(No Model.) 3 Sheets—Sheet 1

H. A. BARNARD.

MIDDLINGS PURIFIER.

No. 401,242. Patented Apr. 9, 1889.

Fig. 1.

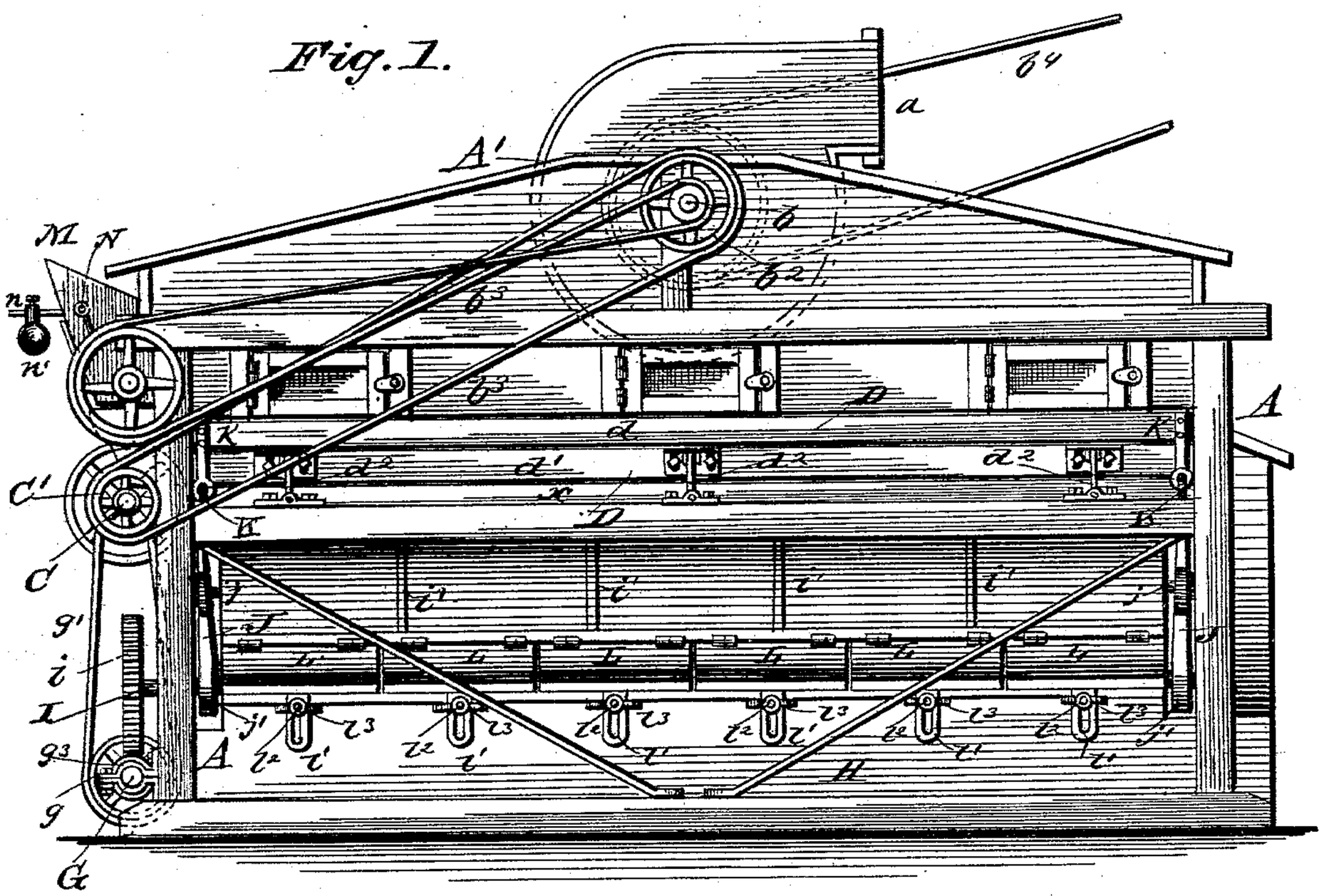


Fig. 2.

