

(No Model.)

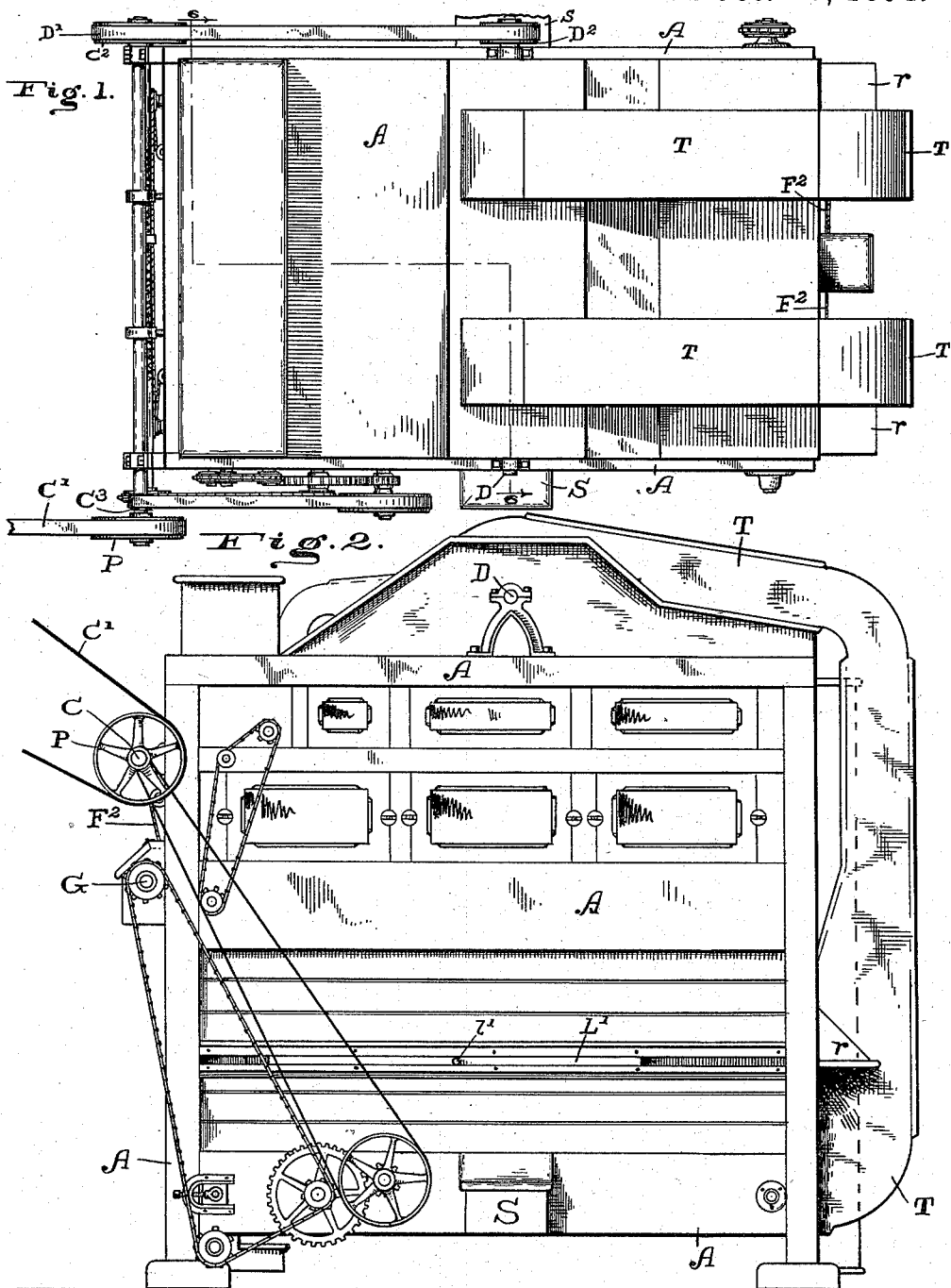
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A. C. BRANTINGHAM.

COMBINED RETURN AIR SIEVE, PURIFIER, AND DUST COLLECTOR.

