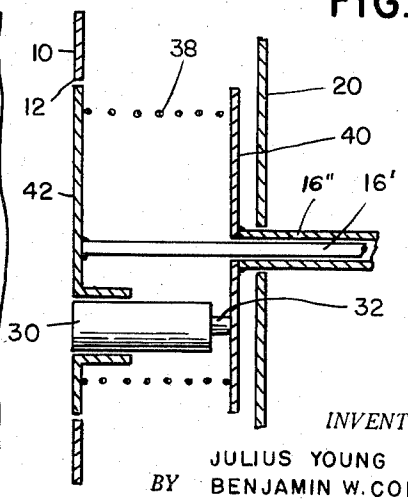


FIG.4.



INVENTORS

JULIUS YOUNG

BY BENJAMIN W. COLMAN

Benjamin W. Colman

ATTORNEY

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FLUSH PANEL CRANK CONSTRUCTION

Julius Young, Detroit, and Benjamin W. Colman, Berkley, Mich.

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7 Claims. (Cl. 74—504)

This invention relates to a flush panel crank construction, and more particularly to a flush construction in which a digitally operable element is flush arranged with an outer panel.

The invention comprises an outer panel having an opening, a revolvable chambered drum in said opening mounted on a shaft supported on a bearing plate, a digitally operable part or knob positioned in the chamber of the drum and having its digital end adjacent the plane of the outer panel, a protecting and finishing plate or recess panel about the part, which plate is shiftable against resilient means into the drum chamber to permit grasping of the part. When the part, which is eccentrically disposed in the drum with respect to the rotating axis of the drum, is moved, the drum revolves on its shaft.

One application of this construction is in window cranks for automobiles. The window operating mechanism is mounted on the drum shaft which is revolved by grasping the eccentric operating crank knob and driving the drum around in the panel opening.

One of the design problems in automobile interiors, as an example, is the projection of window crank knobs from the wall panel of the car. The knob catches and tears clothing or sticks into the side of the person sitting on the seat adjacent the knob. It rarely is positionable at a minimum of discomfort to the driver, and it is a source of annoyance generally to have it projecting out from the wall.

The instant invention therefore has for an object the provision of a flush type crank knob construction in which the operating features are in the plane of the wall, do not project outwardly beyond the wall, and are digitally operable.

This application contains subject matter disclosed in applicants' prior copending application, Serial No. 468,044, filed November 10, 1954, for "Flush Panel Construction."

These and other objects of the invention and features of construction will become more clearly apparent from the description given below, in which the terms are used for purposes of description and not of limitation. In the drawing annexed hereto and forming an integral part hereof—

Fig. 1 is a front elevational view of the inventive construction in one form.

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a front elevational view, similar to Fig. 1, showing a modified arrangement of the crank construction.

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 3.

As shown in Figs. 1 and 2 of the drawing, the outer panel **10** is arranged with an opening **12**, in which is rotatably disposed a drum **14** mounted on a shaft **16**. The outer panel at opening **12** may be arranged with a cylindrical housing **18** to encase drum **14**, if preferred. A supporting plate or member **20** is so arranged as to

provide a bearing for shaft **16**. Member **20** may be mounted on housing **18**, or may be otherwise mounted than as shown.

Drum **14** is disposed in the opening **12** adjacent the plane of the panel **10** to substantially fill the opening and provide the desired flush appearance. Drum **14** comprises the cylinder **22**, base **24** and front facing plate **26**. These parts of the drum may be individually formed and arranged in relationship as shown, or they may be integrally formed. The chamber defined by the drum **14** is designated by the reference numeral **27**.

An opening **28** in plate **26** is arranged eccentrically to the axis of shaft **16**. Of course, the further out this opening is placed the greater the crank arm and therefore the less unit force required to operate the crank. Each individual application, therefore, must be engineered dimensionally to suit the particular character and requirements of the job on which it is to be used.

Disposed in drum opening **28** is a digital knob or operating part **30** terminating at its digital end adjacent the plane of plate **26**. Knob **30** may be rotatable or fixed, and it is mounted by a small shaft **32** on the drum base **24** as a preferred arrangement. It would seem to be the better construction for knob **30** to rotate on its shaft, as this would make it easier to use and operate. However, it may also be positively and non-movably anchored to base **24**.

A protecting and finishing panel or plate **34** having a hub **36** is arranged about knob **30** at its digital end in the drum opening **28**. The protecting panel **34**, or recess panel as it may be called, is disposed flush with the drum face **26** so as to present a complete flush appearance to the entire construction. Recess panel **34** is shiftable into chamber **27** against a resilient means, such as spring **38**, which urges the recess panel into flush alignment with drum plate **26** and outer panel **10**. Spring **38** yieldingly resists inward shifting of recess panel **34**, always tending to return it to its initial flush alignment.

