

A. HUNTER.
MIDDLINGS PURIFIER.

No. 466,962.

Patented Jan. 12, 1892.

Fig. 2.

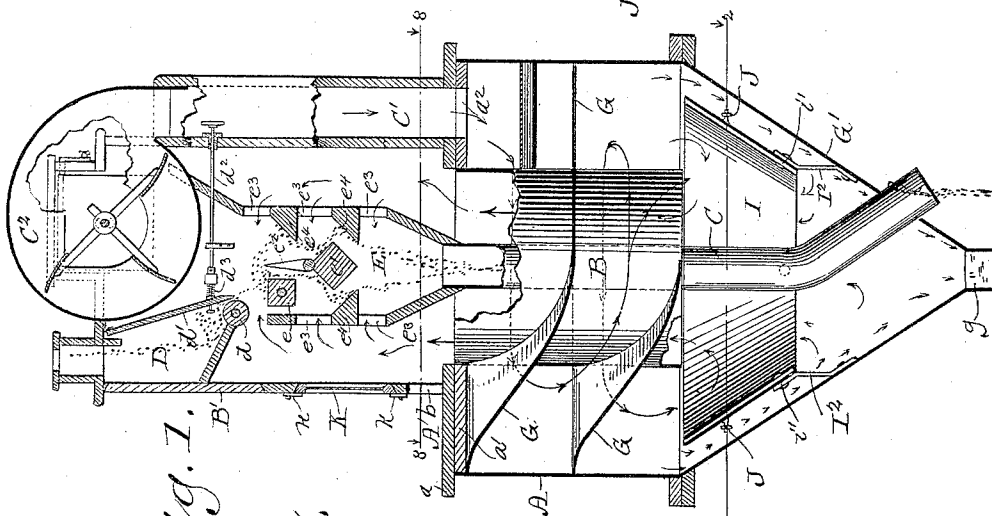
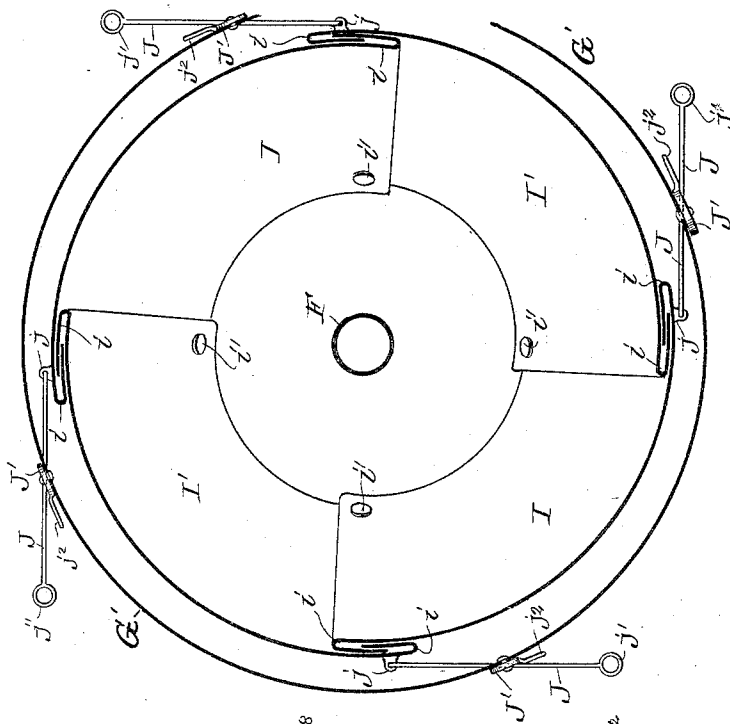


Fig. 1.

Fig. 3.

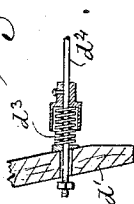
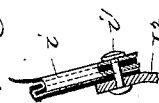


Fig. 6.



