

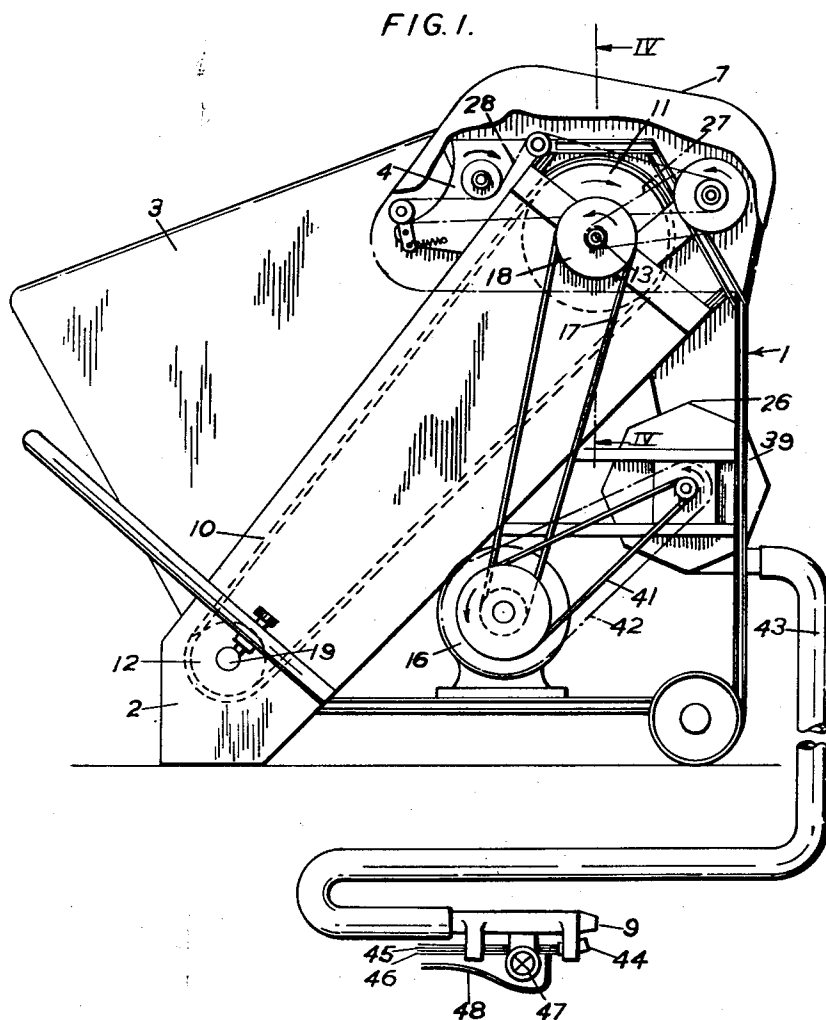
July 22, 1952

N. L. DOLBEY
APPARATUS FOR DAMPING MINERAL
FIBERS TO BE SPRAYED IN AIR

2,604,068

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4 Sheets-Sheet 1



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4 Sheets-Sheet 2

FIG. 2

