

May 4, 1943.

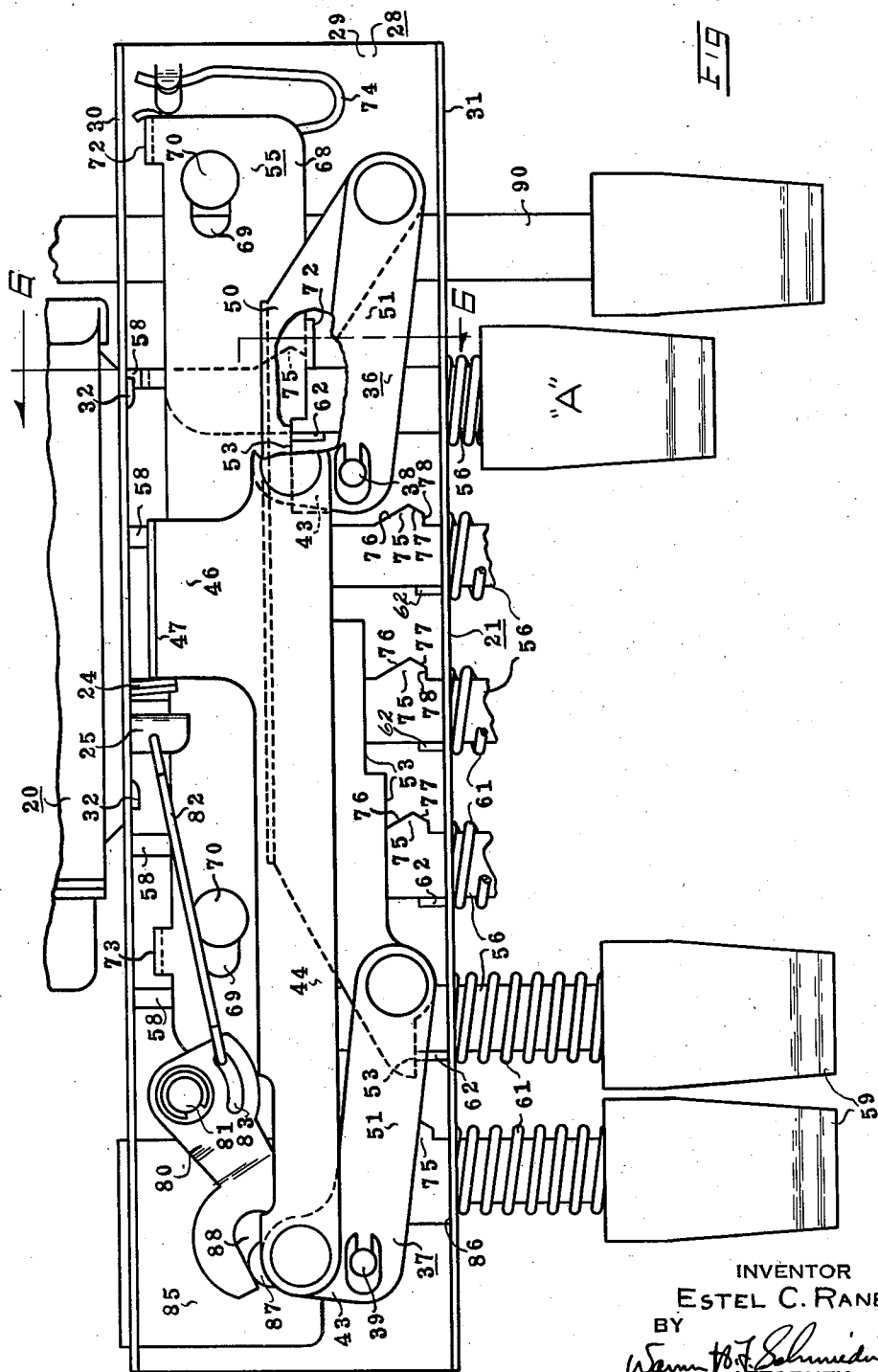
E. C. RANEY

2,318,554

CONTROL DEVICE . . .

Filed Feb. 26, 1941

5 Sheets-Sheet 1



May 4, 1943.

