C. W. STEVENSON.

CRATE MAKING MACHINE.

APPLICATION FILED SEPT. 7, 1915.

1,273,947.

Patented July 30, 1918

2 SHEETS—SHEET 1.

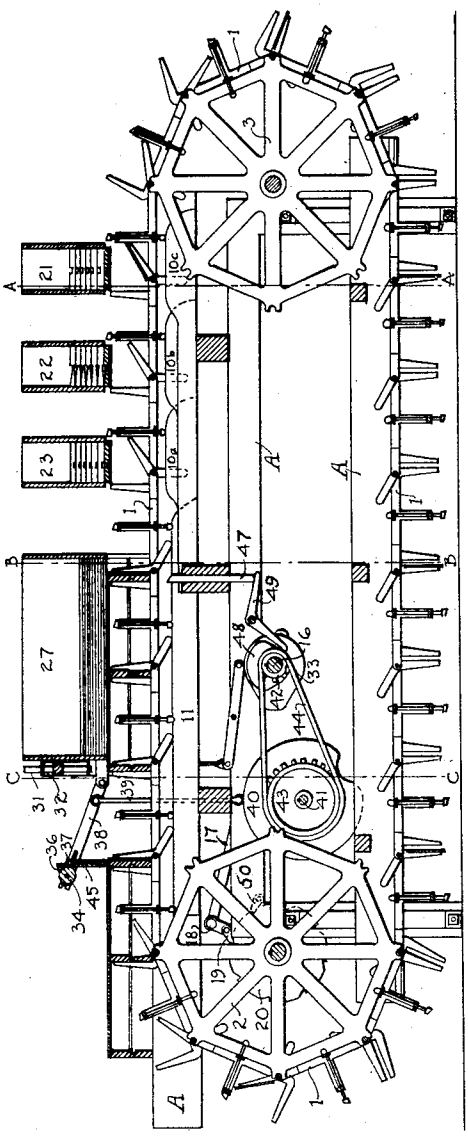


FIG. 1.

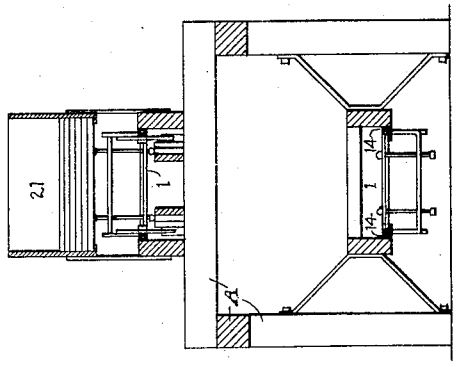


FIG. 2.

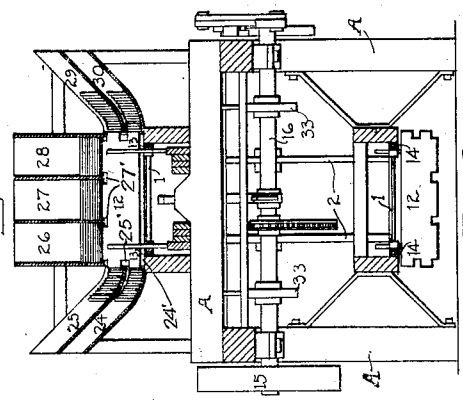


FIG. 3.

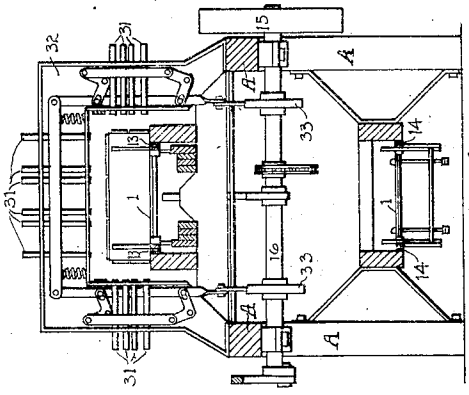


FIG. 4.

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2 SHEETS—SHEET 2.

