

IMPROVEMENTS IN OR RELATING TO BUSBARS

This invention relates to improvements in or relating to busbars and is more particularly concerned with the manner of attachment of a tapping box or tapping unit onto busbar trunking.

Tapping boxes are attached to busbar trunking by four hooked locking legs located near respective bottom corners of the box, said legs usually having at least a hook portion or foot movable behind or over a flange of the trunking in order to attach the tapping box thereto. Additionally, it is known to provide such tapping boxes with a safety "lid interlock device" which generally ensures that the tapping box cannot be removed from the trunking whilst a protective device (for example a circuit breaker) also interlocked to the lid is in the on-position. Such interlock devices may interfere with the lid of the tapping box preventing closure thereof whilst the tapping box is being installed. Thus, only after the tapping box has been installed will the interlock device allow the tapping box lid to be closed and the tapping box energised.

Various arrangements have been proposed for engaging the hook portions or feet of the locking legs behind or over the trunking to attach the tapping box thereto and various arrangements have been proposed for lid interlock devices. However, it is believed that there tend to be disadvantages with these prior proposals. These

disadvantages may range from too greater cost or complexity or lack of ease of operation or user friendliness. In particular, the hook portions or feet may need to be moved individually or in pairs into the correct engaged position

5 and installation may require a more accurate degree of initial alignment of the tapping box with the trunking than need be the case. Several operations may be required to move each of the hook portions or feet inwardly towards one another behind or over the trunking as well as pulling the

10 hook portions or feet upwardly towards the bottom of the tapping box to engage the tapping box tightly onto the busbar trunking. Sometimes, the installation of the tapping box onto the trunking may take longer than should really be necessary and may require a greater number of

15 tightening operations than need necessarily be the case. Consequently, it may take longer and require more operations to remove the tapping box if required and the manner in which the tapping box may be attached or removed may not always be as obvious to the operator as it could

20 be. A further important problem that may occur with at least some arrangements is that the hook portions or feet of the locking arms and/or the interlock device may vibrate loose with obvious disadvantages.

25 It is an object of the present invention to at least alleviate one of the aforementioned, or other, problems related to installation of a tapping box or plug-in unit onto a busbar, or to provide an attachment for such a box or unit which is improved in at least some respect.

This Sheet Has Been Replaced



According to the present invention there is provided a tapping unit having a plurality of locking members or legs provided with hook portions or feet that can be moved into and out of locking engagement with a busbar, said locking members or legs being connected to an over-centre cam mechanism, said cam mechanism being rotatable to move the locking members or legs inwardly and upwardly towards a bottom of the tapping box and outwardly and downwardly away from the bottom of the tapping box, depending upon the direction of rotation of the cam mechanism, said cam mechanism being co-operable with a lid interlock device preventing or allowing a lid of the tapping box to be closed depending upon the position of a cam member of said cam mechanism.

15

Further according to the invention there is provided a locking arrangement for locking a tapping unit to a busbar, said arrangement comprising a plurality of locking members or legs mounted, in use, on said unit and movable into and out of locking engagement with a busbar, said legs being movable together inwardly and upwardly towards a bottom of the unit by movement of a connection or cam member of said arrangement, preferably on rotation of said connection or cam member, said connection or cam member preferably being co-operable with a lid interlock device.

25

Still further according to the present invention there is provided a cam mechanism for actuating a lid interlock device on a tapping unit, said cam mechanism

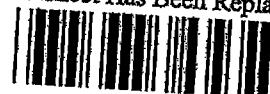


preferably being an over centre mechanism and having a cam member with a cam surface co-operable with an interlock rod of said lid interlock device, said rod being movable relative to the unit on rotation of said cam member, to
5 thereby prevent or allow closure of a lid of the tapping unit depending upon the position of the rod.

Usually the lid will be connected to the tapping unit by a hinge connection.

10

Each locking member or leg may be pivotally connected to one end of an associated link arm which is in turn connected to the cam mechanism. Each link arm may be generally L-shaped with a shorter limb of said link arm
15 being connected in each case to the cam mechanism preferably at opposed diametrical locations of the cam member which may be generally disc shaped. Preferably, the cam member is provided with means (for example a hexagon head) for engaging a tool (for example a spanner) in order
20 to rotate the cam member. Preferably, the locking members or legs connected to the cam member by way of link arms are so mounted that on one particular direction of rotation of the cam member (for example anti-clockwise) the link arms can move the locking members or legs inwardly towards one
25 another and upwardly towards the bottom of the tapping unit, in use, to attach the unit to the busbar trunking. Each locking member or leg may be connected to a tapping unit by pins received in associated slots.