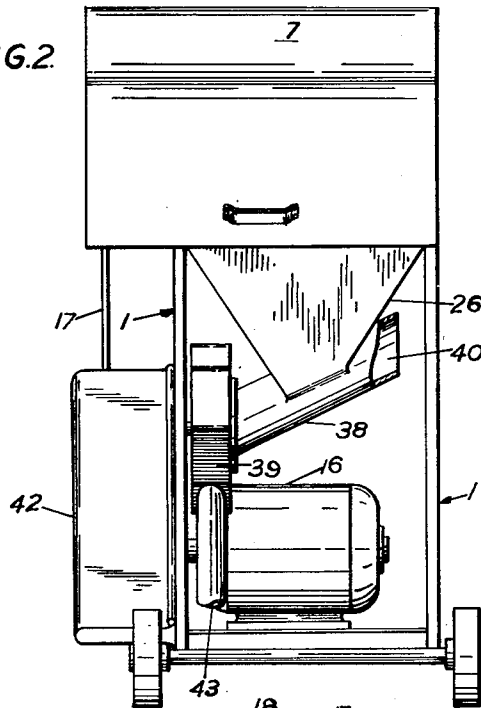
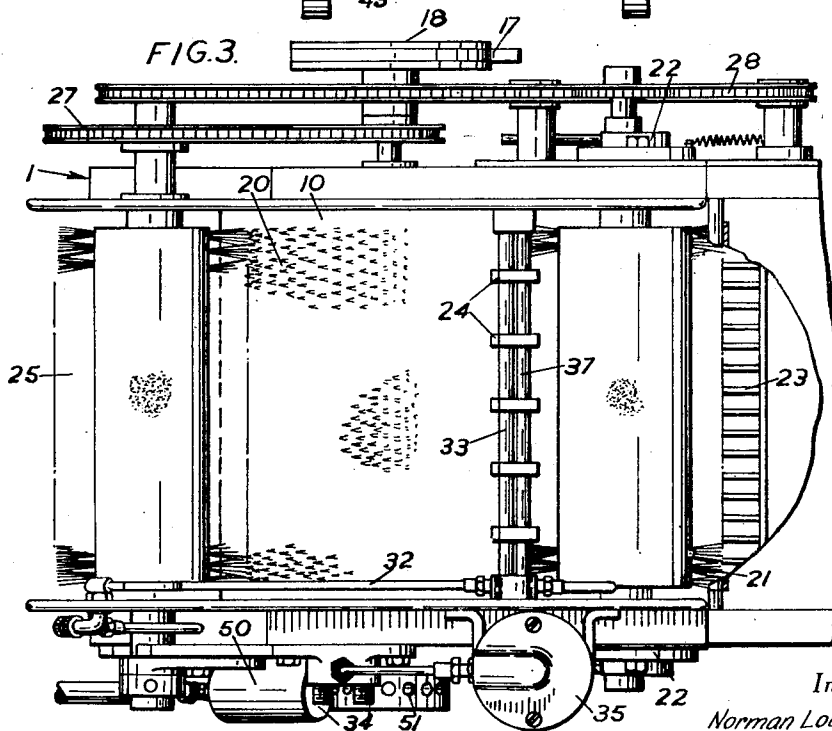


FIG. 3



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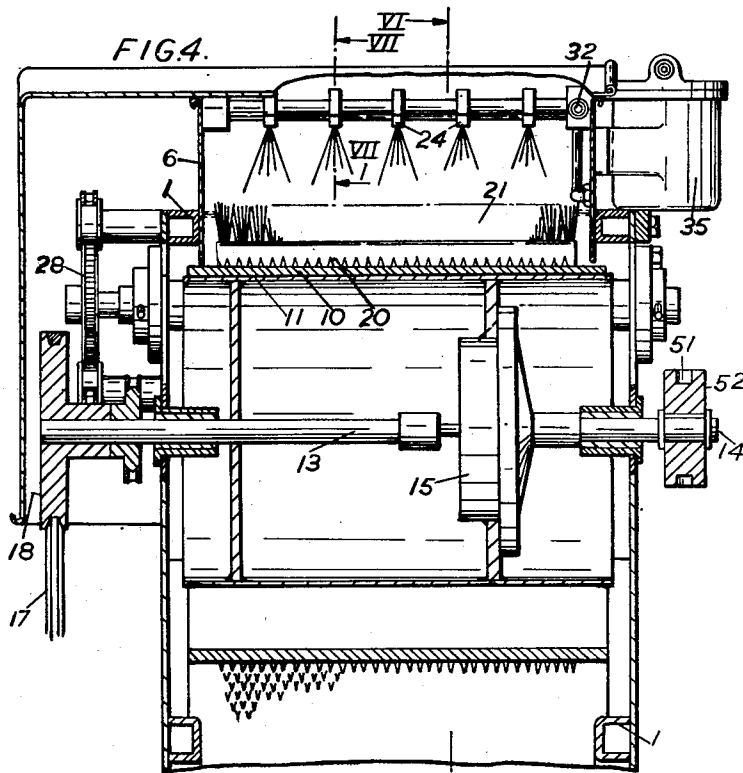
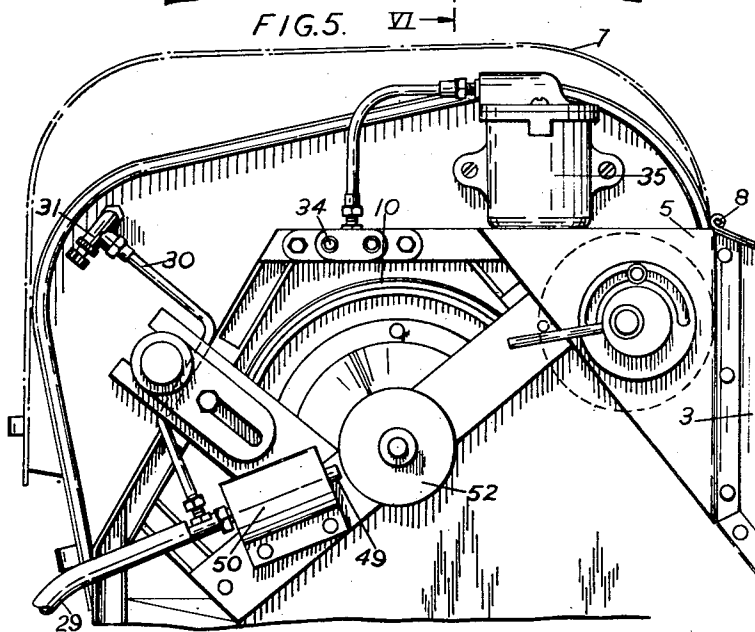
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4 Sheets-Sheet 3



