July , 193[illegible]. F. MATHEWS 1,868,114

FRUIT SIZING MACHINE

Filed March 11, 1930 3 Sheets Sheet 1

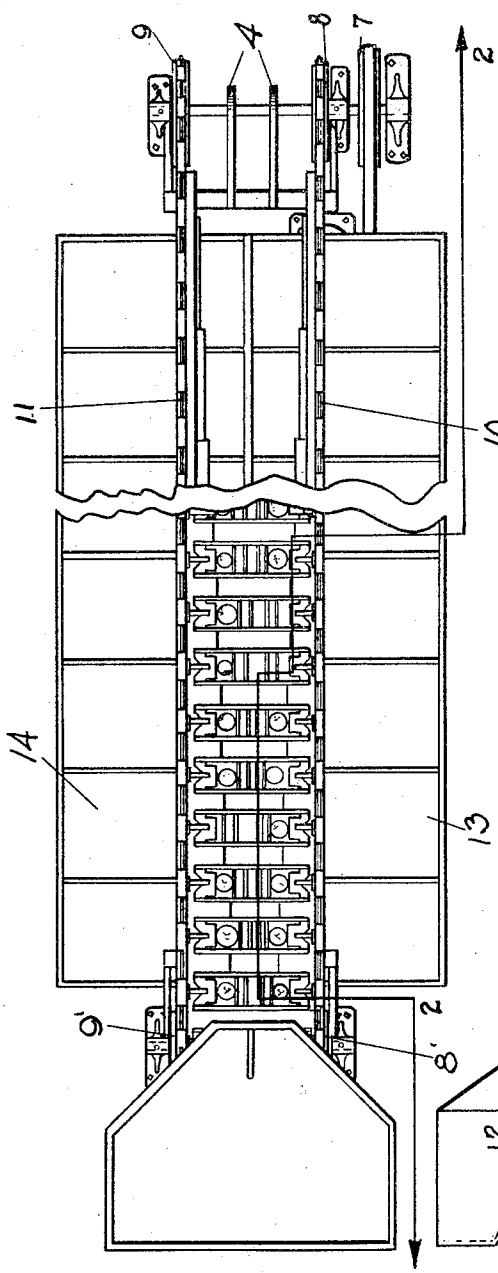


Fig. 1

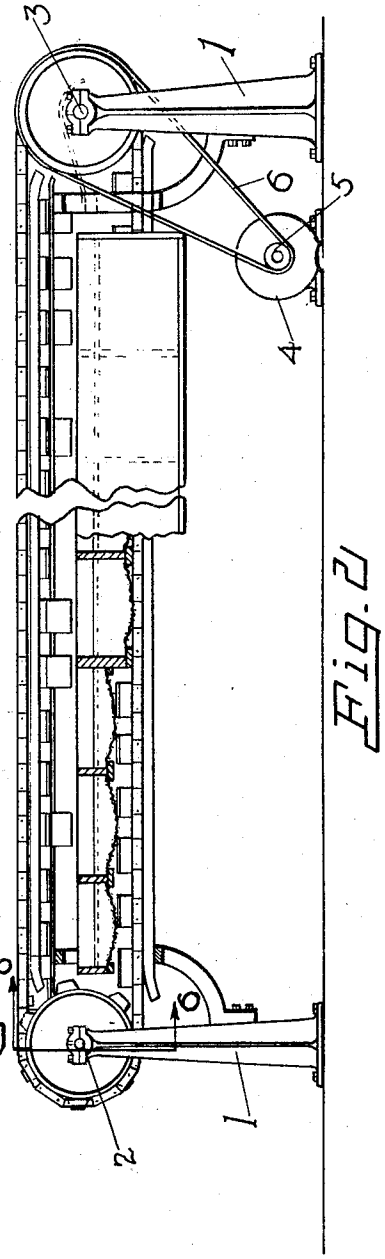


Fig. 2

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July 19, 1932. F. MATHEWS 1,868,114

