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SEPARATOR.

APPLICATION FILED APR. 2, 1912.

1,055,722.

Patented Mar. 11, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

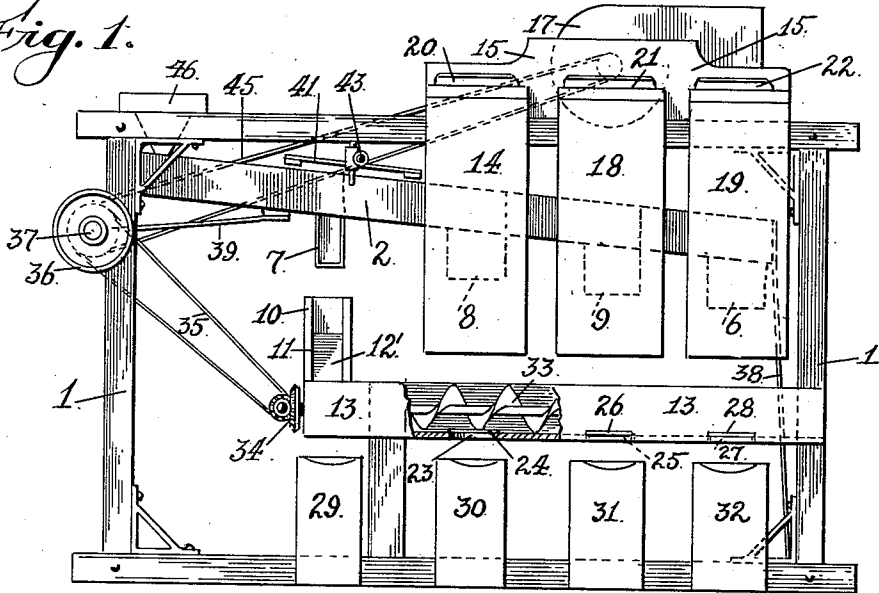
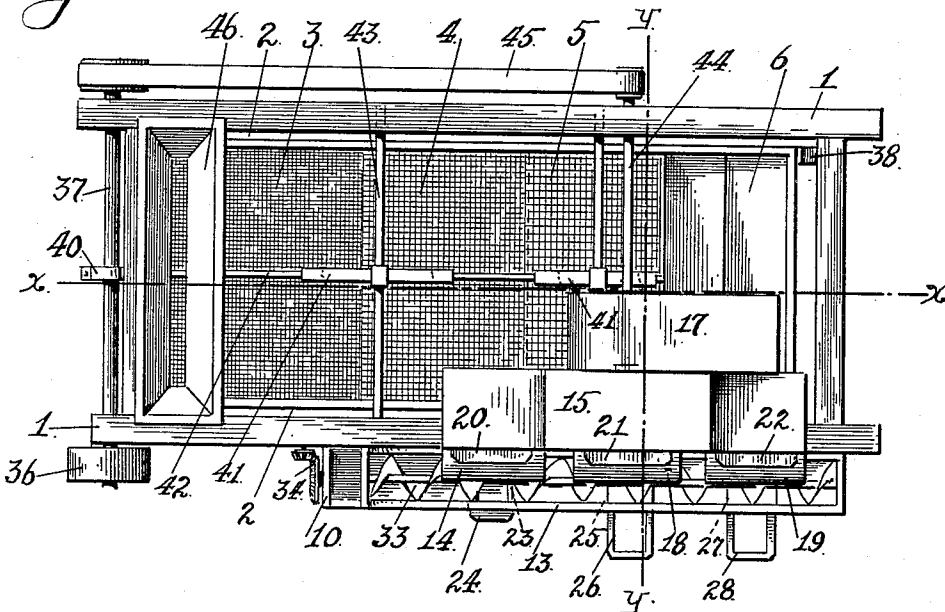


Fig. 2.



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2 SHEETS—SHEET 2.

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Fig. 3.

