(No Model.)

J. B. HOLGATE.

DUST COLLECTOR.

No. 345,508. Patented July 13, 1886.

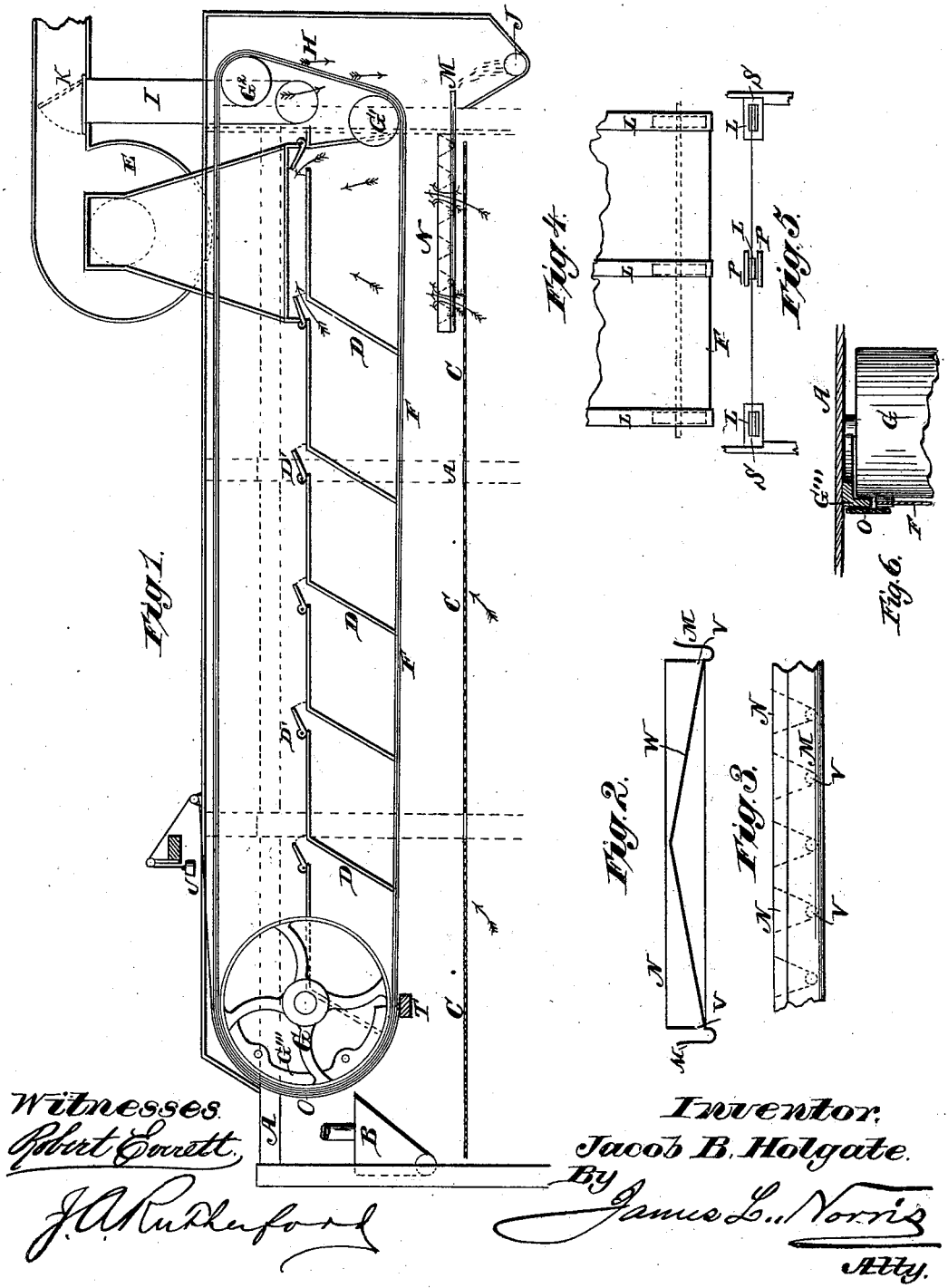

Fig. 1.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 2.

Fig. 3.