FRUIT SIZING MACHINE

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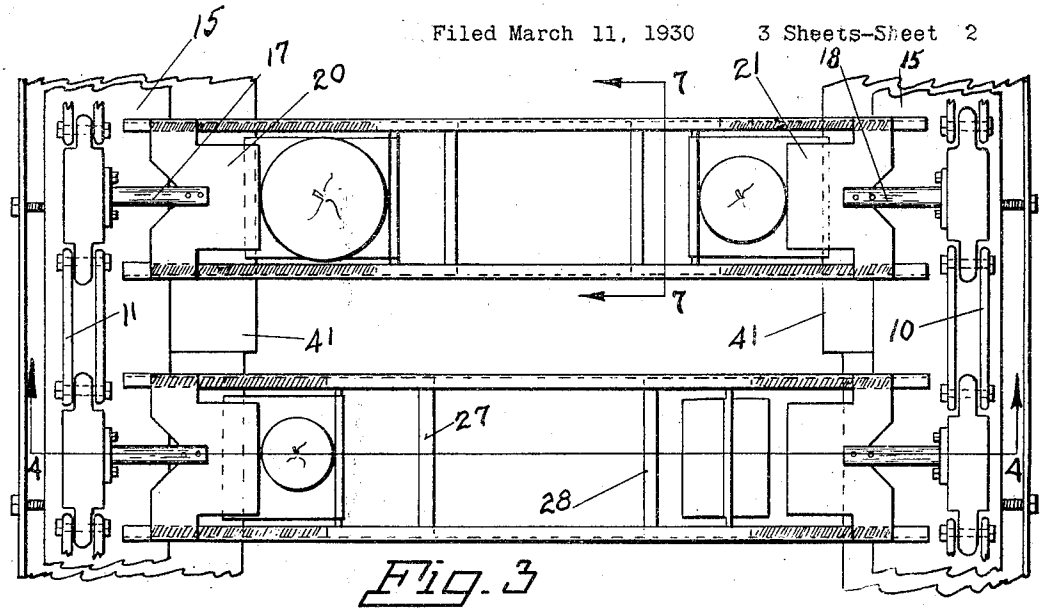
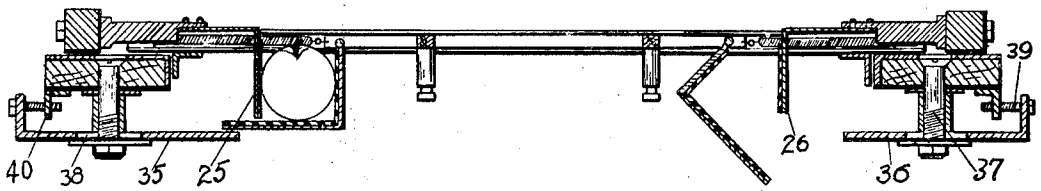