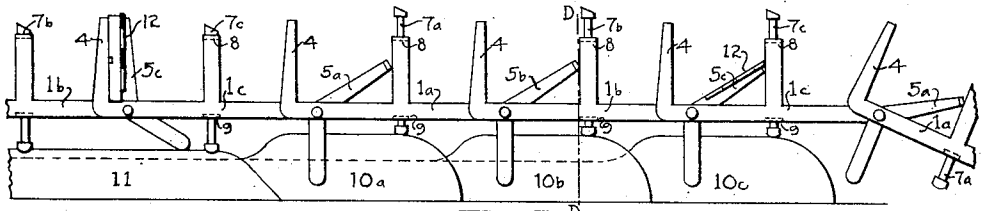


FIG. 5.

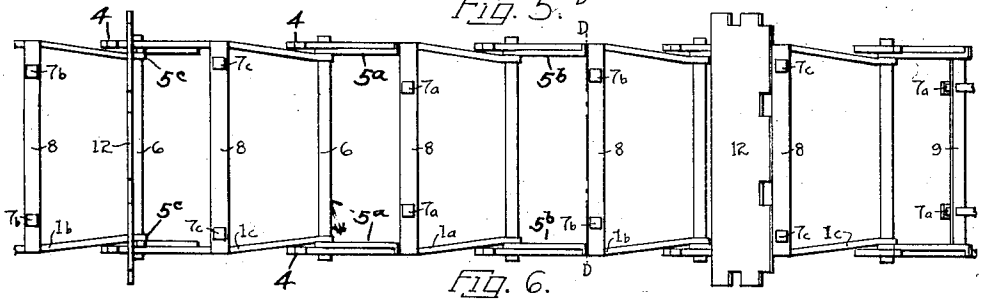


FIG. 6.

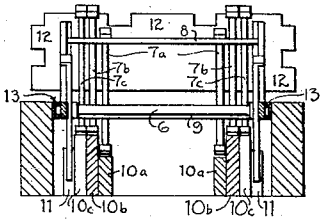


FIG. 7.

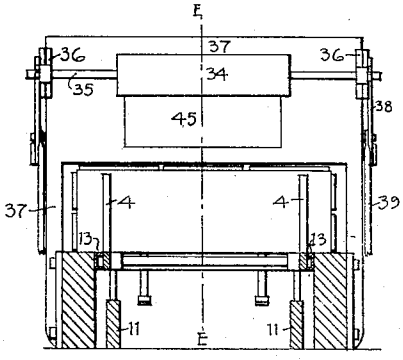


FIG. 8.

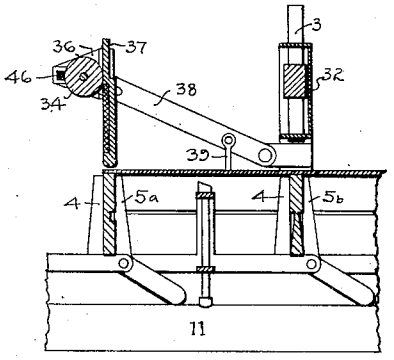


FIG. 9.

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UNITED STATES PATENT OFFICE.

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CRATE-MAKING MACHINE.

1,273,947. Specification of Letters Patent. Patented July 30, 1918.

Application filed September 7, 1915. Serial No. 49,364.

To all whom it may concern:

Be it known that I, CHARLES W. STEVENSON, a citizen of the United States, residing at the town of Puyallup, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Crate-Making Machines, of which the following is a specification.

My invention pertains to machines used to manufacture crates or boxes. It more particularly pertains to machines designed to form, construct and mark berry crates, after the materials are prepared and placed in hoppers in the machine.

The objects of my invention are, first, to form and construct complete a crate or box from the materials prepared and placed in hoppers in the machine; and, second, to provide a machine that will make boxes more economically and rapidly than by machines now in use.

I attain these objects by means of the machine illustrated in the accompanying drawings in which:—

Figure 1 is a longitudinal section showing the main operating features of my invention, Fig. 2 is a cross-section taken on the line A—A, Fig. 1, Fig. 3 is a cross-section taken on the line B—B Fig. 1, and Fig. 4 is a cross-section taken on the line C—C Fig. 1. Fig. 5 is an enlarged view of the side of the main carrier chain, Fig. 6 is view looking down upon the same, and Fig. 7 is a sectional view on line D—D of Fig. 5. Fig. 8 is an enlarged view of the stamping device, and Fig. 9 is a sectional view of the same taken on the line E—E of Fig. 8.

