No. 624,592. Patented May 9, 1899.

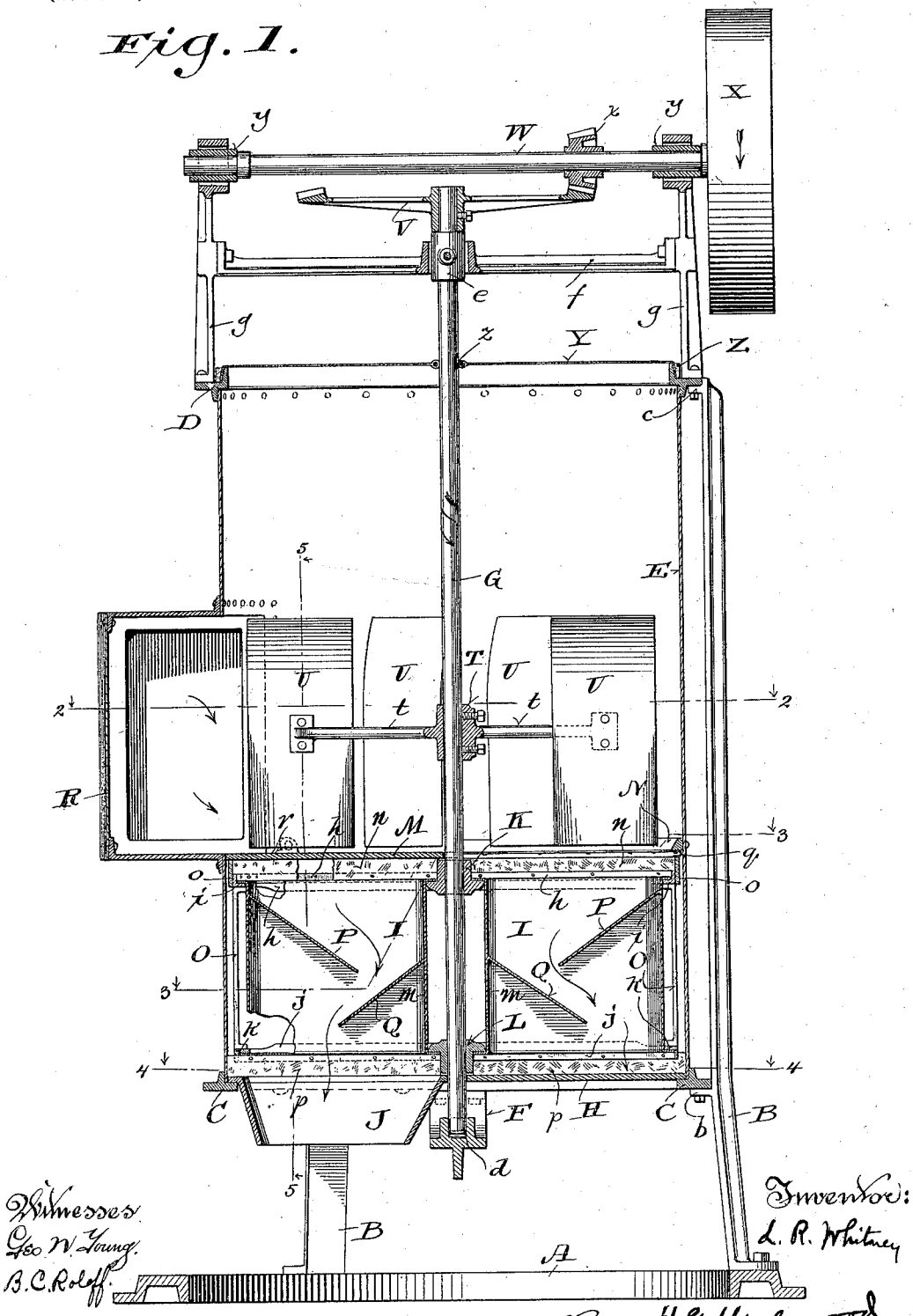
L. R. WHITNEY.

DUST COLLECTOR.

(Application filed Mar. 3, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses
Geo. W. Young.
B. C. Roloff.

