No. 710,981. Patented Oct. 14, 1902.

R. W. JESSUP.

SEPARATOR.

(Application filed July 1, 1901.)

(No Model.)

Fig. 1.

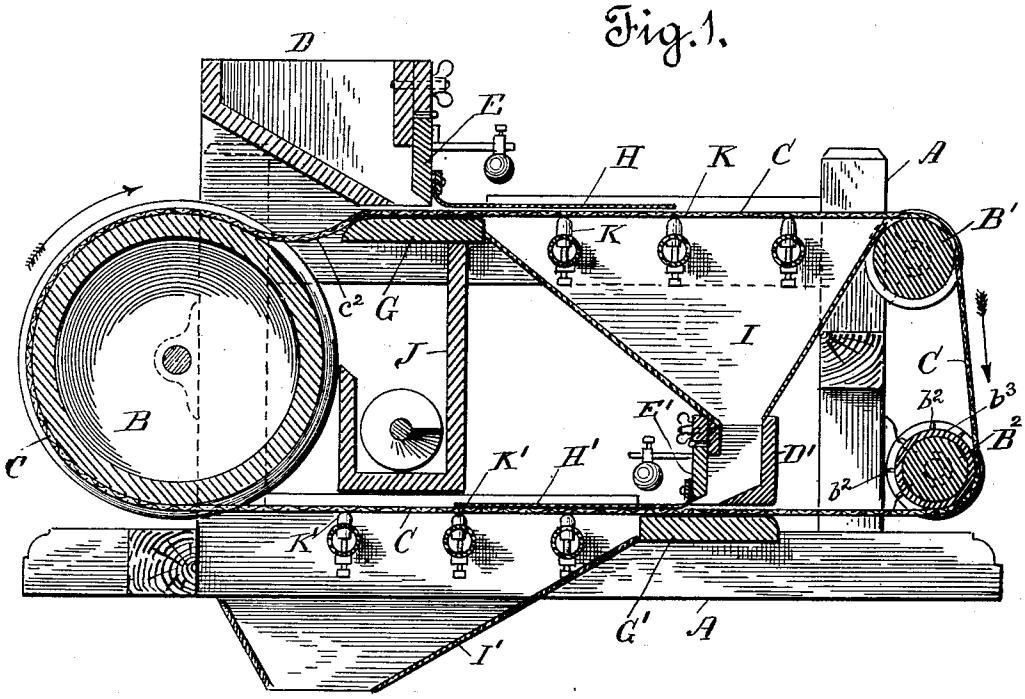


Fig. 2.

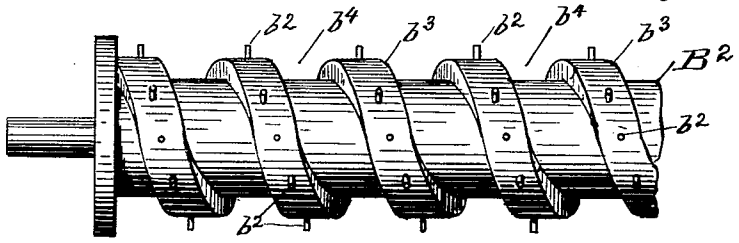
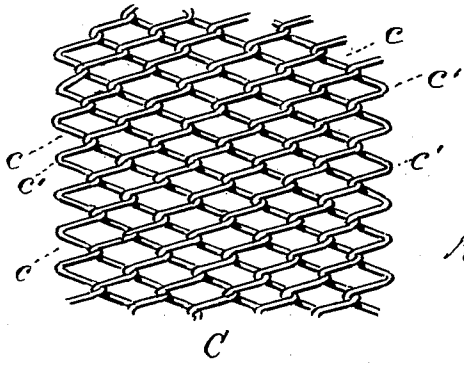


Fig. 3.



Witnesses.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT W. JESSUP, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO SPIRAL BELT SEPARATOR CO., OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 710,981, dated October 14, 1902.

Application filed July 1, 1901. Serial No. 66,634. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. JESSUP, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Separators; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of separators for grains and other small seeds in which an endless traveling screen is employed. The kind of separator to which my present improvements are applied is that illustrated in my previous patents, Nos. 672,981 and 672,982, dated April 30, 1901, and in my pending application, Serial No. 57,243, filed April 24, 1901; and said improvements have for their object an increase in the separating efficiency of the machine. These improvements consist, briefly stated, in a novel manner of arranging and driving the screen and in means rendered possible thereby for utilizing not only the upper run of the screen, but the lower run as well, and also in means for keeping the screen-meshes clear, all of which I shall hereinafter fully describe.

Referring to the accompanying drawings, Figure 1 is a longitudinal vertical section of my separator. Fig. 2 is a view of the lower foot-roller B^2. Fig. 3 is a view of the screen C.

