

June 12, 1928.

W. G. ALLEN

1,673,133

GRADER

Filed June 26, 1925

3 Sheets-Sheet 1

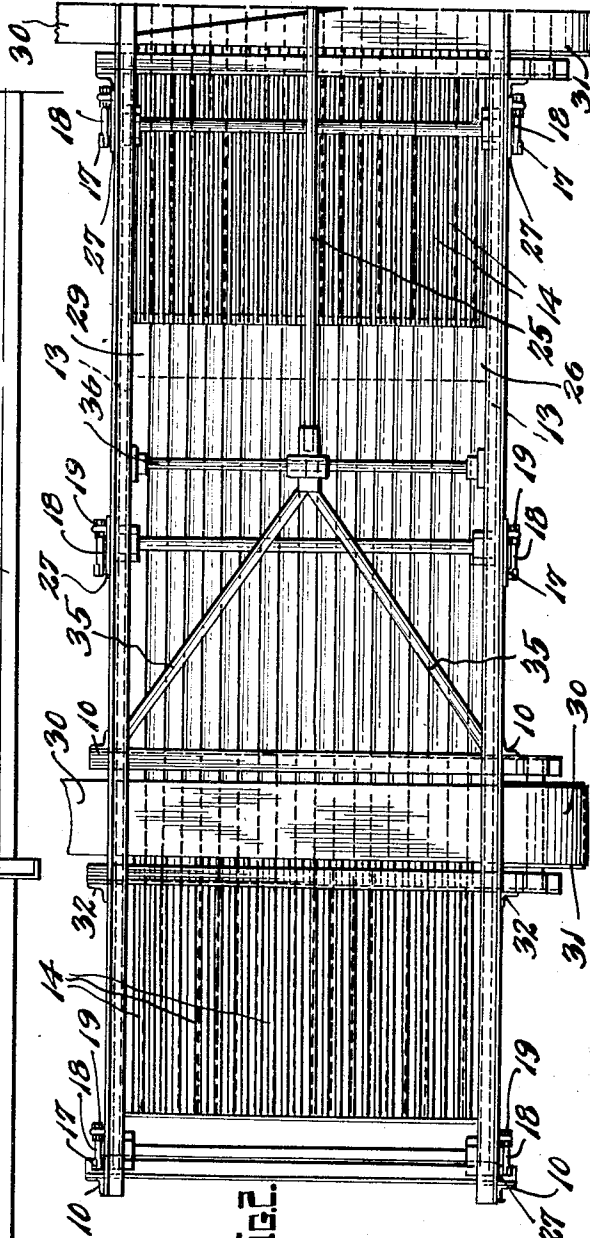
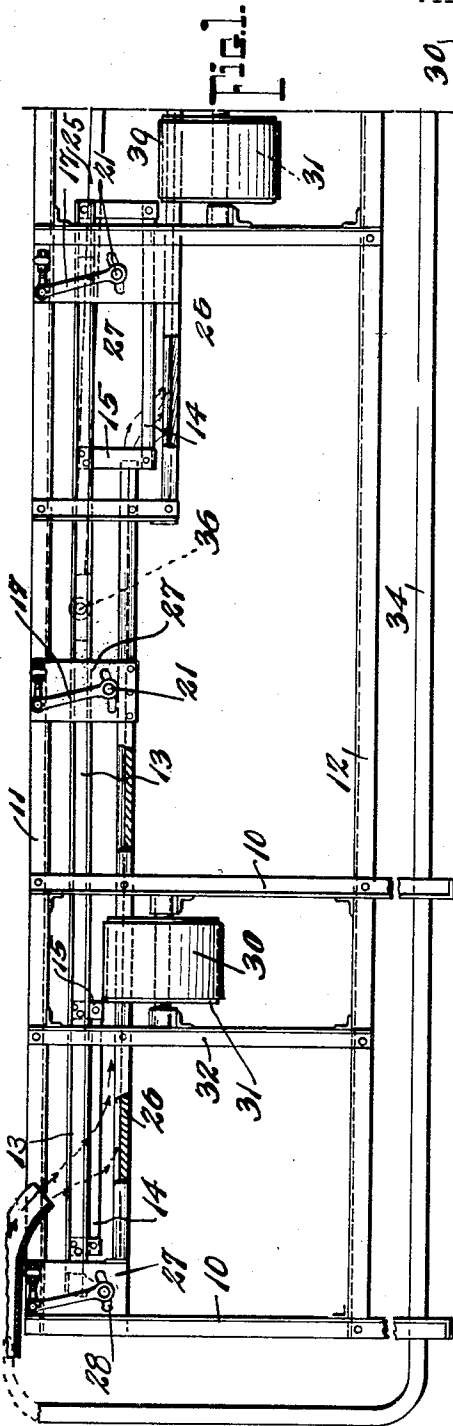


