

No. 697,451.

Patented Apr. 15. 1902.

A. S. CRAIK.
MIDDLINGS PURIFIER.

(Application filed May 5, 1899.)

(No Model.)

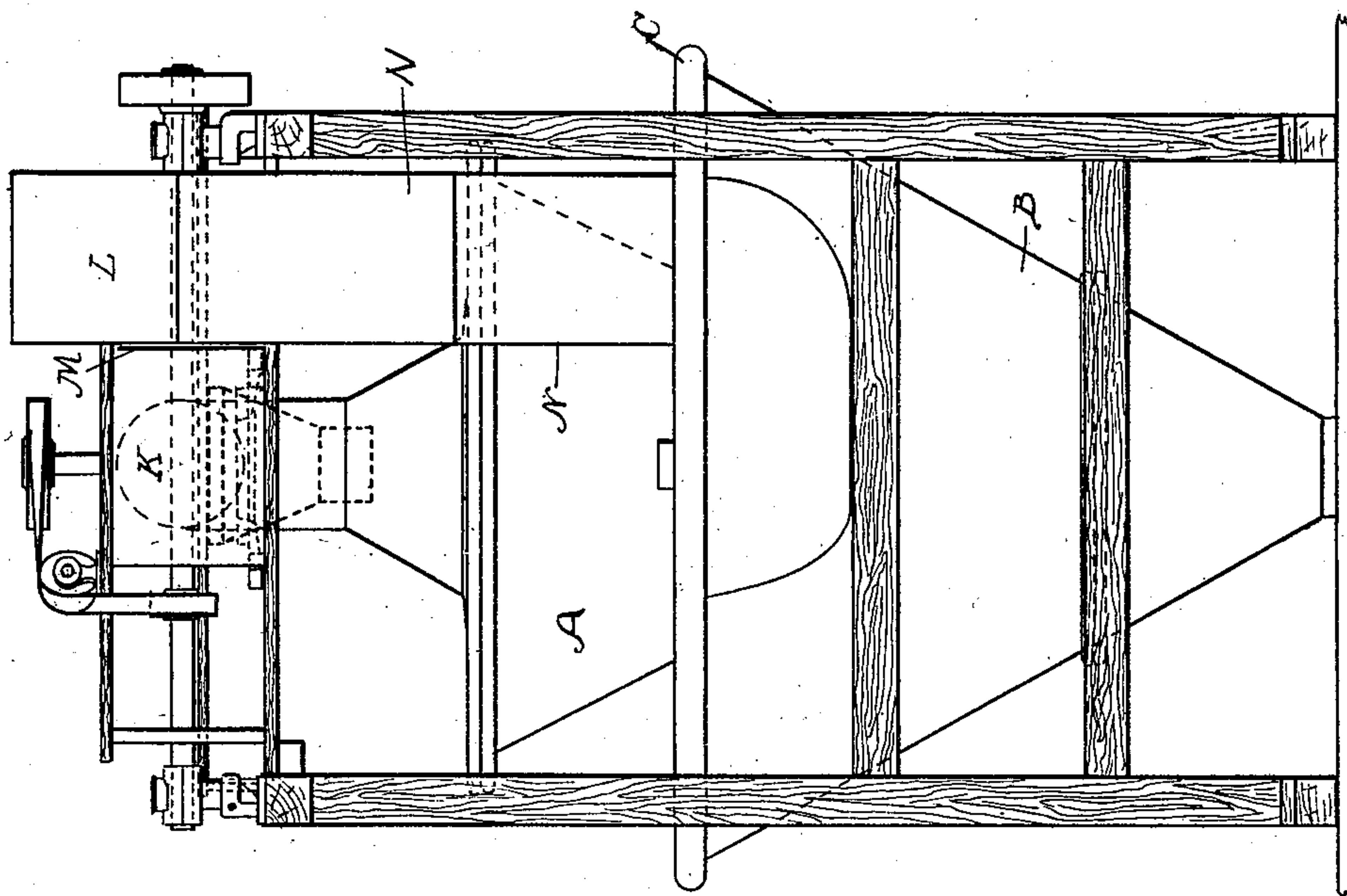


Fig. 1.

