Dec. 8, 1936. A. F. ALLEN 2,063,008

FRUIT SIZING MACHINE

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FIG. 2.

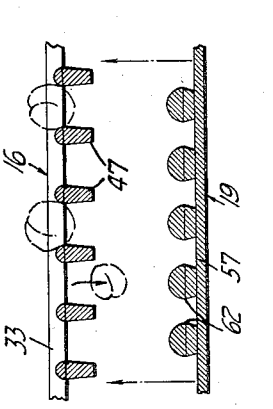


FIG. 1.

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FIG. 4

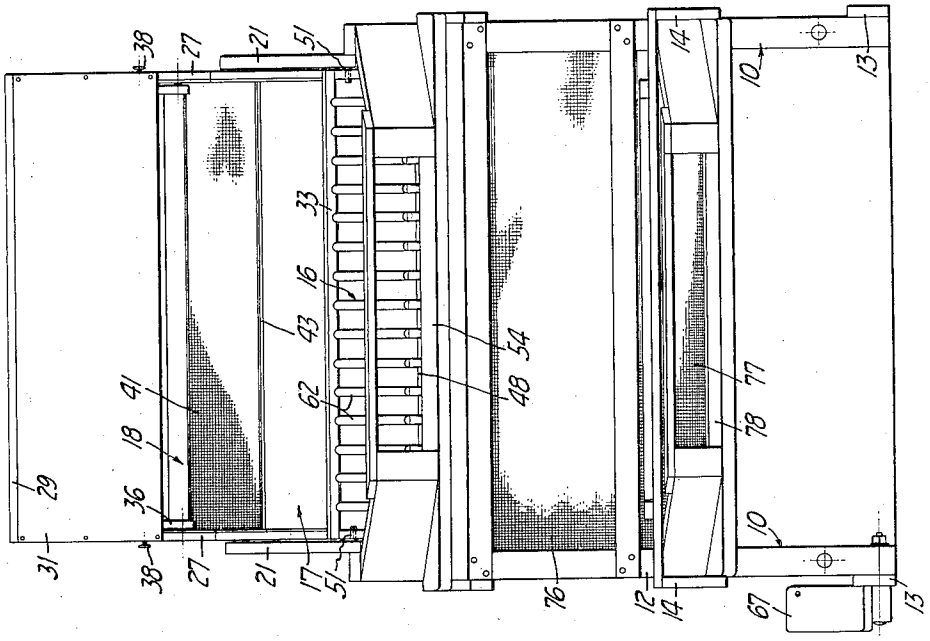
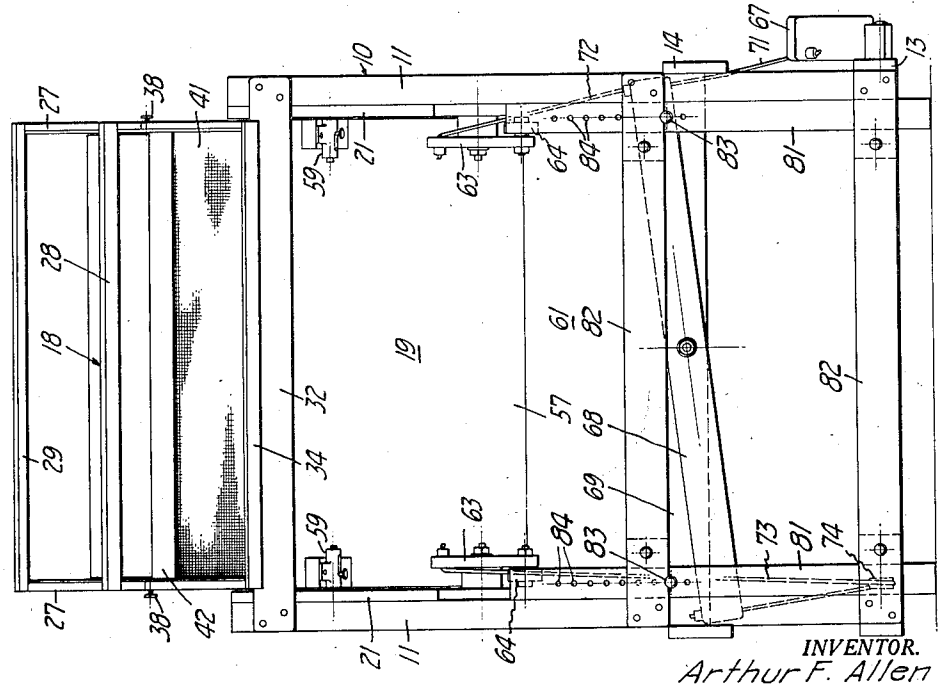


