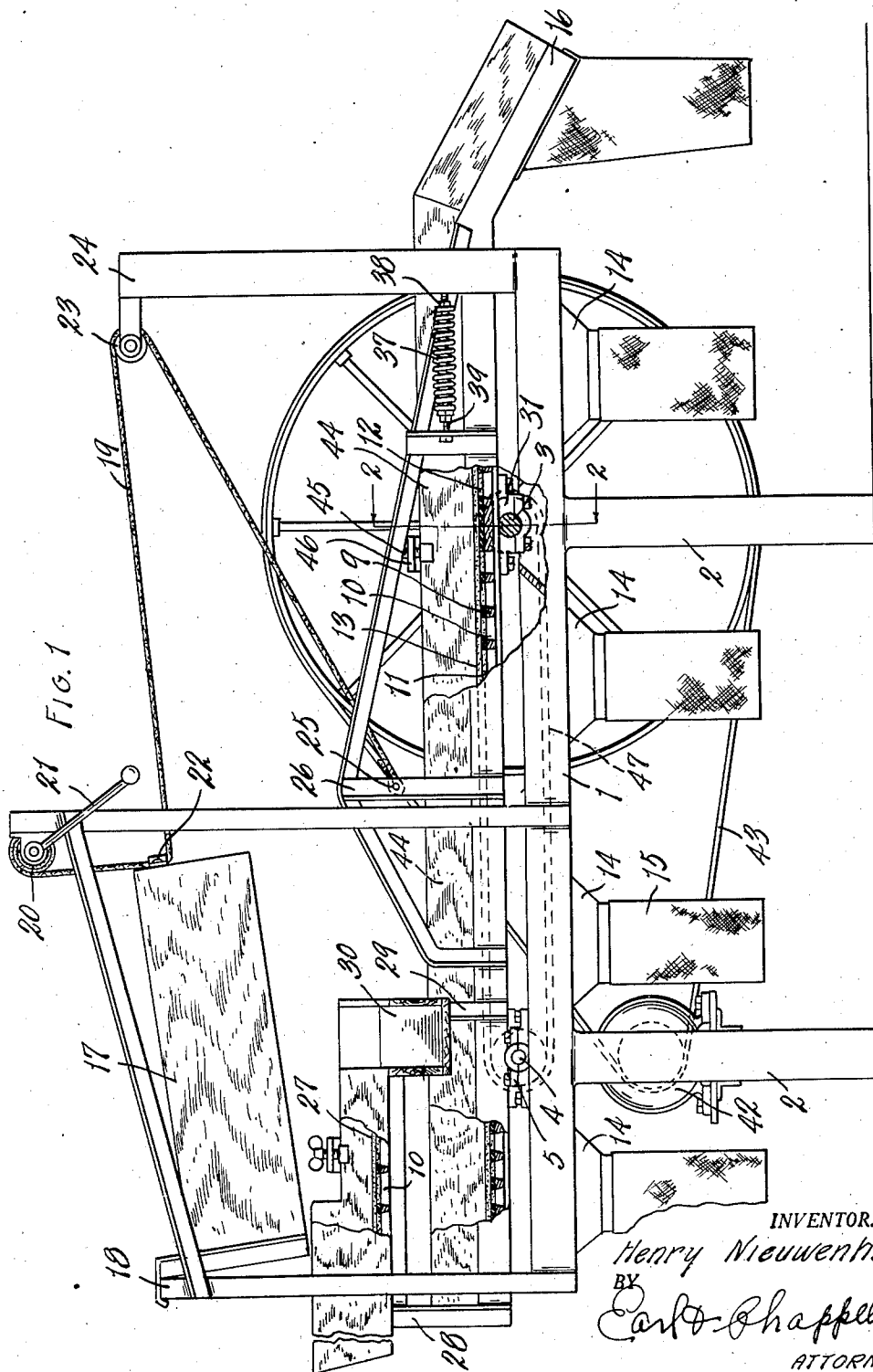


Dec. 17, 1946.

