

(No Model.)

2 Sheets—Sheet 1.

N. WEBER & G. H. RECTOR.
Middlings Purifier.

No. 237,348.

Patented Feb. 1, 1881.

Fig. 2.

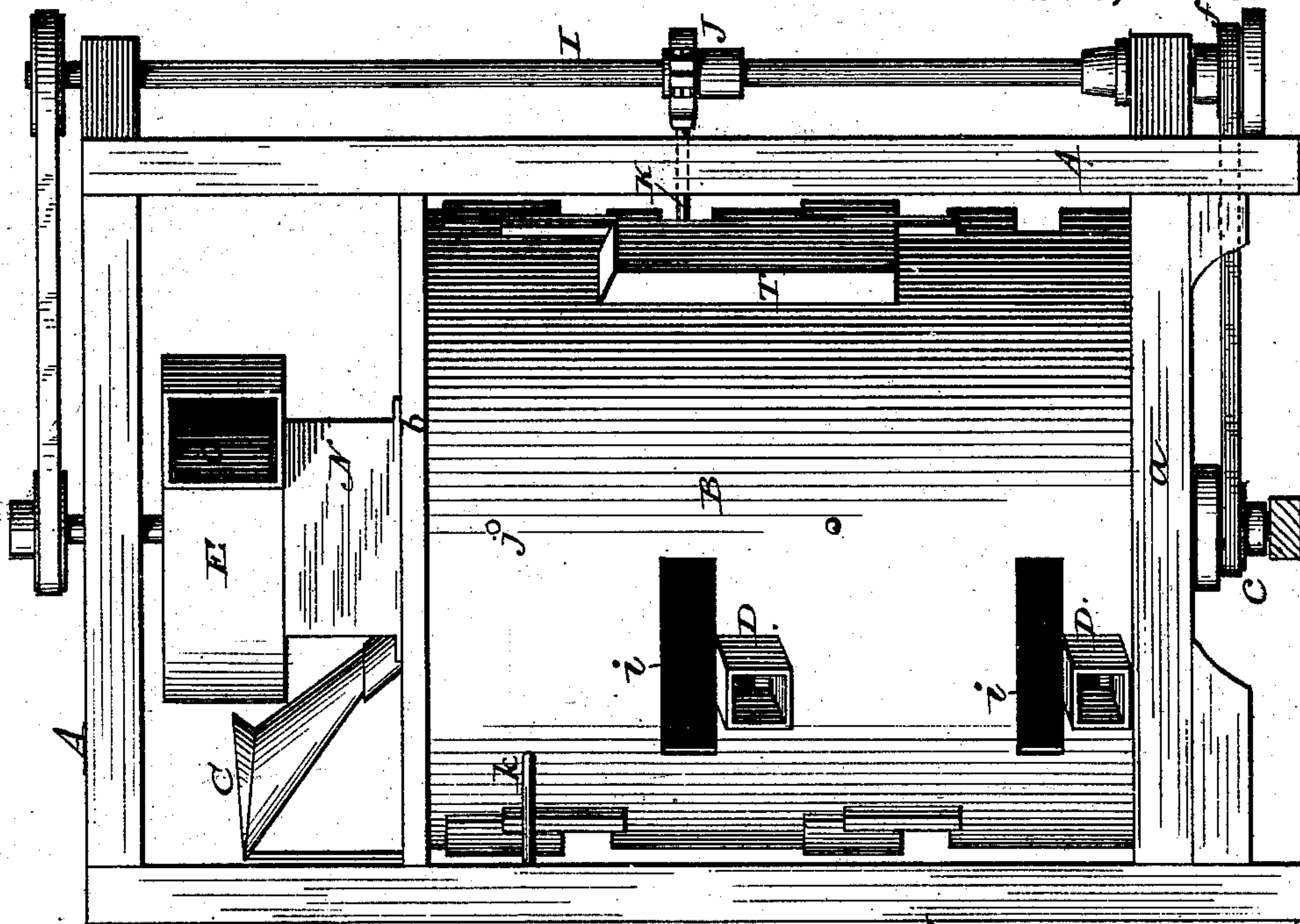
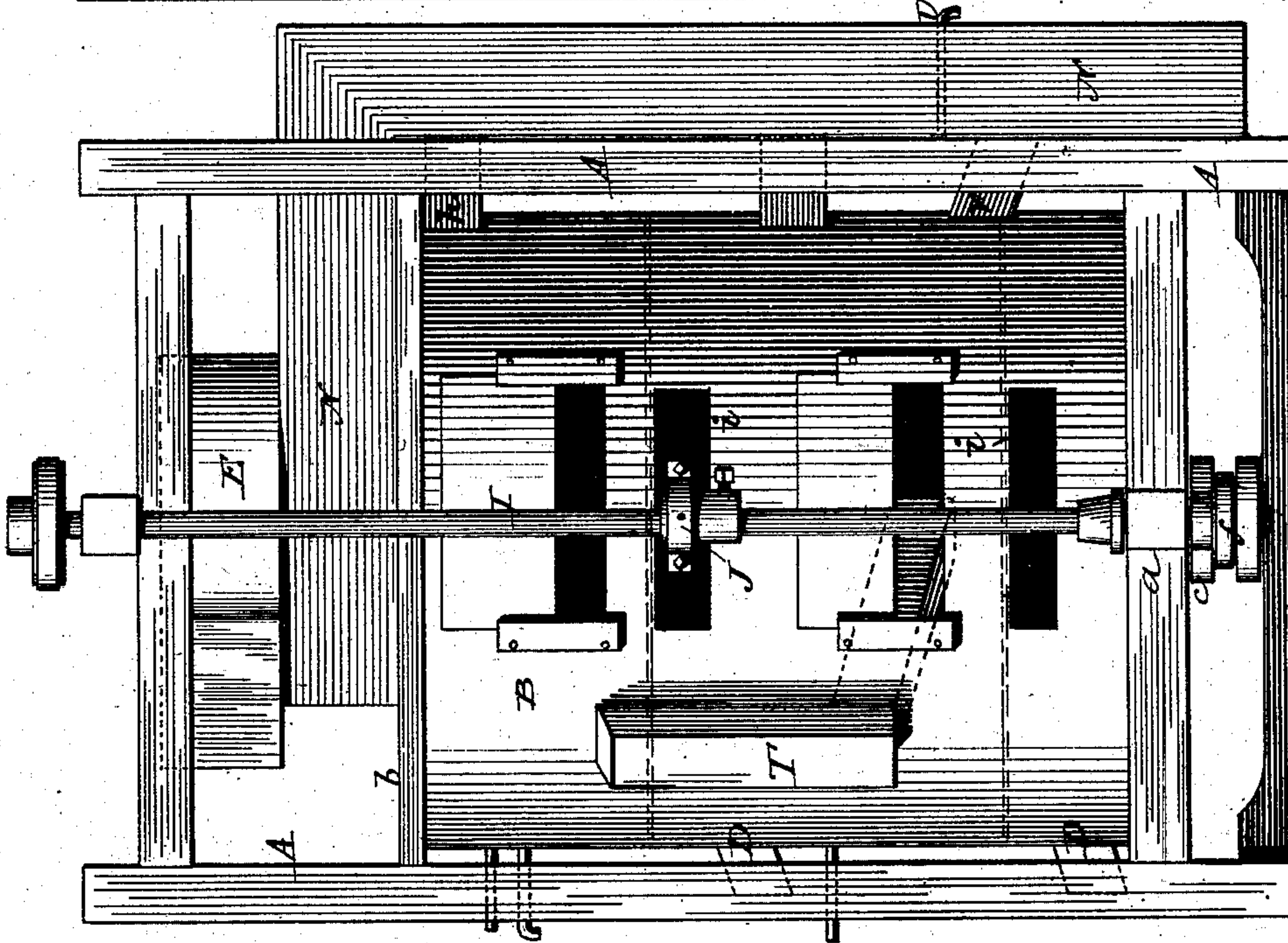


