Aug. 30, 1966 S. L. McGARRY 3,269,211

CONTROL KNOB INDICATOR ASSEMBLY

Filed April 1, 1964 4 Sheets-Sheet 1

Fig. 5

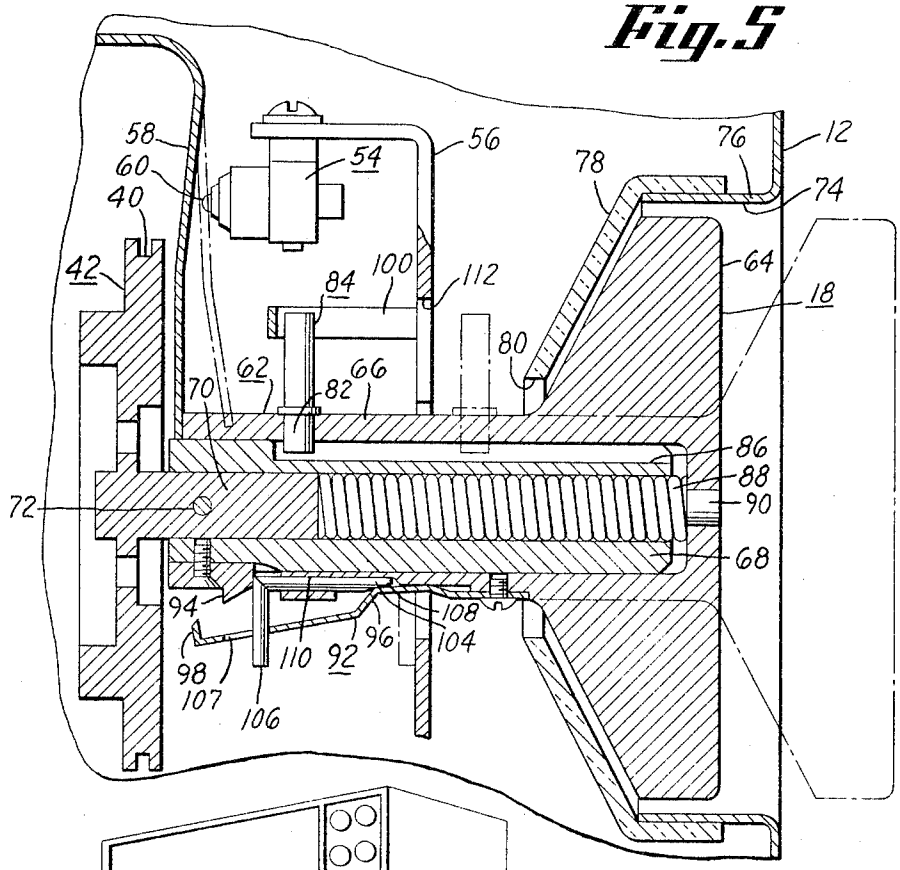
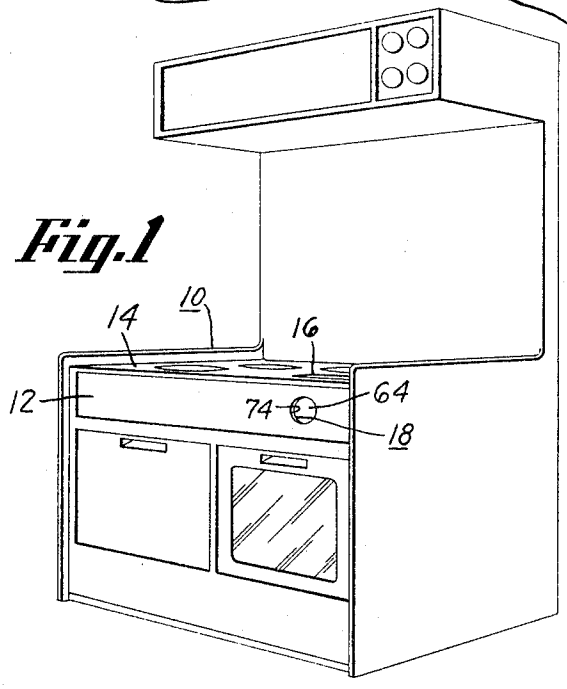


