

Feb. 21, 1933.

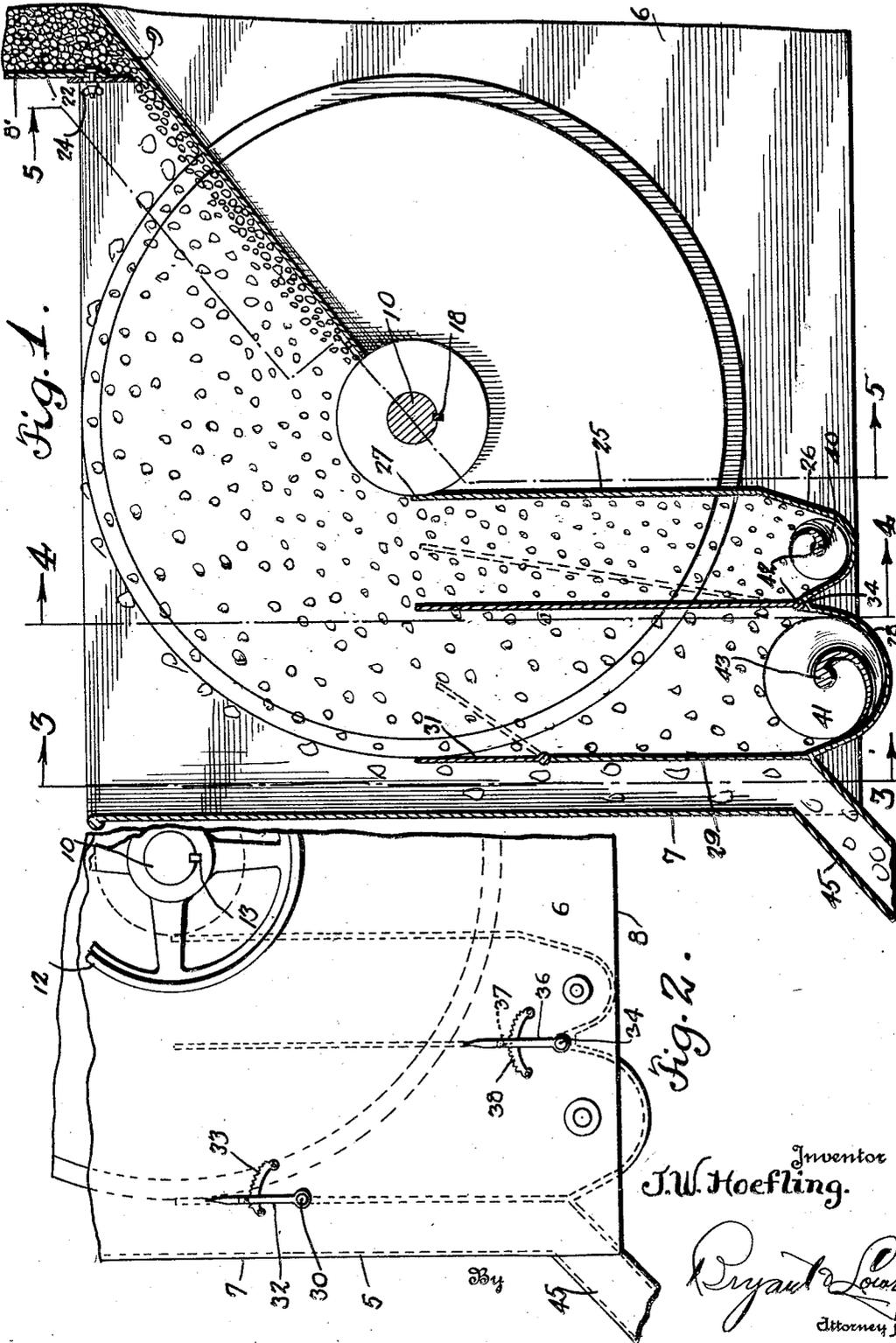
J. W. HOEFLING

1,898,249

GRAIN OR FINE PARTICLE GRADER

Filed March 18, 1931

2 Sheets-Sheet 1



Inventor
J. W. Hoefling.

Bryant & Lewis
Attorneys

Feb. 21, 1933.