Fig. 3



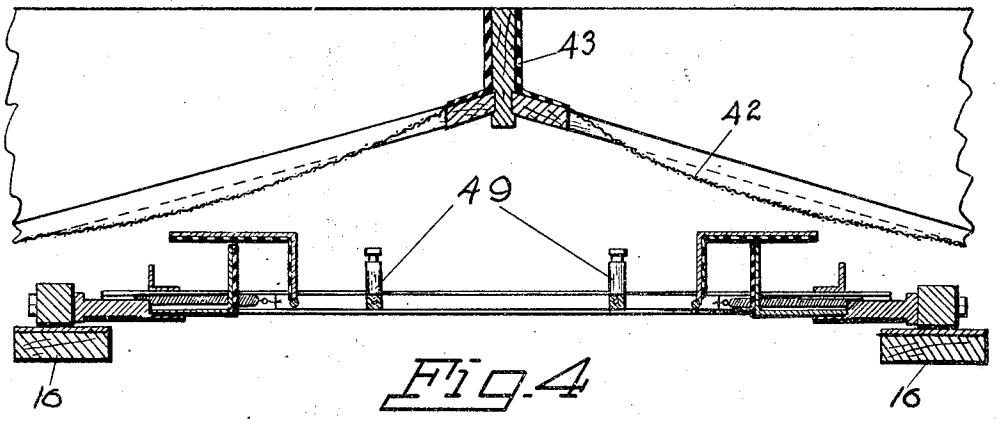


Fig. 4

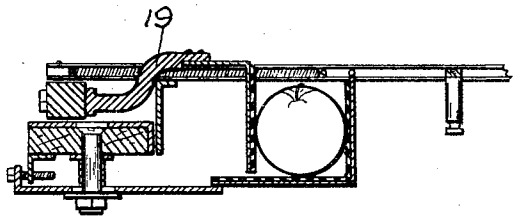


Fig. 9

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FRUIT SIZING MACHINE

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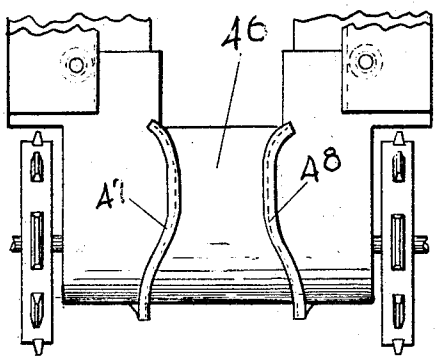


Fig. 5

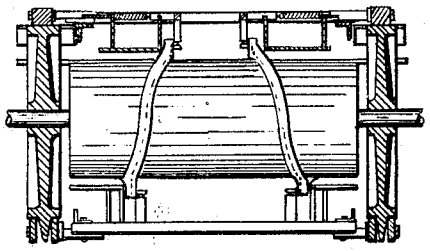


Fig. 6

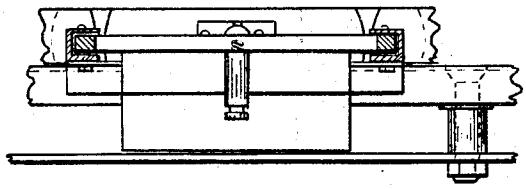


Fig. 7

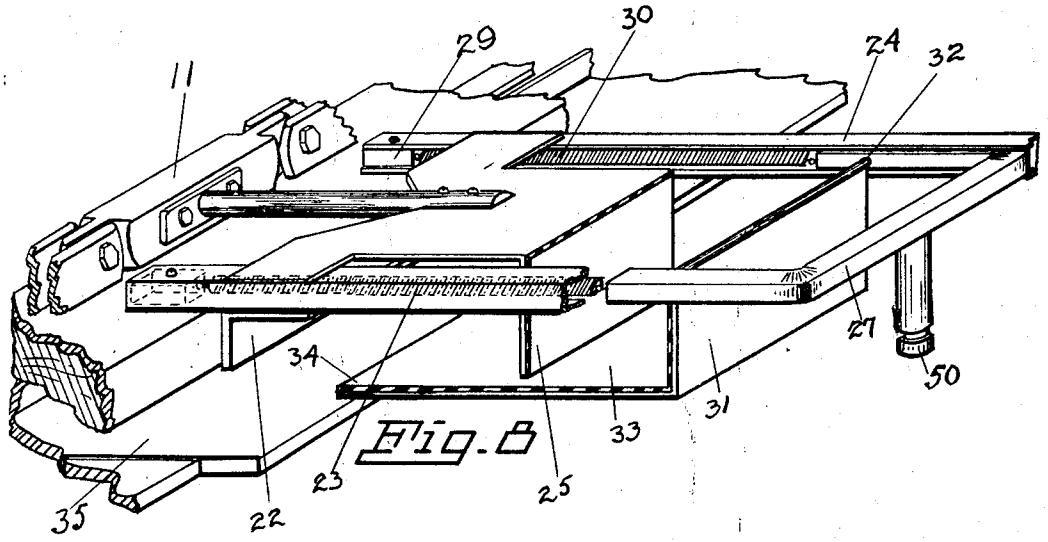


Fig. 8

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Patented July 19, 1932 1,868,114

UNITED STATES PATENT OFFICE

FRED MATHEWS, OF NORTHPORT, WASHINGTON

FRUIT SIZING MACHINE

Application filed March 11, 1930. Serial No. 434,944.

