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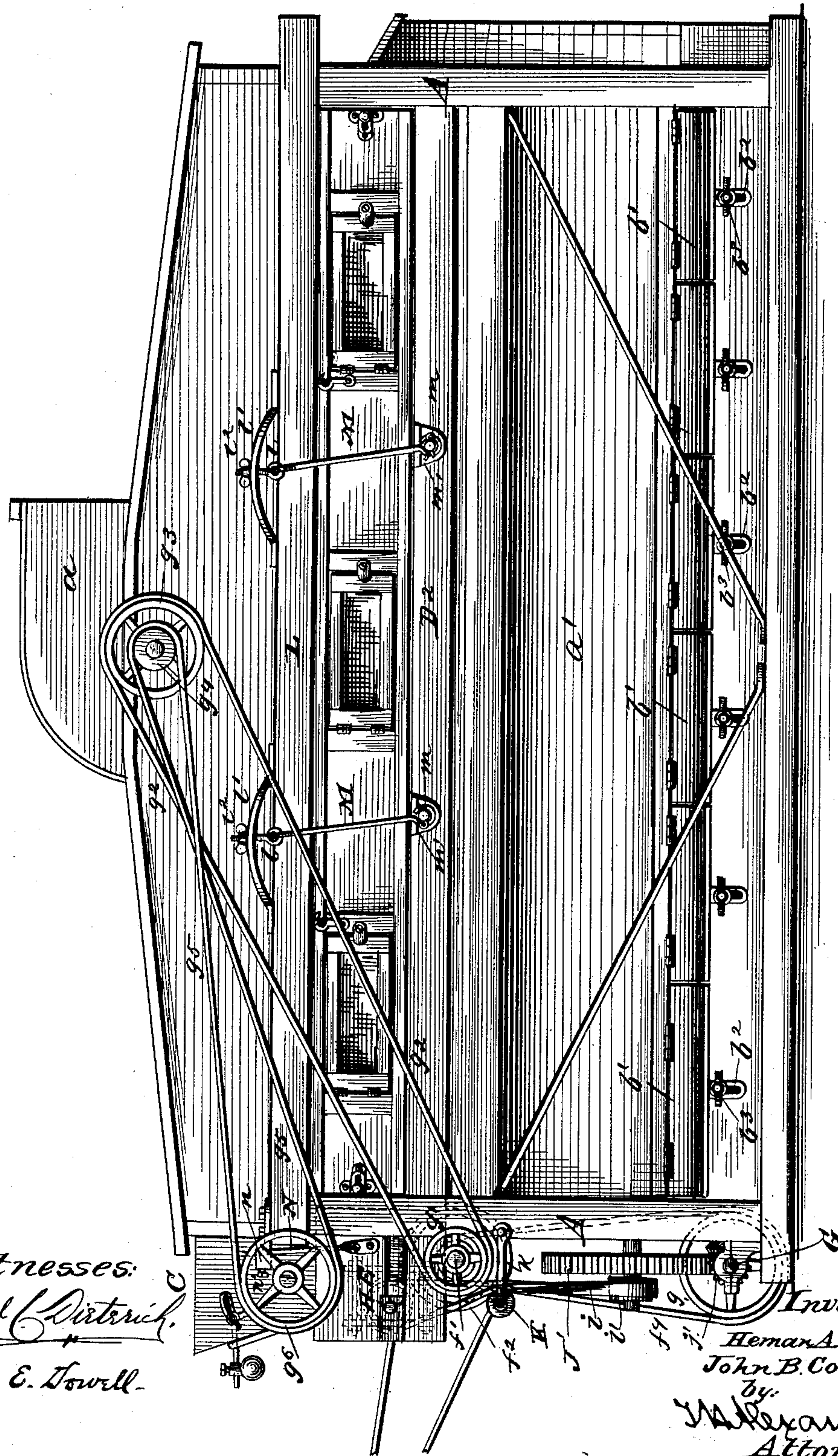
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H. A. BARNARD & J. B. CORNWALL.
MIDDLINGS PURIFIER.

No. 374,388.

Patented Dec. 6, 1887.

Fig. 1.



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Inventors:
Heman A. Barnard
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(No Model.)

