July 15, 1958 H. C. WINKEL ET AL 2,843,072

ADJUSTABLE COMB STRUCTURE

Filed Sept. 22, 1955 2 Sheets-Sheet 1

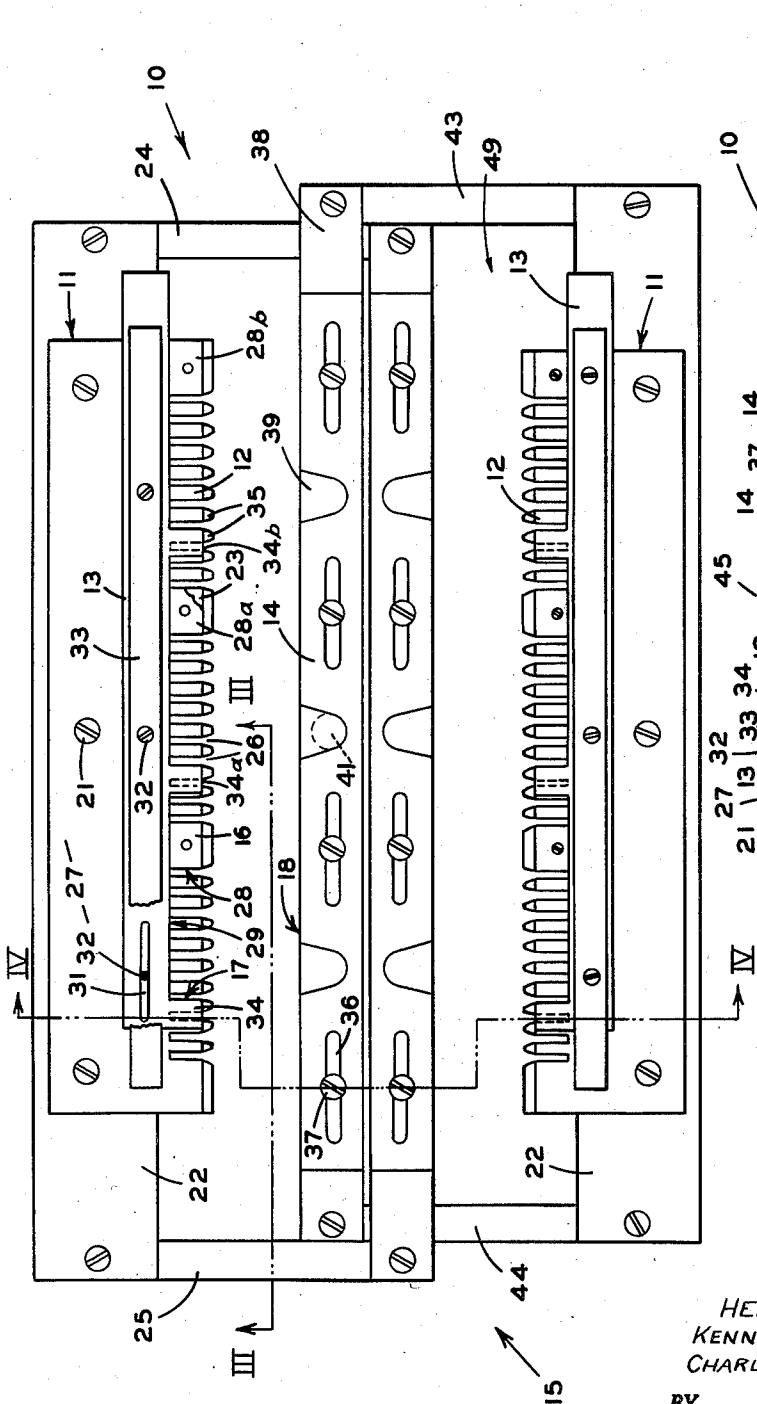


Fig. 1

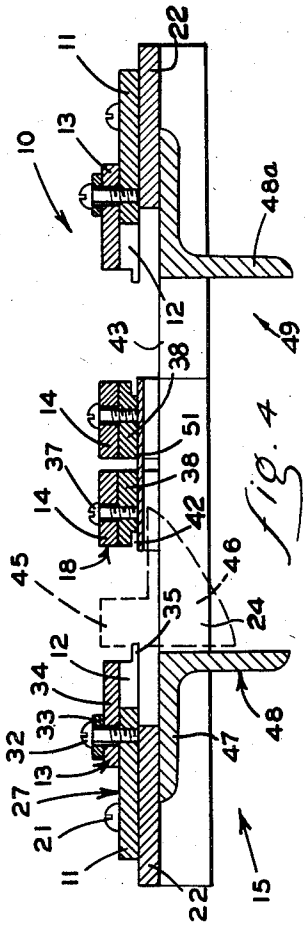


Fig. 4

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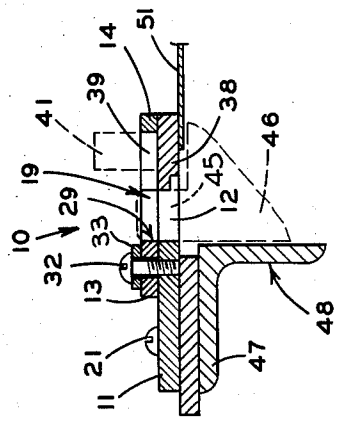


Fig. 5

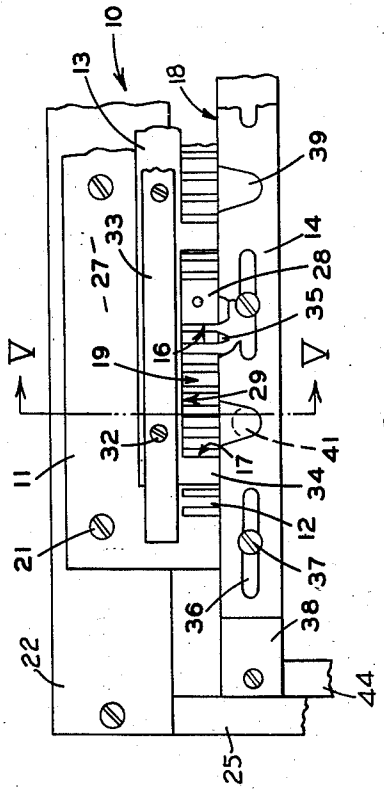


Fig. 2

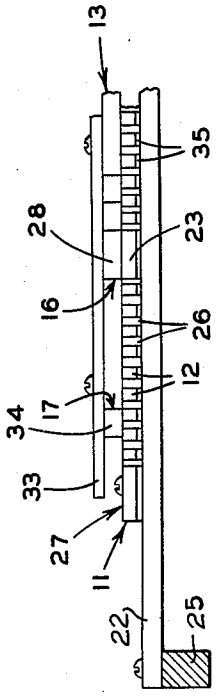


Fig. 3

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ADJUSTABLE COMB STRUCTURE

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Application September 22, 1955, Serial No. 535,938

7 Claims. (Cl. 113—99)

This invention relates in general to a machine or fixture for positioning and holding the plates and posts of a battery preparatory to fusing or "burning" them together and, more particularly, to an adjustable comb for said machine whereby various numbers of said plates can be held in predetermined positions with respect to each other and within said machine.

A machine of the general type referred to herein is disclosed in the co-pending patent application Serial No. 232,215, filed June 18, 1951, now Patent No. 2,759,445, issued August 21, 1956. In this and other similar machines presently used, insofar as we are aware, for fusing or "burning" together the lugs and posts of a battery, the plate positioning combs must be removed and changed each time the number of plates per group is changed. In substance, this means that a separate pair of plate combs, one comb for the negative plates and one for the positive plates, must be provided for each different battery group size, that is, 11, 13, 15, etc. plates per group.

Particularly in the case of small manufacturers, many time consuming changes of the comb members are often required during a short period of operation. Also, to have a complete set of such combs available for all the various sizes of battery plate groups requires a substantial inventory of parts. Furthermore, the unused pairs of plate combs may become damaged by the frequent changes or mislaid and thereby create an additional loss of time in effecting such changes.

