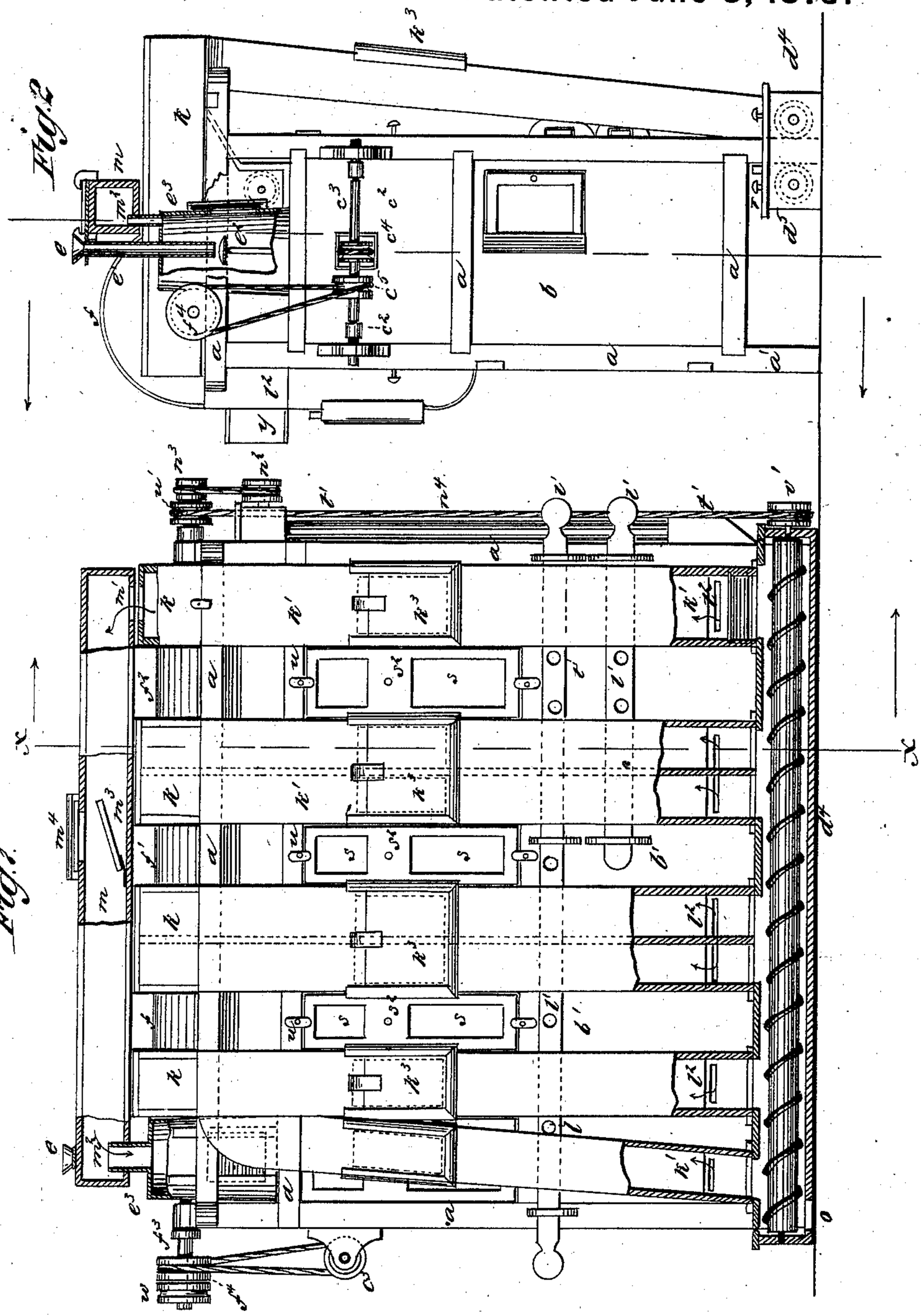
3 Sheets—Sheet 1.

H. WHITE.

Middlings-Purifiers.

No. 216,121. Patented June 3, 1879.