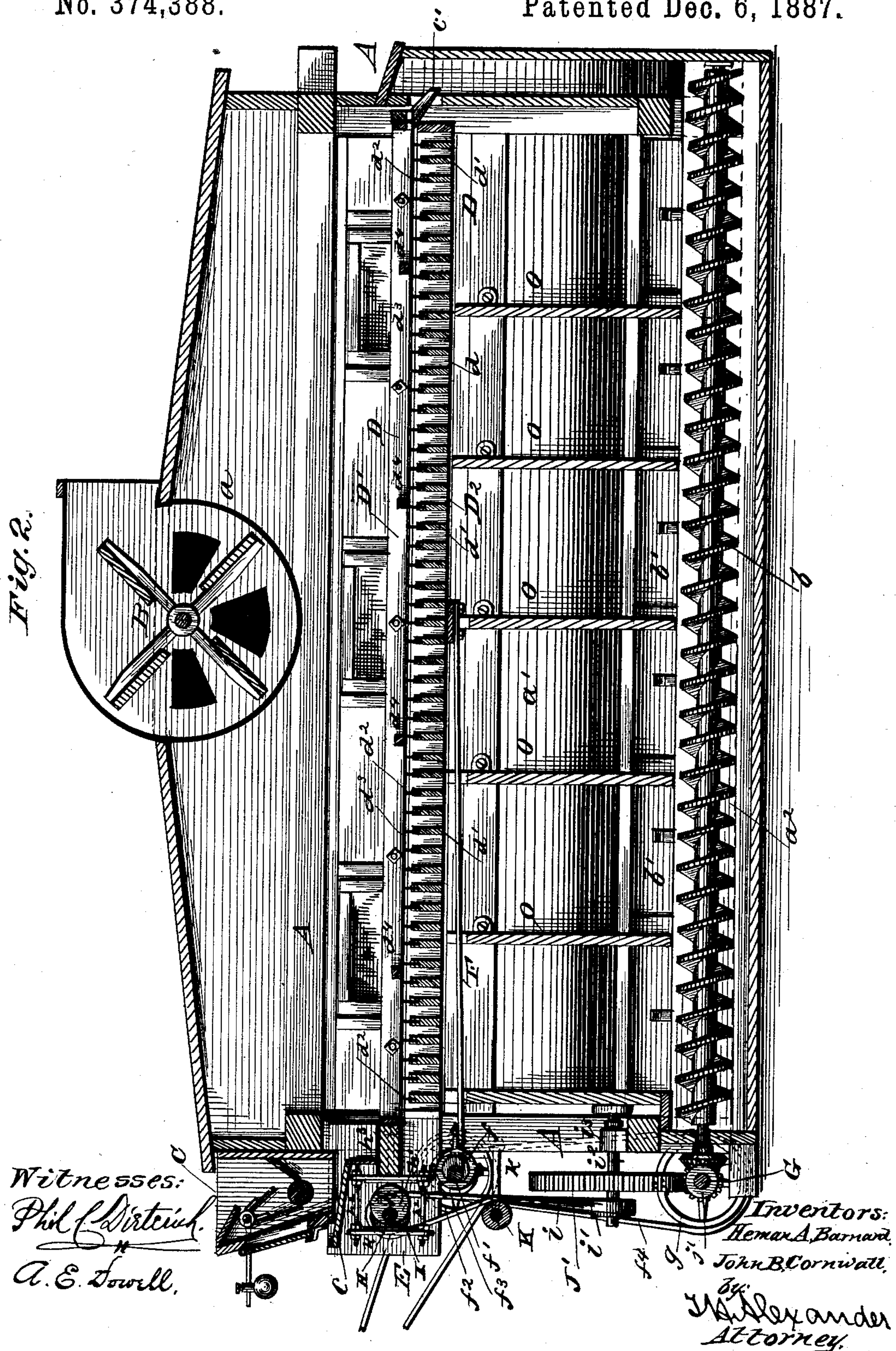
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