Fig. 2
Inventor
William G. Allen

384

Robb, Robb & Tiel
Attorneys

June 12, 1928.

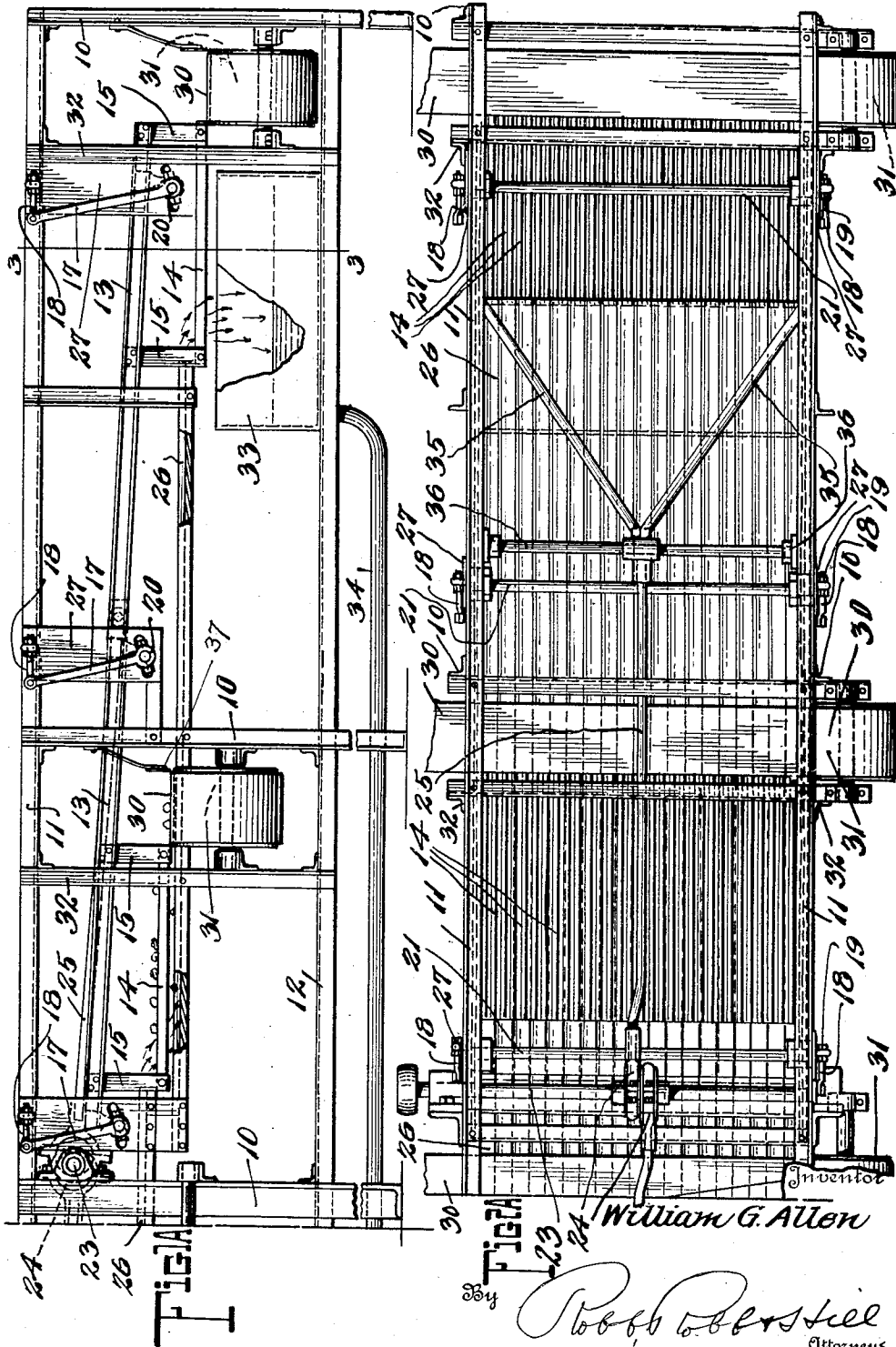
1,673,133

W. G. ALLEN

GRADER

