

June 29, 1943.

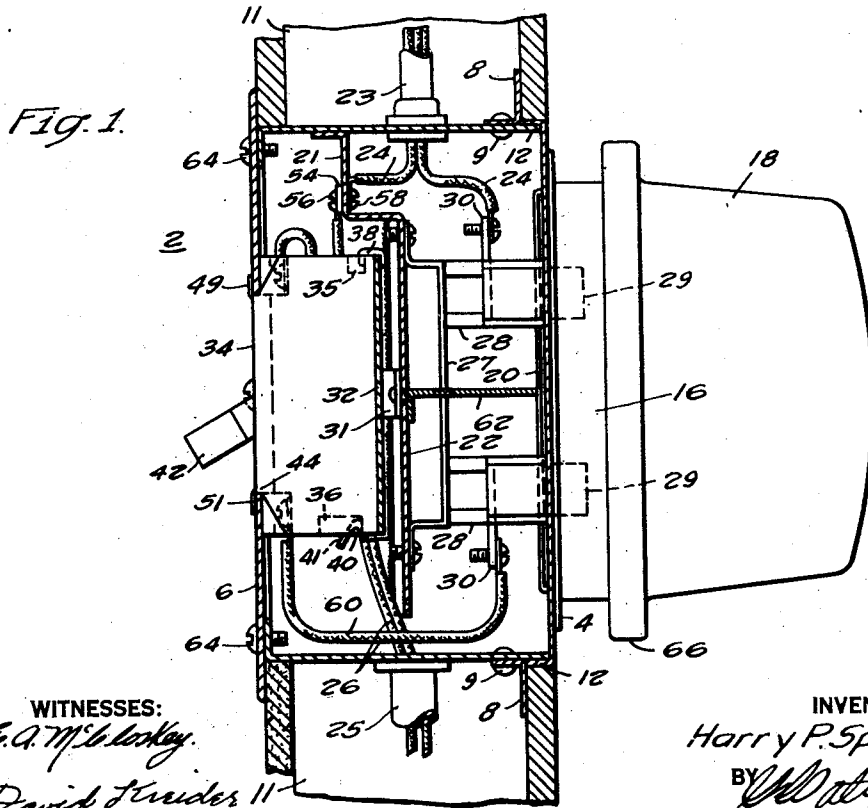
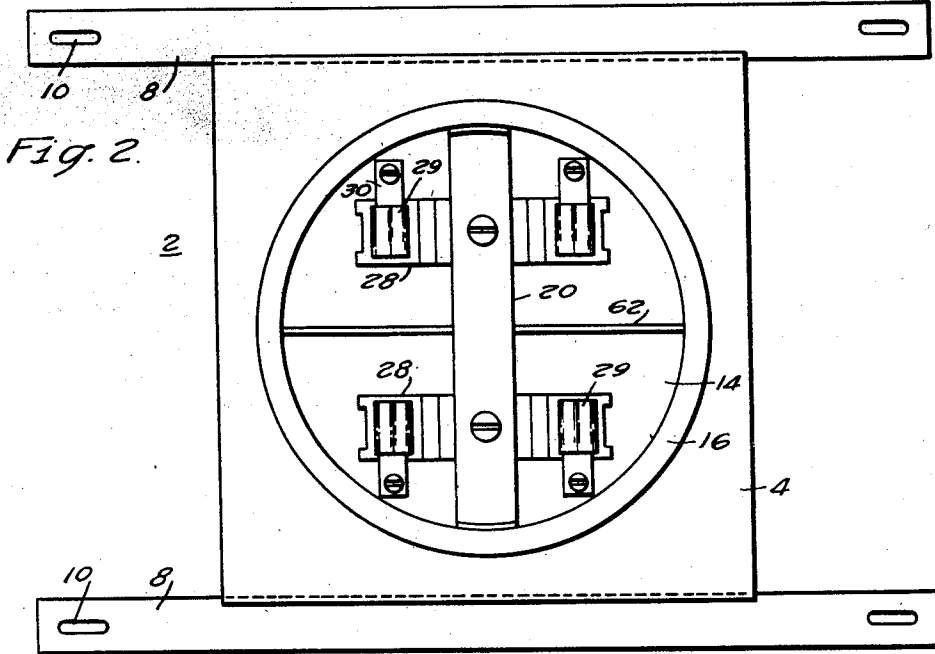
H. P. SPARKES

