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BATTERY BOX FORMING MACHINE.

APPLICATION FILED NOV. 6, 1919.

1,353,339. **Patented Sept. 21, 1920.**

Fig. 1.

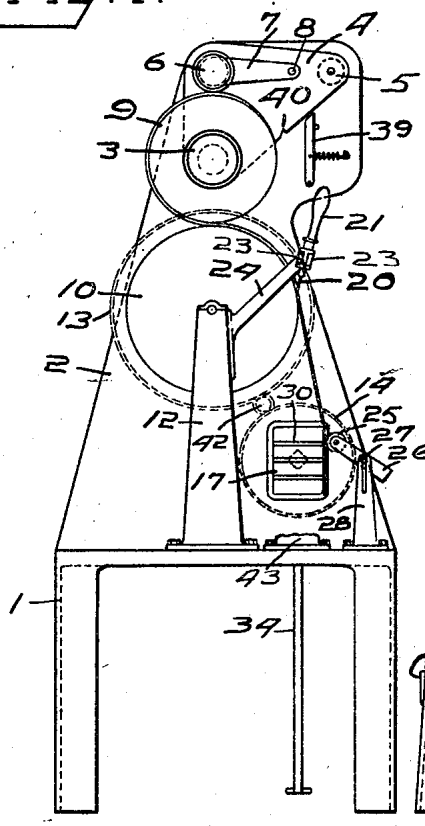


Fig. 2.

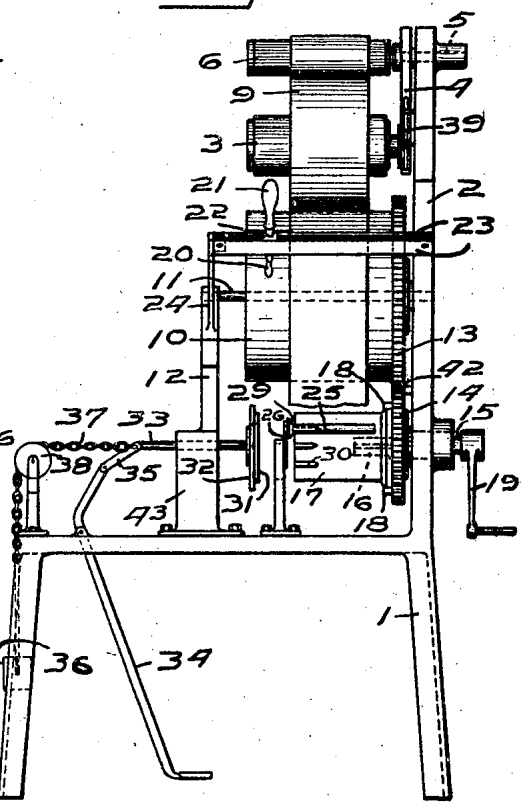
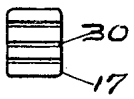


Fig. 3.



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BATTERY-BOX-FORMING MACHINE.

1,353,339. Specification of Letters Patent. Patented Sept. 21, 1920.

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To all whom it may concern:

Be it known that I, STEWART E. HALL, a citizen of the United States, and a resident of Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Battery-Box-Forming Machine; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention has for its object to provide a machine whereby boxes may be readily formed of rubber that when vulcanized becomes hard and stiff and usable for containing the salts and the solutions commonly used in connection with batteries. It also has means for providing supporting or partitioning ribs in the bottom of the box. The boxes, when formed on the machine embodying my invention, may be subsequently vulcanized and consequently forms a box that will contain acids and alkalis without deterioration and yet one which will prevent short circuiting of the electrodes that may be inserted in the box. The particular object of the invention is to provide a machine whereby such boxes may be rapidly and cheaply made.

Constructions containing my invention may in their details partake of different forms and yet embody my invention. For purposes of illustration and description I have selected one of such constructions and shall describe it hereinafter. The construction selected is illustrated in the accompanying drawings.

Figure 1 of the drawings illustrates an end view of the construction selected. Fig. 2 illustrates a side view of the machine, and Fig. 3 is an end view of the block or mold on which the box is formed preparatory to vulcanizing the sheet rubber composition of which the box is composed.

