Oct. 21, 1930. H. J. L. FRANK 1,778,972

METER ADAPTER

Filed Jan. 16, 1924 3 Sheets-Sheet 1

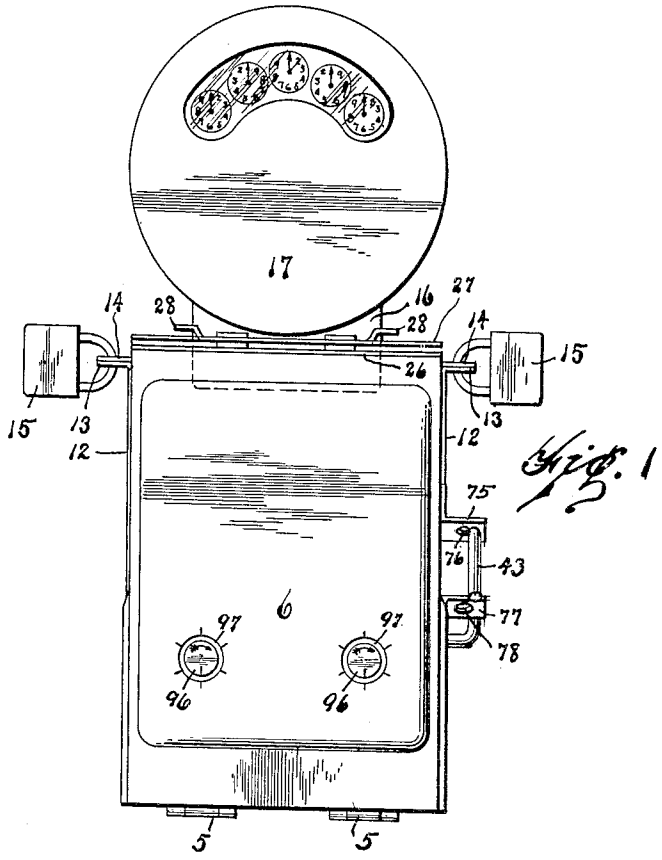


Fig. 1

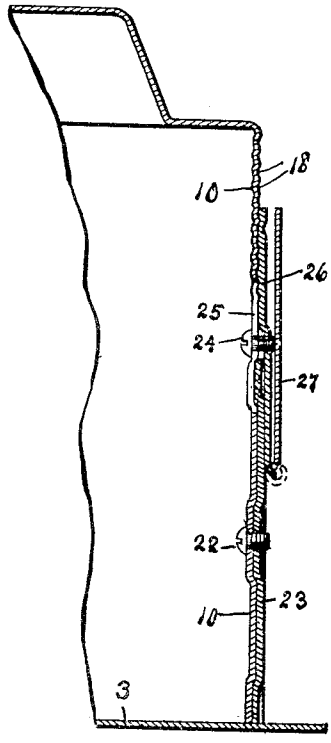


Fig. 3

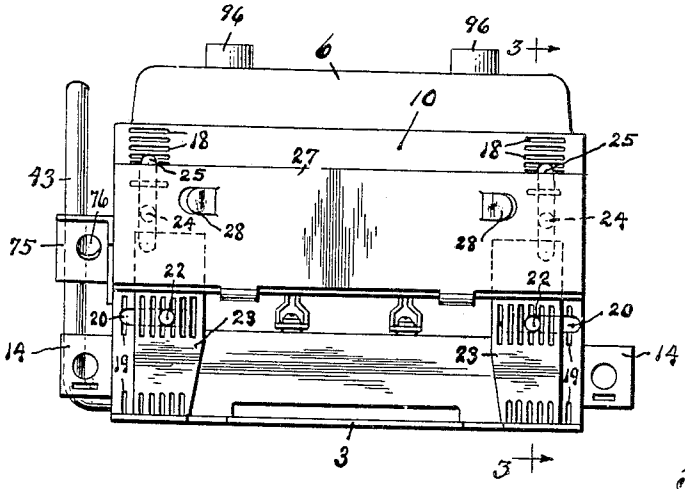


Fig. 2

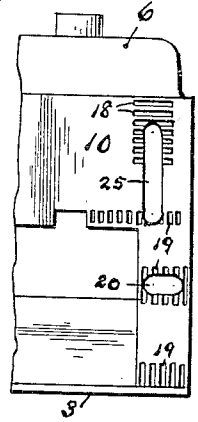


