

(No Model.)

3 Sheets—Sheet 1.

E. R. DRAVER.
DUST COLLECTOR.

No. 521,604.

Patented June 19, 1894.

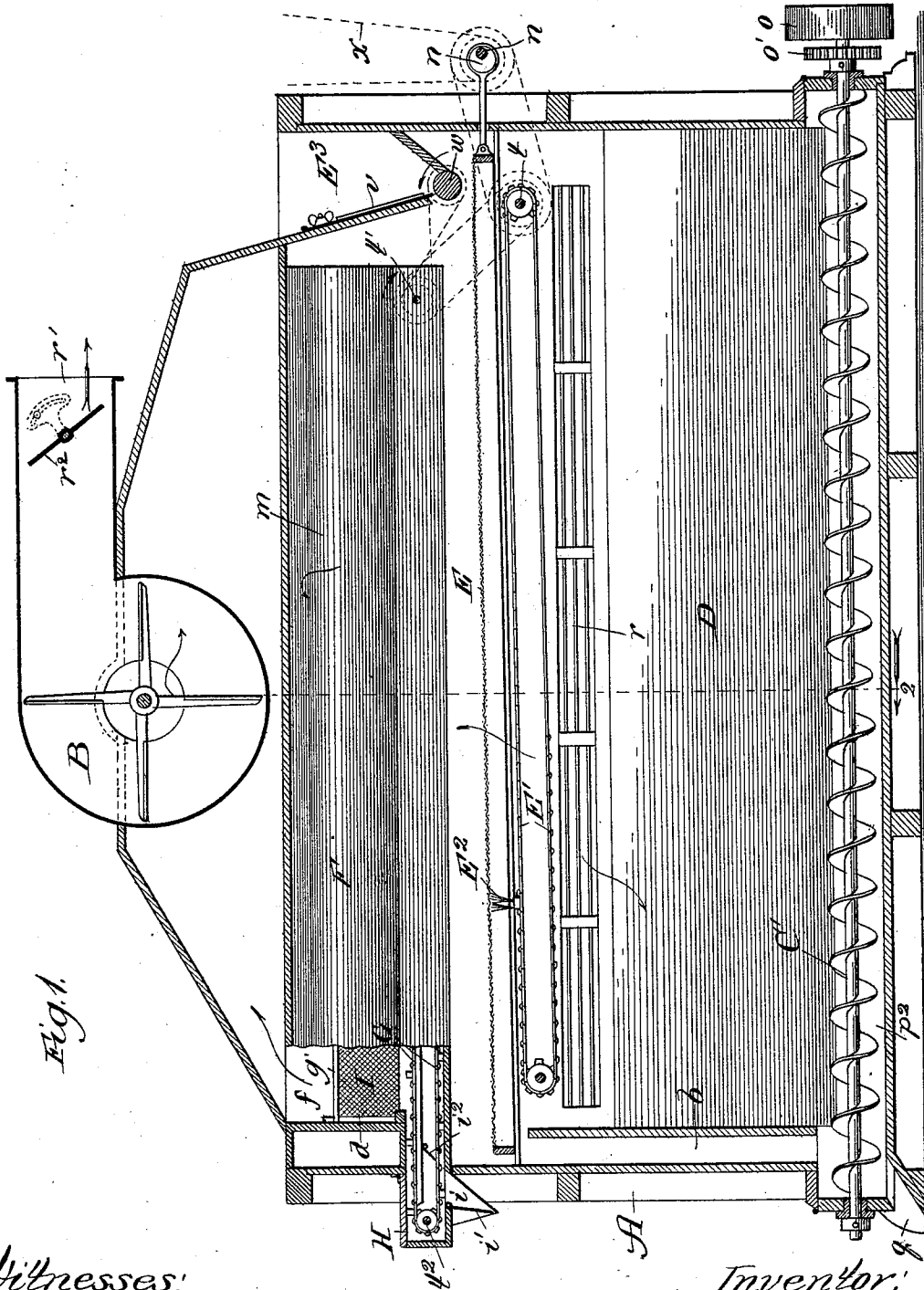


Fig. 1.

