

(No Model.)

2 Sheets—Sheet 1.

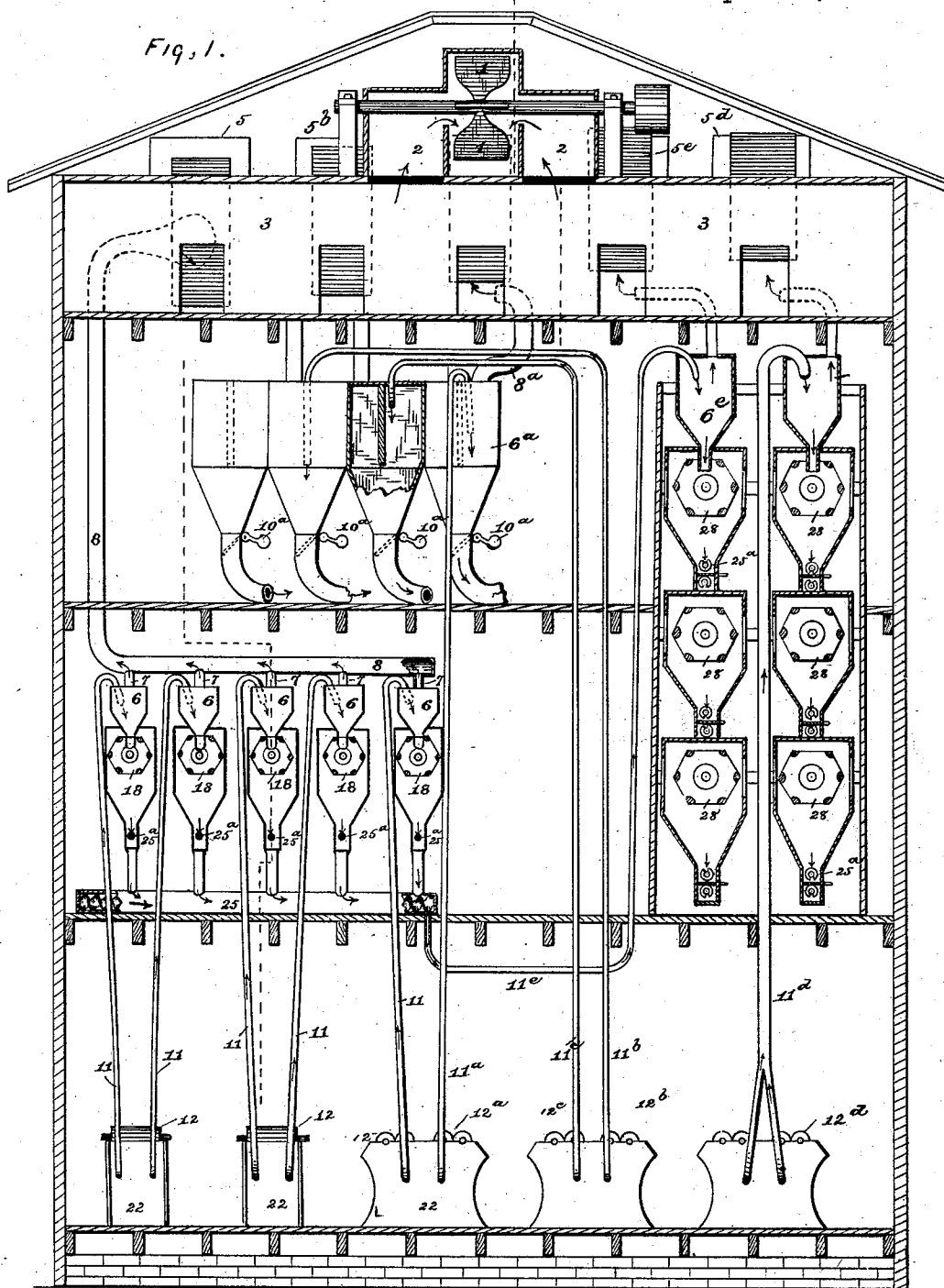
J. M. CASE.

APPARATUS FOR MANUFACTURING FLOUR.

No. 297,757.

Patented Apr. 29, 1884.

Fig. 1.



WITNESSES

H. H. Young
H. C. Knight

INVENTOR

John M. Case
By Knight Bros
Attorneys

(No Model.)