Fig. 4

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Oct. 21, 1930. H. J. L. FRANK 1,778,972

METER ADAPTER

Filed Jan. 16, 1924 3 Sheets-Sheet 2

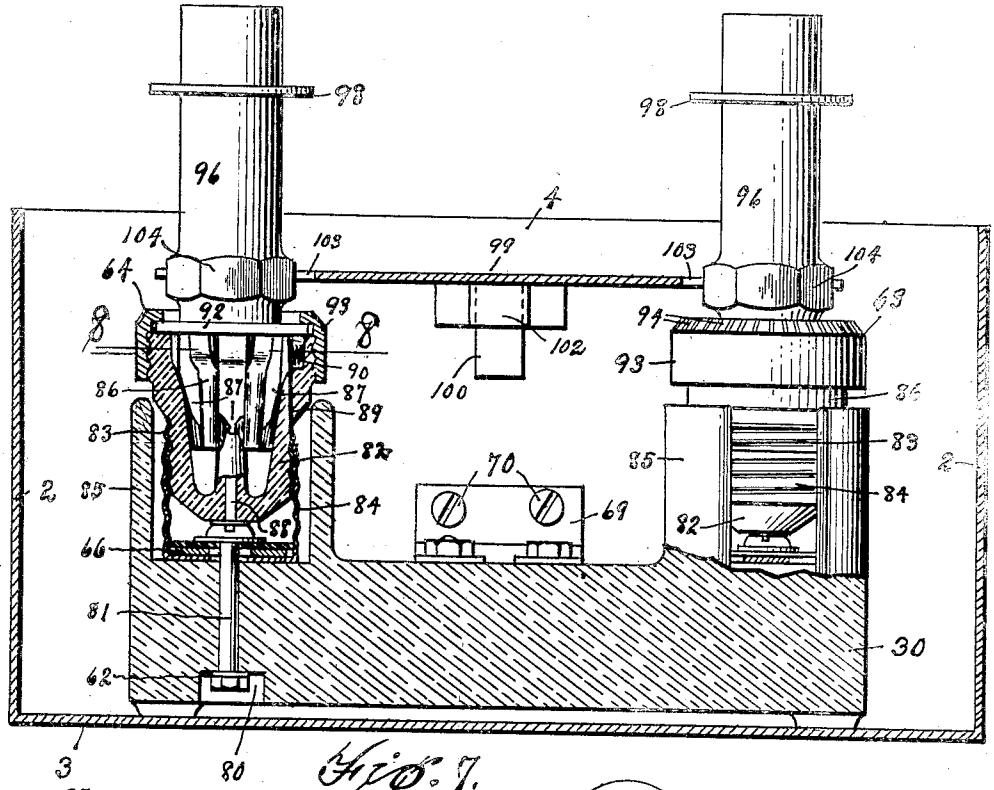


Fig. 7.

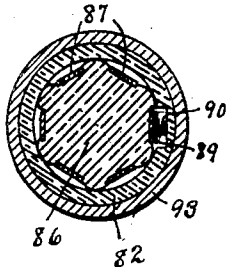


Fig. 8.

