Apr. 24, 1923. 1,453,175

J. E. PERRAULT

GRINDING MACHINE

Filed Feb. 17, 1922 4 Sheets-Sheet 1

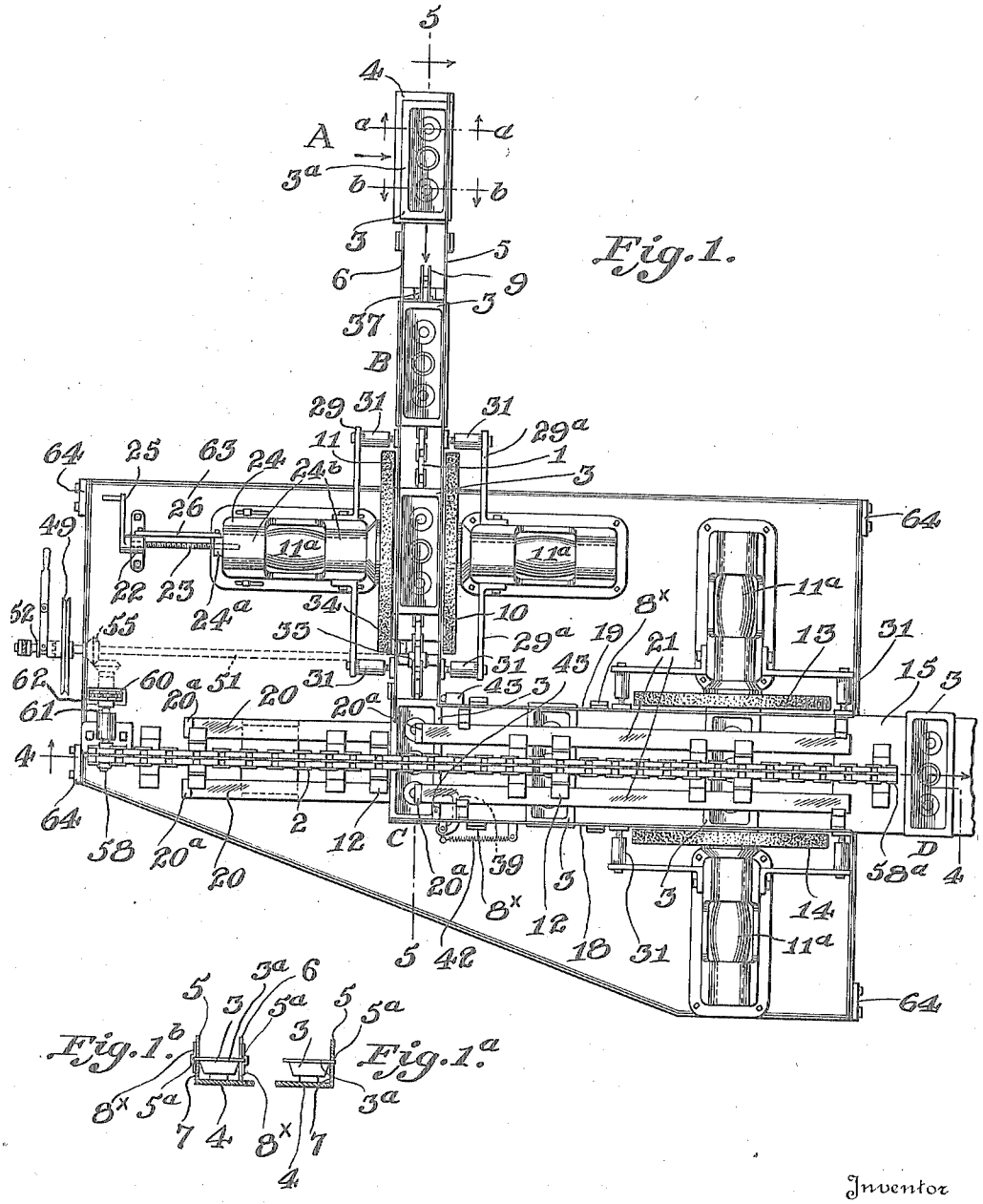


Fig. 1.

