(No Model.) 3 Sheets—Sheet 1.

W. INCE.

DUST COLLECTOR.

No. 484,717. Patented Oct. 18, 1892.

Fig. 2.

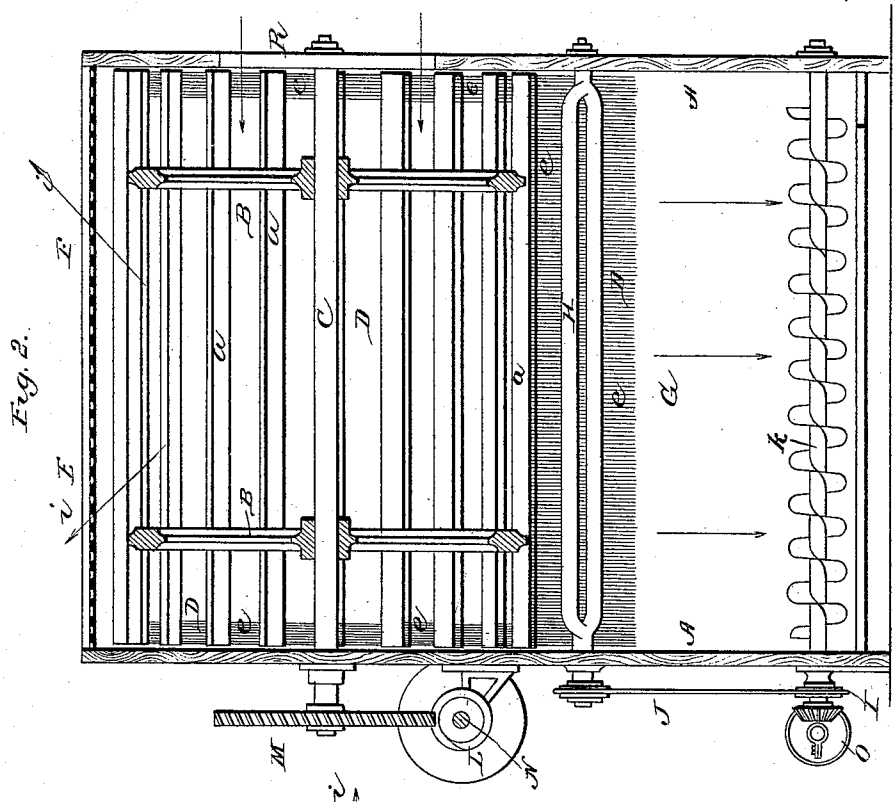
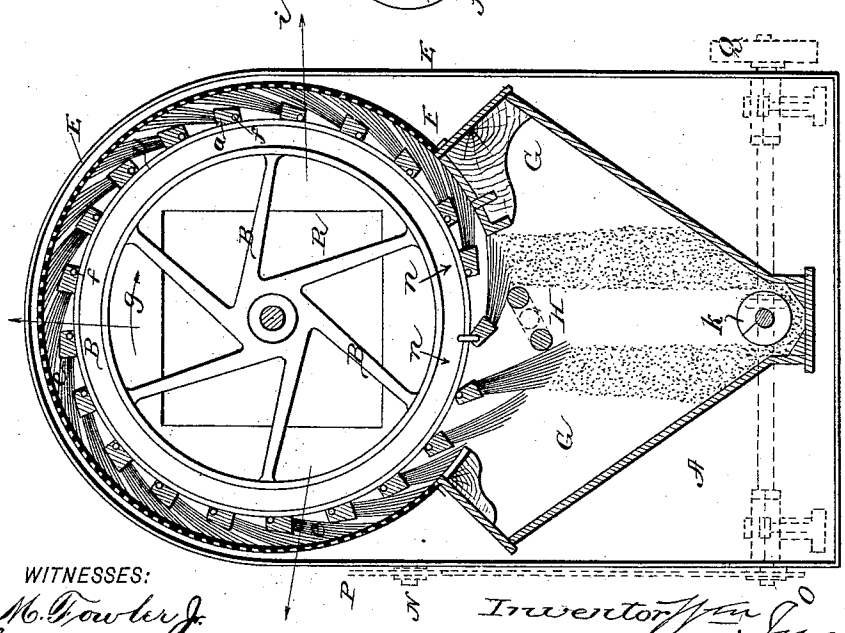


Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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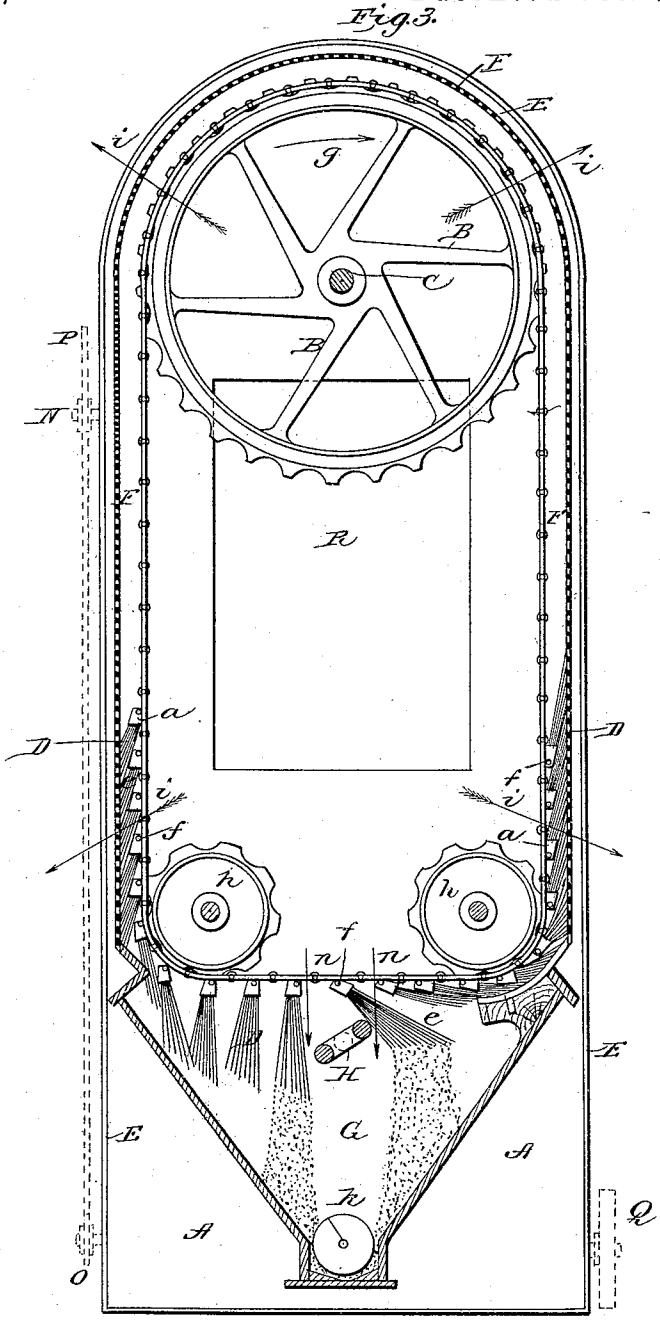
Fig. 3.



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DUST COLLECTOR.