FIG. 3



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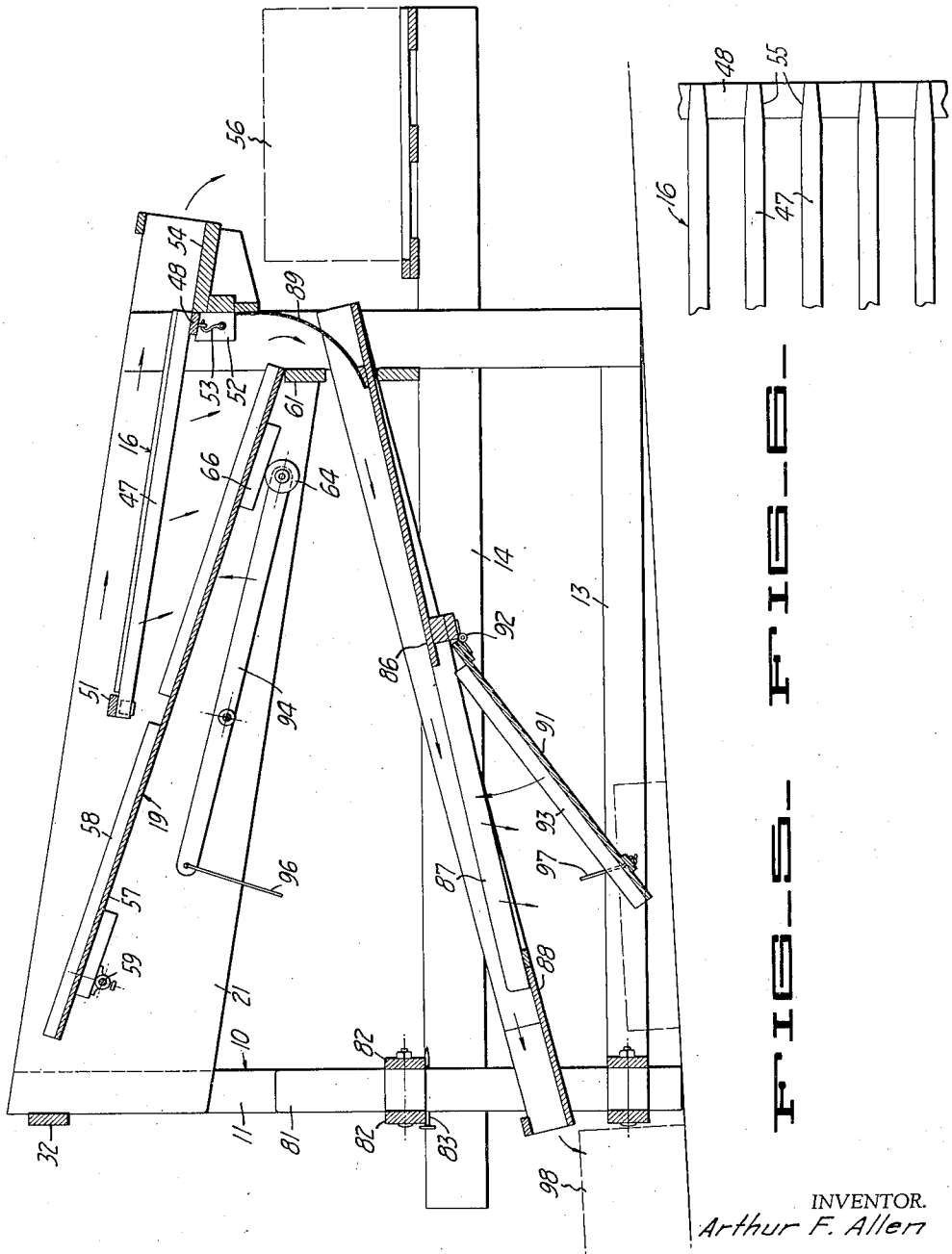


FIG. 6.