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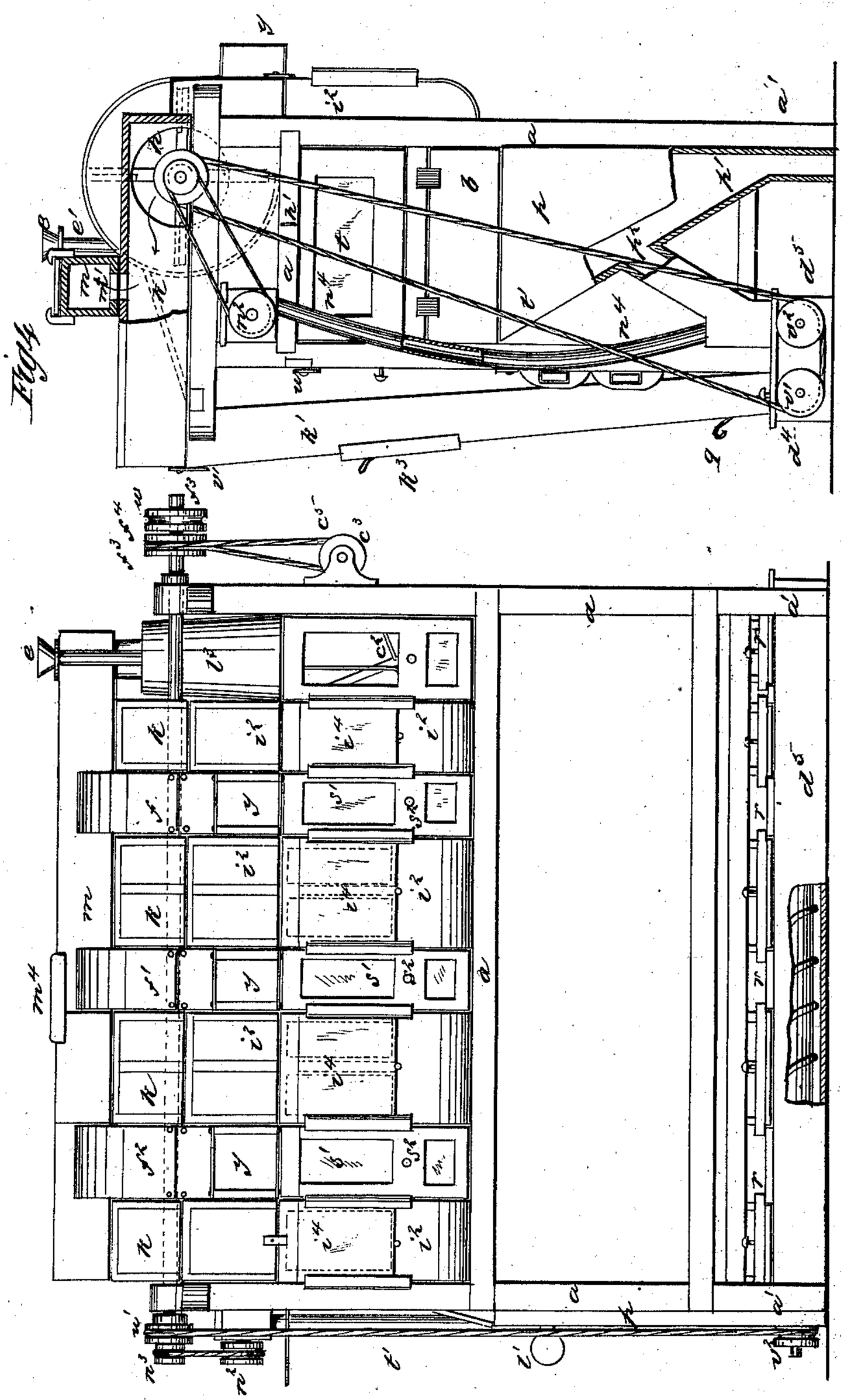

Fig. 3.

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Fig. 6.

