

Jan. 5 , 1926.

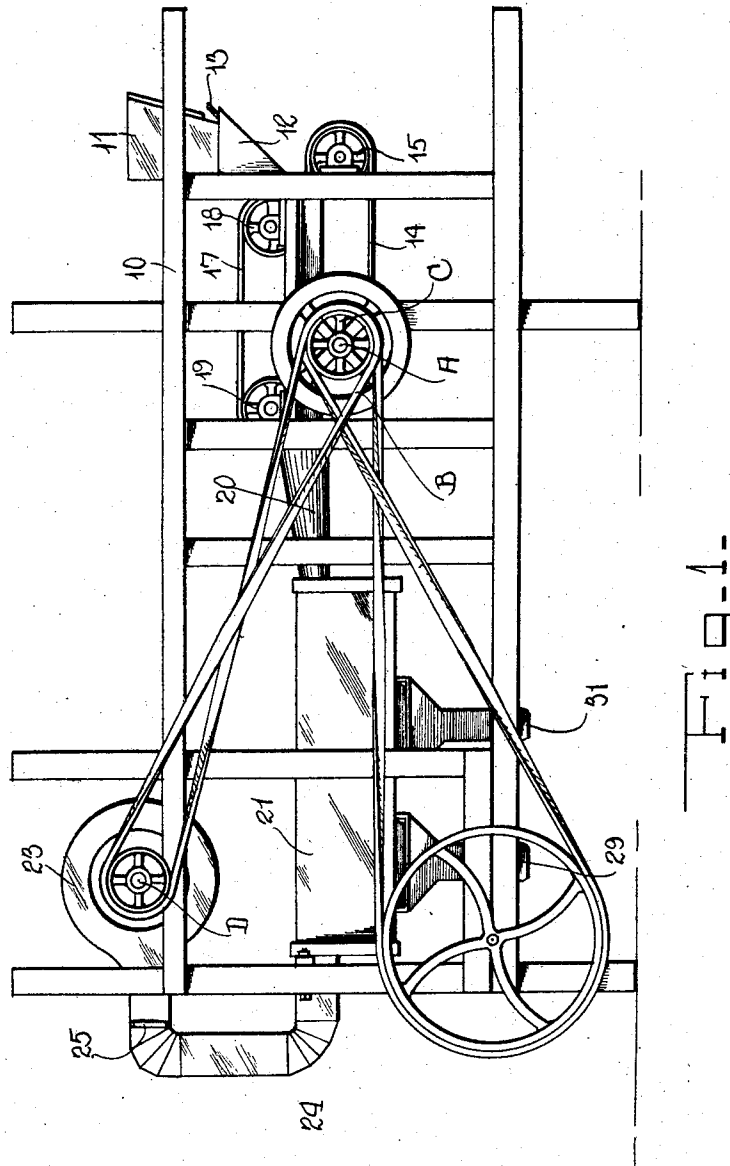
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H. E. PFORR

