

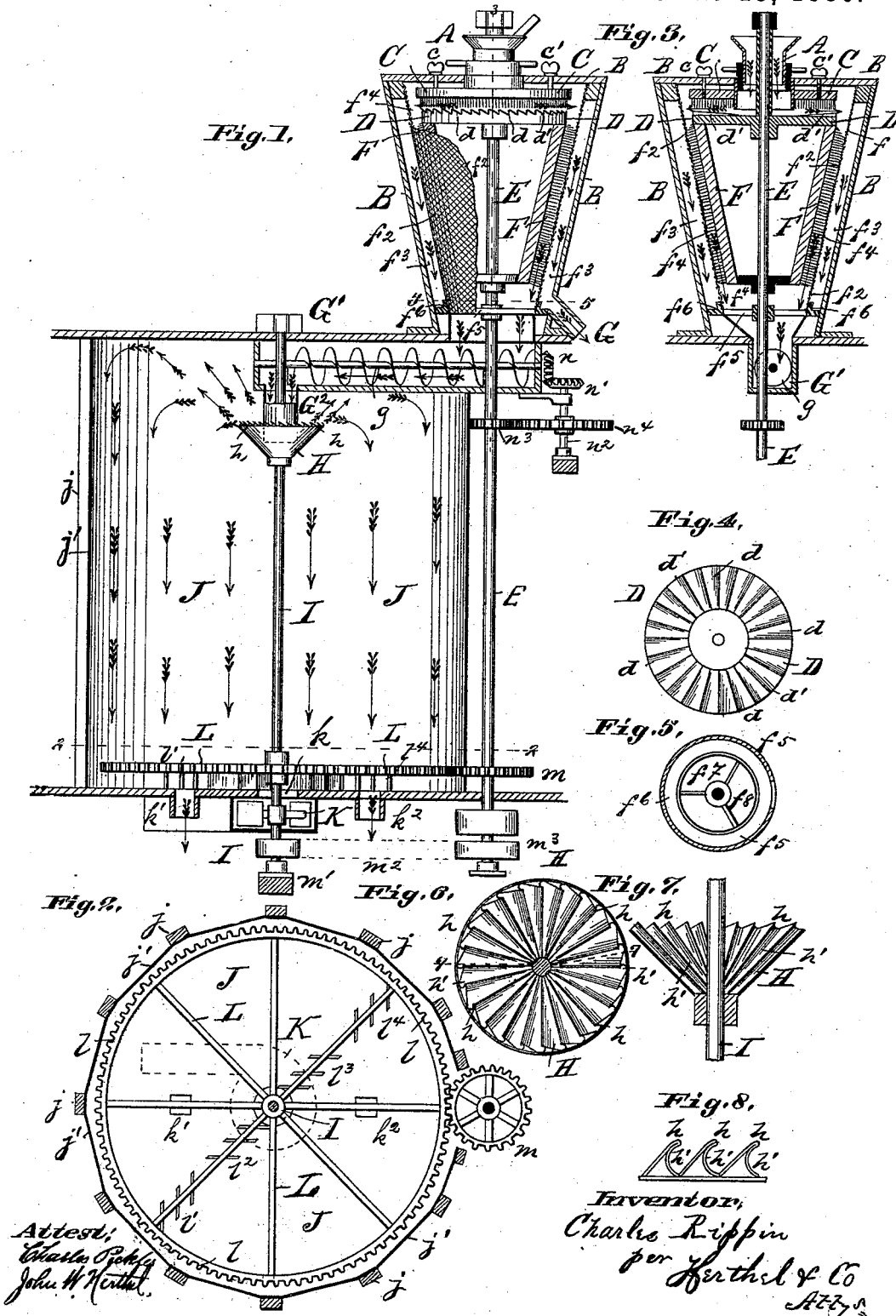
(No Model.)

C. RIPPIN.

GRAIN AND MIDLINGS SEPARATOR.

No. 343,649.

Patented June 15, 1886.



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# UNITED STATES PATENT OFFICE.

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## GRAIN AND MIDDINGS SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 343,649, dated June 15, 1886.

Application filed March 20, 1885. Serial No. 159,602. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES RIPPIN, a citizen of the United States, residing at St. Louis, and State of Missouri, have made a certain new and useful Improved Grain and Middlings Separator, of which the following is a specification.

The invention consists in the construction and novel arrangement of parts, hereinafter described, and illustrated in the drawings, and pointed out in the claims.

