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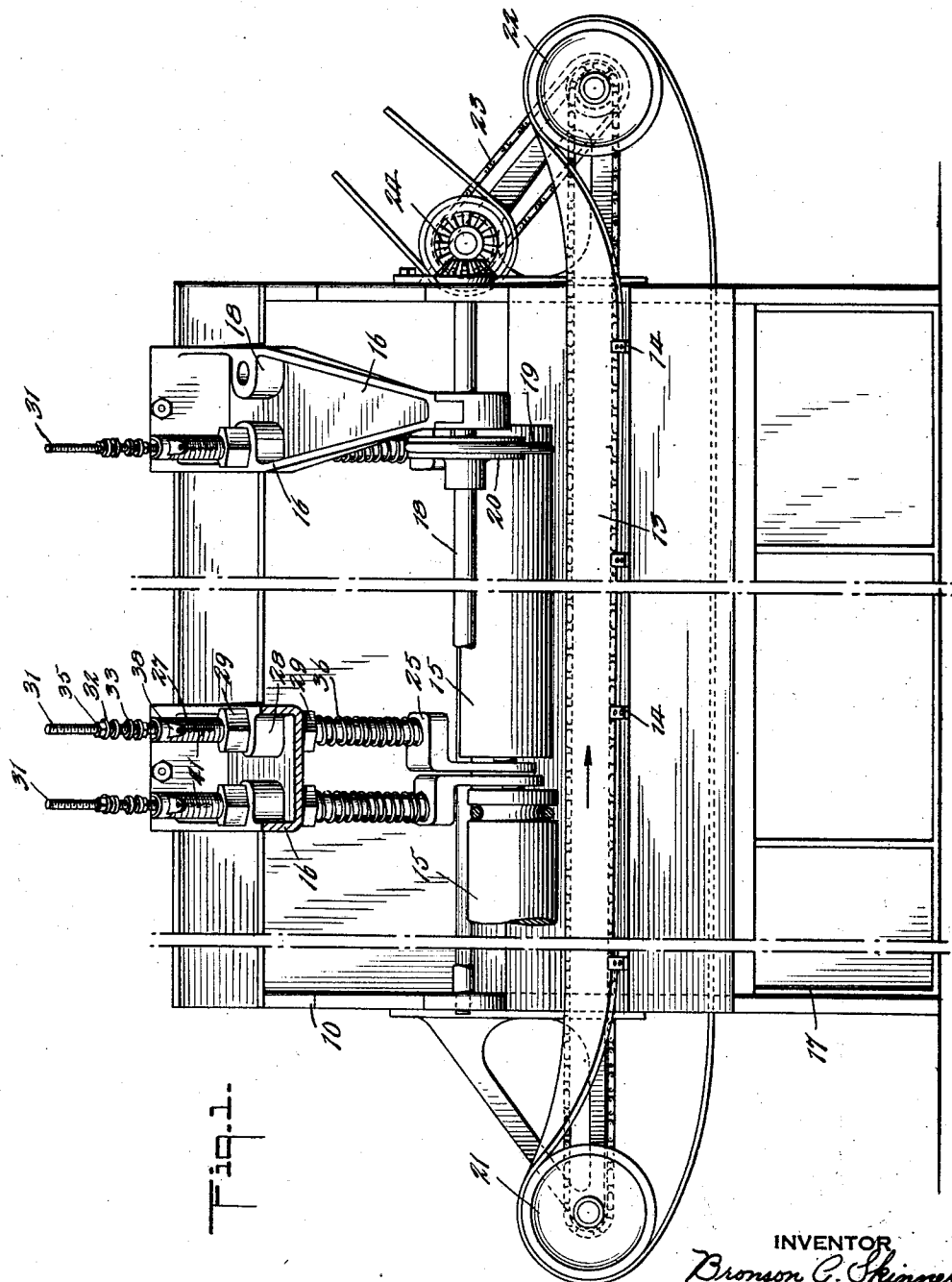
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APPARATUS FOR SIZING FRUIT