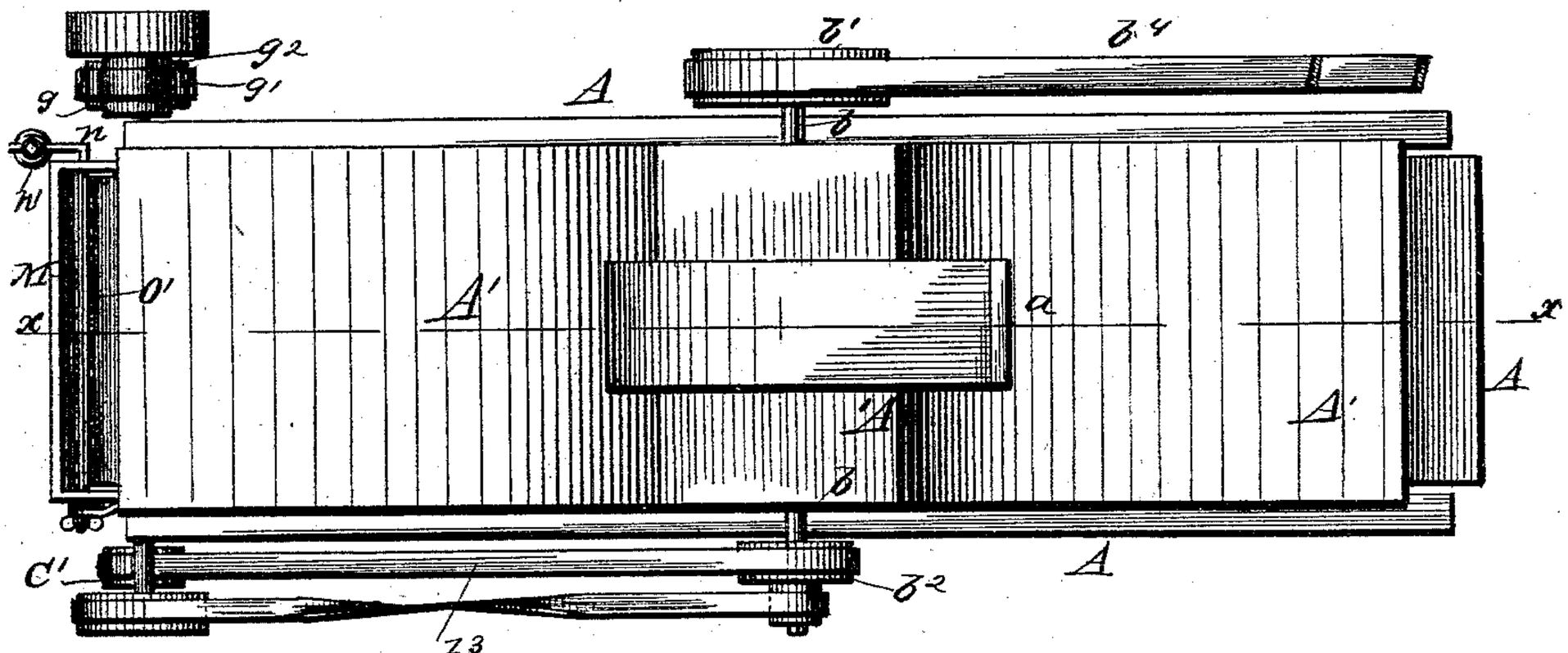
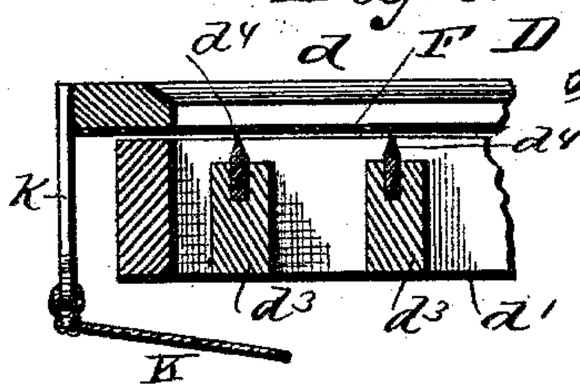


Fig. 3.



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T. H. Alexander
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N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 2.

H. A. BARNARD.

MIDDLINGS PURIFIER.

No. 401,242. Patented Apr. 9, 1889.

