

Feb. 12, 1935.

N. L. DOLBEY

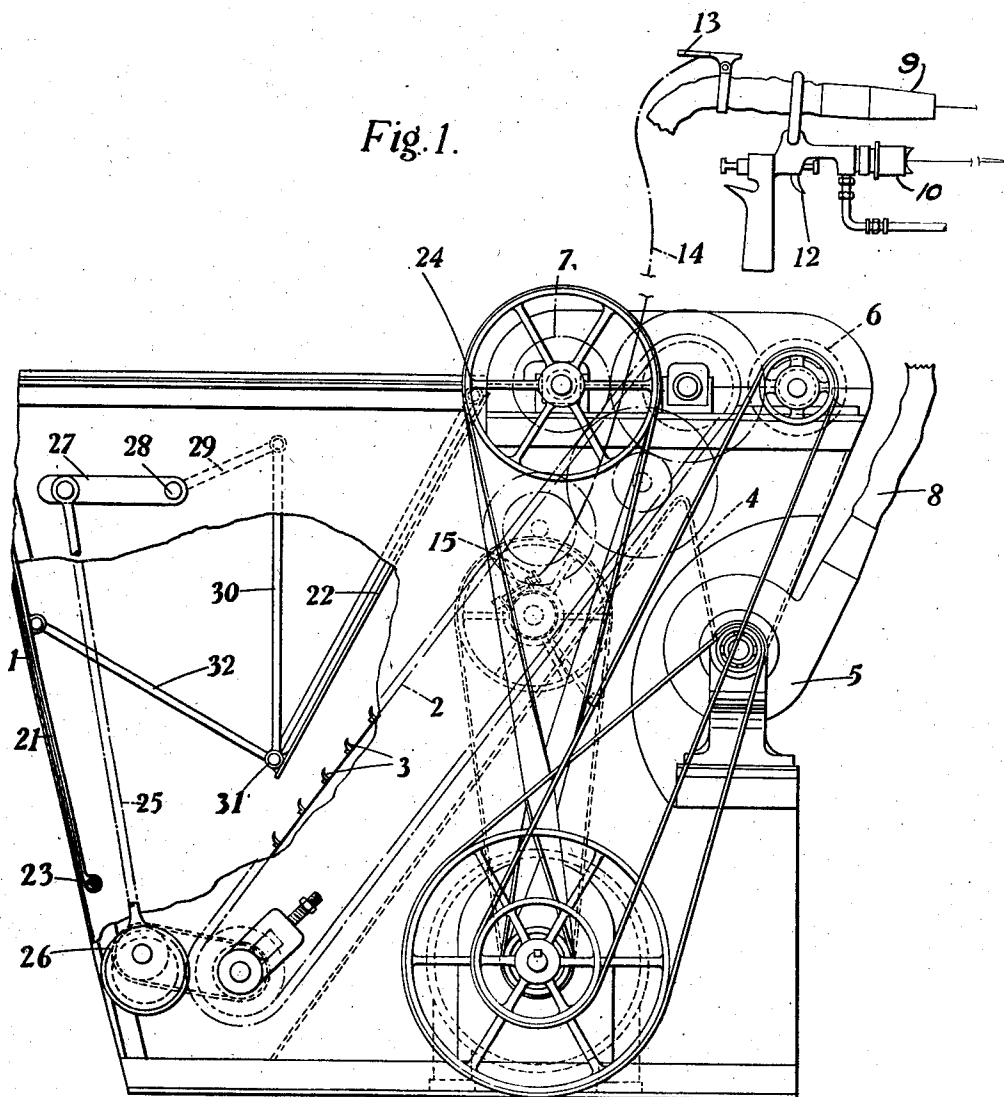
1,990,584

COATING MACHINE

Filed Nov. 30, 1931

2 Sheets-Sheet 1

Fig. 1.