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JACOB BELL HOLGATE, OF BURNLEY, COUNTY OF LANCASTER, ENGLAND.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 345,508, dated July 13, 1886.

Application filed May 4, 1885. Serial No. 164,388. (No model.) Patented in England July 3, 1884, No. 9,711.

To all whom it may concern:

Be it known that I, JACOB BELL HOLGATE, a subject of the Queen of Great Britain, residing at No. 1 Junction Street, Burnley, in the county of Lancaster, England, miller, have invented certain new and useful Improved Dust-Collectors for Collecting Dust and Light Particles while Purifying Middlings or Like Granular Substances, (for which I have obtained a patent in Great Britain No. 9,711, bearing date July 3, 1884,) of which the following is a specification.

This invention has reference to the construction and combination of devices for collecting dust and light particles suspended in air while purifying middlings, and to the discharge of the dust or extraneous matter after its collection, without requiring on the part of the attendant any assistance whatever, so that the purification of the materials under treatment may proceed uninterruptedly.

The machine is also generally applicable for purifying currents of air from dust or like impurities suspended therein.

In carrying out my invention, I employ an endless web of flannel, canvas, or other suitable material, mounted on adjustable rollers, their axes resting in and passing through suitable bearings, adapted to the frame of the machine. Upon these rollers the web is kept properly stretched, and to relieve it from strain and pull in passing over the surfaces of the rollers, I bind the edges and center of the web between strips or bands of leather or other suitable material, of sufficient thickness to hold the dust-receiving portion of the web out of contact with the driving-surfaces of the rollers, which would otherwise have a tendency to "mill" or fill up the pores of the traveling filtering-web and thereby interfere with the free passage of air to the exhaust fan. Suitable grooves are provided on each side of the purifier to receive the leathered edges of the web, and to prevent dust and light particles from passing into the exhaust. These grooves also serve as supports for the web, which is further supported by longitudinal strips of wood, between which the bands of leather are sustained in the middle of the web, which is thereby prevented from bagging. The web or filter-cloth in traveling gradually brings its dust-laden surface over a hopper, where it is acted upon by a reverse current of air or back-draft, which drives off dust or extraneous matter adhering to the collecting-surface of the web down into a suitable dust-chamber, from whence it is conveyed away by an Archimedean screw.

To assist in the collection of the heavier particles of dust carried upward by the exhauster, I employ a suitable number of V-shaped troughs, secured in a suitable position to be clear of the middlings under treatment. Into these troughs the heavier particles of dust, incapable of reaching the traveling surface of the web, fall, from whence they are conveyed along suitable channels to the Archimedean screw above alluded to.

In order that my invention may be fully understood and readily carried into effect, I have hereunto attached the accompanying sheets of drawings, reference being had to the figures and letters marked thereon.

Figure 1 is a longitudinal sectional elevation of a middlings-purifier with my improvements for collecting and discharging dust and light particles applied. Fig. 2 is a longitudinal section of one of the settling-troughs with false bottom inclined from the center to both ends, and showing the connecting side channels in transverse section. Fig. 3 is an end view of a series of V-shaped settling-troughs, showing one of the connected side channels.

Figs. 4 and 5 illustrate the manner of supporting and protecting the traveling web or apron, and of preventing the escape of dust and light particles at the sides of the machine. Fig. 6 is a plan view of part of the roller and sectional view of one side of the machine, showing the semicircular rim or flange projecting therefrom, as hereinafter described.

A is the frame of the machine; B, the hopper, through which middlings are evenly fed upon the screen or sieve C, over which they are caused to travel forward by a vibrating movement imparted to the sieve or screen, which, being composed of various sections of different degrees of fineness, sifts and urges the middlings below.

In the upper portion of the purifier are arranged several compartments formed by partitions D, and provided at the top with suitably-controlled valves or flaps D', so arranged that the currents of air drawn through the meshes of the different sections of the screen or sieve by the exhaust-fan E may be regulated or modified. The meshes of the first section at the freed end of the purifier are the finest,

and require the weakest current of air, the valve or flap in the compartment above being adjusted to modify the current so as not to raise the middlings capable of passing through the meshes of this portion of the sieve. The constant vibratory movement of the sieve, together with the gentle current of air, gradually brings the lighter particles of dust and husky matter to the top, and at the same time urges the finer grade of the middlings under treatment through the meshes of the first section of the sieve. The material is now urged forward onto the next section, through the meshes of which the next larger grade of middlings falls, the valve at the top of the compartment above this section being opened so as to allow the exhaust to act a little more freely, gradually increasing the force of the currents of air ascending through each succeeding section of the sieve.

