

May 18, 1937.

E. E. FORSTROM

2,080,964

INTERLOCKING SWITCH MECHANISM

Filed Oct. 26, 1935

2 Sheets-Sheet 1

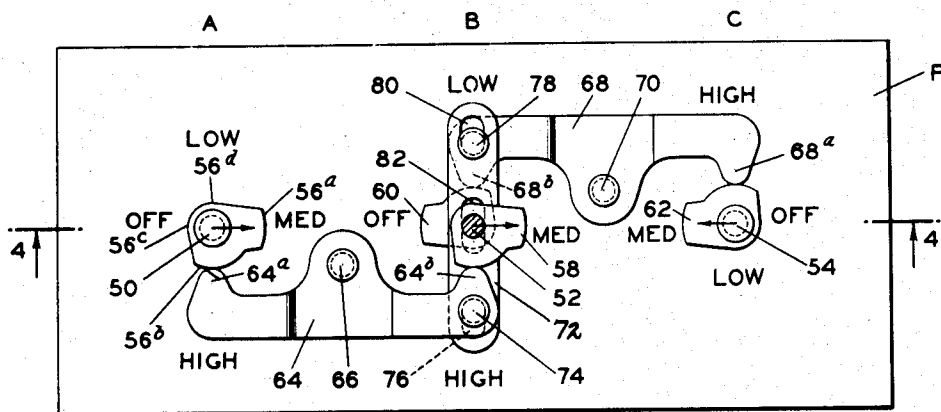


Fig. 1.

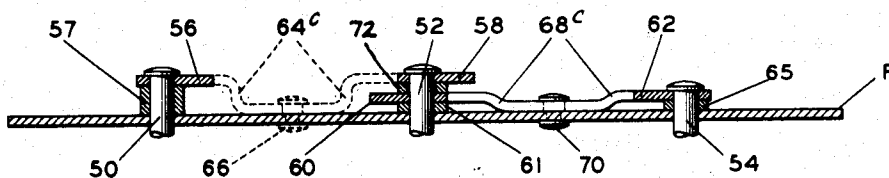


Fig. 2.

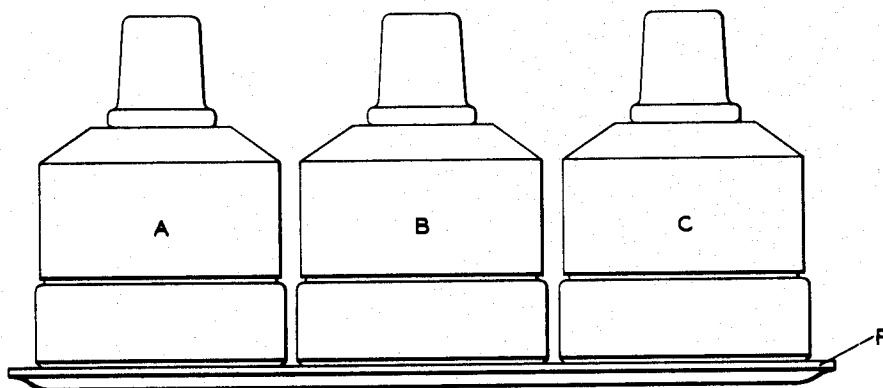


Fig. 3.

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2 Sheets-Sheet 2

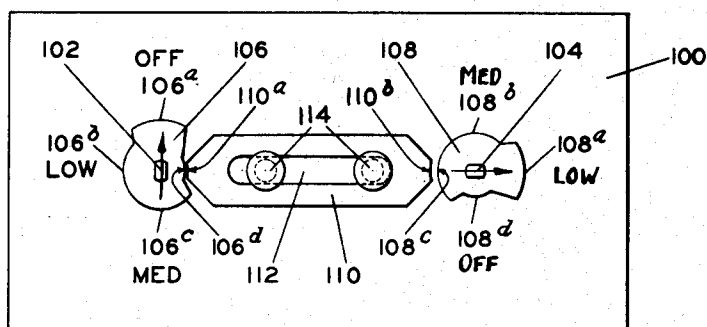


Fig. 4.