Fig. 1



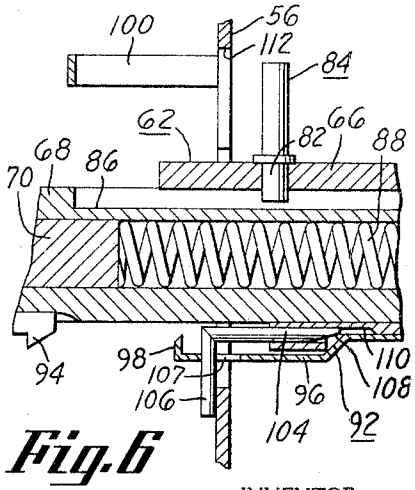


Fig. 6

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CONTROL KNOB INDICATOR ASSEMBLY

Filed April 1, 1964 4 Sheets-Sheet 2

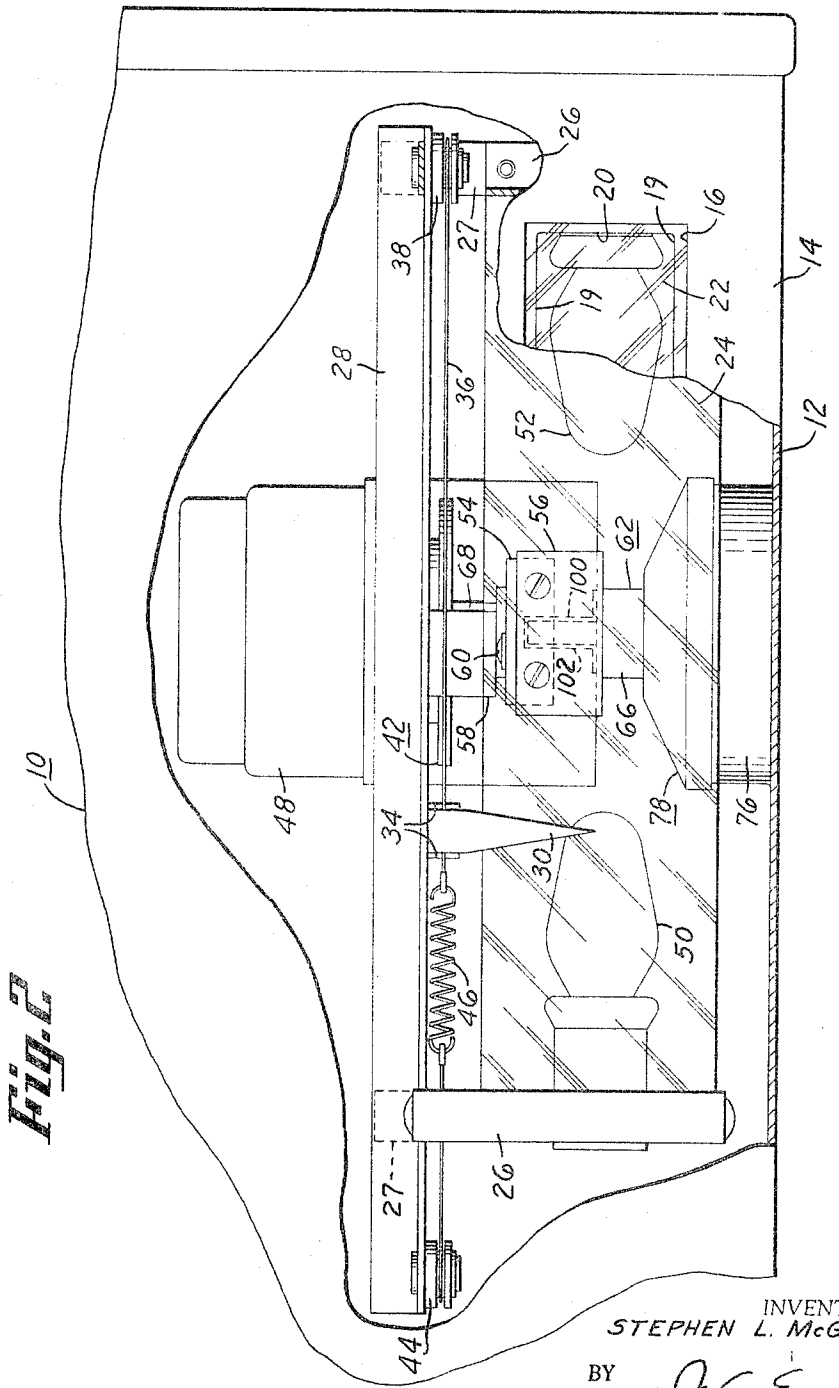


Fig. 2

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CONTROL KNOB INDICATOR ASSEMBLY