No. 527,938.

Patented Oct. 23, 1894.



WITNESSES:

INVENTOR

Allen C. Brantingham,

F. W. Warner.
J. A. Walsh.

BY
Chester Bradford,
ATTORNEY.

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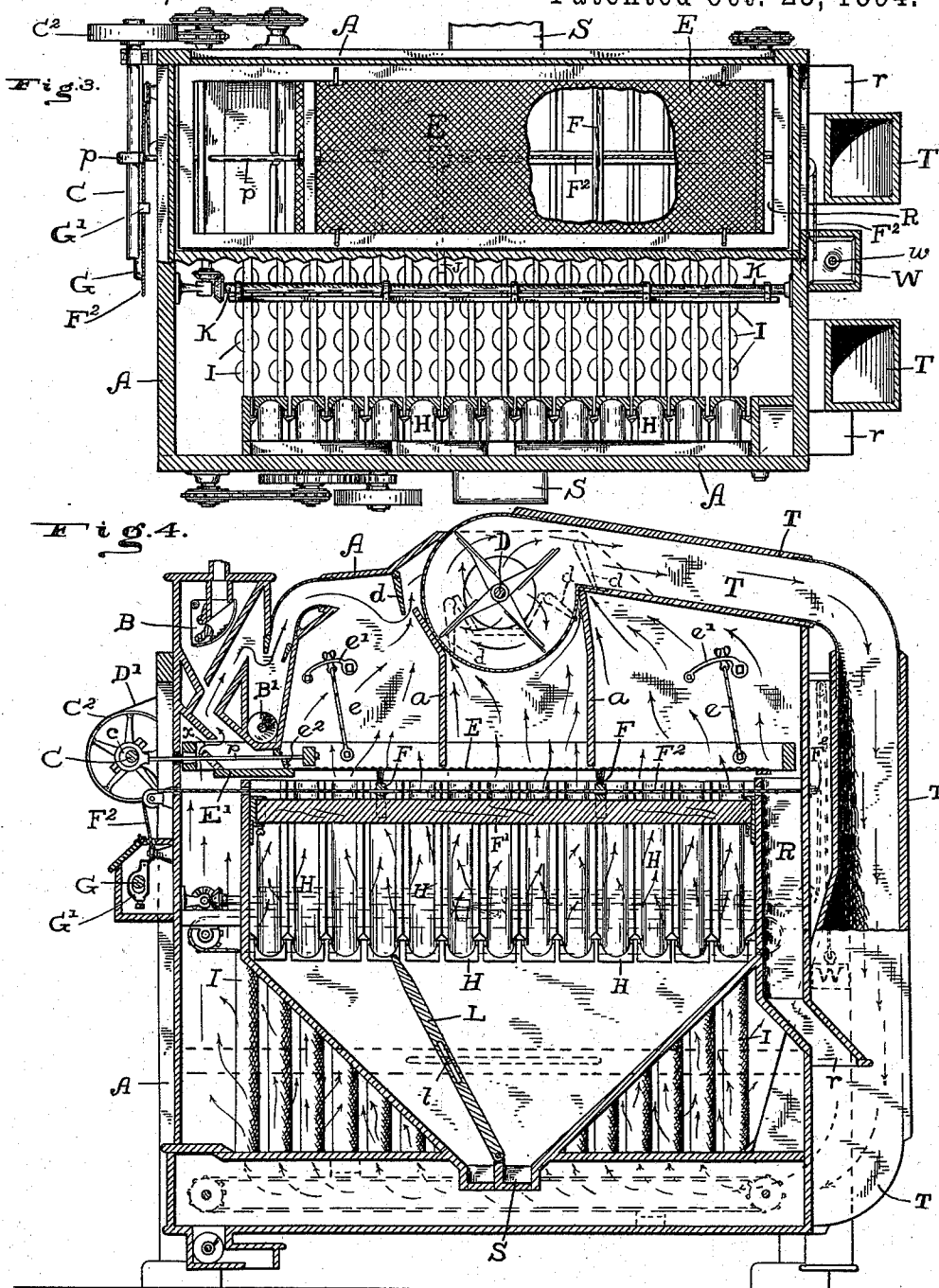
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Fig. 6.