Inventor:
L. R. Whitney
By H. G. Underwood
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 2.

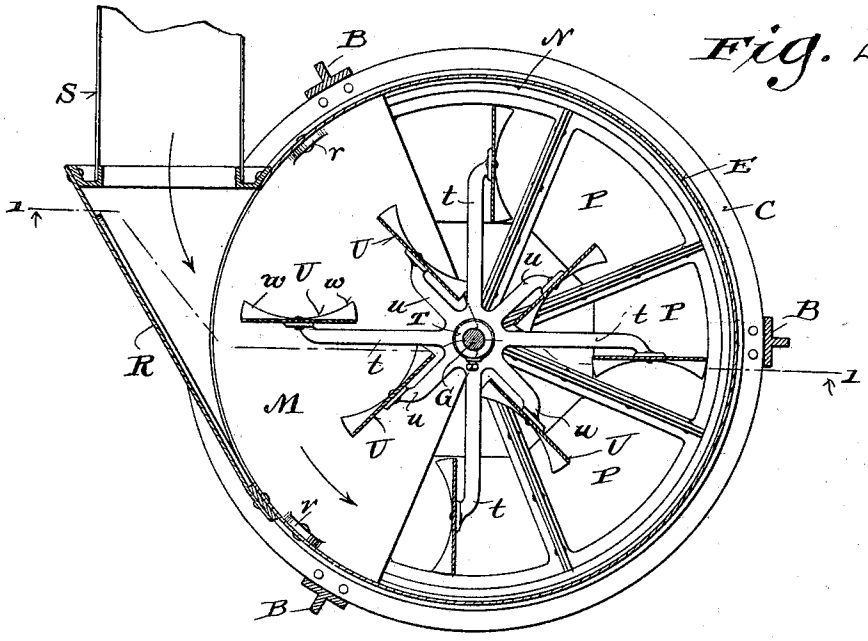
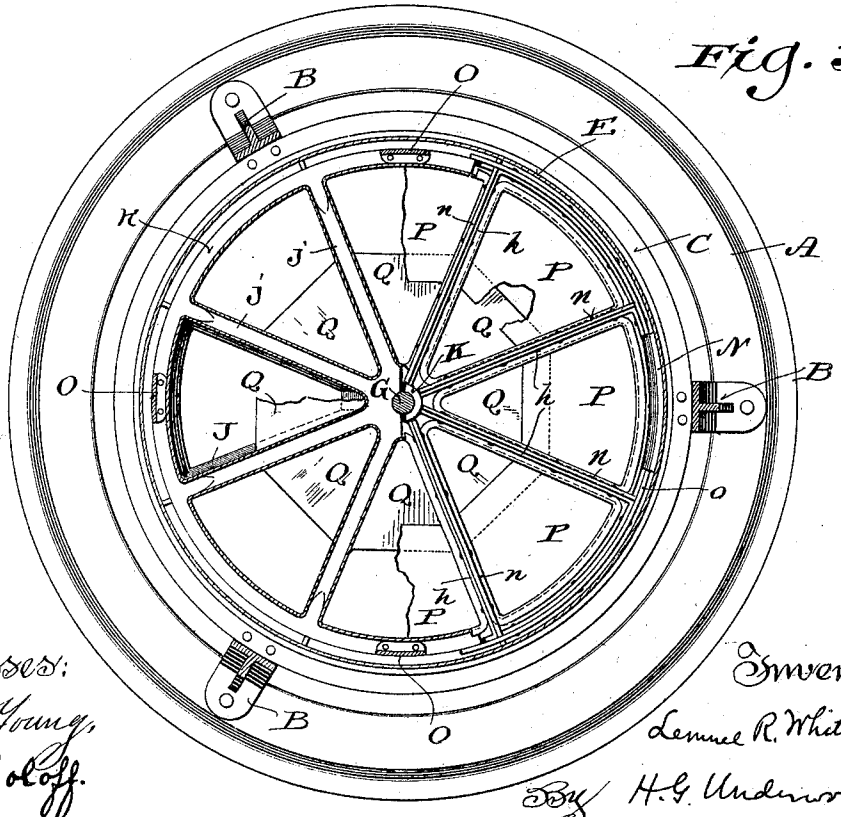


Fig. 3.