2 Sheets—Sheet 2.

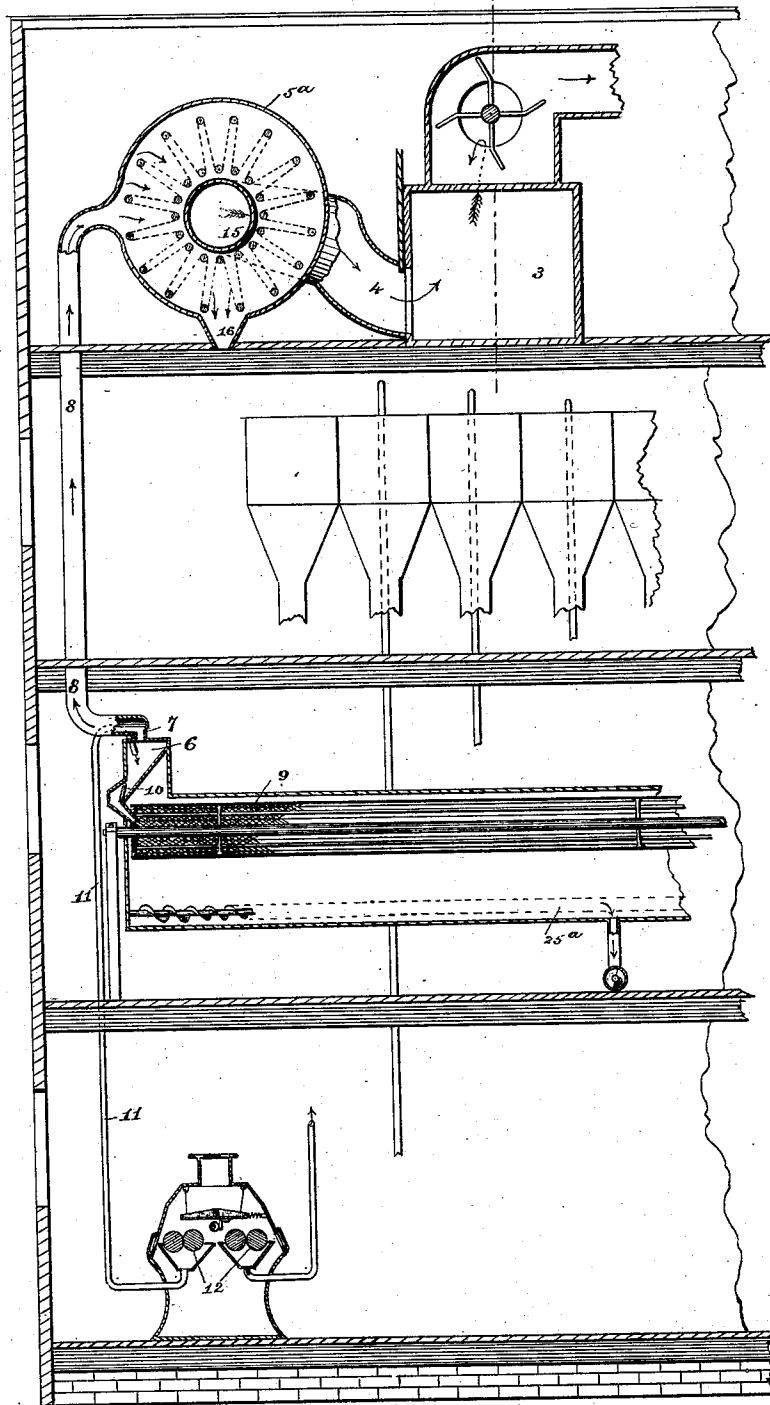
J. M. CASE.

APPARATUS FOR MANUFACTURING FLOUR.

No. 297,757.

Patented Apr. 29, 1884.

Fig. 2.



WITNESSES

J. H. Young
H. E. Knight

INVENTOR

John M. Case
By Knight & Bros.
attorneys

UNITED STATES PATENT OFFICE.

JOHN M. CASE, OF COLUMBUS, OHIO, ASSIGNOR TO THE CASE MANUFACTURING COMPANY, OF SAME PLACE.

APPARATUS FOR MANUFACTURING FLOUR.

