G. W. GOODRIDGE.

ELECTRIC RANGE SWITCH.

APPLICATION FILED OCT. 5, 1917.

1,323,047.

Patented Nov. 25, 1919.

4 SHEETS—SHEET 1.

Fig. 1.

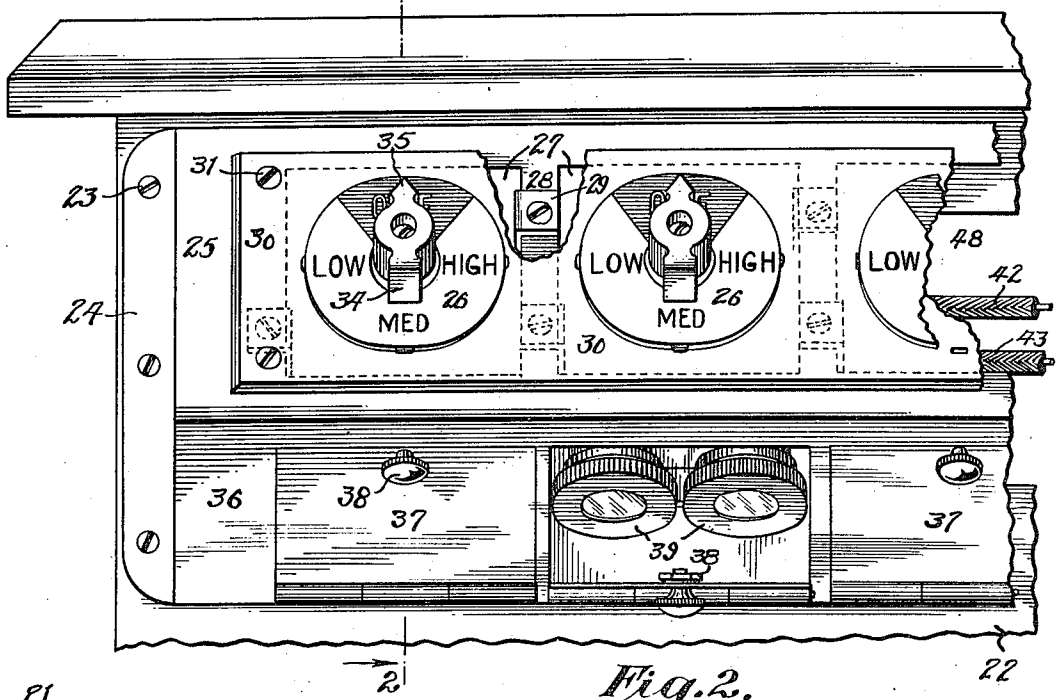
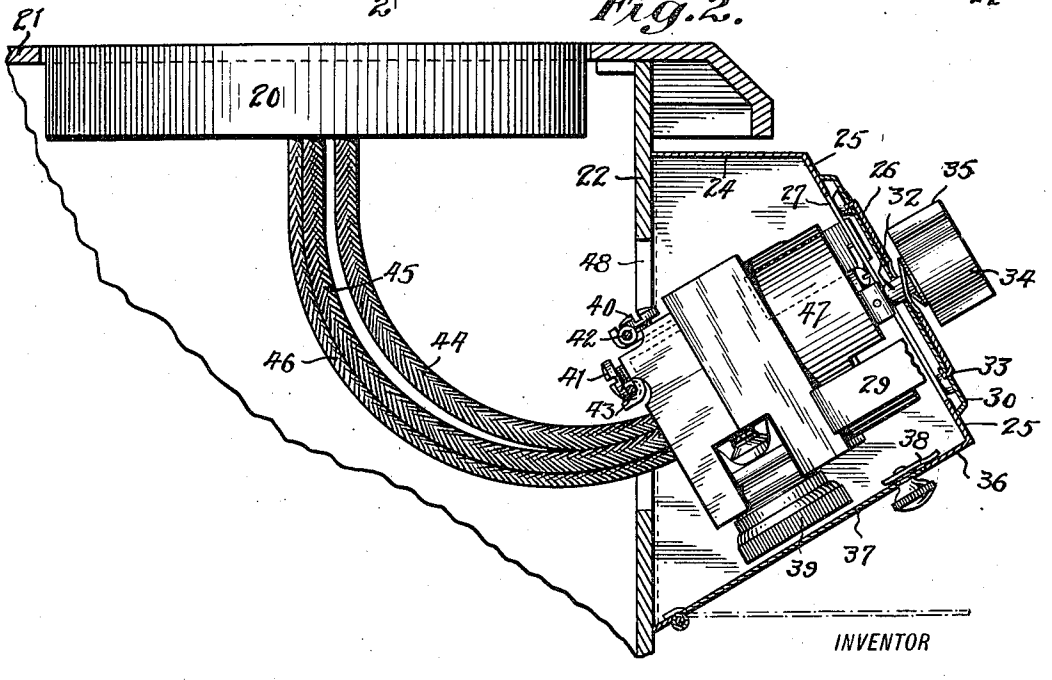


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 3.