J. W. HOEFLING

1,898,249

GRAIN OR FINE PARTICLE GRADER

Filed March 18, 1931

2 Sheets-Sheet 2

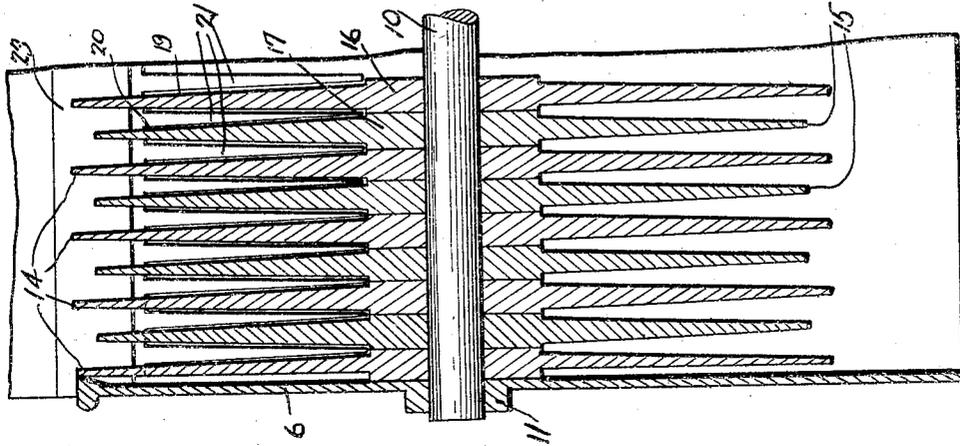


Fig. 5.

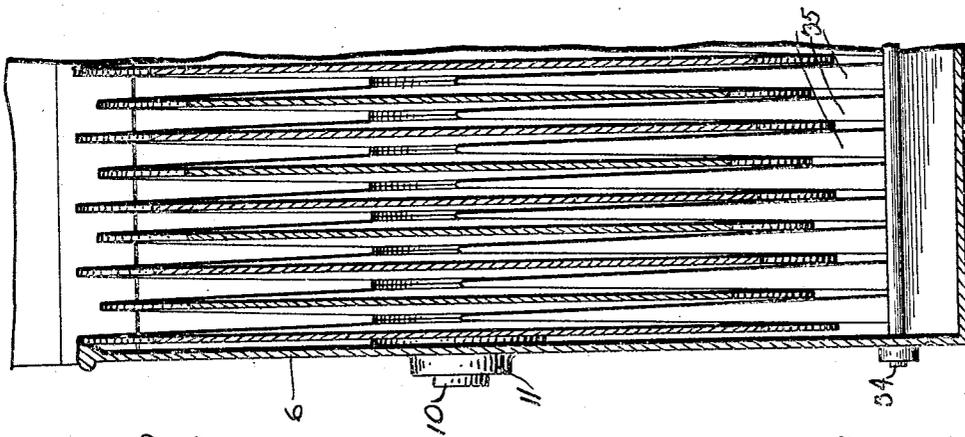


Fig. 4.

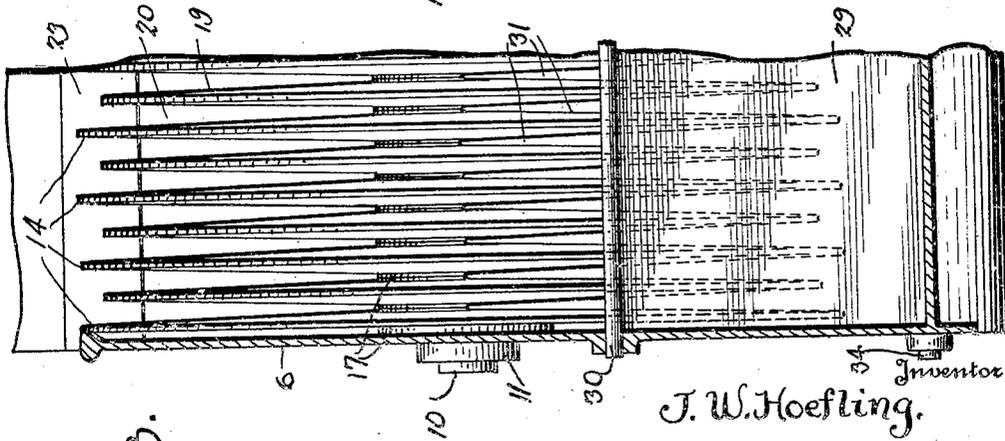


Fig. 3.