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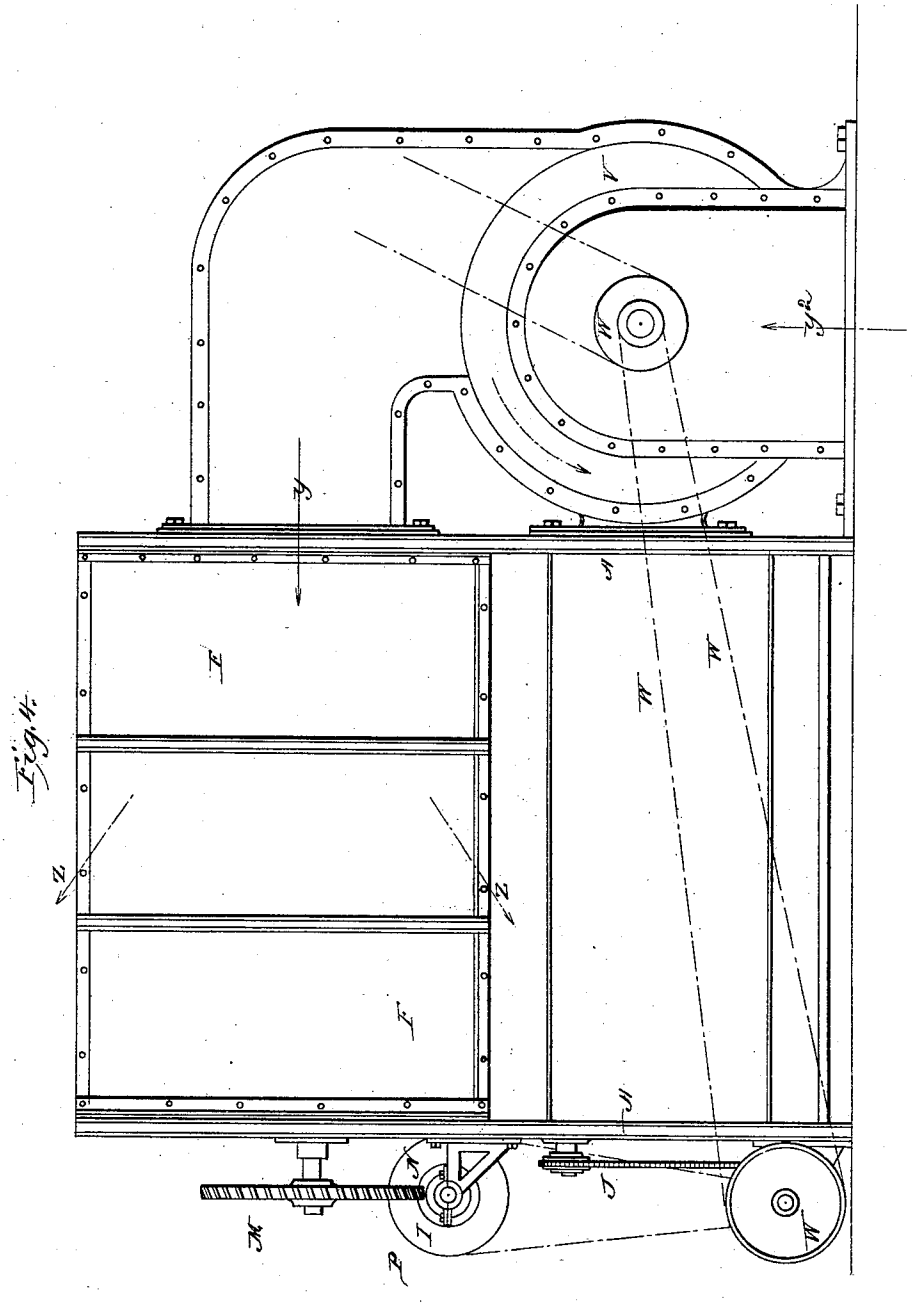

Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM INCE, OF HAYLE, ENGLAND.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 484,717, dated October 18, 1892.

Application filed August 4, 1892. Serial No. 442,160. (No model.) Patented in England March 22, 1888, No. 4,386, and in Austria-Hungary November 9, 1889, No. 2,963 and No. 2,763.

To all whom it may concern:

Be it known that I, WILLIAM INCE, a subject of the Queen of Great Britain, residing at Hayle Foundry Steam Mills, Hayle, in the county of Cornwall, England, have invented certain new and useful Improvements in Dust-Collectors, (for which I have obtained a patent in Great Britain, No. 4,386, bearing date March 22, 1888, and in Austria-Hungary, No. 2,963 and No. 2,763, bearing date November 9, 1889,) of which the following is a specification.