2,323,252

ELECTRIC SERVICE INSTALLATION

Filed Aug. 19, 1941

3 Sheets-Sheet 1



WITNESSES:
E. A. M. Lasky
David Knider 11

INVENTOR
Harry P. Sparkes
BY *W. D. H. H. H. H.*
ATTORNEY

June 29, 1943.

H. P. SPARKES

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Fig. 3.

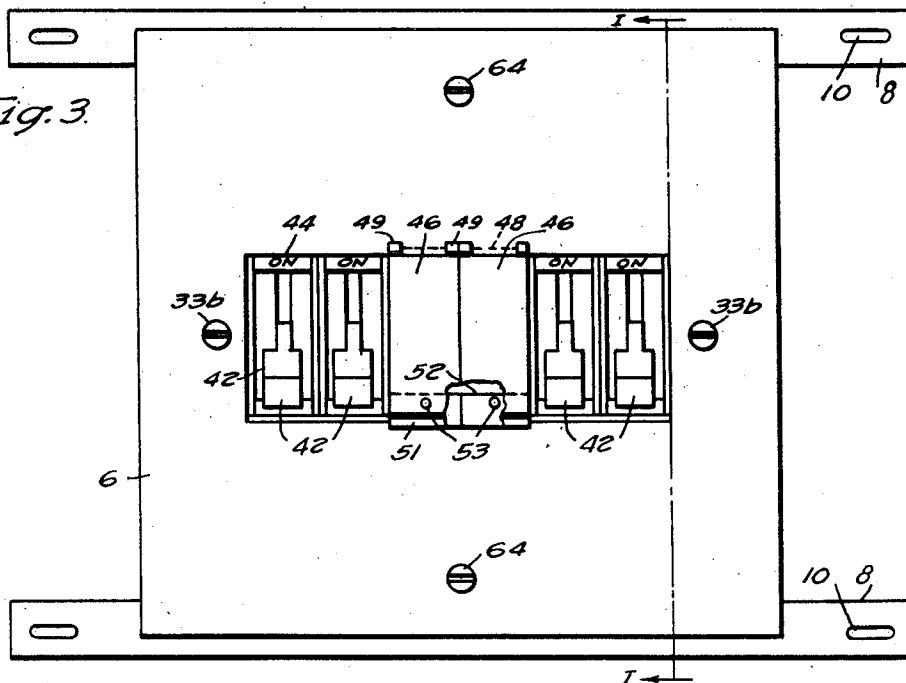
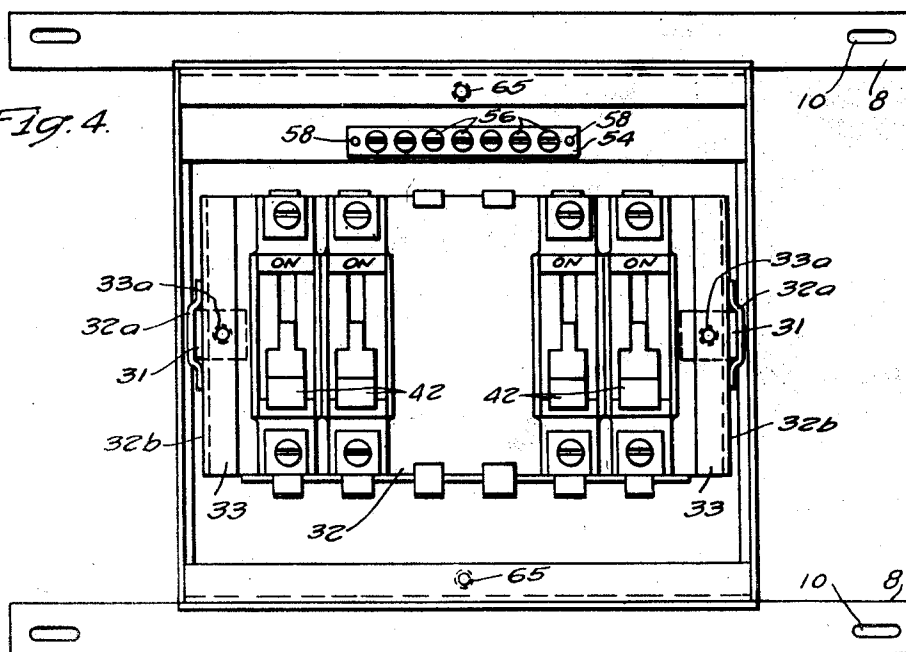