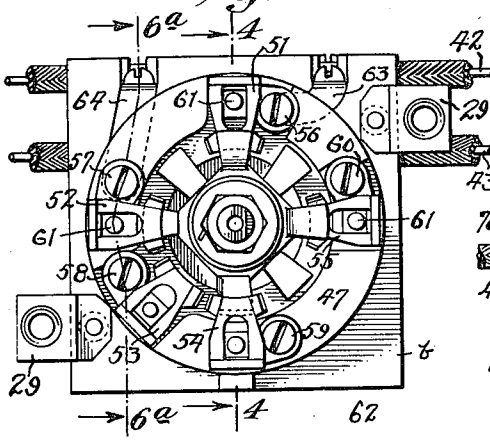


Fig. 4.

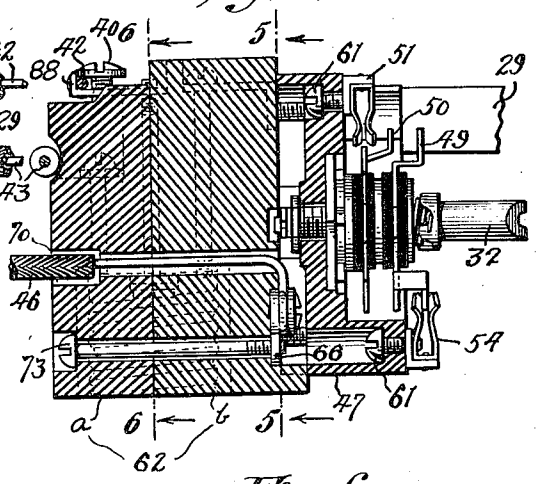


Fig. 5.

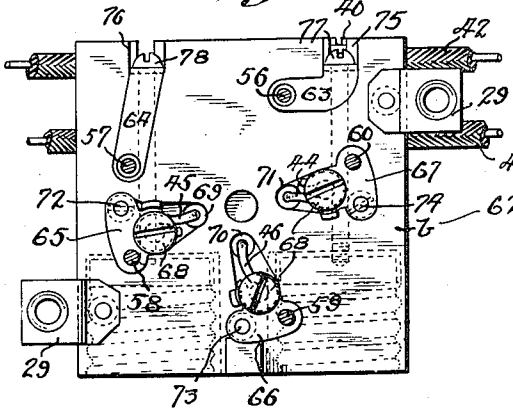


Fig. 6.

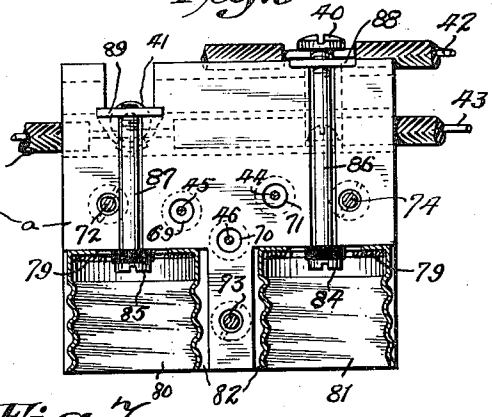


Fig. 7.