Filed June 26, 1925

3 Sheets-Sheet 2



June 12, 1928.

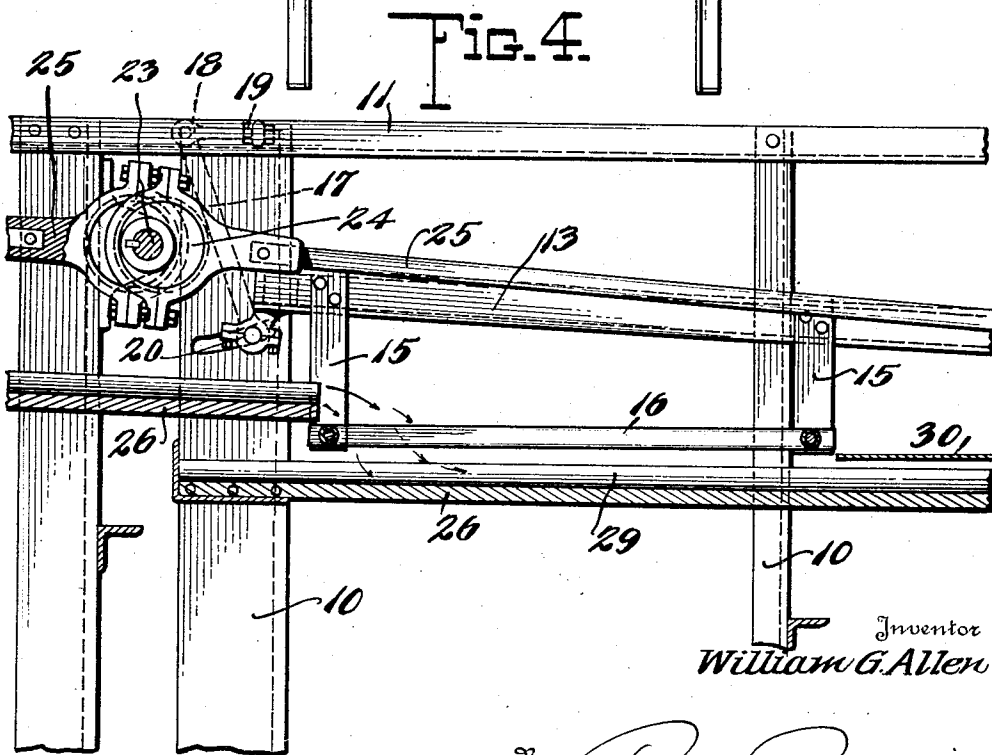
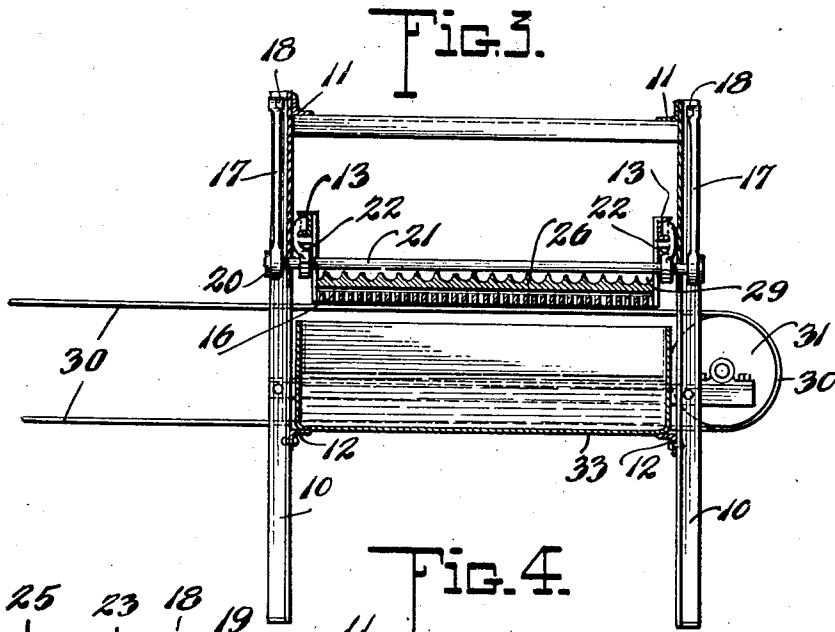
W. G. ALLEN

