(No Model.) 2 Sheets—Sheet 1.

W. S. RUSSELL.

DUST COLLECTOR FOR MIDDLINGS PURIFIERS, &c.

No. 252,144. Patented Jan. 10, 1882.

Fig. 1.

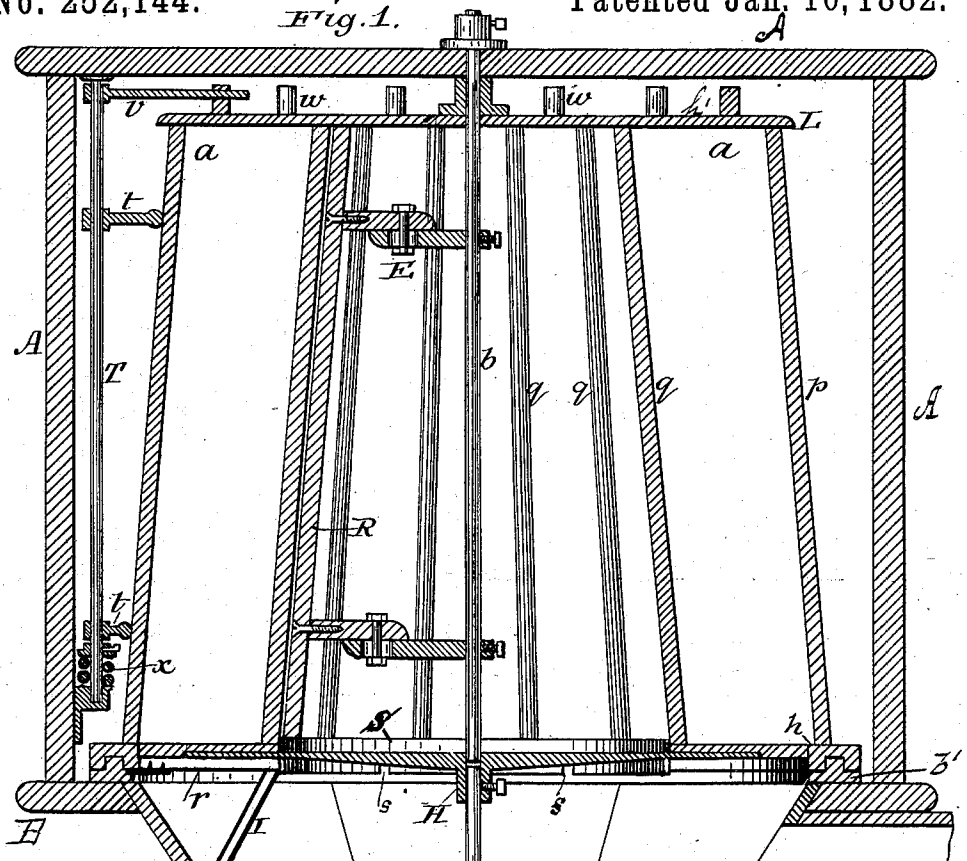


Fig. 7.

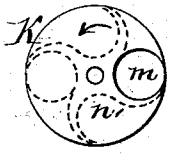
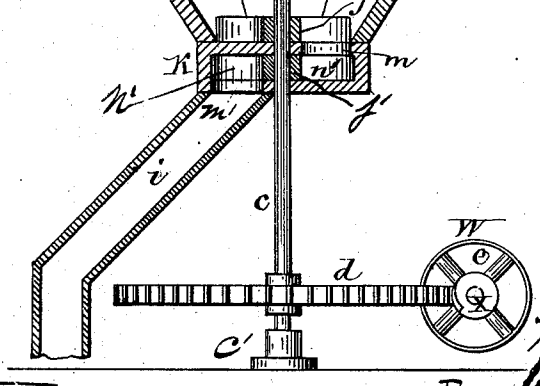


Fig. 2.





