(No Model.) 2 Sheets—Sheet 1.

G. F. SHERWOOD & C. A. SMITH.

FEEDING DEVICE FOR MIDDLINGS PURIFIERS.

No. 339,023. Patented Mar. 30, 1886.

Fig. 1

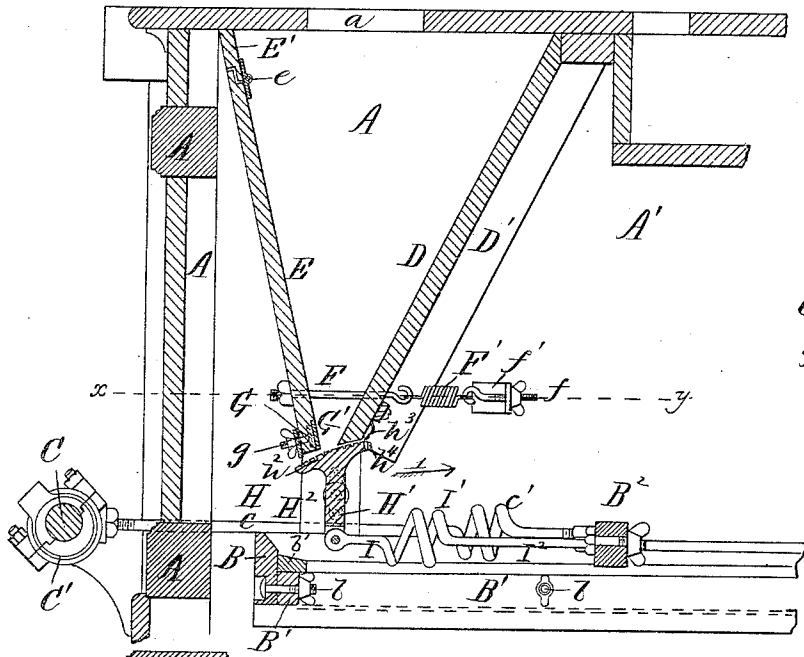


Fig 6.

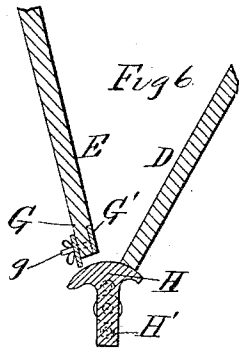


Fig 5.

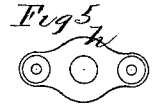


Fig 4.

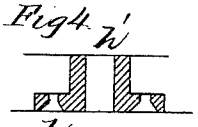


Fig 2.

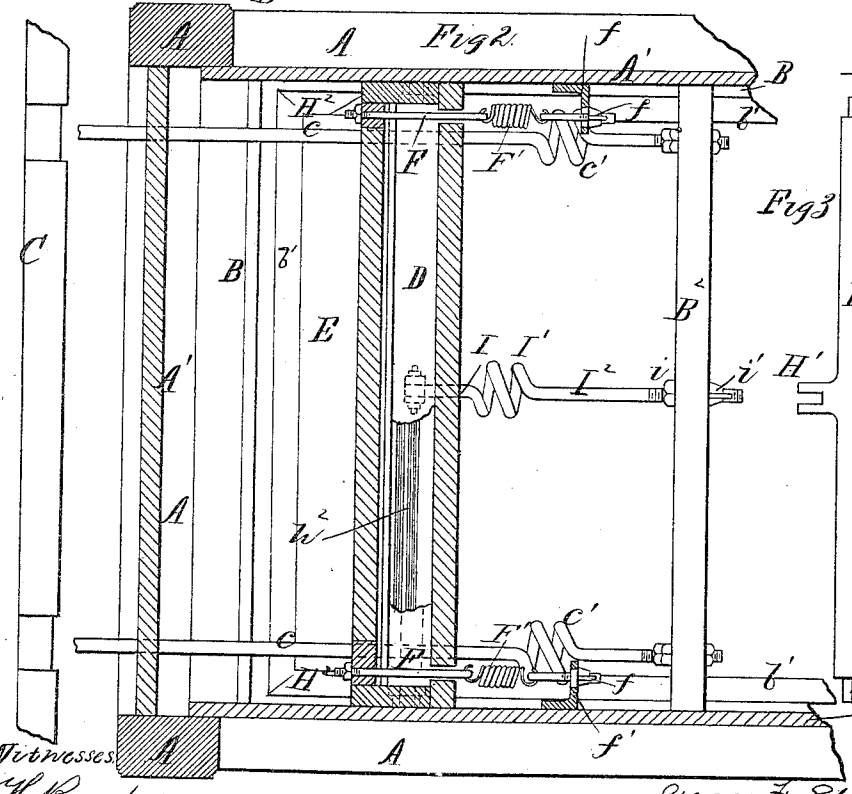
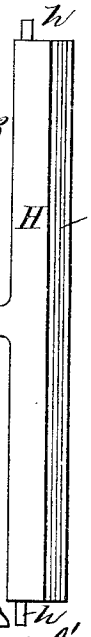


