J. H. LEE AND J. C. DIECKMAN.

GRAIN SEPARATOR.

APPLICATION FILED OCT. 31, 1918.

**1,323,877.**

Patented Dec. 2, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

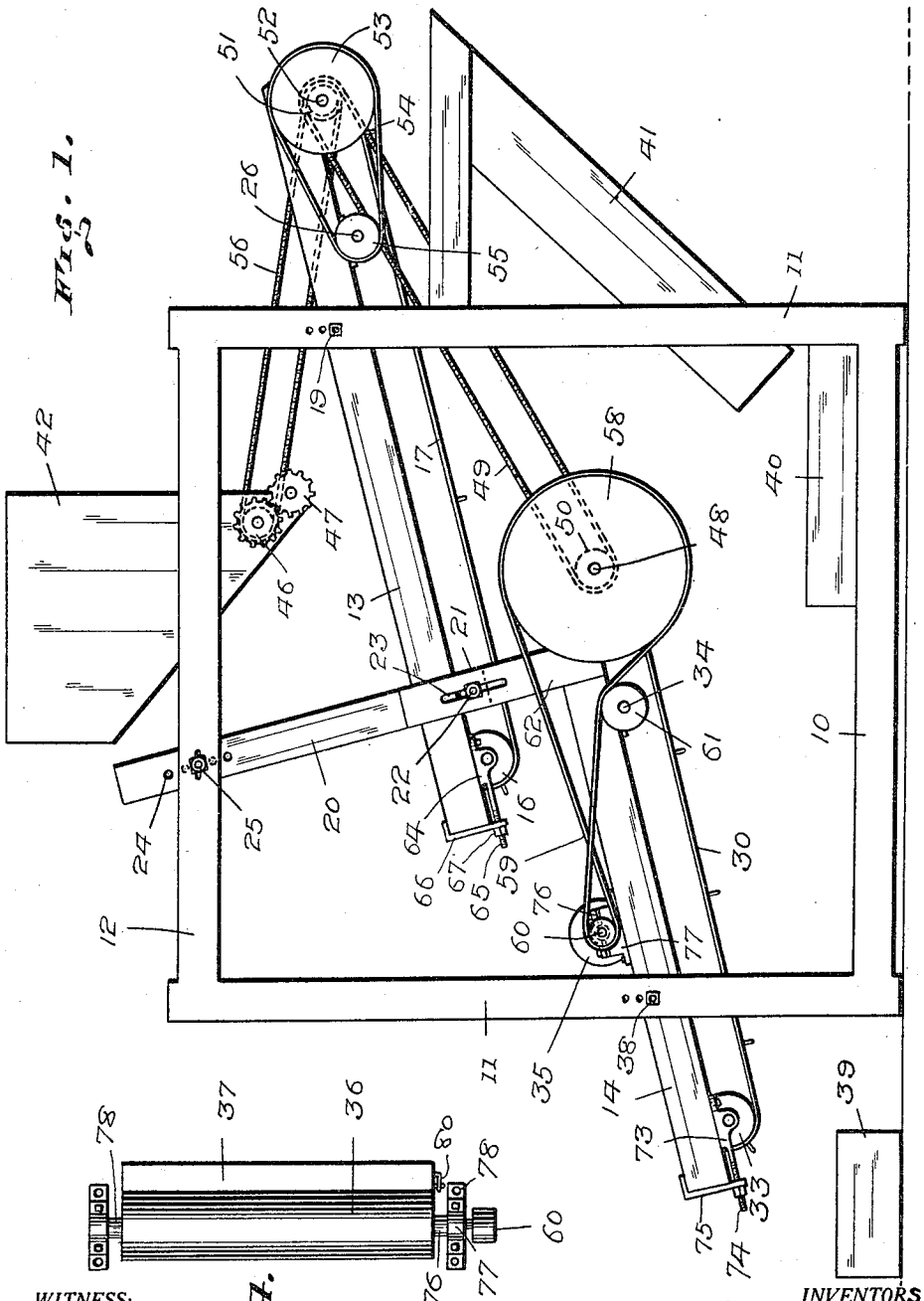



Fig. 4.