Accordingly, a primary object of this invention has been the provision of a single pair of plate positioning combs for a battery plate holding and burning machine, which combs can be used satisfactorily with various sizes of battery plate groups and which combs are constructed so that the number of exposed teeth in said combs can be increased or decreased quickly and effectively without removing the combs from the machine.

A further object of this invention has been the provision of plate positioning combs, as aforesaid, wherein the adjustable feature can be adapted for use on machines of this general type presently in use without material change in said machines.

A further object of this invention is the provision of an adjustable plate positioning comb which is simple to operate, easy to manufacture, and which produces results which are at least as good as those produced by plate positioning combs presently in use.

Other objects and purposes of this invention will become apparent to persons familiar with this type of equipment upon reading the following specification and examining the accompanying drawings, in which:

Figure 1 is a fragmentary top plan view of a portion of a battery plate holding and burning machine, including the plate positioning comb to which this invention relates.

Figure 2 is a fragmentary view of Figure 1 with the plate and post positioning members in the closed position.

Figure 3 is a sectional view taken along the line III—III of Figure 1.

Figure 4 is a sectional view substantially as taken along the line IV—IV of Figure 1.

Figure 5 is a sectional view substantially as taken along the line V—V of Figure 2.

For the purpose of convenience in description, the terms "upper," "lower," "leftward," "rightward" and derivatives thereof, will be used herein with reference to the invention and parts associated therewith as appearing in Figure 3. The terms "inner," "outer," and derivatives thereof, will have reference to the geometric center of said machine and parts thereof. For a full disclosure of the general type of machine with which the plate positioning combs are advantageously used, reference is again made to the co-pending application Serial No. 232,215.

In general

In order to meet the objects and purposes of this invention, as well as others related thereto, we have provided a plate positioning revice **10** (Figure 1) comprised of a plate positioning comb **11**, having a plurality of teeth **12**, an adjustment bar **13** disposed upon the upper surface of the plate positioning comb **11**, and a post positioning member **14** parallel with, and opposed to, the inner edge of said bar. Means (not shown) is provided for moving said comb **11** and said post positioning member toward and away from each other. Said positioning device is mounted upon a battery plate and post burning machine or fixture **15**. The relative positions of the comb **11** and bar **13** determine the number of plates which can be fused at one time in a given group.

Detailed construction

As shown in Figures 1 and 4, the plate positioning comb **11** of the device **10** is removably secured, as by the bolts **21**, upon the elongated, comb supporting element **22**, which runs lengthwise of the burning machine **15**. Said element **22** is preferably mounted at its ends upon a pair of transverse bars **24** and **25** which are slidably supported upon said machine **15** by means not shown.

The plate positioning comb **11**, which is preferably fabricated from a bar of steel, has a plurality of substantially uniform, parallel slots **26** in the inner edge thereof which separate the teeth **12**. Said teeth are divided into groups, usually of equal numbers of teeth in each group, by providing an oversized tooth **23** at uniform intervals in said teeth **12** between each said group. The upper surface of said teeth **12** lies substantially within the plane defined by the upper surface **27** of the comb **11**. A fixed end block **28** is secured to, and extends upwardly from, the upper surface of each oversized tooth **23**. The blocks **28** may be integral with said comb **11** but are preferably riveted to the oversized teeth **23**. The teeth **12**, including the oversized teeth **23**, are preferably of substantially the same length and co-extensive from the positioning comb **11**. Thus, the blind or outer ends of the slots **26** are aligned along the body part of the positioning comb **11**.

The elongated adjustment bar **13** is mounted upon the comb **11** lengthwise thereof, with its inner edge **29** adjacent to the blind ends of the slots **26**. Said bar **13** is provided with a plurality of lengthwise slots **31** through which the adjustment bolts **32** extend for engagement with the comb **11** to permit selected lengthwise movement of said bar **13** along said comb **11**. A gripping strip **33** having suitable openings therethrough, through which the adjustment bolts **32** extend, is mounted upon the adjustment bar **13** for maintaining the proper positioning of said adjustment bar **13** upon the comb **11** after said bar has been adjusted.