Fig. 1



Attest.

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Fig. 4.

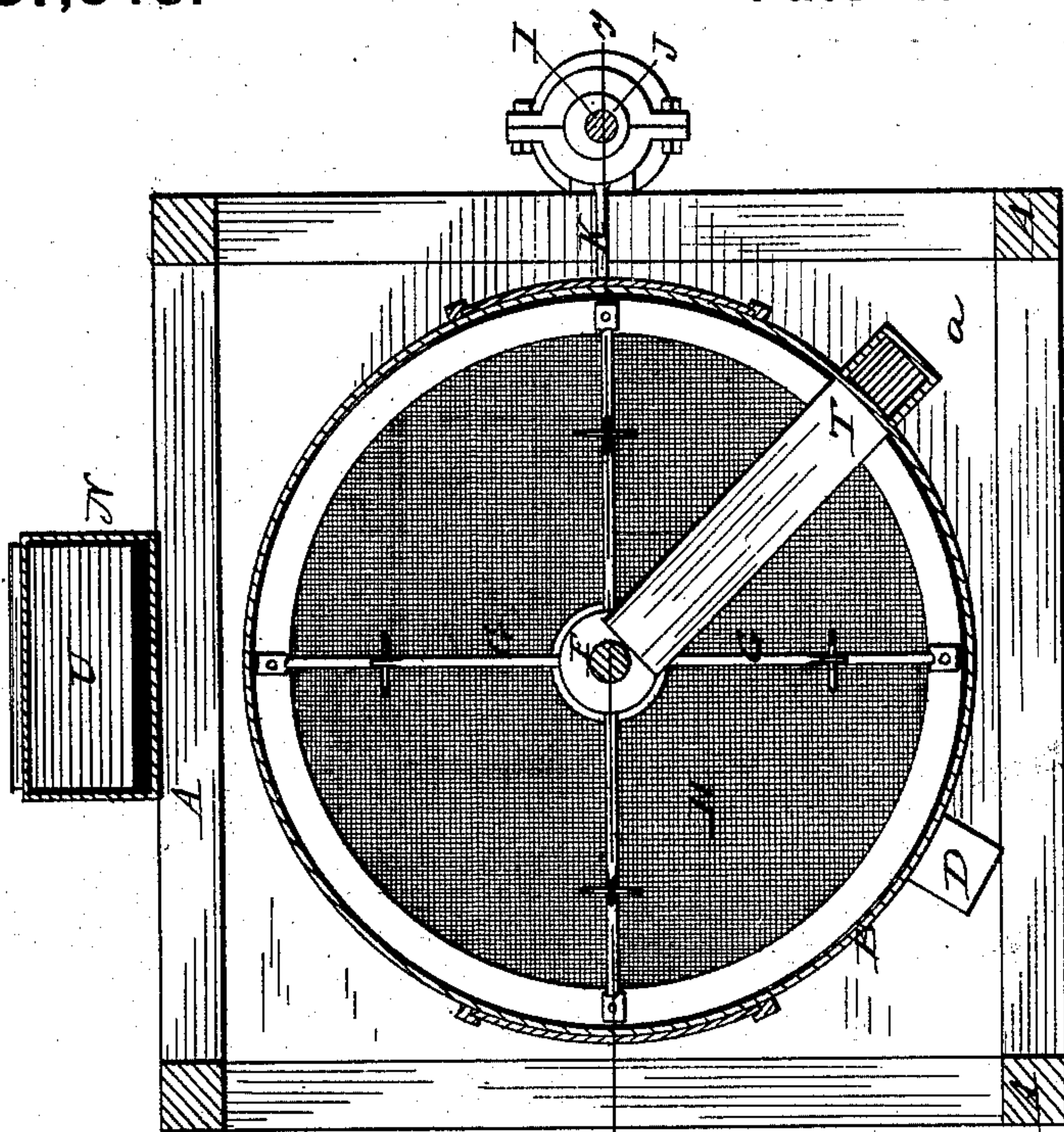
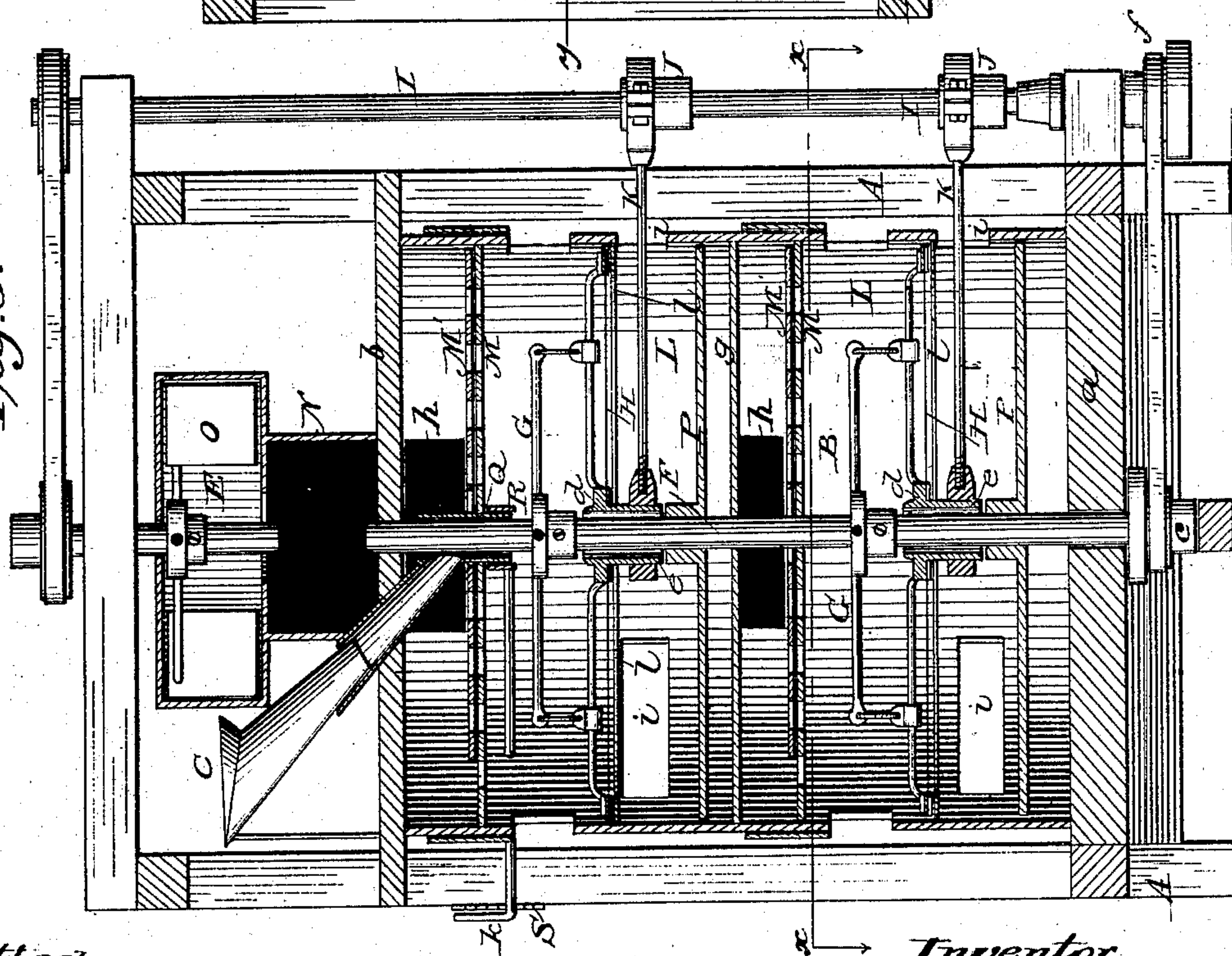