SPECIFICATION forming part of Letters Patent No. 297,757, dated April 29, 1884.

Application filed May 31, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. CASE, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Machinery and Apparatus for the Manufacture of Flour, of which the following is a specification.

My invention relates to new machinery and apparatus for elevating, purifying, and handling stock in the manufacture of flour. In the system now in use elevations are made by mechanical means, such as belts, cups, gearing, and shafting. My improved apparatus will entirely do away with this system of mechanical elevating and the machinery and expense connected therewith, while it has many other advantages, hereinafter more fully explained.

My invention consists in one or more fans having sufficient capacity to supply the necessary air-currents for the elevation of all the material in the mill, said fan or fans being connected with suitable air-conduits, and communicate with suitable dust-catchers for the purpose of arresting any material which may be elevated beyond the settling-chambers, all as hereinafter described and claimed. By this arrangement of the exhaust-pipes and dust-catchers I remove a very large proportion of the fine fiber and impure material which become incorporated with the chop in the process of reduction and grinding. This material from the dust-catchers is sent to separate bolts and treated separately and manufactured into a lower grade of flour. I also cause the air-currents for elevating to be drawn through the rolls or reduction-machines in such a manner as to keep them perfectly cool. This improved means of elevating has other important advantages, among which may be mentioned the fact that it is entirely dustless. It is also free from the special liability to fire incident to the use of mechanical elevators. It is found in the operation of mills that fires are very often produced by the elevators stopping while the pulley continues to revolve, creating a degree of friction sufficient to cause ignition or combustion. My means of elevat-

ing, for this reason, will very materially reduce the liability to fire.

In carrying out my invention I construct a series of settling-chambers, which communicate with a series of bolts, the settling-chambers being also connected with a series of dust-catchers. This series of dust-catchers is connected by suitable pipes with valves to regulate the strength of current to the air-conduits, the suction being produced by fans, as heretofore explained.

In the accompanying drawings, Figure 1 is a vertical section on the line *x*, Fig. 2, of a mill embodying my improved system. Fig. 2 is a vertical section of the same on the line *y*, Fig. 1.

In these views I have not shown the full number of bolts ordinarily used, nor the purifiers or other machinery in the mill, but have only shown a sufficient amount of bolts and other machinery to fully represent my improved means of elevating and arresting the dust.

By reference to the drawings it will be seen that I provide a large fan, 1, which in this instance is located at the top of the mill; but it may be located at any point or position desired. Suitable air-conduits, 2, connect from the fan to the air-chamber 3. To this air-chamber are connected by passages 4 dust-catchers 5. (Shown in section in Fig. 2.) These dust-catchers communicate by ducts 7 and main conduit 8 with practically air-tight settling-chambers 6 over the bolts 9. The chamber 6 is provided with a suitable clack-valve, 10, which valve is so arranged that by the accumulation of stock the material is permitted to fall into the bolt by raising the valve temporarily, without admitting any air to the settling air-chamber through the discharge-passage. The elevating air-pipe 11, leading from the rolls 12 or any other part of the mill whence it is desired to elevate material, is also connected to this tight air-chamber 6 in such a manner that the air to be supplied to the settling-chamber is compelled to pass through this elevating-pipe, and in its rapid transit up said pipe or pipes the material delivered from the rolls is elevated. The

air-chamber 6 is made sufficiently large to allow of the settling of the material within this chamber, while but a small portion is drawn out by the air-currents, the reason being that the area of the air-pipe 11, connecting with the rolls or other part of the mill whence material is to be elevated, is very small compared with that of the chamber; hence a small volume of air is forced through the pipe 11 with a strong current, which small volume of air becomes distributed over the settling-chamber, leaving the air within the chamber comparatively inert and without strong currents. The air passes out through the elevating-pipe communicating with the dust-collectors, through which it passes off very slowly, owing to its being again distributed over a large area. It will readily be seen that in this system of elevating the fine fibrous impure matter, which is so difficult to separate when it is once permitted to pass into the bolt with the good stock, will be elevated and caught by the dust-catchers 5. I have shown in Fig. 2 one of the dust-catchers of the form preferred; but they may be of any suitable construction. The form of dust-catcher here shown is described and claimed by me in a contemporaneous application. It consists of a spider or frame having stretchers or rungs 13, over and around which is stretched a continuous band of cloth, 14. The bearing of the spider is made hollow, as shown at 15, and is put into communication with the passage 4, leading to the air-chamber 3. The air being drawn through this dust-catcher, it passes out through the fan entirely free from any valuable material. The dust-catcher is caused to revolve, and is provided with a suitable jarring apparatus acting in such a manner that the stock which accumulates upon the cloth of the dust-catcher is jarred off and passes out through the dead-air chamber 16, Fig. 2, thence discharging to the reels or to the place for which it may be found best suited.