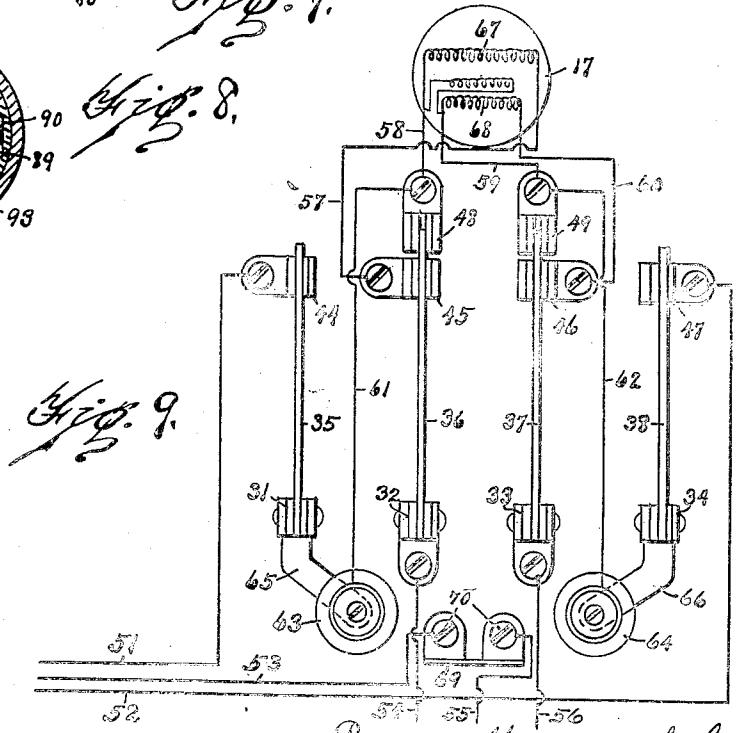


Fig. 9.

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METER ADAPTER

Filed Jan. 16, 1924 3 Sheets-Sheet 3

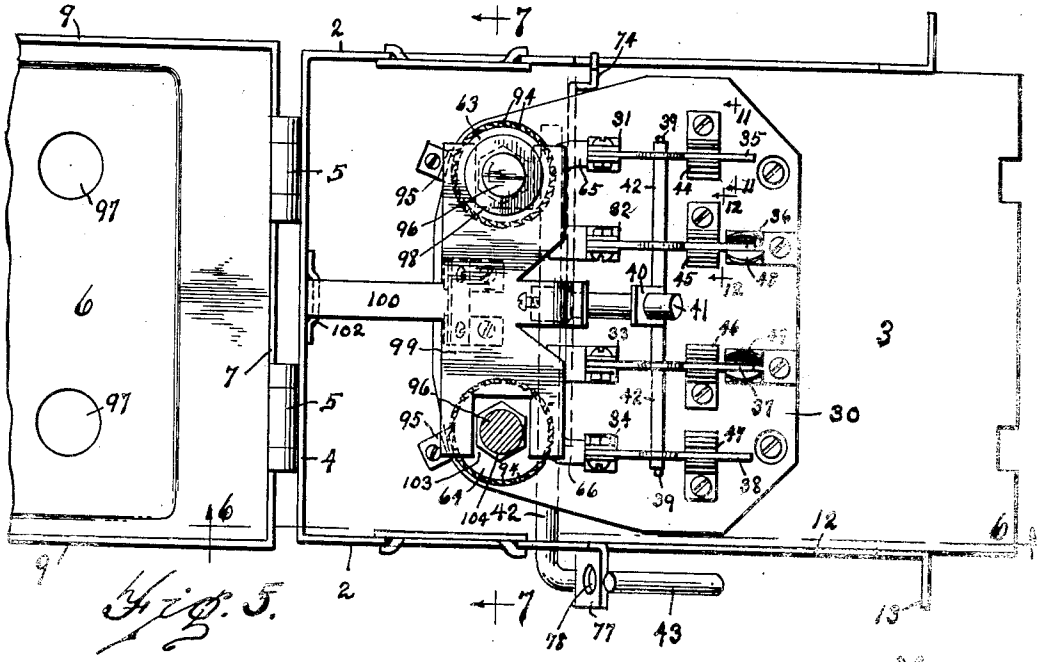


Fig. 5.