J. W. Hoefling.
Inventor

Dryant & Lowry
Attorneys

334

UNITED STATES PATENT OFFICE

JOHN W. HOEFLING, OF CHICO, CALIFORNIA, ASSIGNOR TO HOEFLING BROS. INC., OF CHICO, CALIFORNIA

GRAIN OR FINE PARTICLE GRADER

Application filed March 13, 1931. Serial No. 523,557.

This invention relates to improvements in grain or fine particle graders and material graders in general where the basis of grades or separation is different in thickness or diameter. The invention comprises a series of disks mounted upon a shaft, the complementary walls of which are closer together around the area of the shaft than around the periphery of the disks, whereby the material is fed to the disks and falls therebetween, the downward movement of which will be limited by the varying sizes of the material particles whereupon the material is carried by the disks in a rotary fashion and is collected by providing strips interposed between each of the disks for effecting removal of the particles from between the disks and the collection of the same within receptacles according to the graded sizes of the material. The invention further comprises means for adjusting the collecting fingers toward and away from the rotary shaft whereby the material is collected from between the disks in various desired grades by means of a simple operation. As the different grades are divided and dislodged by the tapering fingers, each falls into a separate conveyor trough for discharge from the machine.

Heretofore, it has been common practice to separate grain and other fine material by means of vibrating screens with the smaller particles dropping through the perforations while the larger ones continue on over the surface. This method is objectionable, due to the fact that such screening apparatus occupies considerable floor space; the operation is slow or inefficient or both; a separate screen is required for each grade of each material and different sets of screens again for different materials; there is no flexibility of separation which is fixed by the size of the screen perforations; screens are impossible to keep clean or free from grains wedging into the holes, thus reducing their efficiency; and a vibrating motion of the heavy screen frames is necessary albeit generally objectionable.

The above objections and disadvantages are overcome by the simple disc grader embodied in this invention, based on the individual gauging of each grain or particle as

determined by the depth to which it drops between the inclined surfaces of the discs. Grain or similar material may be graded or assorted into several sizes at high capacity and efficiency and by means of simple rotary motion. The material is fed from the inclined chute, carried approximately half of one revolution of the disc assembly and removed by a series of fingers interposed between the inclined faces of the disks. Furthermore, a wide range or flexibility of grading is possible and easily accomplished by simple adjustments, which may be made while in operation; comparatively small floor space is required; and there is no loss of efficiency by clogging. This type of machine is particularly well adapted to separating oats from barley, splits from wheat and beans, chaff from grain, and grain and other material grading as determined by diameter or thickness rather than by length.

Other objects and advantages of the invention will become apparent during the course of the following description, forming a part of this specification and in which,

Figure 1 is a vertical cross-section of the invention showing the manner in which the material is fed to the disks and the vertical collecting fingers interposed between the grading disks;

Figure 2 is a fragmentary side elevation of the invention showing the adjusting arms for causing the movement of the collecting fingers toward or away from the shaft upon which the disks are mounted, thus controlling the grade as desired.

Figure 3 is a vertical transverse cross-sectional view on lines 3—3 of Figure 1 showing the collecting fingers mounted upon a transverse shaft having its ends journaled in the casing;

Figure 4 is a vertical transverse cross-sectional view taken on line 4—4 of Figure 1, looking in the direction of the arrows showing another set of collecting fingers for removing the particles from between the inclined surfaces of the disks; and

Figure 5 is a vertical transverse cross-sectional view taken on the vertical and angular lines 5—5 looking in the direction of the arrows in

Figure 1, showing the material feeding chute which is comprised of a series of tapered fingers extending between the inclined surfaces of the disks.

5 In the drawings, wherein for the purpose of illustrating the invention and wherein like reference characters will be employed to designate like parts throughout the same, the reference character 5 will generally be employed
10 to designate a casing having side walls 6, end walls 7 and a bottom wall 8.

Mounted between the side walls 6 adjacent the upper edge thereof is a hopper which includes a casing spanning the side walls 6 and supported thereby. As shown in Figure 1,
15 only one wall of the hopper is shown and the diagonal bottom 9 extends downwardly towards the bottom wall 8 of the casing. Also mounted between the side wall 6 of the
20 casing and journalled therein is a rotary shaft 10 journalled in suitable bearings 11 in the side walls 6 of the casing as clearly shown in Figures 3 to 5 inclusive. On one end of the shaft 10, there is keyed a drive pulley 12.