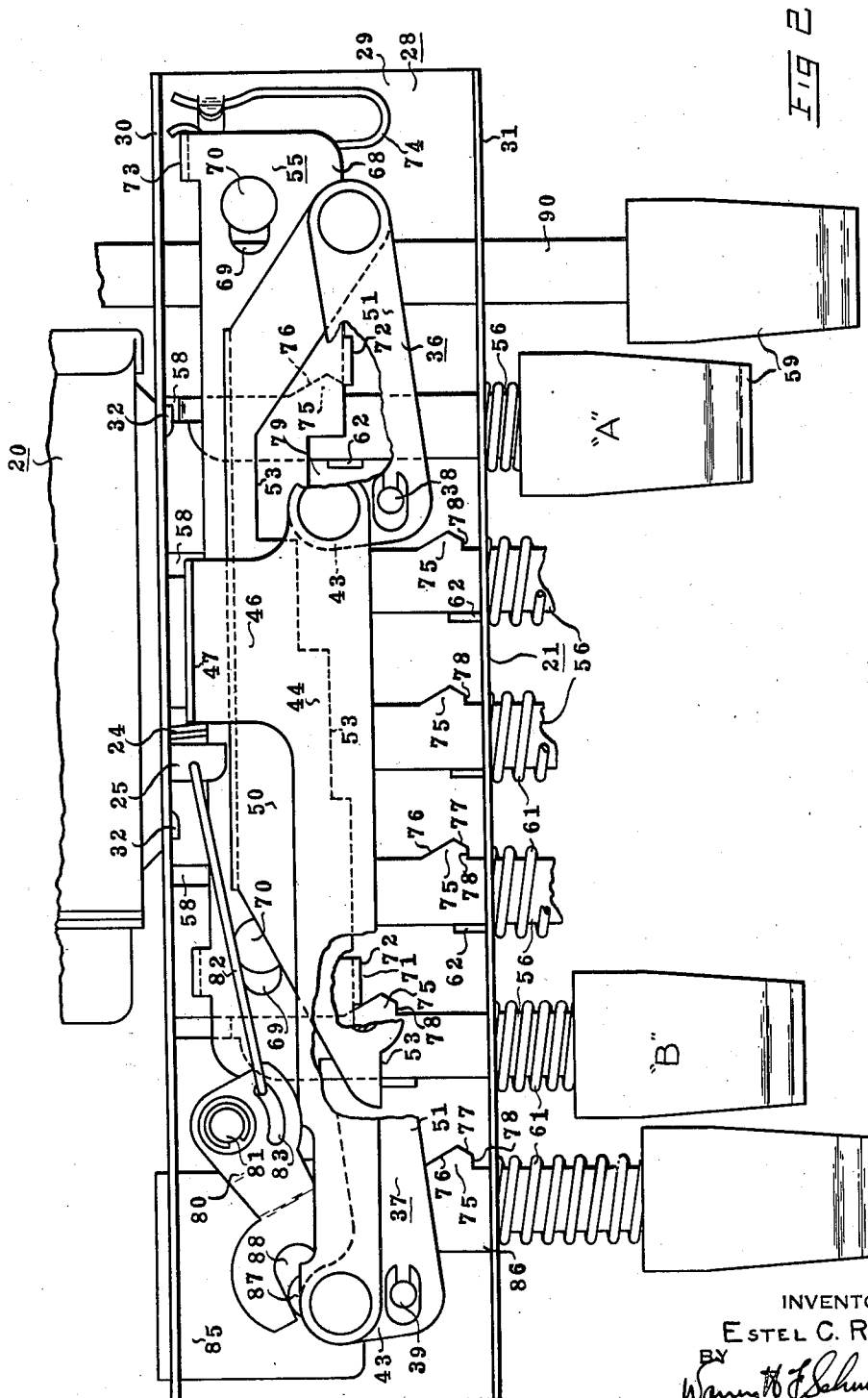
E. C. RANEY

2,318,554

CONTROL DEVICE

Filed Feb. 26, 1941

5 Sheets-Sheet 2



INVENTOR
ESTEL C. RANEY
BY *Warren H. Schmieding*
ATTORNEY

May 4, 1943.

