

**Dec. 19, 1939.**

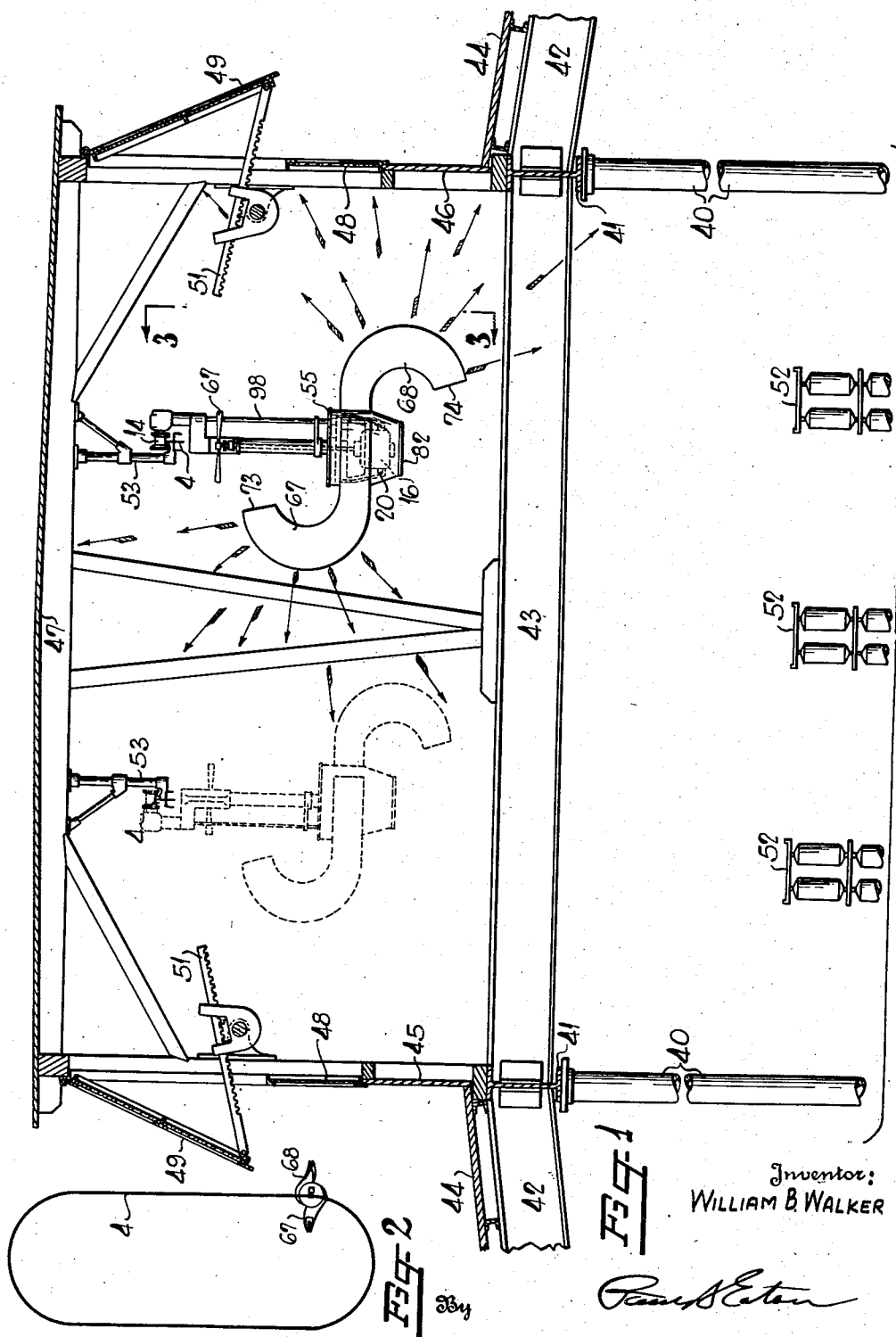
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**2,183,758**