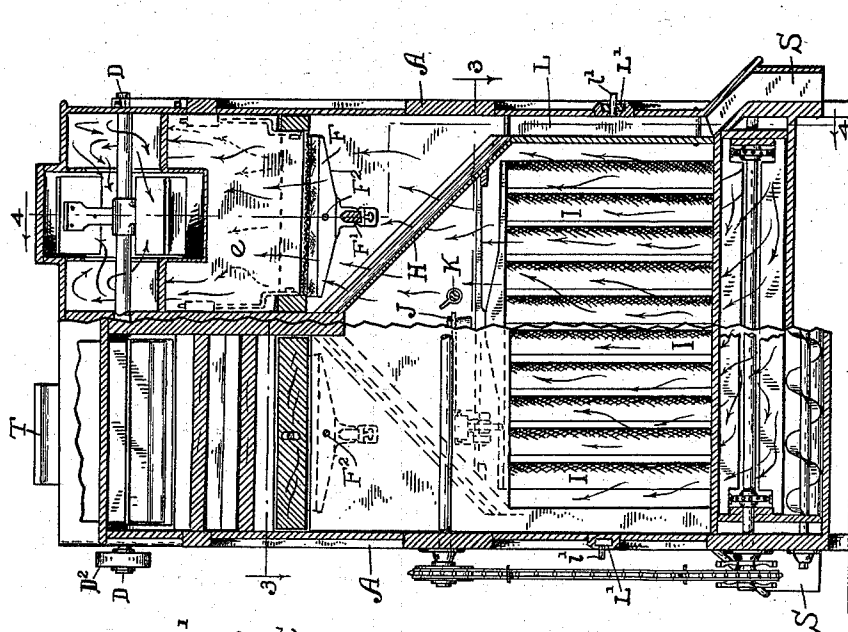
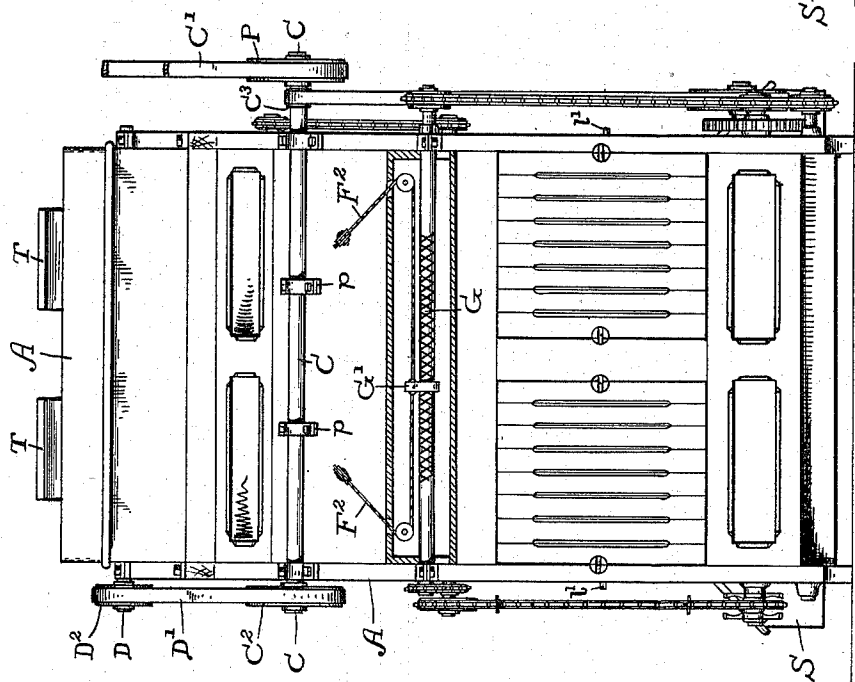


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALLEN C. BRANTINGHAM, OF TOLEDO, OHIO, ASSIGNOR TO THE NORDYKE & MARMON COMPANY, OF INDIANAPOLIS, INDIANA.