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2 Sheets-Sheet 1



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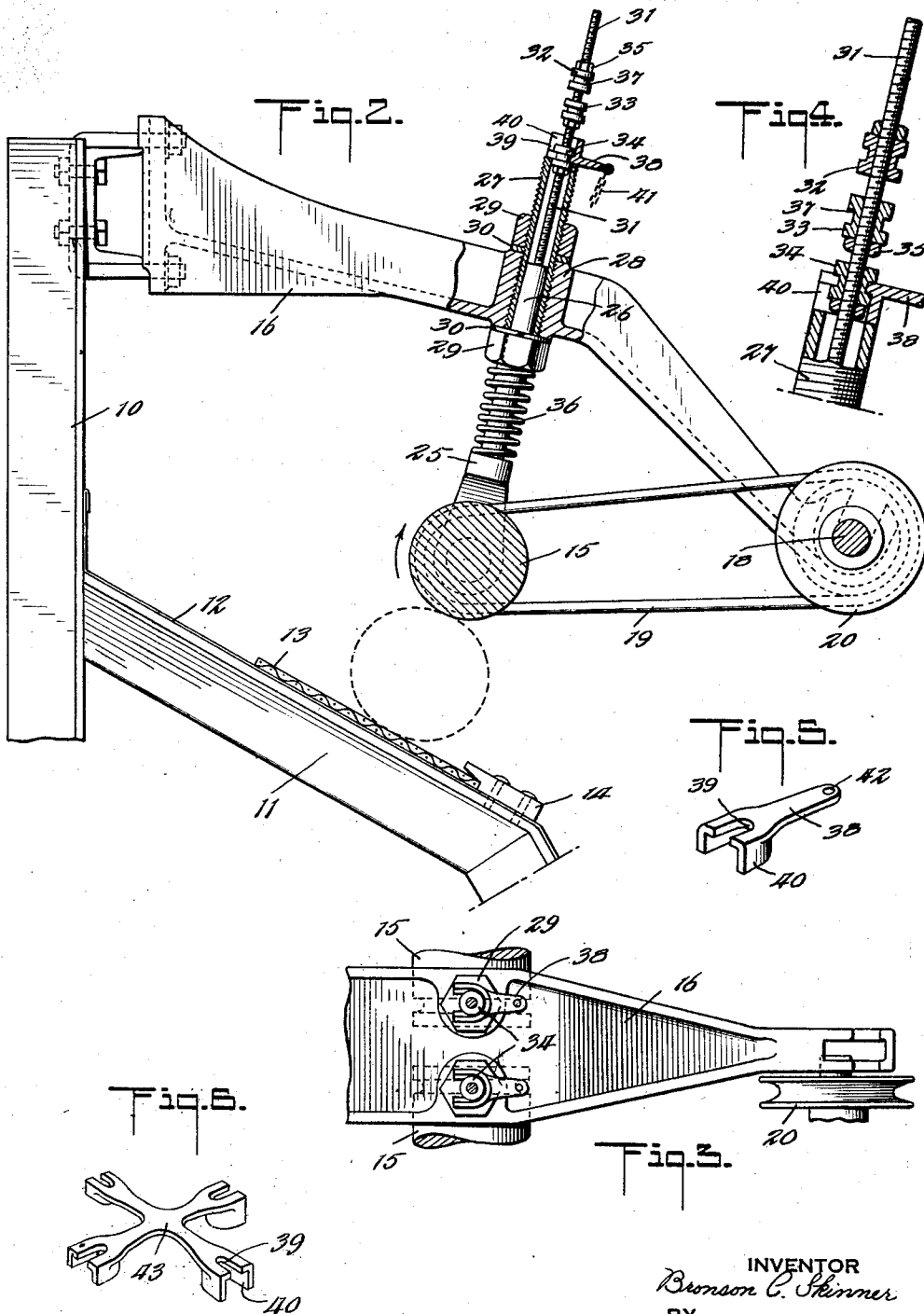
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APPARATUS FOR SIZING FRUIT

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This invention relates to apparatus for sizing citrus fruits and the like, and has for its object to provide an improved sizer which may be adjusted easily, quickly and accurately from one range of settings to another, and is especially adapted to provide close regulation between fruits which differ very little in size.

The invention is particularly applicable to sizers of the type employing a fruit runway comprising cooperating sizing elements, one of which consists of a series of end-to-end rolls arranged at progressively different distances from the other sizing element, forming communicating discharge outlets of progressively different widths along the runway. The fruit pass along the runway in contact with the rolls until they arrive at an outlet wide enough to permit them to escape, whereupon they are discharged into receiving bins along with other fruit of approximately the same size.

The sizing rolls in machines of this type are usually made adjustable so that they may be set to handle any one of several different fruits, such as tangerines, oranges and grapefruit. With previous adjusting mechanisms, however, it has been difficult to obtain accurate regulation between different fruits, such as tangerines and oranges, which differ very little in size. The present invention overcomes this difficulty by providing simple and efficient adjusting mechanisms which may be initially set to handle any one of several different fruits and may then be changed instantly from one setting to another to give accurate variations in adjustment down to small fractions of an inch.

