May 15, 1928. 1,669,686

W. H. WORTHINGTON

RECLEANER

Filed March 20, 1925 3 Sheets-Sheet 1

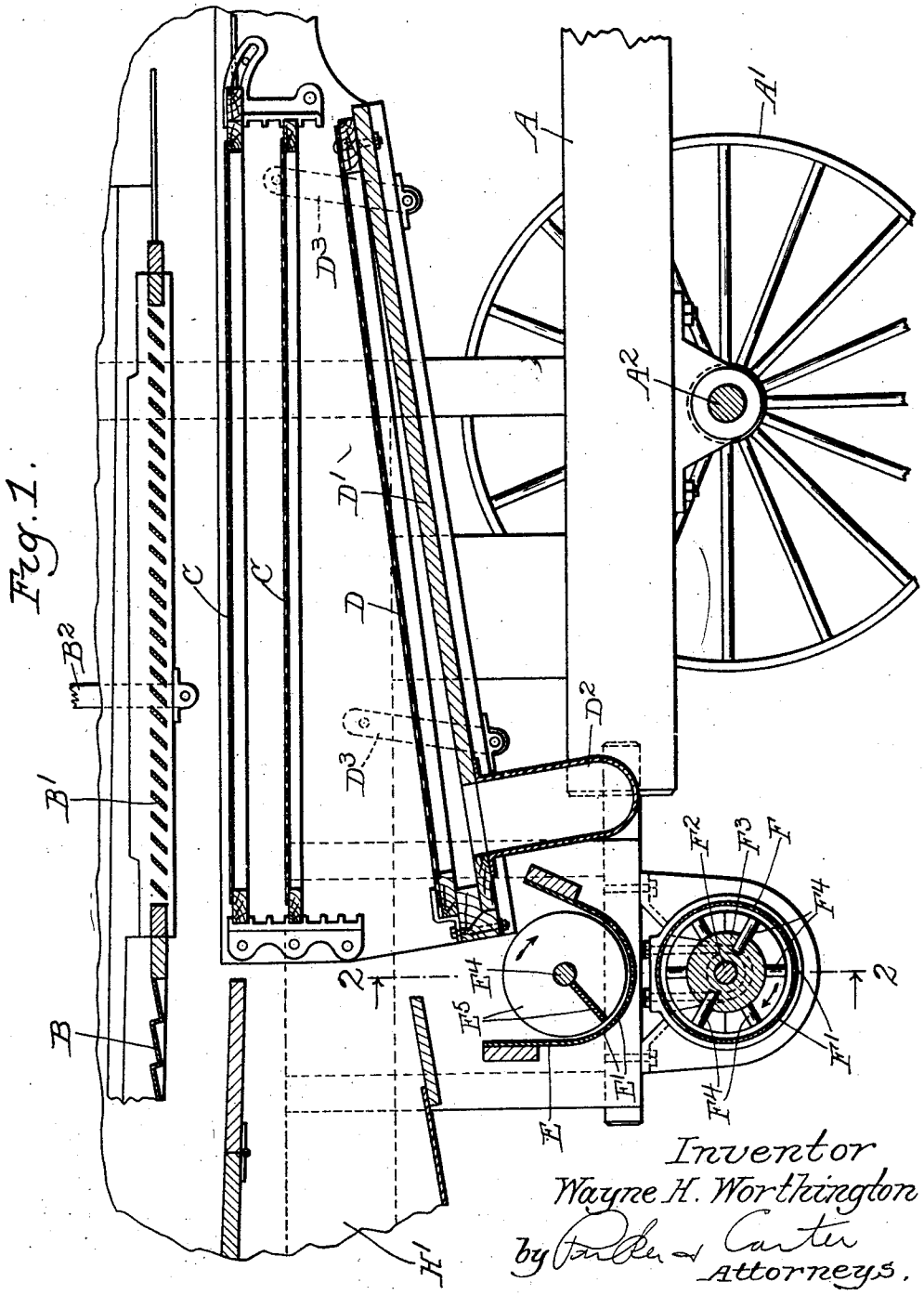


Fig. 1.