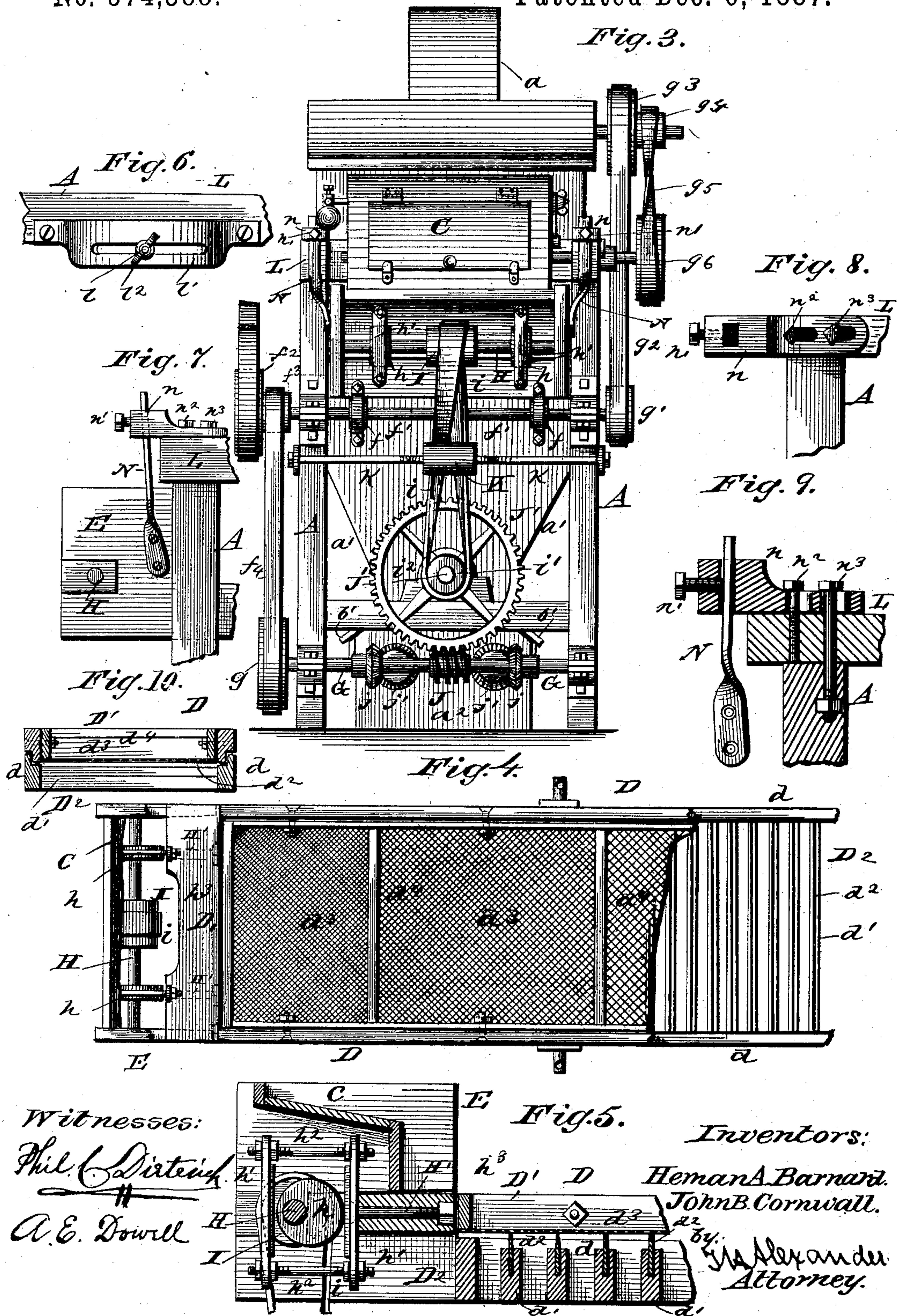
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3 Sheets—Sheet 3.

