No. 693,026. Patented Feb. 11, 1902.

R. W. JESSUP.

SEPARATOR.

(Application filed Apr. 24, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

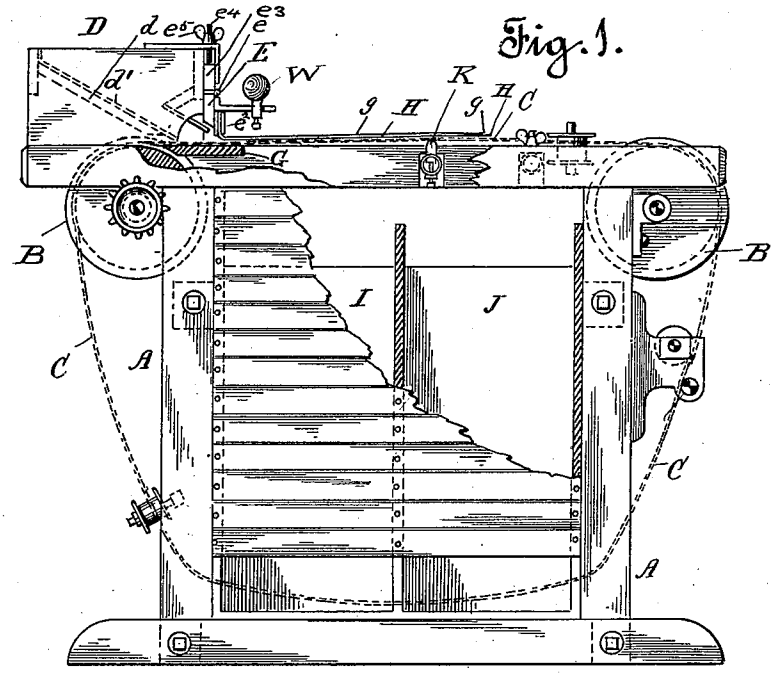
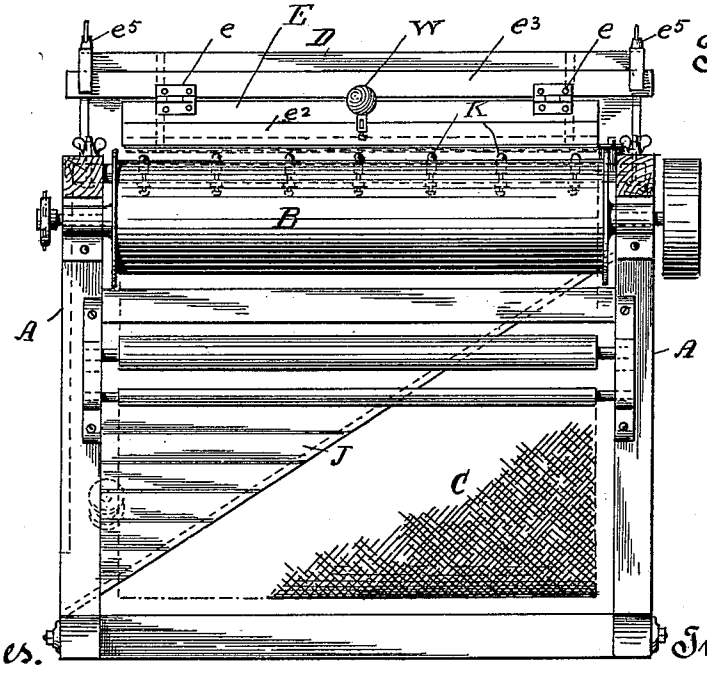


Fig. 2.



Witnesses.

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Walter F. Vane.

Inventor

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by Wm F. Booth

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

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(No Model.) 3 Sheets—Sheet 2.

Fig. 3.