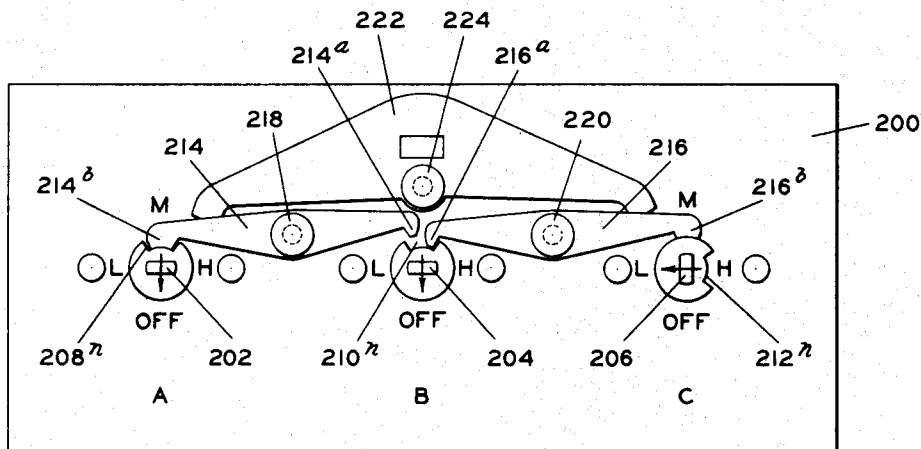


Fig. 5.

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UNITED STATES PATENT OFFICE

2,080,964

INTERLOCKING SWITCH MECHANISM

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26 Claims. (Cl. 200—50)

This invention relates to mechanical interlocking mechanisms which are particularly adapted for use with electric snap switches of the rotary type. Switches of this type are commonly used for controlling the current flow through resistance units of electric stoves, where various degrees of heat must be available to the user to satisfy the different requirements of use of each unit. My invention finds particular application to the rotary snap switches used on electric stoves but is not limited to such use.

It is desirable when a bank of rotary snap switches are used for controlling severally the degrees of heat to be given from a number of heating units that not all of the switches be capable of movement into certain positions at one time. For example it may be desired to prevent more than one switch moving into the high heat position at one time, since such movement might require the feed lines to carry more than the permissible amount of current, or overtax the power supply.

It is an object of my invention to provide an interlocking mechanism between a plurality of rotary snap switches, which control various heating units of an electric range, by means of which mechanism not more than one of the switches may be placed into high heat position at one time.

Another object of my invention is to provide an interlocking mechanism for rotary snap switches which control heating units of an electric stove or the like by means of which the supply lines may not be compelled to supply more than a predetermined amount of current to the units collectively at any time.

Another object of my invention is to provide an interlocking mechanism between a plurality of switches which control the heating units of an electric stove or the like to permit only one switch to be placed in position to supply maximum current to its unit at one time, and to permit the remaining switches to supply only a minimum amount or no current to their units at that time.

Another object of my invention is to provide an interlocking mechanism for switches of the above type when the switches are used for controlling the units of an electric stove or the like, which mechanism will permit two or more switches to be moved into "medium" or "low" heat or "off" position at one time, but which will prevent the movement of any switch into "high" heat position when any other switch is in position to give more than "low" heat from its heating unit.

Another object of my invention is to provide an interlocking mechanism of the above type which

will be simple to construct and inexpensive to assemble but which will be sturdily built and reliable in operation.

Another object of my invention is to provide an interlocking mechanism for a plurality of rotary snap switches whereby only one switch is permitted to operate at one time.

Another object of my invention is to provide an interlocking mechanism for a plurality of rotary snap switches which will permit the switches to simultaneously occupy "medium" and "low" heat positions or "off" position, but will prevent operation of one switch to "high" heat position when another is in any but "off" position.

Other objects and advantages of my invention will become apparent as it is described in connection with the accompanying drawings.

In the drawings:—

Figure 1 is a plan view of an interlocking mechanism constructed according to the principles of my invention, for controlling three rotary snap switches.

Figure 2 is a longitudinal sectional view of the interlocking mechanism shown in Figure 1 with the section taken on line 4—4 of Figure 1.

Figure 3 is a plan view of three rotary snap switches mounted upon a plate controlled by an interlocking mechanism constructed according to the principles of my invention.