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Patented Dec. 6, 1887.



Witnesses:

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Fig. 5.

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UNITED STATES PATENT OFFICE.

HEMAN A. BARNARD AND JOHN B. CORNWALL, OF MOLINE, ILLINOIS, ASSIGNORS TO THE BARNARD & LEAS MANUFACTURING COMPANY, OF SAME PLACE.

MIDDLINGS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 374,388, dated December 6, 1887.

Application filed September 16, 1886. Serial No. 213,692. (No model.)

To all whom it may concern:

Be it known that we, HEMAN A. BARNARD and JOHN B. CORNWALL, of the town of Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Middlings-Purifiers; and we 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 an improved middlings-purifier embodying our invention. Fig. 2 is a central vertical longitudinal section of the same. Fig. 3 is a front end elevation. Fig. 4 is a detail broken plan view of the screen-shoe, showing the upper and lower frames. Fig. 5 is an enlarged sectional detail of one end of the same. Figs. 6, 7, 8, and 9 represent broken detail views of the straps and their adjusting devices. Fig. 10 is a transverse section of the upper and lower screen-frames.

This invention relates to improvements in middlings purifiers, and pertains more especially to the construction, arrangement, and operation of the parts of the screen-shoe, which consists of an upper and lower shaker-frame, our main object being to give the upper frame, to the bottom of which the screen is attached, and which has a rapid longitudinal vibration simultaneously with the lower frame, an additional and independent slow longitudinal vibration, which will move said upper frame upon the lower one, and will thereby cause the hereinafter-described transverse strips of the lower frame to continuously clean the screen or sieve.

The construction, combination, and arrangement of the parts in which the invention consists are hereinafter described, and pointed out in the claims hereto appended.

Referring to the accompanying drawings, A designates the frame or housing of the machine, including fan-casing a , secured centrally to the top thereof, the downwardly and inwardly inclined cant-boards a' , which form the sides of the housing, and the conveyer-casing a^2 , as shown.

B is the fan, situated above the screen and causing an air-draft upward through the same.

b b are the two conveyers below the cant-boards, and b' b' are the adjustable doors by which the draft upward is regulated, the doors being adjusted by the slotted rods b^2 and set-screws b^3 .

C is the hopper, with its automatically-adjusting feed-boards and the roller.

c is the chute for feeding the screen, and c' the discharge-chute therefrom.

D is the screen-shoe, composed of the upper and lower frames, D' D^2 , respectively. The latter is composed of the side rails, d , the transverse equidistant rails d' , about two inches apart, and suitable end rails, as shown. The transverse rails have set into their upper edges the metal strips d^2 , upon which the screens d^3 , secured across the bottom of the upper frame, D' , rest, and are moved by mechanism hereinafter described. The side rails of the lower frame are rabbeted on the inside to receive and support the correspondingly-rabbeted side rails of the upper frame, as shown in Fig. 10, or the latter are formed in any well-known manner to support the former. The upper frame, D' , is divided into compartments or spaces by the transverse rails d^4 , which do not rise to the upper edges of the frames, so as to permit the middlings to pass over them, and screens of different fineness are secured in the bottom thereof, the meshes increasing in coarseness from front to rear. The lower frame, D^2 , has secured to its front end, outside of the housing, a boxing or frame, E, which contains the chute c . In the sides of the boxing or frame is journaled a shaft, H, hereinafter more fully described. The lower frame, D^2 , is actuated by the rods F, the inner ends of which are secured at proper points to the lower edges of the side rails, d , and their outer ends are bolted to the rings of the eccentrics f f on the shaft f' , which has bearings on the front legs of the housing or main frame and upon its outwardly-extending end a pulley, f^2 , driven by a belt from a proper motor. f^3 is a small pulley on the same end of the shaft f' , and drives, by a belt, f^4 , a larger pulley, g , on the extended end of a transverse

shaft, G, which has bearings on the front legs of the main frame and actuates the conveyers, as is hereinafter more fully referred to.

g' is a pulley on the extended end of the shaft f' , opposite the pulley f^2 , and g^2 is a belt running from the same to pulley g^3 on the extended end of the fan-shaft. g^4 is a small pulley on the same end of the fan-shaft, which drives, by belt g^5 , a pulley, g^6 , on the shaft of the feed-roller in the hopper C.

The means by which the upper frame, D', of the screen-shoe is independently actuated is as follows:

H is a shaft having its ends journaled in the sides of the boxing or frame E, forming the front part of the frame D², and having upon it the two eccentric disks, h h , which rotate within the rectangular frames h' , secured by long bolts h^2 and proper nuts, which bolts pass through a transverse block, h^3 , forming part of the frame D', as shown. The frames h' are lined with leather at their points of contact with the disks.

I is a pulley on the shaft H between the eccentrics, and i is a belt running therefrom to a pulley, i' , on a short horizontal shaft, i^2 , having a bearing, i^3 , on the lower part of the front of the main frame, as shown in Fig. 2. The said shaft i^2 carries a large worm-wheel, J', which meshes with the worm J on the shaft G, between the bevel gear-wheels j j thereon, which mesh with the similar gears, j' j' , on the extended front ends of the conveyer-shafts. The relative sizes of the pulleys and gear-wheels are such that while the lower frame, D², and the upper frame, D', connected therewith, have a very rapid longitudinal vibration, the upper frame has a very slow, independent, longitudinal vibration, moving about two inches, or the distance between the metallic strips secured to the transverse rails of the lower frame. The said metallic strips thus clean continuously every portion of the screens. The belt i makes a greater turn in descending to the pulley i' , and then, when ascending, runs against an idler-pulley, K, which turns loosely on the bent rod k , which has its arms secured to the front legs of the machine. The said idler-pulley keeps the belt i sufficiently taut.