Fig. 4.



WITNESSES:

E. A. M. Kolosky
David Freider

INVENTOR

Harry P. Sparkes
BY *W. H. H. H. H.*
ATTORNEY

June 29, 1943.

H. P. SPARKES

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3 Sheets-Sheet 3

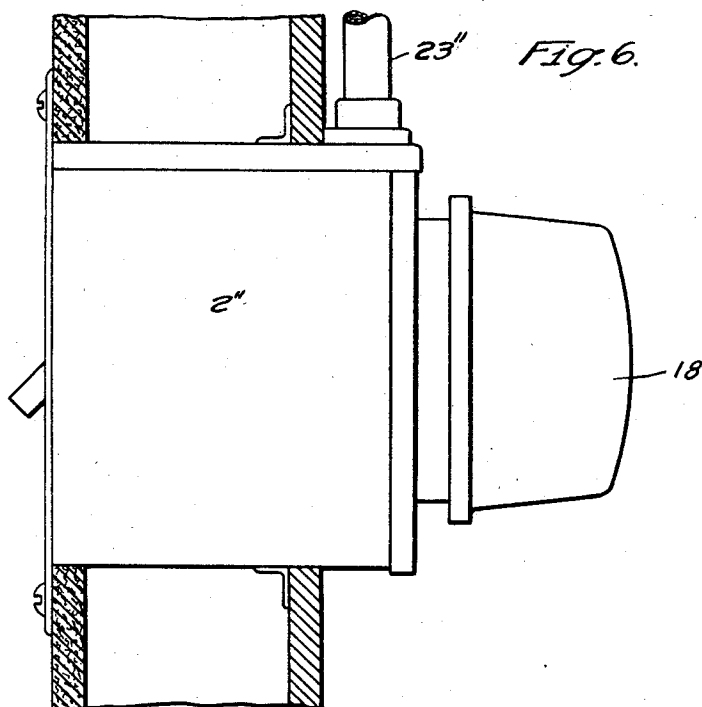


Fig. 6.