Fig. 1b. Fig. 1a.

Inventor

Joseph E. Perrault

By Thos. Middleton Donaldson & Hall

Attorneys

Apr. 24, 1923. 1,453,175

J. E. PERRAULT

GRINDING MACHINE

Filed Feb. 17, 1922 4 Sheets-Sheet 2

Fig. 2.

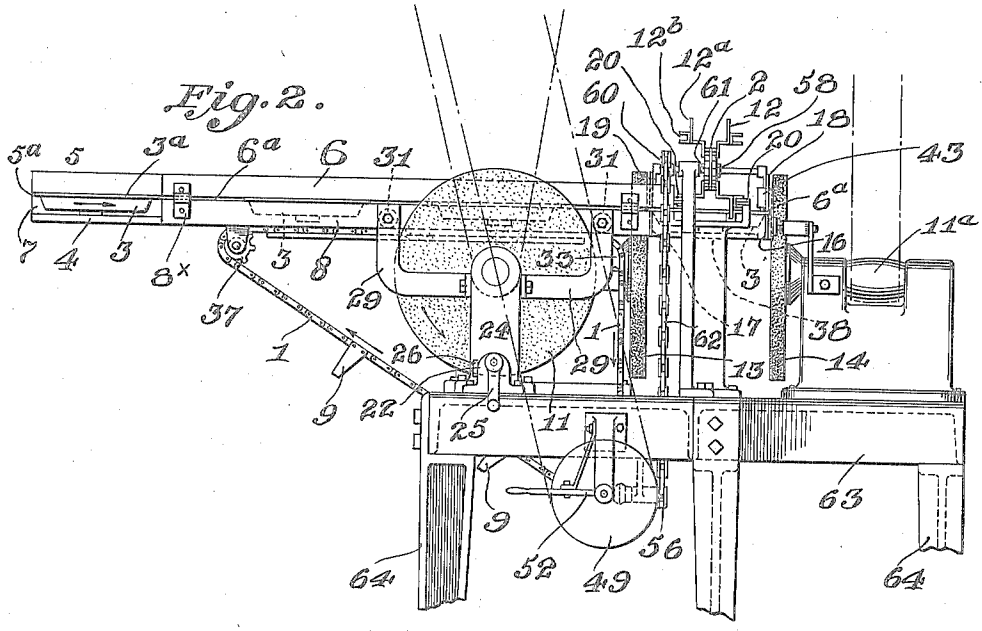
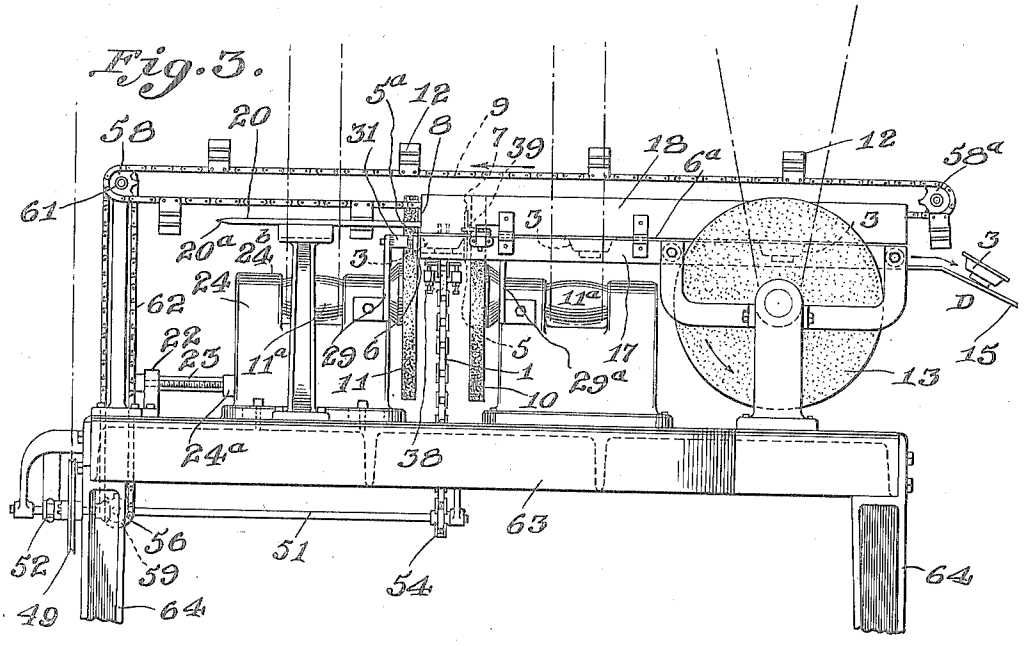


Fig. 3.