COMBINED RETURN-AIR SIEVE, PURIFIER, AND DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 527,938, dated October 23, 1894.

Application filed April 27, 1894. Serial No. 509,171. (No model.)

To all whom it may concern:

Be it known that I, ALLEN C. BRANTINGHAM, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in a Combined Return-Air Sieve, Purifier, and Dust-Collector, of which the following is a specification.

The object of my said invention is to produce in a compact single structure an efficient apparatus for purifying and separating mill products, and collecting and disposing of the dust and worthless parts. Heretofore separate machines have been employed for this purpose, but I have combined the several apparatuses in a single machine, and have also improved many of them in construction and arrangement, and have thereby achieved superior results.

A machine embodying my said invention and improvements will be first fully described, and the novel features thereof then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a top or plan view of such a machine; Fig. 2, a side elevation; Fig. 3, a horizontal sectional view as seen when looking downwardly from the dotted line 3 3 in Fig. 6; Fig. 4, a vertical sectional view as seen from the dotted line 4 4 in Fig. 6; Fig. 5, an end elevation, and Fig. 6 a transverse sectional view on the dotted lines 6 6 in Fig. 1.

In said drawings the portions marked A represent the frame-work and inclosing casing of the machine; B, the feed hopper through which the material is introduced; C, the driving shaft; D, the fan shaft; E, the sieves; F, the brushes; G, a shaft for operating the brushes; H, an inclined partition below the brushes; I, dust collecting tubes below said partition; J, a hammer for operating the dust-collecting tubes; K, the shaft for operating said hammers, and L a grading valve.

The frame-work and casing shown are that of a "double" machine;—that is, practically two machines embodied in one, having two fans, two brushes and two sets of separating apparatus. It is of a suitable size and construction for the purpose, and consists of the

various divisions necessary to accommodate the mechanism and the various separating and purifying chambers, as will be hereinafter more fully explained.

The feed hopper B is preferably of that variety which feeds the stock through gradually and evenly, thus aiding in its distribution. It is, however, a former invention adapted to the present use, and need not, therefore, be further described herein. There are certain air passages arranged below this feed hopper to aid in a preliminary purifying of the stock, but they also, as well as the conveyer B' connected therewith, are adapted from a former machine.

The main shaft C is preferably located at one end of the machine, and is the shaft from which all the other mechanism is driven. It has two eccentrics *c* (preferably set oppositely to each other) by which the structures of the two sieves E are reciprocated. It also has pulleys upon its ends, by means of one, P, of which it is driven by a belt C' from some suitable source of power (not shown), while, by means of other pulleys C² and C³, it serves, through suitable belts, to drive other parts of the machine.

The fan-shaft D, in the double machine shown, carries the two blast fans, but in a single machine, of course, it would carry only one. This shaft is driven by a suitable belt D' running from the pulley C² on the shaft C to the pulley D² on said shaft D. As will be noticed by an examination of Figs. 4 and 6, the air is arranged to be drawn from all directions toward the eyes of these fans, and partitions *a* are placed within the spaces surrounding the fan cases, in order that the air blast may be properly and evenly distributed, and various valves *d* are positioned at the various inlets, which may be adjusted as desired, and the air blast thus regulated to accomplish the result sought. The air, as will be noticed by the arrows, is drawn up, from the dust collecting apparatus, through the interstices between the various parts of the inclined partition H, and up through the sieves E into the upper part of the machine, whence it comes in all directions toward the eyes of the fans, and is discharged from the fans down the air-trunks T, and driven into

the dust-collecting chamber below the machine, whence it rises through the cloth tubes of the dust-collecting apparatus, as will be presently again referred to; and thus the air is used over and over again in the operation, constituting this, in addition to its other advantages, an "air belt" machine.