My invention relates particularly to dust-collectors made exclusively of a metallic substance, rendering the machine absolutely fire-proof. For this purpose an endless sectional traveling filtering mechanism is employed and is inclosed in a perforated metal covering for separating dust from dust-laden air discharged from all kinds of dust-making machinery employed in flour-mills and for other manufacturing purposes.

The object of my invention is to produce a simple and efficient machine that will arrest and collect the finest dust, while at the same time the air in the apparatus is practically unconfined and will therefore not react upon the exhaust-fans, but pass off freely. The dust is collected by the brush-carrying mechanism, retained until it reaches the knockers, and then delivered into the hopper.

According to my invention the dust-collector can be made circular, oblong, rectangular, or of any other suitable form. The framework of the machine may be of wood or iron and the outer covering of wire-gauze or perforated metal, inside which the filtering-brushes travel at a slow pace, while a suitable knocker is arranged underneath the filtering-brushes, so that as they pass in succession over the knocker all the dust from each brush is shaken out into the hopper at the bottom of the machine, from which it is delivered by a worm conveyer. The dust-laden air can be blown into the machine from the exhaust-fan, which may be attached directly to the machine or connected thereto from a distance, or the air can be caused to pass through the apparatus by suction created by an auxiliary exhaust-fan. When suction is employed to cause the air to pass through the collector, an additional air-tight covering is used over the perforated metal shell and is provided with an air-opening connected to the fan, from which source the purified air is blown into the atmosphere.

In order that my invention may be clearly understood, I will now proceed to describe the same by the aid of the accompanying drawings, in which—

Figure 1 is a transverse section of the machine; Fig. 2, a longitudinal section of the same; Fig. 3, a transverse section of an oblong machine; and Fig. 4 is a side elevation of a complete machine with exhaust-fan attached for blowing air into it.

A is the framework of the machine.

B is the spider-frame for carrying the filtering-brushes D and which is mounted upon the driving-shaft C.

E is the outer frame for supporting the perforated metal cover F, through which the pure air escapes from the machine.

The brushes D are composed of a suitable base *a* and a flexible part *e* for arresting and collecting the dust as the air passes through the perforated cover F, and which flexible part may be made of thin perforated metal or fine wire-gauze or of any other suitable flexible material arranged so as to form a continuous and perfect arresting mechanism *e*, as shown in the drawings. The brushes D are mounted on the spider-frames B at such distances from each other in relation to the length of the flexible parts that such parts overlap each other and prevent all possibility of dust escaping with the outgoing air-currents. The spider-frame B is caused to make one revolution about every ten minutes in the direction of the arrow *g*, Fig. 1, and as the filtering-brushes D are attached thereto by pivots *f* the brushes are allowed to leave their proper paths of travel (that is, the space between the frame B and the cover F) and while passing over the opening of hopper G to assume a vertical position, as shown in Fig. 1. Before the brushes fall into the vertical position they have to pass over the knocker H, which is caused to rotate by the chain-wheel I and chain J. The knocker H has a throw of about two inches from the center, as shown in Fig. 1, and when in motion imparts a rapid oscillating movement to the brush-filters as

they consecutively pass over the same, whereby all the dust is shaken from them into the hopper G, from which it is removed by the worm conveyer *k*. After the brushes pass the opening over the hopper G it is obvious that they will readily assume their proper path again.

The filtering mechanism *e* while in motion serves a twofold purpose: first, to collect the dust as the air passes through it, and, second, also by its motion over the perforations in the outer casing F to keep such perforations open and free.

The parts may be actuated in any suitable manner, the following being a suitable arrangement: The spider-frames B are actuated by the worm L and worm-wheel M. The worm-shaft N receives motion from the chain-wheels O and P. The worm conveyer *k* is driven by a cross-shaft operated by driving-pulley Q.

