July 13, 1965 G. D. GURNEY 3,194,443

ROCK DUSTER

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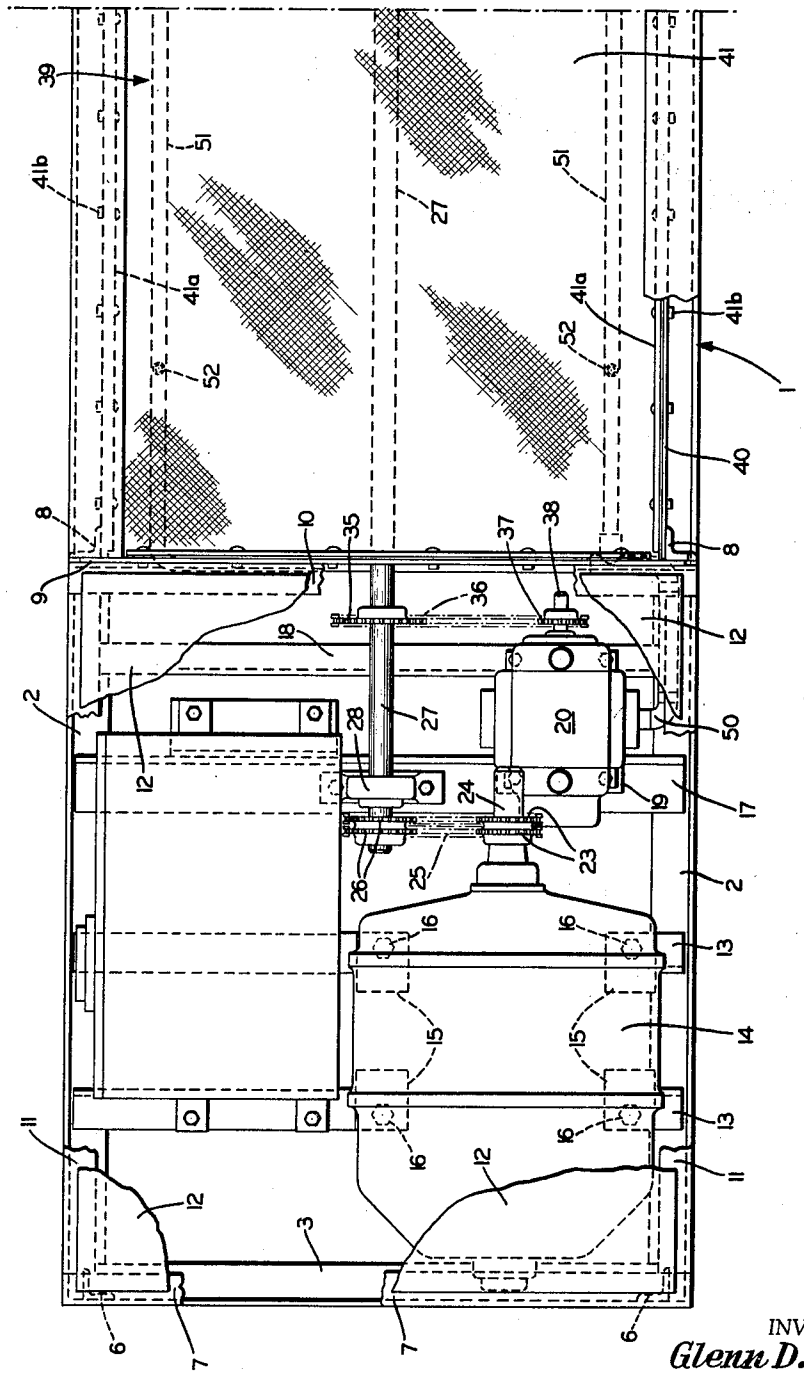