H. NIEUWENHUIS
PERFORATE BULB GRADING TABLE, GYRATORY
MOVEMENT, WITH LATERAL IMPACT
Filed July 20, 1945

2,412,905

2 Sheets-Sheet 1

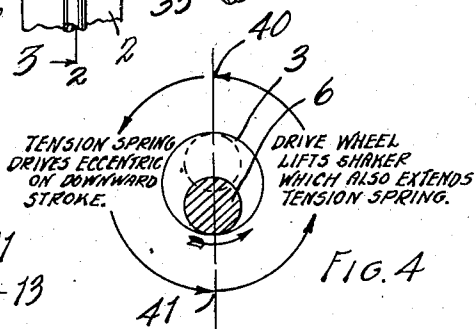
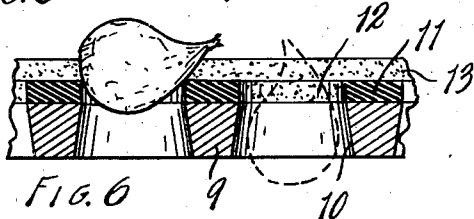
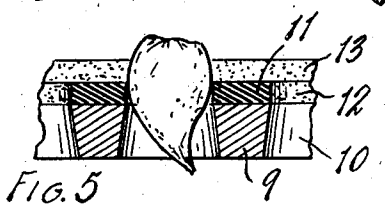
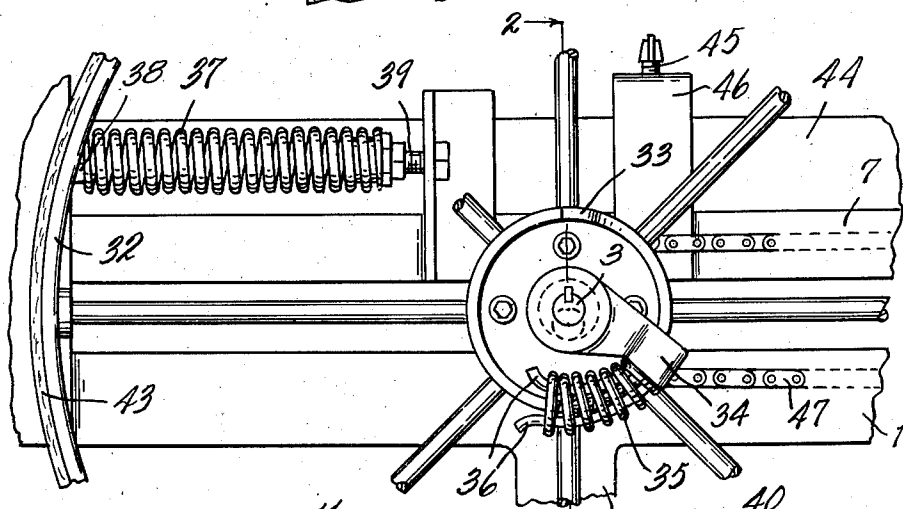
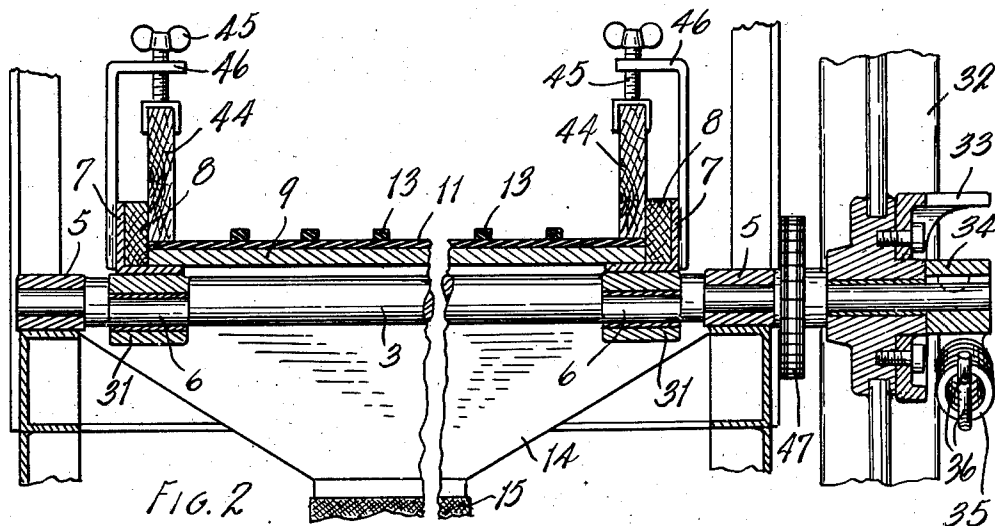


