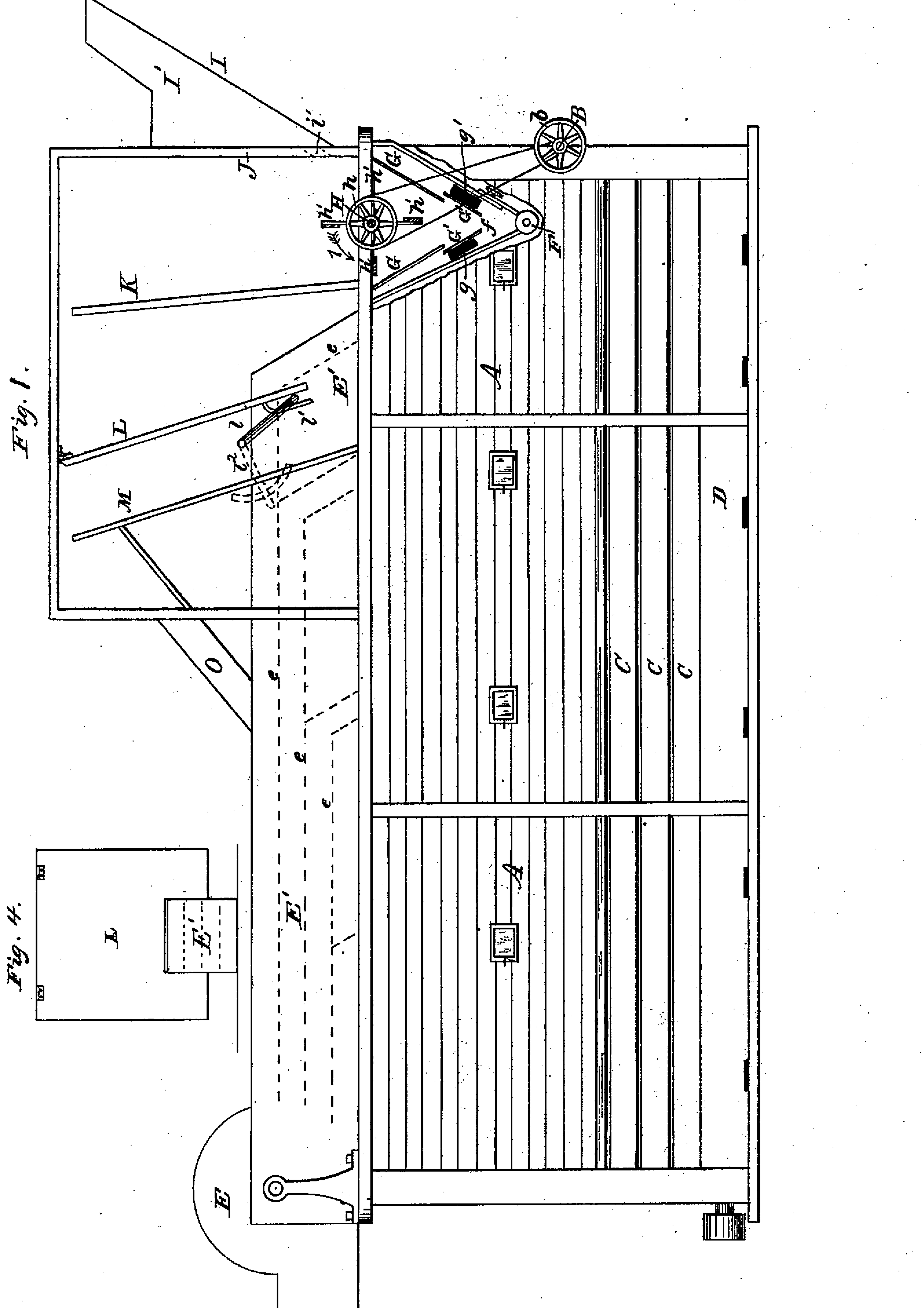
2 Sheets—Sheet 1.

S. C. McMASTER.

Attachment for Middlings Purifier.

No. 230,485. Patented July 27, 1880.



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2 Sheets—Sheet 2.