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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

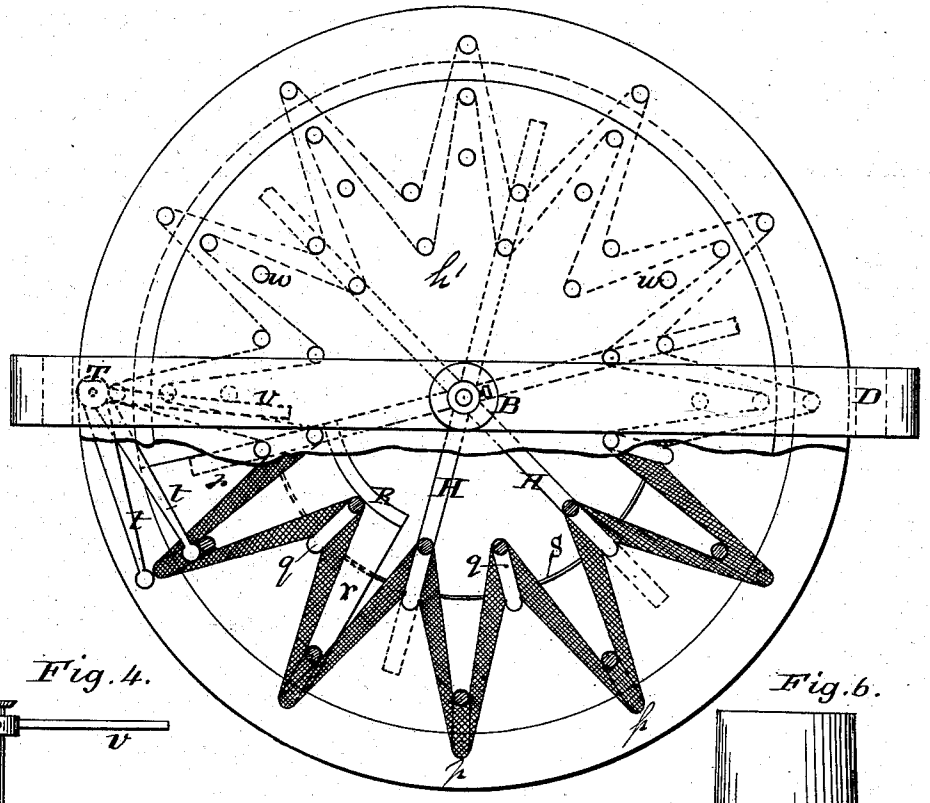


Fig. 4.

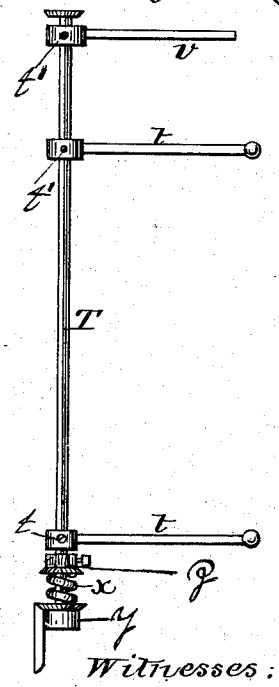


Fig. 5.

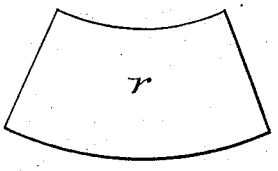
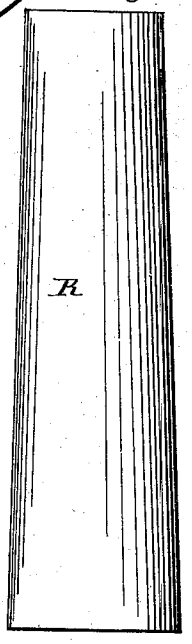


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM S. RUSSELL, OF NORTHFIELD, MINNESOTA.

DUST-COLLECTOR FOR MIDDLINGS-PURIFIERS, &c.

SPECIFICATION forming part of Letters Patent No. 252,144, dated January 10, 1882.

Application filed August 5, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SYLVESTER RUSSELL, a citizen of the United States, residing at Northfield, county of Rice, and State of Minnesota, have invented a new and useful Dust-Collector for Middlings-Purifiers, &c., of which the following is a specification.

My invention relates to certain improvements in machinery for collecting the dust from middlings-purifiers, millstones, and other machinery which produce dust in their operation; and it consists in the method and means hereinafter described, and specifically set forth in the claims.