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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,412,905

PERFORATE BULB-GRADING TABLE, GYRATORY MOVEMENT, WITH LATERAL IMPACT

Henry Nieuwenhuis, Kalamazoo, Mich.

Application July 20, 1945, Serial No. 606,051

7 Claims. (Cl. 209—85)

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The main objects of this invention are:

First, to provide a grader for bulbs which is highly efficient in grading the bulbs according to size and without bruising or abrading the same.

Second, to provide a grader in which the grader bed is horizontally disposed or substantially horizontally disposed and is actuated with a quick or snap spring action during the latter portion of its cycle of movement with a result that the bulbs are advanced along the bed to the graduated openings with a jerking or bouncing movement which results in turning and finally presenting them with their smaller dimensions to openings of the size adapted to pass the same.

Third, to provide a grader having these advantages which is of large capacity and at the same time quite simple and compact in structure.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a fragmentary side elevation of a structure embodying my invention, portions being shown in section on vertical lines.

Fig. 2 is an enlarged fragmentary view mainly in transverse section on line 2—2 of Figs. 1 and 3.

Fig. 3 is an enlarged fragmentary view looking from the right to Fig. 2.

Fig. 4 is a diagrammatic view illustrating the accelerated action during a portion of the cycle of movement.

Fig. 5 is an enlarged fragmentary view illustrating details of the graduated bed.

Fig. 6 is an enlarged fragmentary sectional view illustrating the possible relationship of the bulbs to the sorting openings and the advantage of the movement of the grader bed whereby a bouncing or advancing movement is imparted to the articles to be sorted.

The embodiment of my invention illustrated is designed for the sorting of bulbs. It comprises a suitable supporting frame 1 having legs 2. Shafts 3 and 4 are supported in bearings 5 on the frame, these shafts having cranks or eccentrics 6. The sorting bed or shaker comprises longitudinal side members 7 of angle iron, side members 8, and bottom 9 carried thereby. The bottom is provided with holes 10 graduated longitudinally of the bed, there being a series of holes of each size. The bed is provided with a rubber facing 11 having holes 12 therein registering with the holes 10. Longitudinal aligning ribs 13 are disposed be-

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tween the longitudinally aligned holes of the series.

The frame carries discharge chutes 14 arranged under the series of holes, these chutes being adapted to receive bags 15. The rear end of the bed is preferably downwardly inclined at 16.

A feed hopper 17 is tiltingly supported on the upper ends of the uprights 18 at the forward end of the frame. This hopper is supported in an inclined relation by means of the rope 19 which is connected at one end to the drum 20 provided with a crank 21 whereby the hopper may be tilted as desired to secure the desired feed. The rope is connected to the hopper at 22 and passes from this connection over a pulley 23 on the upright 24 and is connected at 25 to the uprights 26 on the bed.

The hopper delivers to an auxiliary bed 27 which is mounted on uprights 28 and 29 on the bed. This shaker or bed 27 has a bottom similar to that described and is in effect an extension of the bed or shaker and is arranged in this manner for compactness. The bed or shaker 27 has a side delivery chute 30. The bed is provided with eccentric straps or bearings 31 which engage the cranks or eccentrics 6.