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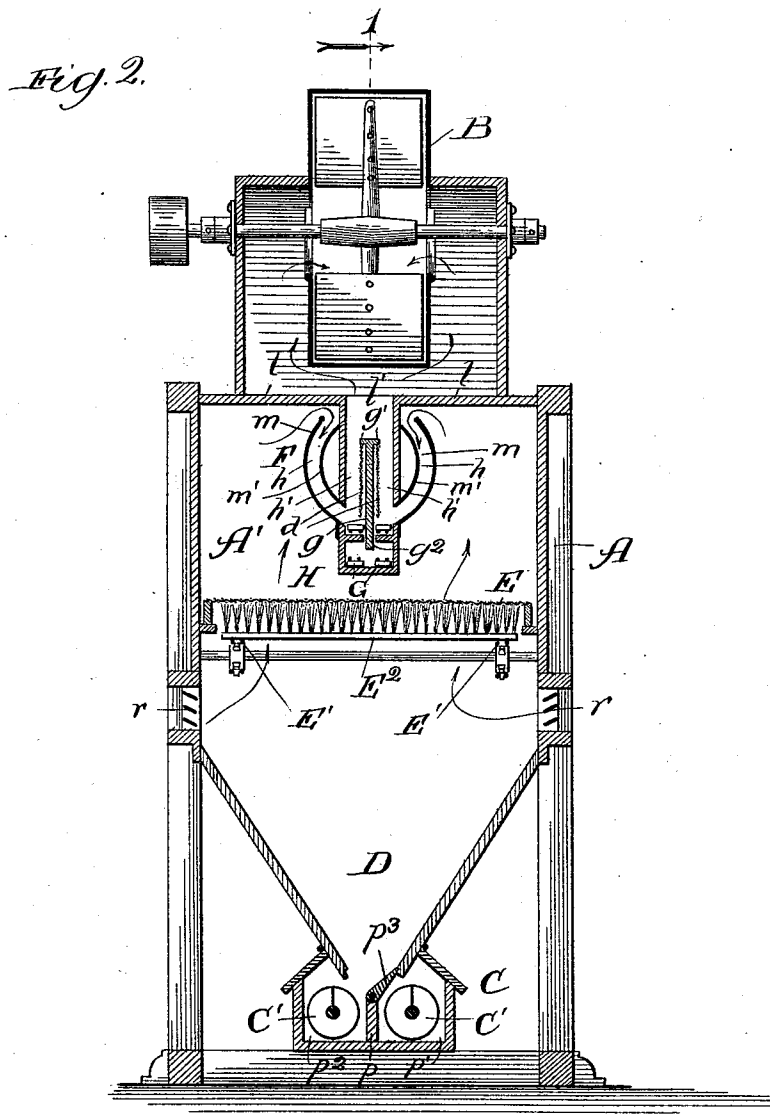
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