Filed April 1, 1964 4 Sheets-Sheet 3

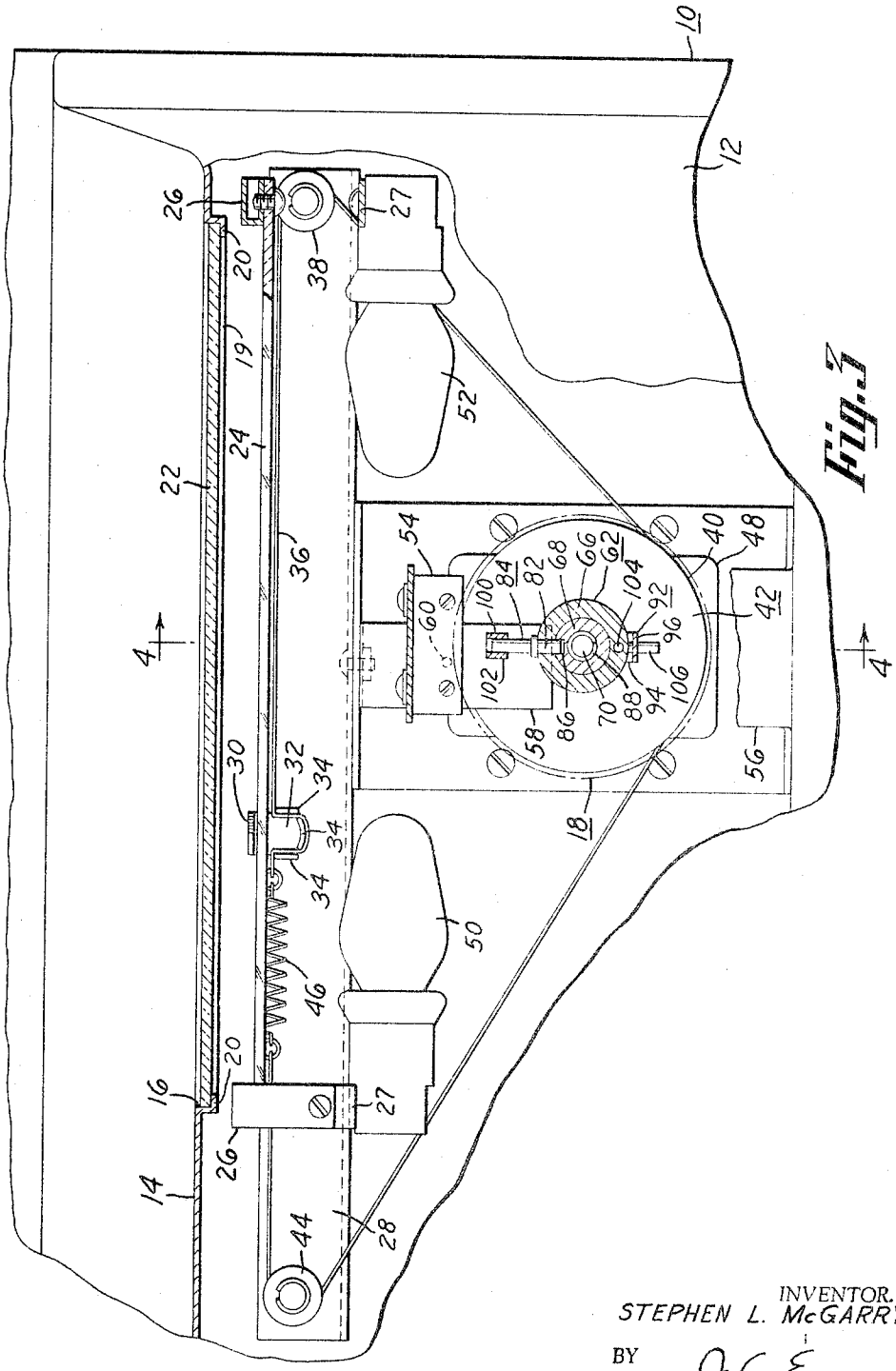


Fig. 1

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CONTROL KNOB INDICATOR ASSEMBLY