When recess panel **34** is moved inwardly by the fingers, the digital end of knob **30** is exposed to gripping by the fingers. Moving the knob **30** on a circle about the axis of drum **14** causes the drum and its shaft **16** to revolve and thus operate a mechanism (not shown) that may require such revolution.

As shown in Figs. 3 and 4, the drum **14** has been replaced by a crank plate **40**, and the recess panel **42** has been extended across the entire panel opening **12** replacing the drum face **26**. Crank plate **40** is arranged to rotate on a shaft **16''** which may be tubular as shown. Recess panel **42** is preferably provided with a guide pin **16'** which is slidable in shaft **16''**. The function of pin **16'** is merely to center the panel **42**. Any other means of keeping it concentric in panel opening **12** may be used.

Operating part or handle **30** is mounted on plate **40** as before. Its mounting is eccentric to the axis of rotation of plate **40** and thus creates the crank or lever arm relationship. Operation of the modified flush panel crank construction is the same as for the drum. Recess panel **42** is urged inwardly against resilient spring means **38**, exposing the digital end of handle part **30**. Upon grasping handle **30**, the plate **40** is revolved about its shaft **16** as a crank. Upon release of the handle, recess panel **42** is urged back into flush alignment with the panel **10** by spring means **38**.

The flush appearance of a wall or panel is not broken by indentations or recesses often employed in crank arrangements. Further, the operating part or knob **30**, though functioning exactly as crank knobs do at present, does not project beyond the plane of the outer panel and yet is easily available for gripping by the fingers.

Having described our invention in its simplest terms, it is to be understood that the details of construction may

be varied in greater or lesser degree without departing from the essence of the invention nor from the scope of the appended claims.

We claim:

1. In a digitally operable mechanism, a panel having an opening, a member rotatable in said opening on a shaft arranged normal to the plane of said panel, an operating part fixedly mounted eccentrically on said member having its digital end terminating adjacent the plane of said panel, a movable protecting and finishing plate arranged in the plane of said panel about said operating part, said plate being inwardly shiftable against resilient means to permit grasping of said operating part and to rotate said member by movement of said part.

2. The structure defined in claim 1, in which said operating part is mounted on said member substantially normal to the plane of said panel.

3. In a digitally operable mechanism, a panel having an opening, a member rotatable in said opening on a shaft arranged substantially normal to the plane of said panel, a digitally operated handle mounted fixedly and eccentrically on said member substantially parallel to the rotation axis of said member, said handle terminating at its digital end adjacent the plane of said panel, a movable protecting and finishing plate arranged in the plane of said panel about said handle, said plate being inwardly shiftable against resilient means to permit grasping of said handle for rotation of said member on said shaft, said resilient means urging said plate back into flush alignment with said panel and said handle's digital end to provide a flush appearance in said panel.

4. In a digitally operable mechanism, a panel having an opening, a member rotatable in said opening on a shaft arranged normal to the plane of said panel, a digitally operated part mounted fixedly and eccentrically on said member, said part having its digital end terminating adjacent the plane of said panel, a movable protecting and finishing plate in said opening and substantially in the plane of said panel, said plate having an opening through which the digital end of said part may pass, said plate being inwardly shiftable whereby said digital end projects through said plate opening outwardly of said plate to permit normal grasping thereof to rotate said member.

5. In a digitally operable mechanism, a panel having an opening, a member rotatable in said opening on a shaft arranged normal to the plane of said panel, a digitally operated part mounted fixedly and eccentrically on said member, said part having its digital end terminating adjacent the plane of said panel, a movable protecting and finishing plate in said opening and substantially in the plane of said panel, said plate having an opening arranged about said digital end, said plate being inwardly shiftable so that said digital end extends outwardly of said plate to permit grasping of said digital end to rotate said member, and resilient means bearing upon said plate at the rear thereof urging said plate into flush alignment with said panel.

6. In a digitally operable mechanism, a panel having an opening, a member rotatable in said opening comprising a hollow drum mounted upon a shaft, said drum having its front face in the plane of said panel, said face having an opening therein eccentric with respect to its axis of rotation, an operating part fixedly mounted on said drum having its digital end terminating in said face opening adjacent the plane of said panel and face, a movable protecting and finishing plate in said face opening about said digital end in the plane of said face, said plate being shiftable inwardly of said front face to expose said operating part and to permit grasping of said operating part to rotate said drum on said shaft.

7. In a digitally operable mechanism, an outer panel having an opening, a member rotatable in said opening comprising a plate mounted upon a shaft, said plate being substantially parallel to said outer panel and inwardly of said outer panel, a plate handle mounted fixedly and eccentrically on said plate and having its digital end terminating adjacent the plane of said outer panel, a movable recess panel in said outer panel opening about said digital end inwardly shiftable to permit grasping of said digital end as a crank handle to rotate said plate on its shaft, and resilient means between said plate and said recess panel yieldingly resistant to inward shifting of said recess panel and urging said recess panel toward flush alignment with said outer panel.

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