Referring to the drawings, Figure 1 is a vertical section of a machine embodying my invention. Fig 2 is a plan of a discharge-gate. Fig. 3 is a plan, and in part a horizontal section, of the machine; and Figs. 4, 5, 6, and 7 are details hereinafter described.

A A represent a simple rectangular framework supported upon and extending centrally over a base-board, B, and serving to support certain portions of the mechanism employed. The base B may, if desired, be supported independently of or in conjunction with the machines with which my machine is intended to be used, and any suitable frame-work may be used.

In addition to the frame A, and co-operating therewith, there are the following principal elements of my machine: an induction-pipe, *f*, a hopper, *g*, an eduction-pipe or discharge-passage, *i*, intervening gates *j j'*, a balloon or reel, L, and knocking or jarring mechanism T, and isolating or cut-off mechanism R *r*, all of which I will now proceed to more particularly describe.

The induction-pipe *f* communicates directly or indirectly with the millstone or plant of milling machinery, or other machine of the character hereinbefore mentioned, and conducts or directs the dust, impurities, light particles of grain, and similar substances into the hopper *g*, while they are intermingled with and carried by the blast of air by which they are moved from said machines, as is usual.

The hopper *g* extends upwardly to the base B, where it terminates at a rib, *b'*, which forms a substantially air-tight joint with the lower reel-head, *h*. The hopper extends downwardly with converging sides and is closed at its bottom by a gate-case, K, the upper surface of which constitutes the bottom of the hopper.

The gate-case K (see Figs. 1, 2, and 7) consists of a circular box, the upper surface of which is provided with an aperture, *m*, and the lower surface with a like aperture, *m'*, but oppositely disposed, so that they do not directly communicate or register with each other.

Upon and within the case are the gates *j j'*, which consist of hubs having curved vanes *n n'*, the hubs being fitted to a shaft, *c*, which passes through the case, as shown. The shaft *c* rests and revolves upon a step, *c'*, and is rotated slowly by means of gear *d* meshing with a worm, *e*, mounted on shaft X, which is driven from any convenient source of power by a belt-pulley, W. The shaft *c* is secured to the casting H, which consists of a hub and spokes, which support the reel L, by which means it is rotated.

The reel consists of a lower head, *h*, and an upper head, *h'*, connected by rods *p p* and *q q*, parallel to each other and slanted from base to top, and about which reticulated cloth or other suitable screening material is so arranged as to constitute pockets or apartments, in this instance V-shaped in cross-section and extending from one head of the reel to the other. (See Fig. 3.) The upper head of the reel is solid and imperforate, constituting, in connection with the screen-apartments, a practically air-tight as well as dust-proof upper end to the reel. The lower head is open at its center, and has an inner outline coinciding with the screen, being extended inwardly in points for the support of the rods *q* of the screen-apartments.

Within the reel is supported, by the frame A, a central non-rotative rod, *b*, to which are adjustably attached laterally-adjustable arms E, which support in any suitable manner a cushion or guard, R, extending from the top to the bottom of the reel and having a curved face coincident with the circle described by the rods *q*.

Beneath the head *h*, and at the top of the hopper *g*, is a small cushion or guard, *r*, supported at its outer end by straps of iron secured to its under surface by screws or other-

wise, said straps being let into the rib b', and at its inner end said cushion is supported by a brace, I, secured to the hopper.

To the spokes of the casting H and to the head h' is secured a hoop, S, the spokes passing through slots in its lower edge, the slots being shown at s. The hoop S closes the space between the inner end of the small cushion r and the lower end of the large cushion R, thus constituting a separate V-shaped apartment, the top being reel-head h', the inner side being guard or cushion R, the outer converging sides being the screen about the posts $q\ q\ p$, and the bottom being the lower head, h, the small cushion r, (at that portion between the rods $q\ q$ where the head h is formed in points,) and the strap S.

The head h' is provided with pins w, against which the arm v on the knocker-shaft T strikes during the rotation of the head. Shaft T is provided with the knockers $t\ t$ and a retracting-spring, x, and is supported in suitable bearings in the frame-work A. The arm V and the knockers $t\ t$ are adjustably attached to the shaft T by means of set-screws t', and the spring x is coiled about the shaft and fastened at one end to the bearing-bracket y and at the other end to a collar, z, provided with a set-screw, whereby the tension of the spring may be adjusted so as to cause the knockers to act with greater or less force.

