

(No Model.)

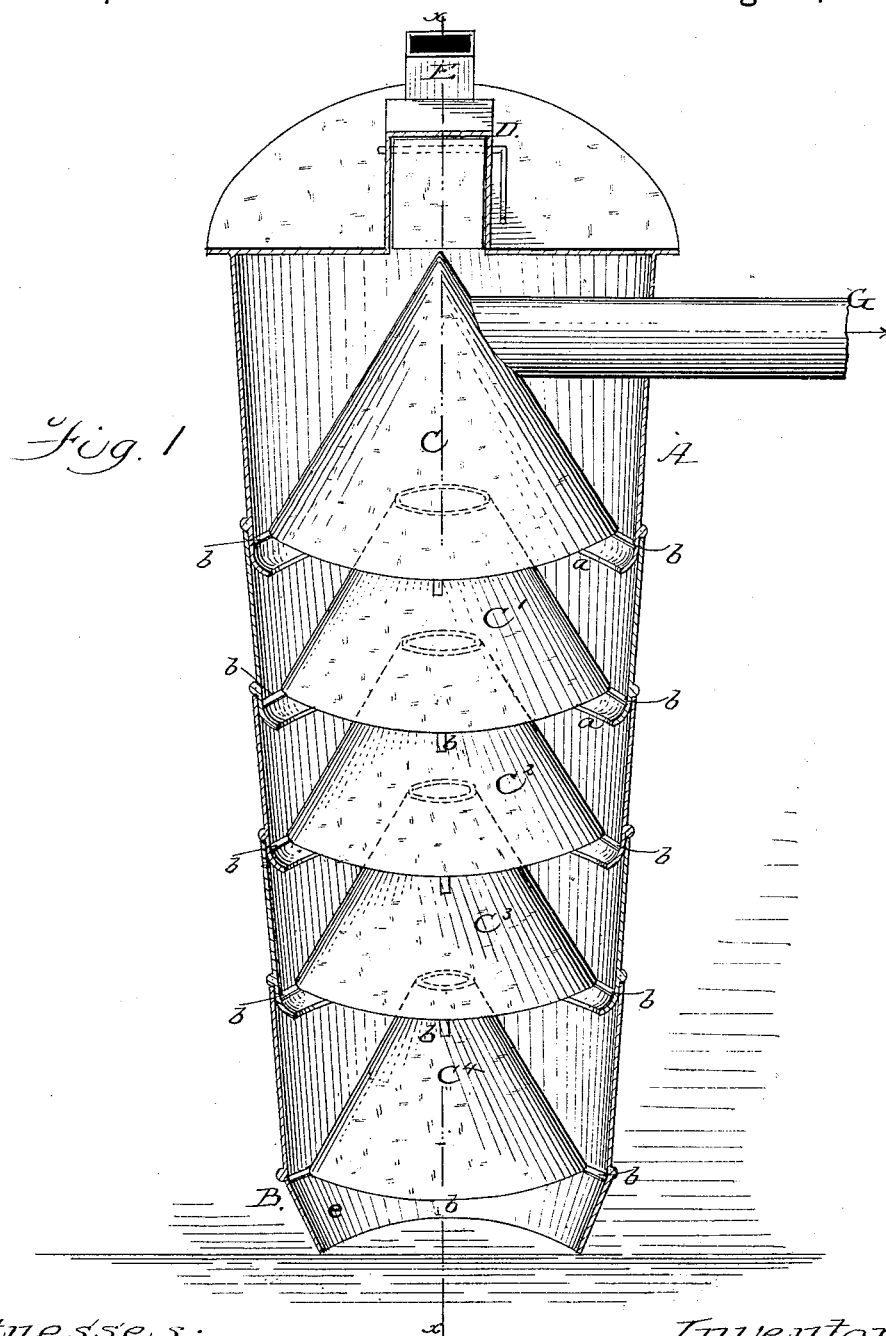
2 Sheets—Sheet 1.

F. M. BROWN.

MACHINE FOR PURIFYING MIDDLEINGS.

No. 263,472.

Patented Aug. 29, 1882.