Fig. 3

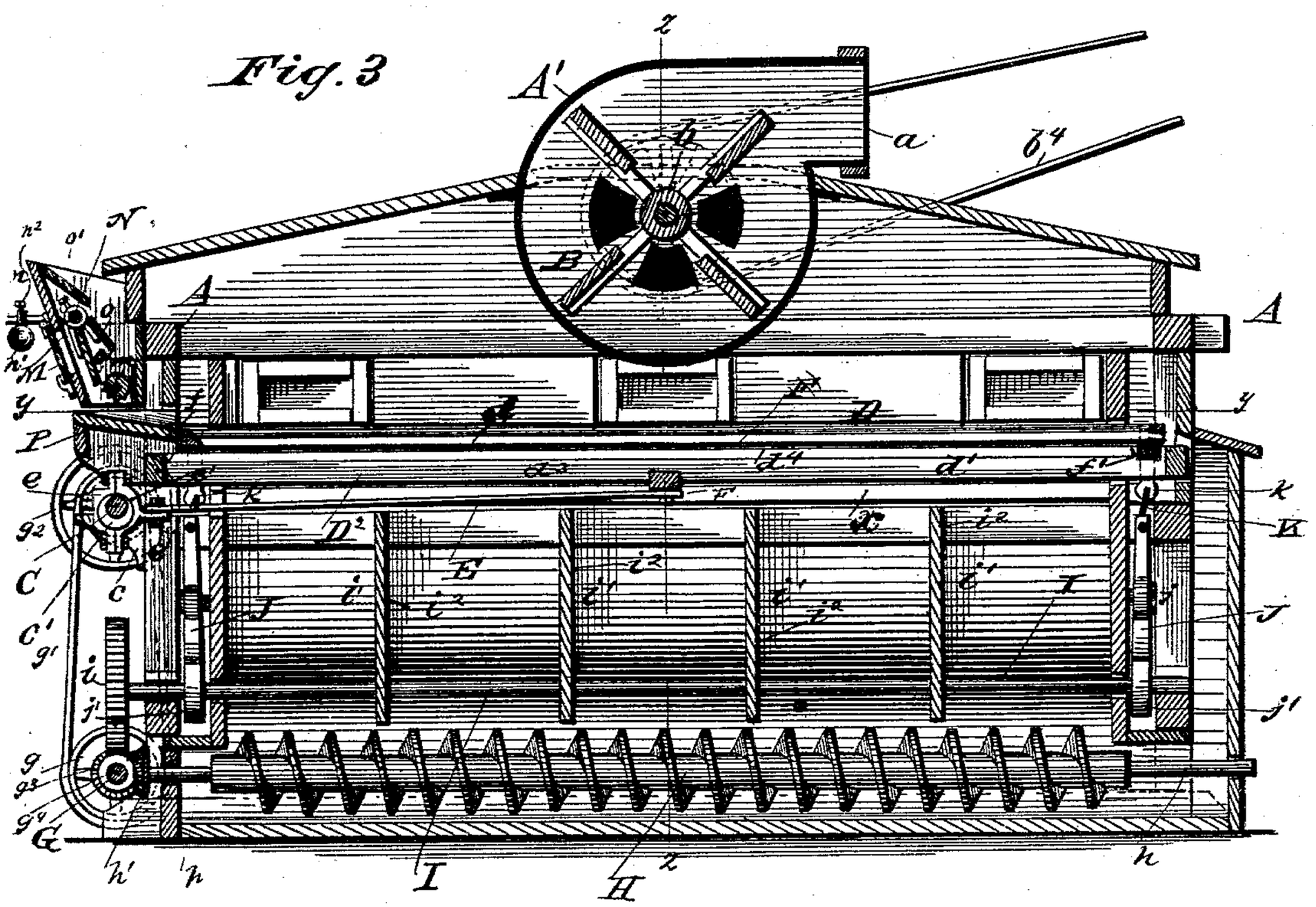

Fig. 4.

Fig. 8.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 3.

H. A. BARNARD.

MIDDLINGS PURIFIER.

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Fig. 5.