In the accompanying drawings, Figure 1 represents my improved middlings-separator in sectional elevation. Fig. 2 is a sectional plan taken on the line 2 2 of Fig. 1, showing the hopper cog-wheel and parts below the same, near the bottom of the separating-chamber. Fig. 3 is a transverse sectional elevation of the upper cone-shaped casing, its brushes, screens, &c., and showing how the vertical shaft and the end of the conveyer-screw are arranged with relation to the bottom of said casing and its interior parts. Fig. 4 is a plan view of the revolving wheel, having its face furrowed with radial ribs. Fig. 5 is a plan of the bottom plate of the upper cone-shaped casing, taken on line 5 5. Fig. 6 is a plan view of the centrifugal saucer, having radial corrugations. Fig. 7 is a vertical section of the same device. Fig. 8 is an enlarged detail or end view of the corrugations of the centrifugal saucer.

Similar letters refer to similar parts throughout the several views.

From an upper floor the middlings to be separated are fed down a chute into the usual feed-tube, at A, at the top of the cone-shaped casing B. (See Figs. 1 and 3.) By taking hold of the handles and turning the lower section of the "silent feed" the feed-passage leading between the top brush and the revolving furrowed wheel can be graduated to suit the nature of the middlings, in manner usual.

C represents the top brush. It is adjustable in a vertical direction by means of the set-screws *c c'*, operating through the top of the casing, as shown in Figs. 1 and 3. The said brush can, therefore, be raised or lowered to suit the desired brushing action for the mid-

dlings fed between said brush and the furrowed wheel below it.

D is the furrowed wheel, mounted to revolve on the main or vertical shaft E, and arranged with relation to the upper stationary brush, C, so that the middlings must pass over the top furrowed face of said wheel and the under face of the said brush, as indicated by the arrows. (See Figs. 1, 3, and 4.) The middlings fed upon the top of the revolving wheel D are caused by its radial furrows *d* to move from the center outward to the periphery. In so doing its inclined faces or ribs *d'* force the particles upward against the upper brush, which rubs them off and cleans and separates the flour from the bran. By the time each particle of middlings reaches the periphery of either the brush or revolving wheel, said particles are forced often over the inclined radial faces *d d'*, and are many times subjected to a rubbing action by the brush. The better class of middlings falls down and is further acted upon by the brushes at the side of the screen, inside the casing, Figs. 1 and 3.

F represents the side brushes, mounted on the shaft E to revolve within the cone-shaped casing A, as shown. It is these revolving brushes that finally separate whatever bran adheres to the middlings in their downward course, that force the pure flour through the screen into a separate passage-way, and otherwise complete the first process of separation.

*f*<sup>2</sup> represents the screen. This divides the outer passage-way, *f*<sup>3</sup>, from the inner passage-way, *f*<sup>4</sup>, where the side brushes, F, revolve, as shown.

Near the bottom of the casing A a bottom plate or disk, *f*<sup>5</sup>, is secured, the rim *f*<sup>6</sup> of which closes and virtually forms the bottom of the outer passage-way, *f*<sup>3</sup>, as shown in Figs. 1 and 3. The openings *f*<sup>7</sup>, between the radial arms of this bottom disk, permit the middlings passing down along the revolving brushes to drop into the conveyer-chamber. (See Figs. 1, 3, and 5.) The hub *f*<sup>8</sup> of this bottom disk surrounds loosely the vertical shaft E, to permit the same to freely revolve. (See Figs. 3 and 5.) It is the pure flour passing through

the screen that falls down the outer passage-way,  $f^3$ , to the bottom disk,  $f^6$ , from whence the flour can be discharged out of the chute G. (See course of arrows in Figs. 1 and 3.)

5 The flour so derived is ready to be rebolted, and the remaining middlings acted upon by the revolving brushes gravitate below into the conveyer-chamber, from whence said middlings can be passed for a second stage of separation, as follows:

10 G' is the conveyer-chamber, communicating at one end with the open bottom of the cone-shaped casing A, the other end with the feed-tube arm at G<sup>2</sup>, whence or through which the middlings gravitate into the saucer-shaped distributor H, mounted to turn on the shaft I, and all arranged within the separating-chamber J, as shown in Fig. 1.

15 g, the conveyer-screw, facilitates the feeding of the gravitating middlings along the conveyer-chamber and down the feed-tube G<sup>2</sup>, which controls the fall of the middlings into the saucer-shaped distributor.

20 The separating-chamber J consists of upright posts j, which can be arranged and secured in circular form and covered at the sides with canvas j', inclosing the said chamber, in which the further process of separating the middlings takes place, as indicated in Fig. 1. The sides of the distributor H flare outwardly at an angle of about forty-five degrees, the object being to utilize centrifugal force to throw out the middlings and allow the same to gravitate to the bottom of the chamber J. (See Fig. 1.)