This Sheet Has Been Replaced

The cam member may comprise a part-circular cam surface (extending for example throughout about 180°) connected to (straight) cam surface portions which each extend for about 90° of rotation and which adjoin at a
5 peak.

The lid interlock device may comprise a rod which is co-operable with the cam member. In one embodiment, the rod has one end thereof spring-loaded into contact with a
10 cam surface of the cam member (said spring loading may be provided by a helical compression spring). In this manner the rotational position of the cam member governs the degree of overlap of the end of the rod in relation to the closed position of the lid on the box unit. Thus, it is
15 envisaged that when one end of the rod engages the peak of the cam member the lid will be free to close on the unit. In this embodiment once the rod has moved just beyond said peak the locking member or legs will be locked "over-centre".

20

Usually the tapping unit will have two opposed locking members or legs provided at one end of the unit with two further opposed locking members or legs being provided at an opposite end of the unit. Rotation of the
25 cam mechanism will usually be arranged to move the locking members or legs only at said one end of the tapping unit. However, said rotation of the cam mechanism may be arranged to move said locking members or legs at said one end together with the further legs at the opposite end of said

unit (or said further legs may be moved by a separate mechanism). Said further legs may or may not be connected by a further cam mechanism to a further lid interlock device at said opposite end.

5

Further according to the present invention there is provided a tapping unit having a plurality of locking members or legs that can be moved into and out of locking engagement with a busbar, said tapping unit having one or
10 more of the following features:-

- (a) Means for moving the locking members or legs inwardly towards one another and upwardly towards the bottom of the tapping unit, substantially simultaneously,
- 15 (b) A cam member arranged to control a lid interlock device on rotation thereof,
- (c) A cam member as in (b) in which said rotation thereof governs the position of the locking members or legs,
- (d) An "over-centre" cam mechanism,
- 20 (e) A cam mechanism arranged to actuate a lid interlock device, said cam mechanism being connected to locking members or legs by means of link arms,
- (f) four locking members or legs movable substantially simultaneously by a connection or cam member to
25 engage or disengage a busbar, said connection or cam member preferably actuating a lid interlock device,
- (g) locking members or legs each connected to the tapping unit by two pin and slot connections and preferably connected together via a connection or cam member,



- (h) Means preventing the locking members or legs from vibrating loose on the busbar.

Further advantageous features of the present invention will now be evident from the following description and drawings.

An embodiment of a tapping unit in accordance with the present invention will now be described, by way of example only, with reference to the accompanying, much simplified, and somewhat schematic drawings in which:

FIGURE 1 shows an end view of the tapping unit which is ready for installation onto busbar trunking;

15

FIGURE 2 shows a view similar to FIGURE 1 but with the tapping unit fully engaged or installed onto the busbar trunking;

20 FIGURE 3 shows an enlarged detail view of a cam member of the tapping unit;

FIGURE 4 shows an end view of a tapping unit similar to FIGURE 1 but with a lid omitted and incorporating a modified lid interlock device;

FIGURE 5 shows a view similar to FIGURE 2 but of the modified arrangement shown in FIGURE 4;

This Sheet Has Been Replaced



FIGURE 6 shows a side view of the tapping unit shown in FIGURE 5;

FIGURE 7 shows a view similar to FIGURE 3 of a modified cam member, and

FIGURE 8 shows a plan view (looking in direction of arrow B) of the cam member shown in FIGURE 7.

10 Referring to FIGURES 1 and 2 of the drawings, a tapping unit or box 1 is generally of a form known per se and may be provided with a hinged lid 2 shown in chain dotted lines. FIGURE 1 shows the tapping box 1 about to be installed or engaged onto a length of busbar trunking 3
15 whereas FIGURE 2 shows the fully installed position of the tapping box on said trunking.

Tapping box 1 includes locking legs 4 and 5 mounted in opposed relationship on a front end 1a of the tapping
20 box 1. It is envisaged that two further locking legs (not shown) will be provided on the tapping box with said two further locking legs mounted in similar fashion as locking legs 4 and 5 on the rear end (not shown) of the tapping box 1.