The adjustment bar **13** is provided with a plurality of uniformly spaced and inwardly extending, movable end blocks **34**, the inner edges of which are flush with the inner edges of the teeth **12**. The distance between corresponding sides of the adjacent, movable end blocks

34 is substantially identical to the distance between corresponding sides of the oversized teeth 23. In this particular embodiment, the movable end blocks 34 are disposed leftwardly of their corresponding fixed end blocks 28, as shown in Figure 1. Also as shown in Figure 1, there are three pairs of fixed and movable blocks indicated at 28 and 34, 28*a* and 34*a*, and 28*b* and 34*b*, respectively, in this embodiment of our invention. Each pair of fixed and movable blocks have opposing side walls 16 and 17, respectively. As shown in Figures 1 and 4, each tooth 12, including the oversized teeth 23, is provided with a thin, tapered extension 35 adjacent to the lower surface of said teeth for reasons appearing hereinafter.

The elongated, post positioning member 14, which is preferably parallel, and substantially co-planar, with the adjustment bar 13, is provided with a plurality of elongated openings 36 extending lengthwise of said member 14, through which adjustment bolts 37 are slidably received for threaded engagement with the positioning member support 38. Said post positioning member 14 is provided with a plurality of recesses 39 in its outer edge 18 in which posts 41, shown in Figures 1 and 5 in broken lines, are disposed prior to the burning operation. The support member 38 (Figure 4) is preferably substantially co-planar with the positioning comb 11 and is provided with a rabbeted recess 42 in its lower outer edge for reception of the teeth extensions 35. The support member 38 is mounted at its opposite ends upon transverse bars 43 and 44, which are slidably supported upon the machine 15 by means not shown.

The plate positioning comb 11, the bar 13 and the post positioning member 14 cooperate to provide a burning zone or well 19 (Figures 2 and 5), defined by the inner edge 29 of the bar 13, the opposing faces 16 and 17 of the blocks 28 and 34, respectively, the outer edge 18 of the post positioning member 14 and the upper surface of the teeth 12. The recesses 39 in said member 14 communicate with said zone 19, into which the lugs 45 (Figure 5) of the battery plates 46 extend to close the slots 26.

In a machine of the type disclosed in the co-pending application Serial No. 232,215, an above described positioning device 10 must be provided on each side of the machine 15 (Figure 1), one being for the positive plates and the other for the negative plates. However, since these devices may be substantially identical for the negative and positive plates, one pair only of said devices is described in detail herein. For illustration of both pairs of said units, reference may be made to Figures 1 and 4, as well as to the detailed drawings in said co-pending application Serial No. 232,215.

The comb supporting element 22 (Figure 4) may be supported upon the horizontal flange 47 of an angle iron 48 comprising one wall of the battery plate compartment 49 of said machine 15. The positioning member support 38 may be slidably supported in part upon an upper plate limiting member 51 (Figures 4 and 5), which is in turn supported along with the angles 48 and 48*a* as part of the general frame of a burning machine, said machine not being shown herein in full but being fully disclosed in the co-pending application Serial No. 232,215.

Operation

As shown in Figures 1, 2, 3 and 4, the plate positioning comb 11 of the plate positioning device 10 is mounted upon the comb supporting element 22, which is in turn reciprocally mounted upon the burning machine 15 for movement toward and away from the centerline thereof. The post positioning member support 38, which supports the post positioning member 14, is also reciprocally supported upon the burning machine 15 for movement toward and away from the centerline of said machine, hence toward and away from the plate positioning comb 11. The post positioning member 14 and its support 38 form a part of the plate positioning device 10, as shown in Figure 5, in that they engage the inner edges of the lugs 45 on the battery plates 46, thereby holding said lugs snugly within the slots 26 in the plate positioning comb 11.