Witnesses:
Geo. W. Young,
B. C. Roloff.

Inventor
Lemuel R. Whitney
By H. G. Underwood
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 4.

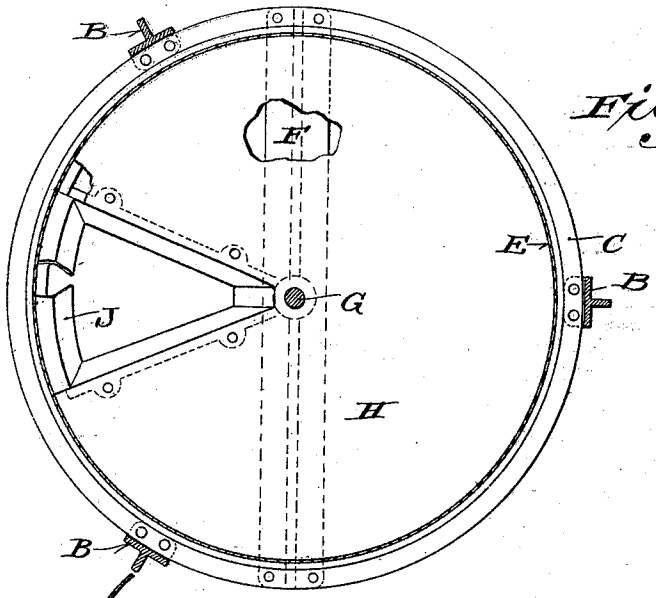


Fig. 5.

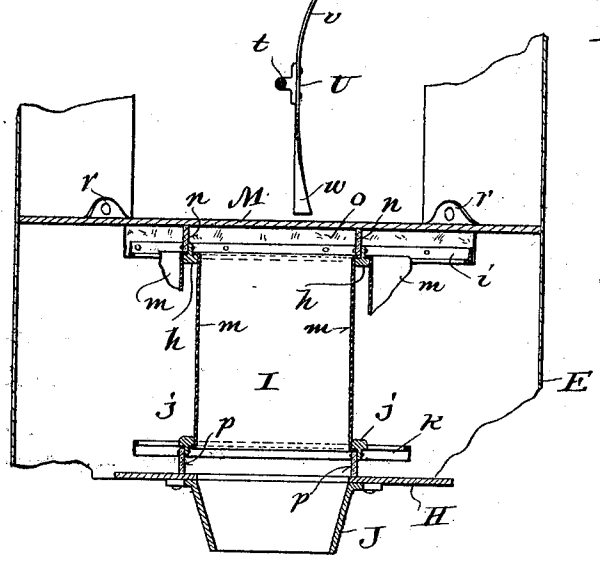


Fig. 6.

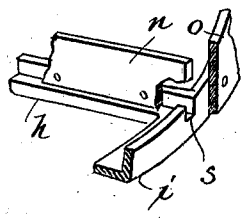
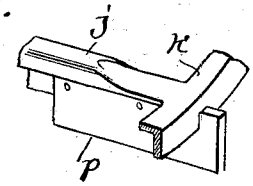


Fig. 7.



Witnesses:
Geo. W. Aury,
B. C. Roloff.

Inventor
Lemuel R. Whitney
By H. G. Underwood
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LEMUEL R. WHITNEY, OF MILWAUKEE, WISCONSIN.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 624,592, dated May 9, 1899.

Application filed March 3, 1899. Serial No. 707,577. (No model.)

To all whom it may concern:

Be it known that I, LEMUEL R. WHITNEY, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Dust-Collectors; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to dust-collectors especially designed for use in flour-mills; and it consists in certain peculiarities of construction and combination of parts, as will be fully set forth hereinafter and subsequently claimed.

In the drawings, Figure 1 is a central vertical sectional view of my improved device on the line 1 1 of Fig. 2. Figs. 2, 3, and 4 are horizontal sectional views, respectively, taken on the lines 2 2, 3 3, and 4 4 of Fig. 1. Fig. 5 is a sectional view on the plane indicated by the line 5 5 in Fig. 1. Figs. 6 and 7 are detail perspective views.