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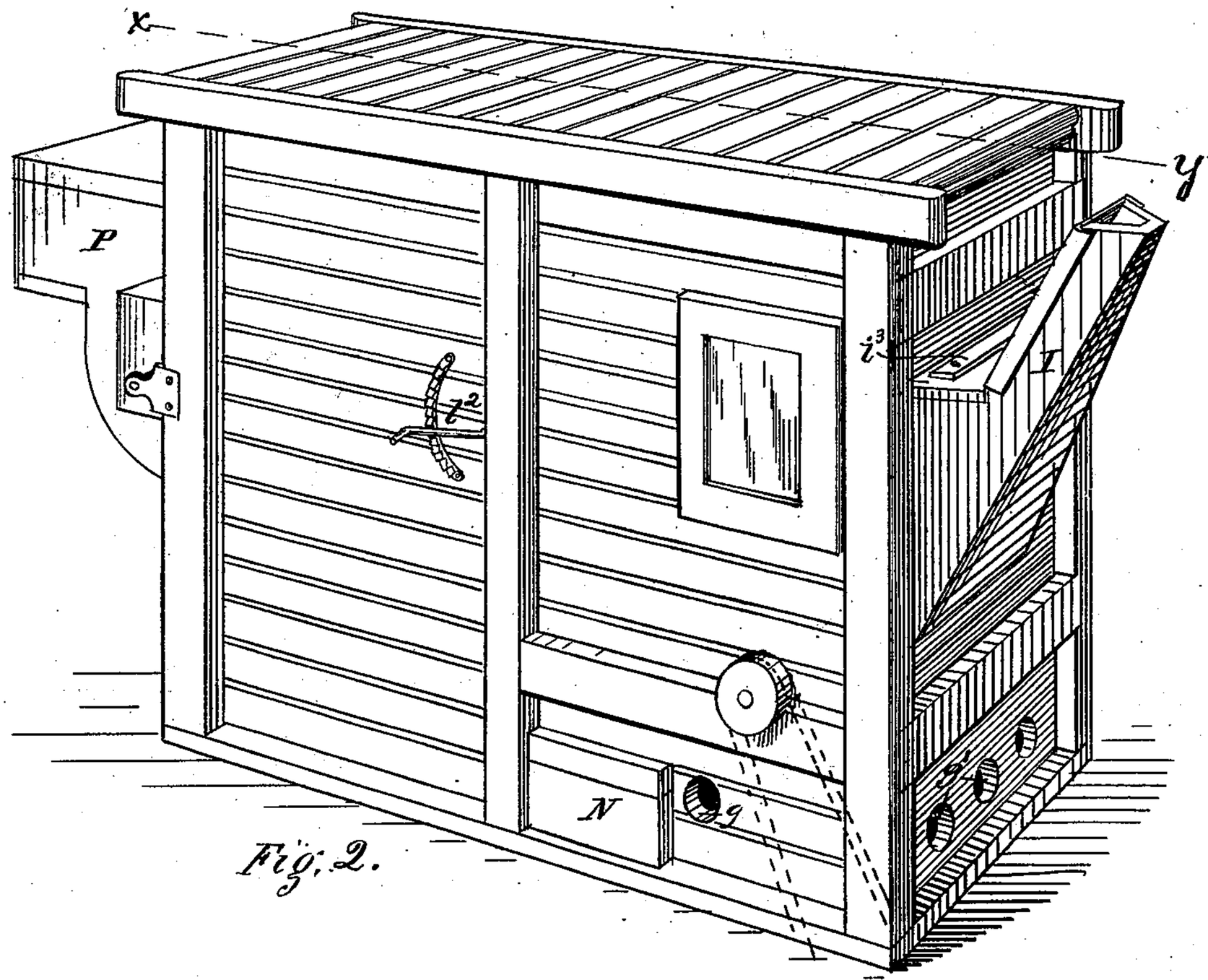

Fig. 2.