Fig. 1a

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ROCK DUSTER

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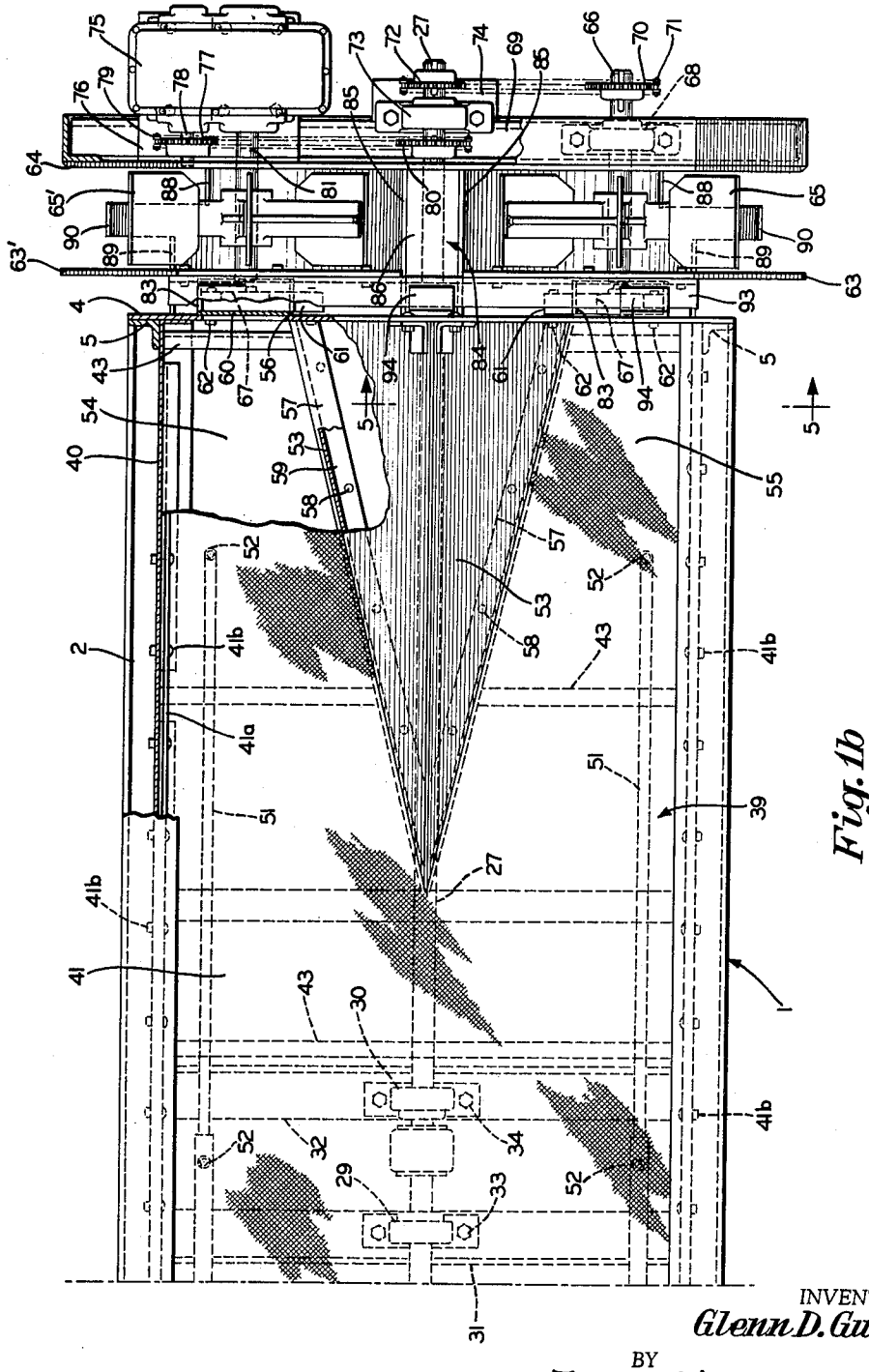