Referring to the drawings, (in which parts are broken away to more plainly show certain details of construction at various points,) A represents the base or platform, and B B B standards or uprights secured thereto and rising therefrom. C is a ring resting on and secured to lugs *b b*, which project inwardly from the lower portions of the said standards B, and D is another ring resting on and secured to similar lugs *c c*, projecting from the upper ends of the said standards. E is a vertical annular casing extending between the said rings C D and secured thereto.

F is a transverse brace-piece or yoke extending diametrically beneath the ring C and secured thereto and having a central socket *d*, in which is stepped the lower end of the vertical shaft G, the upper end of which passes through a box or bearing *e*, secured to a cross-piece *f*, which in turn is secured to standards *g g*, rising from the upper ring D.

H is the floor of the annular casing E, supported on the lower ring C and formed with an opening of a generally triangular shape, (corresponding to the area of one of the revolving buckets I, hereinafter described,) and J is a hopper-shaped outlet secured just beneath said opening in the floor H.

K and L designate, respectively, the hubs of upper and lower wheels, secured to the vertical shaft G, so as to revolve therewith, and *h i* designate the spokes and rim of the upper wheel, and *j k* the spokes and rim of the lower of said wheels. The spokes are T-shaped in cross-section and the rims angle-shaped, as best shown in Figs. 5, 6, and 7. The buckets I are open at top and bottom and are formed of metal sheets *m*, whose upper edges are turned over the horizontal flanges of the spokes *h* and rim *i* and whose lower edges are turned under the horizontal flanges of the spokes *j* and rim *k*. Strips of rubber or like flexible material *n* are secured to the vertical flanges of the upper-wheel spokes *h* from center to rim and a continuous strip of rubber *o* is secured to the vertical flange of the rim *i* of the upper wheel to form upward-projecting flexible scrapers, and similar flexible strips *p* are secured to the vertical flanges of the lower-wheel spokes *j* from the center and projecting beyond the rim *k* of said lower wheel to form downward-projecting flexible scrapers, as hereinafter explained.

M represents a floor-section secured, as by ears *r*, to the casing E above the plane of the revolving buckets I and of an area sufficient to cover three of said buckets, (in the illustration given, wherein there are represented eight of said buckets,) leaving an open space equal to the area of five of said buckets, and N represents a curved strip of wood secured to the casing E and extending all around said open space, while *q* represents a doubled rubber or other flexible strip, whose upper half is secured to the under side of the strip N and whose lower half rests on the top edge of the upward-projecting annular flexible strip *o*. Braces O O connect the upper-wheel rim *i* and lower-wheel rim *k*. The flexible strips *n* may be secured to either side of the vertical flanges of the spokes *h*, and in order to insure a close junction between the outer ends of the strips *n* and the annular strip *o* the vertical flange of the rim *i* may be cut out in line with the strips *n*, as shown in Fig. 6, so that the strip *n* will rest in said recess *s* and bear against the strip *o*, and with the strip *p* of the lower wheel, which strips are designed to project beyond the rim *k*, the vertical flange of the last-named rim is similarly cut out for the reception and passage of the strips *p*, as shown in Fig. 7.

The buckets I are provided with inclined upper and lower deflecting-plates P Q, whose relative arrangement is best shown in Fig. 1 and which extend from side to side of the buckets in opposite directions and overlap at their free inner ends.

At a point within the limits of the floor-section M the annular casing E has an opening formed therein, protected by a tangentially-projecting casing R, which in turn communicates with a pipe S, leading from a fan or blower (not shown) to form the inlet-channel for dust-laden air, and opposite this inlet is a spider, whose hub T is secured to the vertical shaft G, and from the hub there project radial arms *t* and *u* of different lengths, respectively alternately arranged, and to the ends of these arms there are secured blades U. These blades are of peculiar shape, the upper half, as best shown at *v* in Fig. 5, curving over from the horizontal center, while the lower half is centrally straight in a vertical line, but curves inward at each lower corner, as shown at *w w*, the better to receive the currents of dust-laden air, as hereinafter described.