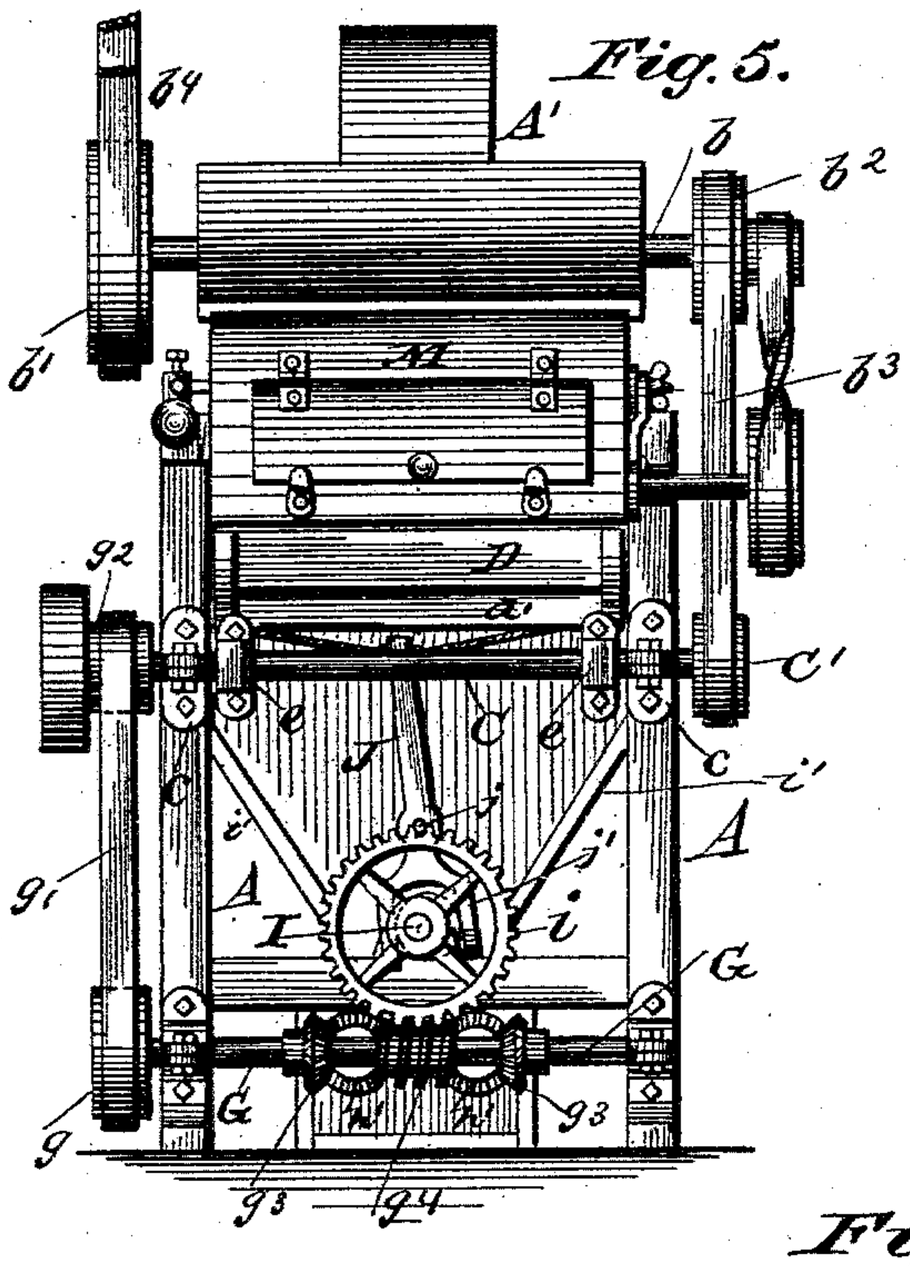


Fig. 6.

