(No Model.)

2 Sheets—Sheet 1

N. W. HOLT.

SEPARATING MACHINE.

No. 422,941. Patented Mar. 11, 1890.

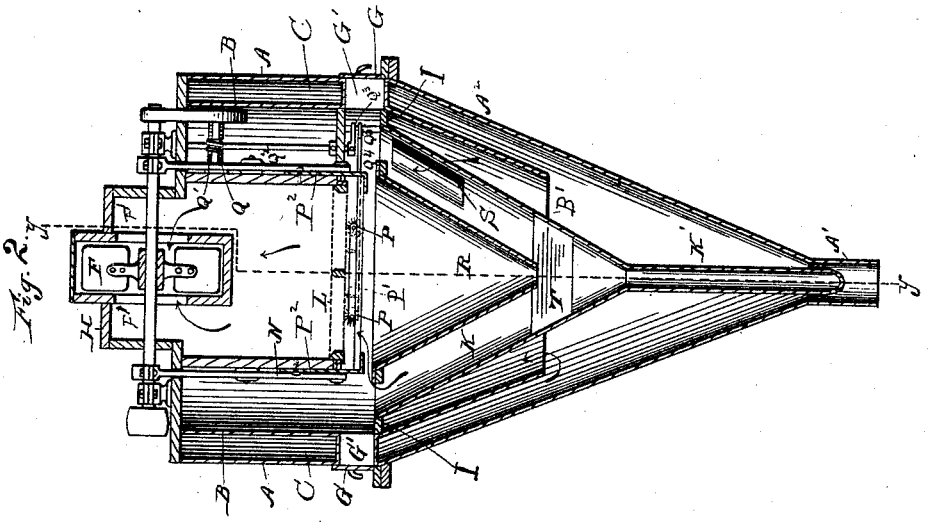

Fig. 2.

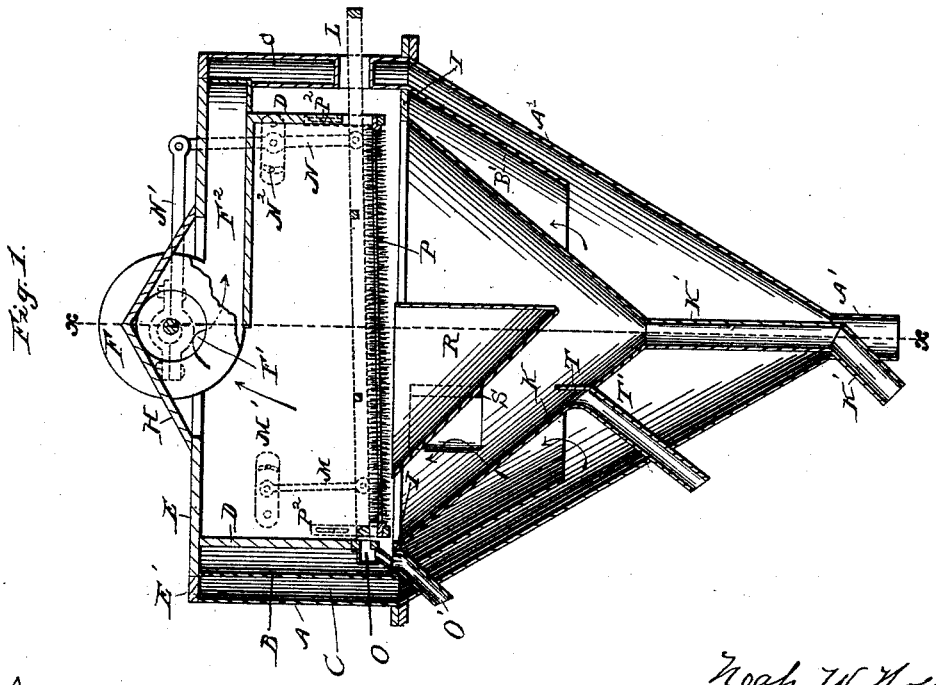

Fig. 1.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 5.