Fig 3



Witnesses.
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by Dowlebay & Burton attys

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(No Model.) 2 Sheets—Sheet 2.

G. F. SHERWOOD & C. A. SMITH.

FEEDING DEVICE FOR MIDDLINGS PURIFIERS.

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Fig. 9.

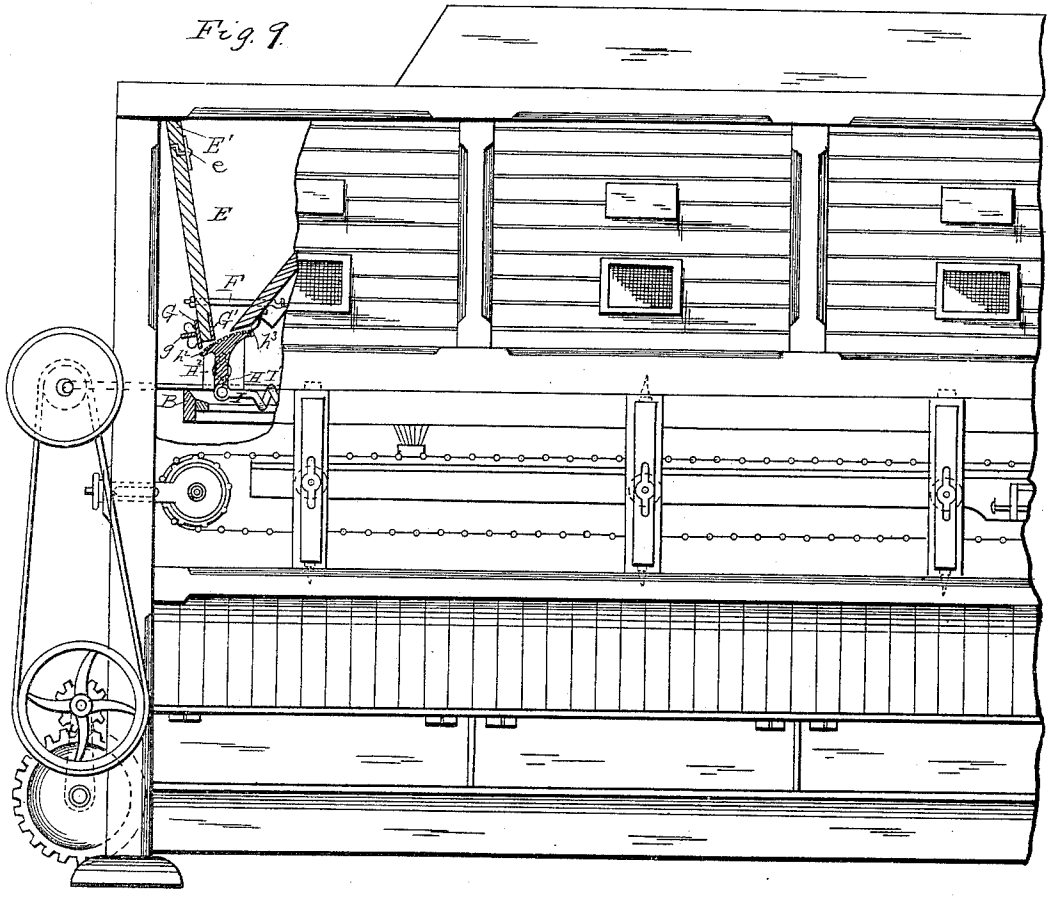


Fig. 7.