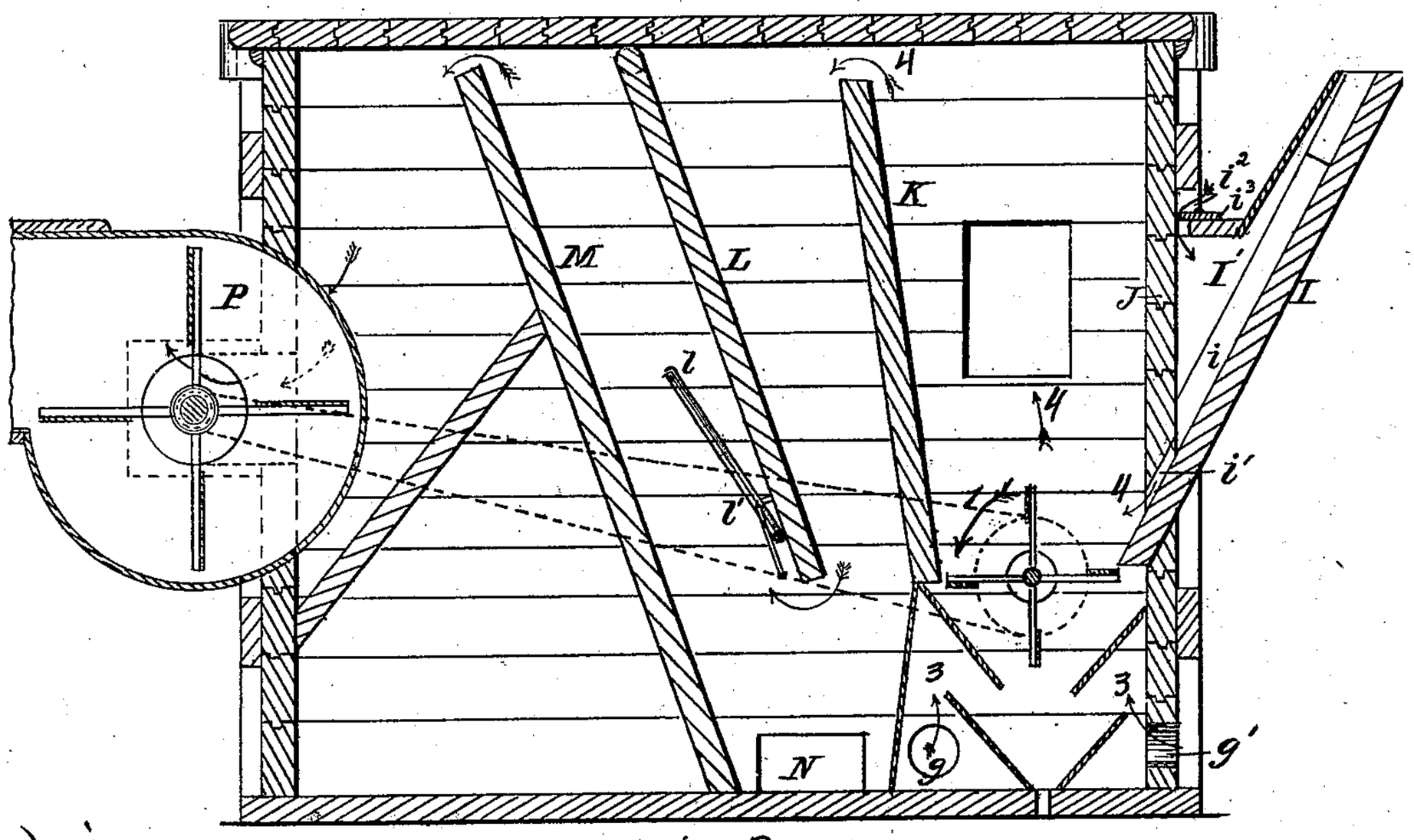

Fig. 3.

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UNITED STATES PATENT OFFICE.

SAMUEL C. McMASTER, OF MALVERN, OHIO.

ATTACHMENT FOR MIDDLINGS-PURIFIERS.

SPECIFICATION forming part of Letters Patent No. 230,485, dated July 27, 1880.

Application filed January 15, 1880.

To all whom it may concern:

Be it known that I, SAMUEL C. McMASTER, of Malvern, in the county of Carroll and State of Ohio, have invented certain new and useful Improvements in Attachments for Middlings-Purifiers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of the first part of my invention is to insure that the middlings shall be distributed uniformly over the entire width of the bolting-cloth, whether they (the middlings) be fed into the hopper rapidly or slowly.

The second part of my invention relates to a novel combination of devices for subjecting the middlings to the action of air-currents before their delivery to the shaker, for the purpose of removing from them the light fluffy impurities, as will be explained.

Figure 1 is a side elevation of a middlings-purifier having my improvements applied thereto, one side of the casing of the attachment having been removed, the construction of parts being such as to adapt the attachment for application to purifiers when placed in a mill having a short distance between its floors. Fig. 4 is a front view of one of the partitions of the air-chamber. Fig. 2 is a perspective view of my attachment, as I prefer to build it, for use in mills where there is sufficient height between the purifier and the floor above. Fig. 3 is a longitudinal vertical section taken on line *x y*, Fig. 2.

Referring to Fig. 1, A represents the side or casing of a purifier of any usual or approved construction, employing a horizontal shaker driven from the eccentric-shaft B, to which motion is imparted from any desired motor through the pulley *b*.

C C C represent gather-boards, which conduct the middlings from the shaker to the conveyer in the box D.

E is the fan, communicating with the air-chambers above the shaker by means of the air-trunk E′, which may, when preferred, be divided into separate conduits by means of partitions, as represented by the dotted lines *e*.