Witnesses;

Walter Fowler,
R. K. Evans

Inventor;

Francis M. Brown
by A. H. Evans & Co
Atty

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2 Sheets—Sheet 2.

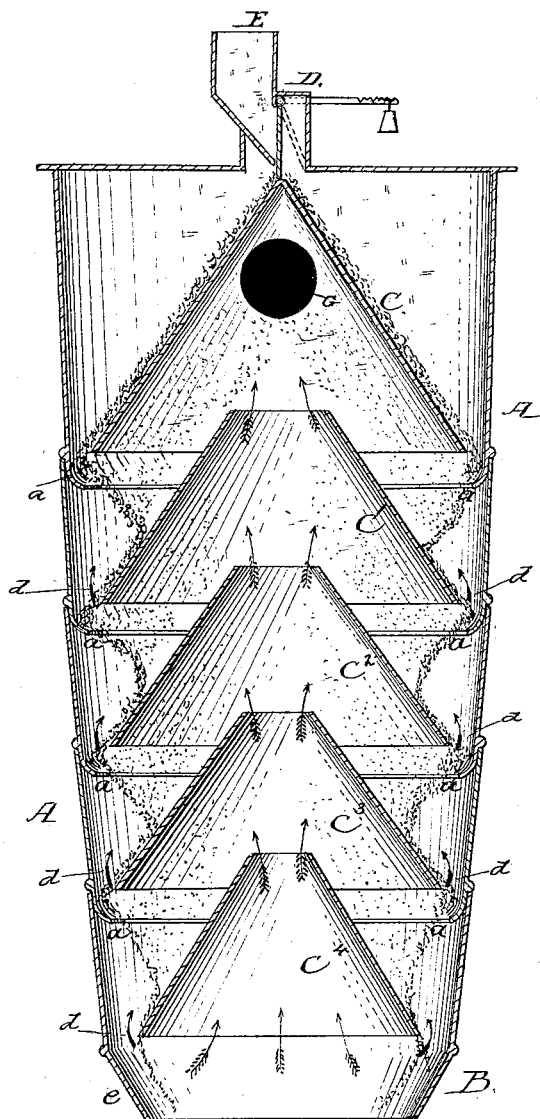
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Fig. 2.



Witnesses:

Shalter Fowler
R. K. Evans

Inventor:

Francis M. Brown
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UNITED STATES PATENT OFFICE.

FRANCIS M. BROWN, OF UNION CITY, TENNESSEE.

MACHINE FOR PURIFYING MIDDINGS.

SPECIFICATION forming part of Letters Patent No. 263,472, dated August 29, 1882.

Application filed April 26, 1881. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS M. BROWN, of Union City, in the county of Obion, State of Tennessee, have invented a new and useful Improvement in Machines for Purifying Middlings, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation with the casing or shell partially removed. Fig. 2 is a vertical sectional view on line *xx* of Fig. 1.

The object of my invention is particularly to separate the light particles from the heavy particles of wheat-middlings in the process of milling; and my invention consists in an apparatus for separating the lighter particles from the heavier as the mass passes in a thin stream through the machine by means of a gentle air-current induced by the formation of a partial vacuum outside of the line of feed, said lighter particles being carried off by means of a rapid air-current, which induces the partial vacuum aforesaid, as hereinafter described and claimed.

In order that those skilled in the art may make and use my invention, I will proceed to describe the exact manner in which I have carried it out.

I construct a shell for the machine by joining together a series of detachable tapering sections, *A A*, the edges of the sections fitting within each other, as shown, and the lower edge of each section being provided with a contracted lip, for the purpose hereinafter described.

The top section of this shell is closed at its top, and is provided with a gravity feed-valve, *D*, located immediately above the apex of the hollow conical distributor *C*, and is provided with a pipe, *G*, through which is drawn an exhaust-current, the end of the said pipe entering the apex of the hollow conical distributor *C*.

Each one of the sections *A* is provided with a hollow truncated conical distributor, *C' C² C³ C⁴*, sustained by proper supports, *b b*, leaving between the shell and the edge of the base of the cone a narrow annular opening, *d*, this opening being of about the same width in all the sections.