25

Locking legs 4 and 5 are provided with hook portions or feet 4a, 5a which, as shown more particularly in FIGURE 2, engage tightly over or behind associated busbar flanges 3a and 3b, in the fully installed position (FIGURE 2).

Each locking leg 4,5 is pivotally connected to one end of the longer limb of an L-shaped link arm 6,7. The shorter limb of said link arm 6,7 is in turn pivotally connected to a cam mechanism 8 at opposed diametrical locations of disc-shaped connection or cam member 9 (see FIGURE 3) of said cam mechanism. Rotation of the cam member 9 in the direction of arrow "A" (i.e. anti-clockwise) actuates the link arms 6 and 7 to pull legs 4 and 5 inwardly together and upwardly towards the bottom 1b of tapping box to firmly attach the tapping box 1 to the busbar trunking 3 as shown in FIGURE 2. Movement of the cam member 9 actuates a lid interlock device 10 which prevents or allows the lid 2 to be closed in a manner to be described later.

15

Locking leg 4 is mounted at the bottom left on the front end 1a of the tapping box 1 by means of two vertically spaced pins 11 and 12, the lower pin 12 being offset slightly outwardly of the upper pin 11. The pins 11 and 12 are received in associated slots 13 and 14, the upper slot being shorter than the lower and at a somewhat steeper incline as shown. The pins 11 and 12 extend outwardly from the end wall 1a of the tapping box and are fixed in position. The link arm 6 is pivoted at one end thereof to an upper portion of locking leg 4, the pivotal location 15 being inbetween the two slots 13 and 14 as shown in FIGURES 1 and 2.

Locking legs 4 and 5 are identical and locking leg 5

is mounted onto pins 16 and 17 which locate in associated slots 18 and 19 as shown. Thus the mounting arrangement of locking leg 5 is substantially a mirror image of the mounting arrangement for locking leg 4 apart from the arrangement of the link arms 6 and 7. The locking legs 4 and 5 are arranged in the same vertical plane as one another and the link arms 6 and 7 are arranged in the same vertical plane as one another slightly outward of the legs 4 and 5 and the cam member 9.

10

Cam member 9 is of part circular shape and is fixed to rotate about axis 20 with hexagon head 21 rotatable by means of a spanner or other tool in a manner which should be readily envisaged. The hexagon head 21 is attached to the cam member 9 by means of a short circular shaft (not shown) and indeed the hexagon head 21, short shaft and cam member 9 can be made in one piece. As shown in more detail in FIGURE 3, cam member 9 has a first, semi-circular cam surface portion 9a which smoothly adjoins a second straight cam surface portion 9b which extends for about 90° of rotation and smoothly adjoins an oppositely angled straight cam surface portion 9c which extends for about a further 90° of rotation. Thus, cam portions 9b and 9c form two sides of a squat generally triangular or smoothly peaked profile occupying about 180° of the cam member 9.

The cam surfaces 9a, 9b and 9c are co-operable with the free end of a rod 22 of lid interlock device 10, said rod being mounted in two vertically spaced, right-angled

receiving brackets 23,24 provided with holes through which the interlock rod 22 passes. Thus, the rod 22 is constrained to vertical movement within the brackets 23 and 24. A compression spring 25 is located around the rod 22 inbetween a horizontally extending flange 24a of mounting bracket 24 and an annular collar 22a surrounding rod 22 to thereby bias the rod 22 downwardly so that the bottom free end thereof will engage the cam surface portions 9a,9b,9c of the cam member 9 in a manner which should be evident from the drawings, in order to control the height of the upper end of the rod 22 depending upon the angular position of the cam member 9.

Although the rear end of the tapping box 1 is not shown it could be identical to end 1a having the same cam mechanism, locking legs and lid interlock device as afore-described in relation to front end 1a. Thus, the cam mechanism at the rear may be joined to the cam mechanism on the front and operated simultaneously with the front mechanism using a spanner on the hexagon head 21. Alternatively, it is preferred that the front and rear cam mechanisms are operable independently of one another by separate spanners. However, it is believed that only one lid interlock device is necessary so that no cooperating cam mechanism and rod need be provided on the rear of the tapping box 1. Instead, rotation of the hexagon head 21 may rotate link arms connected to locking legs on the rear of the tapping box as well as the link arms 6 and 7, to lock all four legs onto the busbar substantially

simultaneously but operating only one interlock rod 22.