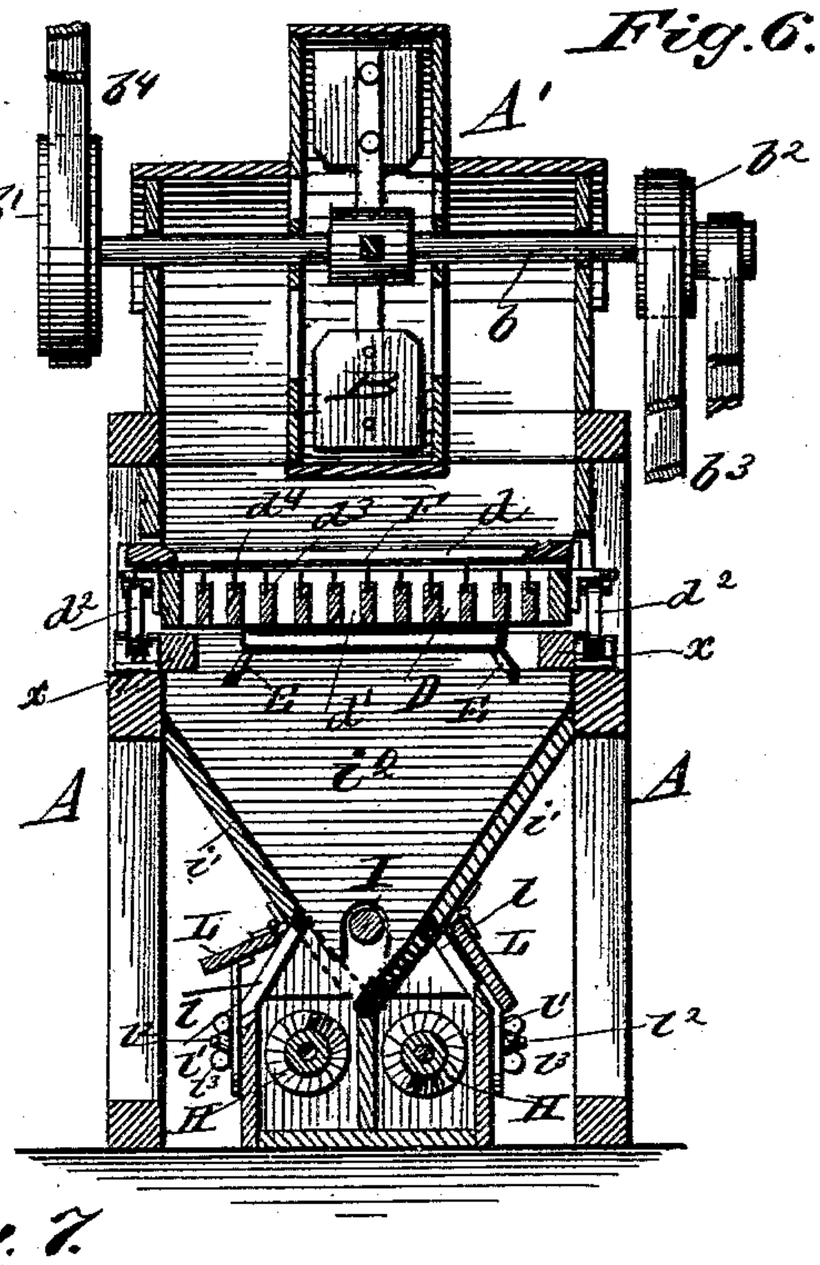


Fig. 7.

