(No Model.) 4 Sheets—Sheet 1.

R. WHITEHILL

DUST COLLECTOR.

No. 421,215. Patented Feb. 11, 1890.

Fig. 1.

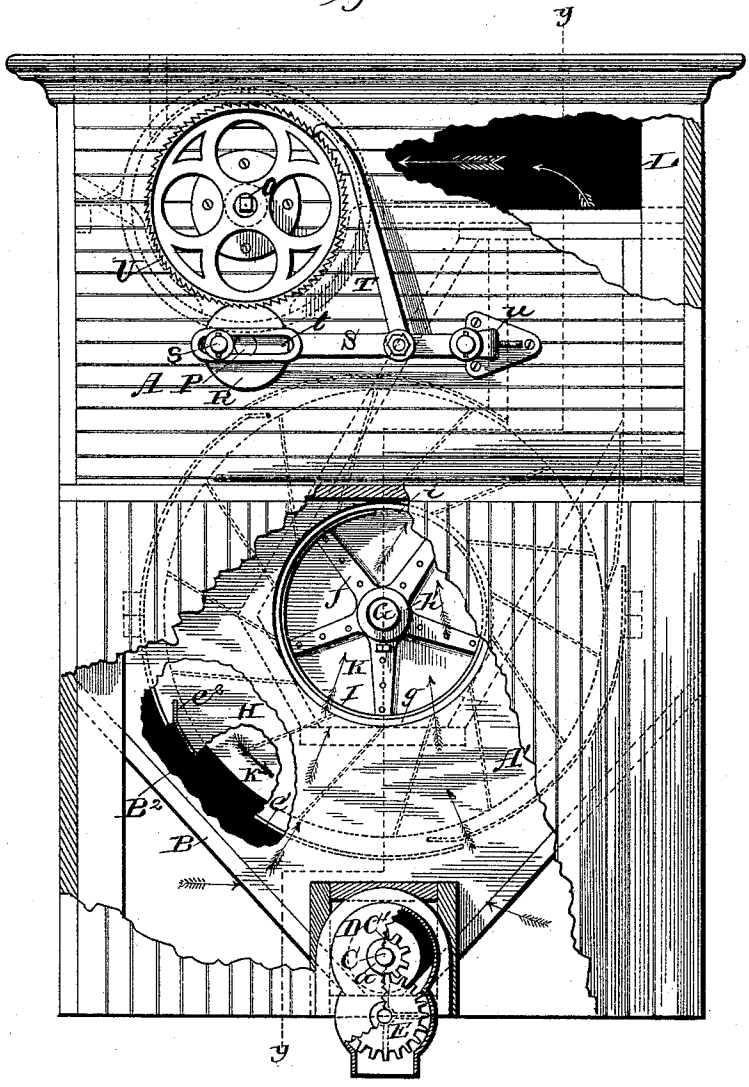
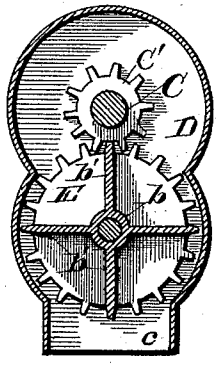


Fig. 2.



Witnesses:
E. G. Sammis
N. E. Oliphant

Inventor:
Robert Whitehill
By Stout + Underwood
Attorneys.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 4 Sheets—Sheet 2.

R. WHITEHILL.

DUST COLLECTOR.

No. 421,215. Patented Feb. 11, 1890.

