(No Model.) 2 Sheets—Sheet 1.

W. A. COWLEY.

BUCKWHEAT HULLING AND SEPARATING MACHINE.

No. 259,670. Patented June 20, 1882.

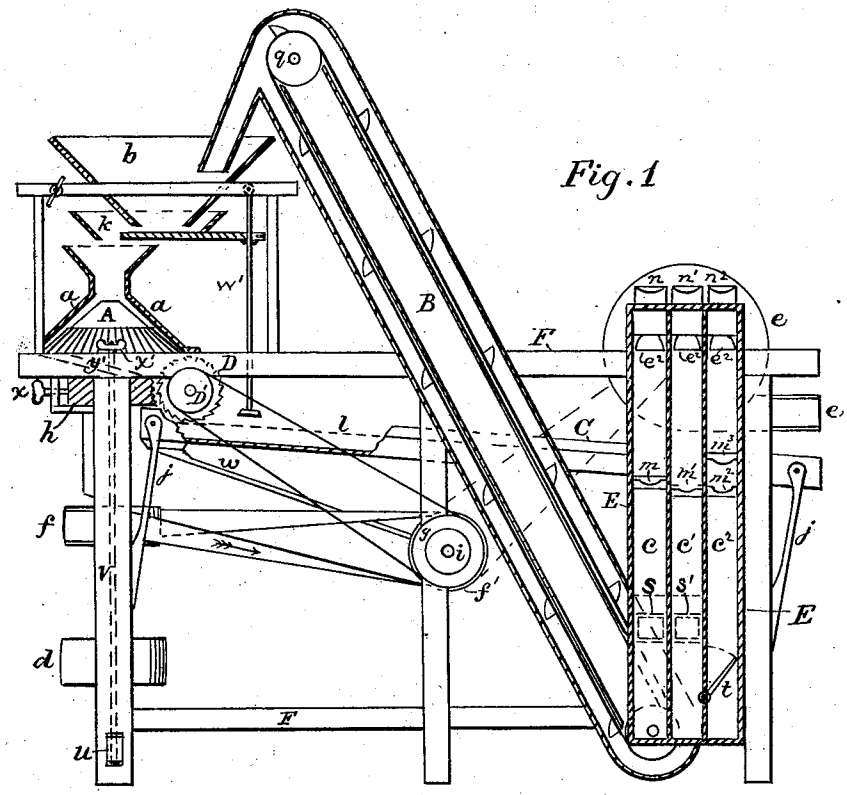


Fig. 1

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(No Model.) 2 Sheets—Sheet 2.

W. A. COWLEY.

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Fig. 8.

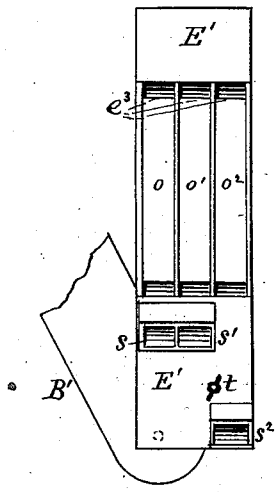


Fig. 2.

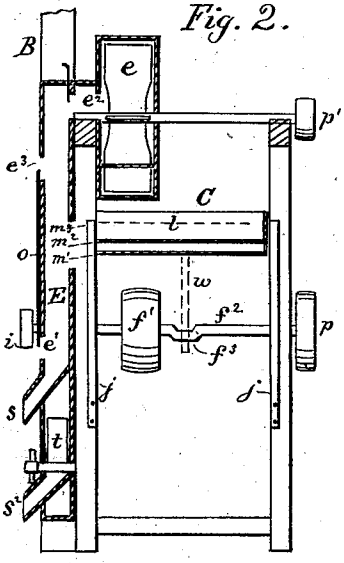


Fig. 3.