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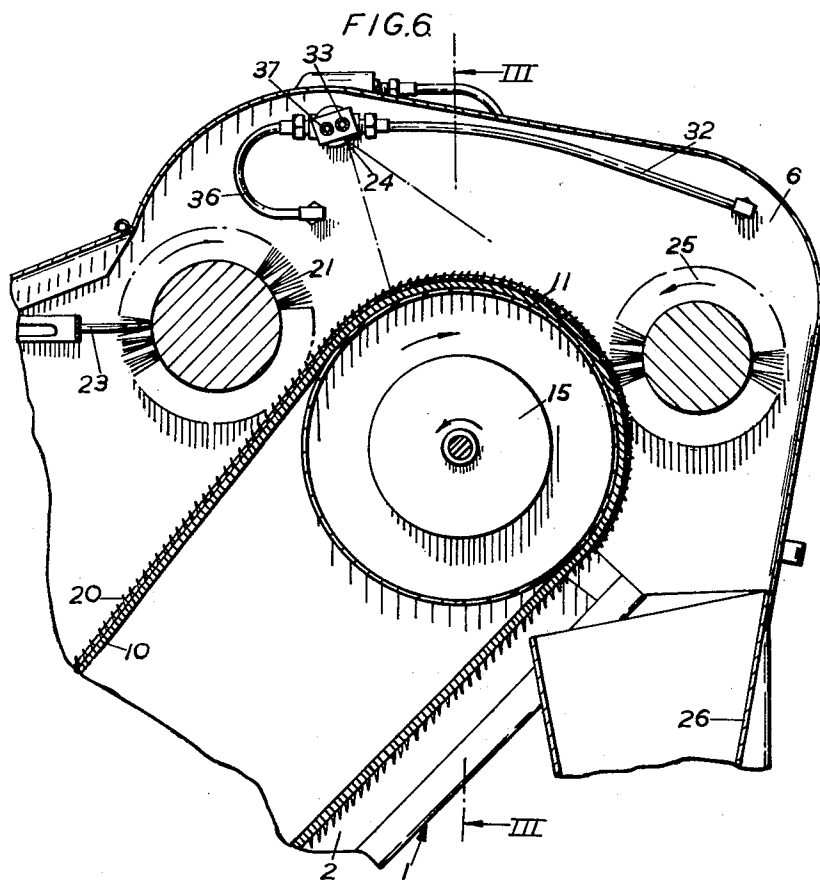
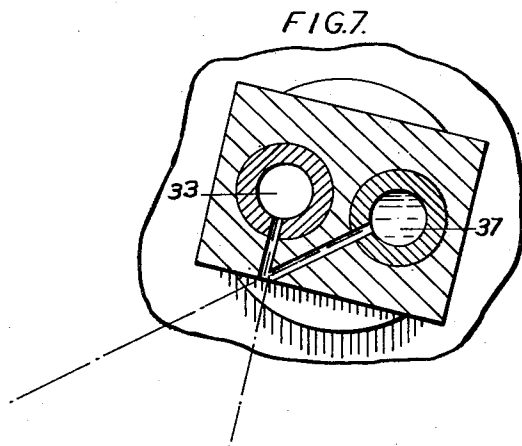
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UNITED STATES PATENT OFFICE