Filed April 1, 1964 4 Sheets-Sheet 4

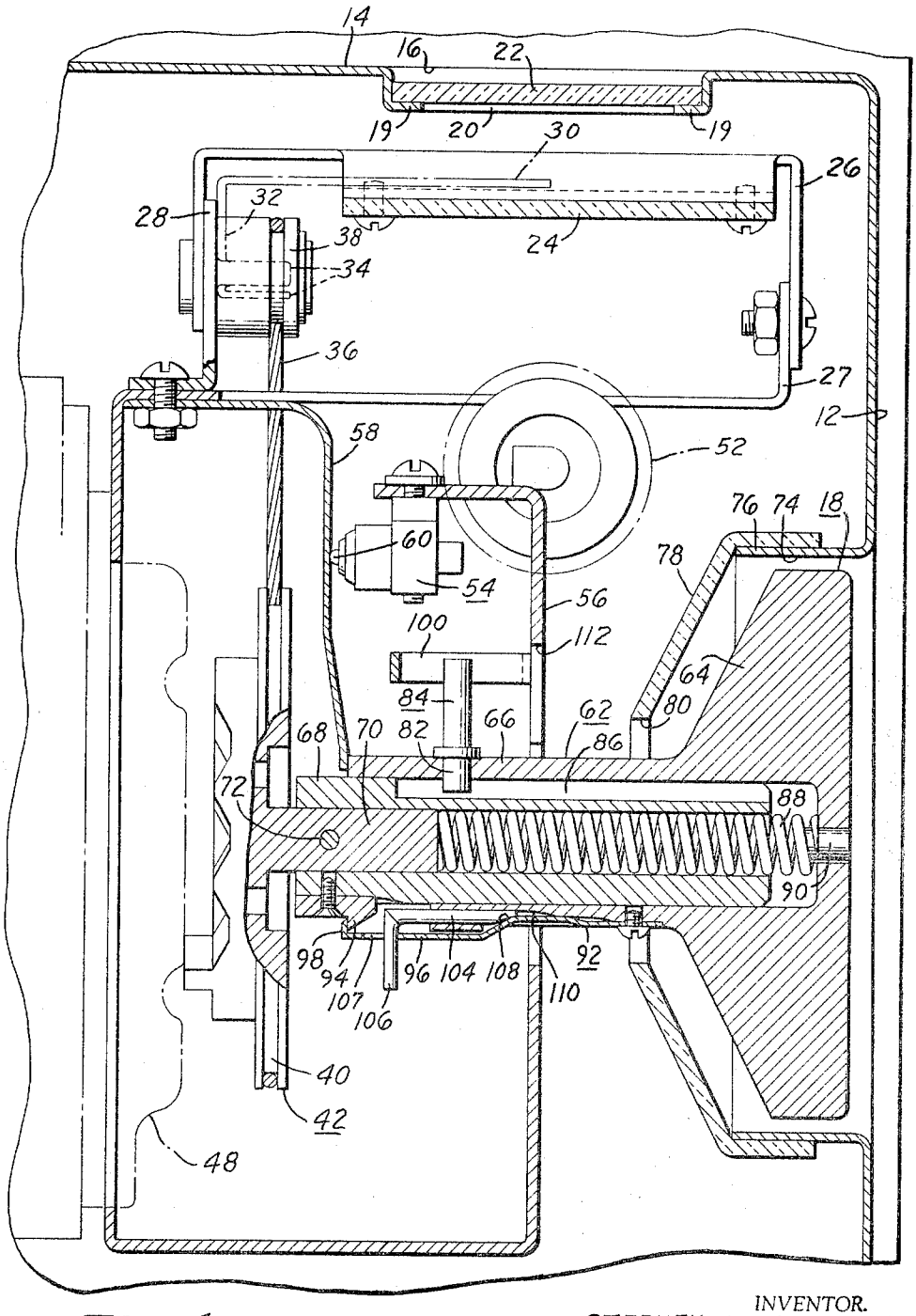


Fig. 4

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3,269,211

CONTROL KNOB INDICATOR ASSEMBLY

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Filed Apr. 1, 1964, Ser. No. 356,621
11 Claims. (Cl. 74—504)

This invention relates to domestic appliances and more particularly to a manually actuatable control knob and indicator assembly for use with domestic appliances.

One problem with many temperature control knob assemblies is that the control knob can be moved away from an "off" position inadvertently by brushing contact therewith as a person passes adjacent a domestic appliance, or the control knob can be moved from its "off" position by a child so as to energize a component of the domestic appliance even though it is not in use. The hazards involved in such accidental or intentional manipulation of a control knob are manifest.

It is, therefore, an object of the present invention to provide a foolproof control knob assembly for association with a domestic appliance including a handle portion held in a nonrotatively inoperative position and movable in one direction to be released for movement opposite to said one direction into a second rotatively operative position.