The upper end of the vertical shaft G is fitted with a horizontal gear-wheel V, which meshes with a pinion *x* on a horizontal shaft W, journaled in bearings *y y* in the upper ends of the standards *g g*, and this shaft W carries a pulley X at one end to serve as a governor, as hereinafter explained. The top of the casing E is closed by a cover Y of suitable fabric, (such as bolting-cloth,) having a central aperture *z* for the passage of the shaft G therethrough and held in place by a ring *z*, which clamps the edge of said cloth top against an upper vertical flange on the upper ring D.

The operation of my device will be readily understood from the foregoing description of its construction taken in connection with the accompanying drawings. Dust-laden air is blown into the pipe S and, passing through the casing R, enters the casing E above the close floor-section M, and strikes against the blades U, thereby revolving them and through them and their spider-arms revolving the vertical shaft G and the buckets I, attached thereto. By reason of the peculiar shape of the blades already described and their alternate arrangement on long and short arms the dust-laden air-currents are all received and retained by the blades and so divided and distributed as the blades are driven around in the direction of the arrows that the objectionable feature of a strong centrifugal current is overcome and the dust in the air falls by gravity and settles into the open-topped buckets beyond the floor-section M, and through said buckets onto floor H, and through the outlet J into any suitable receptacle or conveyer beneath said outlet, the air, free from dust, escaping up and out through the cloth-covered top Y of the casing. The dust slides down over the deflecting-plates P Q in the buckets I and between them, while said plates serve as a guard against the dust being carried back upwardly by any possible lower air-currents, and such dust as lodges against the under side of the floor-section M is brushed off by the upper flexible scrapers and the dust on the lower floor H is brushed and carried around over the outlet J by the lower flexible scrapers.

It is desirable that the shaft G and its attachments should not be revolved too rapidly, and to that end any suitable brake, retarder, or governing device may be used, that illustrated in the present drawings consisting of the pulley X on the shaft W, geared to the shaft G, as shown, it being designed to connect said pulley X by a belt to another pulley running at a comparative low rate of speed on some shaft or counter-shaft of the regular mill machinery. Without some retarding device the air-currents striking against the blades U U, as described, would revolve the shaft G and the buckets I I, connected thereto, at too great a rate of speed for the successful operation of my device; but by the means just described the speed of revolution can be controlled in a satisfactory and economical manner, while the described construction and arrangement of the blades will break up and interrupt the centrifugal current of air, whose tendency would otherwise be to simply whirl around, carrying the dust with it, as long as the machine was in operation.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a dust-collector, the combination of a vertical casing, a tangential inlet, a central vertical shaft, a series of blades secured to said shaft in line with said inlet, and a series of dust-receiving buckets also secured to said vertical shaft below said blades to receive the dust therefrom as said blades and shaft are revolved by the dust-laden air-currents entering the casing through said inlet.

2. In a dust-collector, the combination of a vertical casing, a tangential inlet, a bottom floor, having a dust-outlet, a cloth top for the escape of air therethrough, a vertical shaft carrying blades opposite said inlet and revolved by the dust-laden air therefrom; a series of dust-receiving buckets, secured by suitable framework to said shaft below the said blades, said buckets being open at top and bottom and provided with deflecting-plates; a floor-section adjacent to said inlet and covering part of the space between the said blades and buckets, and flexible scrapers projecting from the framework of said buckets for engagement with the said floor and floor-section.

3. In a dust-collector, the combination of a vertical casing, a tangential inlet, and a vertical shaft carrying blades opposite said inlet and revolved by the dust-laden air therefrom, said blades being arranged at varying distances from the said shaft to arrest the

centrifugal current of the air entering the casing, and receive the dust therefrom, and permit it to fall into suitable receptacles beneath as the blades are revolved by the broken and distributed air-currents.

4. In a dust-collector, the combination of a vertical casing, a tangential inlet, a central vertical shaft, a spider secured to said shaft and having alternately-arranged long and short arms, curved blades secured to said arms in line with said inlet, to receive and be revolved by the dust-laden air therefrom, and a device connected to the upper end of said vertical shaft to govern and retard its revolution.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

LEMUEL R. WHITNEY.

Witnesses:
H. G. UNDERWOOD,
B. C. ROLOFF.