Fig. 5.



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UNITED STATES PATENT OFFICE.

NICOLAS WEBER AND GEORGE H. RECTOR, OF LA PORTE, INDIANA.

MIDDLINGS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 237,348, dated February 1, 1881.

Application filed May 18, 1880. (No model.)

To all whom it may concern:

Be it known that we, NICOLAS WEBER and GEORGE H. RECTOR, of La Porte, in the county of La Porte and State of Indiana, have
5 invented certain Improvements in Middlings-Purifiers, of which the following is a specification.

Our invention relates to that class of middlings-purifiers in which a series of horizontal
10 screens are attached to and rotate about a vertical shaft within a casing communicating with a fan-chest; and the improvements consist in imparting to said screens a vibratory motion simultaneous with their rotation; in a peculiar
15 construction and arrangement of mechanism for producing such motion and in the general construction and arrangement of parts hereinafter set forth.

In the accompanying drawings, Figure 1
20 represents a face elevation of our improved machine; Fig. 2, a side elevation of the same; Fig. 3, a vertical central section on the line *y y* of Fig. 4; and Fig. 4, a horizontal section on the line *x x* of Fig. 3, looking downward.

25 The primary object of our invention is to more perfectly separate the fibrous particles, dust, and impurities from middlings, and in doing so to render the action of the machine more rapid and uniform. To this end it is necessary that the rate of feed, the draft through
30 the respective sieves or screens, and the speed of their rotation shall be under complete control; and it is further necessary that the middlings be subjected to a sifting or shaking action, in order to loosen the pure middlings and
35 permit the separation thereof from the other matters mixed therewith. To accomplish this object we construct our improved machine in the following manner, more clearly understood
40 by referring to the drawings.

First, we construct a rectangular or other shaped frame, A, of wood or other suitable material, and place within said frame a cylindrical or annular casing, B, preferably of sheet
45 metal, the frame A being furnished with a base or bottom platform, *a*, upon which the cylinder rests, and an upper platform, *b*, which serves both as a top for the cylinder and a support or bed for the feed-hopper, air-spout, and fan-case, respectively lettered C, N, and
50 E. Within the cylinder B, and extending

through the platforms *a b*, is a vertical central shaft, F, turning at its lower extremity upon a point or center, as shown in Figs. 2 and 3, and furnished just below the platform *a* with a
55 speed or cone pulley, *c*.

G G represent spider-frames, each composed of a central hub or boss secured to the shaft and furnished with a series of radial arms, from which to suspend the sieves or screens H
60 H. The sieves or screens H consist each of bolting-cloth stretched in an annular frame or rim, which latter is supported and sustained by radial arms extending outward from a central boss, *d*, as clearly shown in Fig. 3. The
65 boss or hub *d* of each screen or sieve is formed or provided with a neck, *e*, the purpose of which will be presently explained.

At one side of the machine and carried in suitable bearings is a vertical shaft, I, provided at its lower end with a speed or cone
70 pulley, *f*, from which a belt passes to and around the pulley *c* of shaft F, to transmit motion from one to the other. Upon this shaft I are secured, at elevations corresponding with
75 the positions of the screens, eccentrics J, which, through the medium of pitmen or rods K, having straps or bands on their opposite ends to encircle, respectively, the eccentrics J and the
80 necks *e* of the screen-hubs *d*, impart to the screens a vibrating motion, the necks or collars *e* being, however, free to turn in the encircling-bands, and thus permit the simultaneous rotation and vibration of the screens. Each screen H is mounted in an independent
85 air-chamber, L, formed by the sides of the casing B, a diaphragm, *g*, below the screen, and a slatted diaphragm, M, above the screen, as shown in Fig. 3, and each of said chambers L communicates, by a suitable passage or
90 spout, *h*, with an air-duct or spout, N, which, in turn, communicates with the fan-case E, in which is mounted a suction-fan, O, air being allowed to enter the casing through openings
95 *i*, just below each screen.

In order that the draft of air may be regulated with nicety in each chamber L, a slatted or grated cut-off slide, M', is placed upon each diaphragm M, and furnished with a rod
100 or handle, *j*, extending outward through the casing, by which the size of the openings may be varied at will, or by which said openings

may be entirely closed, the air-spout N communicating with the chambers just above the several slatted diaphragms, as shown in Fig. 3.

Beneath each screen there is secured, upon the shaft F, a smooth horizontal disk, P, upon which falls the material which passes through the screen, the material being thrown outward by centrifugal force to the circumference of the disk and discharged through a spout or chute, D, at one side of the casing. The disks P should be of such size as to travel closely within the casing, in order that the material may not fall over the edge, except at the delivery-point.

The unpurified or stock middlings enter at the top of the machine through a feed-spout or hopper, C, the inner end of which opens into the side of a tube or spout, Q, passing through the upper diaphragm, M, and encircling the shaft F, as shown, leaving, however, an annular space between its interior and the shaft for the passage of the material. In order that the feed may be regulated and controlled, a second tube, R, is arranged to encircle the tube or spout Q, and to slide freely thereon, being raised or lowered, as desired, by means of a rod, K, passing through and rocking in the wall of the casing B, which serves as a fulcrum for the rod, the outer end of the latter being held at any point of adjustment by means of a rack, S, secured to the frame. A spout, T, leads from the upper side of the upper screen to the upper side of the next screen below, in order to subject the material which fails to pass through the first screen or to be drawn off by the air-current to the action of the second screen, the spout T being carried inward to the center of the latter to cause the material to travel over its entire surface, as indicated in Fig. 4, and by dotted lines in Fig. 1. A pulley on the upper end of the shaft I transmits motion to a pulley on the fan-shaft through a belt, as shown.