1,673,133

GRADER

Filed June 26, 1925

3 Sheets-Sheet 3



Inventor
William G. Allen

By *Robert Robert Steel*
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM G. ALLEN, OF SALEM, OREGON.

GRADER.

Application filed June 26, 1925. Serial No. 39,767.

This invention relates to a grader suitable for fruits and similar materials, and particularly to a construction employing a liquid medium for conducting the material from one grading surface to another, and means for collecting after delivery the separated grades of the material.

This construction of grader while adapted for general application, is especially designed for use in connection with the method of grading and system of grading disclosed in my co-pending applications filed June 26, 1925, Serial Number 39,765, and Serial Number 39,766, respectively. The material to be graded is deposited upon the reticulated primary grading surface by a body of liquid which conveys the material, and the material passing through the primary grading surface is deposited upon a fixed water table beneath the same having a series of parallel channels which discharge upon a succeeding grader in a lower horizontal plane where the action just described is repeated. At the final grading surface the water is collected in a suitable receptacle from which it may be returned for feeding purposes. The grading surfaces are agitated to discharge upon delivery belts while the ungraded material is conducted by the gravity flow of the water in the descending steps of the grading surfaces and water tables.

The invention has for an object to provide a novel and improved construction of grader comprising a series of reticulated grading surfaces having orifices of successively reduced area and a fixed water table disposed beneath one grading surface and discharging upon the succeeding surface.

A further object of the invention is to provide an improved grader structure comprising a fixed frame from which a movable frame is pivotally suspended and adapted to be vibrated longitudinally, said movable frame being provided with a series of reticulated surfaces disposed in descending horizontal planes, in connection with a series of water tables disposed beneath one grading surface and discharging upon the succeeding surface, said water tables being fixed and conducting the material thereon by the flow of the liquid.

A further object of the invention is to provide an improved construction of water table embodying a channeled or corrugated conducting surface upon which the liquid and material to be graded is discharged and sepa-

rated into a plurality of parallel streams each requiring only sufficient liquid to convey the material.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawings:

Figure 1 is a side elevation with parts in section;

Figure 1^A is a continuation of Figure 1;

Figure 2 is a top plan;

Figure 2^A is a continuation of Figure 2;

Figure 3 is a vertical section on the line 3—3 of Figure 1^A; and

Figure 4 is an enlarged section at the longitudinal center of the grader.

Like numerals refer to like parts throughout the several figures of the drawings.