## CLEANING APPARATUS

Filed Nov. 12, 1936

2 Sheets-Sheet 1



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## CLEANING APPARATUS

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2 Sheets-Sheet 2

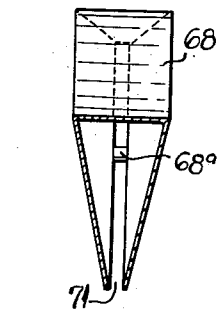
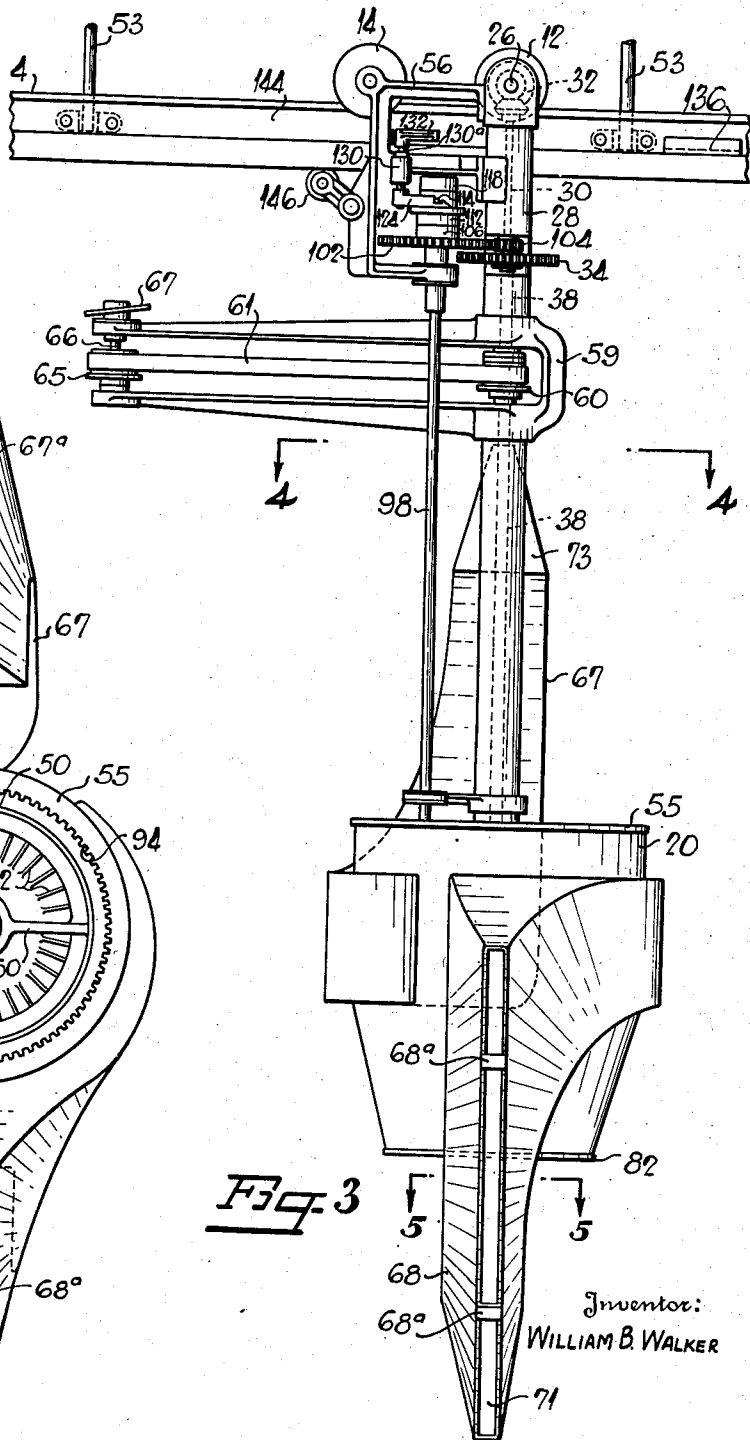
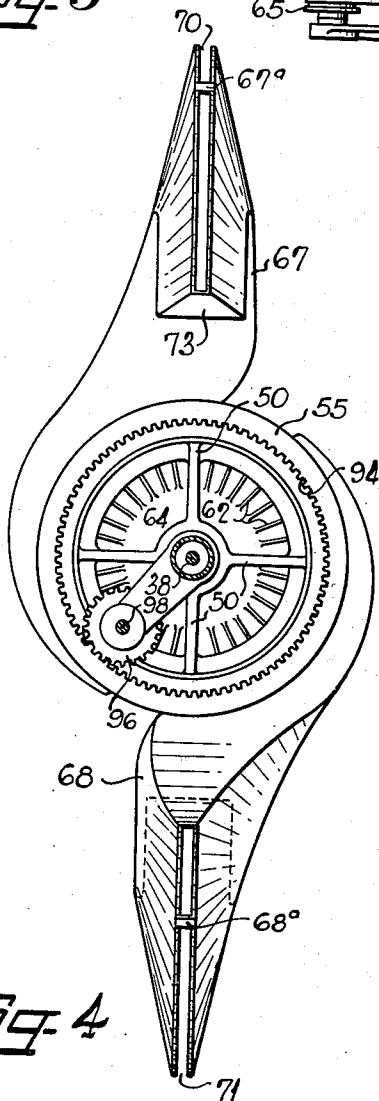