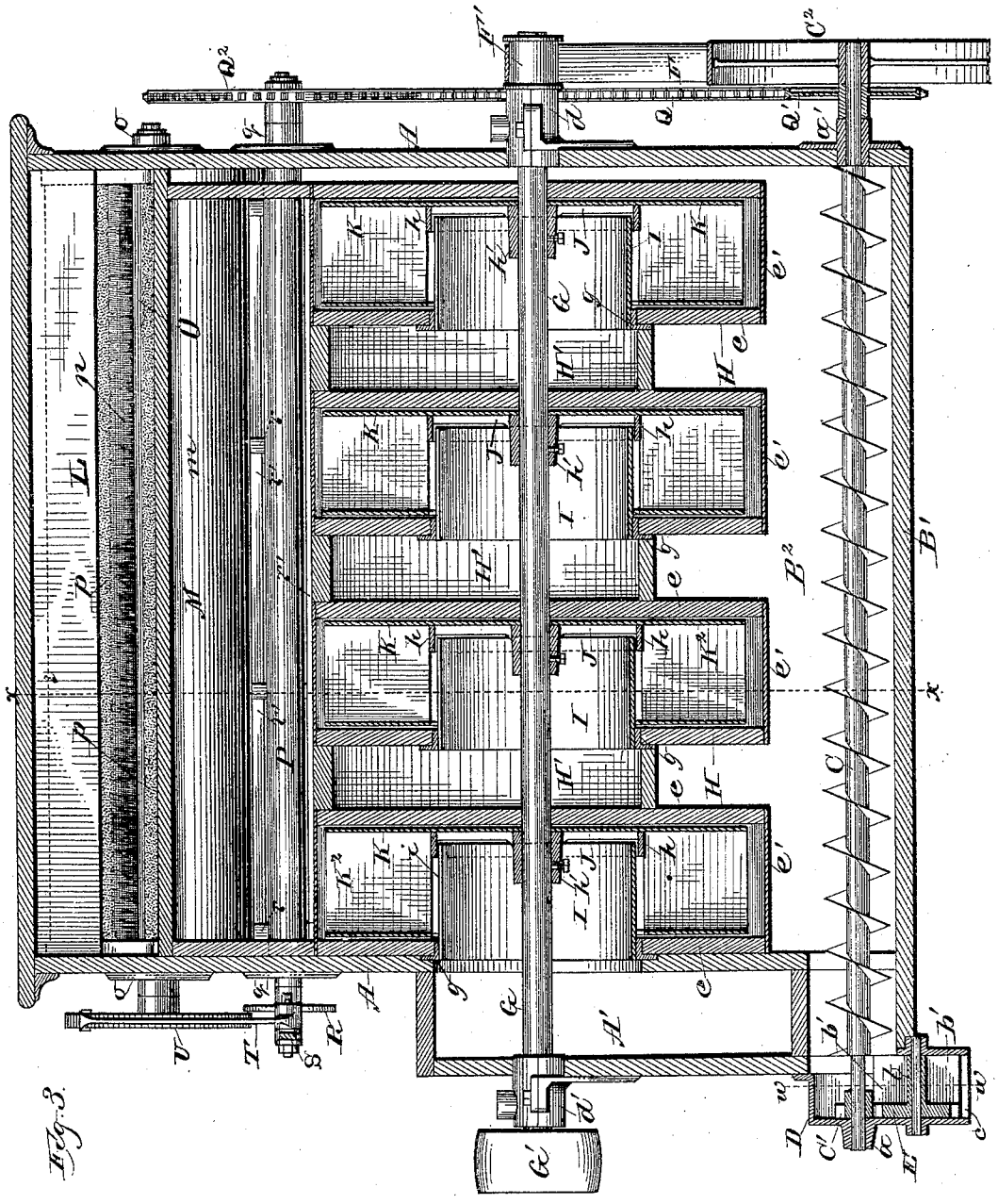


Fig. 3.

Witnesses:
E. G. Spruce
N. E. Oliphant

Inventor:
Robert Whitehill
By Stout & Underwood
Attorneys.