Installation of the tapping box 1 on the busbar trunking will now be described:-

5

The tapping box 1 is first introduced onto the trunking 3 as shown in FIGURE 1 with the cam member 9 in the angular position shown and the locking legs 4,5 diverging outwardly from one another free of the busbar trunking 3. The rod 22 of the interlock device 10 prevents the lid 2 from being closed by the upper end of the rod engaging a rim of the lid as should be evident from FIGURE 1. The hexagon head 21 can be engaged by a spanner and rotated anti-clockwise in the direction of arrow "A" to pull the locking legs 4 and 5 (and, if desired, locking legs provided on the rear of the tapping box) inwardly and upwardly so that the feet 4a and 5a (and possibly the feet of the other locking legs) move over or behind the flanges 3a and 3b of the busbar trunking 3.

20

As the cam member 9 is rotated from the angular position shown in FIGURE 1, rod 22 begins to move downwardly as the lower end of the rod 22 leaves the initial smooth curvature of the cam surface 9a and contacts the straight inclined cam surface 9b almost until the position as shown in FIGURE 2. Meanwhile, the upper link arm 7 will begin moving over centre to the left of FIGURE 1 with the lower link arm 6 moving over centre to the right. The movement of the locking legs 6,7 is determined by the

co-operation of the pins 11 and 12 with slots 13 and 14 and the co-operation of the pins 16 and 17 with slots 18 and 19. Just as the peak P of the cam surface defined at the junction of cam surfaces 9b and 9c engages the bottom of the locking rod 2, a final incremental step in rotation of cam member 9 in the direction of arrow "A" locks the pivot link arms 6,7 (over centre) as shown more particularly in FIGURE 2 with the opposed, inner, straight edges 6a and 6b engaging the short shaft portion at opposed locations underneath the overlapping diametrically opposed portions of the hexagon head, more particularly as shown in FIGURE 1. This provides a firm clip or snap-over action that helps prevent loosening of the legs 4,5 through any extraneous vibrations of the busbar. It will be observed in this position that the height of the rod 22 has dropped sufficiently to allow the lid to be closed and a protective device e.g. circuit breaker (not shown) to be in the on position and the tapping box energised.

FIGURES 4 to 6 show a modified tapping box 101. The tapping box 101 is similar to tapping box 1 previously described save for a modified lid interlock device 110. In this instance, the spring loaded rod 22 has been replaced by a long L-shaped strip of sheet steel with the bottom portion 110a of the L-shaped strip 110 resting on the appropriate cam surface 9a,9b or 9c of cam member 9 depending upon the annular position of the cam member. Thus, the flat L-shaped strip 110 can rest substantially flush with the end 101a of the tapping box 101 and said

strip 110 need not be spring-loaded onto the cam member. The strip 110 may be retained to the end 101a of the tapping unit 101 by way of appropriate screw fasteners (not shown) fitted through elongate slots 110b and 110c as
5 shown. Thus the strip 110 will have a limited range of motion in a vertical direction governed by the slots 110b and 110c. The tapping unit 101 can be connected to the busbar trunking 103 in a similar manner as tapping unit 1, the only difference in the arrangement being in the form of
10 rod interlock device.

FIGURES 7 and 8 show views of a modified cam member 109 with integral hexagon head 121 and it is believed that this form of cam member is particularly advantageous with
15 the L-shaped strip interlock device 110. As will be evident by comparing FIGURES 3 and 7 (drawn to a different scale) cam surface 109b is now shorter than cam surface 109c whilst cam surface 109a is of similar length to cam surface 9a of cam member 9. Thus the peak P' defined
20 between cam surfaces 109b and 109c is now offset somewhat to the left as shown in FIGURE 7 yielding an asymmetrical appearance to the cam member 109. It has been found that the design of cam member 109 shown in FIGURE 7 allows the lid interlock device (more particularly the strip 110) to
25 move more smoothly into and out of the upper and lower height positions occupied by the strip 110, said strip offering less resistance to movement of the cam member than would otherwise be the case.

It is to be understood that the scope of the present invention is not to be unduly limited by the particular choice of terminology and that a specific term may be replaced or supplemented by any equivalent or generic term.