Inventor

A. Hunter

By H. S. Underwood
Attorneys

Witnesses
G. W. Young
John C. Miles

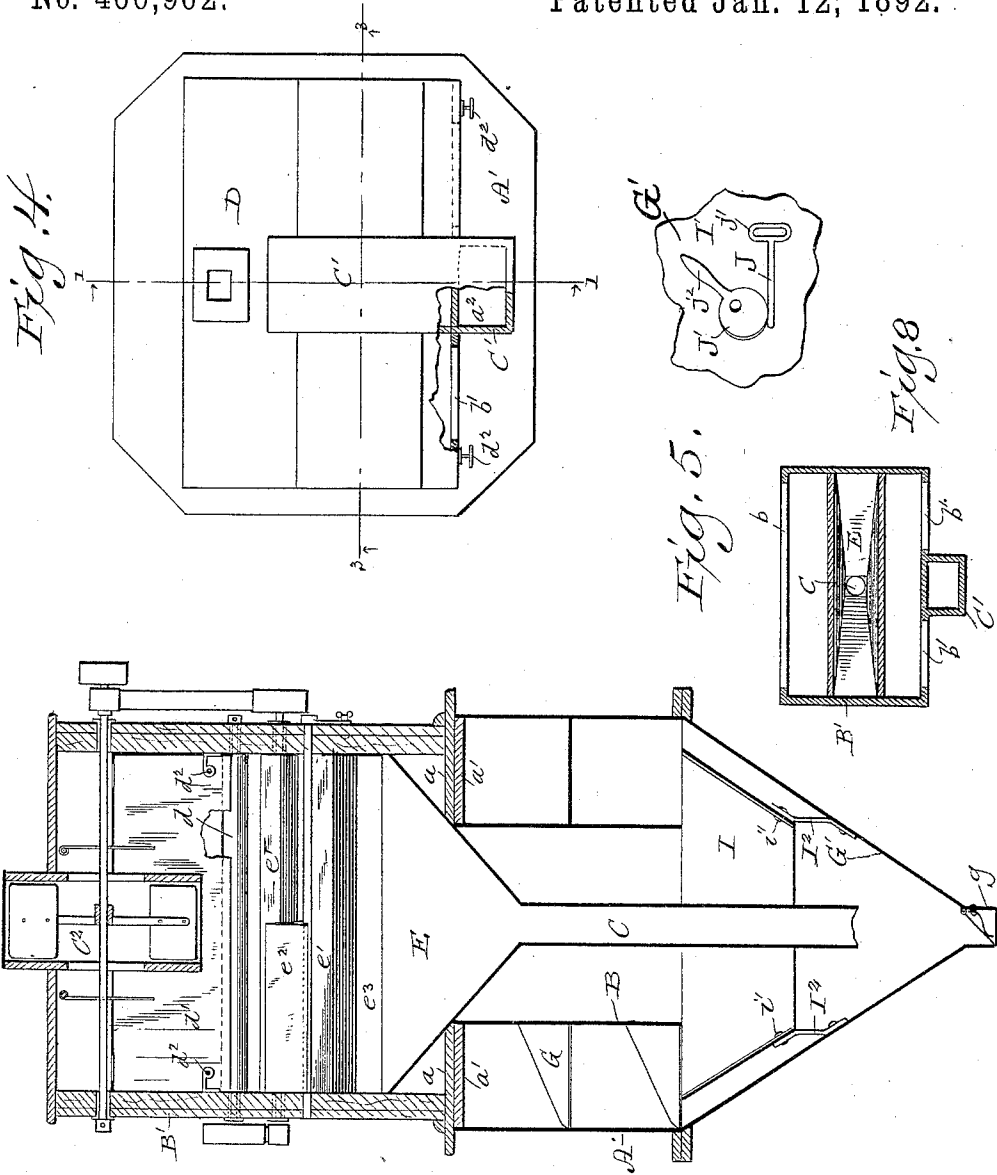
(No Model.)

2 Sheets—Sheet 2.

A. HUNTER.
MIDDLINGS PURIFIER.

No. 466,962.

Patented Jan. 12, 1892.



Witnesses
Geo. W. Young,
John E. Miles.

Fig. 3.

Inventor
Andrew Hunter,
By H. G. Underwood
Attorneys

UNITED STATES PATENT OFFICE.

ANDREW HUNTER, OF CHICAGO, ILLINOIS.

MIDDLINGS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 466,962, dated January 12, 1892.

Application filed August 24, 1891. Serial No. 403,528. (No model.)

To all whom it may concern:

Be it known that I, ANDREW HUNTER, a citizen of the United States, and a resident of Chicago, in the county of Cook, and in the State of Illinois, have invented certain new and useful Improvements in Middlings-Purifiers; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to new and useful improvements in middlings-purifiers; and it consists in the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a central vertical section of a device embodying my invention, taken on line 1 1 of Fig. 4. Fig. 2 is an enlarged horizontal section of the same on line 2 2 of Fig. 1. Fig. 3 is a vertical section of the same on line 3 3 of Fig. 4. Fig. 4 is a top plan view showing parts broken away. Figs. 5, 6, and 7 are detail views of separate parts. Fig. 8 is a horizontal section of the upper portion of the machine, taken on line 8 8 of Fig. 1.