N. PETERS, Photo-Lithographer, Washington, D. C.

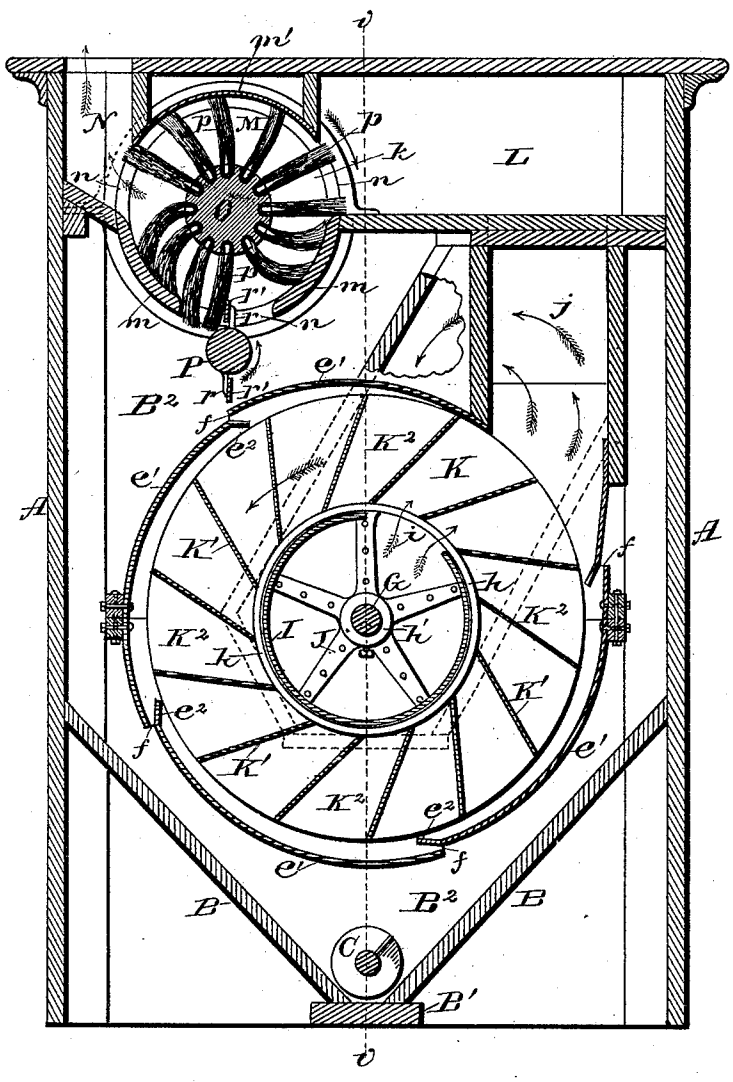
(No Model.) 4 Sheets—Sheet 3.

R. WHITEHILL.

DUST COLLECTOR.

No. 421,215. Patented Feb. 11, 1890.

Fig. 4.



Witnesses:
E. G. Jones
N. E. Oliphant

Inventor:
Robert Whitehill
By Stout & Underwood
Attorneys.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 4 Sheets—Sheet 4.

R. WHITEHILL.

DUST COLLECTOR.

No. 421,215. Patented Feb. 11, 1890.