Inventor

Joseph E. Perrault

By Shan Middleton Donaldson & Hall

Attorneys

Apr. 24, 1923. 1,453,175

J. E. PERRAULT

GRINDING MACHINE

Filed Feb. 17, 1922 4 Sheets-Sheet 3

Fig. 4.

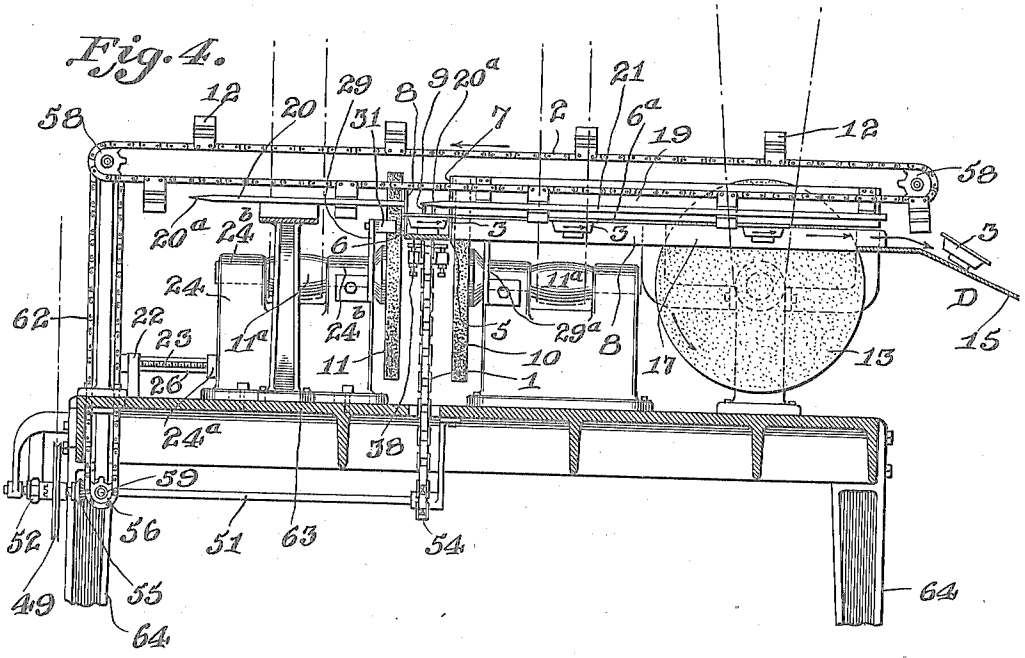
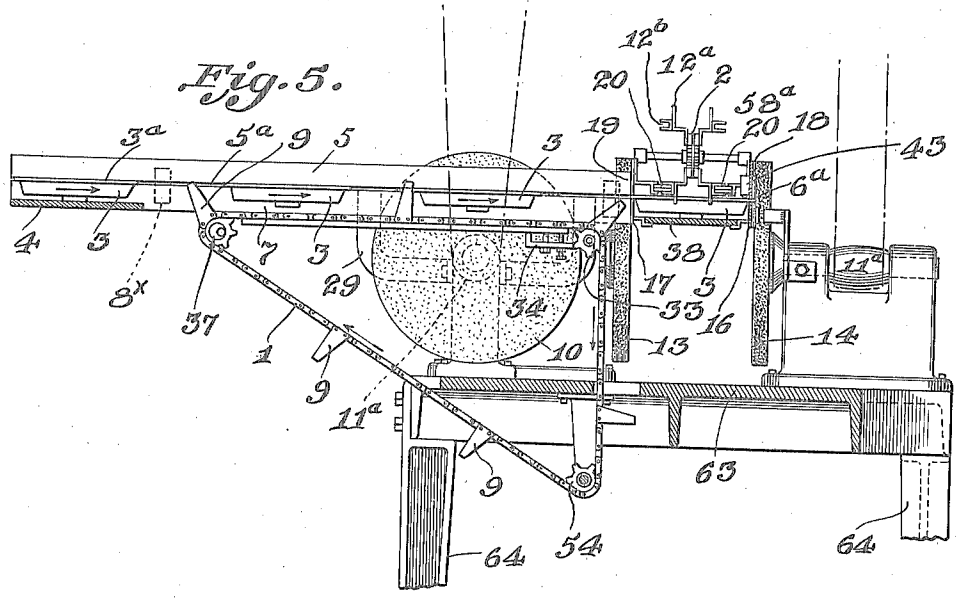