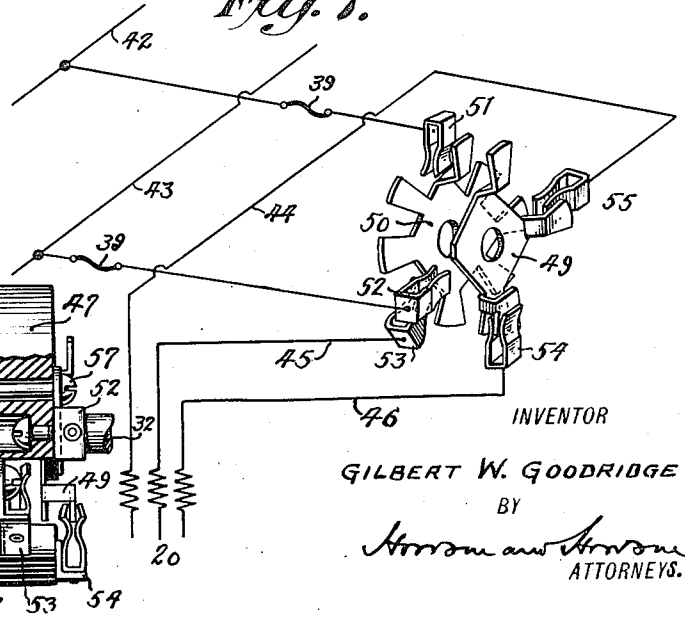
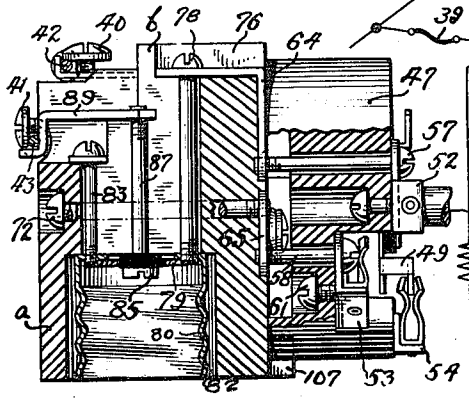


Fig. 6a.



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4 SHEETS—SHEET 3.

Fig. 8.

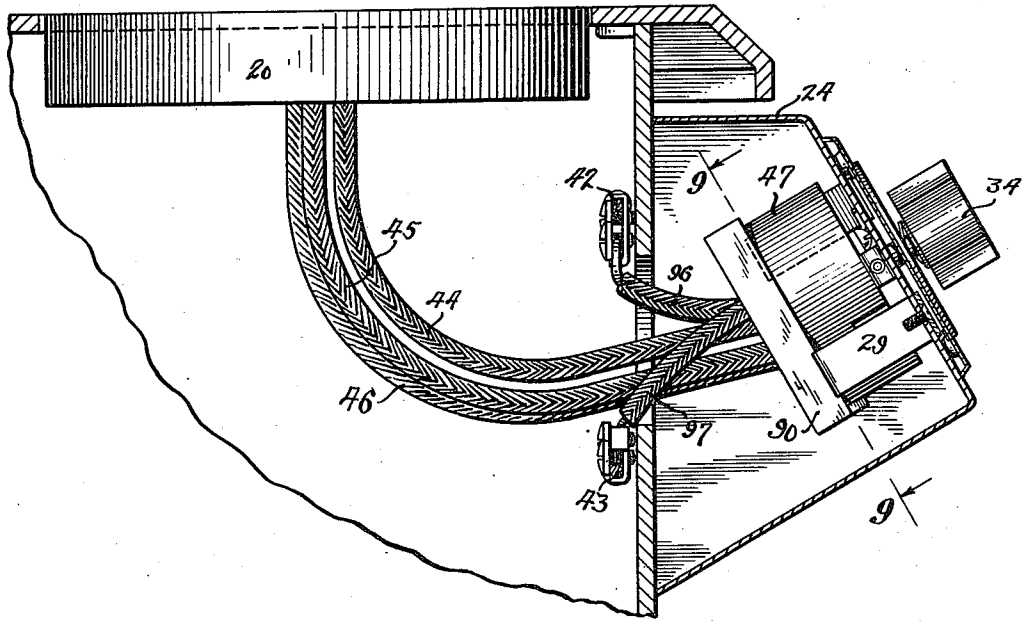
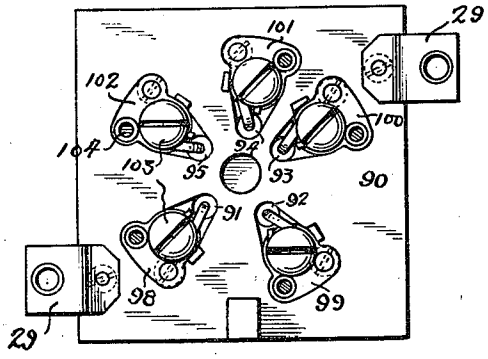


Fig. 9.



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4 SHEETS—SHEET 4.

Fig. 10.