The sieves E consist of fine sieve cloth suitably attached to frames, which frames are reciprocated by means of pitmen *p*, and the eccentrics *c* on the shaft C, which impart the desired reciprocating motion to said sieves. The position of the sieves themselves can be easily adjusted by shifting the tops of the hangers *e* on the inclined support *e'*, which are clearly illustrated in Fig. 4, and thus said sieves may be raised or lowered somewhat, or given a slight inclination, thus varying the flow of the stock over them, in accordance with the work desired to be accomplished. At the point below the hopper where the stock is received, a platform *E'* is provided to receive the weight of the stock and cause it to spread out, in a sheet, before passing onto the sieve proper, and a hinged float or valve *e²* is suspended to a stationary part, at the discharging end of this platform, both to aid in further distributing the stock, and to prevent air from drawing back into the passages behind it. A small blast of air is desired through said passages, however, and for that purpose a small passage is provided at *x*. The pitman rods *p* through which the eccentrics *c* operate the sieves, pass through holes or notches in the valves *e²*. The sieves E extend beyond the space below them into which the finished product falls, and are adapted to discharge any coarse heavy parts, too coarse to pass through the sieve and too heavy to be lifted by the air-blast, over the ends. A chute R is positioned below the rear end of each sieve to receive these heavy coarse parts and convey them away to the outside of the machine, and discharge them at the points marked *r*.

The brushes F are mounted on ways F' within the machine, and are adapted to be driven back and forth and underneath the sieves E, and thus free the under side of said sieves from any accumulation of material, and accelerate the passage of the material through them. These brushes may, of course, be of such construction and material as the work demands; but I have found, for ordinary flouring-mill work, that felt is a desirable material to come in direct contact with the cloth of the sieve.

The brushes F are operated in a peculiar manner. A rope F² makes a circuit from one side of a traveling nut G' on the shaft G over various sheaves back to the other side of said nut, and is suitably connected to the several brushes. The method of attachment is immaterial, but I prefer to pass the rope directly through the structure of the brushes, and have so shown it. The shaft G is a double-threaded screw-shaft, driven by the belting and gearing shown in Fig. 2 to run at a slow

speed, and the nut G' thereon is a shifting nut adapted to travel in either direction along said screw shaft, and is shifted, when it reaches either end, to travel back in the other direction. A double-threaded screw-shaft and a shiftable traveling nut therefor being a familiar mechanical device, this feature will not be further described in this connection. The operation is, in this machine, that the brushes F are drawn by this device such a distance that the under surface of the sieve is brushed at each forward and backward movement, the brushes being obviously drawn in reverse directions as the nut travels on the screw in one direction or the other.

The inclined partitions H are made up of two varieties of strips which are positioned a little distance apart, leaving interstices through which the air may pass from the dust-collecting devices underneath up through this floor, and afterward through the sieve, to the fans. The forms of these strips are shown in Fig. 4. The main or bottom strips are gutter-like in construction, and receive the material as it falls from the sieve, and said material slides down said gutters and is discharged into the pocket or space between the outer and inner walls of the machine, as will be presently more fully described. The other strips constituting these floors are small roof-like strips positioned directly over the spaces between the bottom strips, forming roofs above said spaces, and preventing any material from passing through them; while being set a little distance above said lower strips, they at the same time provide for the free passage of the air. The pockets at the sides of the machine into which the material is discharged, are formed by the outer walls of the machine, inner walls parallel therewith and extending up about the height of the dust-collecting tubes, and inclined walls at the ends leading to spouts S at the lower central portion of the machine, through which the material is discharged from said machine, and is then conveyed away by any appropriate means.

The tube I of the dust collector, as well as the hammers J and shaft K, and the hammer-operating mechanism, (including the weight W and rope *w*) are all similar to those shown and described in my application, Serial No. 499,905, filed February 12, 1893, for patent on "Dust Collector," separately. The dust-collecting chamber, and the devices therein and connected therewith below these dust-collecting tubes, are also similar to those shown in said application. Except as a part of my combined machine, these are not peculiar to my present invention, and, therefore, will not be further described herein. The operation is, in this machine, that the dust and fine fluffy particles are drawn into the eye of the fan, from the various sources shown, and carried thence by the trunk T to the dust-collecting chamber below the machine, where, by means of the dust-collecting devices, such

particles are separated from the air, precipitated, and thence conveyed off out of the machine. The dust-collecting tubes occupy an area substantially co-extensive with the sieve, and the air is thus distributed equally to all portions of said sieve, which is very important.