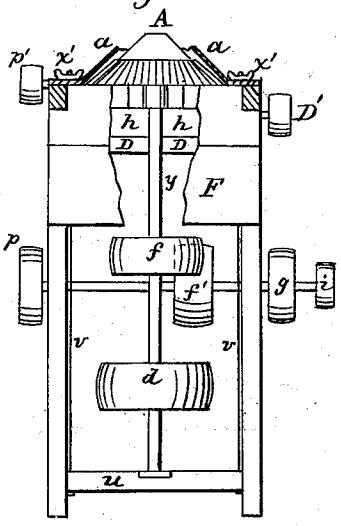


Fig. 6.

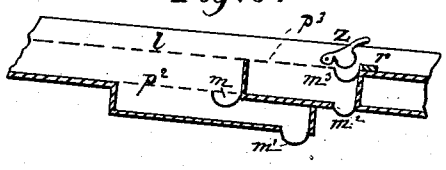


Fig. 4.

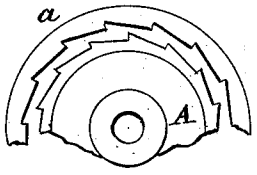


Fig. 7.

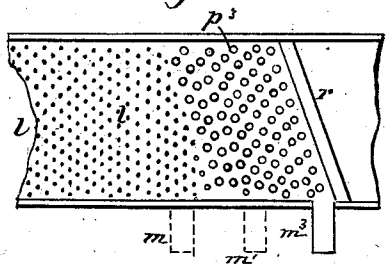
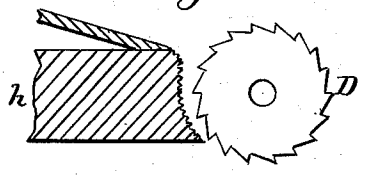


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM A. COWLEY, OF STAMFORD, NEW YORK.

BUCKWHEAT HULLING AND SEPARATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 259,670, dated June 20, 1882.

Application filed August 25, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. COWLEY, of the village of Stamford, in the county of Delaware and State of New York, have invented a new and useful Improvement in Buckwheat Hulling and Separating Machines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which the same letters indicate the same parts, though in different views of the same machine.

This invention relates to that class of machines having for its object the removal of the hulls of buckwheat preparatory to the grinding of the nutritious part of the kernel into flour.

In the drawings, Figure 1 represents a side elevation of the machine with some of the parts broken away and the outer casings of others entirely removed, in order to more clearly show the various details. Fig. 2 is an end view of the machine, designed more particularly to show the construction of the compartmented draft-chest E and its connection with the exhaust fan-blower *e* and the vibratory screen C. Fig. 3 is a view of the opposite end of the machine. Fig. 4 is a horizontal sectional view of the conical huller A and huller-case *a*. Fig. 5 is a cross-sectional view of the auxiliary huller D and concave stripping-block *h*. Fig. 6 is an interior side view of that part of the screen C lying back of the draft-chest E in Fig. 1. Fig. 7 is a top view or plan of the screen C on the line *l*, Figs. 1 and 6. Fig. 8 represents the face-casing E′ of the draft-chest E, with a portion of the face-casing B′ of the elevator B attached. Figs. 4, 5, 6, and 7 are drawn on a somewhat larger scale than Figs. 1, 2, 3, and 8.

In my invention, A represents the primary huller in the form of a frustum of a cone, the upper part of the surface being smooth and plain, and the lower part being cut or cast into serrated corrugations, as shown in Figs. 1, 3, and 4. The interior concave surface of the conical huller-case *a* is corrugated in like manner. The lines of corrugation in the huller are inclined slightly forward in the direction of its motion, thereby insuring contact with the grain in its passage between the two surfaces. The huller is adjusted more or less near to the case, as required, by means of two thumb-nuts, *x′*, screwed onto the two lighter rods *v*, which rods pass downward through a flange in the case *a*, and through the bridge-tree *u*, to which their lower ends are attached. Screwing or unscrewing these nuts will raise or lower the bridge-tree, carrying with it the vertical shaft *y*, upon the head of which the huller is secured.