FIG. 5.

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2,063,008

FRUIT SIZING MACHINE

Arthur F. Allen, Hayward, Calif.

Application August 17, 1934, Serial No. 740,233

1 Claim. (Cl. 209—99)

This invention relates generally to machines for classifying fruit in accordance with size. Such machines are of value to orchardists or packing houses where size specifications must be taken into account.

In general it is an object of the invention to provide an improved machine of the above character. More specifically, the improved features of my invention can be outlined as follows:—Simplicity of construction and operation; high capacity for a given size machine; accuracy and reliability of operation, particularly when applied to fruit having physical characteristics like apricots; provision for quickly clearing the machine in the event fruit becomes lodged between the bars of the sizing grid; a latitude of flexibility and adjustment enabling operation upon a variety of fruits; and portability of the machine as a whole, to enable field operations.

Further objects and features of the invention will appear from the following description in which the preferred embodiment of the invention has been set forth in detail in conjunction with the accompanying drawings.

Referring to the drawings:

Fig. 1 is a side elevational view, in cross-section, illustrating a machine incorporating the present invention.

Fig. 2 is a cross-sectional detail taken along the line 2—2 of Fig. 1.

Fig. 3 is a back view of the machine as illustrated in Fig. 1.

Fig. 4 is a front view of the machine shown in Fig. 1.

Fig. 5 is a view similar to Fig. 1, but showing a modification of the invention.

Fig. 6 is a detail in plan, showing the construction of a sizing grid.

In that form of the invention illustrated in the drawings, the machine is provided with a frame 10 for supporting the various operating parts. The frame includes rear vertical corner posts 11 which are secured to the front corner posts 12 by the longitudinal frame members 13 and 14. As operating parts carried by this frame, there is a sizing grid 16 formed as an extension of a ramp 17. Overlying the ramp 17 there is a second ramp 18, the purpose of which will be presently explained. Underlying the sizing grid 16 and the ramp 17 there is a structure 19 which in part forms means for dislodging articles of fruit becoming jammed between the grid bars.

The sizing grid 16 and the ramp 17 extend between the side boards 21 which in turn are secured to the corner posts 11 and 12 of the supporting frame. The ramps 17 and 18 preferably are carried by an assembly which is removable as a unit from the remainder of the machine. Thus, ramp 17 is in the form of a flat board or plate which is secured to the lower edges of side walls or boards 27. The upper edges of side walls 27 are likewise secured together by bars or slats 28 and 29, while the front of the space between the walls 27 is enclosed by wall 31. At the back of the machine there is a cross-bar 32 which extends between the posts 11 and which serves to carry the rear edge of the ramp 17. The lower or forward edge of ramp 17 rests upon a cleat 33 which forms a part of the sizing grid 16, as will be presently explained. A cleat 34 on the rear edge of ramp 17 serves to prevent normal displacement, although permitting side walls 27 and the parts secured to the same to be lifted as a unit free of the machine.

Ramp 18 can be in the form of a board or plate, as shown, secured to a suitable frame 36. Pivot pins 37 serve to secure the rear edge of the frame to the side walls 27, while the forward portion can be adjustably carried by pins 38.

Arranged beneath the lower end of ramp 18 there is a flexible apron or baffle 41. This apron can be made of suitable material, such as canvas, and is for the purpose of receiving articles of fruit delivered from the ramp 18 and to be delivered with a rolling motion upon the ramp 17. Fig. 1 illustrates suitable means for supporting this apron. Its upper horizontal edge is secured to a cross-bar 42 which in turn has its ends secured to the side walls 27. The lower horizontal edge of the apron is secured to a cleat 43 which in turn is secured to the upper face of ramp 17. Sufficient slack is afforded so that the apron droops naturally, thereby presenting a concave face towards the front end of the machine.