The screen-shoe is suspended from the longitudinal beams LL by the metallic straps M N, the former of which have their lower ends looped or hooked, so as to pass over pins m , standing out from brackets m' , secured to the outer surfaces of the side rails of the frame D², and their upper ends are similarly looped or hooked to engage the looped or hooked lower ends of the eyebolts l , which pass through longitudinal slots in the curved bars l' , having their ends, Fig. 6, bolted to the upper surfaces of the beams L.

l^2 l^2 are thumb-nuts that engage said bolts above the slots, and by means of which the screen-shoe can be adjusted vertically.

The straps N have their lower ends secured to the outer surfaces of the sides of the boxing or frame E, and their upper ends are passed

through vertical openings in the blocks n , secured to and projecting outward from the front ends of the beams L. The straps N are vertically-adjustable and secured by the set-screws n' when it is necessary to raise or lower the front end of the screen-shoe. The blocks n are also longitudinally adjustable and secured by the bolts n^2 n^3 , which pass through slots in the block n , the former through the beams L, and the latter extend through said beams and into the legs of the machine below and have embedded nuts engaging their ends. By loosening the bolts the blocks can be slipped outward or inward, and then again fixed by the bolts, as shown in Fig. 9.

The adjustable doors are situated on each side of the housing, where the cant-boards meet the conveyer-casing, and there is one on each side between the vertical equidistant partitions O, so that the blast can be directed and increased or diminished up through any or all of the compartments formed by said partitions between the cant-boards.

In operation the lower frame, carrying the clearing-strips, has a longitudinal movement imparted to it by the eccentrics f , and the upper or screen frame has a somewhat more rapid and more extended movement, equal to the sum of the movements imparted by the eccentrics f and h . In other words, the upper screen-frame has a slightly more extended and more rapid movement than the clearing-frame.

The arrangement of the fan above the screens, the adjustable doors below the same, the hopper with self-adjusting feed, the arrangement of the two conveyers, and the mechanism for actuating said conveyers are all shown in a pending application of Heman A. Barnard, filed August 17, 1886, Serial No. 211,124, and are therefore not claimed in the present application. The screen-shoe in the said application, Serial No. 211,124, is also made of two frames, the lower of which has longitudinal strips; but the movements of said frames are different.

Having described our invention, we claim—

1. In a middlings-purifier, the combination, with a reciprocating frame carrying cleaning-strips, of a sieve and mechanism for reciprocating it, supported on the reciprocating frame, all substantially as and for the purpose described.

2. In a middlings-purifier, a reciprocating screen-shoe composed of a lower half connected with the operating mechanism of 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 an additional but slower reciprocation to the upper half, independent of its reciprocation by the lower half, substantially as and for the purpose specified.

3. In a middlings-purifier, the combination, with the reciprocating scraper-bearing frame, forming the lower half of the screen-shoe, of the screen-bearing frame forming the upper

half of the screen-shoe and supported by and moving with the lower frame, and mechanism, substantially as described, mounted upon the lower frame and adapted to impart additional reciprocation to the upper frame independently of the lower frame, as and for the purpose specified.

4. In a middlings-purifier, the combination of the reciprocating lower frame having transverse rails provided with the cleaning-strips for the sieve and carrying a shaft and eccentric disk in its front end, with the screen-frame mounted upon the lower frame and provided with a rectangular frame engaging the disk on the lower frame and adapted to be additionally vibrated thereby, all substantially as and for the purpose described.

5. The combination, with the lower reciprocating frame having transverse rails pro-

vided with cleaning-strips in their upper edges, and having a shaft, H, journaled in its outer end and carrying the eccentric disks *h*, of the upper screen-frame mounted upon and moving with the lower frame and having the rectangular frames *h'* on its front end engaging the disks *h* of the shaft H, and the pulleys I *i'*, belt *i*, shaft *i''*, worm-wheel J, and worm J' and its actuating mechanism, all constructed and arranged to operate substantially as and for the purpose specified.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

HEMAN A. BARNARD.
JOHN B. CORNWALL.

Witnesses:

J. S. GILLMORE,
W. H. HILLHOUSE.