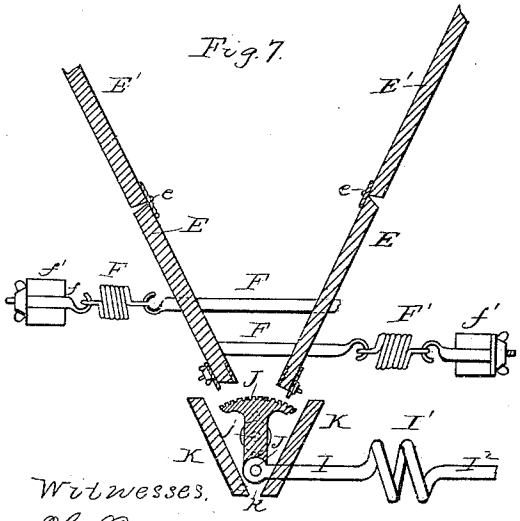
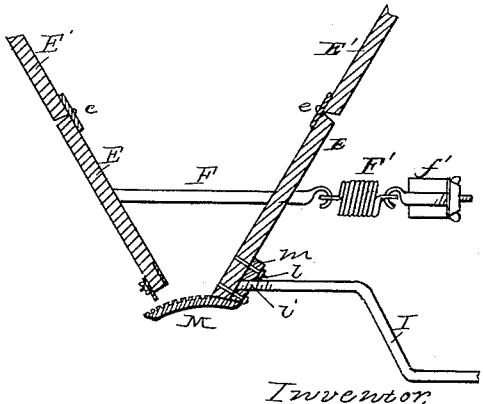


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE F. SHERWOOD AND CHARLES A. SMITH, OF JACKSON, MICHIGAN.

FEEDING DEVICE FOR MIDDLINGS-PURIFIERS.

SPECIFICATION forming part of Letters Patent No. 339,023, dated March 30, 1886.

Application filed March 1, 1884. Serial No. 122,669. (No model.)

To all whom it may concern:

Be it known that we, GEORGE F. SHERWOOD and CHARLES A. SMITH, citizens of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Feeding Devices for Middlings-Purifiers, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a side elevation of so much of a middlings-purifier as is necessary to illustrate our invention. Fig. 2 is a horizontal section taken on line *x y* of Fig. 1, portions thereof being broken away. Fig. 3 is a detached view of the vibrating feeder. Figs. 4, 5, and 6 are detailed views. Figs. 7 and 8 show modifications. Fig. 9 is a side elevation of the front end of a middlings-purifier containing our invention.

In the drawings, A represents the frame, and A′ the casing, which may be of any usual or approved construction.

B is the shaker-frame, and B′ B′ cloth strips or ribs adjustably connected with the inner faces of the shaker-frame by means of screw-bolts *b b*, the lower edges of the cloth ribs being substantially in a plane with the lower edge of the shaker-frame.

b′ b′ are cleats, preferably beveled upon their upper faces, and secured to the inner side of the shaker-frame in such position as to overlap or partially overlap the cloth ribs to guard against material entering between the cloth ribs and the shaker-frame.

C is the eccentric shaft, and C′ an eccentric strap or coupling-box, by means of which the forward or outer end of the rod or pitman *c c′* is attached to the eccentric shaft. The part *c′* of the pitman is in the form of a spiral spring, and the rear end of the pitman is screw-threaded and adjustably connected to a cross-girt, B^2, which latter has its ends firmly connected to the sides of the shaker-frame.

The parts thus far described may be of any usual or approved construction, and as they do not necessarily relate to our invention they need not be more particularly described.

D is the rear wall of the feed-hopper, and is, by preference, stationarily attached to the side walls of the casing, which may be provided with cleats D′ D′, to further support the wall D of the hopper in position.

E E′ is the front wall of the hopper, the lower part, E, being, by preference, hinged to the upper part, E′, as indicated at *e* in Fig. 1; but when preferred this part or wall of the hopper may be made in one continuous piece and hinged to the deck or top of the casing.

a is an opening in the deck of the casing, through which material may be delivered to the hopper.

F F *f f* F′ F′ are devices employed to support the lower end of the vibrating part E of the feed-hopper against internal pressure exerted by the middlings. The parts F *f* of each device are in this instance connected by means of a spiral spring, F′, and the part *f* is screw-threaded, and passes through a supporting-bracket, *f′*, being provided at its rear end with a thumb-nut, by means of which the tension of the spring F′ can be regulated, and the position of the inner end of the swinging part E of the hopper thereby regulated at the will of the operator, while at the same time the lower end will swing forward, as may be required or made necessary by any increase in the pressure of middlings upon it.