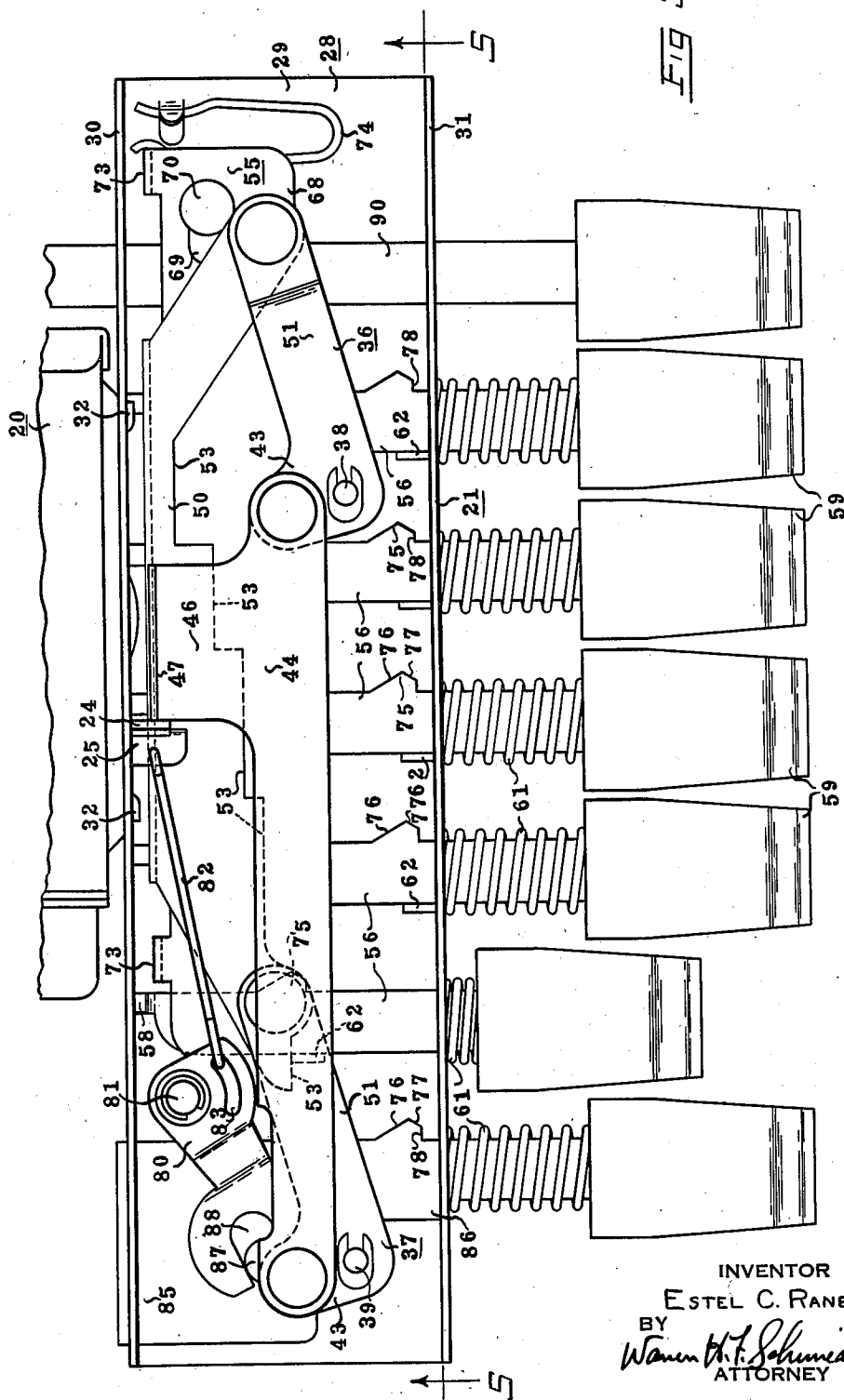
E. C. RANEY

2,318,554

CONTROL DEVICE

Filed Feb. 26, 1941

5 Sheets-Sheet 3



May 4, 1943.