The present invention relates to an improved fruit sizing machine which is motor operated, and of the endless conveyer type, employing successively moving, transversely disposed, duplex carriers, each accommodating two articles of fruit, as a pair of apples which may be of the same size or of different sizes, and the machine is designed especially for accurately sizing the apples with a maximum of speed.

A feed hopper is employed at the front end of the machine, and the apples are fed by gravity to the successive duplex carriers that are suspended transversely of the machine between two endless, longitudinally extending, conveyer chains. The carriers are each provided with pockets, adjustable as to size for the reception of different sizes of apples, and the pockets are automatically opened to release the apples to a pair of longitudinally extending rows of bins, located beneath and also laterally of the conveyer and its carriers.

The conveyer chains glide over parallel tracks and the carriers slide over complementary parallel, stepped, laterally adjustable, diverging rails, that co-act with the carriers to automatically open the pockets and deposit the apples in the predetermined bins, for designated sizes of apples.

The invention consists in certain novel combinations and arrangements of parts for carrying out the above indicated purposes, as will hereinafter be more fully set forth and claimed. In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention wherein the parts are combined and arranged according to one mode I have thus devised for the practical application of the principles of my invention.

Figure 1 is a plan view of the machine, partly broken away for convenience of illustration.

Figure 2 is a view in side elevation of the machine of Figure 1, partly in section at line 2—2 of Figure 1.

Figure 3 is a top plan view, enlarged, showing two carriers arranged transversely of the conveyer chains, with three sizes of fruit therein.

Figure 4 is a vertical, transverse sectional view of the machine at line 4—4 of Figure 3 showing both the upper and lower flights of the endless conveyer, one of the pockets of the working flight being closed while another is open, and the pockets of the lower flight being shown as inverted, but in their usual positions.

Figure 5 is a top, detail plan view at the feed end of the machine showing the rounded guide for the carriers and the spreader flanges for the pocket walls that are initially opened to their maximum width as they travel around the rounded guide.

Figure 6 is an end view at the feed end of the machine, with the sprocket wheels and conveyers, as well as the carriers in section.

Figure 7 is a sectional view of a carrier frame as at line 7—7 of Figure 3.

Figure 8 is a perspective view showing one of the pockets and a portion of its carrier.

Figure 9 is a detail sectional view showing in section a closed pocket sliding on the gauge plate, and a slightly modified form of carrier frame with its conveyer chain on its supporting track.

In carrying out my invention I employ a main frame 1 at the ends of which are journaled the two shafts 2 and 3, the latter being a drive shaft and the former a driven shaft, operated from an electric motor 4, through the belt drive comprising a pulley 5 on the motor shaft, a belt 6, and a driven pulley 7 on the drive shaft 3.

Two pairs of operating sprockets 8, 8′ and 9, 9′ are mounted to revolve with the shafts, and spaced sprocket chains 10 and 11 are supported and travel on the sprockets.

The fruit, (as apples) is fed to the machine in twos or pairs, by gravity, through the feed hopper 12, which has a dividing partition or parting strip 12′ that separates the apples of a pair and causes them to be fed to the duplex carriers, as will be described.

Between the upper and lower flights of the endless conveyer chains are located stationary bins, arranged in longitudinal rows 13 and 14 at the center line of the machine and

the bins, as seen in Figure 1 project laterally of the machine, at both sides. The apples are released from pockets of the carriers and deposited in these bins, and the fruit is sized so that the largest apples will be deposited in the two bins at the left or front end of the machine, the smallest apples will be deposited in the two end bins at the right end of Figure 1, and apples of varying sizes will be deposited in the intermediate bins in both rows, between the end bins.