Fig. 5



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## UNITED STATES PATENT OFFICE

2,183,758

## CLEANING APPARATUS

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Application November 12, 1936, Serial No. 110,503

8 Claims. (Cl. 15—20)

The object of this invention is to provide means for cleaning sidewalls, ceilings, framing, and similar areas of buildings on which accumulation of floating dust, lint or other fly material is likely to settle. In the process of manufacturing cotton or other similar fibrous materials, there is usually an appreciable quantity of short fibres or lint floating in the air, which eventually settles on or sticks to the surfaces with which they come in contact. For the removal of such material numerous types of equipment have been devised but most of these pertain to the cleaning of the surfaces of the machines used in the manufacture of the product.

Such cleaning is accomplished by means of air under greater or less pressure and so directed that the blasts of air strike the machinery, or work in operation, at suitable points, so that the lint is kept constantly removed before it accumulates to an extent that will cause it to blow off or fall off the surfaces in bunches, thereby producing gouts or other imperfections in the finished product.

However, it has been found that the lint which accumulates on the ceilings, sidewalls, and the like, of the rooms containing such machines also has a tendency to form in bunches which, when of sufficient size to break loose, drop onto the machinery or the material in process in the machinery and this results in an imperfect product. This is especially so in textile plants where, for purposes of additional light and ventilation, the room is equipped with a so-called monitor, usually consisting of a raised portion of the roof near the middle of the room, with provision for opening or closing the sides made of glass. Such monitor construction is usually provided with adjustable mechanisms which extend more or less into the room, and these projections usually have irregular surfaces which add considerably to the areas on which lint will collect and finally drop off to the floor or machinery below or on the work in process thereon.

In order to supplement the automatic cleaning of the machinery with devices such as shown in Patent No. 1,857,410, I have devised a special form of equipment to operate near the ceiling and sidewalls, or even in the monitor itself, whereby at suitable intervals of time a substantial draft of air is directed against the ceiling, sidewalls, glass surfaces, and any other obstructions present which might tend to accumulate lint or any other settling matter and thereby prevent the formation of appreciable quantities of such waste material which, without such cleaner, would form and

drop on the machinery, the work in process thereon, or floor below, to the detriment of the work carried on in that area.

This equipment consists primarily of one of the standard cleaner devices shown in Patent No. 1,857,410, but is provided with a peculiarly shaped distributor head whereby the draft of air generated by the fan is directed as required and periodically subjects the adjoining surfaces and areas to a draft of air which prevents the accumulation of this waste material.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

Figure 1 is a cross-sectional view taken through the monitor roof of a mill showing the invention secured thereto;

Figure 2 is a schematic plan view showing the position occupied by the endless monorail track upon which the invention is adapted to operate;

Figure 3 is an enlarged elevation taken along the line 3—3 in Figure 1;

Figure 4 is a sectional plan view taken along the line 5—5 in Figure 3.