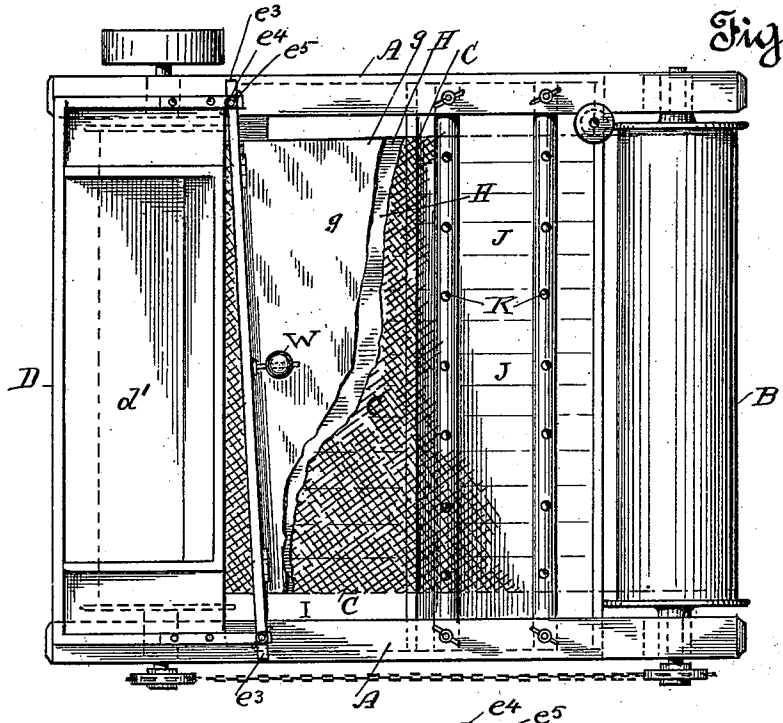


Fig. 4.

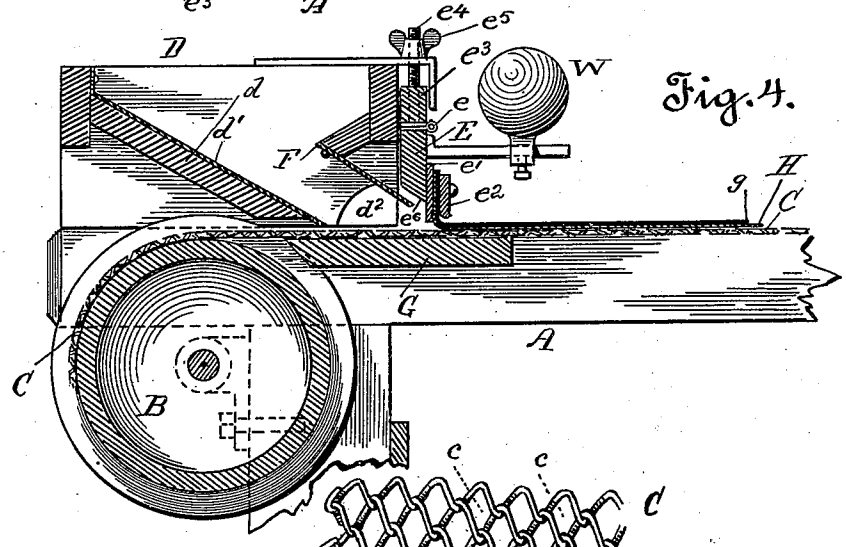
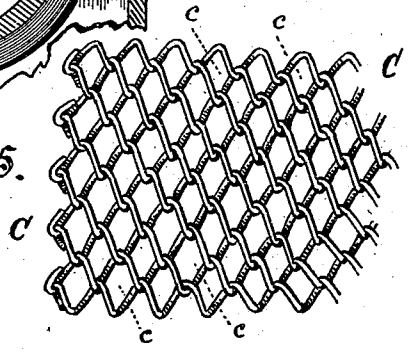


Fig. 5.



Witnesses.

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No. 693,026. Patented Feb. 11, 1902.