E. C. RANEY

2,318,554

CONTROL DEVICE

Filed Feb. 26, 1941

5 Sheets-Sheet 4

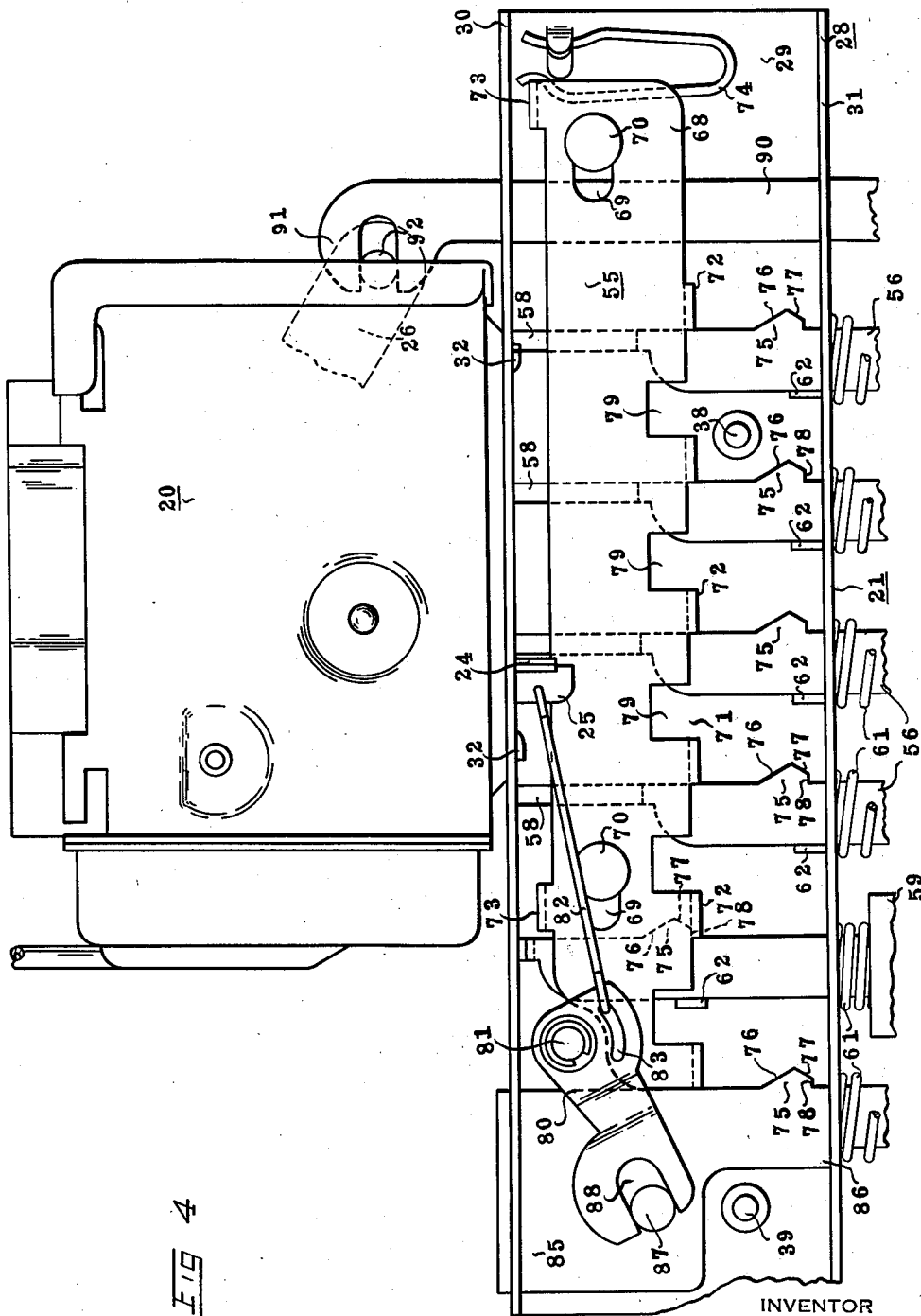


FIG 4

INVENTOR

ESTEL C. RANEY

BY

Wm H. Schmieding
ATTORNEY

May 4, 1943.

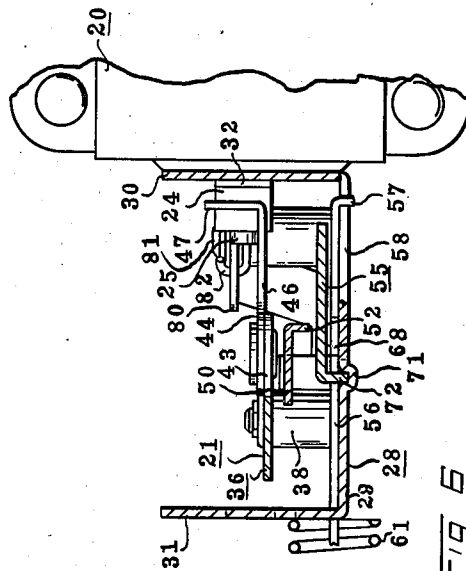
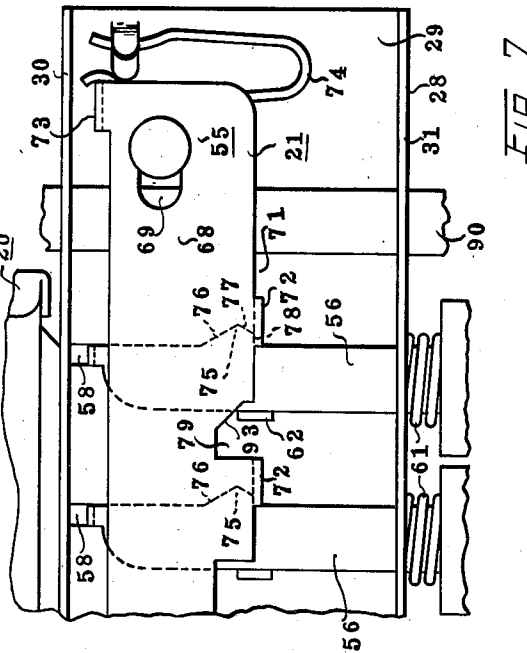
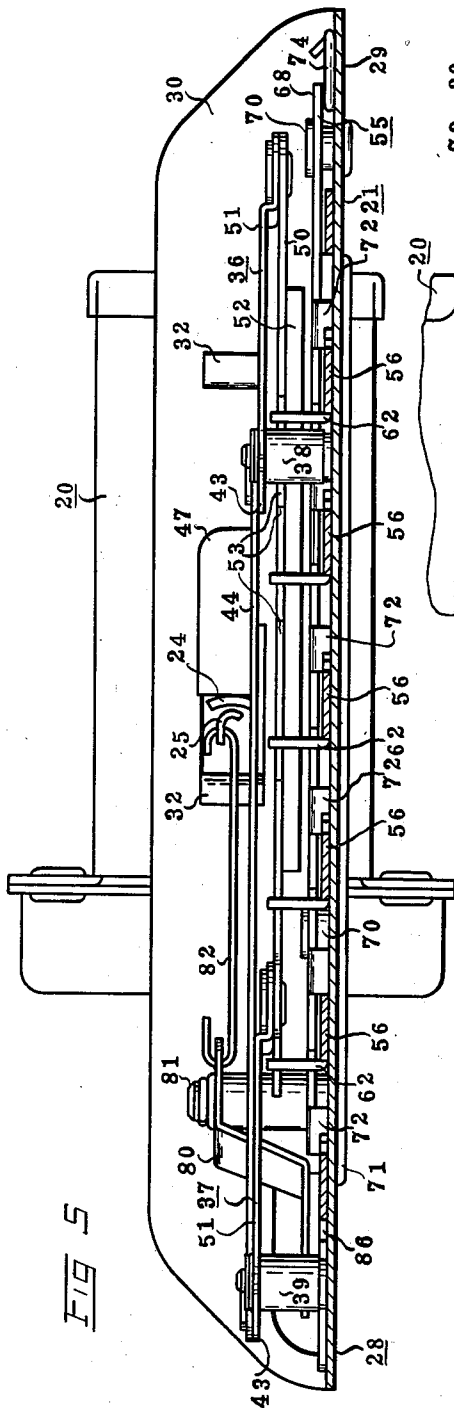
E. C. RANEY