25 Inside the distributor H is provided with corrugations or ribs h, consisting of sheet-metal folds, that are further bent and made to radiate from the center to the periphery in the manner shown in Figs. 1, 6, 7, and 8. It is these ribs that increase the proper spreading and distribution of each particle, and the gutter-shaped channel h', between each two ribs, further compels each particle to rise from the bottom of the distributor to the top thereof, and in so doing the contact of the particles against each other is avoided, each is separated from its neighbor, and each distinctly subjected to the centrifugal action. The middlings so acted upon by centrifugal force are separated while gravitating to the bottom in two conditions: First, the pure middlings or heavier particles gravitate along the periphery of the chamber J, while the lighter stuff, dust, &c., fall nearer to the center of the bottom. It may here be said that a suction-fan, in communication with said chamber J, operates below at the same time, which specially prevents a whirl of the lighter stuff and dust accumulating around the distributor H, and by its suction force in a downward direction keeps the falling particles separated from each other, and each class of separated middlings falls in the two distinct places at the bottom of the chamber.

65 K represents this suction-fan operating, as

usual, in a proper casing, which communicates by means of the opening k with the interior of the separating-chamber, and mounted to turn with the central shaft, as indicated in Figs. 1 and 2. The bottom floor of the chamber J has the separate spouts k' k<sup>2</sup>, the former for the discharge of the offal, the latter for the pure middlings. (See Figs. 1 and 2.)

L represents a raker-wheel, its periphery having cogs l, and two of its radial arms carry on their under side the respective blades, arranged in opposite diagonal direction, as shown at l' l' l' l' in Figs. 1 and 2. When the raker-wheel is revolved, these blades rake the offal to the discharge-chute k', and the purer middlings to the discharge-chute k<sup>2</sup>. The raker-wheel rotates slowly near bottom of the separating-chamber, and for this purpose the cogs of the wheel mesh with a pinion, m, that revolves with the main vertical shaft E, as shown. The lower end of the central shaft, I, turns in a step, m', and by belting m<sup>2</sup> connects to the pulley-wheel m<sup>3</sup> on the main shaft, so that the power source operating the latter also revolves the former shaft and its parts. (See Fig. 1.) The conveyer-screw is operated at the same time by the bevel-gear n n', the shaft n<sup>2</sup> of which is actuated from the main shaft by means of the gear-wheels n<sup>3</sup> n<sup>4</sup>, as shown.

What I claim is—

1. In a middlings-separator, the combination of the side brushes, F, the horizontal wheel D, having radial furrows and ribs d d', revolving shaft E, the cone-shaped casing B, and the screen f<sup>2</sup>, dividing the outer passage-way, f<sup>3</sup>, from the inner passage-way, f<sup>4</sup>, by means whereof the falling middlings are subjected to a brushing and screening action, substantially as and for the purposes set forth.

2. In a middlings-separator, the combination of the casing B, feed-tube A, the adjustable brush C, the revolving wheel D, having furrows and ribs d d', the revolving side brushes, F, the screen f<sup>2</sup>, the passages f<sup>3</sup> f<sup>4</sup>, the bottom disk, f<sup>5</sup>, and discharge-chute G, all constructed to operate in the manner and for the purposes set forth.

3. The combination of the conical casing B, revolving shaft E, the sub-shaft n<sup>2</sup>, gear-wheels n<sup>3</sup> n<sup>4</sup>, bevel-gears n n', conveyer-screw g, and separating-chamber J, substantially as and for the purposes set forth.

4. The combination of the chamber J, having the discharge-openings k' k<sup>2</sup> in its floor, the rotating shaft I, the conical distributor formed with the radial ribs h and gutters h', and the rotating wheel L, having on its spokes the blades l' l' l' l', all constructed and arranged substantially as and for the purpose specified.

5. The combination of the cone-shaped separator, constructed substantially as described, the feed-tube and the spiral conveyer, with the chamber J, having the floor-openings k' k<sup>2</sup>, the rotating wheel L, having the blades l' l' l' l' on its spokes, and the conical distributor H,

secured to the shaft I, and provided with the radial ribs *h* and gutters *h'*, substantially as specified.

5 6. The combination of the chamber J, having the lateral floor-openings *k'* *k''* and central opening, *k*, the shaft I, the rotating wheel L, having the blades *l'* *l''* *l'''* on its spokes, the distributor H, provided with the radial ribs *h* and gutters *h'*, and the suction-fan K and casing

communicating with the chamber J through to the central opening in the floor thereof.

In testimony of said invention I have hereunto set my hand.

CHARLES RIPPIN.

Witnesses:

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JOHN W. HERTHEL.