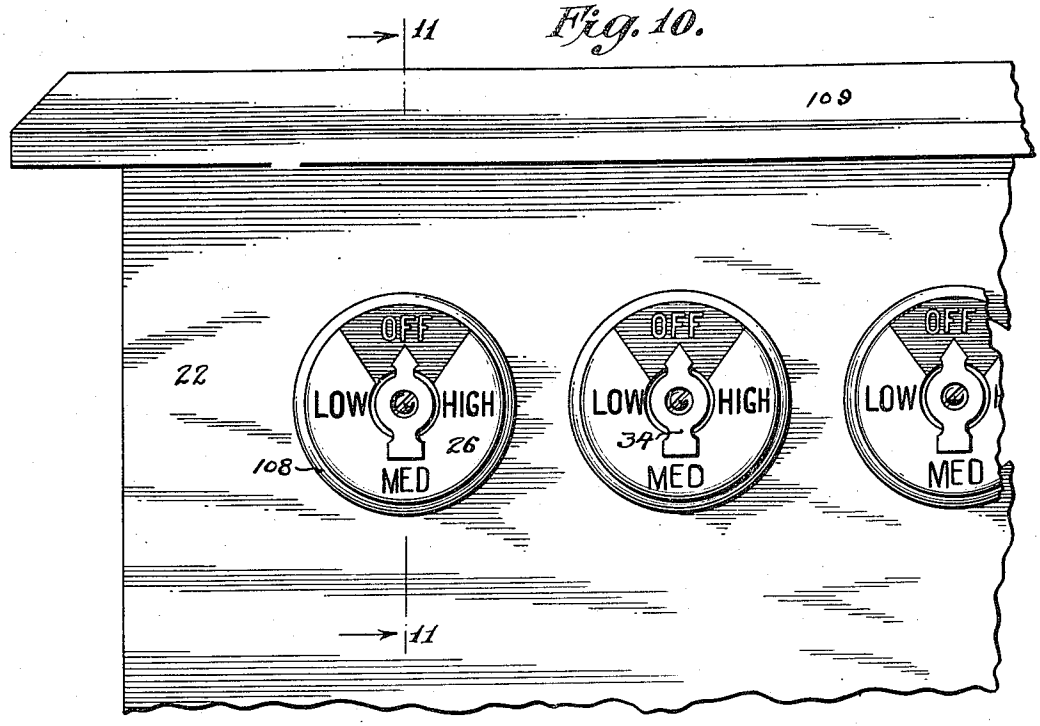


Fig. 11.

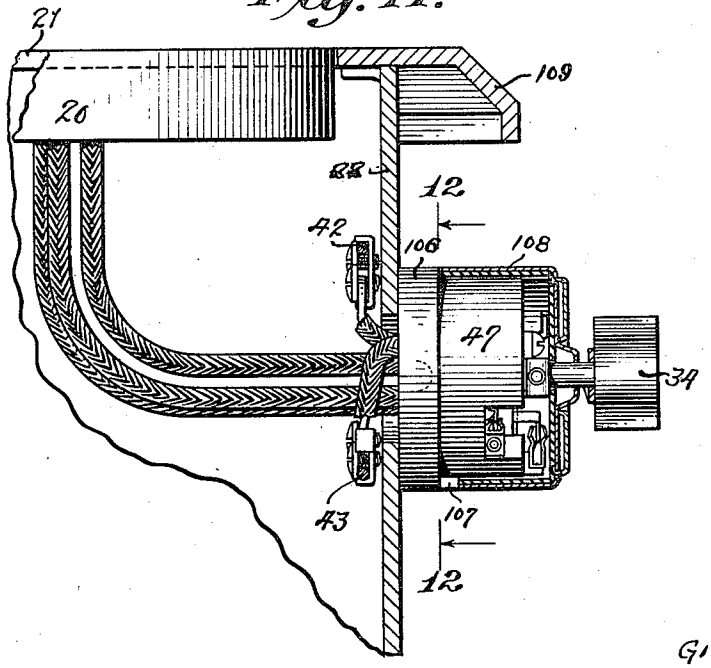
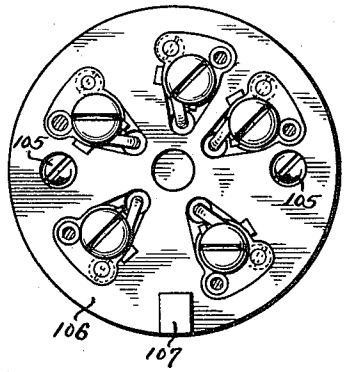


Fig. 12.



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UNITED STATES PATENT OFFICE.

GILBERT W. GOODRIDGE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO BRYANT ELECTRIC COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

ELECTRIC-RANGE SWITCH.

1,323,047. Specification of Letters Patent. Patented Nov. 25, 1919.

Application filed October 5, 1917. Serial No. 194,932.