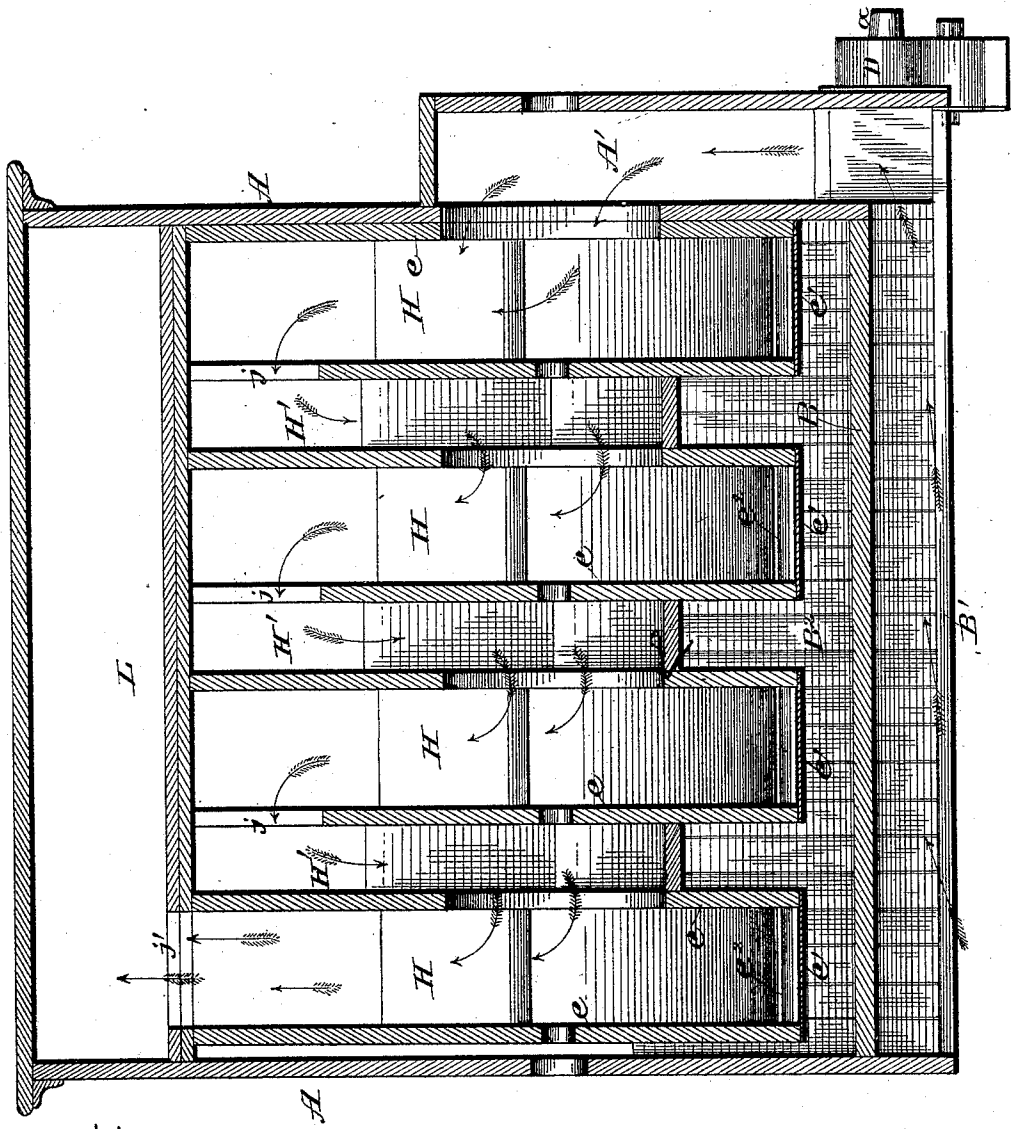


Fig. 5.

Witnesses:
E. G. Sinnes
N. E. Oliphant

Inventor:
Robert Whitehill
By Stout & Underwood
Attorneys

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

ROBERT WHITEHILL, OF MILWAUKEE, WISCONSIN.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 421,215, dated February 11, 1890.

Application filed November 23, 1886. Serial No. 219,600. (No model.)

To all whom it may concern:

Be it known that I, ROBERT WHITEHILL, of Milwaukee, in the county of Milwaukee, and in the 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; and it consists in certain constructions and combinations of parts to be hereinafter described with reference to the accompanying drawings and subsequently claimed.

In the drawings, Figure 1 represents an elevation of the drive end of my machine, partly broken away; Fig. 2, a detail section of the discharge-trap, taken on line *w w*, Fig. 3; Fig. 3, a vertical longitudinal section taken on line *v v*, Fig. 4; Fig. 4, a vertical transverse section taken on line *x x*, Fig. 3; and Fig. 5, a vertical longitudinal section of the main casing and fan-cases, taken on irregular line *y y*, Fig. 1.

Referring by letter to the drawings, A represents the main casing of my dust-collector, open at the bottom and preferably set up immediately over a purifier (not shown) to form part of the latter machine.

A wind-trunk A′ is suitably connected to the drive end of my machine and opens into the air-space beneath the cant-boards B, (best illustrated in Figs. 1 and 4,) these cant-boards and a central longitudinal piece B′ at the bottom of said machine uniting to form a main chamber B^2, at the bottom of which is arranged a conveyer-shaft C. The conveyer-shaft has a bearing *a* in the housing D, suitably secured to the wind-trunk A′, and another bearing *a′* in the opposite end of the casing A.

Inside the housing D, at the drive end of my machine, the conveyer-shaft C is provided with a pinion C′, that meshes with a gear-wheel E, the latter having a rearwardly-extended hub *b*, from which radiate webs *b′*, as best illustrated in Fig. 2, this gear-wheel being also operative in said housing. By the peculiar construction of the gear-wheel E just described I provide what I term a "trap" or "valve" that serves to receive the substance discharged from the conveyer-shaft C, carry this substance down to the mouth *c* of the housing D, and at the same time prevent the inside air from blowing out of the machine through the discharge-opening of the conveyer-chamber.

The end of the conveyer-shaft C opposite the drive end of the machine has keyed thereto a pulley C^2, connected by a belt F with another pulley F′ on a longitudinal main shaft G, journaled in suitable bearings *d d′*, respectively secured to the casing A and wind-trunk A′, as best illustrated in Fig. 3, said main shaft being also provided with a pulley G′ for belt connection with a suitable driving-power.

Inside the casing A are suspended a series of alternate fan-cases H and wind-trunks H′, each of said fan-cases being preferably made in two sections, as best illustrated in Fig. 4, for greater convenience in constructing my machine. The fan-cases are severally composed of heads *e*, to which are suitably secured the respective ends of longitudinal sheet-metal sections *e′*, said heads being so cut that the several sheet-metal sections uniting each pair thereof will stand eccentric to the axial center. The edges e^2 of the sheet-metal sections *e′* are preferably turned in at an angle, as shown by Fig. 4, to serve as deflectors; but, if found desirable, these deflectors may be omitted. In either instance a suitable space *f* is left between each two of the opposing sections.