WITNESS:

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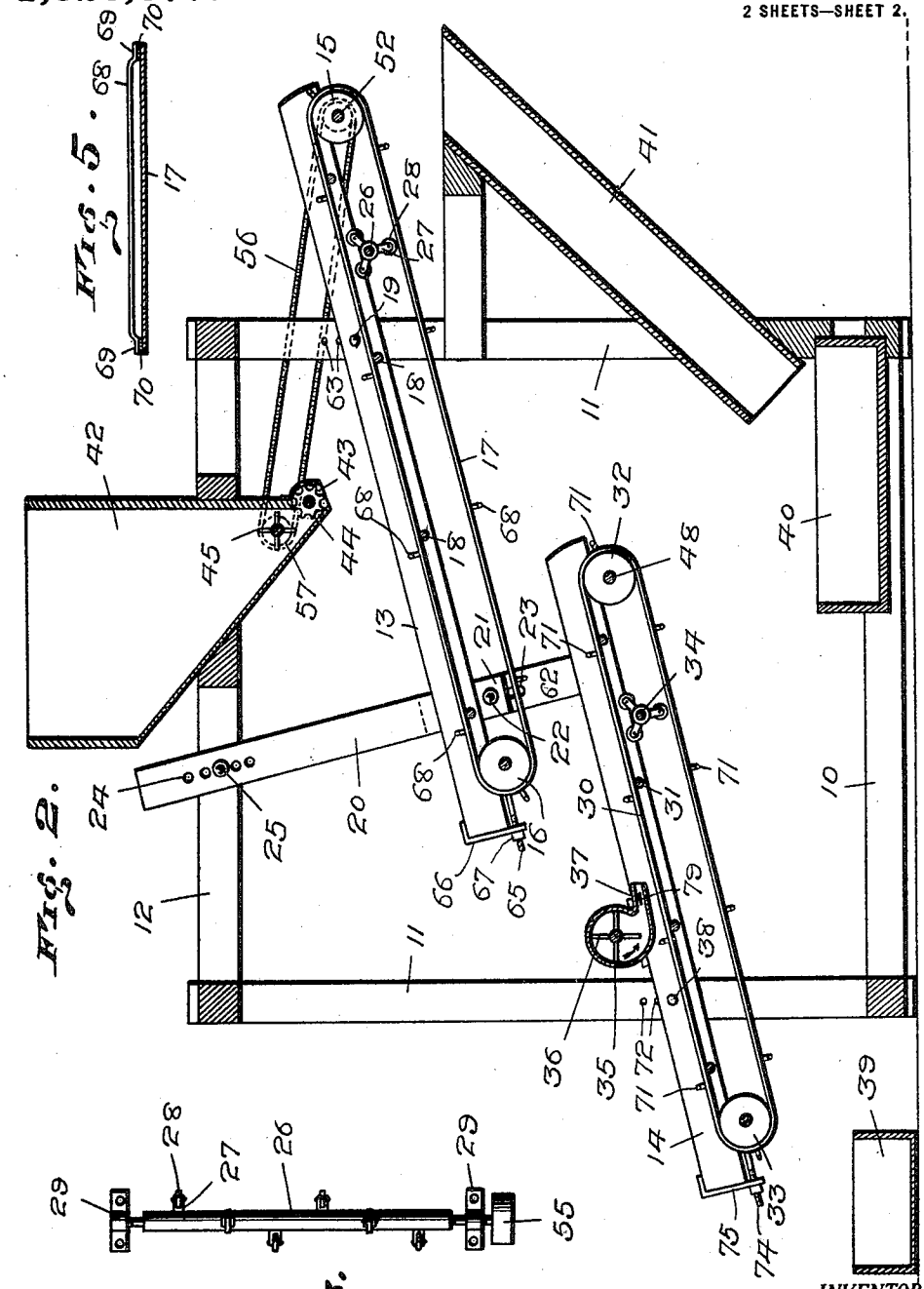


Fig. 2.



Fig. 3.



Fig. 5.

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# UNITED STATES PATENT OFFICE.

JOHN HAYS LEE AND JOHN CLAVIS DIECKMAN, OF ROME, INDIANA.

## GRAIN-SEPARATOR.

1,323,877. Specification of Letters Patent. Patented Dec. 2, 1919.

Application filed October 31, 1918. Serial No. 260,498.

*To all whom it may concern:*

Be it known that we, JOHN H. LEE and JOHN DIECKMAN, citizens of the United States, residing at Rome, in the county of Perry and State of Indiana, have invented certain new and useful Improvements in Grain-Separators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a grain separator and particularly to a structure adapted to separate by gravity wheat or other grain material from vetch and foreign matter of greater specific gravity.

The invention has for an object to provide a novel and improved construction of separator embodying an endless belt or carrier mounted to travel in an inclined plane beneath the feed hopper and provided with means for vibrating the belt during its traveling movement.

Another and further object of the invention is to provide an improved construction and arrangement of the vibrator comprising arms extending radially from the shaft and provided with contact rollers adapted to engage a traveling belt.