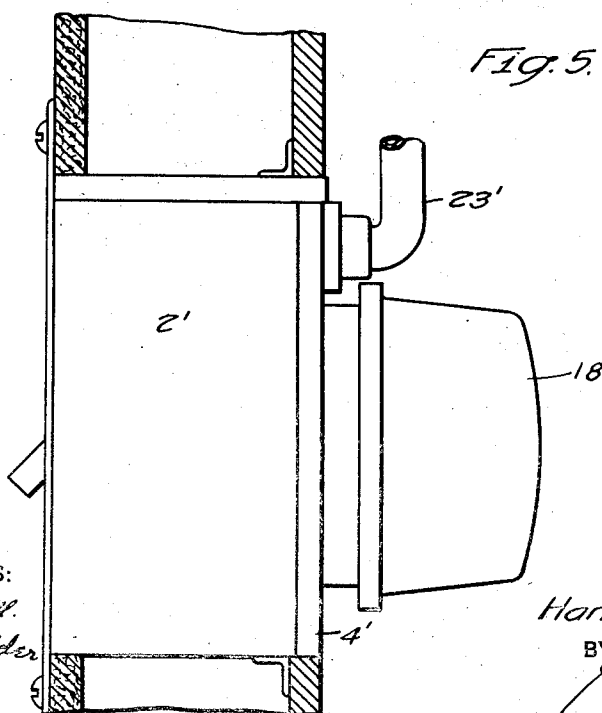


Fig. 5.

WITNESSES:

E. A. M. Key
David H. Hider

INVENTOR

Harry P. Sparkes

BY

W. H. H. H.
ATTORNEY

UNITED STATES PATENT OFFICE

2,323,252

ELECTRIC SERVICE INSTALLATION

Harry P. Sparkes, West Orange, N. J., assignor to
Westinghouse Electric & Manufacturing Com-
pany, East Pittsburgh, Pa., a corporation of
Pennsylvania

Application August 19, 1941, Serial No. 407,453

5 Claims. (Cl. 175-226)

The present invention relates to electrical service installations, and it has particular relation to a service receptacle which includes apparatus for engaging the terminals of an electric meter and means for detachably securing therein a plurality of interrupting devices for controlling the individual load circuits. The invention has especial reference to apparatus of this type wherein the meter and circuit interrupting devices are disposed at opposite sides of the receptacle.

Electrical service installations of the prior art are generally designed to handle the particular amount and type of load which must be supplied at the time of the original installation, but cannot conveniently be modified to take care of additional load circuits which later become necessary due to subsequent changes in power requirements. With the steady reduction in power rates and the cost of electrical appliances which have accompanied the widely increasing use of electricity and the completion of large power developments, many consumers have found their desire to expand their use of electric power hampered by the expenditure required to rearrange this service equipment. Not only does the home owner who wishes to install an electric range or the like face this problem, but the store or shop keeper who desires to modernize his lighting equipment or add other appliances also finds his plans obstructed by fixed capacity service equipment. In fact, it has been found that this condition sometimes causes the consumer to overload existing circuits beyond their permissible capacity with attendant danger and impairment of service.

As a result of the factors mentioned above as well as others familiar in the art, both domestic and commercial power requirements continue to grow from year to year. The power companies themselves have long recognized that fixed capacity service equipment is a serious obstruction in the way of increased power consumption and felt the need for more suitable equipment. Since the initial cost of the installation is of primary interest to the owner as well as the contractor, the provision of an increased amount of the usual type of equipment at an increased cost initially is neither a satisfactory nor logical solution of the problem. The real need is for a device which may be installed originally at substantially the usual cost to handle the immediate demands but is readily expansible at small cost to accommodate later increased requirements.

A solution to this problem which has been

found satisfactory to both consumers and power companies is claimed broadly in my copending application of even date. The present application, however, relates to a particular modification of that solution to provide an installation in which the load circuits may be rearranged or controlled from one side of a wall while metering equipment associated with the same receptacle is accessible from another side thereof. Such an installation, when made within the outside wall of a building, permits the power company representatives to read or test the meter even when the premises are closed. At the same time it is unnecessary for the consumer to go outside to effect control of his equipment.

An installation according to the present invention comprises a receptacle which is adapted to engage a variable number of circuit interrupting devices in a readily detachable manner so as to be accessible from a first side thereof. Ordinarily the original installation will require fewer than the maximum number of circuits which the receptacle is designed to accommodate. The circuit interrupting devices, which are preferably circuit breakers of the type which operate either automatically or manually, are adapted to be readily and conveniently secured in the receptacles as by a simple thrusting action without the necessity of attaching by machine screws. A removable cover for the side of the receptacle from which the circuit breakers are accessible is provided with an opening through which their manual operating handles extend. This opening is adjustable in size to accommodate various numbers of breakers without exposing the wiring.