A further object of the present invention is to provide a compact indicating and control knob assembly for association with domestic appliances and the like including a control knob that is held against accidental movement from its "off" position when in a first position, and further including means for allowing movement of the control knob into a second rotatably operative position by initially pushing the control knob toward the exterior casing or housing of the domestic appliance.

A still further object of the present invention is to improve control knob assemblies for association with domestic appliances by the provision of an improved control knob arrangement including a rotatable element adapted to be operatively associated with a switch means and indicating means wherein the knob is positionable in an out-of-the-way recess in the housing of a domestic appliance when in an "off" position by first pushing the handle of the control knob inwardly of the housing in a positive fashion to effect a release thereof for movement into its exteriorly located operative position.

Still another object of the present invention is to provide an improved, compact indicator and control knob assembly wherein a horizontal viewing window is included having indicia means therein and a movable indicator means actuated by a rotatable element operatively associated with a push-pull knob and wherein the push-pull knob is held in an "off" position against rotation by means including a releasable latch means operative upon movement of the control knob in a first direction to release the rotatable element for movement in a second direction into a rotatable position.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

FIGURE 1 is a view in perspective of a range unit including the indicator and control knob assembly of the present invention;

FIGURE 2 is an enlarged, fragmentary view in top elevation, partially broken away, of the invention;

FIGURE 3 is an enlarged, fragmentary view in front elevation, partially broken away and partially sectioned, of the invention;

FIGURE 4 is an enlarged view in vertical section taken along the line 4—4 of FIGURE 3;

FIGURE 5 is a fragmentary view in vertical section showing the control knob of the invention in one of its operative positions; and

FIGURE 6 is a fragmentary view in vertical section showing a portion of the control knob in another one of its operative positions.

Referring now to the drawings, in FIGURE 1, a range unit **10** is illustrated including a front control panel **12** and a top cooking surface **14** having an opening **16** therein forming a viewing field for the indicator portion of an improved indicator and control knob assembly **18** constructed in accordance with certain principles of the present invention.

As best illustrated in FIGURES 2 and 3, the improved indicator and control knob assembly **18** is enclosed by portions of the outer casing of the range unit **10** including the front control panel **12** and the cooking top **14**. The opening **16** in the cooking top **14** is located at the front edge thereof where the cooking top **14** is bent downwardly to form a pair of spaced apart side flanges **19** and a like pair of end flanges **20** for supportingly receiving a transparent plate **22** defining a field of vision for indicia means within the outer casing of the range unit **10**. In the illustrated embodiment of the invention the indicia means are located on an elongated, horizontally disposed transparent plate **24** supported at either end thereof by a pair of brackets **26** each detachably secured at the front to a respective member **27** and each detachably secured at its rear to a common horizontally arranged support **28**. The end members **27** are fixedly attached to the underside of support **28** as best seen in FIGURE 3. The elongated plate **24** is arranged in line with the elongated viewing window **22** in the cooking top **14** so that the indicia thereon are readily observable at a glance. Above the indicia carrying plate **24** is located a movable pointer element **30** having one end **32** thereof bent downwardly. Forwardly directed tabs **34** on end **32** form grooves adjacent the edges thereon for grippingly receiving a looped portion of a continuous, movable belt or cord **36** so as to be supportingly held thereon. The cord **36** extends from its interconnecting point with the element **30** around a grooved guide pin **38** and thence around the grooved outer periphery **40** of a large diameter rotatable element **42** from whence it passes upwardly and around another grooved guide pin **44** from whence it passes into connecting engagement with one end of a tension spring **46** having the opposite end thereof connected to the cord **36** adjacent the element **30** whereby the cord **36** is maintained at a desired, predetermined tension across the rotatable element **42** and pins **38**, **44**. Thus, upon rotation of the element **42**, the pointer element **30** will move into a predetermined relationship with indicia on the horizontally disposed plate **24** for indicating the operative state of suitable switch means **48** shown in dotted lines in FIGURE 4.

In the illustrated embodiment of the invention the indicia carried on the plate **24** are sharply illuminated by a pair of spaced bulb units **50**, **52** turned on and off by means of a microswitch **54** carried on a suitable fixed U-shaped support bracket **56** located within the outer casing of the range unit **10** wherein the switch **54** is arranged to be responsive to movement of an elongated spring element **58** having one end thereof fastened to the frame **56** by suitable means and the opposite end thereof depending therefrom to overlie a depressible plunger actuator portion **60** of the microswitch **54** and the axially innermost end of a control knob **62** of the improved assembly **18**. The rear portion of frame **56** serves as a mounting for centrally supporting the hori-

zontally arranged support **28** as well as the said spring element **58** as shown in FIGURE 3.