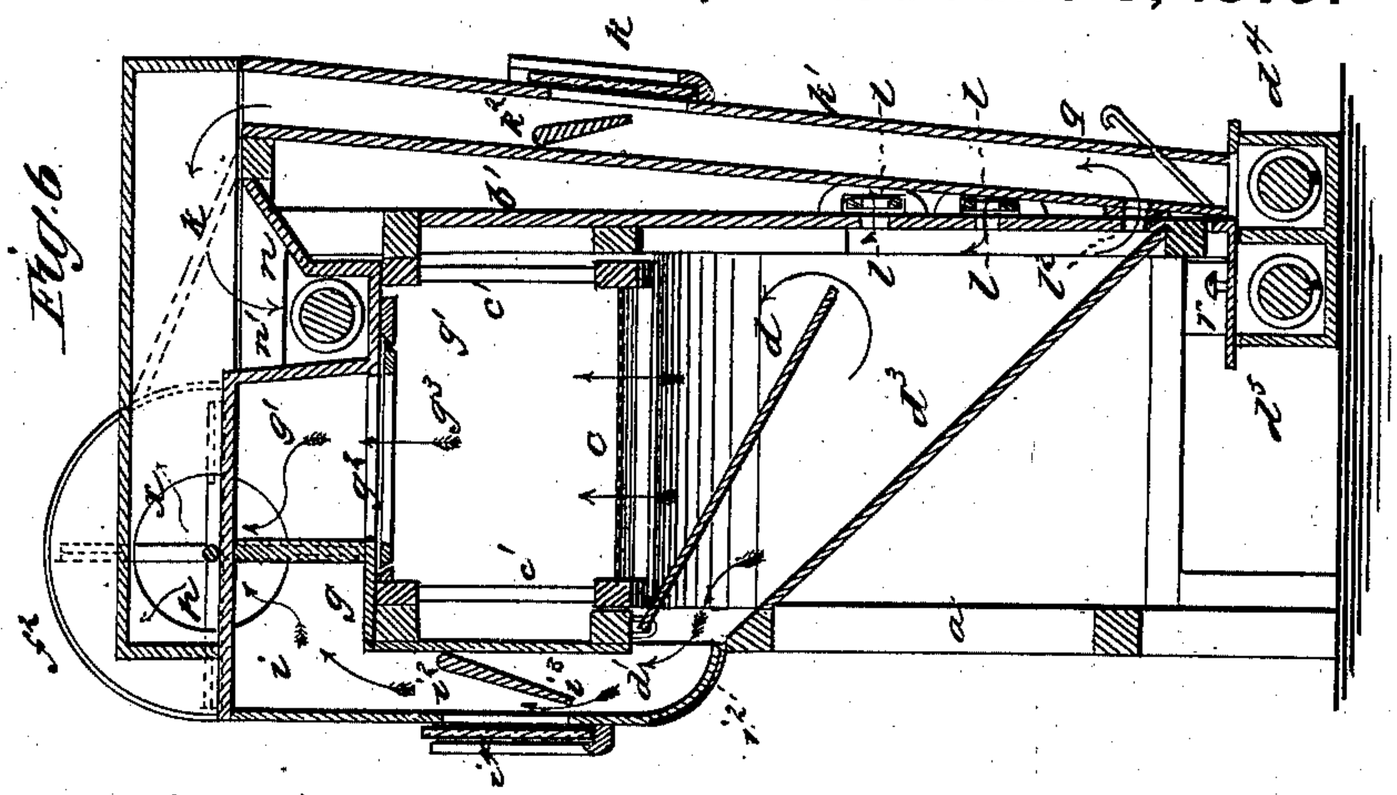
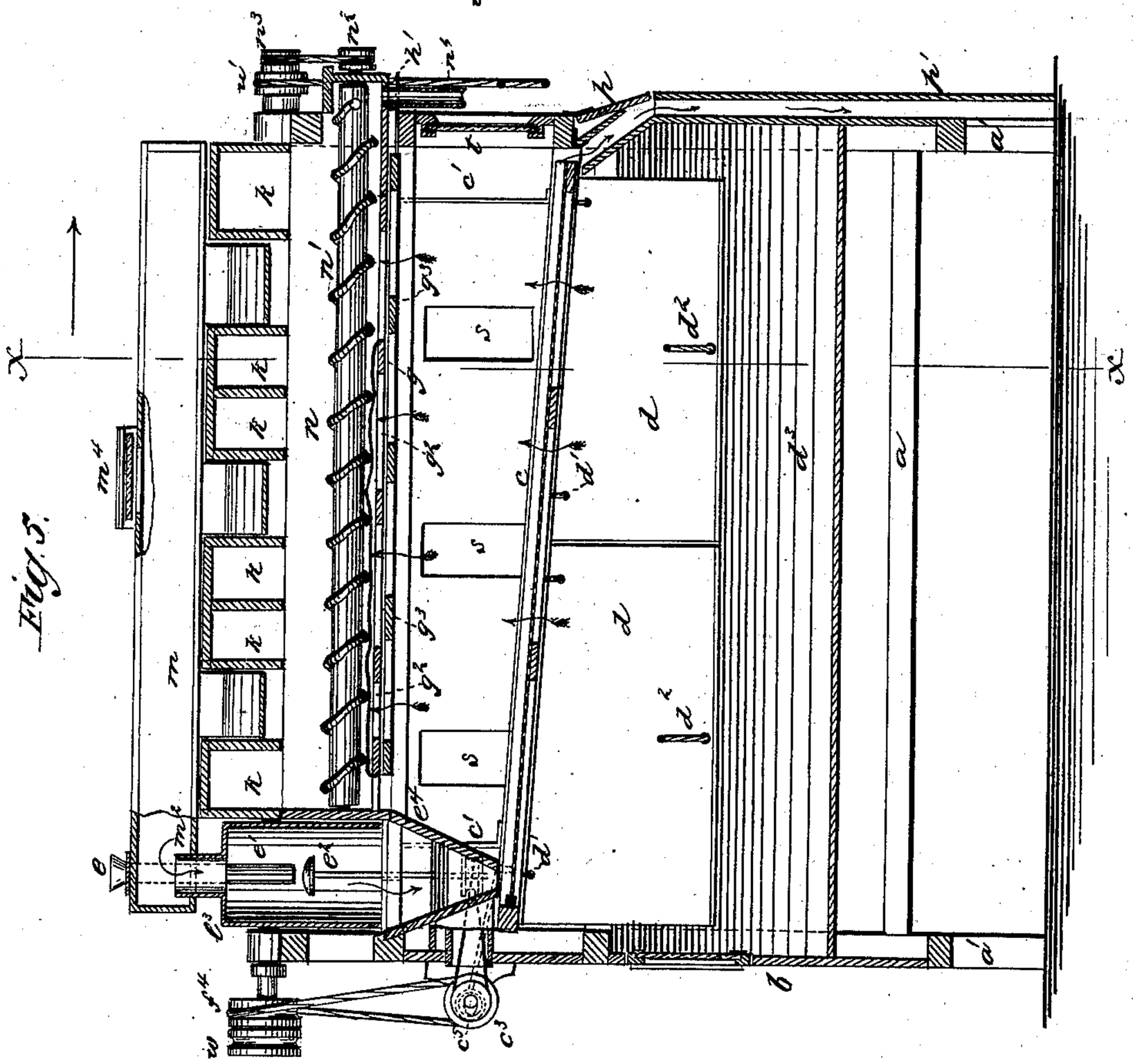