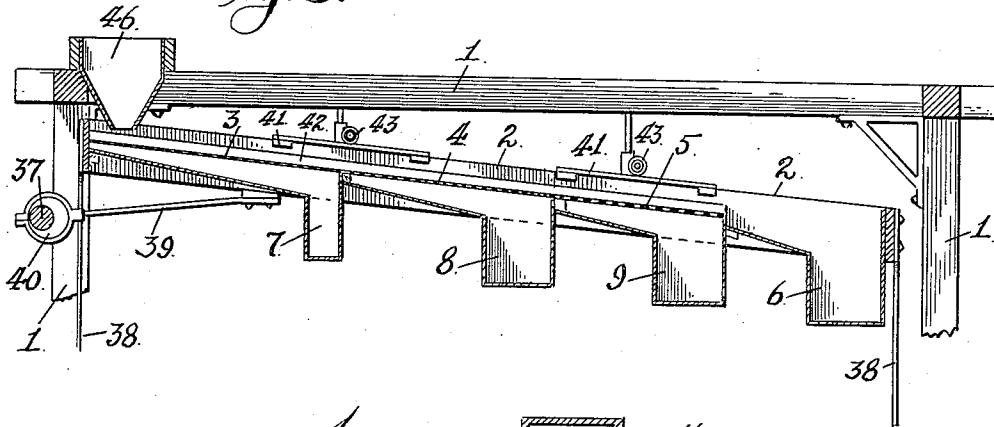


Fig. 4.

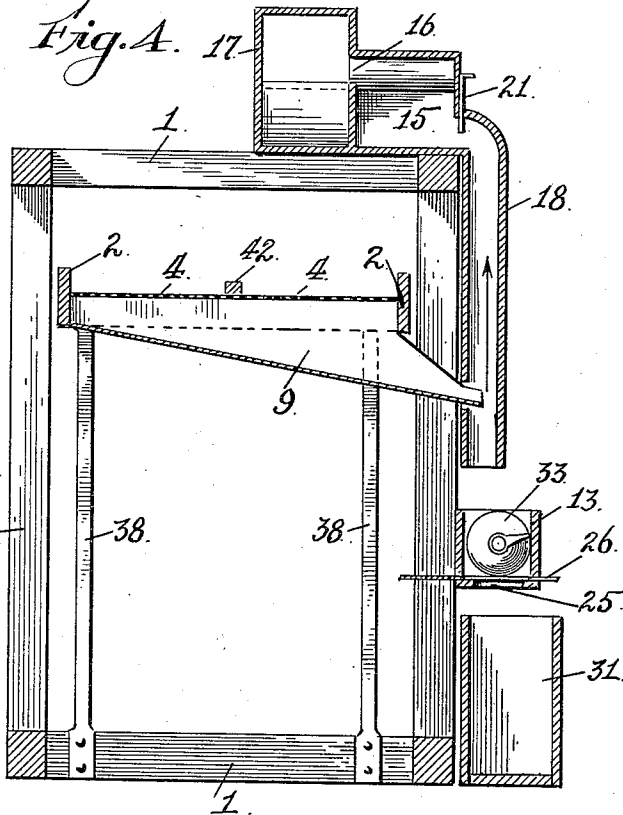
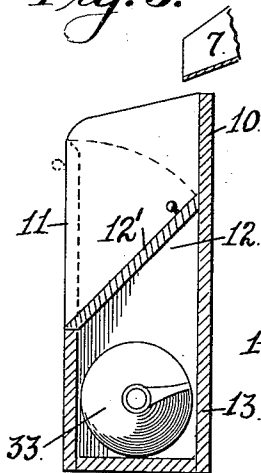


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SEPARATOR.

1,055,722.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed April 2, 1912. Serial No. 688,036.

To all whom it may concern:

Be it known that I, LOYD C. DIBERT, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Separators, of which the following is a specification.

My invention relates to that class of separators in which the operation is dependent upon a difference both in size and in specific gravity of the particles composing the material, the former difference being taken advantage of by screening, and the latter by an air-current.

The object of my invention is to provide a machine which will effect a thorough cleaning with little or no waste; and though the machine is applicable for the separation and cleaning of various materials, it is especially intended for use with coffee. With this material it is particularly of advantage in that it provides for the saving of the very fine particles, which on account of their lightness are apt to be, and in practice largely are, carried away by the air-blast which is usually applied as an "aspirator" or suction-current; and it further provides for the complete removal of all the chaff, without carrying over any of the valuable particles, a result which is attained by first dividing the material into grades according to size, and applying to each grade separately, but simultaneously, air-currents each of which is nicely regulated in intensity to suit the grade to which it is applied; and finally it provides for keeping the cleaned grades separate or mixing them again as may be desired. These results are accomplished by my invention, which consists in the novel separator which I shall now fully describe by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my machine. Fig. 2 is a plan of the same. Fig. 3 is a vertical longitudinal central section, enlarged, on the line $x-x$ of Fig. 2. Fig. 4 is a vertical cross section, enlarged, on the line $y-y$ of Fig. 2. Fig. 5 is a sectional detail of the valved conduit for the fine material.