INVENTOR

N. L. DOLBEY.

BY

Blair & Wilcoyne  
ATTORNEYS

**Feb. 12, 1935.**

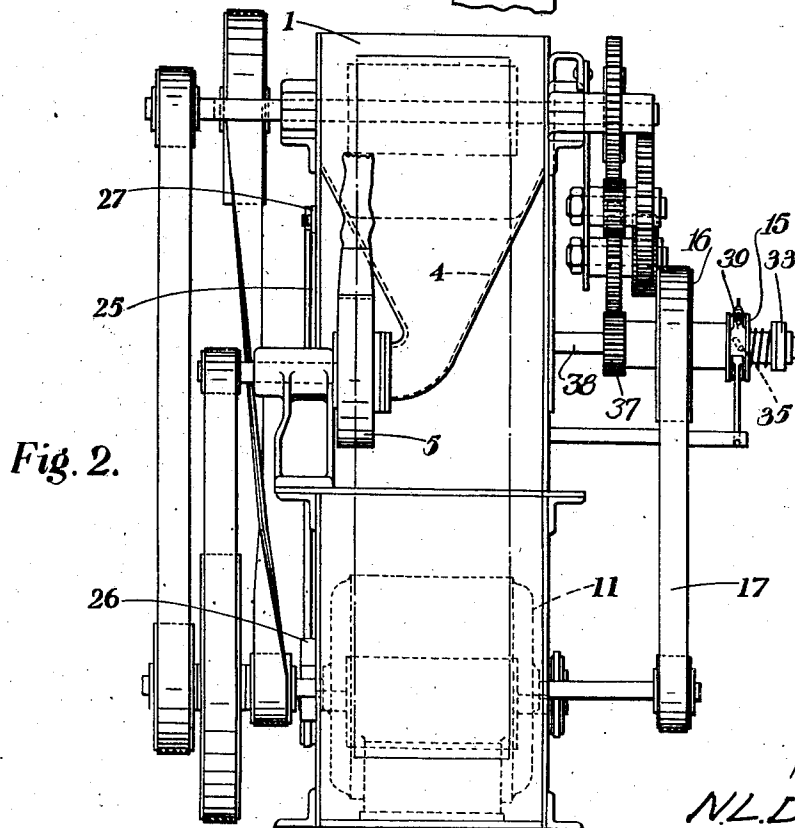
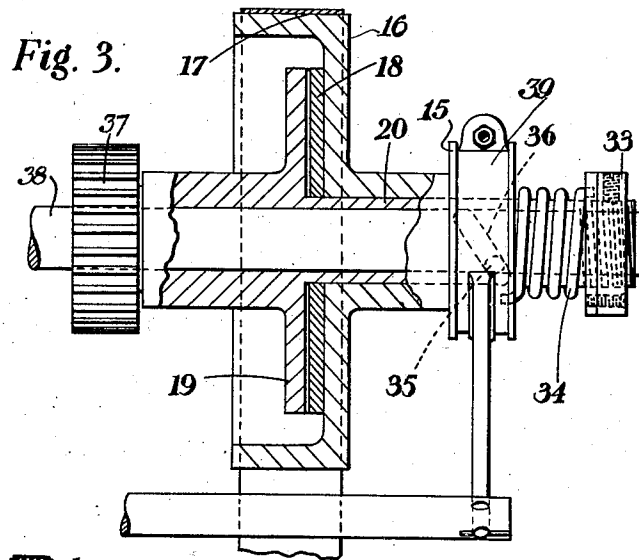
**N. L. DOLBEY**

**1,990,584**

COATING MACHINE

Filed Nov. 30, 1931

2 Sheets-Sheet 2



*INVENTOR.*

N.L. DOLBEY.

BY

Blair & Kilcayne.

ATTORNEYS

## UNITED STATES PATENT OFFICE

1,990,584

## COATING MACHINE

Norman Louis Dolbey, Leeds, England

Application November 30, 1931, Serial No. 578,084  
In Great Britain December 1, 1930

16 Claims. (Cl. 91—45)

This invention relates to the formation of heat or sound insulating coatings or of waterproofing and like coatings and to apparatus for use therewith.

