

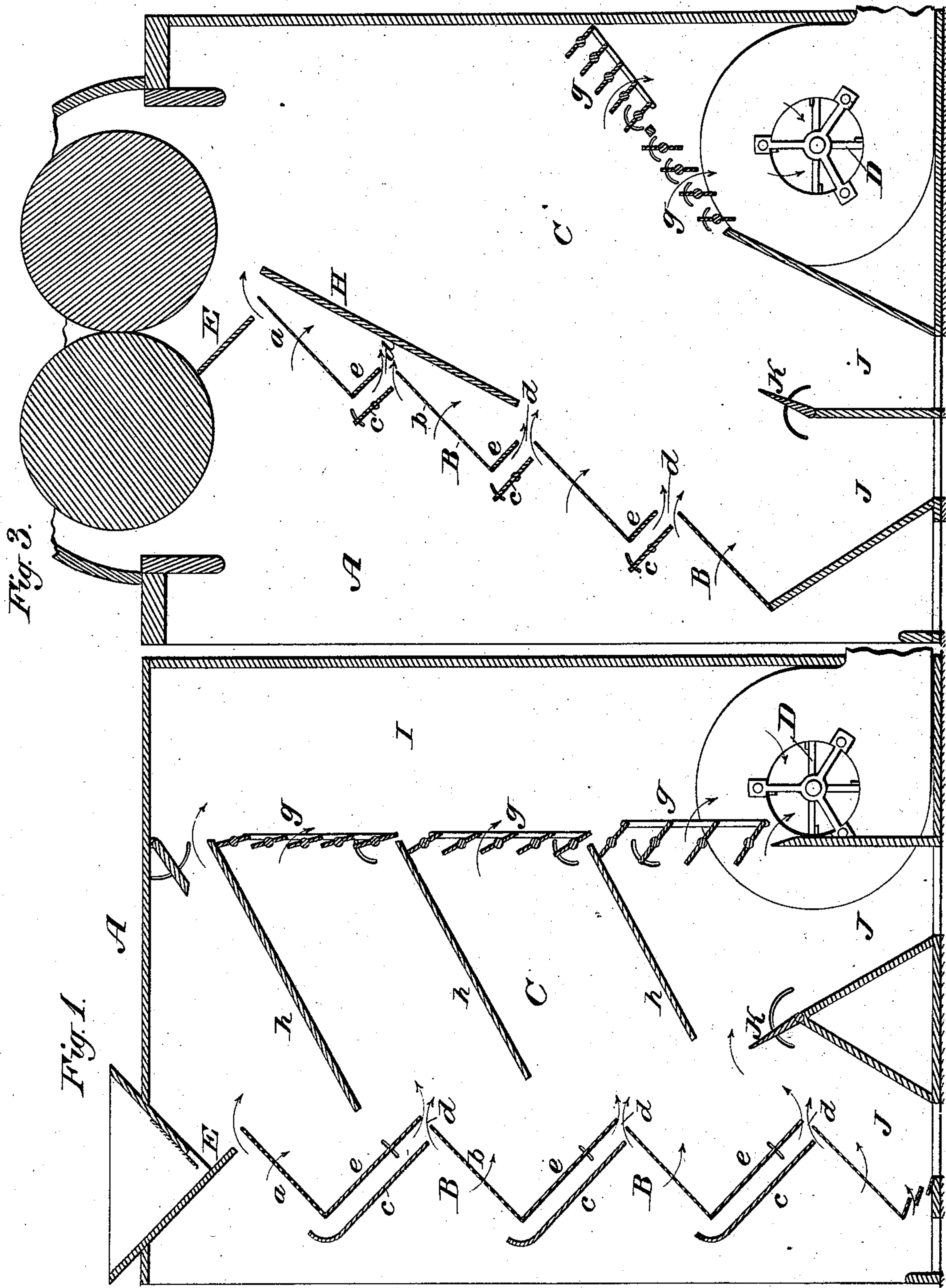
(No Model.)

2 Sheets—Sheet 1.

J. R. DAVIS, Jr.
CHOP SEPARATOR.

No. 380,097.

Patented Mar. 27, 1888.



Attest:
William W. Dodge,
Danl. Kelly.