In the preferred form of the invention, the ends of the sizing rolls are supported by rods which are slidable in fixed sleeves, permitting the rolls to be adjusted up and down. The normal tendency of the rolls is to move downwardly, either by gravity or spring tension, toward the cooperating sizing element. A plurality of stops are adjustably mounted on each rod and are adapted to pass freely inside the sleeves with the rods. For each rod I provide a special forked latch adapted to be slipped over any stop and thereby in-

terlocked between such stop and the adjacent sleeve, thus holding the rolls in adjusted position against gravity or spring tension.

The forked latches controlling the adjustment of the sizing rolls are preferably provided on at least one side with a U-shaped flange so that they may be used in either of two positions. In one position the latch lies flat against the upper edge of the sleeve, limiting the backward thrust of the rod and associated sizing roll. In the inverted position, the latch interlocks with the stop in the same manner except that the U-shaped flange abuts against the sleeve, giving a different adjustment of the sizing roll. The height of the flange on the latch, of course, determines the difference between the two settings obtainable with each stop. With a single-position latch the dimensions of the latch and the stops, even when the stops are close together, prevents close variations in adjustment between different fruits. With my reversible latch, however, accurate minute variations in adjustment may be obtained by using the latch in two different positions on the same stop or in two different positions on adjacent stops. This is particularly advantageous in handling fruits, such as tangerines and oranges, which differ only slightly in size.

The invention will be described in connection with the embodiment shown in the accompanying drawings in which similar reference characters indicate corresponding parts in the several views, and in which:

Fig. 1 is a front elevation of a fruit sizer embodying the invention;

Fig. 2 is a side sectional view thereof illustrating the adjusting mechanisms;

Fig. 3 is a fragmentary top view showing the adjusting mechanisms;

Fig. 4 is an enlarged fragmentary section of the adjusting mechanisms showing the latch in inverted position;

Fig. 5 is a perspective view of the reversible latch; and

Fig. 6 is a perspective view showing a multiple reversible latch.

In the drawings, the main frame 10 has transversely inclined brackets 11 carrying an

inclined floor or track 12 upon which runs an endless conveyor belt 13 which is held in place by guides 14.

A series of adjustable sizing rolls 15 are suspended from fixed arms 16 which overhang the conveyor belt 13. These rolls are arranged in end-to-end relation and are usually spaced at successively different distances from the conveyor belt and form therewith a long sizing outlet which increases in width progressively from the feeding end of the machine to the delivery end.

The fruit when fed to the machine immediately roll transversely on the inclined belt 13 until stopped by the adjacent sizing roll, and then continue to travel in contact with both the belt and the roll, or several successive rolls, in the direction of the arrow in Fig. 1 until the sizing outlet is large enough to let the fruit escape and roll from the machine into receiving bins 17.

The sizing rolls 15 are driven from shaft 18 carried by suitable bearings on the arms 16, through belt 19 and pulley 20. The rolls 15 are rotated in a clockwise direction as indicated by the arrow in Fig. 2, tending to move the fruit upwardly across the inclined conveyor belt 13 rather than downwardly since movement in a downward direction would cause pinching of the fruit with resultant injury thereto. The belt 13 passes around drums 21 and 22, being driven by drum 22 to which power is transmitted by chain and sprocket mechanisms 23 and 24.

The sizing rolls 15 are supported by adjustable hangers carried by the arms 16, as best shown in Figs. 1 and 2. The ends of the rolls are journaled in bearing members 25 to each of which is secured a rod 26. The rods 26 extend through and are slidable in sleeves 27 formed in or carried by the arms 16. The sleeves 27 are preferably tubes threaded externally and screwed into a boss 28 in the arm 16. The sleeves are fastened securely to the arms 16 by means of lock nuts 29 and washers 30 as shown in Fig. 2. The upper portion of each rod 26 is preferably reduced in cross-section as indicated at 31. The reduced section 31 is threaded and carries a plurality of stop nuts 32, 33 and 34, in this instance three in number, which can be screwed along the threaded rod to any desired stopping position. These stop nuts are slightly smaller in diameter than the internal diameter of the sleeve 27 so that they will freely enter the sleeve. Lock nuts 35 are provided to maintain the stop nuts in any desired position.

The weight of the sizing rolls 15 tends to move them downwardly by gravity toward the conveyor belt 13, thus normally tending to reduce the width of the sizing outlet. In the construction illustrated a compression spring 36 surrounds the rod 26, being com-

pressed between bearing member 25 and lock nut 29, the thrust of this spring tending to move the rod and consequently the sizing roll toward the conveyor belt.