During the foregoing operation the dust-laden air ascending from the various sections of the sieve is filtered or strained, before passing to the exhaust-fan, by the web or apron F, which, being caused to travel through the purifier in a horizontal direction by the rollers G, G′, and G², is gradually brought heavily laden with dust and light particles to the dust-chamber H. In this chamber the web or apron is automatically and thoroughly cleansed by currents of air which pass down pipe I from the exit-port of the fan onto the reverse surface of the web to that on which dust and light particles were previously distributed, which are now discharged upon the screw or worm J.

At the foot or delivery end of the sieve or screen C a number of troughs or pockets, N, are placed side by side, with spaces between them, and secured by their ends to side pieces of the same depth, which are bent so as to form a longitudinal channel, M, said troughs N and channels M being arranged to communicate through apertures V, as shown in Figs. 2 and 3. These troughs are preferably V-shaped, so as to present the least possible impediment to the ascending currents of air, which are temporarily compressed while passing the said troughs, by reason of the troughs being V-shaped, and consequently closer together at the top than at the bottom, after which the air-currents expand over the troughs or pockets, into which the heavier particles of dust or other materials incapable of reaching the traveling surface of the web gradually settle. The troughs or pockets extend from side to side, and are placed as near as convenient to the surface of the sieve, with which they are perfectly level, so that the troughs or pockets may receive as heavy particles of dust at one part thereof as at another.

Fig. 2 is a longitudinal section of one of the troughs, in which view is seen an inner lining or false bottom, W, inclining from the center to each end, so as to cause the particles deposited thereon to gravitate each way in the direction of the channels M, into which they enter through apertures V. (Seen in end view, Fig. 3.) A vibratory motion may be imparted to the troughs or pockets to facilitate the gravitation of the particles deposited thereon, impelling them forward to the worm seen in Fig. 1.

I will now describe more fully the construction of the web and the means I employ for its protection and support, and for preventing the escape of dust and light particles at the sides of the machine to the exhaust. As seen in Figs. 4 and 5, the edges and center of the web are bound between bands or strips L, of leather or other suitable material, of sufficient thickness to prevent the web from coming in contact with the driving-surfaces of the rollers, which would otherwise have a tendency to mill or fill up the pores of the filtering-web. These bands also receive the tractional strain imparted by the rollers, whereby the web F may be constructed of any light porous material—such as flannel—which I prefer, as its long projecting fibers are better able to retain upon its surface dust and light particles. The bordered edges of the web F travel in grooves S, the ends of which abut against a semicircular rim or flange, G‴, fixed to each side of the machine, and made to project a little beyond the periphery of the roller G. Near each edge of this roller a flexible band, O, is attached to a cross-piece, T, and weighted by the weight U, (seen in Fig. 1,) so as to gently embrace the bordered edges of the web and the stationary rim, whereby the escape of dust and light particles at the sides of the machine to the exhaust is prevented and the air allowed to escape to the atmosphere in a pure state.

In Fig. 5 are seen rods P, which support the center of the web F, to relieve it from unnecessary strain at the sides.

What I claim as my invention is—

1. The combination, with the vibratory sieve or screen C and filter-cloth F, of a series of settling-troughs, N, having false bottoms W, inclined from the center to each end, and the longitudinal channels M, communicating with the ends of said troughs, substantially as described.

2. The combination, with the frame A and traveling filter-cloth F, having bordered edges L, of the rods P, for supporting the center of said cloth, substantially as described.

3. The combination of the frame A, the vibratory sieve C, the traveling filter-cloth F, a series of valved compartments separated by partitions D, the exhaust-fan E, and the pipe I, substantially as described.

In testimony whereof I have hereunto set my hand this 10th day of April, 1885.

JACOB BELL HOLGATE.

Witnesses:

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