1 is the frame of the machine.

2 is an inclined shaking screen-shoe, the screen of which is, from its head to its foot, composed of zones of successively increasing mesh. The first zone 3, at the head, has the smallest mesh; the second 4, a larger mesh; the third 5, a still larger mesh, while the

foot of the screen discharges into the final cross-chute 6. Under the first zone 3 is a cross-chute 7; under the second zone 4 is a cross-chute 8; and under the third zone 5 is a cross chute 9, all of said cross chutes, including the chute 6, being carried by and shaking with the shoe 2.

The discharge end of the chute 7 communicates with a conduit 10, which has two outlets, one 11, leading to the exterior and the other 12 being in communication with the head of a conveyer-trough 13, as seen in Fig. 5. A swinging valve 12' controls these outlets.

The discharge end of the chute 8 leads directly into an aspirator or suction-trunk 14 the lower end of which opens to the conveyer-trough 13. The upper end of this suction-trunk opens into an air-box 15, which through a passage 16 communicates with the fan-casing 17. The discharge end of the chute 9 leads directly into a second aspirator or suction-trunk 18, the lower end of which opens to the conveyer trough 13 while its upper end opens to the air-box 15. In like manner the discharge end of the chute 6 leads directly into a third aspirator or suction-trunk 19, the lower end of which opens to the conveyer-trough 13, while its upper end opens to the air-box 15.

The communication of the first suction-trunk 14 with the air-box 15, is controlled by a slide gate or valve 20. A similar gate or valve 21 controls the communication of the second suction-trunk 18 with the air-box 15; and a third gate or valve 22 controls the communication of the third suction-trunk 19 with said air-box 15. Each of these gates or valves is separately operatable, so that the intensity of the air-current in each trunk may be separately and nicely regulated.

In the bottom of the conveyer-trough 13, below the first suction-trunk is a discharge opening 23, which is controlled by a gate 24. A second discharge opening 25 in the trough bottom, under the second suction trunk is controlled by a gate 26, and a third discharge opening 27 in said trough, under the third suction trunk is controlled by a gate 28.

Under the front outlet 11 of the conduit 10 is a bin 29; under the discharge opening 23 of the conveyer trough is a bin 30; under the discharge opening 25 of said trough is a bin 31; and finally, under the discharge opening 27 of the trough is a bin 32.

In the conveyer-trough 13 is a screw 33,

which is driven by suitable means, as, for example, by the bevel gears 34 and belt 35 from the pulley 36 on the head shaft 37.

The screen-shoe 2, is mounted upon spring legs 38, and is given a rapid endwise shake by means of a connecting rod 39 to an eccentric 40 on the head shaft 37. A rapid percussion movement is given the shoe by knockers 41 which beat upon its central longitudinal rib 42, said knockers being mounted upon cross shafts 43 oscillated by suitable means. These form no part of my present invention and need no detailed description. The suction or aspirator fan is driven by the shaft 44 and belt 45 from the head shaft 37. 46 is the feed hopper over the head of the screen-shoe.

The operation of the machine is as follows:—

The material, say, ground coffee for example, is fed by the hopper 46 upon the head of the shaking screen-shoe 2. Through the screen-zone 3 of smallest mesh the very fine particles sift. These pass into the underlying cross chute 7 and thence flow into the conduit 10 which according to the predetermined position of the valve 12' directs them either into the receptacle 29 or into the head end of the conveyer-trough 13. The next grade of the material according to fineness sifts through the second screen-zone 4 and falling into the underlying cross chute 8 is by it delivered directly into the aspirator-trunk 14. In this trunk being subjected to the uprising air-current, due to the operation of the fan in the casing 17 above which said current is regulated in intensity by the valve 20, the chaff and light worthless particles of every nature are separated and lifted up and discharged through the wind trunk and fan casing into any suitable receptacle. The heavier and valuable material falls by gravity through the air current into the conveyer-trough 13. The next grade of the original material sifts through the third screen-zone 5 and falling into the chute 9 is delivered into the second aspirator-trunk 18, the air current in which is regulated by the valve 21. The chaff and light worthless particles are by this current carried upward and discharged, while the material itself falls into the conveyer-trough 13. The next grade of the original material, which may here be considered the entire residue, falls from the end of the screen-shoe into the chute 6 and by said chute is delivered into the third aspirator-trunk 19, the regulated air-current in which separates out the chaff and lighter worthless material leaving the valuable material to fall down into the conveyer-trough 13.