Fig. 1b

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ROCK DUSTER

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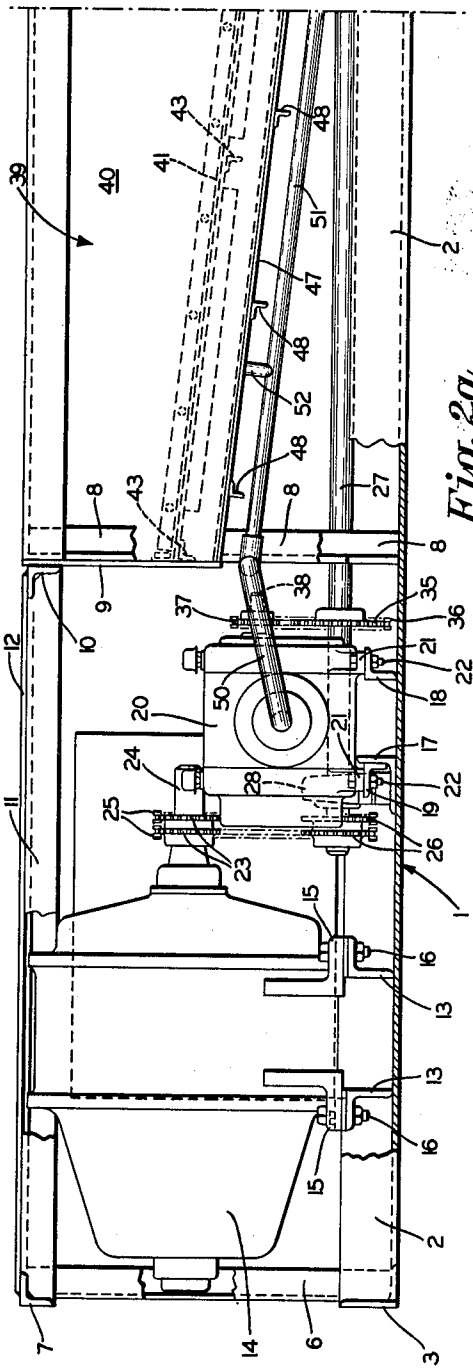