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY WHITE, OF GALVESTON, TEXAS.

IMPROVEMENT IN MIDDLINGS-PURIFIERS.

Specification forming part of Letters Patent No. **216,121**, dated June 3, 1879; application filed July 10, 1878.

To all whom it may concern:

Be it known that I, HENRY WHITE, of Galveston, in the county of Galveston and State of Texas, have invented a new and useful Improvement in Middlings-Purifiers, of which the following is a specification.

The object of my invention is to provide a machine for purifying the middlings in the process of making flour that will free them more completely from impurities than has heretofore been done, and to construct the parts of the machine so that the air-blasts will be completely under control.

Machines for this purpose have heretofore been made in which the middlings are subjected to a current of air while passing over sieves; but those machines require a large amount of power to drive them, and are not easily controlled.

My invention consists in combining the sieve and delivery devices of the purifier with three or more fan-blowers and air-tubes leading therefrom, so that the middlings are subjected to four different currents of air at separate points in their passage through the machine, and there are valves placed in the air-tubes for regulating each current of air to make any one more or less powerful.

In the drawings, Figure 1, Sheet 1, is a front elevation of the machine, partially in section. Fig. 2, Sheet 1, is an end elevation. Fig. 3, Sheet 2, is a rear elevation of the machine. Fig. 4 is an elevation at the end opposite to Fig. 2, and partially in section. Fig. 5 is a vertical longitudinal section, and Fig. 6 is a cross-section at the line *x x*.

