3,281,550
CONNECTOR BLOCK ASSEMBLY FOR WATT-HOUR METER SOCKETS
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Filed Dec. 2, 1964, Ser. No. 415,396
5 Claims. (Cl. 300—51.1)

This invention deals generally with mounting means for watt-hour meters and refers more particularly to an improved mounting structure providing a manually operable bypass arrangement having distinct advantages over those known to the art.

The reasons for and desirability of having a selectively operative bypass circuit in a watt-hour meter socket are gone into rather thoroughly in such prior patents as Waldrop 2,931,879, issued April 5, 1960; Waldrop 2,819,358, issued January 7, 1958; Waldrop 3,029,322, issued April 10, 1962; and Read 3,005,085, issued October 3, 1961.

Among the principal objects of the present invention is to provide a meter socket block assembly having such a bypass circuit and which includes structure that
(a) is positive in its operation and requires sufficient force to make or break the bypass as to insure that it will not be accidentally left in an intermediate or halfway condition;
(b) produces, for each cycle of operation, a wiping action on the make and break electrical contact surfaces involved in the bypass circuit, thus insuring of efficient conduction through the bypass circuit whenever it is closed;
(c) lends itself especially to inclusion in multiple jaw sockets of the order of more than four jaw terminals;
(d) has a small number of parts, thus making it low in cost and easy to assemble; and
(e) does not require carefully controlled procedures involving close tolerance fabrication for its manufacture and assembly.

Other and further objects of the invention together with the features of novelty appurtenant thereto will appear in the course of the following description.

In the accompanying drawings, which form a part of the specification and are to be read in conjunction therewith, and in which like reference numerals indicate like parts in the various views;

FIG. 1 is a front elevational view of a typical seven terminal watt-hour meter socket (without the cover) equipped with a preferred embodiment of the invention;
FIG. 2 is a sectional view taken generally along the line 2—2 of FIG. 1 in the direction of the arrows;
FIG. 3 is a sectional view taken along line 3—3 of FIG. 1 in the direction of the arrows, the bypass circuit being closed;
FIG. 4 is a sectional view taken along line 4—4 of FIG. 1 in the direction of the arrows, but with the bypass circuit open;
FIG. 5 is a sectional view taken along the line 5—5 of FIG. 1 in the direction of the arrows; and
FIG. 6 in an enlarged fragmentary sectional view taken along the line 6—6 of FIG. 3 in the direction of the arrows.

Referring to the drawings, reference numeral 10 indicates a typical open front meter socket box having the side walls 11, back wall 12, bottom wall 13 and top wall 14. A conventional entrance hub 15 secured to the top wall is shown.

The meter socket block assembly is located in the interior of the box. Basically it is, in the illustrated embodiment, made up of three substantially alike connector block subassemblies, each carrying a pair of spaced upper and lower terminal jaws 16, 17 of conventional construction. Between two of the subassemblies is located another subassembly block carrying but one jaw terminal 18; this is a ground terminal and as will be seen is shown herein for illustrative purposes only as it plays no part in the invention.

The main body of each connector block subassembly comprises a substantially U-shaped insulator block 19 (made of porcelain or other good non-conductive material) having a base 19a, an upper leg 19b and a lower leg 19c. The web or base of the block 19 is secured to the base web 20 of a block assembly support later to be described, the securing being accomplished by machines screws 21 extending through the base of the block and threaded into tapped apertures in web 20 (FIG. 4).

Supported on the outer end of the upper leg 19b is a conductor element 22 which in the illustrated embodiment comprises a generally Z-shaped member having one end leg 22a overlying the end of block leg 19b, an intermediate leg 22b extending along the outside of block leg 19a, and another end leg 22c to which is secured a lay-in terminal 23 for receiving a conductor wire (not shown). The lay-in terminal may be of any desired construction; those shown have a longitudinal opening into which the wire is laid and adjustable wire clamping screws 23a. However, inasmuch as the details of construction of the lay-in terminal play no part in the invention, no further description thereof will be provided.

The element 22 is constructed of material of good conductivity, for example, aluminum. It is held in position on the block leg by a machine screw 24 inserted into a passageway in the block leg and threadedly engaging a tapped aperture in the base web 16a of the generally U-shaped jaw terminal 16.

The lower leg 19c carries a conductor element 25 constructed much like conductor element 22. The element 25 has the legs 25a, 25b, and 25c, the latter terminating in a lay-in terminal 23. The leg 25a overlies the end of the lower block leg and has extending therethrough the assembly screw 24 which engages the base web 17a of the lower jaw terminal 17.