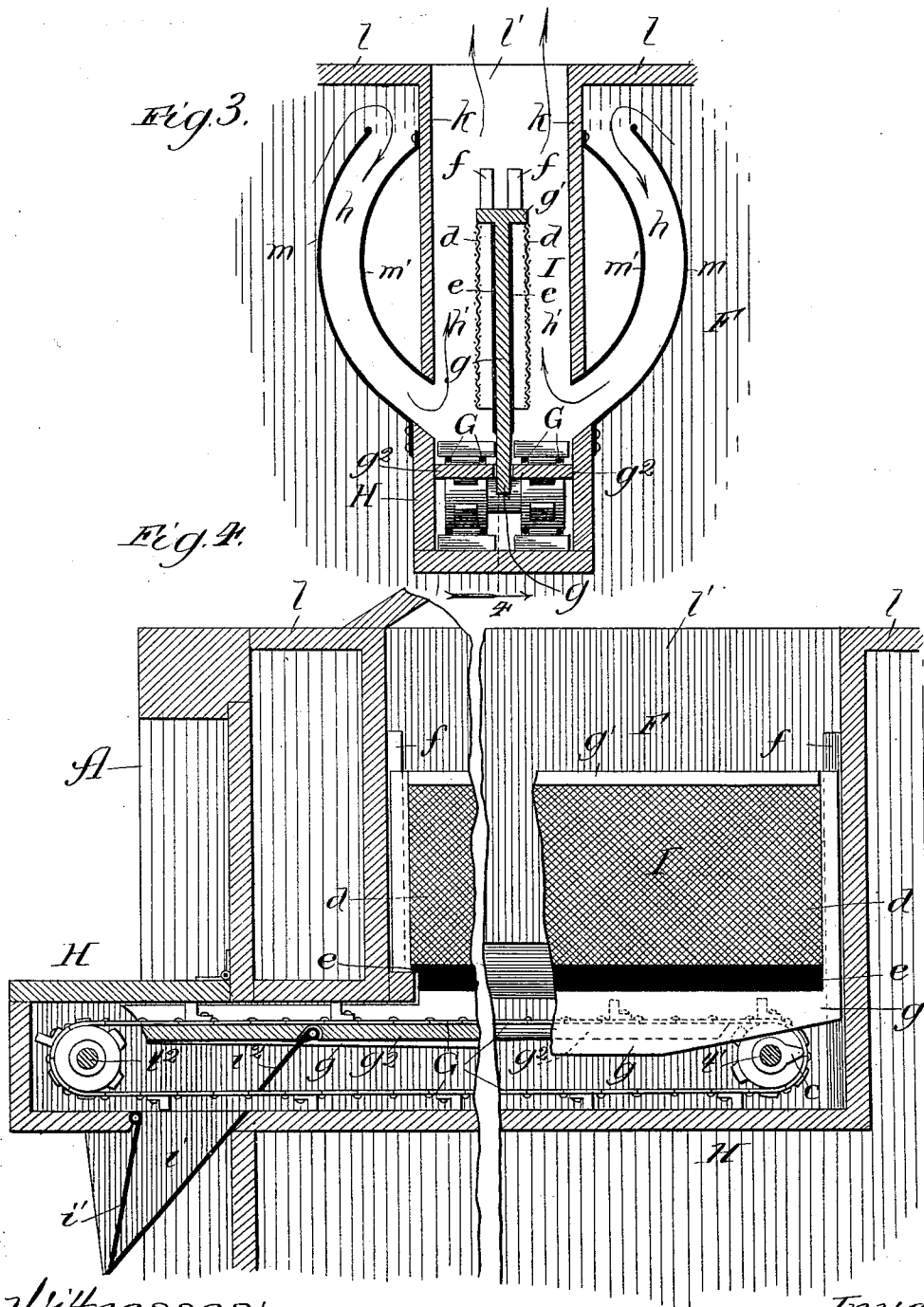
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UNITED STATES PATENT OFFICE.