Similar letters of reference indicate corresponding parts.

a a represent the main supporting framework of the machine. *a'* are the legs, *b* the end boards, and *b'* the front, of the apparatus. *c* is the sieve, supported from the top of machine by springs c^1, and vibrated by a pitman, c^2, connected to the sieve and to a cam on the shaft c^3. *d d* are aprons, hung at d^1, and held at any desired angle by cords d^2. d^3 is the fall-board, which delivers the middlings to the twin conveyers d^4 d^5, operating in the manner hereinafter described. *e* is the hopper where the middlings are fed to the tube e^1 which carries them upon the revolving plate e^2, in a cylinder, e^3, from whence they fall in the hopper e^4 and are led to the sieve *c*.

The plate e^2 is revolved by a belt from a pulley, c^4, on the shaft c^3 to a pulley on the vertical supporting-rod of the plate e^2.

f f^1 f^2 are fan-blowers, placed at the top of the machine upon a horizontal shaft, f^3, which carries a pulley, f^4, at its end, and is connected by a belt to a pulley, c^5, on the shaft c^3. The blower f^2, which is at the rear end of the machine, is larger than the other two, for the reason that a stronger blast is required for the coarse middlings as they reach the end of the apparatus.

The blowers *f* f^1 f^2 are immediately above the top board, *g*, of the purifier, and the circular openings *h* in the sides of the fan-cases communicate directly with the space over the sieve *c* by chambers g^1 and openings g^2 in the top *g*. (See Fig. 6.) That is the case with each fan, the air-tubes of each being similar in construction.

I provide a register-valve, g^3, operated from the outside by a rod, *h'*, (see Figs. 4 and 5,) to close the openings g^2 more or less, and thereby regulate the action of the air-current above the sieve.

i i are chambers at the top of the apparatus (see Fig. 6) at the side of the chambers g^1, but separated therefrom by partitions, and communicating with the openings *h* in the blower-cases. These chambers *i* connect, by air-tubes i^2 on the back of the apparatus, with the space under the aprons *d* and above the fall-board d^3.

i^3 is a damper or valve in the tubes i^2 to regulate the current passing through i^2, and i^4 is an opening in the tube i^2, covered by a pane of glass, which enables the operator to observe the position of the valve i^3 and the working of the purifier at that place.

k k are tubes or trunks extending across the machine over the chambers g^1 and *i*, (see Figs. 5 and 6,) and communicating with the openings *h* in the blower-cases. There are two of the tubes *k* to each blower, one at each side, and they connect by vertical tubes k^1 at the front of the apparatus, Figs. 1, 4, and 6, which tubes

k^1 open at their bottom ends into the conveyer-trunk d^4, so that the current of air may act upon the middlings as they leave the purifier.

k^2 is a valve in the tubes k^1, and k^3 is an opening covered by glass in the side of k^1.

l l are openings through the front of the apparatus to supply air for the current passing by the air-tubes i^2 and through the sieve c to chambers g^1, thus keeping up a cross-current through the purifier. The openings l may be closed more or less by slides l^1 to regulate the quantity of air passing in.

m is a longitudinal trunk on the top of the machine, resting upon the cross-tubes k, (see Figs. 1 and 5,) and extending from the cylinder e^3, where the middlings enter the machine, to the tube k of the blower f^2 at the lower end of the machine. The trunk m has an opening, m^1, (see Figs. 1 and 4,) into the tube k, and communicates with the cylinder e^3 by a short pipe, m^2, thereby creating a suction by the blower f^2 in the cylinder e^3 to act upon the middlings as they enter the machine and are spread by the revolving plate e^2.

m^3 is a valve or damper in the trunk m for regulating the current through m, and m^4 is an opening in the trunk above covered by a glass valve, which is used to observe what is passing through the trunk.

n is a tube or chamber (see Figs. 5 and 6) running lengthwise of the machine at the top, beneath the cross-tubes k, and opening at the upper side into tubes k. n^1 is a conveyer at the bottom of the tube n, with its shaft extending outside of the tube n at the lower end of the machine, and provided with a pulley, n^2, which is connected by a belt to a pulley, n^3, on the shaft f^3 of the blowers, so as to revolve the conveyer n^1.

The chamber n catches everything which does not reach the fans, and it is carried by the conveyer n^1 to the vertical tube n^4, which leads to the conveyer d^5.

I will describe the manner in which the air-currents act upon the middlings during their passage through the apparatus, and then show the means for cutting off the middlings at any point.