2,604,068

APPARATUS FOR DAMPING MINERAL
FIBERS TO BE SPRAYED IN AIR

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In Great Britain October 2, 1946

10 Claims. (Cl. 118—308)

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This application is a continuation-in-part of my co-pending application Serial No. 776,964, filed September 30, 1947.

A very effective way of forming insulating coatings on walls, ceilings or other surfaces is to spray asbestos fibre with or without other material and with an adhesive or ingredients which react to form an adhesive.

This process can advantageously be carried out in the manner and with the apparatus described in Patents Nos. 1,990,584 and 1,990,585 issued to me, the fibre being suspended in air and then subjected to suction but when this is done there is one practical drawback. This drawback is that dust escapes into the atmosphere during the spraying operation and, in order to overcome it, many expedients have been tried. The drawback can be overcome by the method described in my application Serial No. 603,616, now Patent No. 2,563,457, that is to say, by mixing the asbestos with a predetermined quantity of water or other damping material in such a way that in the course of the mixing substantially every particle of asbestos is damped and the damping material is so uniformly distributed throughout the asbestos that there is no tendency for particles to stick together by reason of different moisture contents. In my said application No. 603,616 I have also described apparatus by which this process can be carried out, this apparatus incorporating a rotary mixing drum adapted to carry the asbestos upwards as the drum rotates and a rotary brush mounted within the drum to engage the asbestos which is carried upwards and by a beating action to open up fibre bundles and fling the particles through the drum to fall to the bottom and be carried upwards again. Such an apparatus serves to treat batches of asbestos fibre. Now it is desirable to be able to work continuously, that is to say, to feed dry asbestos to an apparatus such as that shown in my Patents Nos. 1,990,584 and 1,990,585 and to spray it without having to damp the fibre in batches.

An object of this invention is to provide novel means for supplying asbestos or other mineral fibre, e. g. glass fibre, to be supplied in a current of air to a spraying device in a substantially dust-free state.

Another object of the invention is to provide improved means for damping asbestos or other fibres.

As a result of many researches, I have found that the dust can be reduced to such an extent that the drawback is largely overcome, although the formation and spraying of dust may not be

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completely eliminated. To achieve this result I spray the fibre with water or other damping agent while it is travelling in a thin layer and before it is suspended in air, I control the damping in accordance with the flow of fibre, and in feeding the damped fibre particles into the air current I prevent suction being exerted to any substantial extent on such dust as is formed so that practically no such dust is drawn into the air current.

It is important that the damping should be as uniform as possible and for this reason the fibre should be spread out into a thin layer, that is to say, one thinner than is usual at the present time. The damping agent sprayed on to this layer may be water in atomised form, oil or any appropriate liquid. It is simplest to use water, and the water jets should be as fine as possible. In addition to damping the thin layer of fibre, such jets also create a fog-like atmosphere which tends to cause any dust formed to settle within the apparatus.

I effect the damping in a casing through which the thin layer travels and which is substantially closed, and it is an important feature that the interior of this casing is not in communication with any space under low pressure such that dust in suspension in the casing would be drawn out of it by suction.

The apparatus according to this invention is preferably of the general kind shown in my Patents Nos. 1,990,584 and 1,990,585, that is to say, it includes a conveyor belt to carry the fibre upwards past a brush which serves to remove all the fibre except the desired thin layer. I modify this apparatus by providing means for spraying atomised water onto the thin layer while it is still on the conveyor belt, the layer being removed from the belt by a stripping brush. The thinner the layer of fibre which is sprayed with the water the better the results, as the fibre and water become more uniformly mixed. It is possible to make the layer thinner without reducing the capacity of a given apparatus by increasing the speed of the conveyor and making the first brush approach the conveyor closely. I find it impossible to damp the fibre absolutely uniformly while it is on the conveyor and accordingly a little dust is produced by the action of the stripping brush and conveyed to the spraying device. However, this dust is relatively small in amount and to keep it to a minimum the speed of the stripping brush should be made as low as possible.