In addition, the receptacle is adapted to accommodate a watt-hour meter at another side which may be opposite to the side adjacent the circuit interrupting devices. The meter is preferably of the detachable type and the contact members for connecting it to the circuit are disposed in the receptacle opposite to the circuit breakers. The entire receptacle may thus be located within a building wall to insure a neat and compact assembly. It is further possible in this manner to provide an original installation having circuit breakers numbering from one to the total capacity of the device, the capacity of each breaker being selected for the given load but being conveniently changeable along with the total number and position of the breakers to meet the demands of the consumer's increase, decrease or rearrangement of load conditions.

It is, accordingly, an object of the present in-

vention to provide a novel and improved receptacle for an electric service installation.

It is another object of the invention to provide a device for an electric service installation in which the meter and circuit controlling devices are accessible at opposing sides of the same receptacle.

A further object of the invention is to provide an electric service receptacle adapted to enclose an adjustable number of readily attachable circuit breakers accessible from one side thereof and apparatus for engaging a detachable type meter on the opposite side thereof.

Other objects and advantages of the invention will appear from the following detailed description read in connection with the accompanying drawings, in which:

Figure 1 is a vertical sectional view taken along the line I—I of Fig. 3 of apparatus in accordance with the invention installed within the wall of a building, and having line and load conduits and wiring associated therewith;

Fig. 2 is an elevational view of the meter side of the receptacle shown in Fig. 1 with the conduits and wiring omitted;

Fig. 3 is an elevational view with parts broken away of the load center or circuit breaker side of the receptacle with the cover in place;

Fig. 4 is an elevational view similar to that of Fig. 3 with the cover removed, and

Figs. 5 and 6 are views, partly in side elevation and partly in section, of modified installations in accordance with the invention.

Referring to Fig. 1 of the drawings, a receptacle 2 which may be of sheet metal includes front and rear sides or covers 4 and 6, respectively, and is disposed within the wall of a building by means of bracket members indicated at 8. These supporting brackets are secured to the top and bottom of the receptacle as by means of rivets 9 and are provided with apertures at 10 (Fig. 2) to facilitate attachment to wall studs 11 by means of wood screws. Of course, some other suitable attaching means, many of which are known in the art, may be substituted since the particular means of attachment forms no part of the present invention.

The front cover member 4 is shown as including a collar portion 12 which is adapted to snugly engage the sides of the receptacle 2. It will appear that some other or additional means may be employed to either detachably or permanently secure this cover in place, if desired. It also includes a relatively large opening 14 around which is disposed a socket ring 16 for engaging the casing of a watt-hour meter 18 of the detachable type, such as is described in Patent No. 1,969,499 to W. M. Bradshaw et al. While many methods of providing the ring 16 are known in the art, the device may by way of example, employ a separate member welded to the cover member 4 in the manner shown in Patent No. 2,071,936, to W. G. Mylius. In this construction a bridge member 20 is, in turn, welded to the socket ring. A partition or panel indicated generally at 22 is disposed in the receptacle substantially parallel to the two cover members and includes an offset portion 21. This supporting panel may be secured in place as by welding side flanges provided thereon to the end walls of the receptacle in the manner shown. A conduit 23 within which is disposed electrical service leads 24 may be located within the wall structure. Since the offset portion 21 of the panel is provided to permit this conduit to com-

municate with a center knock-out in the top of the receptacle, it is evident that the panel may be flat in cases where the conduit communicates with other portions of the receptacle such as in the modifications hereinafter described. It is preferred to space the lower end of the panel from the bottom of the receptacle to provide a passage for conducting leads extending between the two portions thereof. Fig. 1 also shows by way of example a conduit 25 communicating with the receptacle to bring load circuit conductors 26 into it.