5 Further it is to be understood that individual features, method or functions related to the tapping unit, cam mechanism, lid interlock device, or locking arrangement or parts thereof alone or in combination might be individually patentably inventive. The singular may include the plural

10 or vice versa. In particular, any disclosure in this specification of a range for a variable or parameter shall be taken to include a disclosure of any selectable or derivable subrange within that range and shall be taken to include a disclosure of any value for the variable or

15 parameter found within or at an end of the range.

20

25

CLAIMS

1. A tapping unit having a plurality of locking members or legs provided with hook portions or feet that can be moved into and out of locking engagement with a busbar, said locking members or legs being connected to an over-centre cam mechanism, said cam mechanism being rotatable to move the locking members or legs inwardly and upwardly towards a bottom of the tapping box and outwardly and downwardly away from the bottom of the tapping box, depending upon the direction of rotation of the cam mechanism, said cam mechanism being co-operable with a lid interlock device preventing or allowing a lid of the tapping box to be closed depending upon the position of a cam member of said cam mechanism.

2. A tapping unit as claimed in Claim 1 in which the lid is connected to the tapping unit by a hinge connection.

3. A tapping unit as claimed in Claim 1 or Claim 2 in which each locking member or leg is pivotally connected to one end of an associated link arm which is in turn connected to the cam mechanism.

4. A tapping unit as claimed in Claim 3 in which each link arm is generally L-shaped with a shorter limb of said link arm being connected in each case to the cam mechanism.

5. A tapping unit as claimed in Claim 4 in which said

This Sheet Has Been Replaced





pivotal connections are at opposed diametrical locations of the cam member.

6. A tapping unit as claimed in any one of the preceding
5 claims in which the cam member is generally disc shaped.

7. A tapping unit as claimed in any one of the preceding claims in which the cam member is provided with means for engaging a tool in order to rotate the cam member.

10

8. A tapping unit as claimed in Claim 3 or any claim dependent thereon in which the locking members or legs connected to the cam member by way of link arms are so mounted that on one particular direction of rotation of the
15 cam member the link arms can move the locking members or legs inwardly towards one another and upwardly towards the bottom of the tapping unit, in use, to attach the unit to the busbar trunking.

20 9. A tapping unit as claimed in Claim 8 in which each locking member or leg is connected to the tapping unit by pins received in associated slots.

10. A tapping unit as claimed in any one of the preceding
25 claims in which the cam member comprises a part-circular cam surface connected to cam surface portions which each extend for about 90° of rotation and which adjoin at a peak.

This Sheet Has Been Replaced





11. A tapping unit as claimed in Claim 10 in which the part-circular cam surface extends for about 180° and the cam surface portions are straight.

5 12. A tapping unit as claimed in any one of the preceding claims in which the lid interlock device comprises a rod which is co-operable with the cam member.

10 13. A tapping unit as claimed in Claim 12 in which the rod has one end thereof spring-loaded into contact with a cam surface of the cam member.

14. A tapping unit as claimed in Claim 13 in which said spring loading is provided by a helical compression spring.
15

15. A tapping unit as claimed in Claim 12 or Claim 13 in which once the rod has moved just beyond said peak the locking member or legs are locked over-centre.

20 16. A tapping unit as claimed in any one of the preceding claims in which the tapping unit has two opposed locking members or legs provided at one end of the unit with two further opposed locking members or legs being provided at an opposite end of the unit.

25

17. A tapping unit as claimed in Claim 16 in which rotation of the cam mechanism is arranged to move the locking members or legs only at said one end of the tapping unit.

This Sheet Has Been Replaced



18. A tapping unit as claimed in Claim 16 in which said rotation of the cam mechanism is arranged to move said locking members or legs at said one end together with the further legs at the opposite end of said unit.

5

19. A tapping unit as claimed in Claim 16 in which said rotation of the cam mechanism is arranged to move said locking members or legs at said one end with said further legs being moved by a separate mechanism.

10

20. A tapping unit as claimed in Claim 18 or Claim 19 in which the further legs are connected by a further cam mechanism to a further lid interlock device at said opposite end.

15

21. A tapping unit substantially as herein described with reference to FIGURES 1 to 3 of the accompanying drawings or when modified substantially as in FIGURES 4,5 and 6 or when modified to include the cam member substantially as shown 20 in FIGURES 7 and 8.