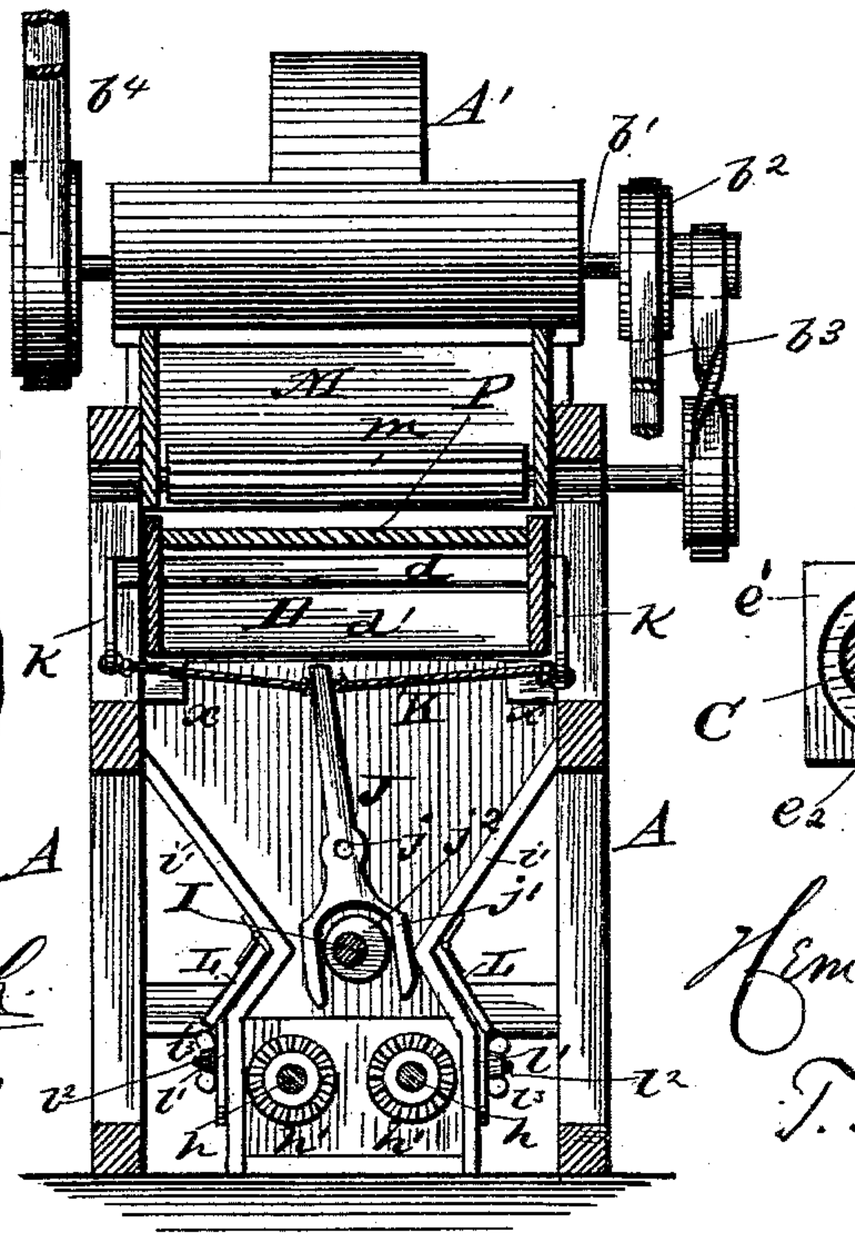


Fig. 10.

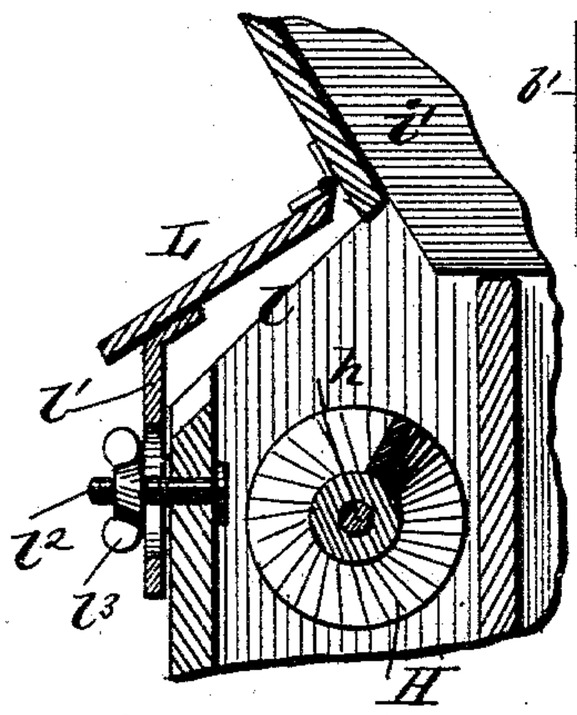
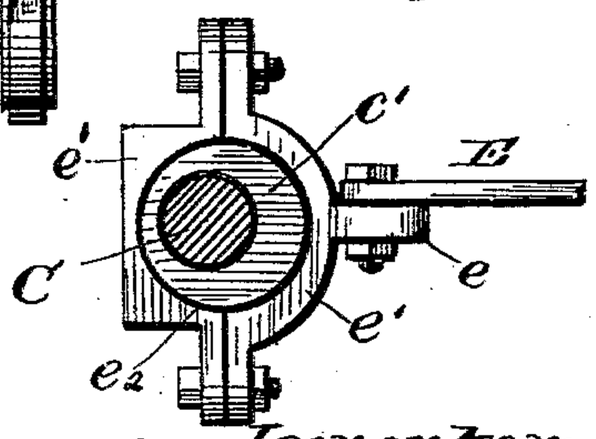


Fig. 11.



Witnesses:

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N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

HEMAN A. BARNARD, OF MOLINE, ILLINOIS, ASSIGNOR TO THE BARNARD & LEAS MANUFACTURING COMPANY, OF SAME PLACE.

MIDDLINGS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 401,242, dated April 9, 1889.

Application filed August 17, 1886. Serial No. 211,124. (No model.)

To all whom it may concern:

Be it known that I, HEMAN A. BARNARD, of Moline, in the county of Rock Island and 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a side elevation of my improved middlings-purifier. Fig. 2 is a top or plan view of the same. Fig. 3 is a vertical longitudinal section of the machine, taken on line *x x*, Fig. 2. Fig. 4 is a horizontal section of the same on line *y y*, Fig. 3, a portion of the screen and upper frame being broken away to show the lower frame. Fig. 5 is an end elevation. Fig. 6 is a transverse vertical section taken on line *z z*, Fig. 3. Fig. 7 is a front end elevation of the machine, partly in section. Fig. 8 is an enlarged detail section showing the construction of the feed devices. Fig. 9 is an enlarged detail section showing the construction of the screen-shoe. Fig. 10 is an enlarged detail section showing the construction of the doors of the conveyer-casing. Fig. 11 is an enlarged detail view showing the construction of the heads *e*, the eccentric-disks, eccentric-straps, and connecting-rod, by which the screen-shoe is reciprocated.