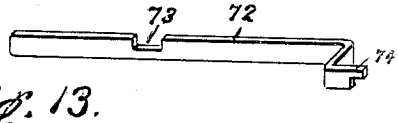


Fig. 13.

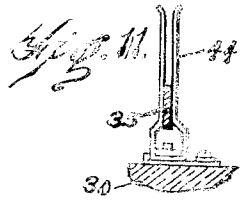


Fig. 11.

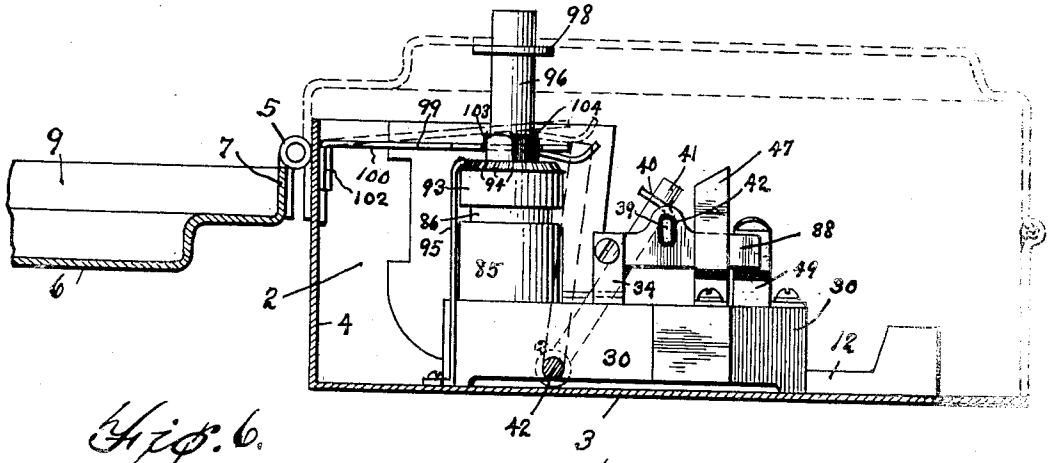


Fig. 6.

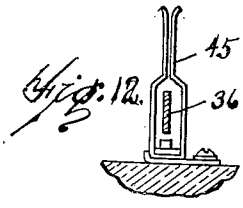


Fig. 12.

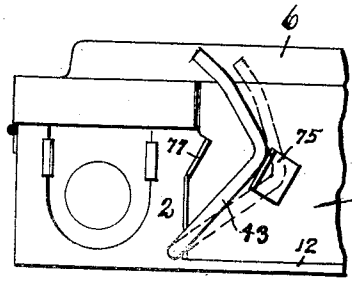


Fig. 10.

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UNITED STATES PATENT OFFICE

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METER ADAPTER

Application filed January 16, 1924. Serial No. 686,585.

This invention relates to the construction of enclosed switches and of the boxes in which they are mounted, and one of the objects of this invention is to provide a box of this character which may be fitted to the majority of electric meters now in use. Another object of this invention is to provide a switch mechanism and the receptacle therefor with means whereby a blown fuse may be replaced without opening the receptacle. A further object of this invention is to provide means to prevent such replacement of fuses while the switch is closed.

In the accompanying drawings, Fig. 1 is a front elevation of this improved switch box mounted to receive the terminal chamber of an electric meter. Fig. 2 is a bottom plan thereof. Fig. 3 is a section on the line 3—3 of Fig. 2 on a larger scale. Fig. 4 is an elevation of one corner of the box with the removable plate removed. Fig. 5 is a plan of the switch and box when on a horizontal support. Fig. 6 is a section on the line 6—6 of Fig. 5. Fig. 7 is a section on the line 7—7 of Fig. 5 on a larger scale. Fig. 8 is a section on the line 8—8 of Fig. 7. Fig. 9 is a diagram of the wiring of the switch shown in Fig. 5. Fig. 10 is a side elevation of a switch box. Figs. 11 and 12 are sections on the lines 11—11 and 12—12 of Fig. 5. Fig. 13 is a perspective of an interlocking bar.