Figure 4 is a plan view of another form of interlocking mechanism constructed according to the principles of my invention for controlling two rotary snap switches.

Figure 5 is a plan view of a third form of interlocking mechanism constructed according to the principles of my invention for controlling three rotary snap switches only one of which may be operated at one time.

Referring to the drawings and particularly to the Figures 1, 2, and 3, thereof it will be noted that three rotary snap switches A, B, and C are mounted upon a rectangular plate P, which may be of sheet metal or sheet insulation or may be part of an electric stove or other electrical appliance containing conventional heating units fed by the usual supply lines (not shown) and controlled by the three switches A, B, and C.

The switches may be of conventional construction and have as many fixed and movable contacts as may be required for controlling a given circuit and heating unit. Customarily switches of this type are movable in steps of 90° and are capable of taking four positions for supplying maximum current to a heating unit when the switch is in "high" heat position or an intermediate

amount of current when the switch is in intermediate or "medium" heat position, or to give a minimum amount of current when the switch is in "low" heat position. The fourth position will, of course, be the "off" position in which no current is transmitted to the heating unit controlled by the particular switch.

Referring to Figure 1 it will be noted that the ends of the spindles 50, 52, and 54 of the switches A, B, and C extend through the mounting plate P and lie in a straight line. Identical cam members designated generally by the numerals 56, 58, 60, and 62 are mounted upon the spindles 50, 52, and 54 as will be apparent by inspection of Figures 1 and 2. It will be noted that cam 56 is mounted upon the spindle 50 and is spaced from the mounting plate P by a collar 57 while cam members 58 and 60 are mounted upon spindle 52, the cam member 60 being spaced from the mounting plate P by a washer 61 and the cam member 58 is spaced from the cam member 60 by an interlocking bar 72, hereinafter described. The cam member 62 is mounted upon the spindle 54 and is spaced from the mounting plate P by a washer 65 of equal thickness to the washer 61. The cams are keyed to the various spindles so as to move therewith.

As before mentioned, the cam members are identical each having a high portion such for example as 56a and a portion of intermediate height as for example 56b and portions of low height such for example as 56c and 56d. The portions 56c and 56d are of equal height and form in effect a single cam surface. The extent of these cam surfaces is in each case less than a 90° arc so that each time the switch spindle is rotated from one position to another, a new surface is presented to interlocking levers 64 and 68, which engage with the cam members as will now be described.

The interlocking lever 64 is bar-shaped, as indicated in Figure 1, having three wide laterally projecting fingers extending from one side at each end and at the middle of the bar. The bar is pivoted at its central portion upon a pivot pin 66 located between the spindles 50 and 52 and slightly to one side of a line through the centers of these spindles. The interlocking lever 68 is similar in plan to the lever 64 and is pivotally mounted upon a pin 70 which is located between the spindles 52 and 54 and slightly to the opposite side of the line through the centers of the spindles from the pivot pin 66. The ends of the interlocking lever 64 are offset away from the mounting plate P as indicated at 64c in Figure 2, to cause the laterally extending fingers 64a and 64b of interlocking lever 64 to lie in the planes of movement of the cam members 56 and 58. The offsets 68c of the interlocking lever 68 are only of such height as is required to bring the end portions 68a and 68b into the planes of movement of the cam members 60 and 62.

The cams and interlocking levers are also proportioned so that when the high point of one cam is in engagement with one end of an interlocking lever for instance if the high point 56a is in engagement with the end 64a, the other end 64b of the interlocking lever 64 will be in engagement with either of the low points of the cam 58. Thus the surface 56a cannot be moved into engagement with the end 64a unless the spindle 52 has been previously moved so as to

put either of the low surfaces of the cam 58 into position to be engaged by the end 64b of the lever 64. Also, the cams are proportioned so that as the end 64a of the interlocking lever 64 rests on the cam surface 56b of intermediate height, the other end 64b may rest on the cam surface of intermediate height of cam 58, as illustrated in Figure 1. A similar situation prevails in connection with the portions of the cams 60 and 62 and the interlocking lever 68. However the movements of the cams and interlocking levers are limited by an interlocking bar 72 which will now be described.