The driving wheel or pulley 32 is free to rotate on the shaft 3 and is provided with a driving lug 33 which coacts with the driven arm 34 on the shaft 3. A tappet or impact spring 35 is provided for the arm 34, this spring being carried by the forks 36 extending from the arm. As the driving pulley 32 rotates, the lug 33 engages the tappet or impact spring, rotating the shaft through a portion of the cycle of movement. This rotation places the spring 37 which is connected to the frame at 38 and to the bed or shaker at 39 under tension so that as the eccentric passes the point designated 40 in Fig. 4, the tension of the spring drives the eccentric or shaft with an accelerated movement or spring snap action, carrying the driven member away from the lug to the point 41 at which point it is picked up by the driving lug for the first portion of the cycle of movement. The spring 37 is stretched while the eccentric 6 is moving from left to right, as viewed in Figs. 3 and 4, during the lower half of its movement in a complete cycle, and contracts while the eccentric 6 is moving from right to left, during the upper half of its movement in a complete cycle. However, due to the compression and expansion of the impact spring 35 and the inertia of the moving parts at the relatively high speed of operation of the grader the tension of the spring 37 is largely instrumental in imparting movement to

the eccentric 6 approximately from a top position indicated by radial line 40 to a bottom position indicated by radial line 41, as viewed in Fig. 4. This results in a jerking and snap action during the last portion of each cycle of movement and the bulbs are bounced or advanced along on the sorter bed with a result that their position on the bed is changed although they are in general guided or aligned by means of the ribs 13. The bulbs may be passed either end up to the grading openings as is indicated in Figs. 5 and 6 or they may be passed sidewise in which case they will not pass through until they have been shifted by the action described to present them endwise.

In the structure illustrated, the pulley 32 is driven from a motor 42 and suitable belt 43.

In the embodiment illustrated, the bottom facing 11 is clamped in place by means of the auxiliary side members 44 which rest upon the edges of the facing against the side members 8, the auxiliary side members 44 being clamped upon the facing by the clamping screws 45 carried by the brackets 46 extending upwardly from the side rails 7. Drive chain 47 is provided for the shaft 4.

My improved grader is of large capacity and handles objects such as bulbs without bruising or injuring or abrading the same. It is desirable that the bulbs be graded without peeling or removing the skins to any substantial extent and I accomplish that result.

In the embodiment illustrated, the bulbs are graded into six sizes which is ordinarily sufficient for commercial purposes. This, however, may be varied as desired.

I have illustrated and described my invention in a commercial embodiment which is very practical. I have not attempted to illustrate or describe certain other modifications and adaptations as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

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

1. In a grader for irregular objects, the combination of a pair of shafts provided with cranks, a horizontally disposed grader bed mounted on said cranks and provided with series of holes graduated longitudinally of the bed, corresponding holes of the series being longitudinally aligned, said bed having a rubber facing with holes therein registering with the holes of the bed, and rubber aligning ribs disposed longitudinally of the bed between the longitudinally aligned holes, driving connections for said shafts, a driving pulley rotatable on one of said shafts and provided with a driving lug, a driven arm on said shaft disposed at the side of said pulley and provided with an impact spring coacting with said driving lug, a spring connected to said bed to be placed under bed actuating stress during each partial rotation of said pulley and the resulting movement of the said bed in a forward direction, the spring then acting to impart a quick return movement to said bed whereby the objects thereon are tumbled and advanced on the bed with a jerking motion, an inclined feed hopper tiltingly mounted at its lower end, and a supporting rope for the other end of said feed hopper, said rope being provided with an adjusting means at one end, the other end of the rope being attached to said grading bed whereby the hopper is agitated to feed the articles to be graded therefrom to the bed.