D is an auxiliary huller, placed across the frame F of the machine and underneath the primary huller A. This huller is corrugated longitudinally, and of form similar to the corrugations described for the primary huller.

The stripping-block *h* is adjusted by the set-screws *x* to any distance required from the huller D, and is dressed or cast roughly on its concave face.

The two hullers, together with the case *a* and stripping-block *h*, may be of stone or iron, as preferred.

C is a screen containing three sieves of different degrees of fineness, and extending between the sides of the frame-work F nearly the whole length of the machine.

The further construction of the machine may be best described and understood by tracing and following its operation.

The buckwheat should, in order to make the best quality of flour, be first subjected to some one of the ordinary processes of scouring, for the purpose of removing the scale, dust, and other impurities from the surface of the grain. It is then, by means of elevators, conveyers, or otherwise, deposited in the hopper *b* of this machine. Falling thence into the shoe *k*, it is shaken by means of the rod *w′*, actuated by the vibratory screen C, into the funnel of the huller-case *a*, where, by means of the plain surface of the horizontally-revolving conical huller A, it is evenly distributed to the corrugations on the lower part of the same cone. In passing between the revolving corrugations of the cone A and the stationary corrugations of its case *a*, set at a proper distance apart, most of the hulls will become loosened, and if the grain is dry a large proportion of them will become detached from the kernel. The grain, then directed by the chute *y′*, falls between the revolving auxiliary huller D and the concave stripping-block *h*, where the hulling is completed. The last-named huller need sel-

dom be used except in the case of green or damp buckwheat, in which case it is found to be very effective in removing hulls which have been partially loosened by action of the primary huller. The hulled grain and hulls then fall upon the perforated sieve *l*, of medium fineness, in the screen C. This screen is supported upon standing springs *j*, and is slightly and rapidly shaken or vibrated in the direction of its length by means of the connecting-rod *w*, attached to the crank or eccentric f^3 on the shaft f^2. The detached hulls, being light and flat, then pass freely downward over the sieve *l*, and also over the short and coarser sieve p^3 and over the low diagonal dam *r*, and are discharged at the tail of the screen.

Most of the meats will be more or less broken into different degrees of fineness in passing through the hullers, and the greater portion of these will pass through the sieve *l* and be discharged through the spout *m* into compartment *c* of the draft-chest E. Here a current of air produced by the exhaust-fan *e*, entering the compartment by the aperture *e'*, meets the falling fragments and separates and lifts the lighter particles of hulls, bran, and dust from among them, carrying this refuse matter upward and through the air-passage c^2 into the fan *e*, whence it is blown into the mass of hulls. The heavier flour particles meantime continue falling until they are discharged through the spout *s*, and are thence conveyed by any means to the ordinary stones to be ground into flour.

p^2 is a short fine sieve, through which the finer fragments or any flour of the siftings through the sieve *l* before mentioned may pass and be taken out through the spout *m'* into compartment *c'*, in order that it may be subjected to a lighter draft in the same manner and from the same fan as just described. The flour of this grade is discharged through the spout *s'*, and thence taken directly to the bolt or to the flouring-stones, whichever may be desired.

In order that nothing of value for flour may be permitted to go into the refuse screenings, the hulls, after leaving the sieve *l*, are passed over a short coarse sieve, p^3, and also over a low bar, *r*, placed diagonally across the screen. Whole meats, freed from the hulls, will pass through this coarser sieve and be discharged through the spout m^2 into compartment c^2 of the draft-chest. Unhulled buckwheat or broken kernels with a part of the hulls still adhering, (as is often the case with damp grain,) being heavier than the hulls, will settle underneath them, and directed by the diagonal bar *r* will slowly move to the lower side corner of the coarse sieve and be discharged through the spout m^3, and also as from spout m^2 into the same compartment, c^2, of the draft-chest. Here they are subjected to a draft of air in the same manner as before described, and sufficiently strong to remove any loose hulls that may have entered with them.