2,318,554

CONTROL DEVICE

Filed Feb. 26, 1941

5 Sheets-Sheet 5



INVENTOR

ESTEL C. RANEY

BY

Wm. H. Schmieding
ATTORNEY

UNITED STATES PATENT OFFICE

2,318,554

CONTROL DEVICE

Estel C. Raney, Columbus, Ohio, assignor to
Ranco Incorporated, Columbus, Ohio, a corporation of Ohio

Application February 26, 1941, Serial No. 380,686

4 Claims. (Cl. 74—483)

The present invention relates to adjusting mechanisms for control apparatus and the like.

An object of the present invention is to provide an adjusting mechanism for an adjustable device, which mechanism includes a plurality of members that are normally biased in a non-adjusting position and movable to an adjusting position for effecting a predetermined adjustment, each of the members being automatically latched in its adjusting position, and being unlatched when another of the members is moved to its adjusting position.

Another object of the invention is to provide an adjusting mechanism comprising two pivoted levers interconnected by a link, the levers being normally urged in one direction about their pivots, and a plurality of members each being movable to, and automatically latched in a position in which they are adapted to engage with the link for limiting rotation of the levers, the abutting parts of the link and members being so arranged that when each of the members is moved to its latched position, the levers will assume a different position, the members being unlatched and moved out of engagement with the link when another of the members is moved to its latched position.

Other and further objects and advantages will be apparent from the following description, reference being had to the accompanying drawings wherein preferred forms of embodiments of the present invention are clearly shown.

In the drawings:

Fig. 1 is a top view in elevation of an adjusting mechanism, certain parts of the mechanism being broken away to more clearly show certain other parts of the mechanism;

Fig. 2 is a view similar to Fig. 1, but showing certain parts of the adjusting mechanism in different positions. Also, certain parts of the mechanism are broken away for more clearly illustrating other parts of the mechanism;

Fig. 3 is a view similar to Fig. 1, but showing certain parts of the adjusting mechanism in different positions;

Fig. 4 is a top view in elevation of a control device and my improved adjusting mechanism, certain parts of the adjusting mechanism being removed for the sake of clarity;

Fig. 5 is a view in section, the section being taken on line 5—5 of Fig. 3;

Fig. 6 is a view in section, the section being taken on line 6—6 of Fig. 1; and

Fig. 7 is a fragmentary, top elevational view of another form of an adjusting mechanism, certain

parts of the mechanism being removed for the sake of clarity.

For the purpose of illustrating the invention, I have shown a refrigerator control apparatus 20, which is adjustable by an adjusting mechanism 21, which mechanism embodies my invention. It is to be understood, however, that the adjusting mechanism may be used for adjusting or controlling mechanisms other than a refrigerator controller. For example, it may be used to control the tuning of a radio set.

The control apparatus 20 is similar to that shown in my copending application, Serial Number 351,010 filed August 3, 1940, for "Control apparatus." This control apparatus comprises a thermostatically operated switching mechanism that is adapted to control the operation of an electric household refrigerator for maintaining predetermined temperatures in the refrigerator. A lever 24 extends from the housing of the apparatus 20, and this lever is movable for adjusting the control apparatus for causing various predetermined temperatures to be produced in the refrigerator. As the lever is moved to the left, as viewed in Fig. 4, the temperatures in the refrigerator are increased. The lever 24 is normally biased toward the right by the adjusting device which is incorporated in the control apparatus, as is clearly disclosed in my application referred to hereinbefore. A second lever 25 extends from the housing of the control apparatus for opening the switch of the control apparatus when the lever is moved to the left, as viewed in Fig. 4.

The control apparatus 20 also includes mechanism for causing defrosting of the evaporator of the refrigerator. This mechanism is rendered operative by a lever 26 which extends from one end of the control housing. This lever, when moved rearwardly, as viewed in Fig. 4, is adapted to cause initiation of the defrosting cycle, and after the temperature of the evaporator has risen above the melting point of ice, the lever is automatically returned to its normal, or forward position when normal operation of the refrigerator is restored. The defrosting mechanism of the control apparatus is fully described in my copending application mentioned previously.

The adjusting mechanism 21 includes a frame 28, formed by a channel shaped sheet metal member having a yoke wall 29 and two upwardly extending confronting side walls 30 and 31. The frame 28 is attached to the control apparatus 20 by two lugs 32, which lugs extend from the control housing, through slots in the wall 30 and

are clinched against the inside of the wall. One of these slots is elongated for also receiving the levers 24 and 25 which extend therethrough.