Fig. 5.



Inventor

Joseph E. Perrault

By Spear Middleton Donaldson & Hall

Attorneys

Apr. 24, 1923. 1,453,175

J. E. PERRAULT

GRINDING MACHINE

Filed Feb. 17, 1922 4 Sheets-Sheet 4

Fig. 6.

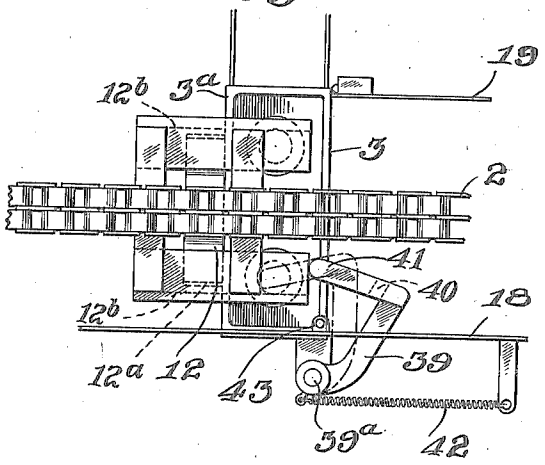


Fig. 7.

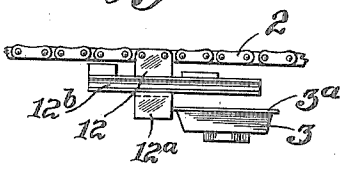


Fig. 8.

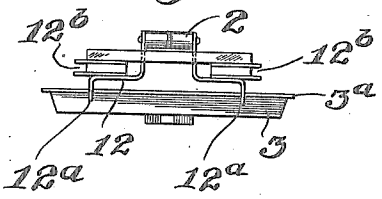


Fig. 9

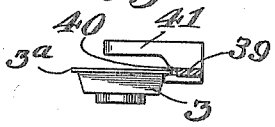


Fig. 10.

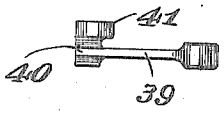


Fig. 11.

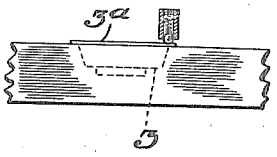


Fig. 12.

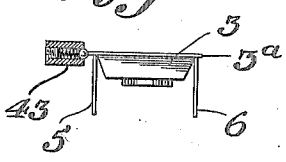


Fig. 13.

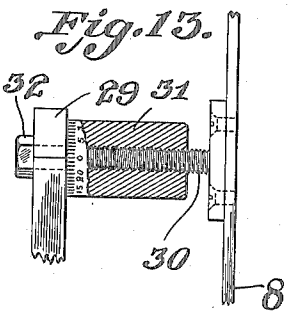
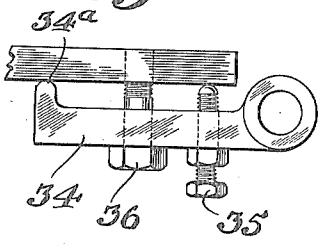


Fig. 14.



Inventor

Joseph E. Perrault

By Spear Middleton Donaldson & Hall

Attorneys

Patented Apr. 24, 1923. 1,453,175

UNITED STATES PATENT OFFICE.