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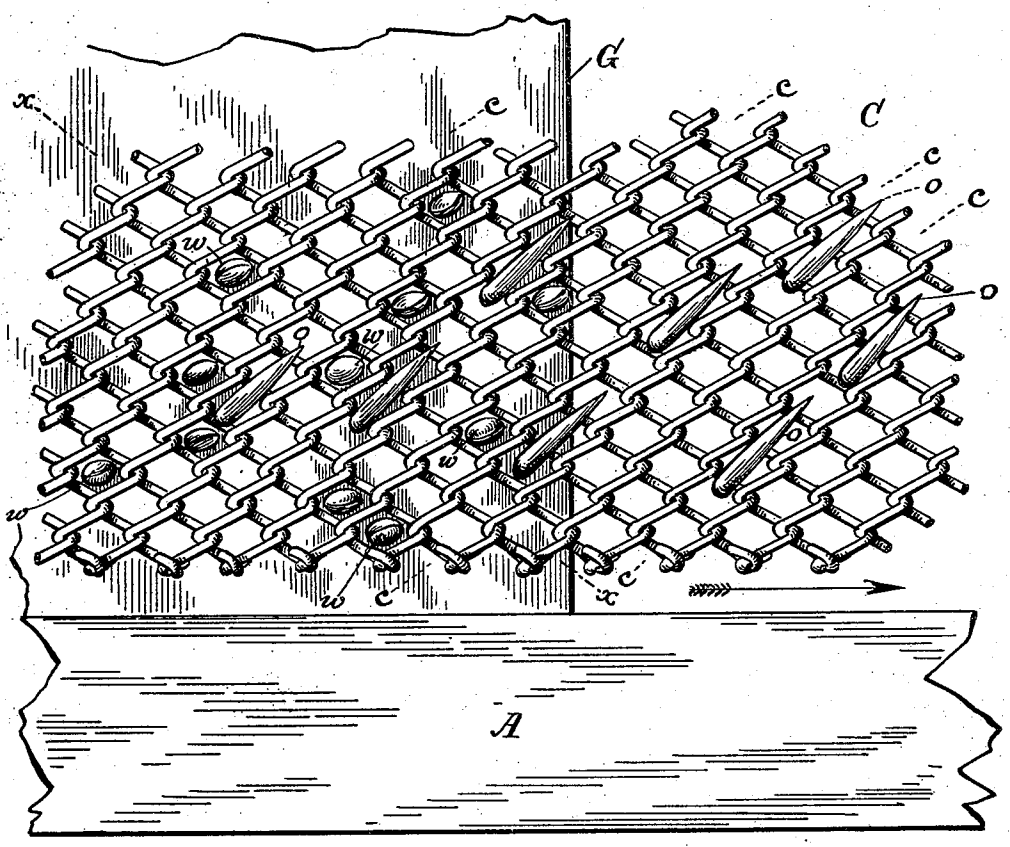
(Application filed Apr. 24, 1901.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 6.



Fig. 7.



Witnesses.

H. Montevercle.

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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. 693,026, dated February 11, 1902.

Application filed April 24, 1901. Serial No. 57,243. (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. I have found that in the use of a screen of this character—that is to say, an endless traveling screen—there should be under the screen at the place of feed and in contact with it a stationary table, which thence extends in that position for a portion of the operative or functionally-active part of the screen, the purpose and effect of said table being to cause the longer particles, like the oats, which approach the screen end on and would were it not for the table pass with the wheat-grains through the openings of the screen to be tipped over by contact with the table and the relative movement of the screen to a horizontal or recumbent position, and thus lie on the screen and be carried off over its foot, while the wheat drops through when the screen-openings, in which it readily lodges, are clear of the table. This separation I have described in my previous patent, No. 672,981, dated April 30, 1901. I have also found that increased efficiency in this separation may be had by using in connection with the traveling screen and the underlying table a means for agitating the screen throughout a zone or area of its functionally-operative portion beyond the part at which upon leaving the table an initial separation takes place by gravity alone, whereby a second separation is had by reason of the agitation. This I have described in my previous patent, No. 672,982, dated April 30, 1901. Finally, I may state that in all my previous use of these principles of separation I have employed a screen of a distinctly channeled character—that is, one having a sectional thickness—appreciable enough to have in it channels or grooves of a depth sufficient to allow the particles of the material to lie down in them flush with or below the plane of its upper surface. One form of this screen I have illustrated and described in my application last above mentioned. Now although the table and the relatively traveling screen are sufficient to tip over the long narrow particles like the oats, thereby causing them to lie down in the channels of the screen, there are other causes, of which the subsequent agitation, for example, is one, which tend to disturb this recumbent position and to upend them sufficiently to make it possible for them to pass through the screen after being carried beyond the plane of the table. It is therefore necessary to insure the continuance of these long narrow particles in their recumbent position in the channels of the screen, and my present invention has this for its object. The end is gained by the combination, with an endless channeled traveling screen and the underlying table by which the long particles are made to lie in the channels of the screen, of an apron lying flat upon the top surface of the screen whereby the particles lying in the screen-channels and passing under the apron are positively held in their recumbent position against any tendency to upend them. The most complete result is gained by the further combination, with said screen, table, and apron, of a means located between the place of the feed of the material to the screen and the entrance to the apron, adapted to level all the material to the plane of the top surface of the screen, whereby all the particles passing said means must lie in the screen-channels.

My invention consists in these combinations and such further combinations, constructions, and arrangements of parts as I shall now fully describe by reference to the drawings and as I shall subsequently claim.