The two sprocket chains of the endless conveyer glide along over upper tracks 15, 15 and lower tracks 16, 16, which may be fashioned of timbers with top wear plates of metal, and these parts are lubricated to insure smooth operation of the machine as the upper flights glide along the tracks 15 while the lower flights glide along the plated rails or tracks 16.

Between the parallel, spaced, sprocket chains are suspended duplex carriers, disposed transversely of the machine and of the conveyer, and with adjustable pockets to receive different sizes of apples. These carrier-pockets are opened to their maximum width or size at the feed end of the machine, and after the apples are fed to the pockets, the latter adjust themselves to the sizes of the apples. As the closed pockets travel along the machine, they are automatically opened, at stations or bins, in connection with gage plates, and as the apples are released they are deposited in the proper bins.

These duplex carriers comprise frames having stud bolts 17 and 18 attached at the inner sides of certain links of the sprocket chains, and alined transversely of the carrier. The stud bolts may be straight, as in Figure 3, or they may be horizontally offset as indicated in Figure 9.

End plates 20 and 21 of the frame are secured to these bolts, and at the undersides of these plates, which are of T-shape, are attached angle bars 22 that frictionally engage the inner faces or edges of the tracks 15, 15, 16, 16 and prevent lateral movement of the carriers. The end plates 20, 21 are joined by parallel, spaced, cross, channel bars 23 and 24, and these bars, together with the end plates and guide bars 22, form rigid frames that extend transversely of the machine and are secured to the chains by the stud bolts, while the guide bars 22 maintain the carriers against movement laterally of the machine. The four ends of the channel cross bars project over the respective tracks 15 and 16 and these ends may or may not touch the tracks as they pass along their upper surfaces.

Each T-shaped end plate of the frame is provided with a down-turned, vertical flange, as 25 or 26, that is rigid with or stationary with relation to the carrier frame, and the pair of down-turned flanges of a carrier are located at opposite sides of the longitudinal center line of the machine, and parallel therewith, to co-operate with other parts in forming pockets for the apples, in the carriers.

At each side of the longitudinal center line of the machine a U-shaped yoke, as 27 and 28, is slidably carried in the two spaced channel, cross bars 23 and 24, and the extremities of these channel bars are provided with blocks 29 to which are anchored springs 30. The ends of the four springs toward the center of the machine are anchored to the four ends of the U-shaped yokes, and the springs, which are alined with the parallel side arms of the yokes, are located in the channel cross bars. The springs, in pairs, tend to pull their respective yokes toward the sides of the machine for reducing the size of the pockets, but the complementary yokes may be mechanically pulled toward each other to increase the size of the pockets.

In each yoke is suspended a plate 31, pivoted in the yoke at 32, and provided with a wide, angular plate 33, and this plate 31, that is parallel with the stationary plate 25 (or 26) together with the horizontal plate 33, form the pocket for the apple. The faces of the pocket walls that engage the apple are all lined with a cushioning material so that the apple may be clamped between the plates 25, 31, and rest upon plate 33, without marring. The springs exert only the necessary tension on the yokes and pocket plates as is required to hold the apples against displacement as they move with the carrier.

The free ends 34 of the pocket-bottom plates 33, at each side of the machine, are supported to slide along on gage plates 35, 36 that are supported beneath the upper tracks 15, 15, by bolts 37. The bolts pass downwardly through slots 38 that extend transversely of the gage plates, and by means of adjusting bolts 39 the plates may be adjusted toward or away from the longitudinal center of the machine. The adjusting bolts are mounted in perforated lugs of the gage plates and they are threaded in bolt holes in lugs 40 attached to the under sides of the upper tracks 15, 15.

The inner edges of the gage plates diverge from the feed end of the machine toward the rear end, and these edges are provided with steps or offsets 41 corresponding to the bins 13, 14. The free edges 34 of the pocket-bottoms 33 slide along on the diverging, stepped gage plates until the edge 34 slides off the stepped gage plate. As the bottom slides off the gage plate the pocket swings downwardly on its hinges or pivots 32, and the apple is deposited in the bin beneath the pocket, as indicated at the right in the upper flight of Figure 4.