Inventor:
John R. Davis Jr.
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Attorneys

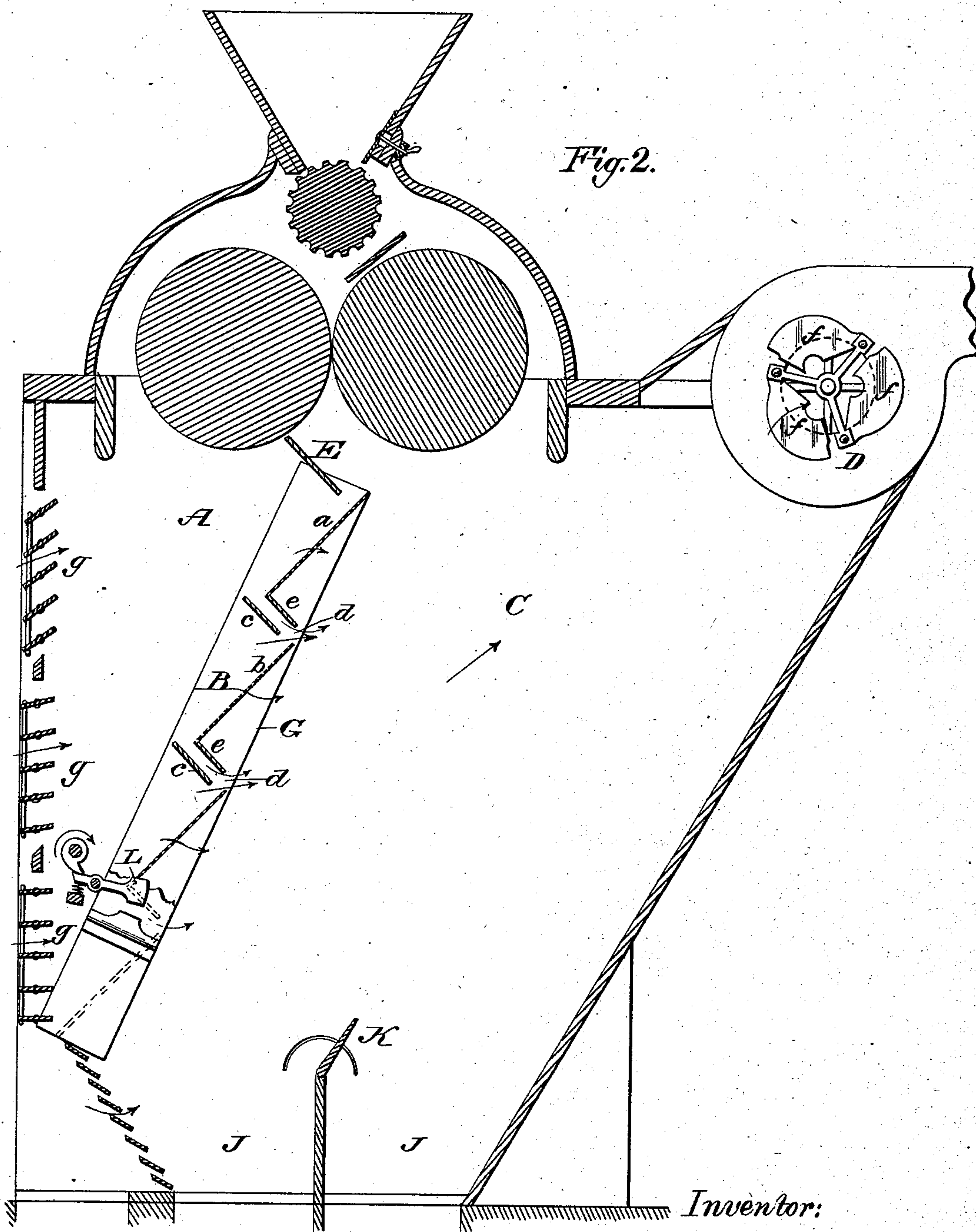
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UNITED STATES PATENT OFFICE.

JOHN R. DAVIS, JR., OF NEENAH, WISCONSIN.

CHOP-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 380,097, dated March 27, 1888.

Application filed February 23, 1881. Serial No. 26,739. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. DAVIS, Jr., of Neenah, in the county of Winnebago and State of Wisconsin, have invented certain new and useful Improvements in Chop-Separators, of which the following is a specification.