A supporting bar 27 of substantially U-shape is secured to the panel 22 to furnish support to a pair of insulating blocks 28. These insulating blocks may be of a type well known in the art and support metallic contact jaws 29 which are adapted to engage the terminal blades of the detachable meter 18. In addition, terminal clamps indicated at 30 are secured to each of these contact jaws to connect them to the service and load wires of the installation. As is shown in the drawing, each of the upper pair of terminals 30 is connected to one of the ungrounded service conductors 24 so that the upper pair of contact jaws 29 are adapted to engage the line terminals of the meter.

A pair of spaced angle members 31 are secured to the panel 22 to project therefrom in the direction of the side 6 of the receptacle as is shown also in Fig. 4. A circuit breaker supporting strap 32 of substantially U-shape has a guide strap 32a disposed on each of the opposite side walls 32b thereof for slidable engagement with the angle members 31. Each of the walls 32b includes an outside portion 33 bent substantially parallel to the side 6 and provided with a screw threaded hole 33a. The main portion of this strap 32 is disposed substantially parallel to the panel 22 and the cover 5 and is adapted to have the breakers secured thereto. It will appear that this arrangement permits adjustment of the strap 32 within the receptacle to properly locate any breakers thereon relative to the side or cover 6. The strap may be secured in adjusted position by machine screws extending through the member 6.

The circuit breakers supported by the strap 32 are designated as 34 and it is intended that each of them be connected to the load side of the meter to automatically open one of the load circuits when the current traversing it exceeds a predetermined value. The breakers are preferably of the type which may be operated manually as well as automatically and have trip free characteristics. Examples of constructions suitable for this purpose are those described in the patent of H. S. Gano, No. 2,195,004, and the application of O. S. Jennings, Serial No. 345,264, filed July 13, 1940.

As is shown in Fig. 1, each of these circuit breakers is provided with a first notch 35 in its upper end and a second notch designated as 36, in the bottom end. The means for detachably clamping each breaker includes an upper U-shaped member or clamping finger 38 and a lower clamping finger indicated at 40 which are adapted for disposal within these openings. The lower finger 40 is of resilient or spring construction and includes an obliquely disposed cam portion 41. A breaker may be very quickly and easily secured to the support by first tilting it to place the end of the finger 38 within the upper notch and subsequently forcing its lower portion against the strap 32 to bring the spring finger 40 into en-

gagement with the notch 36. It will appear that the oblique portion 41 of the finger 40 will be engaged by the lower edge of the breaker as it is thrust into place and that the resulting cam action will force the finger aside until it engages the notch. The breaker may readily be detached by first forcing this resilient member from the notch 36 as by means of a screw driver and reversing the previously described operation. Each breaker includes an operating handle 42 which is adapted to extend through an opening 44 in the cover 6 to permit manual operation thereof. The opening 44 is preferably of such size as to accommodate the maximum number of circuit breakers which may be disposed within the receptacle. While the unit shown in the drawings is designed to support six such breakers, it will be understood that the invention is not limited to any particular number.

Although various means might be employed for closing the unused portions of this opening 44, it is preferred to provide removable panels designated as 46 for this purpose. Each of these panels may be of such a size as to cover the portion of the opening required by an individual breaker so that, with four breakers mounted in a six breaker receptacle as shown by way of example in the drawings, two of these panels 46 are needed to close the unused portion of the opening. As is best shown in Fig. 3, wherein a portion of the panels is cut away, each of them may include a tongue portion 48 cut in the center of its upper end and bent inwardly to engage the rear of the cover 6 while outer prongs 49 are offset forwardly to contact the outer surface thereof. The lower end of the panel is offset forwardly at 51 to engage the outer surface of the cover 6 while a metallic strip 52 is pivotally attached to the rear of the cover 46 at 53. Since the pivot 53 engages the strip 52 at a point displaced from the center of its vertical dimension, its longer end may be extended downwardly to engage the rear of the cover 6 while a 180 degree displacement of the strip will extend the shorter portion downward. Since this shorter portion is not long enough to engage the cover, the panel may be readily removed to permit the addition of another breaker to the installation.