G is a feed-slide, attached to the outer face of the swinging part E by means of set-screws *g*, which pass through slots near the ends of the feed-slide, the outer ends of the bolts carrying thumb-nuts. The heads at the inner ends of these bolts *g* are, by preference, seated in recesses or countersinks in the inner face of the swinging part E, and are covered by a metal strap, G′, the lower edge of which is better adapted to form one side of a feeding-throat than would be the edge of the part E, which in ordinary practice is made of wood.

H H′ is a vibrating feeder, of either wood or metal. This feeder is provided at its ends with journals *h*, which are supported in socket-bearings *h′*—one at each end—the sockets in turn being seated in blocks, cleats, or posts H^2, which are secured to the inner faces of the casing; or, when preferred, these sockets may be let into the casing itself, although we prefer the construction shown in the drawings. The upper portion, H, of this vibrating feeder is convex, and may be made in an arc of a circle, which, however, should be eccentric to

the pivots *h h*, for a purpose which will be explained. A convex feeder operates much more satisfactorily upon middlings than would a concave feeder, because the convexity of the upper surface insures a free and quick discharge or delivery of the middlings without producing undue attrition or rubbing of them against each other, such as would be liable to result if the upper surface of the feeder were concave and the lower surface of the feed-hopper were convex, it being well understood that rubbing of the middlings decreases their sharpness and produces objectionable fine flour or dust, such results interfering materially with their proper purification, in addition to entailing undue waste. This part of the vibrating feeder is, by preference, constructed with longitudinal ribs or grooves h^2, thus forming a corrugated surface.

H′ is a forked arm extending downwardly about midway of its length, and is connected with the transverse girt B^2 by means of an extensible link, I I′ I^2. The forward end, I, of this link is pivotally connected to the forked arm H′. The rear end, I^2, is screw-threaded, and adjustably connected with the cross-girt B^2 by means of a nut, *i*, and thumb-nut *i′*. The central part, I′, of the link is in the form of a spiral spring, the entire length being, by preference, integral and formed of a single piece of wire or small metal rod, and may be made of steel.

h^3 is a flexible flap or web secured at its upper edge to the under or rear surface of the stationary part D of the hopper, preferably by means of a longitudinal rib or cleat, which may be either nailed or otherwise secured to the hopper. The lower edge of this flap is secured to the rear edge of the part H of the vibrating feeder by means of a smaller strip, h^4; but I do not wish to be limited to either of these methods of connecting the flap with the hopper. Nor, indeed, is the flap an absolute necessity, because by slightly modifying the form of the upper surface of this feeder at that point which is adjacent to the lower edge of the stationary hopper-section D, so that that portion of its surface shall be concentric to the pivots *h*, it can be made to fit so closely as to practically prevent the passage of material at this point, as is indicated in Fig. 6. The flap or packing-strip h^3 may be made of canvas, leather, rubber, or other suitable flexible material.

From an examination of the drawings it will be readily understood that when the machine is in operation the vibratory motion of the shaker is transmitted to the vibrating feeder, by means of the extensible link I I′ I^2, in such manner that the middlings are fed to the shaker in a thin sheet or stream across the entire width of said shaker, and that the rate of feed may be regulated by means of the feed-slide G.

It will be readily understood that by reason of the coil or spiral spring I′ being interposed between the ends I I^2 of the link the vibratory motion of the feeder is a yielding one, so that in case any unduly hard or foreign substance shall find its way into the throat between the upper face of the feeder and the swinging portion E of the hopper it can pass through said throat without unduly straining any of the parts of the mechanism; yet we do not wish to be limited to the employment of an elastic link to connect the shaker with the vibratory feeder.

It will be understood that as the upper end of the vibrating feeder moves backward—that is to say, in the direction indicated by the arrow 1, Fig. 1—the feeding throat or space between the upper surface of the feeder and the lower edge of the feed-slide G or of the swinging part E of the hopper is widened, and is of course narrowed as the feeder moves in the opposite direction. This movement we have found very effective; but we do not wish to be limited to such construction, because under many circumstances the device will operate satisfactorily, even though the upper surface be made concentric with the pivots *h h*, as is indicated in Fig. 6.