It is a desirable thing to separate the finished product into different grades; and it is also desirable to have means provided in the machine whereby this grading may be varied. The pockets or receptacles alongside the machine between the outer and inner walls, as shown most plainly in Fig. 4, and at the right of Fig. 6, receive the material which slides down the roof-like partition composed of the pieces H, and the bottom of this pocket is hopper-shaped, which conveys the material toward the center, where it is discharged from the machine by means of the spouts S leading to the outside as above stated. Within these pockets I place shifting valves L, and divide the spouts into two parts, hinging the valves to the upper edge of the division between the spouts, as shown in Fig. 4. Extending through to the outside from each of these valves is a pin *l* which is adapted to slide both longitudinally of the machine and in a slot longitudinally of the valve. A strip *L'* is mounted in a groove or way in the outside of the machine, to which the outer end of the pin *l* is secured, which strip effectually covers the slot extending through the side of the machine. Upon this strip is a knob or handle *l'* by which it may be pushed back and forth by the attendant, and the valve L thus operated from the outside of the machine, while the slot through which the pin *l* passes is completely covered by said strip *L'*, so that no air can be admitted therethrough. By this means I am enabled to position the valves L as I may desire, thus determining the relative quality of the two grades. As is well known among millers, that portion of the material which passes through the sieve at the end where said sieve receives said material, is of a higher quality than that which passes through at points farther down.

In Fig. 4 I have shown the valve L so positioned that the product will be divided into a comparatively small quantity of very high grade material, and a comparatively large quantity of a poorer (but still good average grade) material. Obviously, by moving the valve L farther to the right, the quantities would be more equally divided, and the average quality of both portions would be somewhat lowered, and thus the portion at the left would be greater in quantity and not quite so high in quality, while the portion at the left would be smaller in quantity and still poorer in quality. As will be readily seen, by a manipulation of this valve, any desired relation of the two divisions of the product can be secured.

Having thus fully described my said inven-

tion, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a single structure, of a hopper, a reciprocating sieve, an open space above said sieve divided by partitions into several divisions, a blast fan within the upper portion of said space, the eyes whereof communicate with the said several space divisions, a tube leading from said fan to a dust chamber below the machine, a dust collector above said dust chamber, and a roof-like partition above said dust collector and below said sieve provided with interstices through which the air may pass.

2. The combination, in a purifying and grading machine, of sieving or separating devices, dust-collecting devices, and an inclined partition provided with interstices and located between the sieve and the dust collector, and a hopper-like pocket into which the material may be discharged from said partition, said pocket being provided with an adjustable valve whereby different proportions of the material may be separated and conducted through different discharging orifices, substantially as set forth.

3. The combination of a sieve for receiving and sieving grain products, a dust-collecting apparatus arranged below and substantially co-extensive in area with the sieve, an interposed floor adapted to receive the finished product from the sieve and convey it to the sides of the machine while still permitting the passage of air from the dust-collecting apparatus, and a fan located above the sieve and discharging below the dust-collecting apparatus, whereby the air is evenly distributed throughout the machine and drawn up through the sieve with substantially equal force at all points, giving all portions of the machine equal benefit of the air-blast, substantially as set forth.

4. The combination, with the sieving or separating devices, the dust-collecting apparatus, the interposed conveyer floor and the receiving pocket at the side, of the valve L, the pin *l* extending from said valve through a slot in the side of the machine, and a strip *L'* on the outside of the machine connected to said pin and covering said slot, substantially as and for the purpose set forth.

5. The combination of the sieving apparatus, the dust-collecting apparatus, the interposed floor, the receiving pockets, and spouts positioned under the rear end of the sieve and adapted to receive and convey away the coarse heavy products which may be discharged over the end of said sieve, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Toledo, Ohio, this 23d day of April, A. D. 1894.

ALLEN C. BRANTINGHAM. [L. s.]

Witnesses:

M. W. PLATT,
GEO. J. RUDD.