The legs 22a, 25a of the upper and lower conductor elements extend toward one another but terminate short of contact to provide end edge 22d, 25d, respectively, which are spaced from one another to define a gap between the conductor elements. To bridge this gap there is provided a flexible bypass contact assembly 26 now to be described.

The contact element itself, i.e., the principal conductor in the bypass contact assembly, comprises a somewhat irregularly shaped elongated member 27 which has a flat end anchored by machine screws 28 to a boss on leg 22a, and an outwardly inclined or offset intermediate bifurcated portion which terminates in flat end portions 27a at the other end which, in the condition of the unit shown in FIG. 2, are substantially coplanar with the secured end. While this contact element may be constructed of a single piece of material, preferably it is formed of laminations of copper shim stock (.060") in order to provide longer life and less resistance to flexure.

As is perhaps best seen in FIG. 3, to improve the electrical contact, the free, i.e. the unanchored ends 27a, of bypass member 27 each engage the heads 29 of spaced silver plated copper rivets set into the leg 25a of conductor element 25 and underlying each time of the bifurcated bypass member. These are resiliently biased toward closed electrical contact with the rivet heads by the similarly bifurcated leaf spring 30, which is anchored also at one end by screw 28 and which has the downturned lip portions at the other end bearing on the outside of the respective free end portions 27a of the bypass member.
Positioned beneath the intermediate portion of each bypass member 27 and slidably supported on the outer end portions of legs 22a and 25a of the connector elements on opposite sides of the gap therebetween is a flat rectangular insulated member 31, which I term an insulating separator member. In the normal open condition for the bypass, the separator member 31, which is made of good quality electrically insulative material such as hard fiberboard, lies between the ends 27a of the bypass conductor members and the rivets 29 (FIGS. 2 and 4) thus breaking the circuit therebetween.

Movement of the separator members 31 between non-bypass and bypass position is accomplished through the medium of a hand lever 32 which extends from and is secured to a shaft 33 extending transversely across the block assembly in the openings defined by the legs of the individual block members 19. The shaft is of non-circular cross section, preferably square. Spaced along it according to the location of the bypass contact assemblies 26 are the members 34 having hub portions 34a, from each of which extends an outwardly projecting leg 34a. Each leg 34a passes through an aperture 31a (FIG. 6) in a separator member 31. The members 34 are made of non-conductive material, preferably being cut from a good stiff and hard fiberboard. The hub is assembled with the shaft by providing it with an opening conforming in shape with the cross section of the shaft and sliding it therein until properly positioned.

The shaft 33 is rotatably supported at its respective ends in bearing surfaces 35 formed in and as part of outstanding flanges 20a at the ends of the block mounting web 20 herebefore described. The web 20 in is turn secured to the back wall 12 of the box by the screws 36 and shoulder rivets 37 shown in FIG. 1. The web 20 and flanges 20a turned outwardly thus provide a complete internal mounting support for the block assembly as a whole, including the bypass structure.

It will also be noted that, as shown in FIG. 6, each of the legs 22a, 25a is provided with a cutout 22f, 25f registering with the slot between the bifurcations of the contact members 27 and their springs 30. This is to provide for necessary movement of the arms 34a during operation of the bypass.

In the normal condition for the bypass, which is the open condition, i.e. no current flow through the bypass, the separator members 31 are interposed between the conductor elements 25 and the conductive rivets 29 on the one hand and the bifurcated end portions 27a of the bypass contact assemblies 26. Thus no current can flow from conductor 22 to conductor 25 except through a meter (not shown) which would be plugged into the terminals 16, 17. In this condition the hand lever 32 is in the generally upright position shown in FIG. 4 and lies well within the front edge of the side wall 11 (see FIG. 2) so that a cover could be put in place on the unit.

Whenever it is desired to set up a bypass circuit from the conductor elements 22 to the conductor elements 25 it is necessary only to pull outwardly on hand lever 34, thus rotating the shaft 32 counterclockwise as viewed in FIGS. 2 and 4. As the shaft commences turning counterclockwise from the FIG. 4 position, the legs 34a are pivoted with it and thus engage and carry the separator members 31 toward the upper end of the block assembly. This has the effect of withdrawing the separator members from between the free ends of the contact assembly and the corresponding contact surfaces on conductor 25a. The spring 30 serves to insure closing of the contact when the separator member is withdrawn.