Two bell crank levers 36 and 37 are pivotally mounted on the end portions of two studs 38 and 39, which studs are suitably attached to the yoke wall 29. The crank levers are secured on the studs 38 and 39 by split washers that are inserted in grooves at the outer ends of the studs.

The short arms 43 of the crank levers 36 and 37 are interconnected by a link member 44, which is pivotally connected to the arms 43 by suitable pins. The link member 44 is provided with an outwardly extending portion 46, and an upwardly extending flange 47 is formed on the portion 46. An end edge of the flange 47 is in alignment with the adjusting lever 24 of the control 20. It is apparent that by rotating the crank levers 36 and 37 to the right or left, as viewed in Fig. 4, the link member 44 will be moved to the right or left for controlling movement of the lever 24. Since the lever 24 of the control 20 is constantly biased to the right, it is resiliently maintained in engagement with the end of the flange 47 and it also biases the crank levers 36 and 37, through the link 44, clockwise.

A second link member 50 interconnects the crank levers 36 and 37, and is pivotally attached to the ends of arms 51 of the crank members by suitable pins. The end portions of the arms 51 are off-set downwardly, as is illustrated in Fig. 5, so that the links 44 and 50 will move in separate planes. The rearward edge of the link 50 is turned downwardly at 52 for rendering the link rigid, and the forward edge of the link 50 has off-sets 53 which are progressively off-set with respect to one another. It is apparent that the crank levers 36 and 37, being resiliently urged clockwise, tend to carry the link 50 forwardly toward the wall 31 of the frame 28.

A plurality of keys or adjusting members 56, identical with one another, are slideably mounted on the frame 28. These members 56 extend through guide slots formed in the wall 31 of the frame 28 and rest on the wall 29. The inner ends of the members 56 are provided with downwardly turned fingers 57, which fingers slide in slots 58 formed in the wall 29 of the frame 28 and cooperate with the edges of the slots for guiding the member 56 transversely with respect to the frame 28. Each of the members 56 is provided with a knob 59 on the outer end thereof, so that the members may be pressed inwardly manually. The members 56 are biased outwardly by coil springs 61 that are placed about the members 56 intermediate the wall 31 and the knobs 59. Each of the adjusting members is provided with an upturned lug 62 which abuts the inside of the wall 31 and forms stops for limiting outward movement of the members 56. Each of the lugs 62 is in alignment with an off-set portion 53 of the link 50 so that when the members 56 are pressed inwardly, the lugs 62 can engage with the respective off-set portions 53.

It is apparent that when any one of the adjusting members 56 is pressed inwardly to a predetermined position, the lug 62 thereof is engaged with the link 50, since levers 36 and 37 are biased clockwise, and the positions of the crank levers 36 and 37 are thus determined. Hence, the members 56, when pressed inwardly to a predetermined position, form stops for limiting rotation of the crank levers 36 and 37, thereby determining the position of the adjusting lever 24 of the control apparatus 20.

Each of the members 56 is adapted to be automatically latched in a predetermined position, for engagement with the link 50, by a latching mechanism 55. The latching mechanism, which may be seen to best advantage in Fig. 4, comprises an elongated plate 68 having two slots 69 therein. Two studs 70 extend upwardly from the wall 29 of the frame 28 and through the slots 69. These studs cooperate with the edges of the slots for guiding the plate 68 in a direction laterally with respect to the direction of movement of the member 56. The plate 68 is spaced from the wall 29 of the frame 28 by downwardly extending flanges 72 and 73, and overlies portions of the members 56. The flanges 72 extend into a channel 71 formed in the wall 29 of the frame 28. A flange 72 is located adjacent an edge of each of the adjusting members 56. The plate 68 is constantly urged to the left, as viewed in Fig. 4, by a hairpin shaped spring 74, which spring is interposed between one of the flanges 73 and a lug struck up from the wall 29 of the frame 28. When the plate 68 is urged to the left by the spring 74, a flange 72 thereof is immediately adjacent or in engagement with an edge of each of the adjusting members 56.

A V shaped cam 75 is formed on each of the members 56, which cam is in alignment with the flange 72 immediately adjacent the member. The cams 75 include surfaces 76 and 77. A shoulder 78 is formed on each of the members 56 at the end of the cam surface 77.

It is apparent that when any one of the adjusting members 56 is pressed inwardly, the surface 76 of the cam 75 thereof will engage the end edge of the flange 72 immediately adjacent the member, and force the plate 68 to the right against the tension of the spring 74. As the adjusting member is pushed inwardly further, the surface 77 of the cam engages the flange and permits the plate 68 to move to the left, and when the cam surface 77 moves beyond the flange, the plate 68 moves the flange in front of the shoulder 78 on the member 56. When the member 56 is released by the operator, the shoulder 78 abuts the flange 72 and the member 56 is thereby latched in position. This is illustrated in Fig. 1, for example, wherein the latching member 56, indicated at A, is shown in its latched position. The plate 68 is notched at 79 for receiving the lugs 62 of the member 56 when the members are in their latched positions. Thus, each of the members 56 is latched in a predetermined position when it is pressed inwardly.