Interconnecting the interlocking lever 64 and 68 is an interlocking bar 72 which is connected with the interlocking lever 64 by a pin 74 which passes through the right hand end of the interlocking lever 64 (see Figure 1) and which is connected with the interlocking lever 68 by a pin 78 passing through the left hand end portion of the interlocking lever 68. There are provided in the end portions of the interlocking bar 72 for the pins 74 and 78, slots 76 and 80 respectively. There is also provided in the interlocking bar 72 for the spindle 52 a slot 82 so that the bar is permitted to have relative movement with respect to the pins 74 and 78 and the spindle 52. The slot 82 is of such extent as to permit the interlocking bar to move on the spindle twice the difference in height between the high cam surfaces and the intermediate cam surfaces of the cam members. This difference, by reason of the proportion of the cams, is equal to the difference between the height of the intermediate cam surfaces and the low cam surfaces of the cam members. The slots 76 and 80 are of such extent as to permit the pins 74 and 78 to move within the slots 76 and 80 each a distance equal to the difference between the "high" and "medium" cam surfaces of the cam members.

From the foregoing it may be ascertained that any one of the switches may be moved into "low" or "off" position from the position shown in Figure 1, that is to say in position to put the cam surfaces of least height such as 56c and 56d beneath the ends of the interlocking levers, for instance, under 64a. This is possible because the movement of the cams to put the low surfaces thereof adjacent the engaging fingers of the interlocking levers does not require any movement of the interlocking levers.

Likewise it may be ascertained that no one of the switches can be moved directly into "high" heat position from the position shown in Figure 1. In order to move the switch A to "high" heat position, the central cam 56 must be rotated 90° clockwise from the position shown in Figure 1. This can only be accomplished after the cams 58 and 60 (which it will be remembered are movable simultaneously) are moved into either "low" or "off" position, so as to put the low cam surfaces of these cams, particularly the low cam surface of the cam 58 adjacent the end 64b of the interlocking lever 64. Another condition is requisite before the cam 56 can be moved into "high" position, namely the movement of the cam 62 into either "low" or "off" position so as to put the low surfaces of the cam 62 beneath the cam 60a of interlocking lever 68. This last condition is necessary because the interlocking bar 72, prevents the movement of the interlocking lever 64 counterclockwise from the position shown in Figure 1, until the interlocking lever 68 is permitted to move clockwise to put pin 78 in the outer end of the slot 80, i. e. after the cam 62 has been moved to the "low" or

"off" position. It will be apparent upon inspection of Figure 1 that since the pins 74 and 78 are in the inner ends of slots 76 and 80, movement of the levers 64 and 68 counterclockwise and clockwise respectively must be simultaneous if such movement is initiated by the cam 56.

In order to move switch C to "high" heat position, switch B will have to be moved to "low" or "off", and A will have to be moved to "low" or "off" just as B and C had to be, in the above description of moving A to "high".

In order to move B to "high", both A and C must be moved to "low" or "off" so that low cam surfaces of cams 56 and 62 are adjacent lever fingers 64a and 68a. Then both pins 74 and 78 can move into the outer ends of slots 76 and 80 of the interlocking bar 72 as the lever fingers 64b and 68b are pushed away from each other by the high points of cams 58 and 60.

When the switch B is in "low" or "off" position, the interlocking bar 72 prevents both lever fingers 64b and 68b from at the same time engaging the low surfaces of cams 58 and 60 respectively, by reason of the fact that the spacing of the pins 74 and 78 when they are in the inner ends of the slots 76 and 82 is greater than what the spacing of the pins would be while the fingers 64b and 68b were engaging the low surfaces of the cams 58 and 60 if such engagements were simultaneously possible. Since both fingers 64b and 68b can not engage low surfaces of cams 58 and 60 respectively, at the same time, and since such a condition would have to exist if A and C were to be moved into "high" at once, therefore it may be seen that only one of the two switches A or C can be moved into "high" at one time.

It may also be seen that if switch A or C (A for example) is in "medium" position and switch B is in "off" or "low" position, still the other switch C, could not move into "high" position, because the location of pin 74 in the inner end of the slot 76 of the interlocking bar holds the bar in the same position it occupies in Figure 1 and prevents the lever 68 from moving counterclockwise from the position of Figure 1 as it would have to do to permit the switch C to move to "high".

Below is a table showing all possible positions of the switches.