A particular advantage of the present construction resides in the wiping effect on the electrical contact surfaces which is provided by the reciprocating or sliding movement of the separator members 31 with respect to the electrical contact surfaces. Obviously, both contact surfaces are urged into firm engagement with the separator member by the spring 30 and remain in firm engagement as the separator members are withdrawn.

When the assembly is in bypass condition, the handle is in the position shown in FIG. 3, and thus projects outside or beyond the front edges of the sides 11. This prevents rotation of the cover while the bypass is still closed.

To return the bypass circuit to its normal disconnected position, it is necessary only to push the hand lever 34 back into the box, thereby turning the shaft clockwise and sliding the separator members 31 back into their interposed relationship between the bypass contact surfaces. Again it will be noted that a wiping action takes place during this movement, which supplements and adds to the wiping effect earlier described.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. A connector block assembly for socket type meters including a plurality of pairs of jaws for receiving the blades of a meter, a stationary bypass contact for one of the jaws in each pair of jaws, a movable bypass contact for the other one of the jaws in each pair, said movable contact overlapping and normally engaging said stationary contact whereby to close a circuit through said contacts, means resiliently biasing said movable contacts into said normal position, insulative separator members positioned adjacent each of said pairs of contacts and reciprocably slidable between and out from between said stationary and movable contacts whereby to make and break the circuit between said contacts, and manually operable means for reciprocating said separator members, said manually operable means including a rotatable shaft, a plurality of arms extending from and secured to said shaft, one arm for each separator member, each said arm connected with its separator member, and a hand crank also connected with said shaft for turning same and simultaneously reciprocating said separator members.

2. A connector block assembly for socket type meters including a block of insulative material, conductor elements secured to said block and having intermediate confronting edge portions defining a gap between said elements, a pair of jaw terminals for receiving the blades of a meter, one terminal secured to each said element, an electrically conductive flexible bypass contact member secured to one end of one of said elements and bridging said gap with the other end of said contact member adjacent and yieldably biased toward a portion of the other said element, an insulative separator member positioned to be reciprocated between a position between said other end and said other element and a position in which said other end is in electrical contact with said other element, said insulative separator member further including manually operable means for manually and selectively shifting said separator member between said respective posi-
tions, said operating means including a shaft extending transversely beneath said gap through an opening in said block, and an arm extending laterally from said shaft and engaging said separator member.

3. An assembly as in claim 2 wherein said separator member comprises a substantially flat piece of insulative material bridging said gap and slidably supported on said elements on opposite sides of said gap.

4. A connector block assembly for socket type meters comprising
   a substantially U-shaped insulative block member having a base and two outstanding legs,
   a pair of conductor elements, one secured to each leg, each said element having a portion extending across toward the element on the other leg but terminating short thereof whereby to provide a non-conductive gap between said portions of the respective elements,
   a pair of terminal jaws, one jaw connected with each element,
   an electrically conductive flexible bypass contact member extending across and bridging said gap and having one end anchored to one of said conductor elements and the other end in movable contact with the other of said elements, means resiliently biasing said other end of said bypass contact member toward said other element,
   an insulative separator member adjacent said other end of said bypass member and movable between a position between said other end and said other element and a position in which said other end is in electrical contact with said other element,
   a rotatable shaft extending between said legs of said block member substantially normal to the plane of the legs and spaced therebetween, and
   an arm secured to said shaft, said separator member connected with said arm and movable thereby between said positions therefor.

5. A connector block assembly for socket type meters comprising,
   a plurality of substantially U-shaped insulation block members, each having a base and two outstanding legs, said block members arranged in side by side relationship,
   a plurality of pairs of conductor elements, one pair for each block member, the conductor elements of each said pair secured respectively to the legs of the block member and arranged with a gap therebetween,
   a plurality of pairs of terminal jaws, one jaw on each conductor element,
   a plurality of electrically conductive flexible bypass contact members, one for each gap, each said member extending across and bridging said gap and having one end anchored to one of said conductor elements of each pair and the other end in movable contact with the other of said elements in said pair, means resiliently biasing said other end of each said bypass contact member toward said other element,
   a plurality of insulative separator members, one for each bypass contact member, each said separator member located adjacent said other end of its bypass member and movable between a position between said other end and said other element and a position in which said other end is in electrical contact with said other element,
   a rotatable shaft located between the legs of the block member, a plurality of arms secured to said shaft, one arm for each said separator member, said arm extending upwardly in and through said gap, said separator members connected with the respective said arms and movable thereby between said positions in response to rotation of said shaft.

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