One object of this invention is to provide a simple method of applying coatings to surfaces such as the steel panels of rolling stock. Another object is to form insulating coatings containing a large number of small air spaces or cells. Another object of the invention is to provide an easily mobile apparatus by means of which coatings may be applied with ease to relatively inaccessible points of structures.

The invention is based upon the discovery that the best coatings are formed, particularly when a loose fibrous material such as asbestos is used, if a suspension of the material is subjected to suction action.

In the best method known to me of carrying out my invention a fibrous and/or powdered insulating material in the form of relatively small particles suspended in air is subjected to the suction side of a fan which blows the suspension onto a surface to be coated, while at the same time an adhesive or reagent is separately sprayed onto the surface.

Preferably the suspension is made by forming the small particles in situ by means of a machine which opens out or disintegrates the raw material and, as the particles are formed, feeds them in suspension to the fan.

The adhesive or reagent may conveniently be sprayed by means of a normal spray gun and the insulating material may be arranged to be forced by the fan through an orifice adjacent to the normal spraying orifice of the gun. In any case the streams of adhesive or reagent and of insulating material are so directed that they intermingle and impinge upon the same part of the surface to be coated.

The preferred material for use in the present invention is asbestos, but this affords certain difficulties because when it is handled it tends to mat and to adhere to any parts with which it comes in contact and to clog up any machine through which it is passed. A particular feature of the present invention consists in providing a machine capable of dealing with partly prepared asbestos; the fibres of asbestos quickly become matted together and the machine opens out and separates the individual fibres and then supplies them to the fan.

In order that the invention may be clearly understood and readily carried into effect, one apparatus for use in accordance therewith will

now be described by way of example with reference to the accompanying drawings, in which Figure 1 shows a side elevation of the apparatus partly in section;

Figure 2 shows an end elevation looking from the left hand end of Figure 1, and

Figure 3 shows a detail view of part of the apparatus.

The apparatus consists of a hopper 1 containing an endless travelling band 2 made of leather and provided with a large number of hooked prongs 3 which protrude through the band 2 and serve to pick up and hold asbestos fibre supplied to the hopper 1. The band 2 carries the asbestos to a point above a funnel 4 formed integral with the hopper 1 and in communication at its base with the suction side of a fan 5. A brush 6 arranged to rotate at a very high speed serves to detach the fibre from the band and simultaneously to open it out so that it falls in small particles down the funnel 4. The fan 5 also draws in any dust formed while the fibres are being opened. A second brush 7 arranged to rotate at a moderate speed is placed close to the top of the band 2 so that in rotating it comes into contact with the fibre on the band and serves to control the quantity supplied to the brush 6.

The fan 5 should be one having relatively few blades spaced apart from one another, since it is found that a fan with a number of close-set blades does not convey the fibre satisfactorily.

The fan 5 draws in the particles of fibre suspended in air and delivers them through a hose 8 having a nozzle 9. A spray gun 10 of normal type is connected to the end of the hose 8 and is arranged to spray adhesive onto the surface to be coated at the same time that the suspension of asbestos particles is sprayed through the nozzle 9.

All the moving parts are driven by a small electric motor 11 which is connected to drive the fan 5 and the brushes 6 and 7 through belts, as shown, while the endless band 2 is driven through a belt 17 which drives a pulley 16. The pulley 16 is connected by clutch mechanism to drive a hollow shaft 20 which is journaled on a fixed shaft 38 and to which a gear wheel 37 is keyed. This wheel 37 is connected through further gear wheels, as shown, to drive the endless band 2. The pulley 16 has a clutch lining 18 which can be pressed against a flange 19 on the hollow shaft 20. The latter passes through a flange sleeve 15 against which the end of the bearing surface of the pulley 16 abuts. A collar 33 is fixed on the end of the shaft 20 and a helical spring 34 fixed at one end to the collar 33 and at the other