F is a feed-roll extending the entire width of the machine. It is situated at the bottom of the hopper, which has a sliding board, *f*, which is made adjustable vertically, so as to regulate the width of the throat between the lower edge of the board and the feed-roll, the direction of rotation of the feed-roll being indicated by the arrow 1 in Fig. 3.

The above-named parts may be of any usual or approved construction, as my attachment is adapted for use upon any of the middlings-purifiers in general use to which it can be applied.

G G G′ G′ are overlapping gather-boards, forming a sort of hopper, leaving a narrow space or throat between the lower edges of the lower pair of boards, G′ G′.

H is a shaft mounted in suitable bearings and provided with radial arms *h h h h*, one set at each end of the shaft. *h′ h′ h′ h′* are blades supported upon the outer ends of the arms *h* and revolving with the shaft and arms in the direction indicated by the arrow 1, thus constituting a distributer.

I I′ is a feed-chute, the bottom I of which is provided upon its upper face with a series of divergent ribs, *i*, Fig. 3, which are spread apart at their lower ends. *i′* is a throat formed in the end wall, J, of the attachment, to permit the passage of the middlings, and also of an air-current, which latter enters at i^2 and is regulated by a sliding valve or damper, i^3. By preference the throat or opening i^2 extends the full width of the feed-spout, which, as shown in Fig. 2, may be made nearly the width of the end of the attachment.

g is an opening to admit air, there being, by preference, one opening at each side of the machine.

g′ is an opening (of which there are preferably three) in the front of the attachment.

K is a partition extending from the upper edge of one of the gather-boards, G′, nearly to the upper wall of the attachment.

L is a partition extending from the upper wall or deck, about three-fourths the depth of the attachment, under the arrangement shown in Fig. 3. This partition L is hinged at its

upper end, so as to swing freely toward or from the partition K, the position of its lower end being regulated by means of a rock-shaft, *l*, one arm, *l'*, of which is arranged to bear against the partition, the other arm, l^2, outside the wall of the attachment, being caused to engage with a rigid segment, as indicated in Fig. 2, or other equivalents may be employed for adjusting the position of the partition L.

M is a partition extending from the bottom of the attachment to a point near its upper wall, and, by preference, these partitions K L M are placed in inclined positions, as indicated; but this may not be essential.

N is an opening through which material collected in the bottom of the chamber between the partitions K and M may be removed.

As indicated in Fig. 1, the attachment is connected with the air-trunk of the purifier by means of spouts O upon each side, one only being shown.

In Figs. 2 and 3 P is a fan, the central part of the casing of which is connected with the chamber formed within the attachment, and driven by a belt from any desired motor.

By preference, I belt the shaft H to the eccentric-shaft of the machine, as indicated in the drawings.

The operation of my attachment or improvement is substantially as follows: The middlings are fed in through the feed-spout, and as they pass from the lower edge of the bottom part, I, thereof they are caught by the revolving blades *h'* of the distributer and thrown upward into the chamber between the partition K and the front wall of the attachment, the distributer being assisted in this operation by the air-currents, which enter between the overlapping-boards G G' and pass through the chamber in an upward direction. As the middlings are thus acted upon by the distributer and these air-currents the light fluffy refuse is separated from the better and heavier portions, which fluffy material is skimmed off, as it were, and carried over the top of partition K by means of a supplemental air-current, which enters at the throat *i'*, as will be readily understood from an examination of Figs. 1 and 3, the direction of the air-currents being indicated by the arrows 3 and 4. The air-current, laden with this fluffy material, passes from the top of partition K down under partition L, a large portion of the fluffy material being deposited in the bottom of the chamber formed between partitions K and M, whence it can be removed from the opening N, Fig. 3, the air-current continuing its passage over the top of partition M, and thence out through the fan.

It will be readily understood that by moving the lower end of the swinging partition L toward or from the partition K the velocity of the air-current through the throat thus formed between these two partitions may be so regulated as to form a practically dead-air chamber between the partitions L and M, so as to insure the desired deposit of material, as above referred to.

It will be readily understood that the heavier portions of the middlings, after having been acted upon by the distributer and the air-currents, pass through the throat at the lower edges of the gather-boards G', and thence to the feed-roller F; and one result of the distributer is to deliver the middlings to the feed-roll in a substantially uniform sheet throughout the entire length of the said feed-roll, whence they are discharged below the lower edge of the adjustable board *f* across the entire width of the bolting-cloth.