GRAIN CLEANER

Filed April 8, 1924

3 Sheets-Sheet 1



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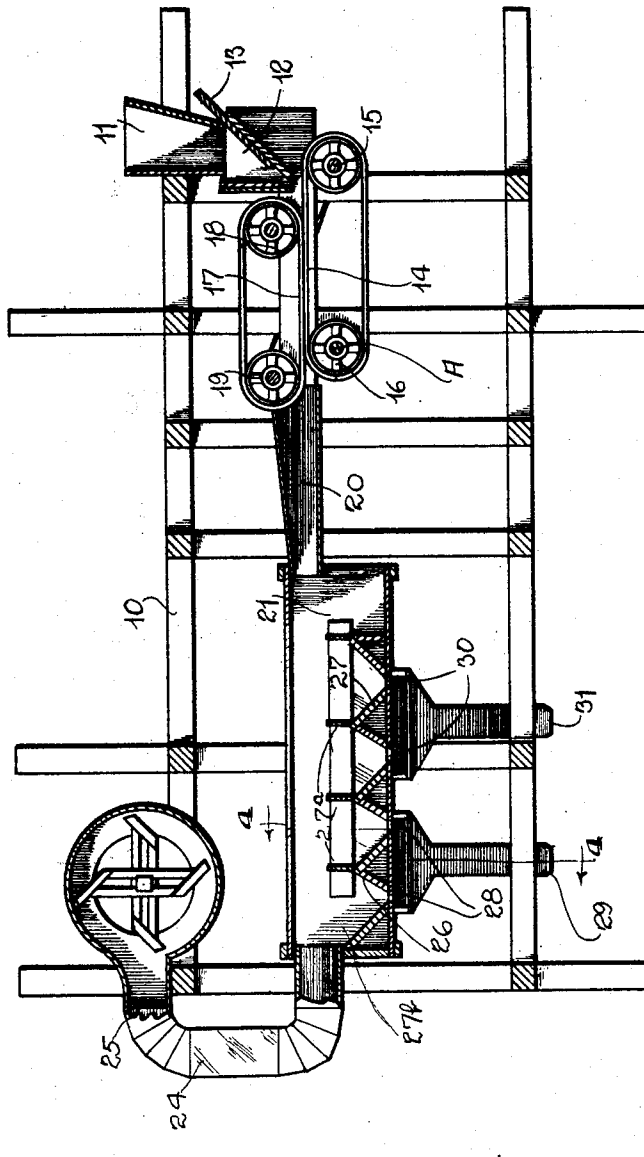
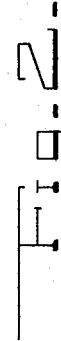
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3 Sheets-Sheet 2



Inventor

Henry Ernest Pforr

By Mark S. Sullivan

Attorney

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3 Sheets-Sheet 3

Fig. 3

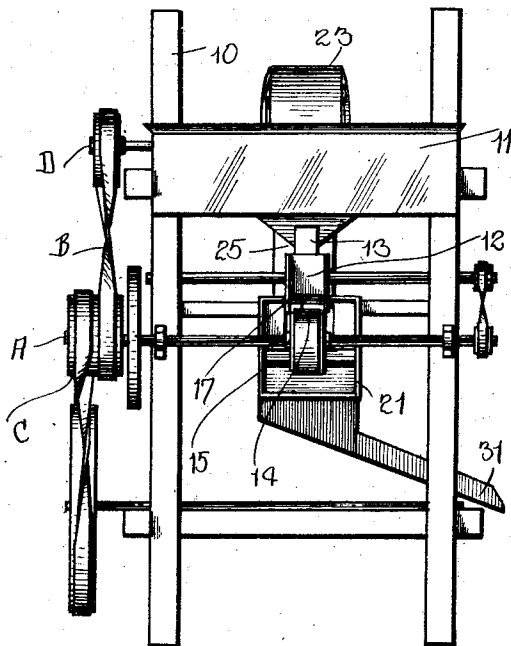
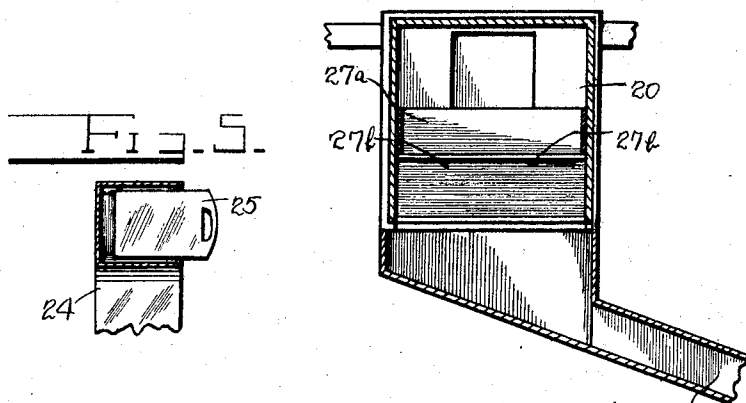


Fig. 4



Inventor

Henry Ernest Pforr.
By *Frank A. Adelman*
Attorney

UNITED STATES PATENT OFFICE.