Fig. 2a

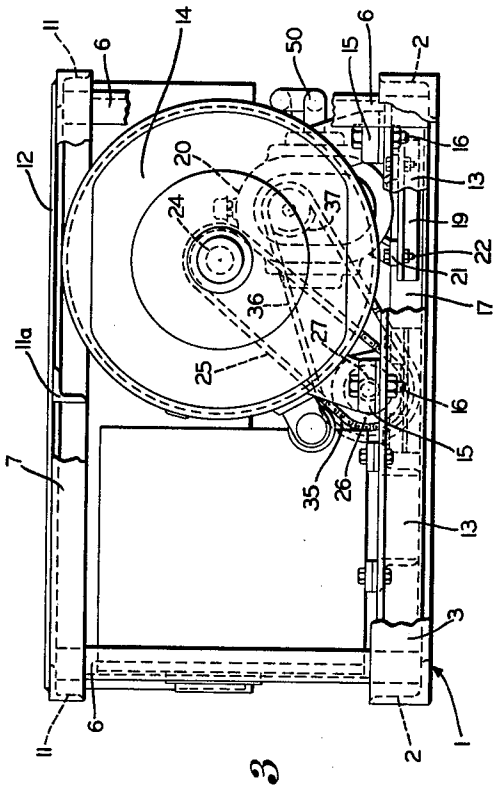

Fig. 3

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ROCK DUSTER

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Fig. 2b

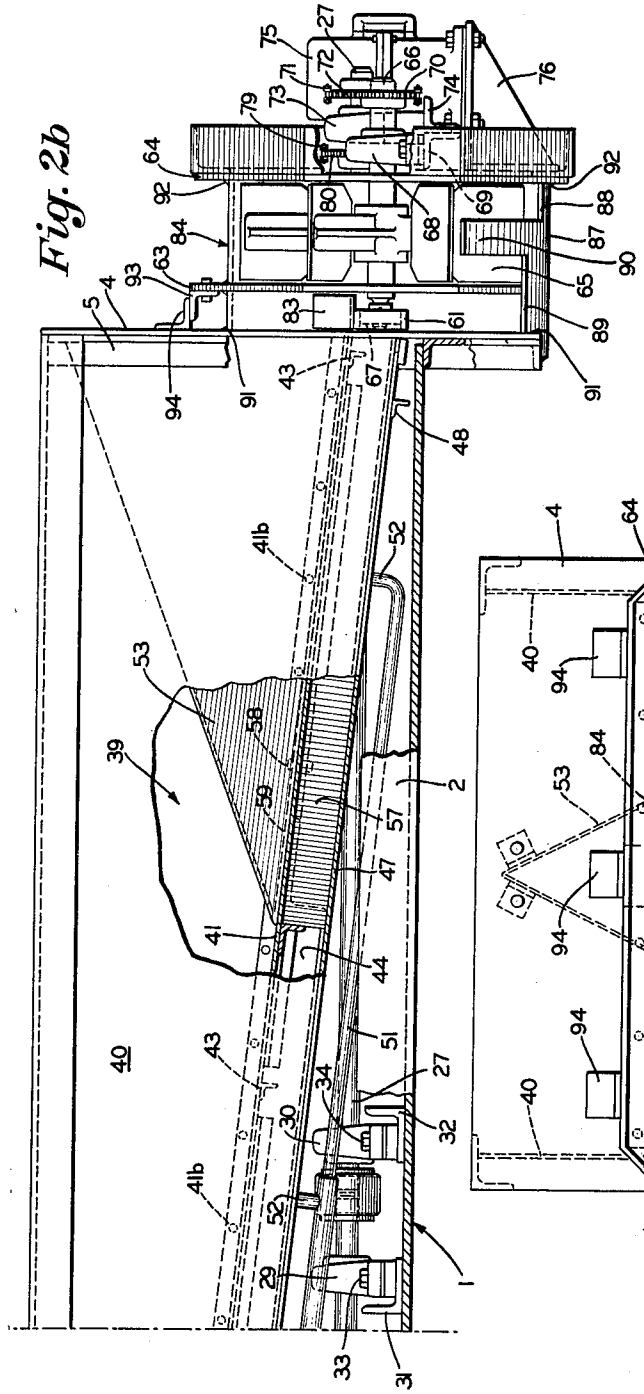
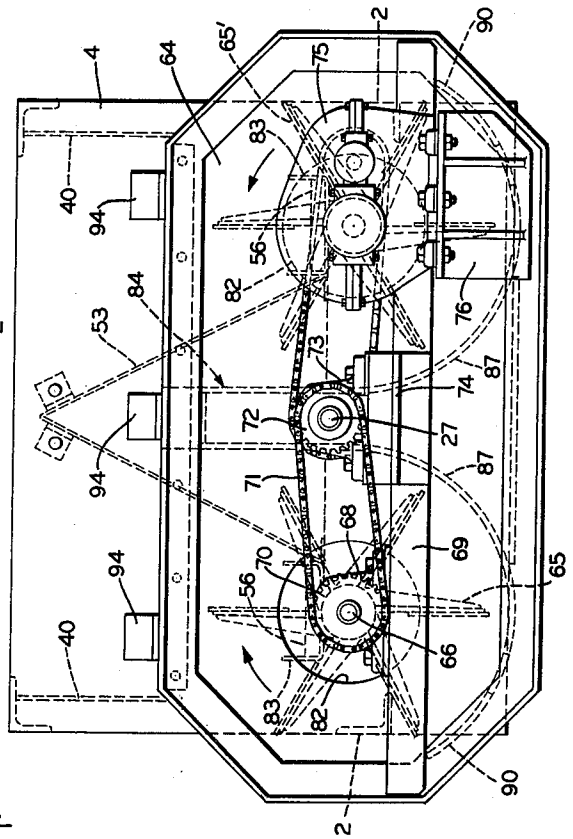