2. In a grader for irregular objects, the combination of a pair of shafts provided with cranks, a horizontally disposed grader bed mounted on said cranks and provided with series of holes graduated longitudinally of the bed, corresponding holes of the series being longitudinally aligned, said bed having a rubber facing with holes therein registering with the holes of the bed, and rubber aligning ribs disposed longitudinally of the bed between the longitudinally aligned holes, driving connections for said shafts, a driving pulley rotatable on one of said shafts and provided with a driving lug, a driven arm on said shaft disposed at the side of said pulley and provided with an impact spring coacting with said driving lug, and a spring connected to said bed to be placed under bed actuating stress during each partial rotation of said pulley and the resulting movement of the said bed in a forward direction, the spring then acting to impart a quick return movement to said bed whereby the objects thereon are tumbled and advanced on the bed with a jerking motion.

3. In a grader for irregular objects, the combination of a pair of shafts provided with cranks, a horizontally disposed grader bed mounted on said cranks and provided with series of graduated holes, driving connections for said shafts, a driving pulley rotatable on one of said shafts and provided with a driving lug, a driven arm on said shaft disposed at the side of said pulley and provided with an impact spring coacting with said driving lug, a spring connected to said bed to be placed under bed actuating stress during each partial rotation of said pulley and the resulting movement of the said bed in a forward direction, the spring then acting to impart a quick return movement to said bed whereby the objects thereon are tumbled and advanced on the bed with a jerking motion, an inclined feed hopper tiltingly mounted at its lower end, and a supporting rope for the other end of said feed hopper, said rope being provided with an adjusting means at one end, the other end of the rope being attached to said grading bed whereby the hopper is agitated to feed the articles to be graded therefrom to the bed.

4. In a grader for irregular objects, the combination of a pair of shafts provided with cranks, a horizontally disposed grader bed mounted on said cranks and provided with series of graduated holes, driving connections for said shafts, a driving pulley rotatable on one of said shafts and provided with a driving lug, a driven arm on said shaft disposed at the side of said pulley and provided with an impact spring coacting with said driving lug, and a spring connected to said bed to be placed under bed actuating stress during each partial rotation of said pulley and the resulting movement of the said bed in a forward direction, the spring then acting to impart a quick return movement to said bed whereby the objects thereon are tumbled and advanced on the bed with a jerking motion.

5. In a grading machine, the combination of a grader bed having a longitudinally disposed graduated series of grading apertures in the bottom thereof, supporting cranks for said bed, driving means for said cranks comprising a driving member provided with a lug, a driven arm connected to one of said cranks, an impact spring for said arm with which said lug coacts, and a spring for actuating said bed in one direction at a speed exceeding the speed of the driving member, said spring being placed under actuat-

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ing stress by said driving member during a partial rotation thereof whereby when the cranks pass a certain point in their rotation the stored power in the spring actuates the bed with an accelerated snap action.

6. In a grading machine, the combination of a grader bed having graduated grading apertures, an eccentric supporting means for said bed, driving means for said eccentric supporting means comprising a driving member, a driven member with which said driving member coacts during a portion of its cycle of movement, and a spring for actuating said bed in one direction at a speed exceeding the speed of the driving member, said spring being placed under stress by said driving member during a partial cycle thereof whereby power is stored in the spring actuating the bed with an accelerated movement during the remainder of the cycle of movement of the bed, said eccentric supporting means while operating said grader bed making complete successive revolutions in a single direction.

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7. In a grader for irregular objects, the combination of a horizontally disposed grader bed provided with series of holes graduated longitudinally of the bed, corresponding holes of the series being longitudinally aligned, and aligning ribs disposed longitudinally of the bed between the longitudinally aligned holes, eccentric supporting means for said bed, driving means for said supporting means comprising a driving member, a driven member with which said driving member coacts, and a spring for actuating said bed in one direction at a speed exceeding the speed of the driving member, said spring being placed under stress by said driving member during a partial cycle thereof whereby power is stored in the spring actuating the bed with an accelerated movement during the remainder of the cycle of movement, said eccentric supporting means while operating said grader bed making complete successive revolutions in a single direction.

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