In the apparatus described in my Patents Nos. 1,990,584 and 1,990,585, the air into which the particles are projected is drawn into the suction

inlet of a fan, so in effect the particles form a suspension in a moving current of air and this suspension is conveyed forward by the fan. In that apparatus it is the fan which produces the greatest part of the dust. In the present invention I may still use a fan but by the time the fibre arrives at the fan it is already sufficiently damped to prevent any appreciable formation of further dust in the fan.

So far as possible, no dust should be drawn forward with the fibre and, to this end, I prefer to modify the apparatus further. In the first place, when I employ a fan to convey the suspension forwards, I prefer to cause the fan to draw in air from the atmosphere so that the suction which it produces is not exerted to any substantial extent upon the interior of the casing. This result is preferably attained by providing the fan with an inlet duct inclined upwards to its open end, and admitting fibre to the duct at a point below the open end. Air enters the duct freely from the atmosphere and then entrains the fibre without setting up any suction which would draw air from within the apparatus.

Instead of causing the particles to pass through a fan I may entrain them in an air current which may itself be produced by a fan. For instance, the particles on being projected into air by a stripping brush may fall down a funnel-like duct to a continuously rotating valve of the star or gate type, through which the particles pass into a pipe in which the air current is flowing. Such a valve serves to break any suction which would otherwise be applied to the interior of the casing.

As stated above, the spraying of the damping agent must be controlled in synchronism with the movement of the fibre. In existing apparatus for spraying asbestos fibre, it is usual to provide a pneumatically operated clutch for the conveyor belt and to operate this by a device fixed to the spraying nozzle so that the belt is stopped whenever spraying is stopped. In the present invention the spray of atomised water, oil or other damping agent may be stopped simultaneously under the same control.

The preferred form of apparatus according to the invention will now be described by way of example with reference to the accompanying drawings in which—

Figure 1 shows an elevation of one side of the apparatus with the hood partly broken away, and the belt casing removed.

Figure 2 shows an elevation of one end of the apparatus.

Figure 3 shows a plan view of part of the apparatus with the hood removed.

Figure 4 shows a vertical section of the upper part of the apparatus on the line IV—IV in Figure 1.

Figure 5 shows an elevation of part of the side of the apparatus opposite to that of Figure 1.

Figure 6 shows a vertical section of the upper part of the apparatus on the line VI—VI in Figure 4; and

Figure 7 shows a detail section of a nozzle on the line VII—VII in Figure 4.

The apparatus is carried on a main frame 1 formed of a number of channel members. On the outside of these channels are side plates 2, and above and within the channels a hopper 3. Above the plates 2 are additional small plates 4, 5 outside the channels and plates 6 inside the channels. The top of the apparatus is cov-

ered by a hood 7 hinged at 8 to the upper corner of the hopper 3.

Asbestos fibre is charged into the hopper 3, and is delivered by the apparatus to a nozzle 9 for use as required. The bottom of the hopper is formed by an endless belt 10 carried on rollers 11 and 12. The roller 11 is carried on a split shaft 13, 14 and contains an epicyclic gear 15. Thus while the shaft 13 is driven continuously by an electric motor 16 through the belt 17 and pulley 18, the roller 11 will be held stationary by friction unless the shaft 14 is locked. When it is so locked, the roller 11 will rotate in the opposite direction to the shaft 13. The roller 12 is carried in bearings 19 whereby the tension of the belt may be adjusted. The belt 10 itself is wider than the hopper and carries over the width of the hopper a series of spikes 20. When the shaft 14 is locked, the conveyor is driven to carry asbestos upwards towards the roller 11.