Similar reference characters refer to like parts throughout the several views.

The meter adapter

The sides 2 of the box in which the present switch is mounted are connected to the bottom 3 and to the end 4 to which the hinges 5 for the cover 6 are attached. The cover has an end flange 7 to which the hinges 5 are attached, sides 9 and an end 10. The sides 2 of the box are shown in Fig. 6 to extend less than one-half the length of the bottom 3, but the sides 9 of the cover extend down to continue these sides 2. I prefer to so construct this cover that its sides extend down outside the upper edges and extend within the vertical edges of the sides 2. These sides 9 also extend along just within the extensions 12 of the sides 2 which extensions are provided with perforated ears 13, through which and through the similar ears 14 on the sides 9 any desired pad-locks 15 or other seals may be placed.

The end 10 of the cover opposite the hinges is so formed that it may be adapted to fit the terminal chamber 16 of electric meters 17. Fig. 4 shows this end to be cut away and formed with grooves 18 parallel to the bottom 3 and with grooves 19 at right angles thereto. Slots 20 receive the screws 22 which are threaded into laterally adjustable adapted plates 23 which are formed with small ribs to fit the grooves 19. As the heads of the screws 22 are on the inside, these plates can be secured to closely fit the meter and cannot be released until the cover is swung back.

Other screws 24 extend through the slots 25 into the plate 26 to which a door 27 is hinged, this door being formed with ears 28 which, when the door is swung into alinement with the plate 26, fit over the inner edges of the plates 23, and this occurs when no meter is to be received. These plates 23 are secured in position after being moved into the space between the ears 28 and the door 27 and thus prevent the door being opened. When a meter is to be received, these plates 23 are released and separated to release this door 27 and the plate 26 is adjusted so that its inner edge fits the extension 16 of the meter.

Within the box is a base 30 of porcelain or other insulating material and to this base are attached the pedestals 31, 32, 33 and 34, to which the knife-blades 35, 36, 37 and 38 are pivoted. These blades are attached to a cross bar 39 which has a perforated ear 40 through which extends the arm 41 on the shaft 42. An operating handle 43 on the outside of the box is used to swing this arm 41 and so open and close the switch. The cross bar 39 is enclosed in the insulation 42 which prevents electric contact with the knife-blades.

The test meter connections

Mounted on the base 30 are the contacts 44 to 49 inclusive. The connections thereto and

to the pedestals 35 to 38 and to the meter are shown in Fig. 9 and consist of the service wires 51, 52 and 53, the load wires 54, 55 and 56, the wires 57 to 60 connecting to the meter, the wires 61 and 62 connecting the contacts 48 and 49 to the fuses 63 and 64, and the conductors 65 and 66 connecting these fuses to the pedestals 31 and 34.

Under ordinary working conditions the knife-blades 35 to 38 are at an angle to the base, extending through the upper portions of the contacts 44 to 47 and the blades 36 and 37 do not engage the contacts 48 and 49. The circuit is over service wire 51 to contact 44, knife-blade 35, pedestal 31, conductor 65, fuse 63, wire 61, wire 58, meter winding 67, wire 57, contact 45, knife-blade 36, pedestal 32 and load wire 54. On the other side the circuit is over load wire 56, contact 33, knife-blade 37, pedestal 46, wire 60, meter winding 68, wire 59, contact 49, wire 62, fuse 64, conductor 66, contact 34, knife-blade 38, pedestal 47 and service wire 52. When a three wire system is employed, the neutral wires 53 and 55 may connect to the plate 69 by the screws 70.