Prior to the insertion of said lugs 45 into said slots 26 between the teeth 12, the adjustment bar 13, to which the movable end blocks 34 are secured, must be properly positioned for the correct and desired number of positive, or negative, plates in the particular plate group desired. This is accomplished by loosening the adjustment bolts 32 and moving the adjustment bar in a lengthwise direction along the plate positioning comb 11 until exactly the proper number of slots 26 remain open between each pair of movable and fixed end blocks 34 and 28, respectively. The number of slots 26 left open between each pair of movable and fixed end blocks will preferably be the same. When the proper adjustment has been made, the bolts 32 are tightened down upon the gripping strip 33, thereby rigidly securing the adjustment bar 13, hence the movable end blocks 34, in fixed position with respect to the plate positioning comb 11, hence with respect to the fixed end blocks 28. The post positioning member 14 may be adjusted in a lengthwise direction in a similar manner upon the positioning member support 38 to place the post recesses 39 in proper registry with the zone 19.

As shown in Figures 1, 2, 3 and 5, the adjustment bar 13, the movable end blocks 34, the fixed end blocks 28, and the post positioning member 14 combine, when said plate positioning comb and post positioning member are in their closed position, as shown in Figure 2, to provide a retaining wall around the zone or well 19. Molten lead, or the like, is then placed in said well to fuse the lugs 45 and the posts 41 together. The general procedure for burning or fusing the lugs and posts together is substantially well known in the art.

When it becomes necessary or desirable to change the setting of the plate positioning device 10, such may be easily and quickly accomplished by loosening the adjustment bolts 32, resetting the adjustment bar 13 to leave the desired number of slots 26 open between the fixed and movable end blocks 28 and 34, respectively, and then retightening the adjustment bolts 32. Repositioning of the post positioning member 14 may be accomplished, if required or desired, by loosening and then retightening its adjustment bolts 37. Thus, it will be seen that one pair of plate positioning devices 10, including a pair of corresponding positioning members 14, can be utilized to provide the same flexibility formerly obtained only by having a separate pair of plate positioning combs 11 and corresponding post positioning member 14 for each plate group size used in the various types of batteries. The economic and operational advantages of my single, adjustable plate positioning device over the multiple unit arrangements presently in use are believed self-evident.

Although a particular, preferred embodiment of our invention has been disclosed hereinabove for illustrative purposes, it will be understood that variations or modifications thereof within the scope of such disclosure are fully contemplated unless specifically stated to the contrary in the appended claims.

We claim:

1. In a plate burning fixture having a plate compartment, means for positioning battery plate lugs with respect to each other in said compartment, comprising in combination: a plate having a straight edge, said plate having a series of substantially evenly spaced, parallel slots in, and extending perpendicular to said straight edge; said straight edge having an unslotted portion; a bar overlying said plate, said bar having a block extending parallel with, and overlying, at least one slot in said first plate; means mounting said bar for movement with

respect to said plate in a direction parallel with the plane of the plate and perpendicular to said slots; means for locking said bar in position with respect to said plate, with said block positioned a predetermined distance from said unslotted portion for receiving a predetermined number of battery plates into the slots therebetween; a positioning member support parallel with and spaced from said plate, said positioning member and said plate being mounted for relative movement toward and away from each other; a post positioning member mounted on said positioning member support for adjustable sliding movement thereon in a direction perpendicular to said slots, said post positioning member having a post receiving recess therein; and means for locking said post positioning member in selected positions on said positioning member support.

2. The combination of claim 1, including an elongated slot in said bar extending perpendicular to said slots in said plate, said means for locking including means extending through said slot in said bar and releasably secured to said plate.

3. In a plate burning fixture having a plate compartment, means for positioning battery plate lugs with respect to each other in said compartment, comprising in combination; a pair of spaced plates having opposed straight edges, said pair of plates having a series of evenly spaced, parallel slots in, and extending perpendicular to, said straight edges, each slot in one of said pair of plates being aligned with a corresponding slot in the other plate; each of said plates having an unslotted portion, said unslotted portions being aligned; a pair of bars, each bar, respectively, overlying one plate of said pair of plates; said pair of bars having opposed, straight edges, said edges each having a block extending therefrom toward the corresponding straight edge on the other bar, said blocks being aligned and each block being parallel with, and overlying, at least one slot in its associated plate; means mounting each of said bars for movement with respect to its associated plate in a direction parallel with the plane of its associated plate and perpendicular to said slots; means for locking each of said bars in position with respect to its associated plate; a positioning member support parallel with, and spaced from each of said plates, each of said positioning member supports being mounted for relative movement with respect to its associated plate toward and away therefrom; a post positioning member mounted on each of said positioning member supports for adjustable sliding movement thereon in a direction perpendicular to said slots, said post positioning members each having a post receiving recess therein; and means for locking said post positioning members in selected positions on said positioning member supports.