At the top corner of the hopper 3 a cylindrical brush 21 is carried in adjustable bearings 22. This brush rotates close to the surface of the belt and serves to remove excess asbestos and return it to the hopper so that a thin layer of asbestos is carried into a substantially closed chamber under the hood 7. The brush is fitted with a cleaning comb 23. The layer of asbestos is sprayed with water from a row of nozzles 24, and is then carried beneath a second cylindrical brush 25. This is rotated at a speed just sufficient to remove damped asbestos from the belt 10, and drop it into a chute 26. The brushes are driven by two chains 27, 28 from the shaft 13. One of the nozzles 24 is shown in section in Figure 7. They are fed with compressed air through pipes 29 and 30, a control valve 31, and pipes 32 and 33. The air serves to draw water from a carburettor 35 through pipes 36 and 37. Water is supplied to the carburettor from an inlet 34.

The asbestos falling into the chute 26 is delivered to the inclined inlet duct 38 of a fan 39. This duct is open to the atmosphere at 40, so that the fan does not tend to suck air from the body of the apparatus. The fan is driven from the motor 16 through a belt 41, normally covered by a casing 42. It delivers the asbestos in a stream of air through a hose 43 to the nozzle 9. On discharge it encounters a spray from a nozzle 44 supplied with water and compressed air through pipes 45, 46 and a valve 47. Compressed air, having passed the valve, is also led off through a pipe 48 to the pipe 29 on the side of the apparatus. This not only supplies air to the nozzles 24, but also operates a plunger 49 in a cylinder 50. This enters one of a number of holes 51 in the periphery of a wheel 52 on the shaft 14 and so causes the motor to drive the belt 10. Thus operation of the valve 47 starts and stops the supply of asbestos, of damping spray, and spray at the discharge, while allowing the fan 39 and brushes 21, 25 to run continuously to prevent choking of the apparatus.

I claim:

1. In an apparatus for use in applying an insulating coating of asbestos to a surface by spraying, the combination of a casing, a conveyor adapted to carry asbestos in a thin layer through said casing, means in said casing for spraying said layer with a damping liquid, a brush for stripping said layer when damped from said conveyor, a discharge chute placed to receive particles stripped from said conveyor, means for setting up a current of air to carry away said par-

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titles, and means for preventing suction being exerted to any substantial extent by said current of air on the interior of said casing.

2. In an apparatus for use in applying an insulating coating of asbestos to a surface by spraying, the combination of a hopper, a damping chamber, an inclined conveyor belt forming successively the bottom of said hopper and the bottom of said damping chamber and adapted to convey asbestos upwards from said hopper to said damping chamber, means for reducing the asbestos conveyed to a thin layer, said means separating said hopper from said chamber, means for spraying damping liquid onto said layer in said chamber, a discharge chute, a rotary brush separating said chamber from said discharge chute, means for rotating said brush relatively to said conveyor whereby to strip asbestos as particles from said conveyor and to deliver said particles to said chute, and a fan for setting up a current of air at the lower end of said chute to carry away said particles, said current being at the lower end of said chute at substantially the same pressure as air within said chamber.

3. Apparatus for damping asbestos fibre to be applied as an insulating coating comprising a conveyor, rotary brushes operating close to said conveyor, a plurality of nozzles for spraying a damping agent, a fan blowing said fibre to a discharge nozzle and pneumatic control means operative by a single controlling movement to stop the movement of said conveyor, and the spraying of said damping agent simultaneously, while permitting said brushes and said fan to rotate continuously.

4. Apparatus for damping asbestos fibre comprising a substantially enclosed damping chamber, a spiked conveyor belt carrying said fibre to said damping chamber, spraying means for supplying atomised water to said chamber, a cylindrical rotary brush, means for rotating said brush to detach said fibre from said conveyor and means for setting up a current of air at substantially the same pressure as that within said chamber, whereby said detached fibre is carried away without entraining air from said chamber.

5. Apparatus for damping asbestos fiber to be applied as an insulating coating, comprising a conveyor for the fiber, means for spraying a damping agent onto the fiber on said conveyor, rotary means for stripping the fiber from said conveyor, a fan blowing said fiber to a discharge nozzle, and controlling means operative by a single controlling movement to stop the movement of said conveyor and spraying of said damping agent simultaneously, while permitting said rotary means and said fan to rotate continuously.