Similar characters refer to similar parts in the several views.

The mechanism of my invention is mounted on a frame A as indicated in Figs. 1, 2, 3 and 4, and comprises a carrier chain 1 mounted on sprockets 2 and 3, to travel on horizontal lines, in the guide rails 13 and 14, and through the several stages in which the materials are assembled, constructed and marked.

It is to be observed that the chain 1 is composed of the three different links, 1^a, 1^b and 1^c, occurring in rotation. These links are substantially alike, all having upright arms 4, pivoted clamping arms 5^a, 5^b, and 5^c hung on pins 6, and sliding claws 7^a, 7^b, and 7^c mounted in cross-bars 8 and 9; each cross-bar 8 being directly above a cross-bar 9, both carried on the same link. These cross-bars 8 and 9 are preferably formed integral with the link on which they are carried. The claws, however, are spaced differently on the different links, so that claws 7^a come directly above fixed horizontal cams 10^a, claws 7^b above cams 10^b and claws 7^c above cams 10^c, over which they respectively slide. Also, on links 1^c, a plate 12 is attached to clamping arms 5^c. One crate is constructed upon each set of three links as they pass through the machine.

Motion is imparted to the mechanism through the pulley 15 mounted on the crank-shaft 16. With each revolution of this shaft the connecting-rod 17 draws the lever 18 back until the pawl 19 drops into the next notch in the ratchet-wheel 20, and then in its forward movement carries the chain 1 ahead one link. An intermittent movement is thus imparted to the chain 1, during the pauses of which the nailing and stamping operations are performed.

The assembling of the end pieces and partitions in their proper relative positions comprises the first operation and is accomplished as follows:—As the set of links 1^a, 1^b and 1^c enter the machine from the sprocket 3, link 1^a passes under the hoppers 21 and 22 which contain, respectively, the rear end pieces and partitions, and approaches hopper 23 which contains forward end pieces; link 1^b passes under hopper 21 and approaches hopper 22; and link 1^c, coming off of sprocket 3 approaches hopper 21. As the links approach these hoppers the claws 7^a, 7^b and 7^c, coming in contact with the fixed horizontal cams 10^a, 10^b and 10^c, are lifted high enough to catch the lowest end and partition pieces in the hoppers and carry them forward with the chain. These end and partition pieces, when they are clear of their respective hoppers, drop onto the open clamping arms 5^a, 5^b and 5^c, and, as the links progress and the clamping arms engage the horizontal cams 11, they are fastened between the clamping arms and the upright arms 4, in their proper relative positions.

In the second operation the side pieces which are contained in the hoppers 24, 25,

29 and 30, and bottom pieces which are contained in the hoppers 26, 27 and 28, and which are detachably retained in said hoppers by the bottom flanges 27′ and 25′, and the stops 24′, are assembled in their proper positions. This is accomplished by the plate 12 on the arms 5^c, which is designed to project just far enough to detach the inner piece from each hopper and carry it forward, coming in contact with the edge of each inner piece and carrying it forward with the motion of the carrier chain. As will be apparent from a consideration of Figs. 1 and 3, during this forward motion of the bottom and side pieces, due to the contact of plate 12 with the edges thereof, the pieces are firmly held in place between the edges of their respective hoppers and the material contained therein and the edges of the end and partition pieces, which are clamped and being carried forward by the carrier chain. As the forward end of the box passes beyond the limit of these hoppers, a pause is made in the travel of the carrier chain, and the bottom and side pieces nailed or stapled to the end pieces. The same operation occurs, on the next forward motion of the chain, to the partition, the bottom and side pieces being nailed thereto.

The third operation consists of the fastening of the side and bottom pieces to the end and partition pieces by the nailing or stapling heads 31. These stapling heads are carried in a frame 32 which is so located that at each pause in the movement of the chain 1, an end piece or a partition of a crate stops directly under them. They are a commercial device in common use and are not shown in detail. They are operated through a suitable system of levers and rods, by the cams 33 on the shaft 16. These cams are designed so that the nailing heads are at rest during the movement of the chain 1, and operate during its pause.