My invention relates to apparatus designed chiefly to act upon the stream of chop as it comes directly or indirectly from the reducing mechanism, and to take out the flour, fluffy material, and fine dust and send them to the dust-room and thence to bolts, while the middlings are carried on, graded or ungraded, to the purifiers; and it consists in certain combinations hereinafter described, and pointed out in the claims.

The primary object of my present invention is to simplify the construction of machines for acting upon chop and taking out the flour, dust, and fluffy material, having the pure middlings to pass either in an ungraded or graded condition to the purifiers, and to remove said matters as soon after the entrance of the chop into the machine as practicable, in order that there may be as little wear of the particles, and consequently as little production of dust, as possible.

To this end I so construct the machine that the chop is caused to gravitate over screens which effect a separation of the heavier particles, and to be acted upon in falling from one screen to another by air-currents which take out the lighter matters.

In the three figures of the drawings I have represented in vertical section several slightly-varying but equivalent and optional forms of the machine embodying my improvements.

The apparatus embraces in each instance a casing or chest, A, of any suitable material, a series, B, of inclined screens, a suction-chamber, C, and one or more suction-fans, D.

The chop to be operated upon may be received directly from reducing rolls or stones, or the machine may be furnished with a hopper and supplied in any convenient and suitable manner. Entering at the top of the machine the chop is guided by an inclined board, E, to the head of the first screen, a, of the series, through which the finer particles pass, partially by reason of gravity and partly because of the suction of the fan D, communicat-

ing with the chamber C below the screens. This suction also tends to hug the material to the screens and thus to prevent its passing too rapidly over the same. Such material as fails to pass through the first screen falls from the tail of the same to the head of the next screen, b, below, and so on throughout the entire series. As shown in the several figures, the screens are arranged one below another, the tail of one projecting more or less beyond a vertical line drawn from the head of the next, so that the material passing off over the tail of one may fall upon the next with certainty; and in order that the material may in every case fall upon the head of the screen, a directing-board, c, is placed just below the tail of each screen, intersecting the line of the falling tailings, so as to deflect them upon the head of the next, as shown. The width of such board will of course depend on the arrangement of the screens, being greater when the screens are arranged in a vertical than when in an inclined series. A space, d, is left between the tail of each screen and the head of the next, through which spaces currents of air are drawn by the fan or fans D. These air-currents cross and pass through the material falling from one screen to another, and also through the material which passes through the meshes of the screens as it falls therefrom, taking out the dust, flour, and light or fluffy matters, and carrying them through the fan-case to the dust-room, while the middlings fall down within the chest, and are collected therein or delivered into hoppers and conducted off to purifiers or other receivers. The chop in passing over the successive screens and falling from one to another has the middlings as well as the lighter matters completely taken out, and the tailings finally pass off at the end of the lower screen.

If desired, the screens may be graded to facilitate the separation; but this is not deemed strictly essential, although most beneficial.

In order that the middlings and lighter particles falling through one screen may not fall upon the next, a guard or fender, e, extends from the tail of each backward to or slightly beyond the head of the next, as shown, the falling material being guided thereby clear of the screen beneath and caused to fall into the suc-

tion-chamber. These guards or fenders may be hinged or pivoted and made to serve as valves to regulate the passage of air through the intervals or spaces between succeeding
5 screens.

In some cases I arrange the screens in a vertical series, as in Fig. 1, while in others the entire series is inclined, as in Figs. 2 and 3, the principle and method of operation being, however, the same in both cases, except that when
10 the screens are arranged in a vertical series the material is caused to travel more rapidly and to have its direction more suddenly changed, its particles being thus more violently agitated and loosened up for the action
15 of the screens and air-currents. The screens are also in some cases mounted in a frame, G, common to all, and removable bodily from the casing or chest, and in other cases separately
20 secured therein. The fan is likewise placed directly within the chest, as in Figs. 1 and 3, below the screens or above them, and either within the same chest or in a case communicating with the suction-chamber thereof, as in
25 Fig. 2, these being mere matters of detail controlled by the space available for the reception of the machine, the location of the other machinery with which it is to operate, and like matters. In some cases, and particularly when
30 the fan is located directly in the lower part of the chest, it is advisable to place a board, H, beneath the upper sieves or screens, as shown in Figs. 2 and 3, to carry the material passing through them sufficiently inward from the fan
35 to prevent the latter from drawing the middlings off with the other matters.