Each of the fan-cases H has the head thereof that faces the end of the machine at which the dust-laden air is received provided with a suitable opening, in which is fitted a flanged ring *g*, and bolted or otherwise secured to this ring is one end of a sheet-metal drum I, its other end being loosely fitted in a flange *h*, that projects from a solid head or spider-frame J, that has its hub *h′* fixed upon the main shaft G, said drum having a suitable opening *i* in its periphery. To the outside of each head or spider-frame J is bolted or otherwise suitably secured a circular plate K, and inwardly extended from this plate, tangential to the periphery of the flange *h* on said head or spider-frame, are a series of wings K′, as best illustrated in Fig. 4.

The circular plate K and tangential wings K′ together form a series of buckets K^2, constituting a fan-wheel, and each one of the

casings H has operative therein a fan-wheel of similar construction.

Each of the fan-cases H, except the one farthest from the drive end of the machine, has an opening *j*, that communicates with the adjacent wind-trunk, the last fan-case having a direct communication *j'* with an air-chamber B at the top of my machine, as best illustrated by Figs. 4 and 5.

In the upper portion of my machine, adjacent to the air-chamber L, is a longitudinal cylinder M, composed of suitable heads *k* and segments *m m m'*, the first two of these segments being of greater thickness than the last one thereof, and between each two of said segments a space *n* is left. One of the spaces *n* communicates with the air-chamber L, another with the main chamber B^2, and the other with a flue N, that leads to the outside air. A longitudinal shaft O has its bearings *o* in the ends of the main casing A and operates within the cylinder M, said shaft being provided with a series of tufts *p*, to form a brush. Another longitudinal shaft P has its bearings *q* in the ends of the main casing A and is arranged just below the space *n* of the cylinder M, that communicates with the main chamber B^2 of my machine. The shaft P is provided with a series of ears *r*, to which are secured longitudinal strips *r'*, whereby a wiper is constructed to operate upon the tufts of the brush-shaft O, as shown by Fig. 4. Motion from the conveyer-shaft C is communicated to the wiper-shaft by means of a drive-chain Q, operative on sprocket-wheels Q' Q^2, respectively keyed to said shafts, as shown by Fig. 3.

At the drive end of the machine the wiper-shaft P is provided with a disk R, having an eccentric stud *s*, that engages a slot *t* in one end of an arm S, the other end of this arm being fulcrumed to a plate *u* on the main casing. Pivotally connected to the arm S is a pawl T, that engages a ratchet-wheel U on the adjacent end of the brush-shaft O, whereby this latter shaft is intermittingly operated.

In the operation of my invention, the main shaft G being driven by suitable power, all the fan-wheels fixed thereto are revolved therewith in the direction of the arrow, Fig. 4, and the dust-laden air from the purifier is drawn in the direction of the arrows, Fig. 5, up through the wind-trunk A' and adjacent drum I, into the first fan through the opening *i* in the periphery of said drum. The dust-laden air is discharged from the first drum I into the buckets K^2 of the corresponding fan-wheel as they successively pass the opening *i* in the periphery of this drum, and thus the dust is confined in these buckets, then thrown by centrifugal force against the eccentric sections *e'* of the respective fan-case, and finds its escape through the spaces *f* between the opposing edges of each two of these sections, the deflectors e^2 serving to aid this escapement into the main chamber B^2, in which latter operates the conveyer. From the first fan-case the air is discharged through an opening *j* into the next adjacent wind-trunk H', and by the suction of the second fan is drawn through the corresponding drum I to be acted upon in the manner described for said first fan, thus getting rid of an additional amount of dust. From the second fan-case the air in a like manner passes on to the next fan, and so on until the last fan in the series has acted thereon, a certain amount of dust being forced out by each of the fan-wheels. From the last fan-case in the series the air, that by this time has been deprived of a considerable amount if not all of the dust, is discharged through the opening *j'* into the chamber L, from which it passes on into the brush-cylinder M. When air enters the cylinder M, such dust as may still remain therein will settle on the tufts *p* of the shaft O to be dislodged therefrom by the wiper, while the air, after being freed from dust, passes through the interstices of the brush, and finally escapes through the flue N. The shaft O being intermittingly revolved, the tufts *p* that come above its axial center brush against the thin segment *m'* with but little frictional contact, while those below said center brush against the thickest segments *m m*, and are consequently compressed thereby in order to prevent the escape of any dust-laden air from the main chamber B^2. The wiper-shaft P is revolved in a reverse direction to the brush-shaft O, and thus serves to knock the dust out of the tufts *p* into the main chamber B^2, where it finds its way to the conveyer-shaft C, to be carried off with such dust as may have been already discharged from the fan-casings, the discharge trap or valve E in the housing D acting, as above described, to prevent air from blowing through the discharge-opening from inside the casing.