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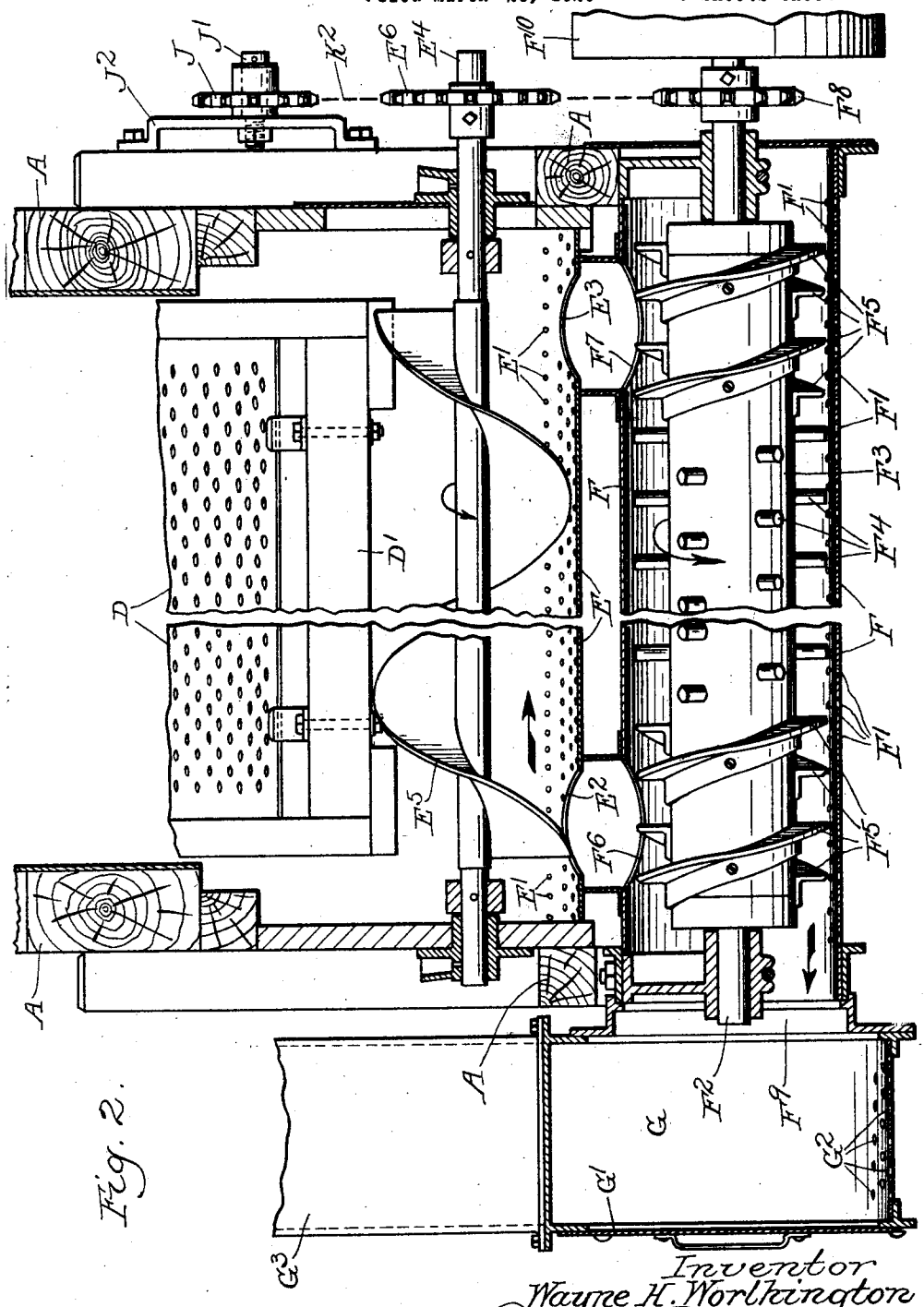


Fig. 2.

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Fig. 3.

