

(No Model.)

J. E. BORCHARD.
SEPARATOR.

No. 527,656.

Patented Oct. 16, 1894.

Fig. 1.

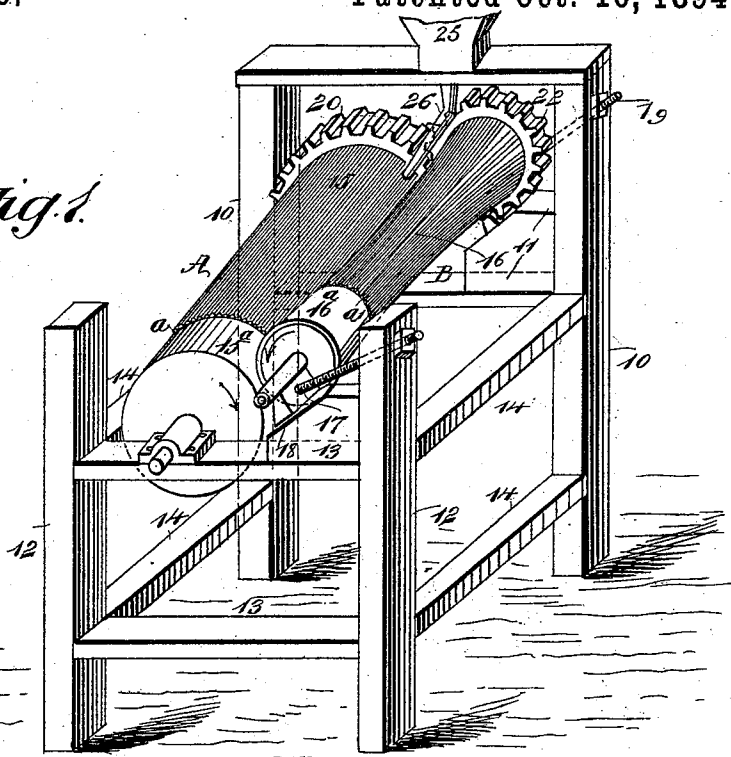


Fig. 2.

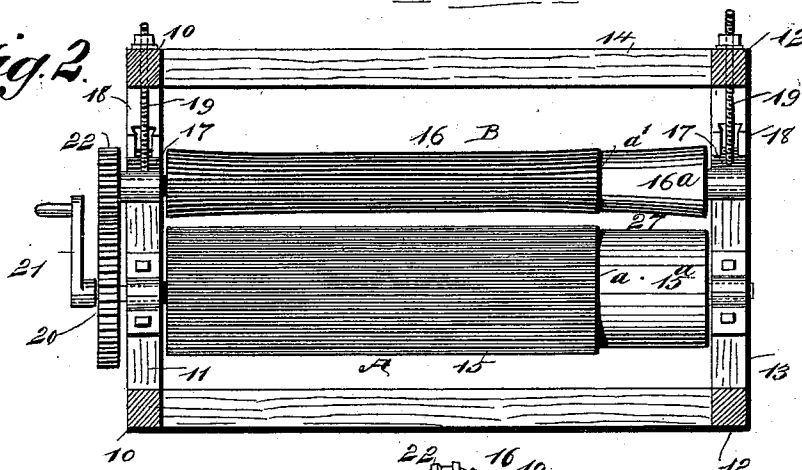
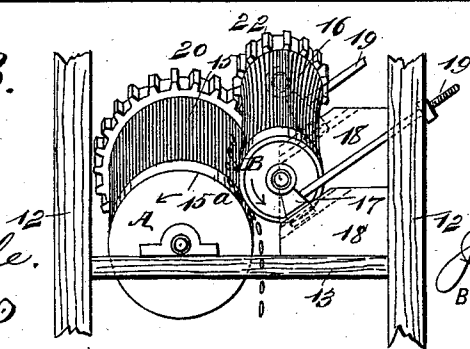


Fig. 3.



WITNESSES:

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SPECIFICATION forming part of Letters Patent No. 527,656, dated October 16, 1894.

Application filed June 19, 1894. Serial No. 515,034. (No model.)

To all whom it may concern:

Be it known that I, JOHN EDWARD BORCHARD, of New Jerusalem, in the county of Ventura and State of California, have invented a new and Improved Separator, of which the following is a full, clear, and exact description.

My invention relates to that class of machines used in separating one kind of seed from another, and also for removing dirt and refuse.

The principal object of the invention is to separate the smooth from the rough particles of any material which is composed of particles of different degrees of smoothness, and the especial object of the invention is to separate dirt and other foreign particles from grain, and particularly from oval shaped grain, such as canary seed, flax, or leguminous seeds.