The fixed frame of the grader may be of any desired construction or configuration and for instance is shown as comprising a series of uprights 10 connected at their upper ends by longitudinal supporting bars 11 and at their lower portion by similar bars 12. Suspended from the bars 11 is a movable frame 13 which carries at intervals reticulated grading surfaces 14, these being disposed in successive descending horizontal planes by means of hangers 15 of different lengths. The grading surfaces 14 may be of any preferred character but preferably comprise a series of parallel spaced bars 16, those of the several surfaces being spaced at different intervals to provide for the proper graduation of the grading. With smaller material, screens may be used instead of bars.

The movable frame may be given an agitation or longitudinal reciprocation by any desired mechanical connection, a preferred construction being the use of hangers 17 pivoted at one end to a support 18 upon the bars 11 and adapted to be adjusted longitudinally by the opposite nuts as indicated at 19. The lower end of this hanger is pivoted at 20 upon a cross rod 21 mounted on the movable frame 13. This rod is supported by means of bearing brackets 22 depending therefrom as shown in Figure 4. Motion is imparted to the movable frames from a driving shaft 23 by means of an eccentric 24 thereon connected to a pitman rod 25 which may be formed with a Y-end 35 extending to the opposite sides of the frame for an equalized application

of the power thereto. This rod may be connected to a cross brace 36 on the movable frame. Where the two frames are used, as shown in Figures 2 and 2^A, these parts are duplicated upon the drive shaft with oppositely disposed eccentrics as indicated in Figure 4.

Beneath each of the grading surfaces a water table 26 is disposed and is supported in fixed position by attachment to the uprights 10 and also by means of depending plates 27 from the longitudinal bars 11, these plates being provided with slots 28 to permit movement of the rod 21 from the hangers for the movable frame. This water table extends for the width of the machine and in order to economize in the quantity of liquid required for conveying the material and also to maintain this material in separated condition the conveying surface of the table is channeled or corrugated as shown at 29 in Figures 2 and 3. The liquid and material passing through the primary grading surface is thus divided into a series of parallel streams which discharge upon the next succeeding surface and maintain the material in a separated free condition which materially facilitates the grading action and the passage through the grading surfaces of the liquid and remaining material.

Extending over these water tables I provide a transverse conveyer for the reception of the graded material from each surface and this may comprise a belt 30 mounted upon a suitable pulley 31 having bearings upon one of the uprights 10 and a cooperating upright 32. These conveyers are provided at the discharge from each of the separate grading surfaces. Beneath the final grading surface a liquid receptacle 33 is disposed which collects the liquid used and this may be returned to the source of feed by means of a suitable conducting pipe 34 as indicated in Figures 1 and 1^A. A stop 37 is provided at one side of the belt 30.

The general operation of the grader will be apparent from the foregoing description from which it will be seen that the material is fed over a series of smooth horizontal bars which are longitudinally agitated so as to cause a feed therefrom of the material collected by the bars and its conveyance from the grader while the material passing through the bars is deposited upon the water table and separated into a plurality of streams by the channel surface which permits the use of the minimum of liquid in conveying the material from one grading surface to another.

The use of a body of liquid for conveying material through the different stages prevents the bruising of fresh fruits when being graded and while this grader is adapted for application to any class of material which

can be conducted by a flowing stream of liquid, still it is particularly designed for use in connection with such fruits as they are practically floated upon the liquid and thus maintained in a separated condition securing the most desirable results in the subsequent canning operations.

While the specific details of construction have been shown and described, the invention is not confined thereto as changes and alterations may be made thereto without departing from the spirit of the invention as recited in the following claims.

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

1. In a fruit grader, a plurality of grading surfaces having orifices of successively reduced area and a water table disposed beneath one grading surface and having means upon its upper face to produce a shallow diffused stream of conveying liquid and discharge and individually separated thin layer of material upon the succeeding grading surface.