When A is in:	B may be in:	C may be in:
High.....	Off.....	Low.
Do.....	do.....	Off.
Do.....	Low.....	Low.
Do.....	do.....	Off.
Off or low.....	High.....	Low.
Do do.....	do.....	Off.
Do do.....	Off.....	Low.
Do do.....	do.....	Med.
Do do.....	do.....	High.
OFF do.....	OFF.....	OFF.
Do. LOW.....	LOW.....	LOW.
Do do.....	do.....	Med.
Do do.....	do.....	High.
Do do.....	do.....	Off.
Do do.....	Med.....	Low.
Do do.....	do.....	Med.
Do do.....	do.....	Off.
Medium.....	Off.....	Low.
Do.....	do.....	Med.
Do.....	do.....	Off.
Do.....	Low.....	Low.
Do.....	do.....	Med.
Do.....	do.....	Off.
Do.....	Med.....	Low.
MEDIUM.....	MEDIUM.....	MEDIUM.
Do.....	do.....	Off.

Referring to Figure 4, an interlocking mechanism is illustrated for controlling the movements of a pair of rotary snap switches to permit only one switch being put in "high" heat position at one time and to prevent the switch from being

put in "high" heat position when the other switch is in "low", "medium" or "high" position. In this form of the invention, the switches are mounted upon a mounting plate 100 which may be a rectangular piece of metal or sheet insulation or may be a part of an electric range or like device. The ends of the switch spindles 102 and 104 extend through the mounting plate. Fixedly mounted upon the end of the spindle 102 is a cam 106 having a high cam surface 106a, an intermediate cam surface 106b and another intermediate cam surface 106c merging with the surface 106b and forming, in effect, a single intermediate cam surface. There is also a low cam surface 106d. The difference in height between the high surface 106a intermediate surfaces 106b and 106c is equal to the difference in height between the intermediate surfaces 106b and 106c and the lower surface 106d. A similar cam 108 is mounted upon the end of the spindle 104.

For controlling the movement of the cams 106 and 108, there is provided between the spindles a straight, sliding interlocking bar 110 which is provided with a longitudinal central slot 112 in which are the shanks of pins 114 upon which the interlocking bar is slidably mounted. The ends of the interlocking bar are preferably tapered providing reduced end surfaces 110a, 110b which are adapted to engage with the cam surfaces of the cams 106 and 108. The length of the interlocking bar 110, as measured between the end surfaces 110a and 110b, is approximately equal to the distance between the intermediate surface 108c and the intermediate surface 106c when the switch spindle 102 is rotated 90° counterclockwise from the position shown in Figure 4. Thus when the switch 102 is in the position shown in Figure 4, the switch spindle 104 can be rotated from the "low" heat position in which it is shown in that figure to the "off" or "high" heats by rotating the spindle 90° or 180° clockwise or the spindle may be rotated into the "medium" position by rotating it 90° counterclockwise. Thus when the switch spindle 102 is in the "off" position, the switch 104 may be rotated to any desired position. The converse is true when the spindle 104 is in "off" position.

When the switch spindle 104 is in the "low" position as indicated in Figure 4, the switch spindle 102 may be rotated from the "off" position in which it is shown, to the "low" or "medium" heat positions by rotating it 90° or 180° counterclockwise, but it may not be rotated into the "high" heat position by rotating 90° clockwise. Since the surfaces 108b and 108c are of equal radius, it will be apparent that the same positions of switch spindle 106 are possible when the switch 104 is in "medium" position as when it is in "low" position. The converse is true as to the possible positions of switch spindle 104 when the switch spindle 102 is in the "medium" or "low" positions.

It will thus be seen that in this form of invention, I have provided an interlocking mechanism which will permit both switches to be moved to "medium" or "low" positions at the same time, but when one switch is in "high" the other may not be moved from its "off" position.