Fig. 4



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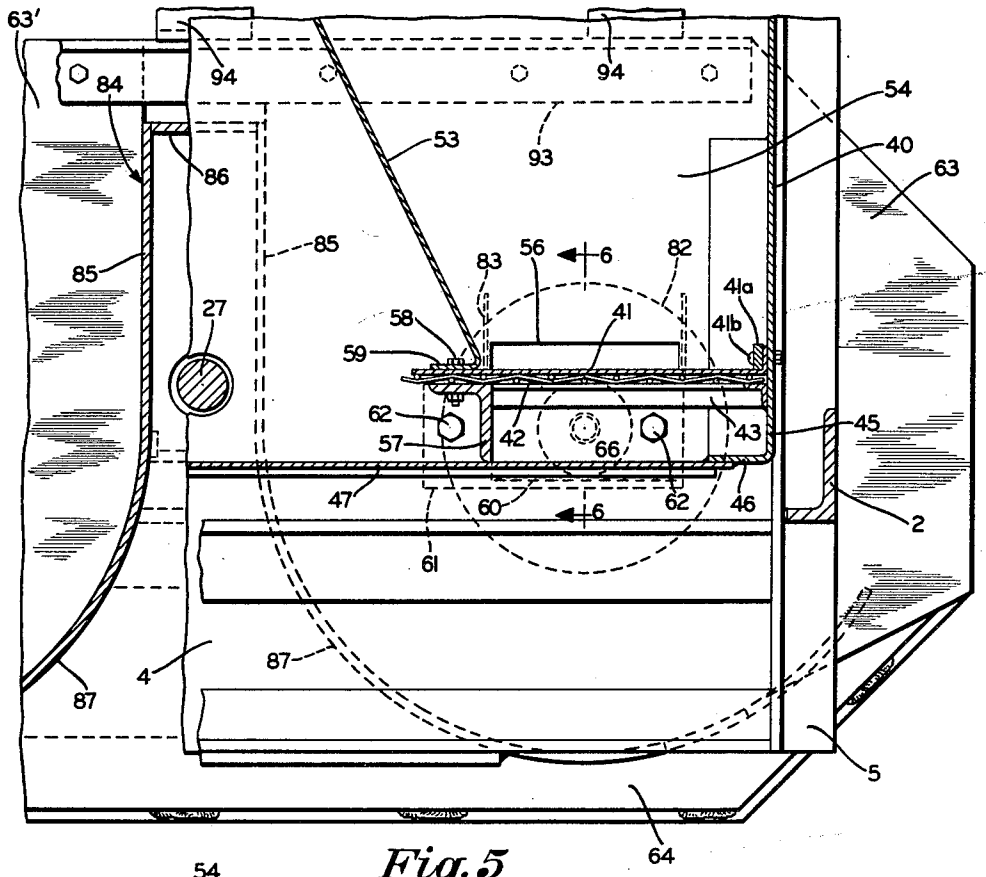

Fig. 5

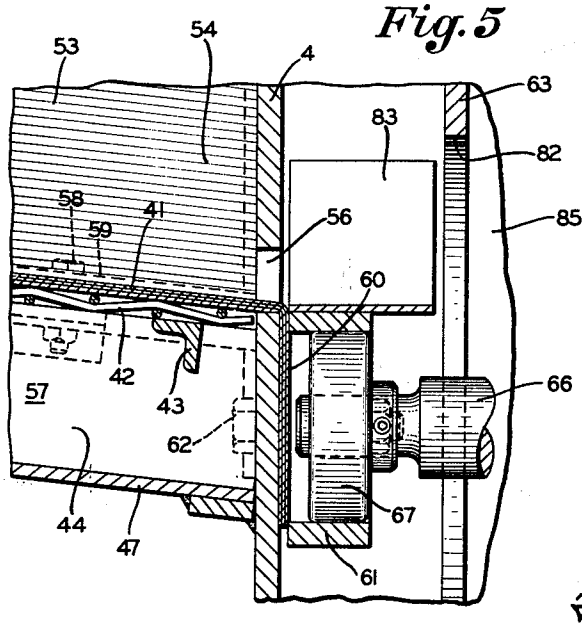

Fig. 6

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United States Patent Office

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3,194,443

ROCK DUSTER

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Filed July 1, 1963, Ser. No. 292,017
20 Claims. (Cl. 222—193)