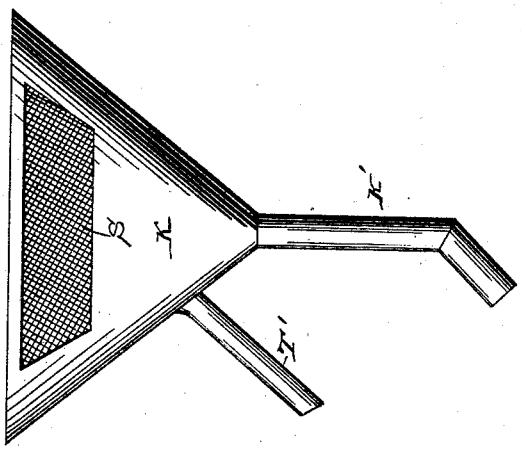


Fig. 3.

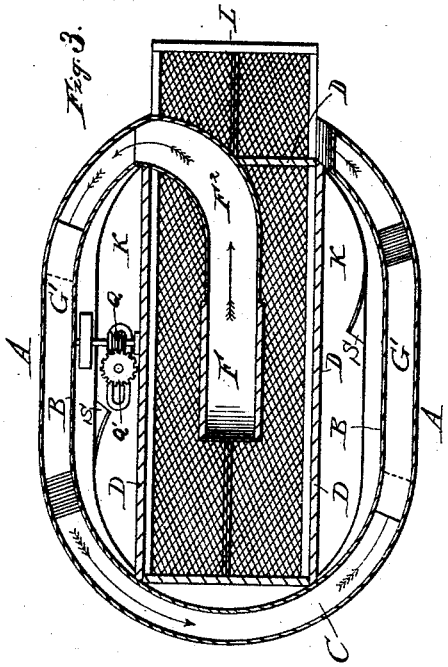
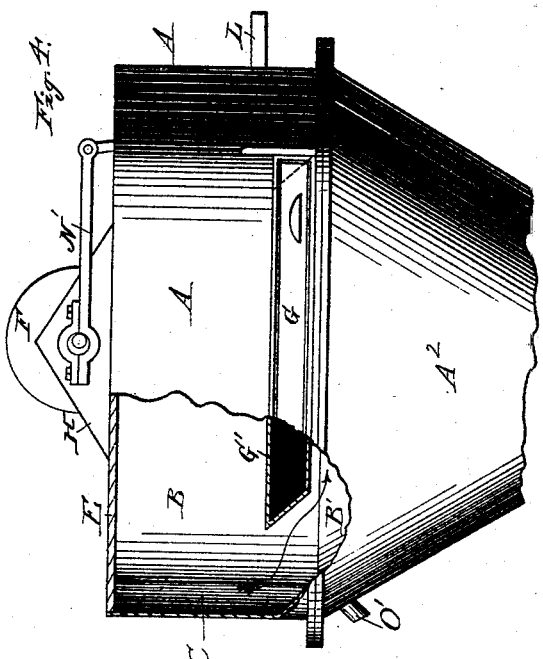


Fig. 4.



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UNITED STATES PATENT OFFICE.

NOAH WILLIAM HOLT, OF MANCHESTER, MICHIGAN.

SEPARATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 422,941, dated March 11, 1890.

Application filed October 26, 1888. Serial No. 289,248. (No model.)

To all whom it may concern:

Be it known that I, NOAH WILLIAM HOLT, of Manchester, in the county of Washtenaw and State of Michigan, have invented a new and useful Improvement in Separating-Machines, of which the following is a specification.

My improvement is applied to that class of machines commonly known as "sieve purifiers," in which a shaking sieve is placed centrally in a chest or casing, which it divides into two compartments, into the lower one of which air is drawn, which rises through the sieve and the material thereon, raising the specifically light particles and wafting them away on the current of air created, generally by a suction, while the fine purified heavier particles pass down through the meshes and the coarser ones pass over the tail of the sieve.