Figure 5 is a sectional detail view taken along the line 5—5 in Figure 3;

Referring more specifically to the drawings, the numerals 40 indicate suitable columns which are employed for supporting the roof structure of a mill. In a typical roof structure these columns have resting upon their upper ends suitable longitudinally opposed I-beams 41, to which are connected rafter beams 42, and struts 43. The rafter beams 42 support the lower roof 44 of the mill. In order to obtain better lighting conditions and sometimes better ventilation within the mill it has been found that it is desirable to provide a monitor roof. This roof comprises walls 45 and 46 which extend vertically upward from the main roof 44 and have a suitable cover or roof 47 which spans the distance between the upper portions of walls 45 and 46. Disposed within the walls 45 and 46 at frequent intervals are suitable ventilating sashes 48 in which it is customary to provide pivoted ventilating sections 49. These ventilators 49 are operated by toothed levers such as 51 which project on the interior of the mill.

By observing Figure 1, it is quite evident that the arms 51 and their associated parts together with the numerous struts and beams disposed within the monitor roof form surfaces to which dust, cotton and lint will adhere or lodge upon. When this dust or lint has accumulated in considerable quantities it will drop downwardly onto

the spinning frames 52 or other machinery disposed therebelow and when this is done, much of this lint will fall upon the yarn which is being processed, resulting in bunches, gouts, and other imperfections in the finished product.

I have provided a plurality of brackets 53, which are suspended from the ceiling framework of the monitor roof. Secured to these brackets is a track 4, preferably endless, which is shown fully in detail and described in the patent to Smith, No. 1,857,410. This patent shows an apparatus having in combination an over-head track, a carriage mounted to travel along the track, and a blower mounted on said carriage, and air directing means associated with the blower for directing air downwardly, whereas, the present structure is identical in all respects except the air directing means. This means comprises a pair of oppositely disposed curved ducts having orifices for simultaneously directing the air laterally onto the interior of the roof portion and sidewalls of the monitor structure. In the patent to Smith, No. 1,857,410, means are also shown and described for turning the air directing means at desired intervals in one direction about a substantially vertical axis a predetermined amount, usually a quarter turn to allow the housing and ducts to pass by obstructions such as posts and belts in the mill, and after the obstructions has been passed the air directing means are turned another quarter circle, making 180 degrees in two steps of 90 degrees each. This means is also present in this application where the turning mechanism operates during a longer interval to impart a one-half or 180 degree turn to the housing at one time, and a detailed description of the same will not be made, but the like parts will be referred to briefly by like reference characters. In other words, the essential difference between the present patent application and that of Smith resides in the manner in which the air directing means are formed and the location of the same in the mill. The other parts are operated in substantially an identical manner as shown and described in the said Smith patent.

The means for propelling the air directing means along the track briefly, comprises a motor 16 disposed within the housing 20, which motor drives a vertically disposed shaft 38. This shaft is connected through a train of gears such as 34 and 104 to another vertically disposed shaft 30. The upper end of shaft 30 has a bevelled gear arrangement 32 which drives the shaft 26 and also a sheave-pulley 12, which pulley is secured on the end thereof and mounted on top of trackway 4. The parts 30, 32 and 26 just described, are mounted in a housing 28. This housing 28 has a bracket member 56 secured thereto for supporting other mechanism associated with the traveller which will be briefly described. A pulley 14 is secured to the bracket 56 and is adapted to travel along the trackway 4 to assist the drive pulley 12 in carrying the air directing means disposed therebelow. The bracket 56 has a bearing 130 extending therefrom which supports a suitable vertically disposed shaft 130a, said shaft having an arm 132 on the upper portion thereof which is adapted to engage an abutment plate 136, secured to the trackway 4 when it is desired to operate the mechanism for turning the air directing means a one-half turn relative to the trackway. When the lever 132 is engaged by the abutment plate 136, the lever 124, disposed on the lower end thereof, is caused to rotate thereby operating suitable mechanism which periodically

sets the shaft 98 in rotation. This shaft has a pinion 96 secured on the lower end thereof which engages a gear 94 and turns the annular member 55 and its associated parts, the desired amount. The amount which these parts are turned depends upon the gear ratio between pinion 96 and gear 94, and also upon the construction of the shaft 98. In the present application it is preferable that the housing 20 and the air directing means secured thereto be turned 180 degrees each time the travelling mechanism traverses the entire length of the endless track. This would necessitate only one bracket or abutment plate 136 being provided along this track. However, it is quite evident that as many of these abutment plates may be provided as desired and also that means can also be provided for turning the air directing means at any angle from that shown in the drawings and as many times as may be desired.