In the drawings, Figure 1 is a side elevation, partly broken, of my separator. Fig. 2 is an elevation of same from the foot end. Fig. 3 is a top plan. Fig. 4 is an enlarged sectional detail elevation of the feed-hopper and adjacent parts. Fig. 5 is a plan view of the screen. Fig. 6 is an enlarged vertical section of screen C on a diagonal line transversely of its channels *c* on the line *x x* of

Fig. 7. Fig. 7 is an enlarged top view of a portion of screen C, showing some wheat-grains at *w* lying encompassed by the mesh and supported by the underlying table G and some oat-grains at *o*, lying within the channels and bridging the screen-meshes and supported thereby.

A is a frame.

B B are rollers over which the endless screen C is made to travel continuously in one direction—that is, its movement is non-reciprocating. The screen C, which may be of any suitable character as far as its perforations or openings are concerned, (by which I mean that said screen may be one which has holes either made directly in its body or formed by the reticulation or mesh of said body) must be one provided with channels or grooves, in the floors of which the perforations or openings are formed. These channels may be formed in any suitable manner and may extend in any direction, and they make the screen practically of two distinct levels, one being the plane of the upper surface and the other being the plane of the perforated floors of the channels. In practice I have found that the best form of screen for this purpose is that which I have here shown by reference to Figs. 5 and 6. It is a wire-mesh screen composed of freely interlaced or interwoven wires. These wires are what are known as "spiral," and they freely interlace without other connection, thereby giving the screen great flexibility, and the arrangement of the wires is such as to form the diagonal or oblique channels or grooves *c*, in the floors of which are the mesh-openings, while the tops of the channel-walls form the upper plane of the screen.

D is a hopper having the slanting rear wall *d*, which is provided with a plate *d'* to better feed the material to the screen. The hopper has a front gate E, hinged at *e* and provided with an adjustable weight W to regulate its resistance. Within the hopper is a metal plate F, which better directs the material downwardly to the screen and protects the gate from too extensive contact of said material. To the front of the gate is secured by its upper edge a piece *e'* of suitable material, like vulcanized fiber, the lower edge of which, projecting below that of the gate, forms a lip therefor which effectually distributes or spreads the material and scrapes it into the channels of the screen. The lower edge of the gate E, as is shown at e^6, is beveled, sloping downwardly and forwardly from the inner surface to the lip *e'*, and the side of the hopper at the end of the gate is open, as shown at d^2, for a purpose which I shall presently describe.

Carried by the frame A, directly under and in contact with the under surface of the screen C at and beyond the place of feed, is the table G. Upon the screen beyond the place of feed lies an apron H. This apron, which is preferably a sheet of oil-cloth, may be of any suitable material which will lie flat upon the surface of the screen—that is to say, it lies directly and flat upon the tops of the channel-walls of the screen, thus lying in the plane of the upper surface of said screen—and said apron may, if necessary, be caused to lie in this flat position by means of a superposed sheet *g* of a sufficiently-weighty material, such as leather or rubber belting. The apron may be secured in any suitable manner. I have here shown it as secured by its rear end between the piece or lip *e'* of the gate E and a plate e^2 of hard wood, thus supporting it from the gate itself, so that whatever material passes the gate must pass under the apron. Beyond the tables are the chutes I and J to receive the particles which fall through the screen after leaving the table.

K represents fixed agitators over and in contact with which the screen passes, whereby screen is gently shaken to increase the said separation.

The gate E is hinged to a bar e^3, which is suspended by hanger-bolts e^4 provided with thumb-nuts e^5, whereby the gate may be vertically adjusted in order to regulate the position of its lip *e'* with respect to the plane of the upper surface of the traveling screen C.

The operation is as follows: The material is directed by the hopper down to the screen. The particles which, like the wheat, are small enough fall into and are encompassed by the screen-openings and rest on the table, as shown by *w* in Fig. 7. The particles which are longer, like the oats, bridge or span the screen-openings and are thereby carried by the screen, as shown by *o* in Fig. 7. Such of these long particles, however, as fall end on are stopped by the table and while thus resting end on upon the table are by the travel of the screen tipped over to a recumbent position. Thus all the particles to be immediately effected by the screen and table are lying in the channels *c* of the screen. The gate E is adjusted so that its lip *e'* will lie sufficiently near to the plane of the upper surface of the screen to insure the result that all the particles which can pass the gate with the screen shall be reduced to the level of the plane of the top of the screen and shall all lie in the channels thereof. These particles consist, as before stated, of the smaller or wheat particles encompassed directly by the walls of the screen-openings and supported by the underlying table and the longer particles, such as the oats, which lie in a recumbent position bridging these openings and being thereby carried by the screen itself, but entirely inclosed within the channels. Now as the screen passes beyond the gate to the apron and as the apron lies directly on top said screen said apron forms a roof, as it were, for all the screen-channels, and thus positively prevents the disturbance, due to any cause, (as, for instance, the agitation of the screen,)