In order that an operator may at any time interrupt delivery of fruit from ramp 18, I have shown a gate 44 hinged to the lower edge of ramp 18. This gate may be moved to a vertical position, as shown in dotted lines, by pulling a cord 46 or like operating means.

The sizing grid 16 consists of a plurality of spaced parallel bars 47, having their ends secured together by cleats 33 and 48. The upper edges of these bars are rounded, as shown in Fig. 2, the sides are tapered downwardly, and the spacing between the bars is slightly greater than the diameter of fruit which it is desired to pass through the grid. In order to removably support this grid in operating position with respect to ramp 17, its upper end is shown car-

ried by bracket 51, while its lower end rests upon lugs 52. Releasable latches 53 can also be provided for securely retaining the grid in proper position. Extending from the lower end of the sizing grid 16 there is an apron 54 for delivering the fruit into a suitable receiving means such as a box 56. As shown in Fig. 6, the discharge ends of the grid bars can be flattened on the sides, as indicated at 55, thus in effect affording tapered ends to avoid jamming of fruit into the proximity of cleat 48.

The structure 19, which underlies the sizing grid 16 and the ramp 17, is preferably constructed as follows:—A board or plate 57, which can be stiffened by cleats 58, has its upper end carried by retractable pivot bolts 59. The lower end of this board normally rests upon a cross member 61 which in turn has its ends secured to the corner posts 12. Fixed upon the upper side of board 57 and disposed directly below the sizing grid 16, are the spaced parallel bars 62. These bars are narrower than the grid bars 47, and their positioning is such that when structure 19 is swung upwardly they are interposed between bars 47 to dislodge any articles of fruit which may have become jammed between the same.

As convenient means for swinging the structure 19 upwardly, I have shown a pair of levers 63 which are pivotally carried by the side boards 21. One arm of each lever 63 carries a roller 64, and each roller engages a shoe 66 which in turn is secured to the underside of board 57. The other arm of each lever 63 is operatively connected with a foot lever 67. The particular type of connection illustrated includes a beam 68 extending laterally of the machine and pivoted centrally to the cross-bar 69. One end of this beam is connected to foot lever 67 by a cord or cable 71. The lever 63 on that side of the machine nearest the foot lever 67 is directly connected to the corresponding end of beam 68, by means of cord 72. On the other side of the machine, lever 63 is connected to the corresponding end of beam 68 by means of a cord 73 which extends down over a pulley 74. Thus, upon depressing foot lever 67, both arms 63 are rotated to swing the structure 19 upwardly against the underside of the sizing grid 16.

As will be presently explained, when the structure 19 is in its normal lowered position it receives undersized fruit passing through the sizing grid 16. In order to collect this fruit, there is shown a canvas baffle wall 76 which deflects the fruit downwardly upon the lower flexible baffle 77. From this baffle the fruit is discharged over an apron 78 to the box 79 or like receiving means.

In addition to the provision for making various adjustments described above, it is desirable to provide means for varying the inclination of grid 16 and ramp 17. Thus, I have provided legs 81 for the rear end of the frame, which slidably extend between the cross-bars 82. Pins 83, extending through openings 84, serve to retain a desired adjustment.

Operation of my machine is as follows:—The operator first dumps a quantity of fruit upon the upper ramp 18, and, if desired, this fruit can be temporarily retained by having gate 44 in an upright position, thus affording an opportunity to pick out imperfect fruit. Upon lowering gate 44 the fruit drops down upon the flexible baffle 41, and from this baffle it is rolled upon ramp 17. As the fruit rolls down ramp 17 it picks up considerable velocity and is then discharged upon the sizing grid 16. Oversized fruit rolls across the sizing grid 16 and is delivered to the box 56. Undersized fruit drops through the spaces between the grid bars and strikes the lower structure 19, from which it is immediately delivered to the box 79. If, during the operation of the machine, an article should become jammed between the grid bars 47, the operator momentarily depresses foot lever 67, to swing structure 19 upwardly, thereby causing the fruit to be dislodged by the bars 62. Structure 19 can be raised at any time to thus clear the machine, since, because of its greater inclination, undersized fruit is quickly discharged from the lower end of the same.