The housing 28 has secured to the lower portion thereof a U-shaped bracket 59 in which is mounted a pulley 60, said pulley being fixedly secured upon vertically disposed shaft 38. This pulley has a belt 61 mounted thereon which belt also is mounted on another pulley 65. The pulley 65 is fixedly secured upon a vertically disposed shaft 66 which, in turn, is rotatably mounted in the ends of a U-shaped member 59. Fixedly secured on the upper end of shaft 66 is a fan 67, for directing blasts of air upwardly in a vertical direction against the trackway and against the interior of the roof structure 47 for cleaning the trackway, the bus bars and the ceiling disposed adjacent the trackway.

The lower end of shaft 38 (Figure 4), has secured thereon a centrifugal fan 64, disposed immediately above the motor 16, such as is fully shown and described in Patent No. 1,857,410, which has a plurality of radially disposed blades 62 integral therewith. This fan is disposed within the housing 20 and as it rotates it sets up an air pressure which forces the air blasts outwardly through the orifices 71 in spouts or ducts 67 and 68. These spouts or ducts are practically identical in construction, except that the spout 67 is directed upwardly, whereas, the spout 68 is directed downwardly. By arranging the spouts in this off-set manner, the amount of surface cleaned by the spouts is increased since means are provided for turning the spouts 180 degrees each time the traveler traverses the trackway. The necessity for so directing these spouts is seen by referring to Figure 1. The spout 67 directs the air more or less upwardly towards the ceiling and the intermediate portions of the monitor, whereas, the spout 68 directs the blast of air downwardly to cover the lower portions of the monitor structure including the walls. After the distributor makes one complete circuit around the trackway it operates in accordance with the description in Patent No. 1,587,410, and the distributor is turned through an angle of 180 degrees and another complete circuit is made, during which travel the side of the outlet which cleaned the ceiling near the center is now rotated so that it cleans the ceiling near the sidewalls, or eaves. And likewise, the outlet which cleaned the lower part of the monitor or sidewalls, on the subsequent trip, now cleans the lower part of the beams and other obstructions not previously cleaned by the other outlet. The spouts 67 and 68 have curved orifices 70 and 71 respectively which are so proportioned that the velocity of

the air issuing therefrom is substantially uniform throughout the entire outlet.

Spacer straps 67a and 68a are provided to reinforce the orifices 70 and 71, and also to maintain the width of these orifices constant and uniform. By providing an outlet or orifice of this type it is quite evident that a thin sheet of air will be emitted from the orifice to cover a very wide area as the traveller carries this means along the trackway. The ends 73 and 74 of the spouts 67 and 68 are closed thereby preventing any air from issuing therefrom and also causing the orifices 70 and 71 to properly distribute the blasts of air at a high velocity.

In Figure 1 the dotted line position of the cleaner represents the position it will occupy after being turned approximately 180 degrees at the beginning of alternate circuits.

It is therefore, seen that as this unit travels back and forth in the monitor roof or around the sidewalls of a room, that both the ceiling and sidewalls are simultaneously subjected to blasts of air which remove or prevent the accumulation of lint and other foreign particles thereon.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being set forth in the appended claims.

I claim:

1. In apparatus for removing lint and other foreign particles from the sidewalls and top of roof structure for buildings employing a trackway disposed below the said top and between the said sidewalls, blast producing and directing means mounted for travel along said trackway, said directing means having oppositely directed orifices arranged at different levels for permitting air issuing therefrom to strike selected portions of the roof and sidewalls, and means for turning said directing means approximately 180 degrees at specified points along the trackway so that when the blast producing and directing means passes again along the trackway the portions which were missed by the blasts issuing from the directing means on a previous lap will be swept thereby.