In the annexed drawings, making a part of this specification, Figure 1 is a vertical central section of a combined shaking purifier and a centrifugal or cyclone dust-collector inclosing the purifier on the line *y y* of Fig. 2. Fig. 2 is a similar section on the line *x x* of Fig. 1. Fig. 3 is a horizontal section through the purifier and dust-collector above the sieve. Fig. 4 is an elevation, partly in section; and Fig. 5 is an elevation of the hopper forming the lower chamber of the purifier and a modification of the air-induction opening.

The same letters are employed in all the figures in the indication of identical parts.

A is the impervious wall of the well-known centrifugal dust-collector, which is oblong in form and of dimensions sufficient to contain a shaking sieve and the inclosing-case of a middlings-purifier. The upper part of the dust-collector has vertical walls. The lower section A^3 is converging to form a hopper, down the wall of which the dust deposited by centrifugal action, slides and escapes through a contracted aperture at A′.

B is an inner wall parallel to the wall A, extending downward from the cover E of the machine some distance into the converging hopper of the wall A^2, and forms a curtain between the inner hopper K and the outer hopper A^3. The converging extension is marked B′. The intermediate space C forms the annular portion of the dust-collecting chamber. Within this wall B is a casing D, extending down from the cover E to or nearly to the plane of the bottom of the vertical walls A and B.

F is a fan, of usual construction, placed over an opening in the cover E and inclosed by a hood H, extending over said opening, with holes neatly fitting the fan-shaft. The eyes of the fan F′ open into the interior of the chamber within the hood and receive the air drawn from the air-chamber within the casing D.

I is wooden ring extending inwardly from the lower end of the vertical wall B, and to it is fastened the top of a tapering hopper K. It also cuts off communication of the air upward from the chamber formed between the hopper K and the curtain B′ into the interior of the purifier, except through openings formed for the purpose.

L is a shaking sieve clothed in the usual manner, which is hung immediately above the hopper K at one end by hangers M, attached to the vertically-adjustable plates M′, and at the other to the levers N, centrally pivoted to the vertically-adjustable plates N^2, and given an oscillatory movement by connecting-rods N′, connecting their upper ends with eccentrics on the fan-shaft. The tail of the shaker delivers the particles too coarse to pass through the sieve and too heavy to be wafted away by the air-current into a transverse trough O, Fig. 1, sloping from each end to the middle, so that the tailings shall run down and escape out of the machine through the tailing-spout O′.

Any of the known devices for keeping the meshes of the sieve open may be employed.

I have shown cylindrical brushes P, which are journaled freely in bars P′, which are supported on ways hung in adjustable hangers P^2, Figs. 1 and 2, so that the points of the bristles merely touch the cloth, and being free to revolve on their journals they turn by their contact with the cloth.

A reciprocating motion is given to the brushes by the following mechanism: Q is a worm-wheel and Q′ a worm-pinion on the shaft Q^2, Figs. 2 and 3.

Q is on the shaft of a pulley driven by a belt from a small pulley on the fan-shaft, and consequently a slow rotation is communicated to the shaft Q^2. On the lower end of the shaft is a crank Q^3. The crank-pin passes through a slot in the arm Q^4, attached to the

brush-bars, so that a slow reciprocating movement will be communicated to the brush.

Purified middlings falling through the meshes of the sieve are caught in the hopper K and run down into a discharge-spout K′, which is bent to one side and discharges its contents separate from the dust and tailings; but as not all the particles going out through the sieve are of the same grade a cut-off R is placed under the sieve, by which a part of the sifted product falling below the adjustable cut-off and running down the side of the hopper will encounter the partition T and be discharged through the spout T′.