To all whom it may concern:

Be it known that I, GILBERT W. GOODRIDGE, a citizen of the United States of America, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, (having a post-office address care of the Bryant Electric Company, Bridgeport, Connecticut,) have invented certain new and useful Improvements in Electric - Range Switches, of which the following is a specification.

My invention relates to electric switches and particularly to switches for controlling the connections for the heating elements of an electric range, the object of my invention being to provide an improved general installation of this type and also an improved switch construction.

It has been common practice to control the heater units of electric ranges by switches of common type, not particularly designed for this service, and to mount them in exposed position upon the front plate of the range in the ordinary manner of surface switches. This not only exposes them to the danger of injury during shipment and use, but is a more or less make-shift practice, lacking in good workmanship and design with respect to the particular needs of the installation. Moreover, the ordinary surface switch comprises merely a one-piece base so that in case of injury thereto or derangement of the mechanism carried thereby, it is necessary to discard the entire switch unit and replace it by a fresh one. This entails renewed connections to the mains and heater lines for the substitute switch. Inasmuch as the repair of the installation is frequently undertaken by persons not skilled in the art, the connections are likely to be wrongly made, with the accompanying danger to the operator of the range as well as to the heater unit and the general installation. This is particularly apt to occur if a different make of switch is substituted for the defective one and it often happens that another switch of the same make as the one replaced is not readily available.

I am aware that in some cases a protective shield has been mounted over flush switches so installed, and that the shield has been perforated to permit the switch operating thumb pieces and stems to project therethrough; but the latter are still exposed to injury during shipment. Moreover, no improvement is afforded with respect to the other matters above mentioned.

It has also been common practice to fuse the switch installation,—in some cases by fuses in the feed line and in other cases by fuses in the heater branches controlled by the separate switches. But in both cases it has been customary to insert the fuses in fuse blocks independent of the switch, and these blocks have commonly been located in inaccessible positions, or else so placed as to constitute unsightly adjuncts to the installation.

The present invention provides an installation particularly designed with reference to the needs of an electric range, and having the advantages of: first, a protected base to which the line and heater connections may be made, and an independent detachable switch block carrying the switch terminals and mechanism, the switch block being readily assembled on the base by securing screws which establish the electrical connections. It is thus possible to make the important connections to the line and heater at the factory, leaving the switch block, which is apt to be injured in transit, to be assembled when the range is installed; second, a special casing for the battery of switches and by which the switches are carried, thus eliminating the necessity of drilling and tapping holes in the range front for the holding screws of each switch; third, fuse receptacles mounted on the switch base and so arranged as to be readily accessible for the renewal of the fuses but without marring the appearance of the installation. To these principal advantages various detail features of improvement in arrangement and construction will appear from the following specification and the accompanying drawings in which:

Figure 1 is a broken partial side elevation of an installation in which my invention is embodied in one form.

Fig. 2 is a section on the line 2—2, Fig. 1.

Fig. 3 is a plan of a switch detached from the casing.

Figs. 4, 5, 6, and 6ª are cross sections on the lines 4—4, Fig. 3, 5—5 and 6—6, Fig. 4, and 6ª—6ª, Fig. 3, respectively.

Fig. 7 is a diagrammatic plan of the wiring connections.

Fig. 8 is a vertical section corresponding to Fig. 2, showing a modified construction.

Fig. 9 is a section on the line 9—9, Fig. 8.

Fig. 10 is a front elevation of a further modified installation.

Fig. 11 is a section on the line 11—11, Fig. 10.

Fig. 12 is a section on the line 12—12, Fig. 11.

The present installation is illustrated in association with portion of an electric range. The electric heating unit 20 is indicated mounted in the top plate 21 of the range. Upon the front vertical wall 22 of the range, mounted by means of screws 23, is a long casing 24, common to the battery of switches necessary to control the various heater units of the range. The face 25 of the casing is inclined outward from its upper margin so as to present the switch indicating dials 26, which it carries, in a readily observable position for the operator standing by the range. This face of the casing is provided with a series of openings 27, separated by bridges 28, to which are secured the outer angled ends of the hanger arms 29, by which the switches are suspended within the casing. The openings 27 are covered by a plate 30, attached to the casing by screws 31. This cover plate 30 is punched out in register with each switch spindle 32 to permit its passage therethrough, while the indicating dials 26 are secured to the face plate 30 by means of lugs 33 passing through slots in the cover plate and bent over beneath the inner face of the latter, as indicated in Fig. 2. Upon the outer end of each switch spindle is secured, in predetermined position, an operating thumb piece 34, the arrow-shaped end 35 of which overlies the switch dial and serves to indicate the position of the switch mechanism.