HENRY ERNEST PFORR, OF HAMBERG, NORTH DAKOTA.

GRAIN CLEANER.

Application filed April 8, 1924. Serial No. 705,055.

To all whom it may concern:

Be it known that I, HENRY ERNEST PFORR, a citizen of the Dominion of Canada, and resident of Hamberg, in the county of Wells and State of North Dakota, have invented certain new and useful Improvements in Grain Cleaners, of which the following is a specification.

This invention relates to grain cleaners and separators, and has for an object the provision of novel means for removing chaff, straw and the like from grain and for grading the grain according to its specific gravity in order that the perfect grain such as may be used for seeding and the like can be separated from the less perfect or lighter grain; novel means being also provided for collecting the grain of different grades in separate receptacles.

It is a further object of this invention to produce an apparatus in which grain in an ungraded state is forced with considerable velocity against an air blast effective to impede or retard the movement of the grain in order that the heavier grain will travel further against the action of the air current than the lighter grain; and the invention also contemplates the production of an apparatus in which the air blast will serve to force straw and chaff away from the grain prior to the collection of the grain in the manner stated.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this application wherein like characters denote corresponding parts in the several views, and in which—

Figure 1 illustrates a view in elevation of a grain cleaning and separating device embodying the invention;

Figure 2 illustrates a longitudinal sectional view thereof;

Figure 3 illustrates a view in elevation of one end of the apparatus;

Figure 4 illustrates an enlarged detail view of a fragment thereof; and

Figure 5 illustrates a detail view of the air pipe control.

In these drawings, any suitable frame con-

struction 10 may be employed having means for supporting the operating parts of the apparatus, and a delivery chute 11 is provided, through which the grain to be cleaned is delivered to a hopper 12, the said hopper having a sliding door 13 by which the escape of grain therefrom may be regulated, as will be apparent.

A conveyer belt 14 is mounted on drums or rollers 15 and 16 on a plane below the discharge opening of the hopper, and the drum 15 is located back or rearwardly of the discharge opening in order that the conveyer belt may operate under the discharge opening and receive grain issuing from the hopper. The conveyer belt 14 coacts with a belt 17 mounted on drums or pulleys 18 and 19 located above the belt 14, but the belts 14 and 17 are in such relation to each other that they will serve to receive grain between them and press on the grain with sufficient force to carry it from the hopper to a horizontally maintained grain guide or chute 20, which converges from its receiving end to its discharge end and through which the grain is forced to a separating chamber 21. The grain guide 20 preferably enters the larger open end of the chamber at the end and near the top thereof and the guide is preferably tapered from its grain receiving end to its discharge end, its upper wall converging toward the other end of the chamber 21 a condition which serves to restrict the action of the air blast prior to the entrance of grain into the separating chamber.

The drums or pulleys 15, 16, 18 and 19 are mounted on suitable shafts provided with suitable belting for operating the conveyer belts rapidly in order that the grain will be forced from the conveyer with considerable velocity proportional to the type of grain being cleaned and the velocity of the air blast, as one skilled in the art will understand. The gearing or belting for operating the pulleys from a drive shaft is conventionally shown and identified by the letter A, it being also shown that a belt B operates over a pulley C on a shaft D for driving a blower or compressor, as will presently appear. A crossed belt, see Fig. 3, drives pulleys on the shafts having drums for the conveyer belt 14 and 17 in order that they will travel in the same direction and at the same speed.

A compressor or blower 23 is conventionally shown and is employed for the purpose of delivering air under pressure to the separating chamber 21 through means of a pipe 24. The pipe may have a suitable gate 25 by which the passage through the pipe may be restricted to regulate the air to be delivered to the separating chamber. The pipe 24 preferably enters the separating chamber at an otherwise closed end near the top thereof and the opposite end of the chamber 21 is open and receives near its top wall the grain guide or chute 20 in order that the open end of the chute will be in line with the discharge end of the blower which will force air against the grain and chaff entering the separating chamber, as has been described.