In the operation as thus far described, the following features of possible manipulation and result are to be noted. By removing at the outset, through the first or smallest

screen-zone 3 the very finest material, a complete saving of such material is effected, for its specific gravity is so nearly that of the chaff and worthless light particles, that if it were allowed to accompany the remaining material to the sphere of action of the aspirator, the air-current no matter how closely regulated would carry the greater part of it away as waste. By delivering this fine material thus separated and saved, to the valved conduit 10, it may by the proper operation of the valve 12' therein, either be taken out of the machine wholly for whatever disposition may be desired, or it may be passed into the conveyer-trough 13 for re-mixing with other grades, one or more, or all of them, as determined upon. By separating in the second screen-zone 4 the next grade of material, this grade may be subjected to an aspirator-current of just such intensity, regulated by the valve 20, as will take out its chaff and worthless light particles, without carrying over any valuable material. Then by next separating out from the original material the third grade in the next screen-zone 5 and subjecting this, with its necessarily heavier, because larger, chaff and worthless particles, to an aspirator-current of greater intensity, regulated by its valve 21, said grade will be properly cleaned. The next separation is a repetition of the preceding, merely accentuating the operation and result, in that the air-current is here of still greater intensity, as determined by the valve 22, so that the largest chaff, etc., is removed.

It will now be seen that, so far, there is a division of the original material into grades, and an independent subjection of each grade to a separating action for the removal of its worthless particles, said separating actions being nicely regulated to the condition of each grade. This would not be possible if all the material were subjected to the same aspirator-current, for an intensity of said current sufficient to take out the larger worthless particles would also carry over much valuable material, and on the other hand, a current of such force as would save all the valuable material would not carry off all the chaff, etc.

Continuing, now, the description of the operation, it only remains to be stated, that by the proper manipulation of the gates 24, 26 and 28 in the conveyer trough 13, the several grades thus cleaned may be separately discharged into the underlying bins 30, 31 and 32, or all may be reunited in the trough and delivered together into the last bin 32, or any two or more preceding grades may be mixed and delivered together, and finally, as before stated, the finest grade may by the operation of the valve 12' be kept separate or mixed with the others. Thus there results the retention of all the valuable mate-

rial and the exclusion of all the worthless material which result may be briefly stated to be the outcome of first dividing the material into grades, second aspirating each grade individually, and third, mixing the grades again for the entire volume.

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

1. A separator comprising a screen provided with a plurality of screen zones of different mesh, said zones increasing in mesh from the inlet end to the outlet end of the screen, independent chutes one underlying each zone of the screen, independent wind trunks one for each of the chutes succeeding the chute which underlies the finest screen zone, said wind trunks being arranged relative to the chutes to cause the wind current to act upon the material of said chutes, means for creating a wind current through each trunk, means separately regulating the intensity of each of said wind currents, a receptacle adapted to receive the material from all of the screen zones, means to divert at will the material coming from the finest screen zone from entering said receptacle, and means controllable at will for separately discharging from said receptacle the different grades of material entering it from the other screen zones, or discharging all of the material together from the receptacle.

2. A separator comprising a shoe with successive screen-zones of successively increasing mesh, for dividing the material into grades according to size; a cross-chute under each screen-zone to receive the material sifted therethrough; a conduit for receiving the finest grade from the chute of the first screen-zone, said conduit having a double outlet with a valve adapted to divert the

material to either outlet; independent suction wind-trunks one for each chute of the succeeding screen-zones, adapted to separately receive the successive grades therefrom; means for creating a wind-current through each trunk; means for separately regulating the intensity of each of said wind-currents; and a conveyer-trough common to all of said wind-trunks and to one of the outlets of the first grade conduit.

3. A separator comprising a shoe with successive screen-zones of successively increasing mesh, for dividing the material into grades according to size; a cross-chute under each screen-zone to receive the material sifted therethrough; a conduit for receiving the finest grade from the chute of the first screen-zone, said conduit having a double outlet with a valve adapted to divert the material to either outlet; independent suction wind-trunks one for each chute of the succeeding screen-zones, adapted to separately receive the successive grades therefrom; means for creating a wind-current through each trunk; means for separately regulating the intensity of each of said wind-currents; and a conveyer-trough common to all of said wind-trunks and to one of the outlets of the first-grade conduit, said trough having throughout its length a series of discharges corresponding to the several grades received from the wind trunks, each discharge having a separately controllable gate.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOYD C. DIBERT.

Witnesses:

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D. B. RICHARDS.