Another object of the invention is to provide a secondary belt upon which the material falls after the primary separation and having disposed adjacent the upper surface thereof a fan with an adjustable gate to direct a current of air to assist in the separation by retarding the movement of the grain upon the belt during the separating action.

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 of the separator;

Fig. 2 a vertical longitudinal section;

Fig. 3 a detail plan of one of the agitators;

Fig. 4 a similar view of the fan casing; and

Fig. 5 is a detail cross section through the belt.

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

The numeral 10 designates the base of the framework for supporting the separator which may be of any desired construction or configuration and in the present instance is shown as comprising vertical standards 11 at each end connected at the top by a framework 12. The separator frames 13 and 14 are of substantially the same construction. The upper conveyer frame is provided at opposite ends with bearing rollers 15 and 16 adapted to carry the belt or conveyer 17 which is preferably formed of canvas or other fabric having a relatively smooth supporting surface for the material. The frame 13 may be pivotally supported in any desired manner, for instance by means of bolts 19 passing therethrough and mounted in the vertical standards 11. The inner end of the frame 13 is supported by the hanger 20 which is slotted, as at 23, and carries a supporting block 21 adjustably clamped in said slot by means of a bolt 22. This hanger at its lower end is connected to the separator frame 14 to support the inner end thereof as shown at 62. The upper end of the hanger is adjustably supported upon the top frame 12 by means of a series of apertures 24 through one of which a securing bolt 25 passes into a fixed part of the frame. The standards 11 are also provided with a series of apertures 63 by which the pivoting bolts 19 may be adjusted to change the vertical inclination of the outer end of the frame 13.

The surface of the belt 17 may be supported in any desired manner where loaded with grain, for instance by means of cross bars 18 extending between the sides of the frame. The belt is also adapted to be stretched and held under longitudinal tension by an adjustment of its bearing roller 16 which as shown in Fig. 1 is mounted in a slidable bearing 64 from which a threaded adjusting rod 65 extends through the end plate 66 and is held under proper tension by means of a nut 67 mounted upon the rod. For the purpose of retaining the belt in a flat smooth and laterally stretched condition laterally a series of tension bars 68 spaced outwardly from the belt are secured at their ends to the edge portions of the belt in any desired manner, for instance as shown in Fig. 5, where the ends of the bars are bent downward at an angle thereto, as at 69, and secured to the canvas belt 17 by a strip 70 of leather or other material. This raises the bar above the unobstructed separating surface of the belt or conveyer so as not to interefere with the action thereof and

the strips guard against accidental loss of the grain at the side edges of the belt.

For the purpose of vibrating the conveyer belt 17 to assist in the separation of material fed thereto, a novel and improved form of vibrator or knocker is provided which comprises a shaft 26 having radially extending arms 27 carrying at their outer ends contact wheels 28 adapted to engage the under surface of the belt and effect a succession of sharp blows thereon causing the material upon the belt to be thoroughly agitated so that those particles of a round formation may roll downwardly while the grain having two axes are retained by contact with the belt and carried upward thereby. The shaft of this vibrator may be supported upon the undersurface of the frame 13 in any desired manner, for instance by bearings 29.

The material delivered from the belt 17 is deposited upon a lower separating belt 30 of similar construction to the first mentioned belt and likewise supported upon cross bars 31 extending between the sides of the frame. This belt is also provided with tension rods 71 secured thereto similarly to the rod 68 before described and the conveyer belt is vibrated by a device similar to the vibrator 26 mounted upon the cross shaft 34 carried by the frame 14. This frame is pivotally supported by means of bolts 38 extending through any one of a series of apertures 72 formed in the vertical standards 11 and the conveyer 30 is retained in longitudinally stretched position by means of a sliding bearing 73 connected by a threaded rod 74 with an end plate 75 similar to the construction of these members before described.

Above the conveyer 30 a fan casing 35 is arranged within which a rotatable fan 36 of any desired character is disposed, and the discharge nozzle 37 from this fan extends across the width of the conveyer, as shown in Fig. 4 and is adapted to be adjusted with the casing 35 about a transverse axis to direct the current of air downward upon the conveyer at any desired angle. This adjustment may be secured by means of a sleeve 76 held in position by a clamp 77 mounted upon the fan support 78. The shaft of the fan passes through this sleeve or collar 76 so that the parts may be bodily swung toward and from the surface of the conveyer. The discharge nozzle 37 of the fan is also provided with a gate 79 by which the current of air may be adjusted in a degree or entirely cut off. This gate is pivotally mounted in any desired manner and may be operated by a handle 80 extended from the fan casing.