25 Mounted upon the shaft 10 is a plurality of disks 14 and 15, the disks 14 being of slightly greater diameter than the disks 15 to avoid bridging of material across their peripheries and the disks are mounted with
30 their hub portions 16 and 17 closely engaging each other. The disks 14 and 15 are secured to rotate with the shaft 10 in a rigid fashion by means of a key 18. It is to be
35 noted that the radial faces of the discs extending from the hubs 16 and 17 are tapered as at 19 and 20 respectively and the taper extends from the hub portion to the periphery so that the outer edges of the disks are almost sharp.

40 The hopper bottom 9 is presented in alignment with the axes of the shaft 10, and formed as a continuation of the bottom 9 are a number of fingers 21 which extend between the opposite inclined faces of the disks 14 and 15. In
45 this manner, the material 22 contained in the hopper 8' is fed to the disks and its flow controlled by an adjustable feed gate 23, secured by wing nuts 24.

As the grains of the material 22 are fed to
50 the revolving disks 14 and 15, they fall between the disks to varying depths according to their sizes and are suspended between the inclined surfaces of the disks and carried around in the fashion shown in Fig. 1, being
55 removed by the different sets of adjustable fingers extending between the inclined surfaces of the disks 14 and 15 in grades as desired.

The dislodging fingers include a plurality
60 of fingers 25, extending upwardly from the conveyor trough 26 which spans the side walls 6 of the casing, and the fingers 25 at their upper ends engage the hubs of the disks at a point 27 in Figure 1. The trough 26
35 has its end secured to the side wall 6 of the casing, and formed integral therewith and

extending parallel thereto is a similar trough
28 also extending between the side walls 6 of the casing. A vertical transverse plate 29 has its lower end connected to the trough 28
70 and its side edges connected to the side walls 6 of the casing and the upper edge thereof is provided with a transverse bar 30 on which is fixed a set of dislodging fingers 31. An
operating member 32 is secured to the shaft 30 and is provided with a pawl adapted to
75 engage a quadrant 33 for holding the fingers 31 in any adjusted position according to grades desired and indicating to the operator the position thereof. The range of adjustment of fingers 31 is disclosed in Figure 1
80 in dotted lines. Pivotaly mounted at the juncture of the trough 26 and 28 is a similar transverse rod 34 which has its ends journalled in the side walls 6 of the casing and
85 affixed to the rod 34 is another set of dislodging fingers 35 as clearly illustrated in Figures 1 and 4. In Figure 1, is also shown in dotted lines the manner in which the series of fingers 35 may be adjusted towards or away from
90 the hubs of the disks 16 and 17, and an operating lever 36 is mounted on the end of the shaft 34 for holding the fingers 35 in an adjusted position. The lever 36 includes a
pawl 37 adapted to engage a quadrant 38
95 secured to the side walls 6 of the casing. Each of the troughs 26 and 28 are provided with screw conveyors 40 and 41 respectively for conveying the material to one side of the casing where it is discharged as desired. The
100 screw conveyors 40 and 41 have their shafts 42 and 43 journalled in the side walls of the casing 5 and are driven by suitable means (not shown) from shaft 10.

The coarser material, generally known as scalplings, collected by the fingers 31 drop
105 directly downward from the edges of the disks into a chute defined by the end wall 7 of the casing and thence out through spout 45.

The construction as set forth above shows
110 the rotor, as being made up of individual discs mounted on a shaft as being the preferred method of production. However this rotor may also be formed from one solid
115 piece of material if desired, to perform the same purpose as fully disclosed herewith.

The operation and advantages of the invention are quite apparent, and it is to be
120 understood that the form of the invention herewith shown and described is to be taken as a preferred embodiment of the same and that various changes in the shape, size and
125 arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, what
is claimed is:—

1. A grading machine of the character described, comprising a casing, a shaft mounted
130 in the casing, a plurality of disks having inclined radial faces mounted rigidly upon the

shaft, alternate disks being of different diameters whereby oblong grains or granular masses are prevented from bridging over the spaces between the disks, and means for collecting the material from between the disks.