6. In apparatus for use in applying a coating of asbestos to a surface by spraying, a casing, an air duct, means providing a substantially enclosed passageway from the interior of said casing to the interior of said duct, a conveyor in the casing adapted to carry asbestos in a thin layer through the casing toward said passageway, means in the casing for spraying said layer with a damping liquid, a rotary brush operative to strip said layer when damped from said conveyor and discharge the asbestos particles through said passageway into said air duct, means producing a current of air through said duct for carrying the asbestos particles in the air stream, said duct being open to the atmosphere ahead of the junction of said passageway with the duct whereby substantially no suction

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is exerted on the interior of said casing by said air current producing means.

7. In apparatus for use in applying a coating of asbestos to a surface by spraying, a casing, an air duct, means providing a substantially enclosed passageway from the interior of said casing to the interior of said duct, a conveyor in the casing adapted to carry asbestos in a thin layer through the casing toward said passageway, means in the casing for spraying said layer with a damping liquid, a rotary brush operative to strip said layer when damped from said conveyor and discharge the asbestos particles through said passageway into said air duct, air moving means for advancing a stream of air through said duct past the mouth of said passageway thereby to carry away the asbestos particles in the air stream, said air moving means being connected to said duct on one side of the mouth of said passageway, and said duct being open to the atmosphere on the other side of the mouth of said passageway, whereby the air pressure in said casing is substantially uninfluenced by the action of said air moving means.

8. In an apparatus for use in applying a coating of asbestos to a surface by spraying, an air duct open at both ends to the atmosphere, air moving means connected to said duct for drawing air into one end thereof and discharging it from the other end, a casing, means providing a substantially enclosed passageway from the interior of the casing to the interior of said air duct, said passageway joining said duct intermediate the air inlet end and the air discharge end thereof whereby the air travels across the mouth of said passageway with relatively little disturbance of the air in the passageway proper and in the casing, a conveyor in said casing adapted to carry asbestos in a thin layer through the casing toward said passageway, means in the casing for spraying said layer with a damping liquid, and a brush operative to strip said layer when damped from said conveyor and discharge the asbestos particles through said passageway into said duct.

9. In an apparatus for use in applying a coating of asbestos to a surface by spraying, an air duct having an inlet and an outlet, means for moving air through said duct from the inlet to the outlet, a casing, means providing a substantially enclosed passageway from the interior of the casing to the interior to said air duct, said passageway joining said duct at a point intermediate the inlet and outlet where the air pressure in said duct is substantially atmospheric, a conveyor in said casing adapted to carry asbestos in a thin layer through the casing toward said passageway, means in the casing for spraying said layer with a damping liquid, and a rotary brush operative to strip said layer when damped from said conveyor and discharge the asbestos particles through said passageway into said duct.

10. In an apparatus for use in applying of asbestos to a surface by spraying, an air duct, a fan in said duct for moving the air there-through, a casing, means providing a substantially enclosed passageway from the interior of the casing to the interior of said air duct, said passageway joining said air duct on the upstream side of said fan, and said duct being open to the atmosphere on the upstream side of said passageway whereby substantially no suction is exerted on the interior of the casing by said fan, a conveyor in said casing adapted to carry as-

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bestos in a thin layer through the casing toward said passageway, means in the casing for spraying said layer with a damping liquid, and a rotary brush operative to strip said layer when damped from said conveyor and discharge the asbestos particles through said passageway into said duct.

NORMAN LOUIS DOLBEY.

REFERENCES CITED

The following references are of record in the file of this patent:

Number	Name	Date
524,650	Potter -----	Aug. 14, 1894
1,770,011	Poston -----	July 8, 1930
1,973,761	Hill -----	Sept. 18, 1934
1,990,584	Dolbey -----	Feb. 12, 1935
1,990,585	Dolbey -----	Feb. 12, 1935
2,019,079	Herring -----	Oct. 29, 1935
2,073,779	Bramsen -----	Mar. 16, 1937
2,229,566	Hill -----	Jan. 21, 1941
2,419,410	Maurer -----	Apr. 22, 1947

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UNITED STATES PATENTS