The lower wall 36 of the casing is upwardly inclined and is provided with a hinged door 37 for each switch, normally held in closed position by a latch 38, but adapted to swing down and afford access to the fuse plugs 39, carried by each switch base. The switch is so mounted that the inner corner of its base projects slightly through the opening 48 in the front wall 22 of the range, and the binding terminals 40 and 41 are so arranged on the base as to engage the line wires 42 and 43 by running connections which obviate the necessity for looping the wires as they pass across the inner face of the front wall 22 of the range. Through the same opening 48 pass the wires 44, 45, and 46, leading from the switch to the resistances of the heater unit 20.

Turning now to the construction of the switch, the latter comprises a switch block 47 of insulating material, upon which is mounted the switch spindle 32, carrying the two insulated switch blades 49 and 50, and the five switch terminals 51, 52, 53, 54, and 55. Each of these terminals has a base plate, through which passes a connecting screw 56, 57, 58, 59, and 60. Each terminal is held in position on the switch block 47 by a screwing screw 61 passing through the block from its lower face and taking into the terminal base.

Coöperating with the switch block is an independent base 62 of insulating material, here comprising, for simplicity of manufacture, two independent base blocks *a* and *b*. Upon the upper face of the base 62 are mounted five plates 63, 64, 65, 66, and 67, corresponding to the five switch terminals on the switch block and underlying the terminal screws 56—60 in the assembled position of block and base so that said screws may engage in the tapped holes in these plates and thus not only mechanically hold the switch block in position on the base, but also establish electrical connection between these plates 63—67 and the switch terminals 51—55. The plates 65, 66, and 67 carry binding screws 68 which grip the bared ends of the heater connection wires 44, 45, and 46, which pass up through registering perforations 69, 70, and 71 in the base blocks *a* and *b*. Screw bolts 72, 73, and 74, passing through the base blocks, secure the terminal plates 65, 66, and 67 in position, and, at the same time, serve to hold the two blocks *a* and *b* in juxta position. The terminal plates 63 and 64 comprise angle straps, the bodies of which overlie the outer face of the block *b* and are tapped to receive the screws 56—57 leading to switch terminals 51—52, while their bent over ends lie in recesses 75—76 in the side of block *b* and are pierced to permit the passage therethrough of the screw bolts 77 and 78. The latter lie in separate parallel channels formed in the lower face of the base block *b* and take, respectively, into the tapped rings 79, overlying the base flanges of the screw shells 80 and 81, each of which forms one terminal of a fuse plug receptacle. Each screw shell terminal 80, 81 is located in a well 82, formed by registering recesses in the adjacent faces of the base blocks *a* and *b*, and is held in position not only by its screw bolts 77, 78, but also by an insulated screw 83, engaging the ring 79 on the opposite side of the axis of the screw shell. The center contacts 84 and 85 for the receptacles are formed by the heads of screw bolts 86 and 87 which take into tapped holes in the terminal plates 88, 89 carrying the binding screws 40 and 41, above mentioned, for the line wires.

The passage of the current from the mains 42 and 43 through the fuses and switch to the branch wires 44, 45, and 46 is readily understood from the diagram, Fig. 7, and from the foregoing explanation. The circuit is made from main 43 through the strap 89 to the screw bolt 87 and center contact 85 of the fuse plug receptacle. Passing through the fuse plug 39, the current enters the screw shell terminal 80, follows the screw bolt 78 to the plate 64, whence it is led by the screw 57 into the switch terminal 52. Passing from this terminal through one or more of the heater coils, it returns to the other main switch terminal 51 and follows a like course therefrom through the other fuse plug to the main 42 of opposite polarity. The terminals 51—55 of the switch are arranged at different levels and coöperate with the switch blades 49 and 50 to establish the various desired connections to the resistances of the heater plate 20—all in a manner well understood by those skilled in the art.

In certain instances, it may be deemed unnecessary to employ fuses for each switch,—for instance, where entrance fuses are arranged in the mains in advance of the battery of switches. Where such an installation is desired, the switch construction may be modified as shown in Figs. 8 and 9. Here the insulating base comprises a single flat block 90, pierced at 91—95 to permit the passage therethrough not only of the heater connections 44, 45, and 46, but also of the lead wires 96 and 97, tapped from the mains 42 and 43. Upon the upper face of the base block 90 are five terminal plates 98, 99, 100, 101 and 102, carrying binding screws 103 for the various wire terminals. Each plate is tapped at 104 to receive the tapped end of the connecting screws 56, 57, 58, 59, and 60 of the switch block 47, which is of precisely the same construction as that heretofore described in connection with Figs. 1 to 7. The same switch block may thus be used on both fused and unfused types of construction.