In operation the air enters at R and after passing through the filtering-brushes D escapes freely through the perforated covering F.

Fig. 3 is a vertical sectional view of a similar apparatus which operates in the same manner as the one above described, but which differs in shape and has a much greater working surface and capacity than that shown in Figs. 1 and 2. In this modified form of machine I use two sprocket-wheels *h h* in addition to the spider-frame B, in order to make the apparatus deeper, and thereby increase its capacity. Instead of pivoting the brushes D to the spider-frame B, as in the previous arrangement, such brushes are mounted on an endless chain or link belt, which passes over spider-frame B and the sprocket-wheels *h h*, all of which are provided with teeth of a pitch corresponding to that of the endless chain or belt. A set of sprocket-wheels and a corresponding chain or belt is provided at each end of the apparatus. The base *a* of each of the brushes D is pivoted to the chain at each end of the machine, so that all the brushes form a continuous filtering mechanism similar to that formed in the apparatus previously described, and shown in Fig. 1. F is the metal cover. The arrows *i* represent the course taken by the outgoing currents. Arrow *g* indicates the direction of travel of the brushes, and R the inlet for the dust-laden air. When in motion, the action is precisely the same as in the former case, the knocker H cleaning the brushes as they pass over the opening to hopper G previous to reassuming their normal position and the dust shaken from the brushes being collected by the worm conveyer *k*. As the dust-laden air enters the machine the heavier particles naturally gravitate through the openings shown by arrows *n* between the filtering-brushes and pass into the hopper. The spider-frame B makes one revolution about every ten minutes, which has the effect of bringing all the dust caught to one common point for deposit. The rising side of the filtering apparatus will always be clean and ready for use, and the movement of the filtering-brushes insures the keeping of the perforations in the outer casing open, so that the air will escape without obstruction, and in no case is it possible for the filtering power of the machine to vary or diminish, for so long as the perforations are kept open and free so long will the apparatus get rid of the injected air as rapidly as it is introduced.

Fig. 4 represents a complete apparatus, with exhaust-fan attached, blowing into the collector air which is being drawn by the fan from the machinery that needs such assistance—such, for instance, as purifiers, rolls, or other machines used in the manufacture of flour or for other manufacturing purposes. V represents the exhaust-fan, W the main driving-pulley, and W′ the driving-belt for operating the collector. The arrow *y* indicates the flow of air from the fan. Arrow y^2 shows the inflow of air to the fan from the machinery. The air escapes from the collector in the direction of the arrows *z*.

The exhaust-fan may be employed or omitted, as found necessary. The filtering-brushes may be arranged either around the spider-frame, as shown in Fig. 1, or in endless-belt form, and the air to be filtered may be either drawn or blown through the collector.

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

1. In a dust-collecting apparatus, the combination of a spider-frame, flexible filtering-brushes pivoted thereto, a covering of perforated metal or gauze approximately surrounding said spider-frame, in contact with said brushes, and a fan for drawing or blowing the air filtered through the brushes.

2. In a dust-collecting apparatus, the combination of a spider-frame, a brush-holder hinged to said frame, and a brush in said holder.

3. In a dust-collecting apparatus, the combination of a spider-frame, an endless traveling belt, brush-holders hinged to said belt, brushes in said holders, and a perforated metal or wire-gauze cover approximately surrounding said traveling belt, in contact with said brushes.

4. In a dust-collecting apparatus, the combination of an outer covering, an inner perforated covering, brush-carrying mechanism within said perforated covering, brush-holders hinged to said brush-carrying mechanism, brushes in said holders in contact with said perforated covering, and a knocker adapted to strike said brushes.

5. In a dust-collecting apparatus, the combination of an outer covering, an inner perforated covering, and brush-carrying mechanism within said perforated covering, substantially as described.

WILLIAM INCE.

Witnesses:
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JNO. GOLDSWORTHY.