Referring now to Figure 5, there is illustrated an interlocking mechanism for three rotary snap switches of the type hereinbefore mentioned. This mechanism permits the movement into active positions of only one switch at a time. In this form of the invention the switch spindles 202, 204, 206 extend through the mounting plate

200 and lie in a straight line. Each spindle has a cam mounted on its end, all the cams 208, 210 and 212 being identical. Each cam is in the form of a disc with a notch (such as 208n) in the periphery thereof extending through an arc of slightly less than 90°. The bottom of the notch is arcuate, forming a low cam surface. Pivotally mounted by means of pivot pins 218, and 220, half way between each pair of spindles and slightly offset from the line joining the spindles, are a pair of interlocking levers 214, 216. These levers have fingers at each end extending laterally therefrom toward the cams. The fingers 214a, 216a which are at adjacent ends of the levers are of such size as to both be capable of movement into the notch 210n. The fingers 214b and 216b are of such width as to occupy substantially the whole of the notches 208n and 212n. Thus when the finger 214b is in the notch 208n or when the finger 216b is in the notch 212n, the spindle 202 or the spindle 206 can be moved. When both of these fingers are in the notches just mentioned, the switch spindles 202 and 206 will be locked, but the narrow fingers 214a and 216a will be withdrawn from the notch 210n and the spindle 204 may be moved freely to any desired position of the switch.

When the narrow finger 214a is in the notch 210n the switch spindle 202 may be moved freely to any desired position of the switch, since the broad finger 214b will then be withdrawn from the notch 208n. Likewise when the narrow finger 216a is in the notch 210n, the long finger 216b will be withdrawn from the notch 212n and the switch spindle 206 may be moved to any desired position of the switch.

In order to prevent the simultaneous movement of switch spindles 202 and 206, there is provided an interlocking bar 222 which is pivoted upon a pin 224 located equidistant from the spindles 202 and 206 and some distance from the spindle 204 on the same side of the line through the switch spindles as the pivot pins 218 and 220. The bar 222 has end portions engaging with the backs of interlocking levers 214 and 216 at points between the pivot pin 218 and finger 214b and between pivot pin 220 and finger 216b respectively. The bar 222 is proportioned to permit movement of either one or the other outer ends of the interlocking levers 214 and 216 out of the notches 208n and 212n when the finger of the other operating lever is in its notch. The proportioning of the interlocking lever requires that when either the finger 214 or 216 is out of the notch of its cam, then the finger of the other lever 216b or 214b must be in the notch of its cam as shown in Figure 5.

It will thus be apparent that I have provided an interlocking mechanism in which only one of three rotary switches may be operated at one time.

Many changes will occur to those skilled in the art within the scope of my invention, therefore I do not limit the invention to the specific embodiments here shown and described.

I claim:—

1. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, means including an interlocking member engageable with said cam members and preventing movement of one switch

into high heat position when another is in high heat position but permitting at least two switches to occupy low and medium heat positions contemporaneously.

2. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, means including an interlocking member engageable with said cam members and preventing movement of one switch into high heat position or medium heat position when another is in high heat position but permitting at least two switches to occupy low and medium heat positions contemporaneously.

3. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, means including an interlocking member engageable with said cam members and preventing movement of one switch into any conducting position when another is in high heat position and permitting movement of at least two switches into low and medium heat positions contemporaneously.

4. In combination with at least three rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, and means engageable with said cam members for preventing movement of one switch from off position when another is in any conducting position, said means including an interlocking member.

5. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position, and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, a plurality of pivoted levers each cooperating with two of said cam members, and means limiting the movement of said levers to prevent more than one switch being moved into high heat position at one time.

6. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, a plurality of pivoted levers each cooperating with two of said cam members, and means cooperating with said levers to prevent one switch from being moved into medium or high position when any other is in high.

7. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, a plurality of pivoted levers each cooperating with two of said cam members, and means cooperating with said levers to prevent more than one switch be-

ing moved from off position when any other is in a conducting position.

8. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising identical cam members each having three cam surfaces of different heights mounted for movement with said spindles, interlocking means cooperating with said cam members and permitting only one switch to be moved into high heat position at one time but permitting at least two switches to occupy medium and low heat positions contemporaneously.

9. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising identical cam members each having three cam surfaces of different heights mounted for movement with said spindles, interlocking means cooperating with said cam members and preventing any switch from being moved into medium heat position when any other switch is in high heat position but permitting at least two switches to occupy medium and low heat positions contemporaneously.

10. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising identical cam members each having three cam surfaces of different heights mounted for movement with said spindles, interlocking means cooperating with said cam members and permitting one or more switches to be put into medium heat position at one time but preventing any switch from being put in position to give medium or high heat when any other switch is in high heat position.

11. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, and interlocking mechanism comprising cam means mounted for movement with the switch spindles, interlocking means engaging with said cam means, and an interlocking device cooperating with said interlocking means to limit the movement of said interlocking means and prevent more than one switch being moved into high heat position at one time.

12. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam means mounted for movement with the switch spindles, interlocking means engaging with said cam means, and an interlocking device cooperating with said interlocking means to limit the movement of said interlocking means and prevent any switch from being moved into medium or high heat position when any other is in high heat position.

13. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam means mounted for movement with the switch spindles, interlocking means engaging

with said cam means, and an interlocking device having a lost-motion connection with said interlocking means, said interlocking mechanism preventing any switch from being moved into high or medium heat position when another is in high heat position.

14. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, pivotally mounted interlocking levers engaging with said cam members and preventing adjacent switches from occupying high heat or medium and high heat positions contemporaneously, and an interlocking device engaging with said levers and preventing any switch from being moved into medium or high heat position when any other is in high or medium heat position.

15. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, pivotally mounted interlocking levers engaging with said cam members and preventing adjacent switches from occupying conducting positions contemporaneously and an interlocking device engaging with said levers and preventing any switch from occupying a conducting position while any other switch occupies a conducting position.

16. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising identical cam members mounted for movement with the switch spindles, identical pivotally mounted interlocking levers engaging with said cam members and preventing movement of adjacent switches into high heat position contemporaneously or medium and high heat positions contemporaneously, and an interlocking device engaging with said levers and preventing movement of any switch into high heat position when any other is occupying high or medium heat position.

17. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising identical cam members mounted for movement with the switch spindles, identical pivotally mounted interlocking levers engaging with said cam members and preventing movement of adjacent switches into high heat position contemporaneously or to medium and high heat positions contemporaneously, and an interlocking device having a lost motion connection with said levers and preventing movement of any switch into high heat position when any other is occupying high or medium heat position.

18. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, pivotally mounted identical interlocking levers engaging with said cam

members and preventing adjacent switches from occupying conducting positions contemporaneously, and a pivoted interlocking device engaging with said levers and preventing any switch from occupying a conducting position when any other switch is in a conducting position.

19. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, and a slidable member preventing any switch from moving into high heat position when any other is in medium or high heat position but permitting at least two switches to occupy medium and low heat positions contemporaneously.

20. In combination with at least three rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, and means engageable with said cam members for preventing movement of one switch into high heat position when another is in high heat position said means including an interlocking member.

21. In combination with at least three rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising one cam member mounted for movement with each switch spindle, and means engageable with said cam members for preventing movement of one switch into high heat position when another is in high heat position said means including an interlocking member.

22. In combination with at least three rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, and means engageable with said cam members for preventing movement of one switch into any conducting position when another is in high heat position said means including an interlocking member.

23. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted

on a switch spindle, an interlocking mechanism comprising identical cam members each having three cam surfaces of different heights mounted for movement with said spindles, interlocking means cooperating with said cam members and preventing any switch from being moved into medium heat position when any other switch is in high heat position but permitting movement of any switch into low heat position when another is in high heat position.

24. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising identical cam members each having three cam surfaces of different heights mounted for movement with said spindles, interlocking means cooperating with said cam members and preventing any switch from being moved into medium heat position when any other switch is in high heat position but permitting at least two switches to occupy medium and low heat positions contemporaneously and permitting movement of any switch into low heat position when another is in high heat position.

25. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, means including an interlocking member engageable with said cam members and preventing movement of one switch into high heat position when another is in high heat position but permitting movement of any switch into low heat position when another is in high heat position.

26. In combination with a plurality of rotary electric snap switches each capable of occupying high, medium and low heat positions and an off position and having movable contacts mounted on a switch spindle, an interlocking mechanism comprising cam members mounted for movement with the switch spindles, means including an interlocking member engageable with said cam members and preventing movement of one switch into high heat position when another is in high heat position but permitting at least two switches to occupy low and medium heat positions contemporaneously and permitting movement of any switch into low heat position when another is in high heat position.

EDWARD E. FORSTROM.