EMIL R. DRAVER, OF ALLIANCE, NEBRASKA, ASSIGNOR TO FLORENCE N. DRAVER, OF SAME PLACE.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 521,604, dated June 19, 1894.

Application filed September 5, 1893. Serial No. 484,858. (No model.)

To all whom it may concern:

Be it known that I, EMIL R. DRAVER, a citizen of the United States, residing at Alliance, in the county of Box Butte and State of Nebraska, have invented a new and useful Improvement in Dust-Collectors, of which the following is a specification.

My invention relates to an improvement in the class of apparatus for separating the dust from a current of dust-laden air.

There are various connections, or particular applications, in which dust-collectors, of the class to which my invention relates, are used; and my improvement is adapted for use in any of these. I especially design my improvement, however, for use in a flour-mill with a middlings-purifier, and therefore hereinafter confine the description to such use and show it applied thereto in the accompanying drawings, in which—

Figure 1 is a view in sectional side elevation of a middlings-purifier provided with my improvement; Fig. 2, a section taken at the line 2 on Fig. 1 and viewed in the direction of the arrow; Fig. 3, a view showing my improved dust-collector in cross-sectional elevation on a larger scale than that observed in Fig. 1; and Fig. 4, a broken longitudinal section taken at the line 4 on Fig. 3 and viewed in the direction of the arrow.

A is the casing of a middlings-purifier, in which is housed my improved dust-collector. A fan B is located on the upper part of the casing to draw air through the machine, as usual, namely, as represented, by sucking it through side-openings *r* in the casing and causing it to escape from the discharge-end *r'* of the fan, in which is provided a suitable adjustable valve *v* for regulating the air-supply; or a continuous circulation of the same air may be had through the machine by a pipe-connection between the discharge end of the fan and the base-portion of the casing A. In the base of the casing and extending longitudinally thereof to an outlet *q*, or outlets, at one end, is a trough C divided lengthwise by a partition *p* into two conveyer-housings *p'* and *p''*, the conveyers C' in which are shown as of the worm variety, though they need not be. The worm-conveyers may be geared together at one end (a gear *o'* being shown, for the purpose, on the end of the conveyer-shaft

presented to view in Fig. 1) to be driven by a belt pulley *o* on the shaft of one.

D is a hopper in the casing, extending lengthwise thereof and seating in the top of the trough C, toward the center of which the sides converge from below the air-inlets *r*; and at intervals on the partition *p* are valves *p''* for the usual purpose of adjustment with relation to the sides of the hopper, to guide the material through it at will to one or the other of the conveyers C'.

Above the plane of the openings *r*, is supported the screen E, having its frame connected by an eccentric *n* with a rotary shaft *n'*, the driving of which, through its connection, indicated at *x*, with the driving-power (not shown) vibrates the screen longitudinally for the usual purpose; and below the screen is supported in the casing the endless traveling belt E', having the roller *t* at one of its ends geared to the shaft *n*, the belt carrying a brush E² to prevent clogging of the screen by operating against its under side.

E³ is the feed-hopper on one end of the top of the casing, containing the regulating slide-valve *v* and having its outlet controlled by a roller *w*, which may be geared to the roller *t* through the end-roller *t'* of a conveyer G, provided for the dust-collector hereinafter described.

The parts thus far described relate to the middlings-purifier as the medium of application of my improved dust-collector, and which need involve in itself no features of novelty in construction or mode of operation.

F is the dust-collector, the primary purpose of my improved construction thereof being to cause it to intercept so completely the dust from the dust-laden air, in the path of which the collector is interposed, as to thoroughly relieve it of the dust it carries. To this end I provide, as the principle of my improved construction, a passage interposed in the path to the fan of the air-current, and having its mouth or inlet in its upper portion, the passage leading thence downward to a dust-intercepting deflector, whence it leads upward toward the fan. The preferred form of the passage referred to, from its inlet-end downward, is that of, or approximating, the arc of a circle; and I prefer to duplicate the passage by providing one at each side of the dust-in-

tercepting deflector, the latter form being the one illustrated, and involving details of construction which may be described as follows: Two curved deflectors m and m' , the latter being supported concentrically within the former, extend lengthwise of the casing A in a chamber A' between the screen E and the fan-chamber, from which it is separated by a horizontal partition l having a central longitudinal opening l' , whence extend downward the sides k . Each of the deflectors m and m' is, as it were, a cylindrical tube cut in two, lengthwise, at its center, the two halves of the inner tube being fastened, along their edges, to the outer faces of the sides k , and those of the outer tube are fastened at their lower edges along opposite sides of a trough H supported below the tubes at the opposite ends of the casing A, in which it extends longitudinally, having a discharge-spout i , at one end, controlled by an outwardly opening check-valve i' . The two deflectors m and m' thus form the curved, or arc-shaped passages h .