1, in the drawings, is a supporting table or base on which the parts of the mechanism are mounted. 2 is an end plate connected to the supporting base or table 1. 3 is a spool which is pivotally supported in a rotatable bracket 4. The bracket 4 is pivotally supported on a pin 5 which is connected to the end plate 2. The spool 3 is adapted to receive a coil of sheet material which is formed of a composition having a rubber base whereby the sheet material may be subsequently vulcanized and yet form a water, acid and alkali proof material which will also form an electric insulator. The sheet material is somewhat soft in its consistency and its coils tend to stick together. Its coils are separated by a layer of cotton cloth which prevents to a certain extent the adherence of adjacent coils and will moreover afford a means for ready separation of the coils when the spool is unwound. One end of the cotton strip is wound upon a spool 6 which is pivotally supported on a movable arm 7. The arm 7 is pivoted by means of the pin 8 to the movable bracket 4. The spool 6 by reason of its weight and its method of support on the arm 7 rests upon the coil 9 located upon the spool 3 and as the coil 9 is rotated the spool 6 and the cotton fabric located thereon will also be rotated and will unwind the cotton strip from the coil 9 while the sheet rubber composition is being drawn from the spool 3. The spool 6 will maintain its contact with the coil 9 until it is quite completely unwound.

The coil 9 rests upon a drum 10 which is pivotally supported on the shaft 11. The shaft 11 is supported in the end plate 2 and in an upright 12. As the drum 10 is rotated and the sheet rubber composition is drawn with the drum 10 the coil 9 will be unwound. The sheet rubber composition being somewhat sticky in its nature will adhere to a certain extent to the surface of the drum 10 and as the drum 10 draws the composition it will operate to unwind the coil 9 and to wind up the cotton cloth on the spool 6.

The drum 10 is connected by means of gear wheels 13, 42 and 14 to a spindle 15 which may be provided with a square end 16. A block 17 may be placed over the end of the spindle and secured in position by any clamping means, such as the lugs 18, or may be held onto the spindle 15 by the hand of the operator. One end of the sheet rubber composition is placed on a corner of the block 17 and caused to adhere against the corner by a slight pressure of the hand of the operator. Thereupon the spindle 15 may be rotated by any suitable means, such as by a motor or by hand. In the latter case

the spindle 15 may be connected to a crank 19 and by a single turn of the crank 19 the sides of the block 17 will be completely covered by the sheet rubber composition which is drawn over the drum 10 from the coil 9. Upon a rotation of the spindle 15 the gears 13 and 14 will cause a slightly slower rotation of the drum 10 which will cause the sheet rubber composition to be slightly stretched and tightly pressed upon the block 17. When the block has been completely or partly covered with the sheet rubber composition, the sheet rubber composition may be cut or severed from the coil 9. In the form shown, means is provided for cutting the sheet rubber composition when the block 17 has been partly covered with the rubber composition. A knife 20 is connected to a handle 21 through a guide block 22 located between a pair of parallel guide bars 23 which are secured to the end plate 2 and to a bracket 24 located on the upright 12. The knife 20 is so positioned, relative to the drum 10 that it moves along the drum and so as to cut the sheet rubber composition on the bevel, that is, so as to skive the sheet rubber composition. The ends of each severed part of the sheet rubber composition that are thus formed by the knife will meet at one of the corners of the block and will overlap and by reason of the ends being thus skived they will eliminate the double thickness that would otherwise be formed, inasmuch as the skived edges or portions only overlap.

As the block is rotated to take up the sheet rubber composition, the portions of the rubber composition, that forms with the bottom, the corner of the box, is turned or flanged inward by a spinning operation. This is accomplished by means of the roller 25 which is pivotally supported on an arm 26. The arm 26 is pivotally supported on the pin 27 which is secured in adjustable relation in the upright 28. The weight of the roller 25 causes it to press against the block 17 or, if the sheet material is interposed, against the sheet material located on the block. The somewhat sticky character of the sheet material causes the roller 25 to quite positively rotate. The roller 25 is provided with an enlarged head having a flat fillet 29 which rotates on the edge of the sheet material and bends the edge inward so as to form an inwardly extending flange.

The block 17 at one end is provided with transverse grooves or depressions 30 which is filled with pieces of sheet rubber composition. These extend through the grooves or depressions so as to make contact with the sheet material that is placed on the outside of the block 17.