In order to control the force of the draft, the fan-case may be furnished with gates or valves *f*, to regulate the size of the inlet-openings thereof; but in order to more perfectly control
40 the suction in different parts of the chest I employ a series of hinged slats or valves, *g*, preferably connected in groups in the same manner as slats of Venetian blinds, varying
45 their location according to the particular form of the machine or other circumstance. In Fig. 1 the valves are shown arranged at the back of the chest, forming one side of a trunk, I, and divided into several groups, one for each
50 screen, boards or partitions *h*, extending from the several points of meeting of the different sections toward the screens, to properly direct the air to the different valve-sections, and to localize the area of draft controlled thereby.
55 In Fig. 2 the valves, arranged in a similar manner, are shown at the front of the chest, and in Fig. 3 the valves are represented as arranged in the rear of the chest close to the fan, but without the boards used in Fig. 1 to localize the currents.
60

If it be desired to grade the middlings, the hoppers J will be formed at the bottom of the chest leading to suitable receptacles, and having hinged cut-offs or dividing-boards K, as
55 shown, to vary the point of separation.

In some cases it may be found desirable to

employ a continuous screen instead of a series, and in such case the screen may be graded or not, as found expedient. When a single screen is employed, or when the screens are mounted
70 in a common frame, a knocker, L, may be employed to jar the frame and prevent particles of matter from clogging the meshes of the screen or screens, and to cause it to travel down the same; or separate knockers may be
75 employed for the respective screens, whether mounted in a common frame or secured permanently in the casing. The screen or screens, or the frame with the screens and deflecting-boards mounted therein, may also be given a
80 shaking motion, especially when the angle of inclination is reduced.

In order that the material may not be too much worn or broken by air passing from screen to screen, the directing-boards *c* may
85 be curved, as represented in Fig. 1, or they may be hinged or pivoted and placed at different inclinations, according to the nature of the material under treatment.

Having thus described my invention, what I
90 claim is—

1. In a chop-separator, the combination, with a series of inclined screens arranged with intervals between the tail of each and the head of the next succeeding, of a suction-chamber
95 on the lower side thereof, a fan or fans whereby air-currents are drawn through the interstices of said screens and through the intervals between them, and valves or gates whereby the currents may be moderated or shut off
100 over any area of the series.

2. In a chop-separator, the combination, with a series of sharply-inclined screens arranged with intervals between the tail of each and the head of the next succeeding, of boards
105 arranged to intercept the tailings of the successive screens and direct them to the head of the next, fenders which deflect the material passing through each screen into the suction-chamber beneath, and a fan or fans arranged
110 in or connecting with such suction-chamber, whereby air-currents are drawn through the interstices of the screens and through the streams descending upon their heads.

3. In a chop-separator, the combination, with an inclined frame holding a series of louverwise screens with intersecting returning-boards, of a knocker or knockers arranged to
115 jar said frame as the material is being fed.

4. In a chop-separator, the combination, with an inclined frame holding a series of louverwise screens with intersecting returning-boards, of a knocker or knockers arranged to
120 jar said frame as the material is being fed, and a fan or fans arranged to draw air-currents through said frame and downward through the interstices of the screens held therein.
125

5. In combination with a screen or screens, a fan or fans arranged to draw air through the
130 same in the direction in which the screenings pass, boards or partitions dividing the air-

currents into separate currents to act upon different portions of the screen or screens, and valves for independently regulating the separate air-currents.

5 6. In combination with a vertical series of inclined screens and a vertical series of intersecting boards, a suction-chamber located at one side of the series on the under side of the screens, a partition or partitions intersecting
10 the screen surface and forming independent draft-areas, a fan communicating with the suction-chamber and serving to draw air through the screens, and valves for independently regulating the draft of the different areas.

15 7. In combination with a series of screens arranged with intervals between the tail of

each and the head of the next succeeding, a suction-chamber beneath the screens, a fan or fans communicating with the chamber and drawing air through the openings between 20 the screens, and boards or slats placed at said openings and adapted to control the air-currents through them.

8. In combination with a series of screens arranged louverwise, a series of adjustable intersecting boards adapted to direct the material from the tail of one screen to the head of the next, substantially as described. 25

JOHN R. DAVIS, JR.

Witnesses:

ALEX McNAUGHTON,
JOHN SHIELLS.