In my improved system of elevating and purifying stock, I use a sufficient number of dust-catchers to correspond with the different qualities of stock to be operated upon, so that in the rebolting of this material caught by the dust-catchers it may be handled with the very best advantage. I place one dust-catcher in the elevator of the stock from the break-machines, as shown at 5 in Fig. 1. Another dust-catcher may be used in the elevator of the material from the bran-rolls 12^a; another, as shown at 5^b, in the elevator of the material from the germ-rolls 12.

In the elevation of material which is uniformly alike and of the same relative value, I connect the pipes together, as shown at 11^a, Fig. 1, in which case one elevating-pipe may answer for elevating the product from two or more pairs of rolls.

In the drawings I have shown with a series of break-machines a series of settling-chambers, 6, located immediately above the scalping-reels

18. This material being of uniform nature, I connect with these several settling-chambers one common suction-pipe, 8, and in each one of these settling-chambers there is inserted a suitable suction-pipe, 11, for elevating material thereto from the rolls. The material passes up from the first break, 12, through one of the pipes 11 by the suction of air, and is discharged into the first settling-chamber 6, and from thence passes through the reel, where a separation of the middlings which may have been made in this break occurs. The tailings of the first reel are spouted by a suitable pipe to the second set of rolls, 12, (herein represented as located in the same frame, 22, as that of the first break,) and into this second set of rolls is connected the second of the elevating-pipes 11, communicating with the second of the settling-chambers 6 over the second scalping-reel 18. This process is continued until any number of breaks are made, which may be optional with the miller. Falling from the last reel, the tailings pass onto the bran-roll 12^a, and from this roll the product is elevated to a special settling-chamber, (represented at 6^a;) which settling-chamber connects by suction-pipe 8^a with another dust-catcher, the bran passing off through suitable reels to be finished. The middlings which are made in the several reductions are fed by the individual conveyer 25^a and common conveyer 25 to the elevating-pipe 11^a, by means of which they are drawn up and discharged into the settling-chamber 6^a, thence passing to suitable bolts, 28, as shown, where they are treated in the usual manner. Purified middlings from the purifying-machine (not shown in this drawing) may be spouted to the rolls 12^a, and, after being crushed, elevated to the second series of wheels, first passing through the settling-chamber 6^a, as represented. In all the settling-chambers I employ valves, as at 10 10^a, for the purpose of preventing any air being drawn up through the discharge-openings. The object of these valves is to arrest the current of air, and they are so arranged that they will open by the weight of the accumulating material, permit it to discharge, and then quickly return to place.

In the drawings some of the discharge-pipes and elevating-pipes are shown broken off, indicating that they may be connected to any desirable machine or stock discharged at any point desired in the mill.

It is obvious that the suction-pipes may be led to the rolls from either side or end. In one of the drawings they are shown as leading into the side of the machines, in the other as entering the ends.

Some details of this machinery and apparatus I have described and claimed in my application No. 96,703, of even date herewith.

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

1. The combination of a series of rolls or breaking-machines, a series of pneumatic ele-

vating-pipes of small area, a series of settling-
chambers, an exhaust-pipe of larger area, a
dust-catcher, and a fan, all arranged substan-
tially in the manner and for the purposes set
5 forth.

2. The combination, with a series of pneu-
matic elevating-tubes of small area, a series
of settling-chambers, and an exhaust-pipe of
larger area, of a second pneumatic elevating-

tube of small area, a second settling-chamber 10
and a second exhaust-pipe of larger area, and
an air-trunk and fan common to all, arranged
substantially in the manner and for the pur-
pose set forth.

JOHN M. CASE.

Witnesses:

OCTAVIUS KNIGHT,
HARRY E. KNIGHT.