In order to arrest the downward movement of the sizing roll and hold it at any predetermined desired distance away from the conveyor belt, the stop nuts 32, 33 and 34 are preferably provided with intermediate circumferential slots 37, and I provide a reversible bifurcated latch 38 having a forked portion 39 adapted to be slipped into the slot 37 of any stop nut to lock the nut against the end of the sleeve 27 and prevent further downward movement of the rod and sizing roll. One forked face of the reversible latch 38 is preferably flat, as shown in Fig. 5, while the opposite face is provided with a U-shaped flange 40 corresponding substantially in cross-section with the sleeve 27 so that the shoulders of the stop nuts 32, etc., will fit inside the flange 40, and when the latch is inverted the flange will abut against the upper edge of the sleeve 27 and coincide substantially therewith.

In Fig. 2 the latch 38 is shown in one position with the flat face of the latch contacting with the upper edge of the sleeve 27, the forked portion 39 interlocked with the slot 37 of stop nut 34, and the upper shoulder of the stop nut seated inside the flange 40. In Fig. 4 the latch 38 is shown inverted or upside-down, also interlocked with the stop nut 34, with the flange 40 abutting against the upper edge of the sleeve 27, holding the rod 26 and sizing roll 15 further away from the conveyor belt 13 than is the case in Fig. 2, and therefore giving a larger sizing outlet than in Fig. 2.

In practice, the stop nuts 32, 33 and 34 are initially set in the respective positions for sizing different kinds of fruit, such as tangerines, oranges and grapefruit. Once the stop nuts are set in the predetermined desired positions the sizing rolls may be adjusted to handle any one of the fruits, and the machine may be instantly changed over from one fruit to another without further manipulation of the stop nuts. In Fig. 2 the latch 38 is engaged with the lowermost stop nut 34, holding the roll 15 further away from the belt 13 than would be the case if the latch were engaged with either of the other stop nuts. In this position the roll 15 is set for sizing grapefruit. By reversing the latch 38 as shown in Fig. 4 the sizing roll 15 is held slightly further away from the belt 13, thus giving a different predetermined adjustment without changing the setting of the stop nut 34. The difference between the settings shown in Figs. 2 and 4 depends upon the height of the flange 40 of the latch.

To change the machine over from grapefruit to oranges, for example, the operator first raises the sizing roll 15 slightly to per-

mit the latch 38 to be disengaged from the nut 34, and then allows the roll 15 and rod 31 to descend. The latch 38 is slipped into the slot 37 of stop nut 33 and strikes against the end of the sleeve 27 to arrest the downward movement of the roll. Due to the position of the nut 33 on the rod 31, the sizing roll 15 will be somewhat closer to the conveyor belt 13 than before. The latch 38 may engage the stop nut 33 in either the upright or inverted position, giving two different adjustments as described above. In like manner stop nut 32 may be engaged for sizing tangerines. For convenience the latch 38 may be attached to the arm 16 or other part of the machine by means of a chain 41 secured in a hole 42 in the reduced end of the latch, as shown in Figs. 2 and 5.

An important feature of the invention resides in its ability to give accurate variations in adjustment down to small fractions of an inch. For example, the first sizing roll at the left-hand end of Fig. 1 might be set to provide an outlet of $2\frac{1}{4}$ inches when used for oranges and $2\frac{1}{8}$ inches when used for tangerines. The next succeeding roll might have to be set at $2\frac{1}{2}$ inches for oranges, and perhaps either $2\frac{7}{16}$ inches or $2\frac{9}{16}$ inches for tangerines. It would be impossible to obtain such close variations in adjustment with a single-position latch even if the stop nuts were mounted closely together on the rod 31 because the amount of adjustment would necessarily be limited by the thickness of the latch 38 and the thickness of the adjacent shoulders of the two adjacent stop nuts. In certain specific instances the latch 38 has been $\frac{1}{4}$ inch thick and each shoulder of the stop nuts $\frac{1}{4}$ inch thick so that the closest spacing obtainable with a single-position latch would be $\frac{3}{4}$ inch. With the reversible latch, however, very small variations in adjustment may be obtained by using the latch in two different positions on the same stop nut or on adjacent stop nuts. For example, the setting for grapefruit when the latch is engaged in upright position with stop nut 34, as shown in Fig. 2 will be close to the setting for oranges when the latch is engaged in inverted position with stop nut 33. The difference between such two settings, of course, depends upon the height of the flange 40.

Fig. 6 shows a multiple reversible latch 43 in the form of a cross which may be used when a multiplicity of adjustments are desired for each stop nut. The arms of the latch 43 are similar in construction to the latch 38 except that the flanges 40 are of different heights to give any desired number of different adjustments.