In accordance with certain principles of the present invention, the control knob **62** includes an outer handle portion **64** and an inwardly directed, elongated, tubular extension **66** slidably received on a tubular member **68** received in supported engagement with a forwardly directed spindle portion **70** of the rotatable element **42** that is fixedly secured to element **68** by a cross pin **72**. The handle portion **64** of the control knob **62** is concentrically arranged with a recess **74** formed in part by an inwardly directed flange **76** on surface **12** and a cup-shaped transparent element **78** having a central opening **80** in the bottom thereof through which the tubular extension **66** is directed. The transparent element directs light from the bulb units **50, 52** to produce a halo effect around the knob **64** and in the recess **74** when the knob is in its operative position.

In the illustrated arrangement, the tubular extension **66** is held against rotation with respect to the tubular member **68** by means of an extension **82** of a pin **84** directed through the tubular extension **66** into interlocking engagement with an elongated, axially extending groove **86** in the outer periphery of the tubular member **68**. Within the tubular member **68** is located an elongated coil spring **88** having one end thereof in engagement with the spindle **70** and the opposite end thereof surrounding a pin **90** in the handle **64** where it bears against the inner surface of the handle **64** so as to bias the handle outwardly of the recess **74** into what will be referred to as a freely rotatively operative position.

In accordance with certain principles of the present invention, however, in order to prevent an accidental rotation of the control knob **62** that might cause the rotatable element **42** to be moved with respect to the switch means **48** so as to energize a component part of the range **10** inadvertently, the control knob **62** is normally latched or held interiorly of the recess **74** in an out-of-the-way location when the control knob is in its "off" position. In order to carry out this aspect of the invention, a latch assembly **92** is provided for releasably holding the control knob **62** within the recess **74** against the outward biasing action of the spring **88**. The latch assembly **92**, more particularly, includes a catch element **94** fixedly secured to the tubular member **68** on the rotatable element **42** and a spring catch element **96** having one end thereof fixedly secured to the tubular extension **66** of the control knob and the opposite end thereof bent over at **98** to interlockingly connect to a shoulder on the catch element **94** to prevent axially outward movement of the control knob **62** from the recess **74**. When the control knob **62** is so latched with respect to the rotatable element **42**, the radially outermost end of the pin **84** passes into interlocking engagement with a pair of spaced apart tabs **100, 102** projecting rearwardly from the front surface of the fixed support member **56** as best shown in FIGURES 2 and 3. The pin **84** and tabs **100, 102** coact to prevent accidental rotative movement of the control knob **62** from its "off" position when the handle **64** is within the in recess **74**.

In accordance with other features of the present invention, when it is desired to move the handle **64** of the control knob **62** into a rotatively operative position, a user depresses the handle **64** inwardly of the recess **74** from the position illustrated in FIGURE 4 into the position illustrated in FIGURE 5. Such inward movement activates means for releasing the spring **96**, best shown in FIGURE 5 as including a wedge element **104** having a depending end portion **106** passing through an opening **107** in spring **96** and an inclined end portion **108** interposed between the outer periphery of the tubular extension **66** and the inner surface of the spring element **96**. The wedge element **104** is supportingly received by the tubular extension **66** in opening **110** therein for sliding movement relative thereto whereby when the handle **64** is moved into its innermost position as shown in FIGURE 5 against the biasing action of the spring **88**, the inclined nose **108** of the wedge element **104** will move between the tubular element and spring **96** as the depending portion **106** contacts the forward edge of the catch element **94** to thereby force the spring **96** out of interlocking engagement with the catch **94** so that the spring **88** will be free to shift the control knob **62** axially along the tubular member **68** until the handle **64** is moved exteriorly of the recess **74** into the position shown in dotted lines in FIGURE 5. When the handle **64** is so positioned, the pin **84** is moved through an opening **112** in the front face of the fixed support means **56** out of interlocking engagement with the tabs **100, 102**, whereby the control knob **62** is freely rotatable with respect to the housing to move the rotatable element **42** with respect to the switch means **48** to thereby effect a conditioning thereof reflected by a corresponding shifting of the pointer element **70** with respect to indicia on the plate **24** as readily observable at a glance through the viewing field of the horizontally disposed window **22**. The latch assembly **92** and release wedge element **104** coact to maintain the handle **64** in its axially outwardly shifted, rotatable position, as best illustrated in FIGURE 6, where it can be seen that the depending portion **106** of the wedge element **104** is held between the spring element **92** and the inner surface of the front face of the bracket **56** to prevent the spring **88** from moving the control knob **62** completely off the tubular member **68**. Additionally, engagement between depending portion **106** and the member **56** serves to shift the release wedge member **104** into its return position, wherein it will be out of engagement with the spring element **96** when the control knob **62** is moved into its inwardly located, non-rotative, off position, as illustrated in FIGURE 4.