This invention relates to improvements in middlings-purifiers, pertaining especially to the construction of the screen-frame, the mechanism for actuating the same, and the means for producing the blast through the screen or bolting-cloth; and it consists in the construction and novel combination and arrangement of parts hereinafter described, illustrated in the drawings, and pointed out in the claims hereto appended.

Referring to the accompanying drawings, A designates the rectangular frame or housing of the machine. The said housing has its top inclined upward from its ends to its central horizontal portion, from which rises the fan or blower casing A′, having a proper outlet-flue, *a*, as shown.

b is the fan-shaft, journaled in proper bearings situated in the sides of the housing, at the central vertical line of the same, and carrying the fan B within the casing A′.

b′ is a pulley on one of the ends of the shaft *b*, extended outside of the housing and rotated by a belt, b^4, running from a pulley on any suitable motor. A pulley, b^2, on the other extended end of the fan-shaft serves, by means of a belt, b^3, to rotate the pulley C′ on the shaft C, which reciprocates the screen-frame. The said shaft is journaled in brackets *c c*, secured to the front or receiving end of the housing, and has upon it the two eccentric-disks *c′ c′*, equally distant from the sides of the housing.

D is the screen-shoe, composed of the upper and lower frames, *d d′*, respectively. The lower frame, *d′*, is rectangular, and its rear end extends through a transverse opening in the rear end of the housing, as shown. The side rails of said frame are supported upon the bars *x x*, extending longitudinally from end to end within the housing by the sets of links d^2 d^2, and two or more in number on each side. The lower ends of said straps are attached to plates secured to the said bars and their upper ends secured to plates on the outer surfaces of the said side rails.

The frame *d′* is provided with the parallel equidistant bars d^3 d^3, which run longitudinally between its side rails and have their sides vertical and are immovably or rigidly secured to said frame. d^4 d^4 are longitudinal metallic strips set in grooves in the upper edges of the bars d^3 and rise to a level with the top of the side rails of the frame *d′*. The said side rails are about a quarter of an inch higher than the bars d^3.

E E are pitman-rods having their inner ends bolted or otherwise secured about centrally to the lower edges of the side rails of the frame *d′* and their outer ends bolted to the heads *e e*, outside of the housing, through proper openings in which the rods pass. The said heads are each composed of two parts, *e′ e′*, bolted together, as shown, and forming between their meeting edges the circular opening e^2, in which one of the eccentric-disks *c′* fits and turns, so that the rotation of the shaft C reciprocates, by means of the pitman-rods

E, the shaker-frame d'. The upper frame, d, of the screen-shoe is also rectangular, but is wider and somewhat shorter than the frame d', so that it does not extend to the rear end of the latter.

F is the screen or bolt cloth covering the lower side of the frame d and resting upon the strips d^4 and the side rails of the frame d'. The frame d is held in place, so as to reciprocate with the frame d', by means of its end rails, which rest, respectively, against the chute f, rising from the front rail of the lower frame, and the transverse bar f', secured to the lower sides of the rails of the frame d at its rear end. The bar f' fits into notches in the upper edges of the side rails of the frame d', so that there can be free discharge over the rear end or tail of the screen. Thus the upper frame will not jar or bump against the lower frame. The side rails of the upper frame bear such relation in the arrangement to the strips d^4 that the upper frame can move laterally over the lower frame without catching on said strips.

G is a transverse counter-shaft journaled in brackets on the front of the housing A, near its lower end, and having a pulley, g, on the end extended outside of the housing, which pulley is rotated by a belt, g', from a pulley, g^2, on the corresponding extended end of the shaft C, opposite that carrying the pulley C'. g^3 g^3 are similar but oppositely-beveled gear-wheels on the shaft G, meshing with the bevel gear-wheels h' h' on the outwardly-extended ends of the shafts h h of the two oppositely-rotating conveyers H H, extending longitudinally from end to end of the housing.

g^4 is a worm situated centrally on the shaft G and meshing with a worm-wheel, i, on the outwardly-extended end of a longitudinal shaft, I, journaled in the ends of the housing opposite the lower ends of the downwardly-converging cant-boards i', which convey the screened material to the conveyers and have between them, at suitable distances apart, the transverse partitions i^2, which aid in directing the suction of the fan up to the screen and form compartments between the cant-boards. The said conveyers are provided with the ordinary cut-offs, as shown in Fig. 6 of the drawings.