In the drawings, A indicates an outer cylinder, preferably formed of sheet metal; B, a smaller open-ended cylinder located concentrically within the cylinder A; C, a central discharge-pipe for the purified middlings, extending centrally through the cylinder B and carried to the outside of the machine. The annular space between the cylinders A and B is closed at the upper end by a cover A', preferably consisting of upper and lower portions a a' , respectively, suitably secured together in such a manner as to be readily separable.

B' is a casing located above and communicating with the cylinder B. An aperture a^2 is provided in the annular cover A', and an air-conduit C' is arranged to communicate with said aperture a^2 at one end and with a blast-fan C² at its other end. A hopper D, of any convenient form, is provided, from the lower end of which the middlings are fed in the usual manner by means of a feed-roller d . An apertured purifying-chamber E is located below the discharge end of the hopper D and is arranged so as to receive the middlings as they leave said hopper. A square roller e is located in the upper end of said apertured purifying-chamber and is arranged to rotate therein in such a manner as to throw

the middlings upwardly as they are discharged into the upper part of said chamber. A squared bar e' extends across the purifying-chamber E, and a divider e^2 is pivotally connected with its angular upper edge, as shown more particularly in Figs. 1 and 2. Apertures e^3 e^3 are provided in the side walls of the purifying-chamber E, and intermediate inclined portions e^4 e^4 are provided upon the inside surfaces of said side walls. The discharge-conduit C is connected with the lower end of the purifying-chamber E, so as to carry off the purified middlings which descend through said chamber. An adjustable gate d' is pivotally connected with the casing B', and is adjustably held adjacent to the feed-roller d at the lower end of the hopper D by means of a longitudinally-movable rod d^2 , provided with a spiral spring d^3 , which engages with the free edge of the gate d' and permits said gate to yield outwardly to permit the escape of any unusually large substance from the hopper D.

Within the annular chamber or space between the outer cylinder A and the inner cylinder B is provided a continuous spiral partition G, which serves to divide said chamber or space into a circuitous air-conduit, which communicates at its upper end with the air-inlet aperture a^2 . A conical bottom G' is provided at the lower end of the cylinder A, and is in turn provided with a discharge-spout g . An adjustable cone I is located within said conical bottom G', this cone being composed of a plurality of sections I' I', adjustably secured together at their lower edges in such a manner as to permit their upper edges to be expanded or contracted so as to give an increased or decreased area to the upper or larger end of said cone. As illustrated more particularly in Fig. 2, the side margins of each of the sections I' I' are bent or folded over, as shown in Fig. 2, at i i , and the adjacent curved edges of said sections are movably engaged with each other. Pivotal connections i' i' are preferably provided at the lower portions of said adjacent curved edges, about which connections the sections I' I' may be moved to produce the requisite expansive or contractive movement of said sections I' I'. Suitable supporting-arms I² I² are engaged with said pivotal connections i'

2', and extend downward and are engaged with the inclined side walls of the conical chamber G', said arms serving to support the cone I centrally within said chamber. Any suitable means may be provided for operating the movable sections I' I'—as, for instance, rods J J, engaged with ears *j j* on the outer surfaces of said sections I' I', and extending through apertures in the side walls of the conical chamber G', and provided with operating-handles *j' j'*. Any suitable means may be provided for locking the rods J J in their adjusted positions, so as to retain the sections I' I' of the cone I in any desired position. As illustrated in Fig. 5, locking-cams J' J' are employed for this purpose, said cams being provided with levers *j² j²*, and journaled upon the outside of the conical chamber G', adjacent to the apertures through which the rods J J are passed, said cams being arranged to engage with the rods J J, so as to hold said rods from moving. The casing B' is preferably provided with one or more air-inlet openings *b b'*, through which outside air is free to enter. A window K is also preferably provided in one side of the casing B', opposite the purifying-chamber E, through which the operation of the device may be observed. This window is preferably made removable, and is secured in the side wall of the casing B' by means of buttons *k k*. By this construction the window may be readily removed and access had to the interior of the machine when desired. As illustrated more particularly in Figs. 1 and 3, the casing of the fan C² is arranged to communicate with the interior of the purifying-chamber E, so as to draw air from the upper portion of said chamber, and the discharge-outlet of said fan-casing being connected with the air-conduit C' it is obvious that the air which is drawn up by the fan C², through the purifying-chamber E, will be discharged through the conduit C' into the annular chamber between the cylinders A and B. The operation of my improved device is as follows: The middlings are fed from the hopper D into the upper part of the purifying-chamber E, falling upon the rotating square shaft *e*, by means of which they are thrown upwardly into the upper portion of the purifying-chamber, where they momentarily remain suspended, during which time the ascending currents of air which are drawn by the fan C², through the apertures *e³ e³*, separate the dust and other light particles from the middlings. The ascending currents of air also assist in holding the middlings in suspension within the top of the purifying-chamber, so that the air is permitted to act for a longer time upon the middlings, and thus more effectually remove the dust therefrom. By the whirling or circular motion of the currents of dust-laden air all particles of dust and other substances heavier than the air are carried to the outside of the annular chamber, while the purified air is forced into