The bottom of the separating chamber has a plurality of oppositely inclined walls 26 and 27 intended to collect grain at different localities as to the length of the separating chamber, it being understood that heavy grain will be propelled to a greater distance against the action of the air blast than the lighter grain, and hence the heavier or perfect grain will be received by the hopper that is farthest from the chute 20 and directed therefrom through openings 28 in the bottom of the separating chamber to the spout 29, from which the grain may be bagged or collected, as is ordinarily done with devices of this kind. The lighter grain will, of course, not have the velocity of the heavier grain and it will be arrested by the baffles 27^a and be diverted thereby into the hoppers and pass through openings 30 in the bottom of the separating chamber, from whence it will reach the spout 31 for collection.

The end of the separating chamber opposite the air pipe and below the end of the chute 20 is open and chaff, straw and light materials will be forced from the open end thereof in order that the grain that has been collected will be clean and free of such chaff.

Any suitable means may, of course, be employed for driving the power shaft and the inventor does not wish to be limited with respect to these features. Figure 1 shows appropriate belting for operating the mechanism from the power shaft, but the inventor does not wish to be limited with respect to the details of construction in this regard.

In order to direct grain that is descending in the separating chamber toward the bottom thereof, a series of transverse and vertically disposed plates 27^a are arranged between the two side members 27^b constituting a frame which may be applied to the interior of the separating chamber, and this frame may be supported by the inclined sides of the hoppers 26 and 27. These vertically disposed plates 27^a will serve to pre-

vent undue agitation of the grain after it has lost the velocity imparted thereto by the belts 14 and 17, as the plates will serve to guard the grain against the action of the air blast which is relied upon for cleaning the grain and retarding its travel.

I claim:

1. In a grain separator, conveyer belts arranged in proximity to each other and co-acting to carry grain between them, to project the same into a separating chamber means for driving the belts in unison and at uniform speed, a converging grain guide in position to receive grain from the belts, a separating chamber into which the grain guide discharges, an air supplying means at the opposite end of the said separating chamber for forcing air against the grain entering the separating chamber, a plurality of spaced grain collecting means at the bottom of the said separating chamber and discharge chutes connected with pairs of the grain collecting means, substantially as described.

2. In a grain separator, means for forcing grain through a converging chute which terminates in the open end of a separating chamber, means for forcing air in a direction approximately opposite the small end of the chute and toward the open end of the separating chamber, collectors at different distances from the means for delivering grain into the separating chamber and means therein which individually will receive grain of different specific gravity, and guards over the collectors for preventing agitation of grain in its descent to the collectors.

3. In a grain separator, conveyer belts arranged in proximity to each other on different planes and coacting to carry grain between them, means for driving the belt in unison and at uniform speed, a separating chamber into the upper portion of which the grain is projected by the conveyer belts, means for delivering air under pressure to the separating chamber in a direction opposite that traversed by the grain delivered to the separating chamber, and a sectional bottom in the chamber the sections of which are at different distances from the grain delivery section of the separating chamber for collecting grain of different specific gravity, the discharge end of the means for projecting the grain into the separating chamber and the discharge end of the air blast conduit being in line with one another and above the means for collecting the grain projected into the separating chamber.

4. In a grain separator, a hopper for receiving grain located above a pair of rotary carriers, a way having a portion of its open larger end opposite the carrier belts, said way converging from its receiving end

to its discharging end, a separating chamber which is open at the end into which the way extends, a blast fan, means for projecting a blast of air into the aforesaid open ended chamber and toward the open end of the way, means for receiving grain of different densities which extend partially upward in the separating chamber providing a plurality of compartments, pairs of said compartments having eduction openings for the grain, and chutes underlying said eduction openings whereby grain of different specific gravity may be separated. 10

HENRY ERNEST PFORR. 11