Having thus fully 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 suitable main casing provided with a wind-trunk to receive dust-laden air, a series of cases arranged within the main casing and provided with peripheral openings, wind-trunks alternately arranged between and communicating with the cases, a suitable fan arranged in each of said cases, and suitable means for actuating the fans, substantially as set forth.

2. In a dust-collector, the combination of a suitable main casing provided with a wind-trunk to receive dust-laden air, a series of fan-cases arranged within the main casing and composed of suitable heads united by longitudinal sections eccentric to the axial centers of said heads and these sections arranged to leave an opening between the opposing edges of each two thereof, a drum centrally fitted in each fan-case to be open at one end, and also provided with an opening

in its periphery, wind-trunks alternately arranged between and communicating with said fan-cases, a series of fans severally arranged to operate within the respective fan-cases, and suitable means for actuating the fans, substantially as set forth.

3. In a dust-collector, a fan-case composed of suitable heads united by longitudinal sections eccentric to the axial centers of said heads, and these sections arranged to leave an opening between the opposing edges of each two thereof, and a centrally-fixed drum having an opening in its periphery, in combination with a fan-wheel comprising a spider-frame having a hub, a circular plate secured to the spider-frame to close the adjacent end of the drum, and a series of wings inwardly extended from the plate tangential to the periphery of said drum, and a suitable shaft for the fan-wheel, substantially as set forth.

4. In a dust-collector, a fan-case composed of suitable heads united by longitudinal sections eccentric to the axial center of said heads, each of these sections having one edge thereof turned in and said sections arranged to leave an opening between the opposing edges of each two thereof, and a centrally-fixed drum having an opening in its periphery, in combination with a fan-wheel comprising a spider-frame having a hub, a circular plate secured to the spider-frame to close the adjacent end of the drum, and a series of wings inwardly extended from the plate tangential to the periphery of said drum, and a suitable shaft for the fan-wheel, substantially as set forth.

5. In a dust-collector, a fan-case composed of suitable heads united by longitudinal sections eccentric to the axial center of said heads and these sections arranged to leave an opening between each two thereof, in combination with a flanged ring centrally secured to one of said heads, a drum in turn secured to the ring, a fan-wheel comprising a spider-frame, having a hub and a flange that loosely engages the drum, a circular plate secured to the spider-frame to close the adjacent end of said drum, and a series of wings inwardly extended from the plate tangential to the periphery of the drum, and a suitable shaft for the fan-wheel, substantially as set forth.

6. In a dust-collector, the combination of a suitable main casing, a cylinder located in said casing near its discharge-opening and comprising suitable heads united by longitudinal segments of varying thicknesses and these segments arranged to leave a series of longitudinal openings, a brush arranged within the cylinder, and means for operating the brush and freeing it of adhering dust, substantially as set forth.

7. In a dust-collector, the combination of a suitable main casing, a brush arranged in the casing, a wiper for the brush, and suitable means for imparting an intermittent motion to the brush and a continuous movement to the wiper, substantially as set forth.

8. In a dust-collector, the combination of a main casing, a brush arranged within the casing, a wiper for the brush, a disk secured to an end of the wiper-shaft, an arm fulcrumed to said casing and eccentrically connected to the disk, a ratchet-wheel keyed to the brush-shaft, a pawl pivoted to the arm and arranged to engage the ratchet-wheel, and suitable means for communicating motion to said wiper-shaft, substantially as set forth.

9. In a dust-collector, the combination of a main casing having inlet and outlet openings, a series of cases arranged within the main casing and provided with peripheral openings, wind-trunks alternately arranged between and communicating with the cases, a suitable fan arranged in each of said cases, suitable means for actuating the fans, and a supplementary dust-separating device arranged to intercept the air prior to its escape from said main casing, substantially as set forth.

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.

ROBERT WHITEHILL.

Witnesses:
H. G. UNDERWOOD,
N. E. OLIPHANT.