the cone I, and thence upwardly through the cylinder B. The air containing the dust at the periphery of the annular chamber is then forced downwardly into the annular space between the inclined wall of chamber G' and the cone I, and by the conical form of said chamber G' the air containing the dust is compressed as it descends through said annular space (meanwhile continuing its circular motion) until it reaches a point below the lower edge of the cone I, when the purified air is free to ascend through the interior of said cone I, thus relieving the pressure within the lower part of the conical chamber G', and thereby forming a dead-air space, into which the dust and other heavy particles are permitted to gravitate and from which they are discharged through the spout *g*. It may happen that a greater or less amount of opening is necessary to the proper operation of the machine in separating the dust-laden portion of the air from the purified portion, and by my improved construction the machine may be readily adjusted so as to give the necessary amount of opening between the cone I and the inclined wall of the chamber G' by a simple operation of the adjusting-rods J J and the locking-cams J' J'. By this construction, therefore, the operation of the currents of air in separating the dust is placed entirely under the control of the operator, and he is enabled to readily adjust the machine so as to effect a perfect separation of the dust under all circumstances.

Valves may be provided in the outlet-passages C and *g* to prevent air from being drawn upwardly through said passages by the fan.

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

1. In a middlings-purifier, the combination, with a purifying-chamber, a blast-fan communicating therewith, a circuitous air-passage below said purifying-chamber communicating with said fan, and a conical dust-chamber into which said circuitous air-passage is arranged to discharge, of a cone located concentrically within said chamber and suitable means for giving an expansive adjustment to said cone, substantially as described.

2. In a middlings-purifier, the combination, with a purifying-chamber, a blast-fan communicating therewith, a circuitous air-passage located below the purifying-chamber and communicating with the discharge-opening of the fan-casing, and a conical dust-chamber communicating with the discharge end of said circuitous air-passage, of a cone located concentrically within said dust-chamber, said cone provided with a plurality of sections pivotally connected with each other at their adjacent lower edges, and means connected with the upper portions of said sections for giving an expansive adjustment to said sections, substantially as described.

3. In a middlings-purifier, the combination, with a purifying-chamber, blast-fan, a cir-

5 cuitous air-passage, and a conical dust-chamber, of an adjustable cone located concentrically within said dust-chamber, said adjustable cone comprising a plurality of sections adjustably engaged with each other along their inclined side margins, rods pivotally connected with the upper edges of said adjustable sections and extending to the outside of said dust-chamber, and means for locking said rods in their adjusted positions, substantially as described.

10 4. The combination, with a purifying-chamber and a blast-fan communicating therewith, a circuitous air-passage communicating with the discharge-opening in said fan-casing, and a conical dust-chamber into which said circuitous air-passage is arranged to discharge, of an adjustable cone located concentrically within said chamber, said cone comprising a plurality of sections having their inclined side margins curved or folded into a substantially U shape and adjustably engaged with each other, pivotal connections between the adjacent lower edges of said sections, and 25 means connected with their free upper edges

for effecting an expansive adjustment of said sections, substantially as described.

5. The combination, with a purifying-chamber and a blast-fan communicating therewith, of a casing surrounding said purifying-chamber, and provided with apertures for the admission of external air, a chamber communicating with the lower end of said casing and open at its lower end, a circuitous air-passage communicating with the discharge-opening in the fan-casing, a conical dust-chamber communicating with the lower end of said first-mentioned chamber and with the discharge end of said circuitous air-passage, and an adjustable inverted truncated cone located concentrically within said conical chamber, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

ANDREW HUNTER.

Witnesses:

JOHN E. WILLS,
WM. KLUG.