As stated heretofore, the middlings are fed into the cylinder e^3, where they are subjected to the first current of air, which passes through the cylinder e^3 and trunk m. The middlings then fall upon the sieve c, where there is a current drawing through the sieve and through the openings g^2 to the chambers g^1 and blowers f, f^1, and f^2. The material which passes through the sieve c falls upon the aprons d d, where it is spread and falls over the edge of d in a thin sheet. At this point it is subjected to the cross-current from the openings l l to the air-tubes i^2, chambers i, and blowers f f^1 f^2. The material then runs down the fall-board d^3 to the conveyer d^4 through the opening l^2, and is carried forward and delivered at the opening o at the end of the conveyer-tube. While being thus carried along for delivery the middlings are subjected to a current by the tubes k^1 k and blowers f f^1 f^2. This last current should be the most powerful, and by the use of the three fans of sufficient size the currents of air are rendered ample to do the work required.

It will be seen that during the passage of the middlings through the machine they are subjected to four distinct currents of air, and each current is independent of the others and may be regulated independently by the valves. Thus the current at any one point may be increased or entirely shut off, according to the character of the material being operated upon.

The sieve c is made in sections, preferably six in number, with cloth of different degrees of fineness, and the sections may be changed, and others with finer or coarser cloth put in. The tailings pass off the end of the sieve into the chute p at the lower end of the apparatus (see Fig. 5) and into the pipe p^1. The heavier particles will pass into the pipe p^2, which leads to the base of the tube n^4, (see Fig. 4,) and from there they may pass to the conveyer d^5.

I provide for cutting off the middlings as they pass from the fall-board d^3 at any point in the length of the conveyer d^4, so that more or less may run into the conveyer d^5 and be then carried out. For this purpose the tubes k^1 are provided with an inclined slide or shutter, q, (see Figs. 4 and 6,) projecting at the front of the apparatus, and in such position that when the shutter q is pushed in its lower end will rest upon the partition between the conveyers d^4 and d^5. The middlings, in passing out by the opening l^2, will fall upon the inclined slides q, and thereby be caused to run into the conveyer d^5 instead of d^4.

r are slides in the top of the conveyer-tube d^5, (see Figs. 3 and 6,) opposite the air-tubes k. These slides r are to be pulled out at the point where the inclined slides q are inserted, so as to make an opening for the middlings to pass into the conveyer d^5 when cut off, as described.

By this means any desired portion of the coarse middlings at the lower end of the machine may be separated from the other portions.

The dust and other refuse is discharged by the pipes y of the fan-blowers into a room or other place provided for that purpose.

To enable the miller to watch the operation of the machine at any part, I insert panes of glass in the front between the pipes k^1, as at s, and also in the back, between the air-tubes i^1, as at s^1, and there is also glass inserted at t in the lower end of the machine.

The panes of glass s and s^1 are set in movable frames s^2, held in place by buttons u, (see Fig. 1,) so that they may be removed to give access to any part of the machine.

The tubes k and trunk m are held in place on the top of the machine by pins, so that they may be removed and replaced again, and the

vertical tubes k^1 are held at their upper ends by buttons v (see Fig. 4) for a similar purpose.

The shafts of the conveyers d^4 d^5 extend outside of the tubes at the lower end of the machine, and carry pulleys v^1 v^2. t' is a belt passing around the pulleys v^1 v and over a pulley, w', on the shaft f^3 of the fan-blowers. The power to operate the purifier is applied to a pulley, w, on the shaft f^3, at the upper end of the apparatus.

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

1. The combination, in a middlings-purifier, with the feeding mechanism, the chambers over and under the sieve, and delivery devices, substantially as described, of two or more fan-blowers provided with air-tubes leading therefrom and independent means of adjustment, as and for the purpose set forth.

2. The combination of the fans f f^1 f^2, having apertures h in their casings, the chambers g^1, having valved openings communicating with the chamber over the bolt, the top chambers i, connected by valved tubes with the space under the bolt, the trunk k, connected by the valved tubes k^1 with the discharge-openings, the trunk m, formed with openings m^1 into air-trunk k, the pipe m^2, communicating with the feeding-chamber, and the chamber n, opening into trunk k, as and for the purpose specified.

HENRY WHITE.

Witnesses:
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