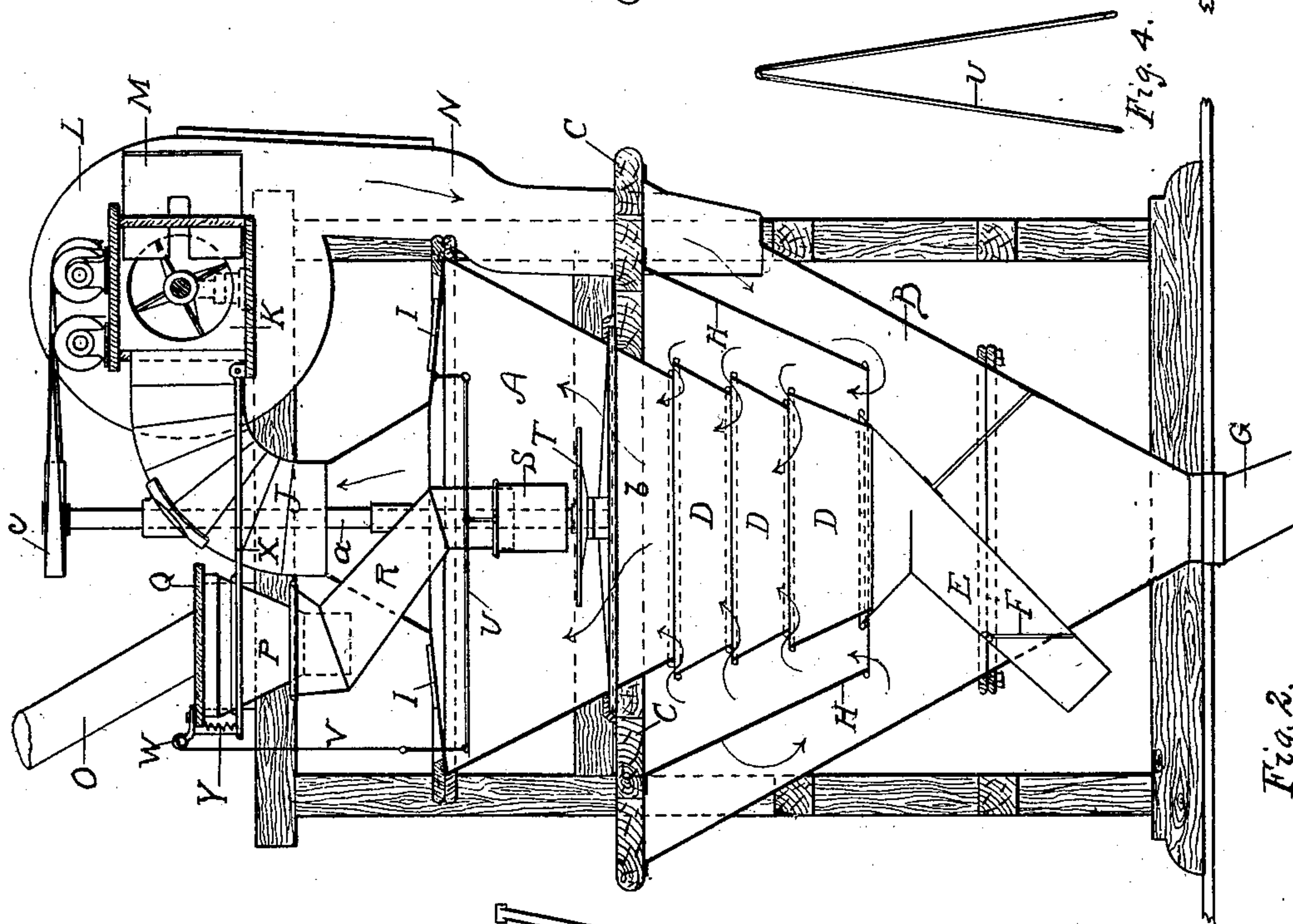


Fig. 2.