I is the dust-intercepting deflector, shown in the form of a center-board g , preferably of wood or metal, supported at its opposite ends by the ends of the casing A, in vertical position to extend centrally in the outlet-passage between the two sides k short of the opening l' in the partition l and below the plane of the outlet-ends of the passages h into the trough H, being provided along its upper edge with a head g' , and fitting along its lower edge in the longitudinal slot of a base g^2 , extending against the sides of the trough to prevent undesired passage of air at its edges. The center-board thus deflects the passages h vertically upward, forming, as it were, upward extending continuations h' thereof. In the trough H is the conveyer G, which I prefer to provide in the form of an endless slat-conveyer having an endless belt carrying cross-slats at intervals and supported on the end-rollers t' and t^2 . Because of the obstruction presented by the lower end-portion of the center-board, the endless-belt and slats of the slat-conveyer may be divided longitudinally to operate in the trough at opposite sides of the center-board; and between the oppositely moving lengths of each of the slat-conveyer belt-sections I interpose a hinged-valve v^2 to obstruct the passage of air while not interfering with the travel of the conveyer, in which it is guided by the base g^2 . The center-board g , while it may be rigid, is preferably supported, to permit it to be jarred by vertical movement through the base g^2 , between upright guide-cleats f at its opposite ends. Moreover, for the more common use of the center-board as a dust-interceptor, its sides should be covered with cloth e , over which screens d are fastened, leaving spaces between them and the cloth-covered surfaces; and as the center-board should be jarred periodically, to shake off the accumulations upon it, I provide on the roller t' a striker-

arm c (Fig. 4) which, with each revolution of the roller, engages the adjacent beveled lower edge of the board g to raise it and permit it to drop.

The operation is as follows: The moving parts of the apparatus being set in motion, and the material, say middlings, fed through the hopper E^3 upon the vibrating screen E (whence the residue tails off to the chute b , through which it falls into the trough C) the fan sucks air from below the screen upward through the latter, and it takes up dust, from the material thereon, with it into the chamber A', the only outlet from which is in the collector F and afforded by the passages h, h' , through which the air-suction draws the dust-laden air, thus first in a downward direction, and, owing to the convex form of the passages h , centrifugally with relation to the common center of the tubes m, m' , whereby the heavier particles of dust tend to seek lodgment against the inner surfaces of the outer walls of the passages h , and work their way down into the trough H, whence the conveyer carries them to the discharge i' . As the air-currents leave the lower ends of the passages h , they strike the center-board g and are thereby deflected upward through the passages h' , the sides of the board gathering more dust from the air, which is further obstructed in its upward course by the overlapping head g' to tend thereby the better to release the dust; and by the time the air reaches the fan, it will be practically, or thoroughly, relieved of dust. The dust-accumulations on the sides of the center-board, particularly if they be cloth-covered and screened, as described, will contain practically all the dust carried by the air when it emerges from the passages h ; and the screens d present the advantage of admitting the fine dust-particles through them to the cloth, on which they accumulate in flakes, which are too coarse to pass back through the screens if they become dislodged. By jarring the center-board the accumulations upon it are dislodged and fall upon the conveyer G, which carries them to the discharge-outlet i .

As will be understood from the statement herein of the principle of construction involved in my improved dust-collector, I do not intend to limit my invention to the particular construction thereof shown and described, as the same may be embodied in various forms without departure from the principle thereof; and I wish it also to be understood that the provision of the two passages h, h' , though desirable for the reason of the increased effect in relieving the dust-laden air, is not essential, as one passage h, h' , will operate.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a suitable casing and a fan for forcing air through the same, a dust-collector interposed in the path of the air-current and containing a passage having

the inlet at its upper end and leading thence downward, an outlet-passage leading from the lower end of the inlet-passage to the fan-chamber, and a dust-intercepting deflector in said outlet-passage adjacent to the lower end of the downward extending passage and forming the upward extension thereof leading to the outlet, substantially as described.