z is a gate in the spout m^3, and is designed to prevent empty floating hulls from entering the draft-chest at that place with the unhulled buckwheat. By slightly raising the gate the heavier grain, directed by the bar *r*, as before described, will pass underneath it and into the spout m^3, while the lighter hulls will be shaken over the bar *r* and out at the tail of the screen. In the case of very dry buckwheat the hulls before reaching this point will all become detached and freed from their meats, and this gate may then be closed entirely.

t is a switch-valve in the lower part of compartment c^2, by which the matter of that compartment, after being subjected to the draft of air before mentioned, may, when the valve is inclined at an angle of from forty to fifty degrees, as shown in Fig. 1, be directed and carried by gravity through the partition to which the lower end of the valve is hinged and underneath the spout *s'* of compartment *c'*. From this valve the grain is projected into the buckets of the elevator B, to be thence conveyed to the hopper *b* to be rehulled and screened and separated, as before; or the valve *t* may be turned up vertically into the partition between compartments *c'* and c^2, thus closing the aperture therein, and allow the grain to fall directly downward and be discharged through the spout s^2, and thence to the flouring-stones or elsewhere, as the operator may desire.

It will be seen by reference to Figs. 1, 2, and 8 that compartments *c* and *c'* of the draft-chest E terminate at their lower ends in the spouts *s* and *s'*, which spouts are above the elevator B and are not connected with it.

The lower end of the elevator B, being placed under the spouts *s* and *s'*, reaches compartment c^2 of the draft-chest, and is placed in working relation to it only when the switch-valve *t* is inclined diagonally across that compartment, as shown in Figs. 1 and 8.

n, *n'*, and n^2 are slides over the air-passages c^2 and between compartments *c*, *c'*, and c^2, respectively, and the fan-blower *e*, to regulate the intensity of the air-drafts in the several compartments.

o, *o'*, and o^2 are slides covering or uncovering the inlet air-apertures *e'* and e^3 of the compartments *c*, *c'*, and c^2. By raising or lowering either one of these slides the air-aperture at one end of that slide is made more or less open, and the one at the opposite end is at the same time and in the same degree made more or less closed, thus admitting the air in greater or less quantities, as may be desired, either above or below the several inlets of siftings.

Motion to the different parts of the machine is communicated and transmitted as follows: by a driving-belt to main pulley *d* on the shaft *y*; thence to counter-shaft f^2 by a quarter-twist belt from pulley *f* to pulley *f'*; to exhaust fan-blower by belt from pulley *p* to *p'*; to auxiliary huller by belt from pulley *g* to D', and to elevator by belt from pulley *i* to a pulley (not shown in the drawings) on the upper shaft of the elevator.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a buckwheat hulling and separating machine, of two separate and distinct hullers, being the primary huller A, with case *a*, and the secondary or auxiliary huller D, with stripping-block *h*, for the uses and purposes as herein set forth.

2. The vibratory screen C, in a buckwheat hulling and separating machine, with its sieves *l* p^2 p^3, its spouts *m* *m'* m^2 m^3, its diagonal bar *r*, and gate *z*, in combination with the compartmented draft-chest E, as specified and described.

3. The compartmented draft-chest E, provided with air-passages *e'* e^2 e^3, slides *n* *n'* n^2 *o* *o'* o^2, spouts *s* *s'* s^2, and switch-valve *t*, in combination with the vibratory screen C, exhaust fan-blower *e*, and elevator B of a buckwheat hulling and separating machine, all substantially as and for the uses and purposes set forth and described.

4. In a buckwheat hulling and separating machine, the primary and auxiliary hullers A D, in combination with a screen, C, draft-chest E, fan-blower *e*, and elevator B, arranged substantially as described, and for the purposes mentioned.

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A. J. CHAMPION.