JOSEPH E. PERRAULT, OF WATERTOWN, MASSACHUSETTS, ASSIGNOR TO HOOD RUBBER COMPANY, OF WATERTOWN, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

GRINDING MACHINE.

Application filed February 17, 1922. Serial No. 537,269.

To all whom it may concern:

Be it known that I, JOSEPH E. PERRAULT, a citizen of the United States, and a resident of Watertown, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Grinding Machines, of which the following is a specification.

My present invention relates to improvements in the art of grinding the edges or sides of rectangular objects, such, for example, as the hard rubber covers of battery boxes or cells, and, though not limited to this specific use, is, for convenience, illustrated and described herein in this connection.

The invention aims to provide apparatus by which such articles may expeditiously, accurately, and economically be ground or trued with a minimum amount of manual work or attention.

With such and other objects in view, the invention includes the novel features of construction and arrangement and combination of parts hereinafter described, the nature and scope of said invention being defined by the claims appended to the following description.

What I regard at present as the preferred embodiment of my invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a plan view of apparatus designed for grinding the edges of hard rubber battery box covers;

Fig. 1ª is a section on line *a*—*a* of Fig. 1;

Fig. 1ᵇ is a section on line *b*—*b* of Fig. 1;

Fig. 2 is a front view;

Fig. 3 is an end view;

Fig. 4 is a section on line 4—4 of Fig. 1;

Fig. 5 is a section on line 5—5 of Fig. 1, and

Figs. 6 to 14 are detail views.

Referring by reference characters to these drawings, in which similar letters or numbers indicate the same parts wherever used, the numerals 1 and 2 designate the primary and secondary coveying or transporting elements which are shown as in the form of endless chains or conveyors, the chain 1 conveying the covers from a feed station in a rectilinear path between a pair of primary grinding discs or devices, by which two of the edges are accurately ground in parallelism, and the chain 2 conveying them in a rectilinear path at right angles to the first named path and between a pair of secondary grinding discs or devices by which the remaining two edges are similarly ground or trimmed. The covers are designated by the numerals 3, 3, etc., and they may be supplied to the machine in any suitable manner, conveniently by placing them successively by hand in inverted position on a supporting plate or table 4 (Figs. 1ª and 1ᵇ) and the flange 3ª at one side edge being inserted in the guide slot or space 5ª between the lower and upper guide rails 5 and 7, which guide rails extend past the primary grinding discs as hereinafter described. Opposed to guide rails or bars 5 and 7, or upon the opposite side of the primary conveyor chain 1, is a second pair of guide rails or bars 6 and 8, spaced apart to provide an intervening guide slot 6ª to admit the opposite edge flange of the cover, it being observed that the guide rails or bars 6 and 8 begin at the delivery end of the table or plate 4, so that the cover may be placed upon the table from position A in Fig. 1, and shoved laterally in the direction of the horizontal arrow, Fig. 1, until its advanced edge flange engages guide slot 5ª, and then moved longitudinally to cause the body of the cover to pass between the two pairs of guide bars and the other edge flange to enter guide slot 6ª, such latter movement being indicated by the vertical arrow, Fig. 1. It will also be understood that the edge portions 3ª or flanges project through the guide slots sufficiently far to enable the grinding discs to act on and shape the projecting edges. Each successive cover may be shoved along between the guide rails, resting upon the lower rails, and retained against displacement by the upper rails, until it reaches the station B (Fig. 1) where it is in position to be automatically moved forward by the primary or cross conveyor chain 1. This chain is provided with a plurality of fingers 9, at suitably spaced intervals, designed to engage or abut against the rear edges or ends of the successive covers and push them forward between and past the grinding discs 10 and 11, the opposed grinding faces of which act on the side edges

of the cover and reduce them to the required dimensions.

Continuing past the grinding discs 10 and 11, the covers successively reach the station C where they are engaged by the suitably spaced guided pushers 12 of the longitudinal or secondary chain or conveyor 2 and moved at right angles to the former direction, and between and past the grinding discs 13 and 14 whereby the remaining two (end) edges are properly reduced in dimensions, or ground. Thereafter the covers are conveyed to the delivery end of the machine (station D) where they may be deposited upon a chute 15 or its equivalent to be delivered into a container (not shown).