The course of the air is as follows: It enters the chamber below the sieve through holes left by sliding doors or porous cloth S in hopper K, and passes upward through the bolting-cloth on the shaker into the chamber above the sieve, thence through the eyes F′ into the fan-case, whence it is driven, laden with dust, out through the discharge-spout F^2 into the dust-separating chamber C. Then sweeping around in a descending spiral the dust is deposited upon the surface of the shell A and falls by gravity to escape at A′.

To give access to the shaker and to examine the work of separation as it progresses, openings are formed in the exterior wall A and the interior wall B, connected by trunks G′ and closed by doors G, Figs. 2 and 4. A similar trunk is also formed for the introduction of the shaker L, which projects outside to receive the feed-middlings. The ends of these trunks are beveled, as shown in Fig. 4, so that the vertical current of air may be divided, part passing over the trunks and part passing below through the intermediate spaces into the hopper, and down the wall A^2 until it reaches the lower end of the tapering extension B′ of the interior wall B, when, its force being spent in a great measure, it will be drawn up into the space between B′ and K, and through S into the air-chamber below the shaker, and so on continuously, first passing through the shaker and stratum of material carried on it into the upper chamber, then into the fan, then out through the dust-collector, where its dust is deposited, and back into the lower air-chamber of the purifier.

Several very important advantages are gained by the continuous use of the same air, none of which are so well attained by other machines. The air will remain of one temperature, instead of constantly drawing in air warmer or colder. The air will be clean, instead of being filled with dust or particles of soot incident to the use of soft coal. The current being continuous, the fan will work with a minimum of resistance, instead of being compelled, as in the ordinary machine, to blow out its current against the resistance of normal atmospheric pressure. The walls may be made practically air-tight, so that the dust cannot escape into the mill, and so keep its air free from particles of fine dust, which are incident to the work of other dust-collectors, the presence of which is not only wasteful but dangerous to health and also liable to cause explosion.

I do not wish to claim in this application any processes or specific constructions which are claimed in any of my pending applications filed as follows: Serial No. 271,134, filed April 9, 1888; No. 272,033, filed April 27, 1888; No. 279,047, filed July 5, 1888; No. 296,349, filed January 11, 1889, and No. 305,716, filed April 2, 1889.

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

1. The combination of a sieve purifier and an inclosing dust-collector, a fan drawing air through the former and delivering it tangentially to the latter, and an intermediate curtain B′, below which air must flow in passing from the dust-collector back into the interior of the purifier, substantially as set forth.

2. The combination of a sieve purifier, a centrifugal dust-collecting chamber surrounding the purifier, a fan common to the purifier and dust-collector, a trunk connecting the purifier-chamber and the dust-collecting chamber, and a series of hoppers arranged one within another below the purifier and provided with separate delivery-spouts, whereby the different materials are separately delivered from the machine.

3. The combination of purifier-casing D and sieve L, surrounding walls A B, fan F, communicating with the spaces within casing D and between the walls A B, hoppers A^2, B′, and K, the latter provided with openings S, and ring I, connecting the hoppers B′ and K.

4. The combination of purifier-casing D and sieve L, surrounding walls A B, fan F, communicating with the spaces within casing D and between the walls A B, hoppers A^2, B′, and K, the latter having openings S, ring I, connecting the hoppers B′ and K, and cut-off R within the hopper K.

5. The combination of the sieve purifier, the inclosing dust-collector, openings through the walls A and D, connected by trunks G′ and provided with doors G, whereby access may be had to the interior of the purifier without interfering with the vertical current in the dust-collector, substantially as set forth.

6. In combination with a sieve purifier and an inclosing dust-collector, a curtain B′ within said dust-collector, a hopper K within said curtain, and a ring I extending from the curtain B′ to the upper edge of the hopper K, and serving to prevent the air from rising between and above the upper edge of the hopper.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

NOAH WILLIAM HOLT.

Witnesses:
A. F. FREEMAN,
C. W. CASE.