The invention claimed is:

1. A fruit sizer comprising a pair of cooperating sizing elements forming a graduated sizing outlet, slidable rods supporting one of said sizing elements to permit it to be

adjusted toward and away from the other sizing element, sleeves in which said rods slide, a plurality of stops on said rods, means tending to move said rods in one direction, and means insertable between said sleeves and said stops to hold said rods in adjusted position.

2. A fruit sizer comprising a pair of cooperating sizing elements forming a graduated sizing outlet, slidable rods supporting one of said sizing elements to permit it to be adjusted toward and away from the other sizing element, sleeves in which said rods slide, a plurality of stops on said rods, means tending to move said rods in one direction, and latches each having a forked portion insertable between said stops and the ends of said sleeves to hold said rods in adjusted position.

3. A fruit sizer comprising a pair of cooperating sizing elements forming a graduated sizing outlet, slidable rods supporting one of said sizing elements to permit it to be adjusted toward and away from the other sizing element, sleeves in which said rods slide, a plurality of stops having circumferential slots mounted on said rods and adapted to be received within said sleeves, means tending to move said rods in one direction, and latches each having a forked portion insertable into the slots in said stops and adapted by contact with the ends of said sleeves to hold said rods in adjusted position.

4. A fruit sizer comprising a pair of cooperating sizing elements forming a graduated sizing outlet, slidable rods supporting one of said sizing elements to permit it to be adjusted toward and away from the other sizing element, sleeves in which said rods slide, a plurality of stops on said rods adapted to be received within said sleeves, means tending to move said rods in one direction, and a reversible latch for each rod having a forked portion insertable between a stop and the end of said sleeve to hold the rod in adjusted position, one side of said latch being higher than the other.

5. A fruit sizer comprising a pair of cooperating sizing elements forming a graduated sizing outlet, slidable rods supporting one of said sizing elements to permit it to be adjusted toward and away from the other sizing element, fixed sleeves in which said rods slide, a plurality of stops on said rods adapted to be received within said sleeves, means tending to move said rods in one direction, and bifurcated latches insertable between said stops and the ends of said sleeves to hold said rods in adjusted position, said latches having a raised portion on one side adapted when said latch is inverted to abut against the edge of said sleeve to hold said rods in another position.

6. A fruit sizer comprising a conveyor, a plurality of sizing rolls arranged end to end longitudinally of said conveyor and spaced

therefrom to provide a graduated discharge outlet, adjustable rods supporting said rolls to permit them to be moved toward and away from said conveyor, fixed sleeves in which said rods slide, a plurality of stop nuts threaded on said rods and adapted to be received within said sleeves, and a plurality of reversible forked latches adapted to be inserted between said nuts and said sleeves to hold said rolls in adjusted position, said latches having a U-shaped flange on one side adapted when upright to clear the adjacent stop nut and when upside-down to abut against said sleeve to provide two different adjustments.

7. A fruit sizer comprising a conveyor, a plurality of sizing rolls arranged end to end longitudinally of said conveyor and spaced therefrom to provide a graduated discharge outlet, adjustable rods supporting said rolls to permit them to be moved toward and away from said conveyor, fixed sleeves in which said rods slide, a plurality of stop nuts having circumferential slots threaded on said rods and adapted to be received within said sleeves, and a plurality of forked latches insertable into the slots in said stop nuts and adapted by contact with the ends of said sleeves to hold said rods in adjusted position, said latches having a U-shaped flange on one side adapted when upright to clear the adjacent stop nut and when upside-down to abut against said sleeve to provide two different adjustments.

8. A fruit sizer comprising a conveyor, a plurality of sizing rolls arranged end to end longitudinally of said conveyor and spaced therefrom to provide a graduated discharge outlet, supporting arms overhanging said conveyor, a plurality of sleeves threaded in said supporting arms, adjustable rods slidable in said sleeves and supporting the ends of said rolls to permit them to be moved toward and away from said conveyor, a plurality of stop nuts having circumferential slots threaded on said rods and adapted to be received within said sleeves, means tending to move said rods and rolls toward said conveyor, and a plurality of reversible forked latches insertable into the slots in said stop nuts and adapted by contact with the ends of said sleeves to hold said rods and rolls in adjusted position, said rods having a U-shaped flange on one side adapted when upright to clear the adjacent stop nut and when upside-down to abut against said sleeve to provide two different adjustments.

Signed at Dunedin in the county of Pinellas and State of Florida this 20th day of May, A. D. 1929.

BRONSON C. SKINNER.