When it is desired to test the meter 17, the cover 6 is swung back to expose the switch and the small bar 72 is pulled outward (upward in Fig. 5 to the position there shown). This bar has a notch 73 which permits the arm 41 to swing to the position shown in Fig. 6, which carries the knife-blades to their inward position shown in Figs. 6, 11 and 12. This disengages them from the contacts 45 and 46 and cuts out the load from the meter 17. The line connections 58 and 59 are still connected. During the period when the switch is being moved to the inward or lower position, the blade 36 is at one point in engagement with both contacts 45 and 48, and blade 37 is in engagement with both contacts 46 and 49. As the blade 36 is placed in full contact with contact 48 and the blade 37 is placed in full contact with 49, they are completely disengaged from contacts 45 and 46. The load is then transferred from the metering position to the shunt position without interrupting the flow of current to the consumer. The tester, by means of connectors, may now attach to contacts 45 and 46 the terminals of the circuit of a test meter, which circuit also includes an adjustable resistance, and make the desired tests. The shunt circuit thus created comprises the wire 61, contact 48, wire 58, meter winding 67, wire 57, contact 45, test meter and resistance contact 46, wire 60, meter winding 68, wire 59, contact 49 and wire 62, which permits complete testing of the meter 17.

In order to restrain unauthorized persons from cutting out the meter 17 while the box is closed and sealed, the bar 72 has an end 74 which extends into the path of the side 9 of the cover while the notch 73 is in below the arm 41. The bar 72 must therefore be pushed in before the cover can be closed, which cannot occur while the parts are in the position shown in Fig. 6. In order to insure the blades 36 and 37 being swung to proper full-contact position between the upper ends of the two sides of the contacts 45 and 46, the handle 43 may be curved as shown in Fig. 10 and a small bracket 75 attached to the side 9 of the cover so that when the cover is closed down this bracket will swing the handle 43 and the knife-blades to proper position. This bracket may have a hole 76 to receive a padlock or other seal whereby the switch may be locked in closed position, while a similar plate 77 on a side 2 with a hole 78 permits the switch to be locked in open position. The bracket 75 also prevents the meter being cut out while the cover is closed down.

The fuse plugs

When a service fuse blows out it is usually necessary to send a service man from the nearest office of the public service corporation which supplies the current to open the switch box to replace the fuse. The present construction embodies a series of fuses in a single holder, any one of which can be readily caused to properly connect two terminals of the service circuits. Substitutions of fuse elements can be made without opening the box by merely turning a selector, but any other desired means may be employed to bring other fuse elements into operative position to replace the blown fuse elements.

The base 30 is provided with grooves 80 in its lower surface to receive the conductors 61 and 62 which connect to the fuses 63 and 64 by means of bolts 81. Each fuse consists of an insulating body 82 having a screw threaded shell 83 in a metal thimble 84 securely held in an insulating socket 85 by means of a bolt 81. Within this body 82 is a rotatable fuse carrier 86 provided with grooves to receive the fuse elements 87 which connect at the lower end of the carrier and contact with a conductor 88 extending up from the bolt 81. These fuse elements contact with a conductor bar 89 whose upper end is pressed against them consecutively by a spring 90. The construction of this fuse plug and of the fuse carrier and its multiple fuses forms no part of the present invention as it is a well known article now on the market. It provides a system of renewable fuse elements between the conductors 62 and 66 on one side of the switch and between the conductors 61 and 65 on the other.

Each rotatable carrier 86 has a flange 92 which is held against the upper end of the body 82 by a threaded ring 93 which is preferably provided with notches 94 engaged by the resilient finger 95 which prevents this

ring from turning back and therefore prevents the fuse plug from unscrewing. A stem 96 extends up from the carrier 86 and through a hole 97 in the cover 6 so that when the cover is closed, this stem and the carrier for the fuse elements may be turned to bring a fresh fuse element into contact with the conductor 89. I prefer to provide a flange 98 on the stem 96 to prevent the introduction of foreign substances.