2. In a fruit grader, a series of grading surfaces having orifices of successively reduced area, means for vibrating said graders, and a water table disposed beneath one grading surface and discharging upon the succeeding grading surface, said table having means upon its upper face to divide the liquid into individual streams and thereby present a relatively thin layer of fruit upon the succeeding grading surface.

3. In a grader, a series of reticulated grading surfaces having orifices of successively reduced area, and a fixed water table disposed beneath one grading surface and discharging upon the succeeding grading surface, said water table having a channeled conducting face.

4. In a grader, a series of reticulated grading surfaces having orifices of successively reduced area, and a fixed water table disposed beneath and substantially parallel to one grading surface and discharging upon the succeeding grading surface, said water table being provided with a series of longitudinal corrugations providing separate parallel channels upon its conducting face.

5. In a grader, a fixed frame, movable grader frames, a series of hanger links pivoted at opposite ends to the frames, reticulated grading surfaces carried by the movable frames in descending horizontal planes, and a series of fixed water tables supported from the frame beneath the grading surfaces to discharge in the same direction as the grading surfaces and upon the succeeding lower grading surface.

6. In a grader, a fixed frame, movable grader frames, a series of hanger links pivoted at opposite ends to the frames, reticulated grading surfaces carried by the

movable frames in descending horizontal planes, a series of fixed water tables supported from the frame beneath the grading surfaces to discharge in the same direction as the grading surfaces and upon the succeeding lower grading surface, a drive shaft intermediate the ends of the fixed frame, eccentrics thereon, and pitman rods extending in opposite directions from the eccentrics to one of said movable frames.

7. In a grader, a fixed frame, movable grader frames, a series of hanger links pivoted at opposite ends to the frames, reticulated grading surfaces carried by the movable frames in descending horizontal planes, a series of fixed water tables supported from the frame beneath the grading surfaces to discharge in the same direction as the grading surfaces and upon the succeeding lower grading surface, and a liquid receptacle disposed beneath the final grading surface.

8. In a grader, a fixed frame, movable grader frames, a series of hanger links pivoted at opposite ends to the frames, reticulated grading surfaces carried by the movable frames in descending horizontal planes, a series of fixed water tables supported from the fixed frame beneath the grading surfaces to discharge upon the succeeding lower grading surface, a liquid receptacle disposed beneath the final grading surface, and transversely disposed conveyers intermediate said surface and table at the delivery from each grading surface.

9. In a grader, a fixed frame, a movable frame, hanger links pivotally connected to the frames, a series of grading surfaces dependent from the movable frame and composed of spaced parallel bars extending longitudinally thereof, means for imparting a reciprocatory movement to said movable

frame to feed material in parallel paths upon said bars, delivery means at the lower ends of each series of bars, and fixed water tables mounted upon the frame and disposed in descending horizontal planes beneath the successive grading surfaces to feed from one grading surface to another.

10. In a grader, a fixed frame, a movable frame, hanger links pivotally connected to the frames, a series of grading surfaces dependent from the movable frame and composed of spaced parallel bars extending longitudinally thereof, means for imparting a reciprocatory movement to said movable frame to feed material in parallel paths upon said bars, a conveyer belt extending transversely of the frame and disposed at the delivery from each grading surface, and fixed water tables mounted upon the frame and disposed in descending horizontal planes beneath the successive grading surfaces to feed in the same direction.

11. In a grader, a fixed frame, a movable frame, hanger links pivotally connected to the frames, a series of grading surfaces dependent from the movable frame and composed of spaced parallel bars extending longitudinally thereof, means for imparting a reciprocatory movement to said movable frame, a conveyer belt extending transversely of the frame and disposed at the delivery from each grading surface, water tables mounted upon the fixed frame and disposed in descending horizontal planes beneath the successive grading surfaces, said tables being provided with a longitudinally channeled conducting face, and a liquid receptacle disposed beneath the final grading surface.

In testimony whereof I affix my signature.

WILLIAM G. ALLEN.