A conductor strip 54 supporting a plurality of terminal screws 56 is secured to the offset portion of the panel 22 by means of machine screws 58 for the purpose of providing a ground connection for each of the load circuits. The incoming ground conductor in the group of service leads 24 is then connected directly to one of the screws 58 and thus to the strip 54. It will also be noted that since this panel 22 does not extend all the way to the bottom of the receptacle 2, a passage is provided for conductors 60 connecting the lower or load terminals 30 to the various circuit breakers. An additional panel or baffle 62 extends forwardly from the panel 22 to separate the upper pair of contact jaw assemblies from the lower pair and thus prevent access to the supply conductors or line side of the meter through the load center side of the receptacle. The usual knockout portions may be provided in the receptacle for permitting conduits carrying load conductors such as that indicated at 25 to be brought thereinto at selected points.

The cover 6 is provided with a pair of openings coincident with the screw threaded holes 33a in the supporting strip to permit machine screws 33b to pass therethrough into the latter holes. Other holes are formed as indicated to permit

machine screws 64 to pass through the cover into engagement with screw threaded holes 65 in the main portion of the receptacle. By means of these latter screws the cover 6 may be brought flush with the wall even though the corresponding edges of the receptacles are not properly aligned therewith because of installation inaccuracies. At the same time, the arrangement including the screws 33b permits the breaker supporting strap to be secured in such a position with respect to the cover 6 that the fronts of the breakers 34 are flush therewith. It will appear that other suitable means for adjusting the position of the strap might be employed to obtain this result.

As is shown in Fig. 1, the detachable meter 18 is secured to the meter socket ring 16 by means of a clamping or sealing ring 66 which may be of a type well known in the prior art.

It will be understood that the wall within which the receptacle is shown mounted in Fig. 1 may be the outside wall of a building in which case the meter is disposed at the outside surface to be accessible to the power company representatives without their entering the building and the circuit breakers are conveniently arranged at the inside surface. While the service conduit 23 is shown disposed within the wall in this Figure 1 to enter the receptacle through a knock-out in its top, there are cases in which this particular arrangement is undesirable. For such situations the installations may be made with the service conduits extending along the outside of the wall to enter a different portion of the receptacle.

Such arrangements are shown by way of example in Figs. 5 and 6. Thus, in Fig. 5, the service conduit 23' is shown as entering the receptacle 2' through a knock-out provided in the meter side cover 4' thereof. The installation may otherwise be the same as that previously described with the load conduits communicating with the interior of the receptacle through knock-out portions suitably located in a usual manner.

In Fig. 6 the receptacle 2'' is disposed so as to project forwardly from the wall and may be somewhat enlarged for this purpose. The service contact 23'' may then extend along the wall and into the top of the receptacle without it being necessary to form a bend therein.

While the apparatus has been explained with reference to a receptacle in which the meter and circuit interrupting devices are at opposite walls, it is within the scope of the invention to have the spaced receptacle walls associated with these devices disposed angularly to one another rather than parallel. Such an application often is of value for corner installations and the like.

Many advantages of the present invention will appear evident from the foregoing description. A novel and compact construction is provided because of the back-to-back arrangement employed, and as a result, the receptacle need not be much larger than is ordinarily employed for mounting the meter alone. Because of the ease with which additional circuit interrupting devices may be added to the installation, the consumer is encouraged to provide additional circuits to meet his load increases rather than overload those already existing. Where the installation is made in the outside wall of a building, the meter is readily accessible to the power company representative for making readings, while the control of the load circuits is likewise convenient for the consumer. Even when the cover member 6 is not sealed to the receptacle by the power com-

pany, access to the service side of the meter is prevented by the upper portion of the panel 22 and the baffle plate 62 so that no unmetered power can be taken from the line.