While under control of its pusher 12, the cover rests on the upper edges of the lower guide rails or bars 16 and 17 and is held thereon by the overlying rails or bars 18 and 19.

As these battery covers are of an elongated nature and are moved broadwise by the secondary conveyor, it is desirable that means be provided to prevent any tipping of the covers, and insure their being moved in a true right angular line. To this end the pushers 12 are provided with spaced pusher fingers 12^a Fig. 8 which engage the side edge of the cover at relatively widely separated points (on opposite sides of the center line) and said pushers are further provided with guide grooves 12^b which engage the guide bars 20 and 21, the front ends of which guide bars are of wedge shape, as indicated at 20^a, Fig. 4 to facilitate entrance into the grooves.

To enable the apparatus to accommodate or operate upon different sized covers, one grinder disc and corresponding set of guide rails is made adjustable towards and from the other.

Taking grinder disc 11 and guide rails 6—8 as an example, a bracket 22 is fixed to the bed frame 63 of the machine (which may be supported by legs or standards 64) in which bracket is rotatably mounted one end of a feed screw 23, the other end of which engages a nut 24^a of head 24.

This head is slidably supported upon the bed frame and has bearings 24^b in which the shaft of the grinding disc 11 is journaled.

Bracket arms 29 connected to the head 24 support the guide rails or bars 6—8, so that on rotating the screw in the proper direction by means of handle 25, the grinding disc 11 and rails 6—8 will be moved towards and from the disc 10 and rails 5—7. These latter rails are supported by similar arms 29^a which however are not adjustable.

In connection with the adjustment of head 24, I find it desirable to use gauge means for accuracy, which may take the form of a bar as 26 Fig. 1 having holes in its ends designed to fit over pins carried by bracket 22 and head 24 respectively, a number of such gauge bars being provided corresponding to the sizes of box covers, only one, however, being shown in the drawings. Preferably the nut 24^a would be made adjustable to compensate for wear.

To compensate for variations in shape of covers, both sets of guide rails (i. e., cross and longitudinal) are preferably provided with means for micrometer adjustment relative to the heads. Such means may take the form of graduated cylindrical nut members 31 Fig. 13 rotatably connected to the arms 29 and engaging screws 30 fixedly secured to the respective rails, the cylindrical nut members being provided with micrometer indications, as shown.

Preferably each member 31 is secured to its arm 29 by means of a bolt 32 which, after adjustment, may be tightened to hold member 31 against turning.

It will be understood that in the embodiment shown in the lower or supporting rails of the pairs of guide rails are connected with the arms 29, while the upper or hold down rails are supported from the lower rails by braces or clips 8^x.

A change in width of the edges of covers operated on, would, in the absence of compensating means, cause a change in the position of the cover when released from the primary conveyor. To obviate this and insure the covers being released in exact alignment with the secondary guides, I mount the idle gear 33, over which primary conveyor chain 1 passes adjacent station C, adjustably, conveniently by journaling it upon the end of an arm 34 fulcrumed at 34^a and provided with operating screws 35 and 36 (Fig. 14) by which it may be adjusted to, and locked in, any desired position.

Conveyor chain 1 also passes around idle sprocket 37 adjacent station B, and also around drive sprocket 54 fast on operating shaft 51 which may be driven in any convenient manner, as for example by belt pulley 49 controlled by clutch 52.

The secondary or longitudinal conveyor chain passes around driving sprocket 58 and idle sprocket 58^a, the former being carried by a shaft 61 carrying a sprocket 60 driven by chain 62 from sprocket 56 fast on shaft 59, Fig. 4, which is driven by bevel gearing 55 from shaft 51, (see dotted lines Fig. 1). It will be understood that the driving connections thus described are what I consider at present the preferred form, but might be changed in various ways without departing from the spirit of my invention.

Preferably idle pulley 37 is mounted on an adjustable carrier to enable the taking up of slack in the chain, as for example an eccentric shaft.