My invention consists in feeding material composed of particles of different degrees of smoothness, between two opposite sides of two oppositely revolving inclined rollers of different sizes, each of which rollers is made to maintain a different degree of inclination from the other, the surfaces of the rollers being preferably roughened to produce a separation of particles having a less cohesive affinity for a roughened roller from those particles having a greater cohesive affinity therefor.

The invention also consists in connection with the above, of means for guiding the material to such a point on the larger roller where the tenacious tendency of those particles having the greater cohesive affinity will be stronger, thereby effecting and maintaining their separation.

The invention further consists in the novel shape of the smaller roller, which may be designated as a guide roller, the said guide roller being concaved longitudinally.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of the machine. Fig. 2 is a partial plan and partial horizontal section, the section being taken above the rollers. Fig. 3 is an end view of a portion of the frame and of the two rollers.

In carrying out the invention the frame of the machine consists of two upright head standards 10, connected by cross bars 11, corresponding foot standards 12 connected by suitable cross bars 13, and side bars 14, which connect the foot and head standards. This frame is adapted to carry two rollers A and B, one of the rollers being of greater diameter than the other.

The roller A, which is the larger in diameter, is journaled in suitable bearings in the head and foot portions of the frame, the head end of the roller being at a greater height than the foot end, whereby the said roller has a longitudinal downward inclination. This roller A is provided with a covering 15 of any approved material having a roughened outer surface, and the said roughened outer surface may be serrated longitudinally, ribbed, or equivalently formed.

The roughened covering 15 of the roller A extends from its upper end to a point *a* near its lower end, and from the said point *a* to the lower extremity of the roller the smooth surface 15^a of the roller is exposed.

The second or guide roller B is of less diameter than the larger roller, and is concaved longitudinally, the concavity extending from end to end, the roller A being of the same diameter throughout. The guide roller B is likewise provided with a covering 16 of a suitable material, and the said covering is made to extend from end to end thereof. The covering, however, is provided with a smooth section 16^a at its lower or foot end, corresponding in length preferably to the length of the exposed portion of the roller A, the plain surface of the roller B being made to face the plain surface of the roller A. From the termination *a'* of the plain surface of the covering of the guide roller to the opposite or upper end of the said roller, the exterior of said covering is roughened preferably in a manner corresponding to the outer face of the covering of the larger roller A.

The guide roller B, for such it really is, is given an inclination downward in direction

of the foot of the frame, the inclination differing from the inclination of the main roller A, since the head end of the guide roller is usually higher than that of the main roller; and the foot end of the guide roller is likewise more elevated than the corresponding portion of the main roller, and is carried inward toward the main roller in such manner that the guide roller will have more or less of an aspiral relation to the main roller. The guide roller is journaled in boxes 17, which are preferably mounted upon inclined planes 18, located upon the frame at the foot and at the head, the boxes being adjustable upon the said inclined planes through the medium of attached adjusting screws 19, or equivalent devices; and the two rollers are driven in opposite directions, one at a greater speed than the other, which may be accomplished in any suitable or approved manner, the driving mechanism in the drawings consisting of a gear wheel 20, secured to the head end of the larger roller and turned through the medium of a crank 21, or its equivalent, the said gear meshing with the gear 22, attached to the head end of the smaller or guide roller B.

The material to be separated is fed to the rollers through the medium of a hopper 25, which is provided usually with a delivery tube 26, which may be led to any point between the rollers. Between the two plain surfaces of the rollers an opening 27, is formed, which is adapted as an exit for the seed separated from those which are not intended for use. Thus while the proper material will fall through the discharge opening 27 between the rollers, the larger material, or that of improper size will be carried forward to and over the foot end of the rollers. The discharge opening may be made larger or smaller in width according to the adjustment of the boxes in which the guide roller is mounted.

The operation of the machine is substantially as follows: The main roller A being put in motion in the direction indicated by the arrows, will cause the guide roller to rotate at a much higher rate of speed, and the material to be operated upon is fed between the rollers from the hopper at the upper portion of the machine. The motion of the main roller A and the inclination at which it is set, together with the rapid motion of the periphery of the guide roller, cause the material to work downward toward the lower end of the rollers, and in so doing, owing to the oval shape of the material, the latter assumes an upright position, as shown in Fig. 3, and in this position continues downward until the material reaches the widened portion of the discharge opening 27, between the plain surfaces of the rollers, through which opening the proper material will fall; and before the material has reached the widened portion of the space between the rollers, or the discharge opening 27, the dirt and like refuse will have been removed in the following manner: The

fine dirt and sand will fall directly through the narrow space between the two rollers. The twigs, hard hulls, half-beans, cracked seeds, and refuse of like nature, are caught by the roughened surface of the main roller A, are carried over the said roller and are deposited in proper receptacles which may be placed at the side of the machine, while stones, lumps of dirt, and seed of more spherical form will be carried on down over the ends of the rollers and there discharged. Owing to the hard smooth surface of the perfect seed, which seed is designed to fall through the discharge opening 27, the rough surface of the main roller A does not act upon it with sufficient cohesion to carry it over, as it does the rougher surfaced material.