4. In a plate burning fixture having a plate compartment, means for positioning battery plate lugs with respect to each other in said compartment, comprising in combination: a pair of spaced plates having opposed straight edges, said pair of plates having a series of evenly spaced, parallel slots in and extending perpendicular to said straight edges, each slot in one of said pair of plates being aligned with a corresponding slot in the other plate; each of said plates having a plurality of unslotted portions, said unslotted portions in each plate being equally spaced, each unslotted portion in one plate being aligned with a corresponding unslotted portion in the other plate, equal numbers of slots being provided in each plate between said unslotted portions; a pair of bars, each bar, respectively, overlying one plate of said pair of plates; said pair of bars having opposed, straight edges, each of said bars having a plurality of blocks extending from the straight edge thereof toward the corresponding straight edge of the other bar, each of said blocks on one of the bars being aligned with a corresponding block on the other of said bars and each block being parallel with and overlying at least one slot in its associated plate, adjacent blocks on said bars being spaced from each other the same distance as the spacing between adjacent unslotted portions on said plates; means mounting each of said bars for movement with respect to its associated plate in a direction parallel with the plane of its associated plate and perpendicular to said slots; means for locking each of said bars in position with respect to its associated plate; a positioning member support parallel with and spaced from each said plate, each of said positioning member supports being mounted for relative movement with respect to its associated plate toward and away therefrom; a post positioning member mounted on each of said positioning member supports for adjustable sliding movement thereon in a direction perpendicular to said slots, said post positioning members having a plurality of post receiving recesses therein, said recesses being equal in number to the number of blocks on each of said bars and being spaced apart the same distance as said blocks; and means for locking said post positioning members in selected positions on said positioning member supports.

5. The combination of claim 4, including an elongated slot in each of said bars extending perpendicular to said slots in its associated plate, a second pair of plates, each plate of said second pair overlying the elongated slot in one of said bars; and threaded means extending through each plate of said second pair, its associated elongated slot and its associated plate of said first pair, for removably locking each of said bars in position.

6. In a plate burning fixture having a plate compartment, means for positioning battery plate lugs with respect to each other in said compartment, comprising in combination: a first pair of coplanar, spaced plates having opposed straight edges, each of said plates having a plurality of sets of evenly spaced, parallel slots in, and extending perpendicular to, said straight edge; said sets of slots being separated by equally spaced, unslotted portions of said edge, each set containing equal numbers of slots, said unslotted portions and said slots in said first pair of plates being aligned; a bar mounted on each of said plates for adjustable sliding movement thereon in a direction parallel with the plane of said plates and perpendicular to said slots, each of said bars having a plurality of evenly spaced blocks thereon extending toward the other bar and overlying at least one slot in each of said pair of plates; adjacent blocks on each bar being spaced from each other the same distance as the spacing of said unslotted portions, each block on each bar being aligned with a corresponding block on the other bar; a positioning member support parallel with, and spaced from, each of said plates; means mounting each of said positioning member supports for movement toward and away from its associated plate, each of said positioning member supports having a post-positioning member thereon, said post-positioning members being mounted for adjustable, sliding movement on said positioning member supports in a direction perpendicular to said slots; said post-positioning members having a plurality of post-receiving recesses therein, said recesses being equal in number to the number of blocks and being spaced apart the same distance as said blocks; means for locking said bars in selected positions on said plates; and means for locking said post-positioning members in selected positions on said positioning member supports.

7. The combination of claim 6 wherein said positioning member supports are coplanar with said plates and have recesses for receiving the teeth defined by said slots, said post-positioning members being coplanar with said bars.

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