A is the frame of the machine. At one end of the frame is mounted the head-roller B. At the other end are mounted the upper foot-roller B′ and the lower foot-roller B^2.

C is the endless traveling screen. This screen in practice is a flexible one, and its best form is that known as the "spiral-wire belt," which I show in Fig. 3 and which consists of freely interwoven spiral wires, forming channels *c* and intervening ridges *c*′, the latter defining the top plane of the screen, while the former determine the mesh-plane. This screen is mounted upon the three rollers, as shown, and is longer—say about eight inches—than the direct course or distance around the three rollers. The head-roller B is the driver, and the screen travels in the direction shown by the arrows.

D is the feed-hopper, having the weighted automatic spreading and leveling gate E. Under and in contact with the screen at the place of feed of the material is the stationary table G, which extends a short distance beyond the vertical plane of the gate E. Secured to gate E is the apron H, which lies flat upon the ridge-tops of the screen. I is a chute under the upper run of the screen between the end of table G and the foot of the machine.

K represents stationary agitator-pins in contact with which the under surface of the upper run of the screen travels.

With the exception of mounting the screen upon the three rollers the parts thus far described are similar in construction, relative arrangement, and operation to those in my former patents, Nos. 672,981 and 672,982, and application Serial No. 57,243, all heretofore mentioned, and a brief recital of the separation they effect will suffice.

The short rounder particles, like the wheat, falling upon the screen where the table G underlies it, enter the screen-meshes and are supported therein by the table. The long slim particles, like the oats, barley, straw-joints, &c., fall in two general ways—that is, some fall sidewise and some fall end on. Those which fall sidewise enter the screen-channels, but, being long, they bridge the meshes, and thus lie in the channels of the screen and are supported therein. Those which fall end on enter the screen-meshes, but striking the table G they are thereby tipped over, so that they fall to a recumbent position and bridge the meshes, like those particles of similar character which originally fall sidewise. Now as the screen moves over the table such of the long slim particles as have fallen end on and have struck the table, but which, through the interference and obstruction of neighboring particles, have not been tipped over, are induced to lie down in the channels and bridge the mesh, because as the screen moves forward, carrying them along, and their lower ends by contact with the table resist this movement, they are forced to lie down. Finally the gate E spreads and levels them all down into the channels, and

the apron H, acting as a roof for the screen-channels, holds them in said channels in a recumbent position. The short particles, like the wheat, which were confined in the meshes and supported by the table G, as soon as they are free of said table drop from the meshes into chute I. The contact of the screen with the agitator-pins K effects a further separation by reason of the gentle disturbance of the material due to the vibration of the screen in moving over the pins. This operation, as I have before stated, has become familiar through my previous patents, and from what I have now said my present improvements will be readily understood. To increase the efficiency of the separation, I repeat it by making use of the lower run of the screen. In order to do this, I so mount the screen upon its rollers and so apply the driving power that the lower run of the screen shall travel with like precision as the upper run. The three rollers B, B′, and B^2 represent a practical arrangement, though not an essential one. It will be seen that the lower or return run of the screen is like the upper one—straight, true, and even. The chute I leads down to a hopper D′, like the hopper D above, and having an automatic gate E′. Under the lower run of the screen at the place of feed is a stationary table G′, like the table G above. There are also the apron H′, the agitator-pins K′, and the chute I′, arranged similarly to the corresponding parts of the upper run. The operation at the lower run is a repetition of that at the upper run, with one exception, however, which grows out of the necessities of the case—namely, a provision for disposing of the second run of the oats and similar long slim particles. These particles on the first or upper run are discharged over the top foot-roller B′; but on the lower run they are inside instead of outside the screen. These oats and other long slim particles which lie in the screen-channels after the second separation in the lower run are carried up by the screen around the head-roller B and are held in the channels by said roller until they reach its top. From this point to the table G they are free, and being on the lower side of the screen they may drop out by gravity from the screen-channels into a chute or box J, which is the receptacle for the second run of oats, &c. They have a tendency, however, to cling to the screen, and if not dislodged will be carried on and discharged with the wheat into the first chute I. This is prevented as follows: The head-roller B, being the driver, the screen draws evenly from the upper table G around the two foot-rollers and back again to the top of the driver-roller; but as the screen is some eight inches longer than the direct line of its travel there is a sag in it between the top of the driver-roller and the table G. This sag I have designated by c^2. There are two points of advantage gained by this sag. The first is that it enables the screen to run without strain, and thereby reduces the wear upon it. The second is that the oats and similar particles which lie in the channels from the second run and which are held in place by the uprising roller B are positively—even forcibly—thrown out by the rapid motion of the screen and the quick and decided turn at the sag c^2 in making the change from downturning and downmoving from the roller-top to the upturn and movement to the table G.