of the recumbent position of the long particles, such as the oats, and holds said particles positively in this recumbent position, thereby insuring their support and carriage by the screen and their final discharge over the foot. The smaller or wheat particles when relieved from the support of the table drop through the screen by gravity into the first chute, and such as remain are caused by the subsequent agitation to drop into the second chute. The support of the apron directly by the top of the screen and the carrying of the particles under the apron within the channels of the screen relieves the particles from any contact with the apron itself, as would be the case if the material were carried on the surface of the screen and the apron lay upon the material. This results in avoiding the disturbance and consequent change of position which would be caused by direct contact of the particles with the apron. Mixed with the material are large round particles, such as kernels of corn, which are too large to enter the screen-channels. These particles, by reason of their shape, are caused by the bevel of the gate at e^6 to be guided within the hopper laterally and to be discharged at the side opening d^2. When the machine is handling grain, the gate E is set close against the face of the hopper its entire length, and in this case the corn-kernels, as stated, are directed to the side opening d^2 by the beveled lower edge e^6 of the gate, just behind the lip e'; but when the machine is used for scalping purposes the gate E, as shown in Fig. 4, is set farther away from the face of the hopper at one end or side than at the other, thereby throwing the plane of said gate to an inclination to the direction of travel of the screen. This causes large sticks, corncobs, &c., to work out at the open end d^2.

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, non-reciprocating, channeled screen, a table lying under and in contact with the screen at the place of feed of the material thereto, and thence extending, in such contact, for a portion of the functionally operative part of the screen, whereby the longer particles, entering the channels with the shorter particles are caused to lie down therein, bridging the openings of the screen, and are, thereby, carried by the screen, after the table is passed and the shorter particles have dropped through the screen, and an apron lying flat and directly upon the top surface of the screen beyond the place of feed, whereby the long particles are held in a recumbent position in said channels, to insure their being carried by the screen to their discharge.

2. In a separator, the combination of an endless, traveling, non-reciprocating, channeled screen, a table lying under and in contact with the screen at the place of feed of the material thereto, and thence extending, in such contact, for a portion, of the functionally operative part of the screen, whereby the longer particles, entering the channels with the shorter particles are caused to lie down therein, bridging the openings of the screen, and are, thereby, carried by the screen, after the table is passed and the shorter particles have dropped through the screen, an apron lying flat and directly upon the top surface of the screen beyond the place of feed, whereby the long particles are held in a recumbent position in said channels, to insure their being carried by the screen to their discharge, and a means located at a point between the place of feed and the entrance to the apron, and so adjusted as to level the material to the plane of the top surface of the screen, whereby all the particles passing said leveling means must lie in the screen-channels.

3. In a separator, the combination of an endless, traveling, non-reciprocating, channeled screen, a table lying under and in contact with the screen at the place of feed of the material thereto, and thence extending, in such contact, for a portion of the functionally operative part of the screen, whereby the longer particles, entering the channels with the shorter particles are caused to lie down therein, bridging the openings of the screen, and are, thereby, carried by the screen, after the table is passed and the shorter particles have dropped through the screen, an apron lying flat and directly upon the top surface of the screen beyond the place of feed of the material to the apron and so adjusted as to level the material to the plane of the top surface of the screen whereby all the particles passing said gate must lie in the screen-channels, the lower edge of said gate being beveled as described to cause particles too large to enter the channels to be guided laterally to a discharge.

4. In a separator, the combination of an endless, traveling, non-reciprocating, channeled screen, a table lying under and in contact with the screen at the place of feed of the material thereto, and thence extending, in such contact, for a portion of the functionally operative part of the screen, whereby the longer particles, entering the channels with the shorter particles are caused to lie down therein, bridging the openings of the screen, and are, thereby, carried by the screen, after the table is passed and the shorter particles have dropped through the screen, an apron lying flat and directly upon the top surface of the screen beyond the place of feed, whereby the long particles are held in a recumbent position in said channels, to insure their being carried by the screen to their discharge, and a means located

at a point between the place of feed and the entrance to the apron, and so adjusted as to level the material to the plane of the top surface of the screen, whereby all the particles passing said leveling means must lie in the screen-channels, said leveling means being disposed at an angle to the direction of travel of the screen, whereby particles too large to enter the channels are guided laterally to a discharge.

In witness whereof I have hereunto set my hand.

ROBERT W. JESSUP.

Witnesses:
JOHN CARDEN, Jr.,
MORTON L. MARKS.