It will also be understood that the grinding discs may be driven in any desired man-

ner from any suitable source of power, and I have shown band pulleys as a convenient means, as indicated for example at 11ª.

While passing into position C, or into alignment with the longitudinal or secondary guides, the covers necessarily pass a gap or cutaway portion of the transverse rails, which must of course terminate short of the path of the secondary conveyor, so as not to obstruct the same. To support the cover at this point, I provide a plate or table member 38, removable and replaceable by plates of different thickness to suit variations in thickness of covers operated on. As such a support would not necessarily prevent the tilting of a cover, due to its peculiar shape, I provide additional holding means in the shape of a control finger 39, (see Fig. 6). During the time the cover is crossing the gap, the control finger, which is fulcrumed at 39ª, occupies the position shown in dotted lines in Fig. 6.

The finger is provided at its free end with a groove 40 (Fig. 9) into which the advanced edge of the cover enters and by which it is supported against tilting. The finger is also provided with a lug or extension 41 adapted to be struck by the portion 12 of the guided pushers of the secondary chain 2, which pushes the finger free from the cover against the tension of spring 42 as the cover moves onto and along the longitudinal or secondary guide rails 16—17.

In this transfer position C the cover is momentarily free from both conveyors and should be held securely in correct position. To this end I provide a spring pressed ball retainer 43 Fig. 12 which yields to permit the ready passage of the edge of the cover, but which springs out behind the rear corner and prevents any retrograde movement or rebound after the cover has been released from the propelling finger or projection of chain 1.

While I have shown endless chains as the means for moving the covers past the grinding or shaping devices, it will be understood that I do not limit myself to such specific means, though such I regard as preferable, as the conveyors can thereby be driven in absolute uniformity.

Having thus described my invention, what I claim is:—

1. In a machine for shaping the edges of battery box covers and similar articles having flanged edges, two sets of upper and lower guide rails having intervening guide spaces through which the said flanged edges project, shaping devices mounted outside said guide rails and arranged to shape said projecting edges, and means for moving said articles along said guide rails.

2. In a machine for shaping the edges of articles having marginal flanges, a pair of supporting rails, means for conveying the articles along said rails with their edges projecting over the same, and trimming devices arranged outside said rails and adapted to act on the projecting portions of said flanges.

3. In a machine for shaping the edges of articles having marginal flanges, a pair of supporting rails adapted to support said marginal flanges, hold down rails above the same and supported therefrom, means for adjusting one of said supporting rails towards and from the other, means for moving the articles along said rails, and means for shaping the edges during such movement.

4. In a machine for shaping the edges of articles having marginal flanges, a pair of supporting rails, hold down rails supported thereabove forming intervening flange guides, trimming devices located adjacent said guides, pusher means for moving the articles on the guides, one set of said rails terminating at its initial end short of the remaining rails.

5. In a machine for shaping the edges of articles having marginal flanges, a pair of supporting rails, hold down rails supported thereabove forming intervening flange guides, trimming devices located adjacent said guides, pusher means for moving the articles on the guides, one set of rails terminating at its initial end short of the remaining rails, and an article support associated with the projected portions of the supporting rails.

6. In a machine of the character described, a pair of primary guides, means for conveying the articles along said guides, shaping means adapted to act on two opposed edges while so moved, a second set of guides arranged at right angles to said first named guides and to receive the articles therefrom, shaping devices for the remaining two opposed edges associated with said guides, means for moving the articles along said second set of guides, and a yielding retaining dog at the termination of the primary guides to prevent rebound of the article.

7. In a machine of the character described, a pair of primary guides, means for conveying the articles along said guides, shaping means adapted to act on two opposed edges while so moved, a second set of guides arranged at right angles to said first named guides and to receive the articles therefrom, shaping devices for the remaining two opposed edges associated with said guides, means for moving the articles along said second set of guides, and means for supporting the article during its transfer from one set of guides to the other, and a yieldable retaining device for engaging the edge of the article to prevent tipping while resting on said supporting means.

In testimony whereof, I affix my signature.

JOSEPH E. PERRAULT.