end to the sleeve 15 surrounds the shaft 20 between the collar and the sleeve. A strap 39 surrounds the sleeve 15 and is connected by a Bowden wire 14 to an operating handle 13 mounted close to the end of the hose 8, as shown, or on the gun. The sleeve 15 normally rotates with the hollow shaft 20 and the pulley 16 so that when the Bowden wire 14 is pulled tight, the strap acts as a brake on the sleeve 15. The result is that a pin 35 which projects from the shaft 20 into engagement with a slot 36 in the sleeve 15 causes the shaft 20 to move axially relatively to the pulley 16 against the action of the spring 34, so that the clutch is taken out. The endless band will then stop, and delivery of the material is thus interrupted independently of the operation of the fan 5, whereby continued operation of the fan functions to prevent clogging of the material in fan 5, hose 8, and nozzle 9. As long as the strap 39 continues to grip the sleeve 15 the clutch will remain out because the sleeve 15 is held against rotation and the spring 34, which has been wound up as well as compressed, is not strong enough to cause the shaft 20, the gear 37, and the endless band 2 to rotate backwards. As soon, however, as the grip of the strap on the sleeve 15 is released, the sleeve 15 can be rotated relatively to the hollow shaft 20 by the unwinding of the spring 34, and simultaneously the latter will expand and bring the flange 19 into engagement with the clutch lining 18 again.

The supply of adhesive can be shut off at the same time as the supply of fiber, by means of a valve trigger 12 which is provided, as usual, on the spray gun 10.

In practice it is desirable to prevent the fibre in the hopper from adhering to the sides thereof, and for this purpose two slowly moving agitators 21 and 22 are provided in the form of metal sheets. The sheet 21 is pivoted at 23 close to the end wall of the hopper 1 and the sheet 22 is pivoted at 24 so that it lies fairly close to and approximately parallel to the endless band 2. The two sheets 21 and 22 then form in effect the boundary walls of the hopper and are slowly rocked about their pivots through a small angle by a mechanism which consists of a rod 25 fixed to an eccentric 26 at one end and to a pivoted link 27 at the other end. The pivot 28 of the link 27 is rigidly connected to an arm 29. The latter is connected by a rod 30 to a pivot point 31 on the sheet 22, the point 31 being connected by a rod 32 to the sheet 21. The result is that an almost horizontal movement is imparted to the point 31 so that the sheets 21 and 22 are slowly rocked about the pivots 23 and 24 respectively. It will be seen that the fibre detached by the slowly running brush 7 is thrust downwards into the space between the band 2 and the sheet 22 and escapes into the bottom of the hopper.

The amount of fibre supplied to the fan can, of course, also be regulated by varying the speed of the endless band 2. This can easily be done by changing the gear ratio between the motor and the band.

If desired the bottom of the hopper may be enlarged or widened so as to provide ample space and thus to reduce choking or bridging of the fibre.

The whole apparatus may easily be made mobile by mounting it upon a frame or trolley. It thus can easily be taken to any point where it is required and has the great advantage that in general only one man is needed to operate it.

The invention is in no way limited to the

apparatus described above, as when it is desired to disintegrate or open out the coating material in situ any other means may be used capable of forming the material into a state of sub-division sufficient to form a suspension in air which can be drawn in by the fan.

Although the invention is particularly applicable to coatings formed from fibrous material such as asbestos, animal hair, wool, cotton and so forth, which materials form extremely efficient sound insulators owing to the large number of air cells or pockets contained in the resultant coating, the invention may also be applied to the formation of coatings from such powdered substances as cork powder and boiler covering compositions. These may be cemented in position by the use of adhesive or simply of water which in this case acts as an adhesive.

Again, waterproofing coatings may be formed, for example, by spraying a bituminous emulsion onto a surface and simultaneously blowing a relatively small quantity of asbestos fibre onto the surface by means of a fan as described above.

Any suitable adhesive may be employed, but the preferred adhesive is sodium silicate of 30° Twaddell, although the concentration of sodium silicate employed in accordance with the invention may vary between 10 and 60° Twaddell. However, instead of spraying a simple adhesive through a spray gun, a solid reagent may be mixed with the fibrous or powdered material and be blown by the fan onto the surface to be coated, while a liquid reagent may simultaneously be sprayed onto the surface; for example magnesite powder and magnesium chloride solution may be sprayed simultaneously in this way as may Portland cement and water.