The bins are provided with flexible and soft bottoms 42 of canvas or other material, and they are lined with cushion material 43

to prevent marring the apples as they contact with the bin portions.

As soon as the apple is released from the pocket, the tension of the springs 30 draw the angle plate 31—32 toward the stationary plate 25.

At the far end of the machine the carriers pass thru an arc of 180 degrees and the down-hanging or open pockets of the carrier are guided and swung on their hinges by contact with guide bars 45, which swing the pockets to closed position as they are inverted during their travel thru said arc.

The lower flight of the conveyer, or endless chains, brings the closed, but inverted pockets back to the feed end of the machine, the inverted, hinged pockets resting on the free edges of the stationary plates 25, 26.

At the feed end of the machine the carriers pass around and up, over a rounded guide plate 46, surrounding the sprocket-wheel shaft, and this plate has two spreader flanges 47 and 48 that separately contact with the yokes of the carrier frames, and thereby "spread" the hinged pockets with relation to their stationary walls 25, or 26. These spreader flanges are designed to open the pockets to their maximum width, that is, separate plate 31 as far as possible from plate 25, so that the pocket may receive the largest apple, the smallest apple or intermediate sizes, from the feed hopper.

As the pocket, in closed position, turns from inverted to upright position in passing around the guide plate 46, the free edge 34 of the pocket is in position to ride or slide along on the gage plate, and of course the apple that is clamped in the pocket is carried to the bin for which it is intended.

For a positive "spreading" action of the pockets, and guiding of the pockets as they pass around the end, curved plates, the yokes may be provided with studs 49 to ride alongside the guide flanges or annular spreader ribs, 45, 47, and 48, and these studs may have anti-friction rollers 50 on their ends for contact with the guide flanges.

While I have shown a pair of fruit sizing devices, in each of the yokes or carriers, it is to be understood that I do not wish to be limited thereby as the device of my invention is equally adapted to one or any number of sizing devices in series across the yoke to meet various needs of the several industries to which my invention may apply.

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

1. The combination, in a fruit sizing machine of the endless conveyer type, with a stepped-edge gage plate, of a carrier having a stationary wall, a pocket hinged in the carrier for coaction with the wall, said pocket having a free edge adapted to slide on the stepped gage plate, and resilient means on the carrier for drawing the pocket toward the wall.

2. The combination in a fruit sizing machine of the endless-conveyer type, with a gage plate having a stepped edge, of a carrier having a stationary wall, a hinged pocket supported in the carrier adjacent the wall and having a free edge to slide on the plate, and springs on the carrier connected to the said hinged pocket for drawing the latter toward the wall.

3. The combination with a pair of endless, spaced sprocket chains, of a rigid carrier frame connecting said chains and rigid walls in said frame, of a pair of slidable yokes in the frame, a pair of pockets pivoted in the yokes, a pair of laterally adjustable gage plates each having a stepped edge to support the free end of a pocket, and springs for drawing the pockets toward the walls.

4. The combination with an endless conveyer and a carrier frame, of a stationary wall in said frame, a laterally movable, hinged pocket supported in the frame for co-action with the wall, a laterally adjustable gage-plate having a stepped edge to support the free end of a pocket, resilient means for drawing the pocket toward the wall, and means for positively spreading said pocket.

5. The combination with an endless conveyer and a carrier frame, of a stationary wall in said frame, a laterally movable hinged pocket supported in the frame for co-action with the wall, a laterally adjustable gage-plate having a stepped edge to support the free end of a pocket, resilient means for drawing the pocket toward the wall, and means for positively spreading said pocket.

6. The combination in a fruit sizing machine with an endless conveyer, of a transversely suspended carrier having a stationary pocket-wall, of an open-side pocket hinged in the carrier for co-action with said wall, a laterally adjustable gage plate having a stepped edge to support the free ends of pockets, and a bin for receiving the fruit deposited from the pocket.

In testimony whereof I affix my signature.

FRED MATHEWS.