The operation of the machine is as follows: The blast of air bearing the dust enters the hopper g by the induction-pipe f, and there expands and rises into the reel through its central opening, and between the arms of the casting H, and between the inwardly-extending points of the head. During this time the heavier particles fall by gravity to the bottom of the hopper, while the lighter substances are carried by the air against the screen-apartments, and from the inner surface thereof some portions of the dust may fall into the hopper by gravity when it has collected upon the screen in quantity sufficient to overcome the pressure of the air which passes through the screen, leaving its burden of dust deposited thereon. As the screen moves in its slow rotation the successive apartments are brought over the cushion r and outside of and adjacent to the large cushion R, and these cushions or guards and the strap S cut off or separate such apartments from the pressure and influence of the air, rendering them what might be termed "dead-air chambers or apartments," and while so protected and isolated the knockers $t\ t$ strike against one (the outer in this instance) of the posts of said isolated apartments and by concussion remove the accumulated dust from the inner surfaces of said isolated screen-apartments, each after the other in regular succession, as they are successively brought within the limits of the cushions or guards. The dust, having been separated from the blast, now lies at the bottom of the hopper, when the revolving gate j rotates and sweeps the dust over the aperture m, when it falls within the gate-case K, where the gate j' sweeps it around therein and over the opposite aperture, m', where it falls into the discharge-passage i, and is conducted to desired points for further operation, as usual. During this operation of discharging the contents of the hopper it will be observed that the air or blast has been retained within the hopper by reason of the construction, arrangement, and operation of the gates $j\ j'$. The curved arms n' of the gate j' constitute, in connection with the inner sides of the case K, air tight, separated, and isolated pockets or carriers, which, after they have moved a quarter-revolution, are completely beyond any influence of the blast and inaccessible thereto, and so continue until they discharge their contents into the passage i.

The guards or cushions may, if desired, be extended in area so as to isolate more than a single section, and other apparent modifications may be availed without departure from my invention.

It is evident that by tightening the coil of spring x by turning the collar z upon the shaft T, the set-screw being used to retain the collar in a desired position, the force of the blow of the knockers may be increased or diminished, as desired.

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

1. The combination of mechanism for conducting a blast against and through a screen, mechanism for rotating said screen, mechanism for isolating a portion of said screen, mechanism for jarring said isolated portion, and mechanism for isolating the substances thus separated from the blast and conducting them away from the influence of said blast, all substantially as shown and described.

2. The combination of an induction-pipe, a hopper, and a gate-case having an upper receiving port or aperture and a lower oppositely-disposed discharging port or aperture, and an inclosed rotating gate adapted to register alternately with said ports or apertures, all substantially as shown and described.

3. The combination of an induction-pipe, a hopper, a gate for closing the outlet of the hopper, a rotating reel having an upper closed head and a lower open head and sides arranged in compartments, and cushions or guards which isolate successive compartments with mechanism for jarring such isolated compartments, all substantially as shown and described.

4. The combination of a rotating reel or screen formed in compartments, a stationary inner guard or cushion and a stationary lower guard or cushion, and a strap attached to the reel-head, substantially as shown and described.

5. The combination of the shaft T, adjustable arm v, adjustable knockers $t\ t$, and adjustable coiled spring x, substantially as shown and described.

6. The combination of frame A, non-rotative shaft *b*, adjustable arms E, and cushion or guard R with the reel L and rotative shaft *c*, substantially as shown and described.

7. The combination of the reel L, knockers *t*, and guards R *r* with means, substantially as shown and described, for their operation, substantially as and for the purpose set forth.

8. The combination of the reel or screen L, hopper *g*, connected therewith, the shaft *c*, and the gate-case K and gates *j j'*, substantially as shown and described.

9. The combination of the reel or screen L, provided with pins *w*, and rotated about the fixed bar *b*, supported in frame A, with said frame and the knocker-shaft T, supported in said frame and provided with the arm *v*, substantially as shown and described.

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J. F. HUNTER.