I claim:—

1. In an apparatus for applying a coating to a surface, the combination of a dispersing mechanism adapted to receive loose fibrous material having a tendency to mat and to form it into a suspension of fine particles in air, a fan placed to receive said suspension and operative to drive it forwards, means for directing said suspension onto the surface to be coated, and means for simultaneously spraying a liquid onto said surface.

2. In an apparatus for applying a coating to a surface, the combination of a container for loose fibrous material having a tendency to mat, a band mounted to travel through said container and operative to take up such fibrous material, a rotary brush so placed as to be capable of detaching fibres from said band and forming them into a suspension in air, a fan placed to receive at its suction side the suspension thus formed, a conduit connected to the delivery side of said fan and adapted to discharge said suspension onto the surface to be coated, and means for simultaneously spraying a liquid onto said surface.

3. In an apparatus for applying a coating to a surface, the combination of a container for loose fibrous material, having a tendency to mat, a band mounted to travel through said container and operative to take up such fibrous material, a rotary brush so placed as to be capable of detaching fibres from said band and forming them into a suspension in air, a second rotary brush placed between said first brush and the receiving end of said band and adapted to limit the amount of material carried by said band to said first rotary brush, a fan placed to receive at its suction side the suspension thus formed, a

conduit connected to the delivery side of said fan and adapted to discharge said suspension onto the surface to be coated, and means for simultaneously spraying a liquid onto said surface.

4. In an apparatus for applying a coating to a surface, the combination of a dispersing mechanism adapted to receive loose fibrous material having a tendency to mat and to form it into a suspension of fine particles in air, a fan placed to receive said suspension and operative to drive it forwards, a conduit connected to the delivery side of said fan and provided with a discharge nozzle, and a spray gun attached to said nozzle and adapted to spray liquid onto the surface to be coated simultaneously with said suspension.

5. In an apparatus for applying a coating to a surface, the combination of a container for loose fibrous material having a tendency to mat, a band mounted to travel through said container and operative to take up such fibrous material, a rotary brush so placed as to be capable of detaching fibres from said band and forming them into a suspension in air, a fan, a nozzle, a conduit connecting said fan and said nozzle, said fan being adapted to receive material delivered by said dispersing mechanism and urge it through said conduit and nozzle, a spray gun attached to said nozzle and so located that liquid issuing from said spray gun and material issuing from said nozzle can be caused to impinge simultaneously on substantially the same part of a surface to be coated, driving means for said traveling band, said rotary brush and said fan, a clutch interposed between said driving means and said travelling band, a control trigger for said spray gun mounted upon said spray gun, and an operating handle adapted to control said clutch and mounted close to said control trigger.

6. In an apparatus for applying a coating to a surface, the combination of a dispersing mechanism adapted to receive loose fibrous material having a tendency to mat and to form it into a suspension of fine particles in air, a fan having blades located a substantial distance apart from one another and placed to receive said suspension and operative to drive it forwards, means for directing said suspension onto the surface to be coated, and means for simultaneously spraying a liquid onto said surface.

7. In an apparatus for applying a coating to a surface, the combination of a container for loose fibrous material having a tendency to mat, agitating means within said container, a dispersing mechanism adapted to receive the fibrous material from said container and deliver it as a fine suspension in air, means for conveying the fibrous material from said container to said dispersing mechanism, a fan placed to receive said suspension and operative to drive it forwards, means for directing said suspension onto the surface to be coated, and means for simultaneously spraying a liquid onto said surface.