2. A grading machine of the character described, comprising a casing, a shaft rotatably mounted in the casing, a plurality of disks having inclined radial walls mounted in close relation on the shaft, alternate disks being of different diameters whereby oblong grains or granular masses are prevented from bridging over the spaces between the disks, means for feeding granular material between the disks, and adjustable means for collecting the material from between the inclined walls of the disks.

3. A grading machine of the character described, comprising a casing, a shaft transversely arranged relative to the casing and having its ends journalled in the side walls thereof, a plurality of disks closely arranged on said shaft, each of said disks having inclined radial faces, said inclinations gradually extending from the hubs to the perimeter of the disks, a hopper supported by the casing and having its discharge opening presented to the rotary disks, and adjustable fingers presented between the inclined radial walls of the disks for removing particles of material lodged therein.

4. In a grading machine, a shaft, a pair of disks mounted thereon and having their proximal faces gradually increasingly separated from their central portions to their peripheries, means to feed unsized material into the space between said disks along the radial extent of said disks, a stripping finger pivotally mounted outwardly of the peripheral edges of the disks and having its free end projecting into the space between said disks in a position substantially opposite the said means, and means to adjust the stripping finger inwardly toward and outwardly from the center of the disks.

5. In a grading machine, a shaft, a pair of disks mounted thereon and having their proximal faces gradually increasingly separated from their central portions to their peripheries, means to feed unsized material into the space between said disks along the radial extent of said disks, a plurality of stripping fingers pivotally mounted outwardly of the peripheral edges of the disks and having their free ends projecting into the space between said disks in positions substantially opposite the said means, and means for independently adjusting certain of said fingers toward and from the center of said disks.

6. In a grading machine, a pair of coaxial revolubly mounted disks in laterally disposed relation and having their proximal faces gradually increasingly separated from their central portions to their peripheries, an inclined feeder finger extending between the

disks downwardly from a point at the peripheries of the disks to a point adjacent the axis of the disks, a stripping finger pivotally mounted outwardly of the peripheral edges of the disks and having its free end projecting in the space between said disks in a position substantially opposite the feeder finger, and means to adjust the feeder finger towards and from the axis of the disks.

7. In a grading machine, a pair of coaxial revolubly mounted disks in laterally disposed relation and having their proximal faces gradually increasingly separated from their central portions to their peripheries, an inclined feeder finger extending between the disks downwardly from a point at the peripheries of the disks to a point adjacent the axis of the disks, a plurality of stripping fingers pivotally mounted outwardly of the peripheral edges of the disks and having their free ends projecting into the space between said disks in positions substantially opposite the feeder finger, and means for independently adjusting certain of said fingers toward and from the axis of the disks.

8. In a grading machine, a shaft, a pair of disks mounted thereon and having their proximal faces gradually increasingly separated from their central portions to their peripheries, means to feed unsized material into the space between said disks along the radial extent of said disks, a plurality of stripping fingers pivotally mounted outwardly of the peripheral edges of the disks and having their free ends projecting into the space between said disks in positions substantially opposite the said means, a casing enclosing said disks and fingers, and means operable from the exterior of the casing for independently adjusting certain of said fingers toward and from the centers of said disks.

9. In a grading machine, a pair of coaxial revolubly mounted disks in laterally disposed relation and having their proximal faces gradually increasingly separated from their central portions to their peripheries, an inclined feeder finger extending between the disks downwardly from a point at the peripheries of the disks to a point adjacent the axis of the disks, a plurality of stripping fingers pivotally mounted outwardly of the peripheral edges of the disks and having their free ends projecting into the space between said disks in positions substantially opposite the feeder finger, a casing enclosing said disks and fingers, and means operable from the exterior of the casing for independently adjusting certain of said fingers toward and from the centers of said disks.

10. In a grading machine, a pair of coaxial revolubly mounted disks in laterally disposed relation and having their proximal faces gradually increasingly separated from their central portions to their peripheries, an in-

clined feeder finger extending between the disks downwardly from a point at the peripheries of the disks to a point adjacent the axis of the disks, a plurality of stripping fingers 5 pivotally mounted outwardly of the peripheral edges of the disks and having their free ends projecting into the space between said disks in positions substantially opposite the feeder finger, means for independently adjust- 10 ing certain of said fingers toward and from the axis of the disks, chutes into which the stripper fingers guide material from between said disks, and conveyors in certain of said chutes.

15 In testimony whereof I affix my signature.
JOHN W. HOEFLING.

20

25

30

35

40

45

50

55

60

65