It is well known to all who are familiar with the operation of middlings-purifiers that the rate at which the middlings are delivered to the purifier varies materially, even from one hour to another during the day, and that where the middlings are discharged through a spout directly into the hopper and upon a feed-roll (represented by F) the hopper and spout are apt to become frequently choked up for the following reasons: In order to insure that the middlings shall be distributed across the entire width of the shaker, it is necessary that the throat between the feed-board and the roll shall be narrow enough and the rate of feed slow enough to insure that there shall always be sufficient middlings in the hopper to cover the feed-roll throughout its entire length, even when the middlings are being fed slowly through the spout, so that when an increase in the rate of delivery to the hopper takes place the middlings soon fill up the hopper and back up into the spout to such an extent as to become objectionable. The feed-board must now be raised and the throat widened to get rid of this accumulation, the result being that as soon as the rate of delivery to the hopper is reduced the hopper is emptied, and the middlings are delivered only to the central portion of the shaker—a result which is also objectionable.

By my construction of devices these difficulties are obviated, because the width of the throat between the edge of the feed-slide and the roller may be such that no ordinary increase in the rate of delivery will fill the hopper, and even though the hopper shall be nearly filled the accumulation will soon pass through the throat.

It will, of course, be understood that the best results, so far as relates to uniformity in feed is concerned, will be obtained by placing the entire attachment, as represented in Figs. 2 and 3, above the upper line of the hopper of the machine to which the attachment is applied, because of the increased space for accumulation of middlings which is thus provided below the lower edges of the gather-boards, for which reason I prefer to use the construction shown in Figs. 2 and 3 rather than that shown in Fig. 1.

I propose to drive the distributer from the eccentric-shaft of the purifier by an independent

belt, in order that, when found desirable, it (the distributer) may be thrown out of action. For instance, suppose that the mill has stood still all night, and the weather being dry and cold when the mill is started in the morning, the quantity of middlings delivered to the purifier is greater than can be properly treated. Under such circumstances I can throw the distributer out of action, raise the adjustable board *f* so high only as will deliver all the middlings that can be properly purified on the shaker, letting the balance accumulate in the hoppers. As soon as the supply of middlings has been reduced to about an average amount the distributer may be started, after which no ordinary fluctuation will affect the delivery of the middlings across the entire width of the shaker.

It will be seen that the employment of a distributer which rotates about a horizontal axis enables me to make the hopper in which the distributer is located so narrow that it can enter the feed-hopper of a purifier of the ordinary construction.

It will of course be understood that the partitions L and M have their central portions cut away to fit over the air-trunk which leads from the fan to the sections of air-chamber above the shaker.

I have described my invention as being an attachment to a middlings-purifier, and propose to so construct it that it can be attached and used in connection with many purifiers as already built and sold; but I do not wish to be limited to so building it, it being apparent that it may be constructed as an integral part of a purifier when the same is being manufactured; but in view of the fact that it may be advantageously employed as a separate contrivance for purifying middlings I prefer to call it an "attachment." I do not, however, wish to have the scope of this patent limited by the use of this language.

What I claim is—

1. In a middlings-purifier, the combination of a feed-hopper, an adjustable feeder arranged below the hopper and adapted to deliver the middlings uniformly across the entire width of the shaker, and an independently driven distributer revolving about a horizontal axis, and adapted to receive the middlings and deliver them across the entire width of the purifier, substantially as set forth.

2. As an attachment for middlings-purifiers the combination of a feed-spout, the distributer rotating about a horizontal axis, gather-boards arranged below the distributer and provided with openings adapted to direct air-currents through the mass of middlings which has been acted upon by the distributer, and an opening above the feed-spout to admit air, substantially as set forth.

3. In a middlings-purifier, the combination, with the shaker, of a distributer rotating about a horizontal axis, a feeding mechanism, an opening below the axis of the distributer to admit air-currents, an opening above the air-distributer to admit an air-current to remove from the middlings the finer impurities, and a wall dividing said distributer from the air-chamber, through which air passes after leaving the shaker, substantially as set forth.

4. In an attachment for middlings-purifiers, the combination of a distributer rotating about a horizontal axis, gather-boards arranged below the distributer and having their edges in planes parallel with the axis of the distributer, an opening between the adjacent edges of the overlapping gather-boards, an air-chamber above the distributer, a partition dividing the air-chamber into compartments, and a fan adapted to draw an air-current through the middlings before they pass the revolving distributer, substantially as set forth.

5. An attachment for middlings-purifiers having a removable air-chamber in which middlings acted upon by the rotating horizontal distributer are treated with air-currents, and a receiving-hopper arranged below the plane of the lower part of the air-chamber, adapted to enter within the feed-hopper of a middlings-purifier, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of January, 1880.

SAMUEL CUMMINGS McMASTER.

Witnesses:
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