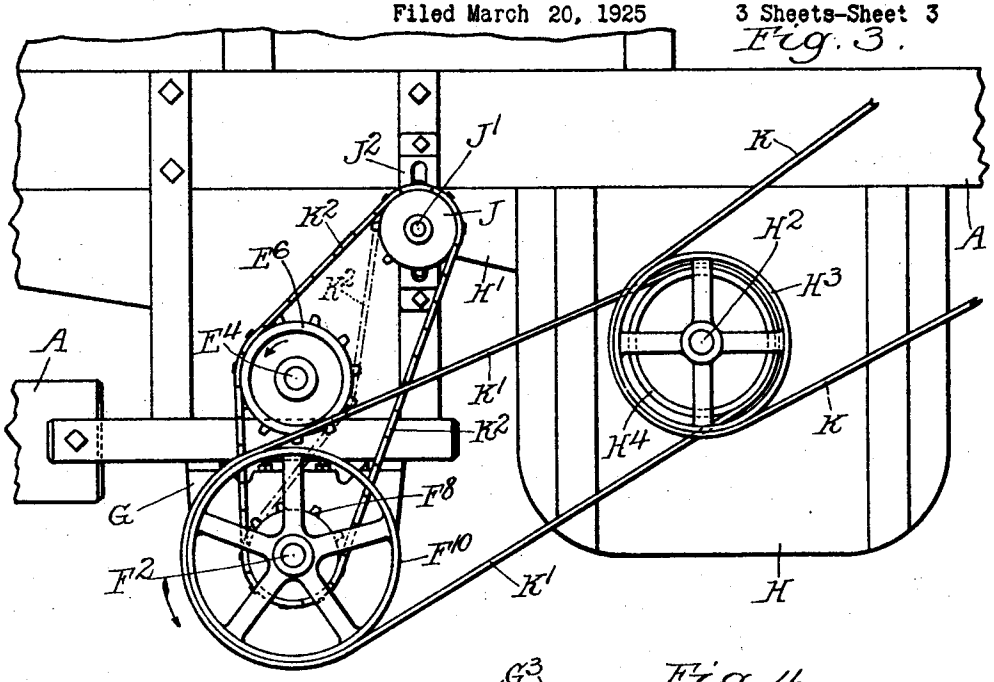
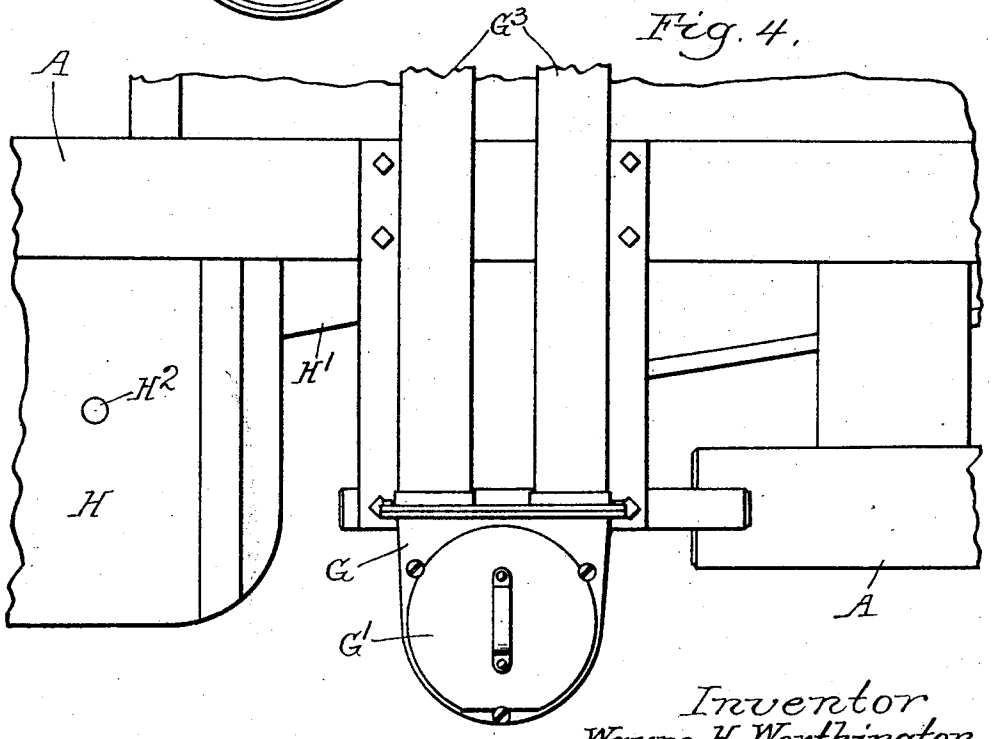


Fig. 4.