In the further modification shown in Figs. 10, 11, and 12, the casing 24 has been dispensed with and the switch mounted directly upon the front wall 22 of the range by means of screws 105, piercing the base 106 and taking into tapped holes in the wall 22 after the fashion of an ordinary surface switch. Inasmuch as there is no necessity for the hanger arms 29 to suspend the switch from the casing, the base 106 is made circular to correspond with the shape of the switch block. It is pierced in like manner, as in the construction just described, to permit the passage therethrough of the connectors leading from the mains and the heater unit wires. The five base plates 98—102 are tapped to receive the screws 56—60, leading into the terminals on the switch block, and as in the other constructions, the switch block is not only mechanically secured in position by means of the screws 56—60, but its switch terminals electrically connected thereby to the base plates.

In all the constructions, the switch block is properly located with relation to the base by means of a lug 107 on the base which takes into a corresponding recess in the side wall of the switch block. The same lug serves also to position the switch cover 108 in the construction shown in Figs. 10, 11, and 12.

It is obvious that the switch block may be replaced in any of the constructions without disturbing the switch base or the connections thereon to the mains and to the heater units. Moreover, it is possible to make these connections to the insulating base at the factory by those familiar with the proper connections, leaving the installation of the switch block for subsequent assembly therewith when the range is set up. This construction is of great value in minimizing the danger to the switch of breakage during shipment and installation of the range.

This is true not only where the casing 24 is used (since the switch spindle and thumb piece would still be exposed during shipment), but also in the surface type shown in Figs. 10, 11, and 12, in which the base 106 is protected by the overhang 109 of the range top, while the switch block and thumb piece extend beyond the overhang and are particularly subject to injury.

Various modifications of detail and arrangement will readily occur to those skilled in the art which do not depart from what I claim as my invention.

I claim:

1. A rotary snap switch having a base, main and branch wire terminals mounted thereon, said base being pierced adjacent the branch terminals to admit branch wires through the block thereto, an independent switch block overlying the branch terminals, a rotary switch spindle, switch blades and switch terminals carried thereby, said switch block being adapted for detachable assembly with said base, and means for establishing electrical connections between the respective switch terminals and the main and branch terminals on the base.

2. A rotary snap switch having a base, main and branch wire terminals mounted thereon, said base being pierced adjacent the branch terminals to admit branch wires through the block thereto, an independent switch block overlying the branch terminals, a rotary switch spindle, switch blades and switch terminals carried thereby, together with means for locating said switch block in predetermined position with respect to the base.

3. A rotary snap switch having a base, main and branch wire terminals mounted thereon, said base being pierced adjacent the branch terminals to admit branch wires through the block thereto, an independent switch block overlying the branch terminals, a rotary switch spindle, switch blades and switch terminals carried thereby, together with screws, mechanically and electrically connecting said switch terminals to the terminals on the base.

4. A rotary snap switch having a base, main and branch wire terminals plates on its upper face, said base being pierced adjacent the branch terminals to admit branch wires through the block thereto, an independent switch block fitting on said base and overlying the said terminal plates, a rotary switch spindle, switch blades and switch terminals carried thereby, and screws mechanically and electrically connecting said switch terminals with the main and branch terminal plates on the base.

5. A rotary snap switch having a pierced base, terminal plates on its upper face, main and branch conductors extending through the base to said plates, together with an independent switch block fitting on said base, a rotary switch spindle, switch blades and switch terminals carried thereby, and screws mechanically and electrically connecting said switch terminals with the main and branch terminal plates on the base.

6. A rotary snap switch having a base, and an independent switch block fitting thereon, main and branch terminals on said base and covered by the overlying face of said switch block, the latter being pierced to permit branch wires to be led through the base to the branch terminals on the base, switch terminals and a rotary switch mechanism carried by said block, and screws connecting said switch terminals with the inclosed main and branch terminals on the base.

7. A rotary snap switch having a pierced base, binding terminals on the upper face of said base, branch wires piercing said base and connected to said binding terminals, an independent switch block fitting on said base, switch terminals and a rotary switch mechanism carried by said switch block; and screws connecting certain of said switch terminals to the binding terminals for the branch wires on the base.