2. In apparatus for removing lint and other foreign particles from the sidewalls, framing members and roof structure of the monitor portions of a roof which employs a trackway disposed longitudinally of the monitor, and a traveler mounted for travel on the trackway, and a motor driven fan carried by the traveler, a housing surrounding said fan, an outwardly and downwardly extending duct communicating with one side of the housing and having a slot in its outer edge, an outwardly and upwardly extending duct communicating with the opposed side of the housing and having a slot in its outer edge said slots being at different levels whereby the lower portion of one side and the upper portion of the other side of the sidewalls of the monitor will be swept by the air blasts issuing at different levels as the traveler travels along the trackway, and means for turning the housing at specified intervals to cause the blasts from said slots to strike the upper portion of one side and the lower portion of the other side of the sidewalls of the monitor.

3. In a building having monitors provided with sidewalls and a top and having framing members for supporting the monitor, and employing

a trackway disposed between the sidewall portions and extending longitudinally of the monitor and a traveler mounted for travel on said trackway and having blast producing means supported by the traveler, said blast producing means having air ducts extending from opposed sides thereof and at approximately the same level and arranged to direct blasts in opposite directions both laterally and vertically at different levels to sweep the upper portion of one sidewall and the lower portion of the other sidewall and means for turning the blast producing means at predetermined points whereby the lower portion of one sidewall and the upper portion of the other sidewall will be swept by the blasts issuing from the ducts.

4. In apparatus for removing lint and other foreign particles from the sidewalls and framework of the superstructure of a building employing a trackway disposed parallel to and in spaced relation to the sidewall and blast producing means mounted for travel on said trackway, blast directing means associated with said blast producing means, said blast directing means being disposed vertically and laterally with respect to the trackway and extending in opposite directions with relation to the trackway and with relation to the vertical, each blast directing means having an arcuate vertically disposed slot on its side farthest removed from the trackway, and means for turning the blast directing means approximately a half revolution at specified points along the trackway.

5. A traveling cleaner comprising a motor driven fan, a housing surrounding the fan, an outwardly and downwardly extending duct communicating with the interior of one side of the housing and having a substantially vertically disposed slot in its outer sidewall, an outwardly and upwardly extending duct communicating with the interior of the other side of the housing at approximately the same level as the first point at which the first-named duct joins the housing and also having a substantially vertically disposed slot in its outer sidewall, whereby blasts of air may be discharged through said slots at different levels and in opposed directions.

6. A traveling cleaner comprising a motor driven fan, a housing surrounding the fan, an outwardly and upwardly directed duct provided with an arcuate outer surface and communicating with one side of the housing, a second duct extending from the other side of the housing and extending outwardly and downwardly and having an arcuate outer surface, the arcuate surfaces of said ducts being at different levels and each having a substantially vertically disposed slot therein whereby fan-shaped blasts of air will be delivered from said slots at different levels and in opposed directions.

7. In a traveling cleaner adapted to travel along a trackway, a motor driven fan, a housing surrounding the fan, an outwardly and upwardly directed duct provided with an arcuate outer surface and communicating with one side of the housing, a second duct extending from the other side of the housing and extending outwardly and downwardly and having an arcuate outer surface, the arcuate surfaces of said ducts being at different levels and each having a substantially vertically disposed slot therein whereby the fan-shaped blasts of air will be delivered from said slots at different levels and in opposed directions and means for turning the casing a one-half turn at specified intervals.

8. In apparatus for removing lint and other foreign particles from the sidewalls and the roof and roof supporting structure of a building, employing a trackway disposed below the roof and between the sidewalls, blast producing means mounted for travel on said trackway and arranged to discharge two oppositely directed

blasts of air at different levels to strike against the roof supporting structure and sidewalls, and means for turning the blast producing means approximately 180 degrees at specified points as it travels along the trackway.

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