The box is finished by securing the bottom to the sheet rubber composition that forms the side and the ribs that extend through the slots or channel 30 of the block 17. The bottom is formed of a piece of sheet rubber composition 31 that is placed on a plate 32 which is secured to a ram 33. The ram 33 is movable in the standard 43 toward the block 17 and is operated by a lever 34 and extends beneath the table 1. The lever 34 may be provided with a pedal and consequently the bottom strip 31 may be forced onto the inwardly extending flange formed by the roller 25 and its head by means of the foot of the operator. The lever 34 is connected to the ram 33 by means of the link 35. The ram 33 may be drawn from the block 17 by the operation of the weight 36 which is connected by means of the chain 37 that passes over the pulley 38 and is connected to the end of the ram 33.

In order to insure the adherence of the sheet rubber composition to the block 17, the block 17 may be varnished with a suitable varnish which will cause the sheet composition to stick to the block. This will also cause the flange formed by the roller 25 to adhere along the corner of the block 17 and also cause the bottom strip 31 to adhere to the bottom of the block. The sheet rubber composition will readily adhere to its uncovered parts, that is, the sheet rubber composition of the rubber composition that forms the sides of the box will readily adhere to the ends of the strips that are located in the channels or slots 30 and the bottom 31 will readily adhere to the flange formed by the roller and also to the strips located in the channels or slots 30. When the block has been covered it may be readily removed from the spindle 15 and a new block inserted in its place and the operations repeated in the formation of another box. When a plurality of boxes have been formed on blocks or molds 17 the sheet rubber composition may be vulcanized by inserting the blocks and the sheet rubber composition covering the blocks in a vulcanizing furnace. The varnish placed upon the blocks for causing adherence of the sheet rubber composition is of such character that in the vulcanizing operation it will either dry out or crystallize in such a way that adherence between the sheet rubber composition and the block will cease. When the sheet rubber composition has been properly vulcanized the blocks may be removed from the vulcanized hard rubber boxes that are thus formed leaving the bottom ribs that were formerly located in the channels or slots 30 and the bottom 31 and the sides of the box formed practically into a unitary structure.

When it is desired to insert a new coil 9 upon the spool 3 the bracket 4 may be rotated upward and a dog 39 may be pressed rearwardly so as to engage in the recess or notch 40 and hold the bracket in its raised

position. When it is desired to permit the coil 9 again to rest upon the drum 10 the dog 39 may be released from the notch 40 and the bracket 4 to drop or lower so as to cause the coil 9 to rest on the drum 10.

I claim:—

1. In a battery box forming machine, a spool for supporting a sheet rubber composition, a drum, means for permitting the sheet rubber composition located on the spool to ride on the drum, means for skiving and cutting portions of the sheet rubber composition, means for guiding the movements of the skiving means across the face of the drum, a mold for receiving the sheet rubber composition from the drum, and means for rotating the mold and the drum.

2. In a battery box forming machine, a spool for supporting a sheet rubber composition, a drum, means for permitting the sheet rubber composition located on the spool to ride on the drum, means for skiving and cutting portions of the sheet rubber composition, means for guiding the movements of the skiving means across the face of the drum, a mold for receiving the sheet rubber composition from the drum, means for rotating the mold and the drum, a roller, and means for causing the roller to rest upon the sheet material located on the mold, the roller having a spinning end for turning the edge of the sheet material located on the mold inward over one end of the mold.

3. In a battery box forming machine, a spool for supporting a sheet rubber composition, a drum, means for permitting the sheet rubber composition located on the spool to ride on the drum, means for skiving and cutting portions of the sheet rubber composition, means for guiding the movements of the skiving means across the face of the drum, a mold for receiving the sheet rubber composition from the drum, means for rotating the mold and the drum, a roller, and means for causing the roller to rest upon the sheet material located on the mold, the roller having a spinning end for turning the edge of the sheet material located on the mold inward over one end of the mold, a plunger member for supporting the bottom piece of sheet rubber composition, and means for causing the plunger to press the bottom piece against the end of the mold and the inturned flange.

In testimony whereof I have hereunto signed my name to this specification.

STEWART E. HALL.