2. In combination with a suitable casing and a fan for forcing air through the same, a dust-collector interposed in the path of the air-current and containing an outwardly curved passage *h* having the inlet at its upper end and an upward extension *h'* leading from its lower end to the outlet and a dust-intercepting deflecting board *g* forming one side of the said extension *h'*, substantially as described.

3. In combination with a suitable casing and a fan for forcing air through the same, a dust-collector interposed in the path of the air-current and containing a passage having the inlet at its upper end and leading thence downward, an outlet-passage leading from the lower end of said inlet-passage to the fan chamber and a dust-intercepting deflecting-board *g*, yieldingly supported in said outlet-passage adjacent to the lower end of the downward-extending passage and forming the upward extension thereof leading to the outlet, substantially as described.

4. In combination with a suitable casing and a fan for forcing air through the same, a dust-collector interposed in the path of the air-current and containing a central upright dust-intercepting deflector, and passages, at opposite sides of the deflector, each having the inlet at its upper end and leading thence downward to said deflector and branching into an upward extension *h'* leading, between the deflector and adjacent said passage, to the outlet, substantially as described.

5. In combination with a suitable casing and a fan for forcing air through the same, a dust-collector interposed in the path of the air-current and containing the outwardly curved passages *h* each having the inlet in its upper end and an upward extension *h'* leading from its lower end to the outlet, and a dust-intercepting deflector interposed between the said passages and forming the said extensions, substantially as described.

6. In combination with a suitable casing and a fan for forcing air through the same, a dust-collector interposed in the path of the air-current and containing a central upright dust-intercepting deflector formed with a center-board *g* having a head *g'*, cloth-covered sides and screens *d*, and passages *h*, at opposite sides of the deflector, each having the inlet at its upper end and leading thence downward to said deflector and branching

into an upward extension *h'* leading, between the deflector and adjacent said passage, to the outlet, substantially as described.

7. In combination with a suitable casing having a fan B arranged to draw air through the same, middlings-purifying mechanism, substantially as described, in the casing, and a chamber A' therein between the fan and air-inlet, and a dust-collector in said chamber, containing a passage having the inlet at its upper end and leading thence downward an outlet-passage leading from the lower end of the inlet-passage to the fan chamber and a dust-intercepting deflector in said outlet-passage adjacent to the lower end of the downward-extending passage and forming the upward extension thereof leading to the fan, substantially as described.

8. In combination with a suitable casing having a fan B arranged in its top portion to draw air through the casing, middlings-purifying mechanism, substantially as described, in the casing and a chamber A' therein formed, between the fan and air-inlet, by a partition *l* having an opening *l'* flanked by the sides *k*, and a dust-collector in said chamber and containing an upright dust-intercepting deflector formed with a board *g* supported between the said sides and curved passages *h* on the outer surfaces of said sides, each having the inlet at its upper end and leading thence downward to said deflector and branching into an upward extension *h'* leading between the deflector and adjacent side *k* to the opening *l'*, substantially as set forth.

9. In combination with a casing A having a fan B arranged in its top-portion to draw air through the casing, middlings-purifying mechanism, substantially as described, in the casing and a chamber A' therein formed between the fan and air-inlet, by a partition *l* having an opening *l'* flanked by the sides *k*, and a dust-collector F in said chamber containing an upright dust-intercepting deflector formed with a board *g* supported between said sides and provided with a head *g'*, a base *g''* and cloth-covered screened sides, passages *h* in the outer surfaces of said sides, each having the inlet at its upper end and leading thence downward to said deflector and branching thence into an upward extension *h'* leading, between the deflector and adjacent side *k*, to the opening *l'*, and a trough H provided with a valve-controlled outlet *i* and containing a conveyer G provided with means for jarring the board *g*, the whole being constructed and arranged to operate substantially as and for the purpose set forth.

EMIL R. DRAVER.

In presence of—

H. V. SCHAUPP,
C. D. SNYDER.