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UNITED STATES PATENT OFFICE.

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RECLEANER.

Application filed March 20, 1925. Serial No. 16,874.

This invention relates to a separator and particularly to a re-cleaning attachment therefor. In the form illustrated herewith it is particularly adapted for use in connection with a bean huller. It has for one object to provide a re-cleaner which may be attached directly to a hulling machine. Another object is to provide in combination with a huller a re-cleaner which may be used or not at the will of the operator so that the material being separated may be run through the cleaner or run directly from the separating zone without passing through the re-cleaner. Other objects will appear from time to time, throughout the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a longitudinal vertical cross section showing a portion of the screening sieves of the machine and a transverse section of the re-cleaning parts;

Figure 2 is a longitudinal vertical cross section through the re-cleaner on an enlarged scale with parts in elevation, section being made on line 2—2 of Fig. 1;

Figure 3 is a side elevation of the driving connection of the re-cleaner.

Figure 4 is a view on the opposite side of the separator showing the elevator housing;

Like parts are indicated by like characters throughout.

A is a portion of a vehicle frame which is supported on wheels A^1 carried by an axle A^2. B is a grain pan; adjoining it is a screen B^1 which is carried on a pair of hangers B^2 by means of which it may be reciprocated. The details of this construction will not be described further as they form no part of the present invention.

C C are sieves beneath the screen B^1. D is a screen. Beneath it is a pan D^1. The two are inclined and the pan D^1 at its lower end discharges into a discharge chute D^2. The screen assembly including the pan, the screen and the chute are carried on hangers D^3 and are adapted to be reciprocated. The details of the reciprocating action are not described as they form no part of the present invention.

Beneath the lower end of the screen D is an open topped conveyor cylinder E. This cylinder is preferably provided with perforations E^1 in its bottom and has also two openings E^2 E^3. Mounted within the cylinder on a shaft E^4 is a helicoid conveyor or grain auger E^5. At one end the shaft E^4 carries a driving sprocket E^6.

Beneath the cylinder E is a second and closed cylinder F. It is preferably provided in its bottom with perforations F^1. Lying within it and carried on a shaft F^2 is a lump crusher or spike cylinder F^3. This cylinder has upon it a helically arranged series of spikes or projections F^4. It has also in the preferred form at each end a number of generally helicoid conveyor flights F^5. In the top of the cylinder F immediately below the opening E^2 E^3 of the cylinder E are corresponding openings F^6 F^7. At one end the shaft F^2 carries a sprocket F^8 which is in line with the sprocket E^6. One end of the cylinder F is open as at F^9 and discharges into a conveyor housing G. F^{10} is a driving pulley mounted on the shaft F^2.

The housing G is provided with a removable door plate G^1 and preferably with a perforated bottom G^2. Extending upward from the conveyor housing G are two casings G^3 G^3. In these casings and in the housing a bucket conveyor might be positioned, and it will carry the grain delivered to the conveyor housing upward to any suitable grain weigher or other discharging or measuring device. The details of this assembly are not shown as they form no part of the present invention.

H is a blower housing within which is located a blower not shown. From the blower housing a passage H^1 communicates with the space beneath the screen C and from the blower a draft of air is forced to the screens and assists in the separating operation. The blower is carried on a shaft H^2 which has on its outer end a driving pulley H^3 and a second pulley H^4.

J is an idler adjustably mounted on a stub shaft J^1 which is adapted to be adjusted along a slotted plate J^2. K is a driving belt about the pulley H^3. From any suitable power source by means of this belt the assembly described is driven. K^1 is a belt about the pulleys H^4 F^{10}. By means of this belt the spiked cylinder is driven from the shaft H^2 which carries the blower. K^2 is a chain about the driving sprockets F^8 E^6 and about the idler J. As shown in full line in Figure 3 the chain is arranged so

as to drive the grain auger in one direction. If the chain is passed on the other side of the sprocket E^6, as shown in dotted lines in Figure 3, the direction of rotation of the grain auger will be reversed.

Although I have shown an operative device, still it will be obvious that many changes might be made in size, shape and arrangement of parts without departing materially from the spirit of my invention, and I wish, therefore, that my showing be taken as in a sense diagrammatic.