It will be evident that various modifications may be made in the structure shown and described, and for this reason it is intended that the invention shall be limited only by the appended claims interpreted in view of the prior art.

I claim as my invention:

1. In an electric service installation, a receptacle including a pair of oppositely disposed openable covers each of which has an opening therein, means for supporting said receptacle at least partly within a building wall with said covers accessible at opposite sides thereof, a detachable type meter disposed on the first of said covers with its terminal blades extending through the opening therein, contact jaws disposed in said receptacle for detachably engaging the meter terminal blades, a plurality of circuit breakers having operating handles, means for individually securing each of said circuit breakers in an operating position in said receptacle in response to a thrusting movement thereinto, said operating positions being such as to secure said breakers in back-to-back relationship to said contact jaws with the operating handles extending through the opening in the second of said covers, and means for adjusting the position of said breaker securing means relative to the end of said receptacle closed by said second cover.

2. In a device for an electric service installation, a receptacle including a pair of oppositely disposed openable covers each of which has an opening therein, an integrating meter having line and load terminals, contact means in said receptacle for engaging the terminals of said meter when disposed on the first of said covers, means for individually securing circuit breakers in a plurality of operating positions in said receptacle in response to a thrusting movement of each breaker into one of said positions, said operating positions being such as to dispose said breakers between said contact means and the second of said covers with their operating members extending through the opening in said second cover, a partition in said receptacle for preventing access to the line terminals of said meter through the end thereof which is normally closed by said second cover, and means for closing the unused portion of the opening in said cover when less breakers than the total capacity of the receptacle are employed.

3. A meter service installation comprising a receptacle having oppositely disposed removable end walls each having an opening therethrough and means for mounting the receptacle in the wall of a building with said end walls respectively removable from inner and outer sides of the

wall, a partition permanently secured intermediate said end walls, line and load contact terminals and means for securing them on said partition to be exposed through the opening in said outer end wall to constitute a socket for a watt-hour meter of the detachable type to be mounted on the outer face of said outer end wall, a plurality of circuit interrupting devices and means for individually mounting them for access through the opening in the inner end wall including a mounting plate provided with means for individually receiving said devices and means for adjustably mounting said plate on said partition for movement with respect to said inner end plate.

4. A meter service installation comprising a receptacle having oppositely disposed removable end walls each having an opening therethrough, and means for mounting the receptacle in the wall of a building with said end walls respectively removable from inner and outer sides of the wall, a partition permanently secured intermediate said end walls, line and load contact terminals and means for securing them on said partition to be exposed through the opening in said outer end wall to constitute a socket for a watt-hour meter of the detachable type to be mounted on the outer face of said outer end wall, a plurality of circuit interrupting devices and means for individually mounting them for access through the opening in the inner end wall including a mounting plate provided with means for individually receiving said devices, and means for adjustably mounting said plate on said partition for movement with respect to said inner end plate; said partition being of such dimensions as to prevent tampering with the meter line contact terminals from the end of the receptacle housing the circuit interrupting devices.

5. In a meter service installation, a receptacle for mounting in the wall of a building and having removable end walls exposed respectively on the inside and outside of the building wall, a partition permanently mounted intermediate the ends of said receptacle defining two substantially independent chambers, means on the outside end wall for mounting a socket type watt-hour meter with its terminal blades projecting into the adjacent chamber, terminal jaws mounted on said partition to receive said blades, means in said chamber for connecting certain of said jaws to the line side of the circuit to be metered, and circuit interrupting devices for the load side of the meter adjustably mounted on said partition in the other of said chambers for operation from the inside of the building wall, said partition being so dimensioned that access to the line side of the meter from inside the building wall is prevented.

HARRY P. SPARKES.