When another of any of the adjusting members 56 is pressed inwardly, its cam 75 engages the edge of the flange 72 adjacent an edge thereof and causes the plate 68 to be moved to the right. This causes the flange 72, in alignment with the shoulder 78 of the latched adjusting member, to be moved out of alignment with that shoulder and into engagement with the cam surface 77 of the latter member. This is illustrated in Fig. 2, wherein an adjusting member 56, indicated by B, is shown moved toward its latched position while member A is latched. The spring 61 associated with the adjusting member A moves the member A outwardly as the plate 68 is moved to the right by the cam of the adjusting member B. The tension of the spring 61 is sufficient to cause the cam 75 of the member A to pass by the flange 72 of the plate 68. As the cam 75 of the member A passes the flange 72, the plate 68 then moves to the left for latching the adjusting

member B in position in a manner similar to that in which the member A was latched. Similarly, when any one of the members 56 is pressed inwardly, the latching mechanism releases any of the other adjusting members latched thereby and then latches the inwardly pressed member.

By forming the channel 71 and extending the ends of the flanges 72 therein, the ends of the flanges extend beyond the cams 75 and therefore, cannot bind with the cam surfaces, even though the plate 68 moves outwardly, slightly, due to wearing or play between certain parts of the locking mechanism.

Since the adjusting members 56 are identical, when they are moved to their latched positions the lugs 62 thereof will be inwardly equal distances from the wall 31 of the frame 28, for example. In order to cause the lever 24 of the control apparatus 20 to move to different adjusting positions when different members 56 are moved to their latched positions, the off-set portions 53 are provided on the link 50. These off-set portions permit different degrees of rotation of the crank levers 36 and 37 when different adjusting members 56 are moved to their latched positions, respectively, although the members are identical and are moved inwardly the same distance. Thus by pressing different adjusting members 56, the adjustment of the control mechanism is changed.

Obviously the same results can be produced by providing adjusting members having lugs, corresponding to the lugs 62, but positioned at different intervals along different members for causing more or less rotation of the levers 36 and 37 as different members are pressed inwardly to their latched positions. I prefer to use the arrangement illustrated because each of the adjusting members 56 can be made identical.

In order to open the switch of the control apparatus 20 by the lever 25, a lever 80 is pivotally supported on a stud 81 which extends from the wall 29 of the frame 28. The lever 80 is connected to the switch lever 25 by a wire 82, which wire is attached to the lever 25 by extending an end portion thereof through an eyelet formed in the lever, and to the lever 80 by extending the opposite end thereof through a slot 83 formed in the lever 80. A member 85 is slidably mounted on the frame 28. This member 85 includes a portion which extends through a slot in the wall 31, and a knob 59 is secured on the end of the extending portion. The opposite end of the member 85 extends through a slot in the wall 30 of the frame 28 and cooperates with the edges of the slot for guiding the member 85 when it is moved transversely with respect to the frame 28. A spring 61 is interposed between the wall 31 and the knob 59 for biasing the member 85 outwardly. A shoulder 86 is formed on the member 85 for limiting outward movement of the member by the spring 61. A stud 87 is provided on the member 85, and this stud is received in a slot 88 formed in the end of the lever 80. Thus, when the member 85 is pressed inwardly, the lever 80 is rotated clockwise, as viewed in Fig. 4, and the lever 25 is moved to the left by the wire 82 and causes the switch of the control apparatus to be opened.

The member 85 is latched in the switch opening position by the latching mechanism 55 in a manner similar to that in which the members 56 are latched. One of the flanges 72 of the plate 68 is disposed to lie adjacent the edge of the member 85, and a cam 75, similar to the cams 75

formed on the adjusting members 56, is formed on the member 85 and in alignment with the flange 72. A shoulder 78 is also provided adjacent the cam 75, which shoulder is adapted to engage the inner face of the flange 72 adjacent the member 85 for latching the member 85, when the member is pressed inwardly. It is apparent, that when the member 85 is pressed inwardly for causing the switch of the controller 20 to be opened, the cam 75 will cause the plate 68 to be moved to the right for releasing any of the adjusting members 56 from their latching positions in a manner similar to that described with reference to the members 56.

When it is desirable to cause the switch to be closed, any one of the adjusting members 56 is pressed to its latching position. This causes the latching plate 68 to be moved to unlatch the member 85, which member then returns to its outward position by action of the spring 61 associated therewith. The switch operating lever 25 is normally biased toward the switch closing position, and when the member 85 is unlatched, the lever 25 moves to that position.