The lower foot-roller B^2 is made with flanged ends and has pins b^2 projecting radially and which enter the screen-meshes and dislodge any kernels which may clog them. The best construction of this roller is that shown in Fig. 2. A piece of belting b^3 is wound spirally about the roller, its coils being separated to leave intervening spaces b^4. The pins b^2 are carried by and project from this piece, and said pins intersect each mesh of the screen once in so many revolutions and dislodge clogging particles. The open arrangement of the piece b^3 tends to greater freedom of escape for any clinging oats from the screen-channels, while by its spiral disposition a much less number of pins is required to clear the screen.

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

1. In a separator, the combination of an endless traveling screen, a feeder to supply the material to the upper run of said screen, whereby certain of the particles will pass through the screen, and certain others will be carried by the screen and discharged from the foot of the separator, an auxiliary feeder under the upper run of the screen to receive the particles passing through and to direct them upon the lower run of said screen, whereby certain of said particles will pass through said lower run to the outside, while certain others will be carried by the screen from the lower to the upper run and dropped therefrom, and a receptacle located between the upper and lower runs of the screen at a point away from the auxiliary feeder and below the first-mentioned feeder adapted to receive said other particles carried upwardly with and falling from the screen and from which said particles may be conducted away from the machine.

2. In a separator, the combination of suitable supports, an endless traveling screen mounted upon said supports and having a length in excess of the length of the direct course about the said supports to form a sag therein at a point immediately before it reaches the feeder, a feeder to supply the material to said screen.

3. In a separator, the combination of an endless traveling screen, head and foot rollers upon which said screen is mounted, said head-roller being the driver and said screen having a length in excess of the length of the direct course about the rollers to form a sag therein directly after leaving the top of the

driving-roller, a feeder to supply the material to the upper run of the screen in advance of the sag, whereby certain of the particles will pass through the screen, and certain others will be carried by the screen and discharged from the foot of the separator, and a feeder under the upper run of the screen to receive the particles passing through and to direct them upon the lower run of said screen, whereby certain of said particles will pass through said lower run to the outside, while certain others will be carried by the screen from the lower run, around the head-roller to the sag of the screen, and dropped therefrom.

4. In a separator, the combination of an endless traveling screen, head and foot rollers upon which said screen is mounted, said head-roller being the driver and said screen having a length in excess of the length of the direct course about the rollers to form a sag therein directly after leaving the top of the driving-roller, a feeder to supply the material to the upper run of the screen in advance of the sag, whereby certain of the particles will pass through the screen, and certain others will be carried by the screen and discharged from the foot of the separator, a feeder under the upper run of the screen to receive the particles passing through and to direct them upon the lower run of said screen, whereby certain of said particles will pass through said lower run to the outside, while certain others will be carried by the screen from the lower run, around the head-roller to the sag of the screen, and dropped therefrom, and a receptacle under said sag for receiving said other particles therefrom.

5. In a separator, the combination of an endless traveling screen, head and foot rollers upon which said screen is mounted, said head-roller being the driver and said screen having a length in excess of the length of the direct course about the rollers to form a sag directly after leaving the top of the driving-roller, a stationary table under and in contact with the upper run of the screen and defining the forward limit of the sag, said table terminating short at the foot of the machine, a feeder to supply the material to the upper run of the screen above the table, whereby certain of the particles after the screen has left the table will pass through the screen, and certain others will be carried by the screen and discharged from the foot of the separator, and a feeder under the upper run of the screen to receive the particles passing through and to direct them upon the lower run of said screen, whereby certain of said particles will pass through said lower run to the outside, while certain others will be carried by the screen, from the lower run, around the head-roller to the sag of the screen, and dropped therefrom.

6. In a separator, the combination of an endless traveling screen, a head driving-roller and an upper and a lower foot-roller upon which said screen is mounted, said screen having a length in excess of the length of the direct course about the rollers to form a sag directly after leaving the top of the driving-roller, a feeder to supply the material to the upper run of the screen in advance of the sag, a stationary table under and in contact with the upper run of the screen at the place of feed and terminating short of the foot of the machine, said table defining the forward limit of the screen sag, a feeder to receive the particles passing through the upper run of the screen beyond the table, and to feed them to the upper surface of the lower run of the screen, a stationary table under and in contact with the lower run of the screen at the place of feed and terminating short of the head of the machine, and a receptacle under the sag of the screen.

7. In a separator, the combination of an endless traveling screen, terminal rollers on which said screen is mounted, and an intervening roller having pins entering the screen-meshes to clear them.

8. In a separator, the combination of an endless traveling screen, terminal rollers on which said screen is mounted, one of said rollers having a strip wound spirally about it with its coils separated, and pins carried by said strip and adapted to enter the screen-meshes and clear them.

In witness whereof I have hereunto set my hand.

ROBERT W. JESSUP.

Witnesses:
EDWARD F. NORTON,
MORTON L. MARKS.