8. In an apparatus for applying a coating to a surface, the combination of a container for loose fibrous material having a tendency to mat, reciprocable walls within said container for agitating material therein, a dispersing mechanism adapted to receive the fibrous material from said container and deliver it as a fine suspension in air, means for conveying the fibrous material from said container to said dispersing mechanism, a fan placed to receive said suspension and operative to drive it forwards, means for directing said suspension onto the surface to be coated, and means for simultaneously spraying a liquid onto

said surface, and a motor connected to reciprocate said walls and drive said dispersing mechanism and said fan.

9. In an apparatus for applying a coating to a surface, the combination of a container for loose fibrous material having a tendency to mat, a hopper located adjacent said container, a band mounted to travel through said container and operative to take up the fibrous material, a rotary brush so placed as to be capable of detaching fibres from said band and forming them into a suspension in air inside said hopper, a fan having its suction side connected to the base of said hopper and adapted to convey said suspension forwards, a conduit connected to the delivery side of said fan and adapted to discharge said suspension onto the surface to be coated, and means for simultaneously spraying a liquid onto said surface.

10. In an apparatus for applying a coating to a surface, the combination of a dispersing mechanism adapted to receive loose fibrous material having a tendency to mat and to form it into a suspension of fine particles in air, means for exerting suction pressure on said suspension whereby to drive it forwards, means for directing said suspension on to the surface to be coated, and means for simultaneously spraying a liquid on to said surface.

11. In an apparatus for applying a coating to a surface, the combination of a dispersing mechanism adapted to receive loose fibrous material having a tendency to mat and to form it into a suspension of fine particles in air, means for delivering such material to said dispersing mechanism, means for exerting suction pressure on said suspension whereby to drive it forwards, means for directing said suspension on to the surface to be coated, and means for simultaneously spraying a liquid on to said surface.

12. In apparatus for applying a coating to a surface, the combination of a container for loose fibrous material having a tendency to mat, means mounted to travel through said container and operative to convey such fibrous material from the container, a rotary brush so placed as to be capable of detaching fibers from said traveling means and forming them into a suspension in air, means for exerting a suction pressure on said suspension thereby to drive it forwards, means for directing said suspension on to the surface to be coated, and means for simultaneously spraying a liquid on to said surface.

13. In an apparatus for applying a coating to a surface, the combination of a dispersing mechanism adapted to form loose fibrous material having a tendency to mat into a suspension of fine particles in air, means for supplying such material to said dispersing mechanism, means for controlling the quantity of such material supplied to said dispersing mechanism, a fan placed to receive said suspension and operative to drive it forwards, means for directing said suspension on to the surface to be coated, and means for simultaneously spraying a liquid on to said surface.

14. In an apparatus for applying a coating to a surface, the combination of a dispersing mechanism adapted to form loose fibrous material having a tendency to mat into a suspension of fine particles in air, means for supplying such material to said dispersing mechanism, means for controlling the quantity of such material supplied to the dispersing mechanism, means for exerting suction pressure on said suspension where-

by to drive it forwards, means for directing said suspension on to the surface to be coated, and means for simultaneously spraying a liquid on to said surface.

- 5 15. In an apparatus for applying a coating to a surface, the combination of a dispersing mechanism adapted to receive loose fibrous material having a tendency to mat and to form it into a suspension of fine particles in air, means for delivering such material to said dispersing mechanism, a fan placed to receive said suspension and operative to drive it forwards, means for directing said suspension on to the surface to be coated, means for controlling the operation of said material delivering means independently of the operation of said fan, and means for spraying a liquid on to said surface to be coated simultaneously with said suspension.
- 10
- 15

16. In an apparatus for applying a coating to a surface, the combination of a dispersing mechanism adapted to receive loose fibrous material having a tendency to mat and to form it into a suspension of fine particles in air, means for delivering such material to said dispersing mechanism, a fan placed to receive said suspension and operative to drive it forwards, a conduit connected to the delivery side of said fan and provided with a discharge nozzle, means operatively related to said nozzle for interrupting the actuation of said material delivering means independently of the actuation of said fan, and a spray gun attached to said nozzle and adapted to spray liquid on to the surface to be coated simultaneously with said suspension.

5

10

15

NORMAN LOUIS DOLBEY.