For the purpose of feeding the grain in the properly distributed manner upon the upper conveyer, a hopper 42 is supported upon the frame 12 in any preferred manner and formed with a discharge opening 43 at its lower end. This opening is provided with a longitudinally grooved delivery wheel 44 which is rotated simultaneously with a stirrer 45 disposed within the hopper above the wheel. This rotation may be effected by means of a gear 46 upon the shaft of the stirrer which meshes with a coöperating gear 46 upon the shaft of the wheel 44.

The parts heretofore described may be driven in any desired manner, for instance from a driving shaft 48 which also carries the upper roll 32 of the lower conveyer. From this shaft a chain drive 49 extends from the sprocket 50 thereon to the coöperating sprocket 51 upon the shaft 52 upon the upper roll 15 of the conveyer 17. This shaft is also provided with a driving wheel 53 from which a belt 54 extends to a drive wheel 55 upon the shaft 26 of the vibrator. The shaft 52 is also provided at its opposite end with a chain driving gear by which the chains 56 extending to a sprocket 57 on the shaft of the stirrer 45 may be operated. This sprocket 57 may be of any desired diameter to effect the preferred speed of rotation for the stirrer and hopper delivery. The main shaft 48 also carries a driving wheel 58 over which a crossed belt 59 extends to the pulley 60 upon the shaft of the fan 36 and the lower line of this belt passes over a driving pulley 61 upon the shaft 34 of the vibrator for the lower conveyer. The discharged grain from the upper end of the lower conveyer falls into the receptacle 40 while the material from the lower end thereof falls by gravity into the receptacle 39. The discharge from the upper conveyer at its outer end is carried by means of an inclined chute 41 to the grain receptacle 40.

The construction and operation of this separator will be apparent from the foregoing description, and it will be observed that the grain is delivered in small quantities from the hopper falling upon the upper conveyer which is constantly vibrated so that the round particles of vetch and other material will roll by gravity down the conveyer while the wheat or grain having two axes will adhere to the belt more closely and be carried upward and discharged at the outer end thereof. Among the material passing by gravity down this conveyer is some imperfect or partially developed grain in which the axes are not distinctly different, causing them to have a rolling movement. Such material is caught by the lower separator and the action of the air current or blast thereon causes the grain to contact more closely with the surface of the conveyer while the round material not being affected to the same extent rolls downward by gravity, and is discharged in the final

separation. It is essential in such separation to maintain the belt in an even and smooth condition both longitudinally and laterally and this result is very efficiently performed by means of the adjustment of one roll of the conveyer and the transversely disposed tension bars, which being raised above the surface of the belt do not interfere with the separation but rigidly maintain the belt in a stretched condition. As is well known if depresssions or corrugations occur in a separating belt of this character the grain collects therein and a successful separation cannot be secured. The adjustment of the fan and the regulation of the blast therefrom permit the proper air pressure to be applied to the material upon the lower conveyer so that partial or wholly developed grain is caused to travel with the conveyer while the round material which will rotate from any angle passes down the vibrator belt by gravity. It will be seen that this invention comprises a simple, efficient and economically constructed form of separator adapted for treating different classes of grain and particularly for the separation of vetch or other foreign matter from the grain.

While we have described specifically the details of construction of the several parts the invention is not confined thereto as defined by the following claims.

What we claim is:

1. A separator comprising a conveyer belt, transverse rods secured at their ends to the edge portions of the belt for stretching the belt transversely, said rods being spaced from the belt and said belt being unobstructed beneath the rods, and means for vibrating the belt between the ends of said rods.

2. A separator comprising a conveyer belt, transverse rods spaced above the belt and said belt being unobstructed beneath the rods, and having their end portions secured to the edge portions of the belt, said rods stretching the belt transversely, and means underneath the belt for vibrating it between the ends of said rods.

3. A separator comprising a frame, a pair of conveyers in the frame, one conveyer having one end underneath one end of the other conveyer, the opposite ends of the conveyer being pivotally mounted in the frame, and means for jointly adjusting the adjacent ends of the conveyers.

4. A separator comprising a frame, a pair of inclined conveyers within the frame, the upper end of the one conveyer being located below the lower end of the other conveyer, the opposite portions of the conveyers being pivotally mounted in the frame, and means for jointly adjusting the adjacent ends of both conveyers and independently adjusting the lower end of the upper conveyer.

5. A separator comprising a frame, a pair of conveyers therein, one end of one conveyer being located below one end of the other conveyer, means for pivotally mounting said conveyers in the frame, and means for mounting the adjacent portions of the conveyers and providing for the joint adjustments thereof and also the relative adjustment thereof.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN HAYS LEE.
JOHN CLAVIS DIECKMAN.

Witnesses:
JOHN D. KRAUSCH,
CASSIUS SHOEMAKER.