It will be noted that in the operation of my machine, fruit is always dropped at substantially the same point upon the flexible baffle or apron 41, so that, with a given inclination for ramp 17, a predetermined amount of rolling motion will be imparted before delivery upon the sizing grid 16. I have discovered that with fruit having a physical form comparable to apricots, rolling the fruit at a velocity above a given amount causes the fruit invariably to rise and roll upon its largest diameter. Thus, in sizing fruit of this character the inclination of ramp 17 is so adjusted that the velocity imparted to each article of fruit causes sizing upon its smallest diameter. In other words, before each apricot is delivered upon the sizing grid 16 it is rolling upon an axis substantially normal to the plane of its suture and at right angles to the direction of movement, whereby when it rolls upon the sizing grid the smallest diameter is the important factor in determining whether the article continues over the grid or falls therethrough.

It will also be evident from the above that my machine can be operated at a relatively high capacity. In fact, when operating upon apricots the machine will properly size the fruit practically as fast as the fruit can be delivered to the machine by an operator. At the same time, however, the machine can be made sufficiently compact and light to enable operation in the field.

Aside from the various adjustments afforded for the machine, which have been mentioned, the removable sizing grid makes it possible for an operator to select a sizing grid constructed in accordance with the nature of sizing required. In other words, each machine may be supplied with a plurality of sizing grids having different spacing between their bars, whereby a grid which will produce the sizing desired can be employed. Likewise, various structures 19 can be provided to insure proper operation with various sizing grids.

Under certain conditions, or when operating upon certain types of fruit, it is desirable to divide the fruit into three sizes or grades, namely, large size, medium size, and undersize fruit. A modification of the machine, making such operation possible, is shown in Fig. 5. Thus, below the structure 19 there is a second ramp 86 which is inclined downwardly toward the rear of the machine. A sizing grid 87 extends from the lower end of ramp 86 and serves to deliver fruit upon a discharge apron 88. Fruit dropped from the lower end of the structure 19 is received upon a cloth baffle 89, which serves to roll the fruit upon the ramp 86. Below the sizing grid 87 there is a structure 91, having its upper end supported by a hinge 92, and provided with spaced slats or bars 93. The spacing between bars 93 is such that when the structure 91 is swung upward-

ly these bars are interposed between the bars of the sizing grid **87**, to expel any articles of fruit which may have become jammed.

As in the previous modification, structure **19** of Fig. 5 may be swung upwardly by the pivoted levers **94**. Operating cords **96** can be connected to these levers, and likewise an operating cord **97** can be connected to structure **91**. The remainder of the machine shown in Fig. 5 is substantially the same as that of Fig. 1, it being understood that when the machine is operating, the structural unit carrying ramps **17** and **18** is supported by the frame, with the lower end of ramp **17** terminating at the upper end of sizing grid **16**. The spacing between the bars of sizing grid **87** is somewhat less than the spacing afforded for the sizing grid **16**, so that of the fruit passing through the grid **16**, a certain amount, conforming to an intermediate size, will not pass through the grid **87** but will be delivered to a container **98**.

Operation of the modification shown in Fig. 5 is the same as the modification first described. The essential difference is that the fruit passing through grid **16** is again subjected to sizing upon grid **87**, and before being delivered upon this grid a predetermined amount of rolling movement is afforded to it.

I claim:

In a machine of the character described for the handling of non-spherical fruit, a sizing grid, and means for causing fruit to roll upon the sizing grid with sufficient velocity to cause the fruit to roll upon their largest diameters, said sizing grid including spaced bars extending in the direction of the movement of the fruit.

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