This arrangement leaves the projecting lips *a a* in each section slightly below the base of

each truncated hollow distributor. The openings in the apexes of the truncated hollow distributors decrease in area toward the bottom of the machine, or in a direction opposite to that of the draft. The lower edge of the lowest section is contracted suddenly, as seen at *e*.

The operation of the machine is as follows: Middlings are fed through *E* against the gravity-valve *D*, which opens when the weight of the middlings becomes sufficient and allows them to flow through in a stream upon the apex of the conical distributor *C*, over the surface of which they move in a thin layer. Meantime, through the medium of a proper fan, an exhaust is drawn at a desired velocity through the pipes *G*, causing a draft to pass through the machine and meet the middlings in their downward passage. The shape of the truncated conical distributor *C⁴* causes a concentrated blast of high velocity to be drawn through an opening in its apex, whence it passes through the distributor *C³*, having in its apex an opening of greater area than that of *C⁴*, thence up through distributor *C³*, having a still greater size of opening, then up through distributor *C'*, which has the largest area of opening in its apex, and, lastly, out through pipe *G*. As, under well-recognized laws of fluids, only a given amount of air can be drawn through the apex of *C⁴* at a given velocity when the exhaust-fan is moving at a certain rate, it is quite apparent that when that same volume of air is drawn by the same fan, without alteration of speed of revolution, through a larger opening, as seen in the apex of *C³*, there will be a reduction in the velocity of the current in a ratio proportionate to the difference in area of the openings. So, from distributor to distributor, as the air passes, its velocity is reduced as it approaches the point of exit from the machine. When the central air-current passes through the cones it carries with it the air along the exterior surfaces of the cones below the openings, and creating thereby a partial vacuum along the sides of the cones, a small quantity of air is thereby caused to flow through the space *d* to fill this vacuum, as is indicated by the small arrows in Fig. 2. As the middlings pass down over distributor *C* in a thin layer they strike the up-

per projecting lip, *a*, and are directed away from the sides of the shell. As they fall away from the sides of the shell they are brought within the influence of the gentle current of
 5 air passing through the upper opening, *d*, and by it the lightest particles of the waste are carried toward the apex of distributor *C*, where they are caught by the main central current and carried out through the exhaust-pipe. The
 10 heavier particles, dropping against the exterior of the cone *C'*, fall along its face and against another projecting lip, *a*, which directs them toward the surface of distributor *C*², and passes them across the path of the suction-draft, pass-
 15 ing between the base of *C*² and the shell; and as the central draft, passing through the top opening of *C*², is moving at a higher velocity than that passing through *C'*, the vacuum created along the outer surface of *C*² is greater than
 20 that produced on the outer surface of *C'*, and consequently the draft between the base of the cone *C*² and the shell is stronger than that between the base of the cone *C'* and the shell, and heavier particles are carried up through
 25 cone *C'* and out through the exhaust-pipe. Thus from cone to cone, as the middlings fall through the machine, is the separation conducted by a series of gradual steps, until at the
 30 lowest cone the contraction of the apex is sufficient to create such a draft between the base

of the cone *C*⁴ and the shell that all the waste particles which are of considerable specific gravity, but of less than the middlings, shall be separated, carried up through the machine, and out through the exhaust-pipe.

As there is no moving air above the base of the cone-distributor *C* the middlings are unaffected by the blast until after they strike the upper projecting lip, *a*.

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

1. In a middlings-purifier, a series of truncated conical distributors provided with openings of an area increasing from the bottom toward the
 45 top of the machine, in combination with the enclosing air-trunk and suitable mechanism for creating an air-current, substantially as and for the purpose herein set forth.

2. The sectional shell *A*, provided with the
 50 lips *a a*, in combination with the section *B*, having its sides suddenly contracted, the series of truncated conical distributors, and a suitable mechanism for creating an air-current, substantially as and for the purpose set forth.

FRANCIS M. BROWN.

Witnesses:

JNO. L. CONDRON,
 R. K. EVANS.