By virtue of the above-described arrangement, it will be appreciated by those skilled in the art that a compact, economical indicator and control knob arrangement is provided that is relatively free from inadvertent or accidental energization of a component portion of a domestic appliance. Furthermore, it will be appreciated that the above-described arrangement can be quickly moved from its inoperative position by a positive step that further will assure that a user is aware of the fact that the device is being turned on before the knob is moved into an accessible, rotatively operable position exteriorly of the front panel of the control assembly.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A control knob assembly for association with a domestic appliance comprising the combination of, a housing having a recessed surface portion, a knob having an elongated end directed inwardly of said housing, said knob being located within said recessed surface of said housing and movable relative thereto, means for supporting said elongated inwardly directed portion of said knob for movement inwardly and exteriorly of said recessed surface portion of said surface housing, coacting means on said elongated knob extension and said housing for preventing rotation of said knob with respect to said housing when said knob is located inwardly of said recessed surface portion, said coacting means being inoperative when said knob is moved exteriorly of said recessed surface for allowing free rotation thereof with respect to said housing when in such an exterior position, and means for holding said knob in a position interiorly of said recessed surface portion, said means being operative upon inward pushing of said knob for releasing said knob for movement exteriorly of said recessed surface portion.

2. In a control assembly for association with a domestic appliance or the like the combination of, a control housing having a recessed surface portion, a manually rotatable control knob supported within said recessed

surface portion including an elongated extension thereon directed inwardly of said housing, means for supporting said knob within said housing, coacting means between said support means and said elongated extension on said control knob for releasably holding said control knob in a first position within said recessed housing surface portion, means for releasing said knob holding means on movement of said knob inwardly of said recessed surface, and means for biasing said knob outwardly of said recessed surface for movement outwardly thereof upon release of said holding means, said knob being rotatable upon movement thereof exteriorly of said surface recess.

3. In a control assembly for association with a domestic appliance the combination of, a housing having a recessed surface portion, a manually rotatable knob including an elongated extension thereon directed interiorly of said housing, coacting means on said housing and said knob for preventing rotation of said knob when said knob is within said recessed surface portion, means for biasing said knob exteriorly of said recessed surface portion for disengaging said rotation preventing coacting means, said biasing means including means for supporting said elongated extension for axial movement into and out of said recessed surface portion, and latch means on said support means and said elongated extension for releasably holding said knob interiorly of said recessed surface portion, said latch means including means for releasing said knob for outward movement upon movement of said knob interiorly of said recessed surface portion from its releasably held position.

4. In a control knob assembly the combination of, a rotatable element having a portion thereon for conditioning switch means associated with the assembly, housing means including a recessed surface portion, a rotatable knob having a handle portion located within said recessed surface portion and an elongated extension directed inwardly of said housing, means for operatively connecting said elongated extension with said rotatable element for actuation thereof by rotation of said handle portion, coacting latch means on said rotatable element and said elongated extension for releasably holding said handle within said recessed surface portion, coacting stop means on said housing means and said tubular extension for preventing rotation of said handle when said handle is in its releasably held position, and means for biasing said handle exteriorly of said recessed surface portion upon disengagement of said coacting latch means, said coacting stop means being disengaged upon movement of said handle exteriorly of said recessed surface portion for allowing free rotation thereof along with said rotatable element.

5. In the combination of claim 4, said latch means including a spring arm biased toward said elongated handle extension, a catch element fixedly secured to said rotatable element including means thereon for interlockingly engaging said spring arm when said knob is in its first position and a wedge element slidably supported with said elongated handle extension having a portion thereon movable into engagement with said catch element upon movement of said control knob inwardly of said recessed surface portion and a second portion movable by engagement of said first portion with said catch element in between said spring arm and said tubular handle extension for moving said spring arm radially outwardly of said handle extension so as to disconnect it from said catch element.