The stem 96, or selector, is provided with an indicating mark so that the meter reader or other inspector can determine whether or not this has been moved to a new position, and, if moved with sufficient frequency, can then inspect the premises to determine if the conditions are unusual or hazardous. Or, he may determine whether a new fuse or a series of elements is desired. This arrangement will reduce the number of calls necessary to make replacement of fuses, and dangerous conditions of the electrical system beyond the meter can also be determined.

It is desirable that the switch should be open while the fuses are replaced. In order to secure this, a plate 99 is attached to a resilient tongue 100 whose end turns down and is secured in a socket 102 attached to the end 4 of the box. As shown in Fig. 5, this plate has notches 103 adapted to receive the polygonal portions 104 of the stems 96 and normally prevents the stems from turning. But when the switch is opened and the arm 41 swung to the dotted-line position shown in Fig. 6, this arm lifts the plate 99 to the dotted-line position and frees the stems which thereupon may be turned to replace the blown fuse element. The arm 41 may then be swung down to normal position to again close the switch and lock the stems.

The broad idea of using a multi-fuse device operable from without the case may be embodied in practically numberless constructions by those skilled in the art. In fact, all the details and proportions of the several parts shown in the drawings may be modified without departing from the spirit of my invention as set forth in the following claims.

By providing a multiple fuse whose elements are all of the same capacity, I provide for the renewal of burnt-out fuses by the user while preventing him from substituting fuses of different capacity, thus protecting the lines and apparatus connected to this fuse mechanism. The distance the stems 96 extend above the polygonal portions 104 will be varied according to the desired accessibility of this operating mechanism.

I claim:—

1. In combination, a switch box comprising a bottom, sides and an end, a cover hinged to said end and embodying a second end for the box opposite the hinges of the cover, said second end comprising a plurality of plates arranged about a meter receiving opening, a pair of said adapter plates being laterally adjustable, a third adapter plate extending across said end and being adjustable toward and from the bottom of the box, the plates being adjustable to define meter receiving openings of various sizes.

2. In combination, a switch box comprising a bottom, sides and an end, a cover hinged to said end and embodying a second end for the box opposite the hinges of the cover, said second end comprising a plurality of plates arranged about a meter receiving opening, a pair of said adapter plates being laterally adjustable, a third adapter plate extending across said end and being adjustable toward and from the bottom of the box, said plates being adjustable to define meter receiving openings of various sizes, and means to lock said plates in position.

3. A switch box comprising four walls, one of said walls comprising a plurality of plates arranged about a meter receiving opening, two of said adapter plates being laterally adjustable, a third adapter plate extending across said laterally adjustable plates, and means accessible from the inside of the box and inaccessible from the outside of the box to lock said plates in position.

4. A switch box comprising side walls, one of said side walls having an opening to receive a meter, a pair of adapter plates positioned adjustably at an angle to each other across said opening to contact with said meter, and means accessible from the inside of the box and inaccessible from the outside to lock said plates in engagement with the meter.

5. A switch box comprising side walls, one of said side walls having an opening to receive a meter, a pair of adapter plates positioned adjustably at an angle to each other across said opening to contact with said meter, means accessible from the inside of the box and inaccessible from the outside to lock said plates in engagement with the meter, a door hinged to one of the adapter plates and adapted to be swung across the opening in said wall and provided with means adapted to be engaged by the other adapter plate to lock the door in closing position.

6. A switch box comprising side walls, one of said side walls having an opening to receive a meter, a pair of adapter plates positioned adjustably at an angle to each other across said opening to contact with said meter, means accessible from the inside of the box and inaccessible from the outside to lock said plates in engagement with the meter, a door adapted to close the opening in said wall and provided with means adapted to be engaged by an adapter plate to lock the door in closing position.

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