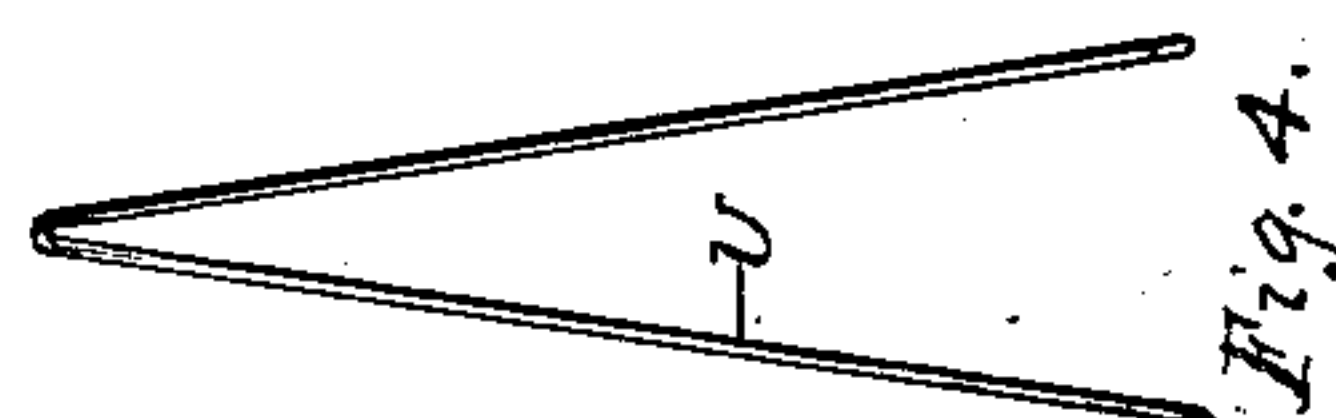
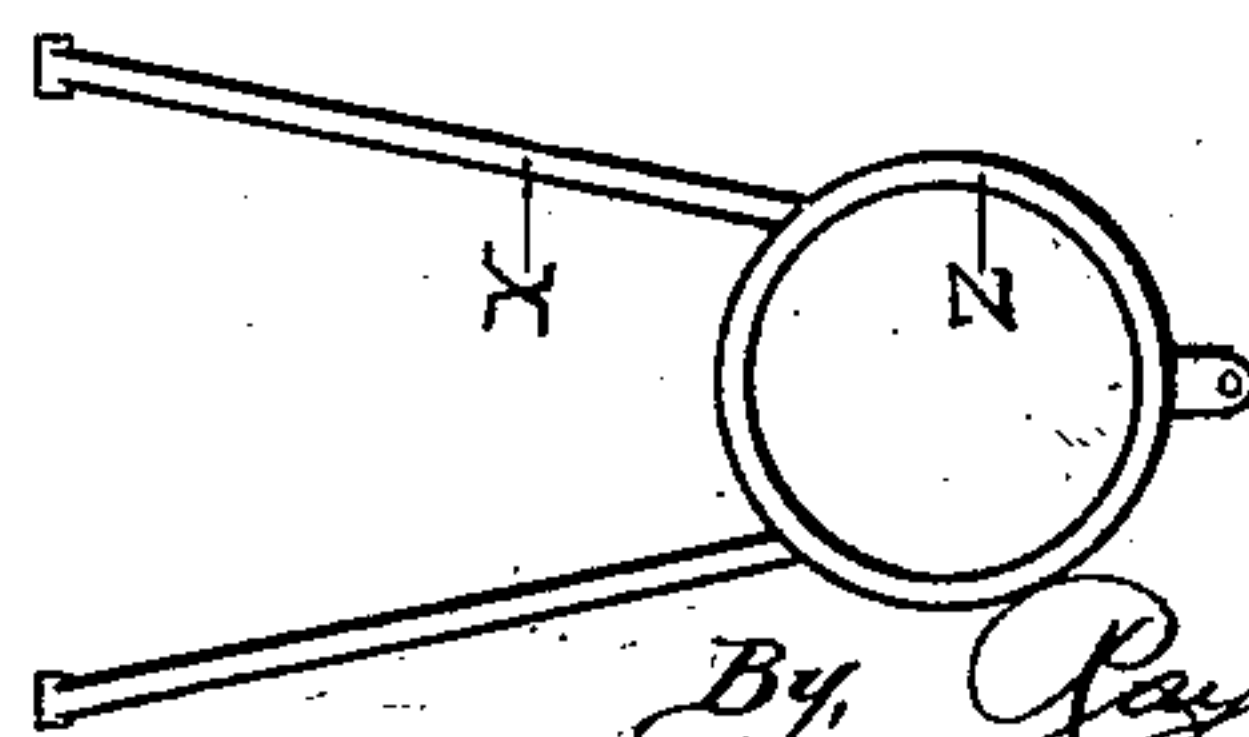