Particularly where in the specification and claims I have used the word "grain" I mean grain of any sort. It might be wheat, oats, beans, or any material which in growth is associated with pods, chaff, stalks and other matter which must be separated.

The use and operation of my invention are as follows:

The material to be separated or threshed, frequently beans to be hulled, is fed to the machine, passing through the separating and threshing zone. The threshed and separated material comes finally upon the grain pan and sieve. By this time it consists practically wholly of the grain or beans, the hulls and pods and other material having been removed. However, dirt and other foreign matter is generally presented with the beans and some times is stuck to them and it becomes necessary to remove this material or to re-clean the beans. Beans and foreign matter approximating beans in size, or smaller, pass through the holes in the sieve and some of the dirt is shaken off in passing over the bottom screen and finally the beans fall into the upper open cylinder where the grain auger or helicoid conveyor is located. If it is rotated in the direction shown by the curved arrow in Figure 2 the beans are all fed laterally to the right. The conveying motion serves to stir up and agitate the beans and some of the dirt will be separated from the beans, the lumps to some extent crushed will fall through the perforated bottom of the cylinder. The beans with some remaining dirt and lumps will be fed further to the right and will fall through the opening E^3 and from it through the opening F^7 in the lower cylinder. When the cylinder is rotated as shown, the material will be fed back in the direction of the straight arrow to the left. The spikes on the drum break up the lumps, agitate the beans and the lumps and serve to knock off and dislodge the dirt and other matter that adheres to the beans.

The conveyor flights at each end of the drum assist in moving the contents of the cylinder to the left and thus the material is fed first to the right by means of the grain auger and then to the left by means of the spiked re-cleaner drum.

The grain is further cleaned in the re-cleaner cylinder and the dirt falls out through the perforated bottom of that cylinder. Finally the beans or grain are discharged into the conveyor housing which itself has a perforated bottom to permit further discharge of the dirt and dust and the cleaned beans are raised from the conveyor housing G and upward and deposited into a weigher or other measuring and discharging device.

For some purposes and under certain conditions it is not advisable to pass the beans through the re-cleaner cylinder. When this is the case the arrangement of the driving belt shown in dotted lines in Figure 3 is used and the direction of rotation of the grain auger is reversed. Thus the beans are fed to the left in the upper open cylinder in the direction opposite to that of the straight arrow. They are discharged through the opening E^2 and fall from it through the opening F^6 and pass directly out of the re-cleaner cylinder into the conveyor housing G^3 without having passed the mouth of the re-cleaner.

Where the beans are wet and the skins therefore soft it in generally not advisable to pass them through the re-cleaning cylinder, as the cylinder tends to break and tear the skins and crush and otherwise mutilate the beans. Where the beans are not fed through the re-cleaner cylinder, the operation of the other parts of the assembly are the same as that above described.

While I have described the invention particularly in connection with its use as a re-cleaner for beans, it can, of course, be associated with any separating or threshing device, and used with such a device no matter what the type of material that passes through it.

I claim:

1. Recleaning means for separators and the like comprising a receptacle having a perforate bottom adapted to receive grain from the separator, a conveyor adapted to propel grain along said bottom, a closed cylinder below the receptacle adapted to receive grain from one end thereof, a combined conveying and breaking drum in the cylinder adapted simultaneously to convey material therealong and to break up dirt and foreign matter which is with the grain, the bottom of the cylinder being perforated, the perforations in the bottom of the cylinder and the receptacle being of such size as to permit discharge of dirt while retaining the grain.

2. Recleaning means for separators and the like comprising a receptacle having a perforate bottom adapted to receive grain from the separator, a conveyor adapted to propel grain along said bottom, a closed cylinder below the receptacle adapted to receive grain from one end thereof, a combined conveying and breaking drum in the cylinder

adapted simultaneously to convey material therealong and to break up dirt and foreign matter which is with the grain, the bottom of the cylinder being perforated, the perforations in the bottom of the cylinder and the receptacle being of such size as to permit discharge of dirt while retaining the grain, an open passage between each end of the receptacle and the adjacent end of the cylinder, and means for reversing the direction of travel of the conveyor in the receptacle in order to feed material selectively into either end of the cylinder.

Signed at Battle Creek, county of Calhoun and State of Michigan, this sixth day of March, 1925.

WAYNE H. WORTHINGTON.