The stamping of the purchaser's name on the end of the crate is the final operation and is accomplished by the stamping device shown in Figs. 8 and 9. This consists of a cylindrical stamp 34, mounted on the shaft 35, in the guide blocks 36. These guide blocks are mounted on the frame 37, to move in vertical lines. The stamp is operated by the forked lever 38 which is connected by the rod 39 to the cam 40. The cam 40 is mounted on the shaft 41 which is driven at one-third the speed of shaft 16, by the sprockets 42 and 43 and the chain belt 44. The frame 37 is located so that the end and partition pieces stop with their forward faces flush with its face; and the cam 40 is so designed that the roller 34 is operated only when the forward end of a crate is at rest under the frame. An ink pad 45 is set into the frame 37 so that the stamp rolls over it at each operation and receives fresh ink. The shaft 35 is mounted in slots in the guide blocks 36, so that it can move forward or back, and the spring 46 holds it firmly against the plate 37 and adjusts it to any variation in the position of the crate.

After this operation is completed the clamping arms 5^a, 5^b and 5^c, passing the end of cam 11, are released and the completed crate is delivered to the operator.

To insure the stopping of the chain 1, at the proper position the stop claw 47 is raised by the cam 48 and the bell-crank 49, so that the pins 6 in the chain catch against it, and is then dropped before the next move commences.

At the completion of each move forward the pawl 50, attached to the frame of the machine, engages the ratchet-wheel 20, and prevents any backward movement of the chain.

While my drawings show a machine designed to construct berry crates, my invention is equally applicable to the construction of boxes of other types.

In constructing my machine, I do not limit myself to certain materials, nor to fixed dimensions, but reserve the right to vary the same as circumstances may require.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A box-making machine comprising a plurality of hoppers containing the stock for the various parts of a crate or box, an endless traveling carrier chain having means for detaching the various parts of the box from their respective hoppers and assembling them in the form of a box, holding them in their proper relative positions and carrying them forward through the machine, and means for fastening the various parts of the box together.

2. In a machine of the class specified, the combination with a plurality of hoppers containing stock for the various parts of a box, of an endless traveling carrier chain provided with means for detaching the various parts of the box from their respective hoppers and assembling them in the form of a box, and means for holding the various parts of the box in their proper relative positions.

3. An endless traveling carrier chain composed of a plurality of links, substantially alike, each link having upright arms against which the transverse pieces of the box are held, clamping arms operable to hold the transverse pieces against the upright arms and means to move the arms to clamping position.

4. An endless traveling carrier chain composed of a plurality of links substantially alike, each link having upright arms against which the transverse pieces of the box are held, and pivoted clamping arms operable

to turn the transverse pieces from an inclined to a vertical position and hold them against the upright arms.

5. A box machine comprising an endless traveling carrier chain composed of a plurality of links, substantially alike, each link having hooks or claws, operable in a vertical direction, to detach the lowest pieces of material in the hoppers, transverse hoppers to contain the material, and clamping arms adapted to receive the detached pieces.

6. A box machine comprising an endless traveling carrier chain composed of a plurality of links, substantially alike, each link having hooks or claws, operable in a vertical direction, to detach the lowest pieces of material in the hoppers, transverse hoppers to contain the material, clamping arms for receiving the detached pieces, said claws being located differently in the different links, and means to operate the claws so arranged that each set of claws operates to detach the transverse piece only which that link is designed to carry.

7. A box machine comprising an endless traveling carrier chain composed of a plurality of links, substantially alike, each link that is designed to carry the rear transverse piece of a box having means for detaching the longitudinal side and bottom pieces of the box from their respective hoppers and carrying them forward through the machine, and hoppers to contain said side and bottom pieces.

8. In a machine of the class specified, the combination with an endless traveling carrier chain composed of a plurality of links, substantially alike, each link having clamping arms operable to turn the transverse pieces of the box from an inclined to a vertical position and hold them so, of means for operating said clamping arms at the desired point in the travel of the carrier chain.

9. In a machine of the class specified, the combination with an endless traveling carrier chain and a plurality of transversely disposed hoppers containing stock for the transverse pieces of the box, of a plurality of longitudinally disposed hoppers grouped over and on either side of the carrier chain and containing stock for the bottom and side pieces of the box, the hoppers which contain side pieces having a downward slope toward the chain.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES W. STEVENSON.

Witnesses:

J. BERT FORBES,

MAURICE E. FORBES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."