The defrosting lever 26 of the control apparatus is adapted to be operated by a member 90 which is extended through slots in the walls 30 and 31 of the frame 28. One end 91 of the member 90 is furcated, and a stud 92 on the end of the defrosting lever 26 is extended beyond the prongs of the furcated section. A knob 59 is mounted on the opposite end of the member 90 so that the member 90 can be pushed inwardly. The mechanism of the controller 20 is so arranged that when the lever 26 is moved rearwardly by the member 90, a defrosting cycle will be initiated in the refrigerator and after the refrigerator has defrosted, the lever 26 will be automatically moved forwardly, which returns the member 90 to its outward position. In the present embodiment of the invention the member 90 is not associated with the latching mechanism, since defrosting can be accomplished without disturbing the normal adjustment of the control.

If in the embodiment of the invention just described, all of the adjusting members 56 and the member 85 were latched simultaneously, it would be impossible to release any of these members without gaining access to the plate 68 and moving the plate to the unlatched position by extraneous means. In order to obviate any difficulty arising from this characteristic of the mechanism, I have provided another form of embodiment of the invention, which is shown in Fig. 7. In this embodiment, the plate 68 is provided with a cam surface 93, which surface is in alignment with the lug 62 of one of the adjusting members 56. Preferably, the cam surface 93 is in alignment with the lug 62 of the adjusting member A. When this particular member 56 is pressed inwardly beyond its latching position, the lug 62 engaging the cam will move the plate 68 to the right and unlatch the other adjusting members 56 and the member 85.

The adjusting mechanism 21 and the controller 20 can be attached to the rear side of a baffle plate of the refrigerator by extending bolts through suitable openings formed in the wall 31 of the frame 28. The baffle plate is preferably formed with a slot through which the knob 59 can be extended.

By my invention a control apparatus, or the like, can be adjusted to predetermined adjustments by pressing any one of a plurality of ad-

justing members, which members will be locked in their adjusting positions until another of the adjusting members is pressed to its adjusting position.

While the forms of embodiments of the present invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

I claim:

1. An adjusting mechanism including in combination, a plurality of adjusting members, each of said members including a shaft having a knob at one end thereof and an abutment spaced from the knob, the abutments and knobs of the respective adjusting members being spaced apart equally, said adjusting members being movable between two positions, the movement of said members between said two positions being substantially equal; an elongated member; means for mounting the elongated member for movement substantially parallel with the movement of said adjusting members, said elongated member having portions thereof in alignment with the abutments of said adjusting members and being engageable by said abutments when the adjusting members are moved from one of said positions toward the other of said positions, said portions of the elongated member being spaced from the respective abutments different distances when the adjusting members are in said one position for causing the elongated member to be moved a different degree by one of the adjusting members when said one adjusting member is moved between said positions than by another of said adjusting members when the latter adjusting member is moved between said two positions; and mechanism to be adjusted movable by the said parallel movement of the elongated member.

2. An adjusting mechanism including in combination, a plurality of adjusting members, each of said members including a shaft having a knob at one end thereof and an abutment spaced from the knob, the abutments and knobs of the respective adjusting members being spaced apart equally, said adjusting members being movable between two positions, the movements of said members between said two positions being substantially equal; means normally urging each of said members toward one of said positions; an elongated member; means for mounting the elongated member for movement substantially parallel with the movement of said adjusting members, said elongated member having portions thereof in alignment with the abutments of said adjusting members and being engageable by said abutments when the adjusting members are moved from one of said positions toward the other of said positions, said portions of the elongated member being spaced from the respective

abutments different distances when the members are in said one position for causing the elongated member to be moved a different degree by one of the adjusting members when said one adjusting member is moved between said positions than when moved by another of said adjusting members when the latter adjusting member is moved between said two positions; and mechanism to be adjusted movable by the said parallel movement of the elongated member.

3. An adjusting mechanism including in combination, a plurality of adjusting members, each of said members including a shaft having a knob at one end thereof and an abutment spaced from the knob, the abutments and knobs of the respective adjusting members being spaced apart equally, said adjusting members being movable between two positions, the movements of said members between said two positions being substantially equal; means normally urging each of said members toward one of said positions; an elongated member; means for mounting the elongated member for movement substantially parallel with the movement of said adjusting members, said elongated member having portions thereof in alignment with the abutment of each of said adjusting members and being engageable by said abutments when the adjusting members are moved from one of said positions toward the other of said positions, said portions of the elongated member being spaced from the respective abutments different distances when the members are in said one position for causing the elongated member to be moved a different distance by one of the adjusting members when said one adjusting member is moved between said positions than when moved by another of said adjusting members when the latter adjusting member is moved between said two positions; mechanism to be adjusted movable by said parallel movement of the elongated member and means for latching any one of said adjusting members in the other of said positions when moved thereto and for simultaneously releasing any other of said adjusting member from its latched position.

4. An adjusting mechanism including in combination, a plurality of adjusting members, each of said members being movable between two positions; an elongated member having an edge thereof in alignment with a part of each of said adjusting members, said edge having portions offset relative to one another and each of said offset portions being engageable by one of the adjusting members, respectively, when the adjusting members are moved from said one position to the other of said positions for causing the elongated member to be moved to predetermined positions; and means urging said elongated member toward said members.

ESTEL C. RANEY.