J J are levers pivoted at j j upon the outer surfaces of the front and rear ends of the housing. The lower arms, j' j', of said levers are widened and bifurcated, and each embraces an eccentric, j^2, on the shaft I, so that the rotation of the same vibrates the levers. The ends of the upper arms of the levers have secured to them the inner ends of the cords K, of leather or any suitable material that will not stretch, the outer ends of which are secured to the lower ends of the strips k k, secured to and depending from the outer surfaces of the side rails of the frame d at its ends. By means of said cords the upper frame, d, is moved laterally over the lower frame, d', by the vibrations of the levers J, and this motion causes the upper edges of the strips d^4 to continuously clean the bolt-cloth when the machine is in operation.

L L are doors or valves hinged to the sides of the housing or cant-boards and adapted to close longitudinal side openings, l l, therein above the conveyer-casings. These doors are each held more or less open by means of a small vertical slotted slide-rod, l', through the slot in which passes a rod, l^2, having its inner end secured to the side of the conveyer-casing of the machine and its outer end threaded to engage a thumb-nut, l^3, by means of which and the slide-rod the door may be held more or less open. Thus each door is separately adjustable, so as to regulate and direct the blast produced by the fan through the screen or bolt-cloth.

M is the hopper secured to the front end of the housing near its top, and m is a grooved feed-roller journaled in bearings in the side of the same.

N is a shaft journaled in the sides of the hopper above and outward from the feed-roller and having extending from one end outside of the hopper the arm n, bearing the pendent-weight n', which may be fixed in any suitable position on the rod by the set-screw n^2.

O O' are feed-boards secured to their castings o o, which slip on the rod and are bound by the set-screws o' o'. The said valves extend the whole length of the hopper and the outer valve, O', has its lower edge pressed up against the feed-roll by the action of the pendent weight and rod, and the inner valve, O, is pressed outward by the weight of the middlings fed into the hopper, which also presses the outer valve outward. The material runs over the narrow chute-board p, which inclines downward from the roll to the main frame, and is fed outward by the roll below the edge of the valve O', which causes it to feed evenly the whole length of the roll. The pendent weight and the material thus act against each other or in opposite directions in regulating the feed.

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

1. In a middlings-purifier, a reciprocating screen-shoe composed of a lower half connected with the mechanism for longitudinally vibrating the shoe and an upper half mounted upon, supported by, and moving with the lower half, in combination with mechanism, substantially as described, for imparting a transverse motion to the upper half independent of its longitudinal reciprocation by and with the lower half, the two halves being inseparably connected, substantially in the manner and for the purpose specified.

2. In a middlings-purifier, a reciprocating screen-shoe composed of a lower half connected with the mechanism for longitudinally vibrating the shoe, having slots or bars extending from end to end and immovably se-

cured therein, and an upper half carrying a sieve and mounted upon, supported by, and moving longitudinally with the lower half, in combination with mechanism for imparting an independent transverse motion to said upper half, all substantially as and for the purpose specified.

3. In a middlings-purifier, the combination of a screen-shoe, D, composed of two frames, *d d'*, the upper frame, *d*, having a screen secured to its bottom and supported upon and moving with the lower frame, *d'*, and the lower frame having longitudinal strips rigidly secured therein and sustaining the screen on the upper frame, with mechanism for imparting a longitudinal movement to the shoe, and mechanism for imparting a transverse movement to frame *d* independent of its movement with frame *d'*, all substantially as and for the purpose described.

4. The combination of the rectangular lower frame, *d'*, having the bars d^3, carrying cleaning-strips d^4, standing upward from said bars, the chute *f*, rising from its head or front end rail, and the transverse bar *f'*, with the reciprocating upper frame, *d*, shorter and wider than the lower frame, having the bolting-cloth stretched over its lower side and resting between the said chute and bar *f'*, the links d^2, supporting-frame *d'* upon the main frame, the pitman-rods E, heads *e*, shaft C, and fan-shaft by which it is rotated, and the eccentric-disks *c'* on said shaft for reciprocating the rods E and frames *d' d* longitudinally, and mechanism for reciprocating frame *d* laterally, all substantially as specified.

5. The combination of the frames *d d'*, the mechanism to longitudinally riciprocate the two frames simultaneously, with the countershaft, shaft C, and belt by which it is rotated, and a worm, g^4, on said shaft, the longitudinal shaft I, the worm-wheel *i*, and eccentrics j^2 thereon, the pivoted levers J, having the lower bifurcated arms, *j*, embracing said eccentrics, cords K, and strips *k*, all constructed substantially as and for the purpose described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HEMAN A. BARNARD.

Witnesses:
W. R. MOORE,
J. L. MYTTHEW.