Fig. 4.

Witnesses
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Fig. 3.



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MIDDLINGS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 697,451, dated April 15, 1902.

Application filed May 5, 1899. Serial No. 715,719. (No model.)

To all whom it may concern:

Be it known that I, ALBERT S. CRAIK, a citizen of the United States, residing at West Superior, in the county of Douglas and State of Wisconsin, have invented certain new and useful Improvements in Middlings-Purifiers, of which the following is a specification.

This invention relates to improvements in middlings-purifiers, designed for separating dust, small seeds, and other impurities from whole grain preparatory to feeding the same to the roller-mills or for separating flour from the cracked grain as the meal comes from the roller-mills.

My present invention is more especially adapted to the purification of middlings.

Among the principal objects of my invention is the separation of the dust and fine particles from the stock by a circulation of air in such manner that all parts of the stock are subjected to the direct action of the air in its passage through the machine and with the least expenditure of power in producing the circulation, to increase the capacity of machines of this class by providing for the forcible separation of the stock into a thin circular sheet through which the air must pass in its circulation, and the provision of means whereby the feed of the stock to the machine shall be automatically controlled by the stock, so as to prevent clogging of the feed-pipes and at the same time maintain the feed-pipes practically closed as against the admission of air therethrough to the interior of the separator. These and such other objects as may hereinafter appear are attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of a machine embodying my invention. Fig. 2 is a vertical longitudinal section thereof, and Figs. 3 and 4 are plan views of details described farther on.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A and B indicate, respectively, upper and lower tapering or conical hoppers supported in a suitable frame and concentrically arranged one above the other. The lower hopper B is provided with a cover C,

through which projects the open lower end of the hopper A. Suspended from the lower end of the hopper A is a plurality of rings D, each of which is enlarged at the top, so as to leave a space between it and the ring next above, the rings illustrated in the drawings being formed on a taper corresponding with the walls of the hopper A, each ring having its side of greater diameter uppermost and of greater diameter than the lower side of the ring next above. The lowermost ring is arranged to discharge into an obliquely-disposed spout E, having a spring-valve F therein, from which spout stock is delivered through the side of the hopper B. The hopper B at its lower end terminates in a discharge-spout G.

Surrounding the series of rings D is a deflector H, which is suspended from the cover of the hopper B and preferably tapers correspondingly with the walls of said hopper.

The hopper A has a cover provided with a series of covered openings I, and rising from the center of such cover is an air-pipe J, leading to the suction-box K of a fan L, said box being provided with a sliding valve or shutter M to regulate the flow of air to the fan, which discharges by a pipe N into the lower hopper B and preferably above the lower edge of the deflector.