In the drawings the screens are represented as suspended from the spider-frames G G by means of rings; but chains, cords, springs, or any other flexible suspension devices may be employed. A narrow ledge or flange, l, is placed beneath the outer edge of each screen to prevent escape of material or passage of air, and the same may be provided for the disks P.

The air spout or duct N is furnished just above the lower tailings-spout with a valve or slide, U, by which a stronger or weaker current of air may be admitted at its lower end, and the tailings thus subjected to reseparation.

The operation of the machine is as follows: The stock-middlings, entering at the top of the machine through the hopper and tube Q, fall upon the upper screen, H, which, being rapidly revolved and at the same time reciprocated, thoroughly sifts the middlings, allowing the pure middlings to pass through the screen and fall upon the disk P. In falling from the tube or spout Q the material is acted

upon by the current of air which enters through the sides of the casing, passes upward through the screen and into the fan case or box, and the air further acts upon the material as it travels over the screen, removing all the light fibrous particles, and carrying them through the fan-case to the dust-room. The middlings which pass through the screen are discharged through a spout, D, of which there is one on line with each disk P, by the centrifugal action of the disk. The tailings are discharged at the circumference of the screen into a spout, T, which conducts them to the center of the next lower screen, by which they are again acted upon, the tailings passing out through a spout, V, opening into the air-spout or duct N, near the lower end, and being there subjected to a reseparation by a current of air passing up said duct and controlled by the slide U. The finished middlings falling upon the second disk P, are discharged, as above, through a spout, D, while the light particles are carried into the air-duct, as before. The purified middlings may be conveyed either to stones for regrinding or to a bin, as desired.

The relative speeds of the shafts F and I and of the fan-shaft may be varied by shifting the belt on the pulleys *c f*.

Any desired number of screens may be employed, in which case the necessary attendant parts will of course be employed; but the arrangement will be the same as above.

Openings are formed in the sides of the casing just above each screen, through which to examine the latter, but these openings are furnished with covers or closing slides, and are of course closed when the machine is in operation.

Power may be applied at any suitable point, either to the fan-shaft, the central shaft, F, or the shaft I.

In practice, a brush is placed beneath each screen, extending from the central shaft to the periphery of the screen, and capable of being adjusted vertically in the same manner as the feed-regulator, to cause the screens to be brushed with more or less force or pressure.

It is apparent that other devices will readily suggest themselves to the mechanic familiar with the construction of machines of this class for vibrating the screens, such, for instance, as a crank or series of levers.

We are aware that in a middlings-purifier a series of compartments has been formed by the introduction of impervious endless belts between the several screens; but as in such case the endless belt or apron was employed to deliver the material falling upon it to the head of the next screen below, and as a space of greater or less size was necessarily left for the passage of the middlings, more or less air would necessarily pass from one chamber to another, and consequently interfere with the regulation of the air-current in the respective chambers. In our machine an air-tight diaphragm separates one screen-chamber from the

next, so that the regulation of the air-current in one is unaffected by the current in others. Separate discharging devices being employed, the diaphragm may be made stationary, and in consequence is more readily rendered air-tight.

By the term "horizontal screen," in the foregoing description is meant a screen of disk form, whether perfectly flat or slightly concave or convex, operating in a horizontal position, in contradistinction to a reel or cylinder.

Having thus described our invention, what we claim, is—

1. In a middlings-purifier, a horizontal rotating screen of disk form, and means substantially such as described for imparting a vibratory motion thereto.

2. In a middlings-purifier, the combination of a suspended rotating screen having a cen-

tral hub or boss, an eccentric located at one side of the hub, and a rod or pitman extending from the eccentric to the hub, whereby the rotation of the eccentric produces a vibration of the screen.

3. In a middlings-purifier, the combination of the casing A, communicating with an exhaust-chamber, a series of screens mounted in said casing, traveling discharge-beds located below the screens, and air-tight diaphragms independent of the discharge-beds, located between the respective screens, whereby a separate chamber for each screen is provided.

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Witnesses:

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JOSEF ULRICH.