6. A control assembly for association with a domestic appliance or the like comprising, means forming an indicia viewing field, indicia means within said viewing field, indicating means including means movable with respect to said indicia means for indicating a controlled condition, a rotatable element, means operatively connecting said rotatable element to said indicator means for effecting a desired movement thereof with respect to said

indicia means, a control knob including a handle portion and an elongated extension, means for operatively connecting said elongated extension to said rotatable element, means for releasably holding said elongated extension to said rotatable element against axial movement relative thereto, means for preventing rotation of said handle and said elongated extension when held by said holding means against such axial movement, said rotation preventing means being made inoperative upon releasing said handle for movement axially outwardly of said rotatable element.

7. In a control arrangement for association with a domestic appliance the combination of, housing means, means forming a viewing window in said housing means, indicia means within the field of vision defined by said viewing window, indicator means movable with respect to said indicia means, a rotatable element, means for operatively connecting said rotatable element to said indicator means for moving said indicator means into one of a plurality of indicating positions, a tubular extension fixedly secured to said rotatable element, means forming a recessed surface portion in said housing, a knob having a handle portion and an elongated tubular extension slidably supported by said rotatable element extension for axial movement therealong, coacting means on said tubular handle extension and said rotatable element extension for preventing relative rotational movement therebetween, coacting latch means on said rotatable element and said tubular handle extension for releasably holding said handle in a first predetermined position wherein said handle is located within said recessed surface portion, said coacting latch means including means releasable upon movement of said handle inwardly of said housing from said first predetermined position for releasing said knob from said rotatable element, means within said extension of said rotatable element for biasing said knob exteriorly of said recessed surface portion, said coacting latch means including means coacting with said housing means for holding said knob in a second predetermined position wherein said handle portion thereof is located exteriorly of said housing means, said handle being rotatable in said second predetermined position for moving said rotatable element to condition a switch means associated therewith and move said indicator means into a predetermined desired indicating position, and coacting means on said housing means and said tubular extension of said control knob for preventing rotation of said control knob with respect to said housing means when in its first predetermined position.

8. In the combination of claim 7, said latch means including a spring arm biased toward said tubular handle extension, a catch element fixedly secured to said rotatable element including means thereon for interlockingly engaging said spring arm when said knob is in its first position, and a wedge element slidably supported with said tubular handle extension having a portion thereon movable into engagement with said catch element upon movement of said control knob inwardly of said recessed surface portion and a second portion movable by engagement of said first portion with said catch element inbetween said spring arm and said tubular handle extension for moving said spring arm radially outwardly of said handle extension so as to disconnect it from said catch element.

9. A control knob assembly for association with a switch mechanism comprising, a rotatable element, a control knob having a handle portion and a tubular extension, an elongated extension on said rotatable element received within said tubular handle extension in supporting relationship therewith, said tubular handle extension being axially slidable upon said extension of said rotatable element, coacting means on said rotatable element extension and said tubular handle extension for preventing rotation therebetween, a catch element on said rotatable element, spring means on said tubular handle extension biased into releasably held engagement with said catch element for locating said control knob in a first position, means for

preventing rotation of said control knob when it is in its first position, means for releasing the interconnection between said catch element and said spring means upon movement of said control knob toward said rotatable element, said release means cooperating with said spring element and said housing means for holding said handle in a second position outwardly of said housing upon said handle being released from said rotatable element, said knob being freely rotatable in said second position.

10. In the combination of claim **9**, said means for releasing said spring element from said catch including a wedge element slidably mounted in said tubular handle extension including a first portion engageable with said catch element upon movement of said control knob toward said rotatable element and a second portion interposed between said tubular extension and said spring element for moving said spring element away from said tubular extension upon outward movement of said control knob, and means for biasing said control knob away from said rotatable element following release of said tubular extension from said rotatable element for moving said control knob positively into its second rotatable position.

11. A control knob assembly for association with a domestic appliance comprising the combination of, a housing having a recessed surface portion, a knob having an elongated end directed inwardly of said housing, said knob being located within said recessed surface of said housing

and movable relative thereto, means for supporting said elongated inwardly directed portion of said knob for movement inwardly and exteriorly of said recessed surface portion of said surface housing, coacting means on said elongated knob end and said housing for preventing rotation of said knob with respect to said housing when said knob is located inwardly of said recessed surface portion, said coacting means being inoperative when said knob is moved exteriorly of said recessed surface for allowing free rotation thereof with respect to said housing when in such an exterior position, a spring arm on said knob end biased thereagainst, a catch element interlockingly engaging said spring arm when said knob is located interiorly of said recessed surface portion means for releasing said spring arm and said catch element upon movement of said knob inwardly of said housing, and means for moving said released knob into its rotatable position exteriorly of said recessed housing surface.

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