Stock is fed into the machine through a pipe O, which empties into a floating feed-hopper P, suspended under the shelf Q, and which in turn discharges into a spout R, at the lower end of which is a regulator S. This regulator is preferably in the form of a vertically-movable sleeve working on the end of the spout R and connected with the floating feed-hopper P in such manner as to be automatically raised and lowered by the weight of the stock in the hopper, so as to increase or decrease the space between the regulator and the disk T, upon which it discharges, thus, in effect, increasing and decreasing the size of the discharge-opening. This operation of the regulator is brought about by hanging the same from a lever U, pivoted within the hopper A and connected at its free end by a cord V, passing over the pulley W on the shelf Q, with the free end of a floating lever X, which is pivoted at one end to a stationary part of the machine—as, for instance, to the

suction-box K—and at its opposite end is suspended by the spring Y from the shelf Q. Near its free end this floating lever is secured to, so as to carry, the feed-hopper P, a simple means for accomplishing this being to provide the ring Z (see Fig. 3) in the lever, of less diameter than the hopper, so that the latter will find a seat therein.

The disk T, located below the regulator S, is rigidly secured upon the vertical shaft *a*, extending axially through the sleeve and furnished with a suitable bearing near its upper end, while the lower end thereof is preferably stepped in a bearing provided upon the cross-bar *b*. This shaft may be driven in any suitable manner, such as by means of the pulley *c*, secured to the upper end thereof.

The operation of the machine is as follows: A circulation of air is induced by the fan, which draws air from the top of the upper hopper A and discharges it into the lower hopper B, from whence it flows upward between the deflector H and the rings D, thence in between the rings D, and again up into the hopper, passing around the disk T on all sides thereof, the course of the air-current being shown by the arrows. Now as the stock passes down through the spout R and regulator S onto the revolving disk T the centrifugal force given to the stock by the disk causes it to spread out and fall from the disk in an even and thin circular sheet, which as it falls meets the upward current of air entering the upper hopper A on all sides and which passes through the sheet back and forth, according to the formation of the eddies due to the tortuous passage which must be taken by the air in entering and passing through the hopper A. As the stock is finely divided, the current of air takes up the fine dust and lighter impurities, which are carried through the fan and discharged into the lower hopper B, from whence it passes to the spout G, while the heavier stock falls through the upper hopper A and series of rings and passes out through the spout E.

By its connection with the floating feed-hopper P the regulator will be automatically raised and lowered, according to the weight and amount of stock fed into the hopper, and by thus being automatically raised and lowered the discharge-opening of the spout R, which is represented by the space between the regulator S and the disk T, is automatically adjusted to the feed of the stock and so as to cause the stock to spread evenly over the disk, while at the same time the discharge-opening is maintained at all times practically

closed by the stock against the admission of air therethrough into the upper hopper.

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

1. A separator comprising concentrically-arranged upper and lower hoppers in open communication, a fan connected at its suction-port with the upper hopper and a discharge-pipe leading from said fan to the lower hopper, a series of rings arranged below the upper hopper and spaced apart, a deflector in the lower hopper interposed between the fan-discharge opening and said rings and surrounding all of said rings, a discharge-spout below said rings leading out of the lower hopper, and a feed-spout opening into the upper hopper, substantially as described.

2. A separator comprising concentrically-arranged upper and lower hoppers in open communication, a fan connected at its suction-port with the upper hopper and arranged to discharge into the lower hopper, a series of rings arranged below the upper hopper and spaced apart, a deflector in the lower hopper interposed between the fan-discharge opening and said rings, a discharge-spout below said rings leading out of the lower hopper, a revolving disk below the discharge end of the feed-spout, a floating lever pivoted at one end and suspended by a spring at its opposite end, a floating feed-hopper mounted on said lever and arranged to discharge into the feed-spout, a sleeve upon the discharge end of the feed-spout suspended from a second lever, said lever being fixedly pivoted at one end, and a cord trained around a pulley and connecting the other end of said lever with the free end of the floating lever, substantially as described.

3. The combination with a separator and means for maintaining a circulation of air therethrough, of a feed-spout, a revolving disk below the discharge end of the feed-spout, a floating lever pivoted at one end and suspended by a spring at its opposite end, a floating feed-hopper mounted on said lever and arranged to discharge into the feed-spout, a sleeve upon the discharge end of the feed-spout suspended from a second lever, said lever being fixedly pivoted at one end, and a cord trained around a pulley and connecting the other end of said lever with the free end of the floating lever, substantially as described.

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Witnesses:

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