In Fig. 7 we have shown so much of the hopper and feeding devices of a purifier as is necessary to illustrate one modification. In this figure we have shown both sides of the hopper composed of jointed or hinged members E E, attached by hinges *e e* to the upper stationary members or parts, E′ E′, the lower parts being drawn toward each other by elastic links F *f*, supported at their outer ends in brackets *f′ f′*, substantially as the swinging member of the hopper in the other figures is drawn toward the stationary member. There should be, of course, suitable cleats or stops attached to the end walls of the hoppers, or the adjacent inner casing of the machine, to prevent the elastic links from drawing the parts E E too close together at their lower ends. J J′ is a vibrating feeder, substantially like the one shown in the other figures at H H′, except that the upper part, J, represents an arc of a circle, so that the path described by this upper part, J, relative to the lower edges of the side boards, E E, of the hopper, when the feeder is vibrated about its supporting-pivots *j j*, shall be alike or similar with regard to each of the side boards or swinging parts E E. K K are converging hopper-boards extending the entire width of the machine to receive material from both sides of the vibrating feeder and collect the same and deliver it in a thin stream or sheet to the cloth of the shaker, which, it will be understood, is placed immediately below the throat *k*, because we believe it better to deliver the middlings nearer to the head or receiving end of the shaker than could be done if they were allowed to fall from both edges of the vibrating feeder directly upon the cloth, it being apparent that such material as passes over the rear edge of the feeder would fall upon the cloth at a much greater

distance from the extreme head end of the shaker if these converging boards were omitted.

In Fig. 8 the construction of the feed-hopper is substantially the same as that in the other figures, except that instead of providing the lower edge of the swinging part E with an adjustable feed-slide we propose to attach a vibrating curved feeder, M, thereto, the feeder being constructed with an upwardly-extending flange, *m*, to receive the bolts *l l*, which secure it to the vibrating part L. In this figure we propose to make the front end of the elastic link I I′ I² curved, and screw-thread its extreme forward end, as at *i*, where it is screwed into a corresponding threaded socket or seat formed in the upwardly-projecting flange *m* of the vibrating feeder.

By an examination of the drawings it will be understood that the construction of the vibrating feeder in all of the figures is such that when its edge is drawn toward the adjacent feed-slide G the throat between the lower edge of the feed-slide and the upper face of the feeder is widened; but we do not wish to be limited to such construction or arrangement of parts.

In Fig. 9 we have shown an arrangement of wheels and chains for driving the brushes, but lay no claim to them, because they are not of our invention, which is limited to the mechanism for feeding materials to the shaker.

We are aware that a vibrating feeder arranged below the open mouth of a hopper and having a curved upper surface has been used in middlings-purifiers and similar machines, and therefore do not claim such construction broadly.

We are also aware that a feed-hopper in a middlings-purifier has been made of such length as to extend nearly down to the plane of the upper surface of the shaker, with a vibrating feeder interposed between the hopper and the bolt-cloth, the relation of parts being such that the middlings after leaving the feeder fall directly upon the bolt-cloth; but in the construction last referred to the vibrating feeder was supported upon links which projected upwardly some distance above the lower end of the hopper, and were pivoted near their upper ends to the casing of the purifier, which necessitated a different construction of purifier from that in ordinary use, because it required a space between the wall of the purifier and each end of the feed-hopper, within which the vibrating links were arranged and supported, whereas our invention is adapted to be used in that construction of purifiers in which the casing of the machine forms the ends of the feed-hopper, the sides of the feed-hopper being of a length substantially equal to the distance between the side walls or side casings of the machine.

What we claim is—

1. In a middlings-purifier, the combination of the shaker, the feed-hopper, the vibrating feeder, and pivots arranged eccentrically to the upper curved surface of the feeder and supporting the feeder upon the frame-work of the purifier, substantially as set forth.

2. In a middlings-purifier, the combination of the shaker, the feed-hopper, the vibrating feeder, and the extensible link connecting the feeder with the shaker, substantially as set forth.

3. In a middlings-purifier, the combination of the shaker, a vibrating feeder, the feed-hopper having one side movable, the link F, connected with the movable part of the feed-hopper, the part *f*, connected with the stationary casing of the machine, and the spring F′, interposed between parts F *f*.

4. In a middlings-purifier, the combination of the shaker, a vibrating feeder, the feed-hopper having one side movable, the link F, connected with the movable part of the feed-hopper, the bracket *f′*, supported upon the casing of the machine, the screw-threaded part *f*, passing through bracket *f′*, the spring F′, interposed between the parts F and *f*, and a thumb-nut mounted upon the screw-threaded end of part *f*, by means of which the tension of spring F′ may be regulated.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE F. SHERWOOD.
CHARLES A. SMITH.

Witnesses:
WM. H. DICKEY,
GEO. S. BENNETT.