The object of the smaller or guide roller being roughened for a portion of its length only is, that taken together with the rapid motion of the periphery of the said guide roller it will cause the material to become more agitated during its downward course at the discharge opening, thereby affording more opportunity for the roughened surface of the main roller to catch the rough surfaced material.

The object of the guide roller B being concaved longitudinally is to admit of its being elevated at its lower end and yet leave the space between the two rollers of a uniform width the entire length of their roughened surfaces, which is accomplished by placing the guide roller in such a position with relation to the large roller that said guide roller will have assumed a somewhat spiral relation to the periphery of the main roller.

The object of elevating the lower end of the guide roller is to guide the material obliquely along the main roller for the following purpose: When the material is fed into the machine it will begin traveling more or less near the horizontal center of the main roller. The periphery of the said roller being too steep even for the roughened surface to catch any refuse, it is evident that to accomplish good work the material must by some means be guided to that point on the main roller where, owing to the less acute angle of the periphery of the latter, its rough surface may catch up the refuse, &c., and carry it over, and at the same time not carry over the perfect seed. The nearer to the horizontal center of the main roller the material can be fed, the less the percentage of perfect seed that will be carried over the main roller.

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

1. In a separator, a frame, a main cylinder or roller having a longitudinal inclination in direction of the forks of the frame and mounted to revolve, the said roller having a portion of its periphery roughened, a guide roller concaved longitudinally, having likewise a longitudinal inclination from the head

of the frame downward and mounted to revolve contiguous to the main roller, and a driving connection between the two rollers, whereby one will be driven at a greater speed 5 than the other, substantially as shown and described.

2. In a separator, a frame, a main roller journaled therein and having a longitudinal inclination, the said main roller being provided 10 with a roughened surface extending from its higher end to a predetermined point near its lower end, the lower peripheral portion of the roller being smooth, a guide roller of less diameter than the main roller and longitudinally 15 concaved, the said roller being journaled contiguous to the main roller, the guide roller having its surface roughened and a part rendered plain, corresponding to the surfaces of the main roller, whereby a discharge opening 20 is formed between the plain surfaces of the two rollers, and a driving mechanism whereby the concaved roller is driven at a greater rate of speed than the main roller, as and for the purpose set forth.

3. In a separator, a frame, a main roller journaled in the said frame and having longitudinal inclination, the said roller being provided 25 with a roughened surface extending from a point near its upper end to a point near its lower end, the lower portion of the roller being smooth and of slightly less diameter than the roughened portion, a longitudinally concaved guide roller, having its surface formed 30 correspondingly with the surface of the main roller, the guide roller having likewise a longitudinal inclination but differing from that of the main roller, means, substantially as shown and described, for adjusting the guide roller 35 to and from the main roller, and a driving mechanism whereby the two rollers are driven at different rates of speed, as and for the purpose set forth.

4. In a separator, the combination, with a frame, a main roller of cylindrical shape, jour-

naled in the said frame and having longitudinal 45 inclination in direction of the foot of the frame, the said roller having a portion of its peripheral surface roughened, the extreme lower peripheral surface of said roller being 50 reduced in diameter and plain, of a guide roller of less diameter than the main roller, concaved longitudinally and mounted in adjustable bearings located in the frame at one 55 side of the main roller and contiguous thereto, the guide roller being inclined from the head downward, the inclination of the guide roller varying from that of the main roller, the guide roller being made to sustain substantially a 60 spiral relation to the main roller, the discharge end of the guide roller being higher than that of the main roller, and the space between the plain surfaces of the two rollers serving as a discharge opening for the proper grain, and a driving mechanism for said rollers, substantially as shown and described. 65

5. In a separator, a frame, a main roller journaled in the frame and having longitudinal inclination, being provided with a smooth peripheral surface at its lower end, the remainder of the peripheral surface being rough- 70 ened, a guide roller at a greater elevation than the main roller, located adjacent thereto, and having a longitudinal inclination in the same direction as the main roller, the said guide roller being longitudinally concaved 75 and having its outer surface formed correspondingly with the surface of the main roller, whereby a discharge opening is formed between the plain surfaces of the two rollers, means for adjusting the guide roller, whereby 80 it may sustain a spiral relation to the main roller, and a driving mechanism for the said two rollers, substantially as and for the purpose specified.

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Witnesses:

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