8. A rotary snap switch having a casing, an insulating base suspended from said casing, main and branch terminals on said base, together with an independent switch block, switch terminals and a rotary switch mechanism carried thereby, and screws for detachably connecting said switch terminals to the main and branch terminals on the base.

9. A rotary snap switch having an insulating body, main and branch line terminals, corresponding switch terminals, a rotary snap switch mechanism controlling the connections between the terminals, and fuses arranged on the side of said body beneath the switch and electrically interposed between the main line terminals and the corresponding switch terminals.

10. A rotary snap switch having an insulating body, main and branch line terminals, corresponding switch terminals, a rotary snap switch mechanism controlling the connections between the terminals, and plug fuses arranged on the side of said body beneath the switch at right angles to the axis of said switch and electrically interposed between the main line terminals and the corresponding switch terminals.

11. A rotary snap switch having a base, main and branch line terminals thereon, an independent switch body, switch terminals and a rotary switch mechanism carried thereby, means for connecting the switch terminals with the main and branch terminals on the base, and fuses carried by said base beneath the switch and electrically interposed between the main line terminals and the means for establishing connections from the latter to the corresponding switch terminals.

12. A rotary snap switch having a base, main and branch line terminals thereon, an independent switch body, switch terminals and a rotary switch mechanism carried thereby, means for connecting the switch terminals with the main and branch terminals on the base, and plug fuses carried by said base beneath the switch and electrically interposed between the main line terminals and the means for establishing connections from the latter to the corresponding switch terminals.

13. A rotary snap switch having a casing, an insulating base suspended from said casing, main and branch terminals on said base, together with an independent switch block, switch terminals and a rotary switch mechanism carried thereby, and screws for detachably connecting said switch terminals to the main and branch terminals on the base, said casing having an inclined wall and a switch operating member overlying said inclined wall.

14. A rotary snap switch having a casing, an insulating base suspended from said casing, main and branch terminals on said base, together with an independent switch block, switch terminals and a rotary switch mechanism carried thereby, and screws for detachably connecting said switch terminals to the main and branch terminals on the base, said casing having an inclined wall and a switch operating member overlying said inclined wall, together with a switch

indicating dial carried by said inclined wall and above which said operating member rotates.

15. A rotary snap switch having a casing comprising a body member apertured to permit the insertion of the switch body therethrough, a cover plate overlying said aperture and pierced to accommodate an operating spindle passing through the cover plate, a thumb piece on said spindle, and an indicator dial secured to the outer face of said cover and surrounding the spindle substantially as described.

16. A rotary snap switch having a pierced casing an operating spindle passing through the casing, a thumb piece on said spindle, and an indicator dial secured to the outer face of said casing and surrounding said spindle, and having tongues passing through said casing and turned over beneath the inner face of the latter.

17. A rotary snap switch having an insulating body, line and switch terminals thereon, a snap switch mechanism mounted on one face of said body, and fuses mounted on a face at right angles thereto, said fuses being electrically interposed between the line and switch terminals.

18. A rotary snap switch having an insulating body, line and switch terminals thereon, a snap switch mechanism mounted on one face of said body, and fuses mounted on a face at right angles thereto, said fuses being electrically interposed between the line and switch terminals, together with a switch casing, operating mechanism for the switch overlying one wall thereof, the wall over the fuses having a door through which access to the fuses may be had.

19. An electric switch comprising an insulating body, a rotary snap switch mounted thereon, line wire terminals arranged at a bottom corner of said body, a casing adapted to be mounted on a vertical support, and means suspending said body from said casing, with the axis of the switch upwardly inclined and with the line wire terminals adjacent the vertical support.

20. An electric switch device having an insulating body, line and branch terminals thereon, a rotary switch mechanism mounted on the base, a plug fuse receptacle mounted on said base with its axis at substantially right angles to the axis of the switch, said fuse receptacle and switch being electrically interposed between the line and branch terminals.

21. An electric switch device having an insulating body, line and branch terminals thereon, a rotary switch mechanism for said base in combination with fuse receiving terminals mounted on a face of said base lying substantially at right angles to the axis of the switch mechanism, said fuse receiving terminals and switch being electrically interposed between the line and branch terminals.

22. An electric switch device having an insulating body, line and branch terminals thereon, a switch mechanism for said base, and operating means therefor projecting from one face of the base, in combination with fuse receiving terminals mounted on another face of the base lying substantially at right angles to that from which the switch operating means projects, said fuse receptacle and switch being electrically interposed between the line and branch terminals.

In testimony whereof I have signed my name to this specification.

GILBERT W. GOODRIDGE.