22. A locking arrangement for locking a tapping unit to a busbar, said arrangement comprising a plurality of locking members or legs mounted, in use, on said unit and movable 25 into and out of locking engagement with a busbar, said legs being movable together inwardly and upwardly towards a bottom of the unit by movement of a connection or cam member of said arrangement.

This Sheet Has Been Replaced





23. An arrangement as claimed in Claim 22 in which said movement of said connection or cam member is a rotational movement.

5 24. An arrangement as claimed in Claim 22 or Claim 23 in which said connection or cam member is co-operable with a lid interlock device.

25. An arrangement as claimed in any one of Claims 22 to
10 24 in which each locking member or leg is pivotally connected to one end of an associated link arm which is in turn connected to the connection or cam member.

26. An arrangement as claimed in Claim 25 in which each
15 link arm is generally L-shaped with a shorter limb of said link arm being connected in each case to the connection or cam member.

27. An arrangement as claimed in Claim 26 in which said
20 pivotal connections are at opposed diametrical locations of the connection or cam member.

28. An arrangement as claimed in any one of the preceding
claims in which the connection or cam member is generally
25 disc shaped.

29. An arrangement as claimed in any one of the preceding claims in which the connection or cam member is provided with means for engaging a tool in order to rotate the





WO 97/12434

21

PCT/GB96/02345

connection or cam member.

30. An arrangement as claimed in Claim 25 or any claim dependent thereon in which the locking members or legs
5 connected to the connection or cam member by way of link arms are so mounted that on one particular direction of rotation of the connection or cam member the link arms can move the locking members or legs inwardly towards one another and upwardly towards the bottom of the tapping
10 unit, in use, to attach the unit to the busbar.

31. An arrangement as claimed in Claim 30 in which each locking member or leg is connected, in use, to the tapping unit by pins received in associated slots.

15

32. An arrangement as claimed in any one of claims 22 to 31 in which the connection or cam member comprises a part-circular cam surface connected to cam surface portions which each extend for about 90° of rotation and which
20 adjoin at a peak.

33. An arrangement as claimed in Claim 32 in which the part-circular cam surface extends for about 180° and the cam surface portions are straight.

25

34. An arrangement as claimed in claim 24 or any claim dependent therefrom in which the lid interlock device comprises a rod which is co-operable with the connection or cam member.

This Sheet Has Been Replaced





35. An arrangement as claimed in Claim 34 in which the rod has one end thereof spring-loaded into contact with a cam surface of the cam member.
- 5 36. An arrangement as claimed in Claim 35 in which said spring loading is provided by a helical compression spring.
37. An arrangement as claimed in Claim 34 or Claim 35 in which once the rod has moved just beyond said peak the
10 locking member or legs are locked over-centre.
38. An arrangement as claimed in Claim 25 and substantially as herein described with reference to the accompanying drawings.
- 15 39. A cam mechanism for actuating a lid interlock device on a tapping unit, said cam mechanism preferably being an over centre mechanism and having a cam member with a cam surface co-operable with an interlock rod of said lid
20 interlock device, said rod being movable relative to the unit on rotation of said cam member, to thereby prevent or allow closure of a lid of the tapping unit depending upon the position of the rod.
- 25 40. A cam mechanism as claimed in Claim 39 and substantially as herein described with reference to FIGURE 3, or FIGURES 7 and 8 of the accompanying drawings.
41. A tapping unit having a plurality of locking members





WO 97/12434

PCT/GB96/02345

23

or legs that can be moved into and out of locking engagement with a busbar, said tapping unit having one or more of the following features:-

- 5 (a) Means for moving the locking members or legs inwardly towards one another and upwardly towards the bottom of the tapping unit, substantially simultaneously,
- (b) A cam member arranged to control a lid interlock device on rotation thereof,
- 10 (c) A cam member as in (b) in which said rotation thereof governs the position of the locking members or legs,
- (d) An over-centre cam mechanism,
- (e) A cam mechanism arranged to actuate a lid interlock device, said cam mechanism being connected to locking
- 15 members or legs by means of link arms,
- (f) four locking members or legs movable substantially simultaneously by a connection or cam member to engage or disengage a busbar, said connection or cam member preferably actuating a lid interlock device,
- 20 (g) locking members or legs each connected to the tapping unit by two pin and slot connections and preferably connected together via a connection or cam member,
- (h) Means preventing the locking members or legs from vibrating loose on the busbar.

25

This Sheet Has Been Replaced