The invention relates to apparatus for spreading rock dust in coal mine tunnels and the like, for covering and mixing with the coal dust on the walls, ceilings, and floors, and more particularly to an apparatus of this general type having novel conveying means as well as novel spreading means for the rock dust.

It is common practice to spray the interiors of coal mine tunnels and similar places with rock dust in order to prevent explosion of the coal dust which accumulates on the floor, walls and ceilings thereof.

The apparatus generally used for this purpose comprises a vehicle which may be arranged to be propelled upon the railroad rails in the mines or otherwise, such vehicle having a hopper containing a supply of rock dust. Screw means is usually provided for feeding the rock dust from the hopper to a feed tube or pipe through which an air blast is passed for spraying the rock dust from a nozzle connected to the feed tube.

In the past, difficulty has been experienced by the rock dust having a tendency to pack and arch over the feed screw and pack in the feed tube, so that feeding of the rock dust to the nozzle is interrupted, requiring stopping of the operation to break up the packed or caked rock dust.

Furthermore, this feeding of the rock dust from the hopper to the feed tube, by a feed screw, and then spraying it through the nozzle was a slow operation.

The object of the present invention is to provide a rock dusting apparatus which overcomes the above difficulties and disadvantages, and which will quickly and easily convey the rock dust to the spreading means and rapidly spread it upon the walls, ceilings and floors of mine tunnels and similar places.

Another object of the invention is to provide rock dusting apparatus having simple, effective and inexpensive means for rapidly and uniformly conveying the rock dust without any danger of packing or caking.

A further object of the invention is to provide apparatus of the character referred to having conveying means of the general type disclosed in Ihlefeldt Patent No. 1,971,853, dated August 28, 1934, in which a conveying trough has a porous bottom wall through which air or gas under pressure is forced to maintain the pulverulent material being conveyed in a suspended state approximating a fluid condition.

A still further object of the invention is to provide rock dusting apparatus of this character comprising a hopper or bin for containing rock dust, the bottom wall of the hopper or bin being in the form of a porous flexible member inclined slightly downward toward the discharge end.

Another object of the invention is to provide such a rock dusting apparatus in which an air-tight chamber is located beneath the hopper or bin, the porous flexible member forming the top wall of the air-tight chamber, means being provided for admitting a gaseous medium under pressure to said air-tight chamber at spaced points throughout the length thereof.

A still further object of the invention is to provide a rock duster of this general type in which the rock dust is discharged from two spaced outlets in the end wall of the hopper or bin, directly into two preferably oppositely rotating fans which spread the rock dust evenly over the surfaces of the ceiling, side walls and floor of a tunnel or similar place in a coal mine.

The above and other objects, apparent from the drawings and following description, may be attained, the above described difficulties overcome and the advantages and results obtained, by the apparatus, construction, arrangements and combinaitons, subcombinations and parts which comprise the present invention, a preferred embodiment of which, illustrative of the best mode in which applicant has contemplated applying the principle, being set forth in detail in the following description and illustrated in the accompanying drawings.

In general terms the invention may be briefly described as comprising an elongated hopper or bin having an open top, substantially vertical side walls and end walls, and a flexible porous bottom wall, slightly inclined from one end wall to the other.

An air-tight chamber is located directly below and coextensive with the inclined bottom wall, which forms the top wall of said air-tight chamber. Means, such as an air pump, is provided for furnishing air or other gaseous medium, and discharge pipes from the pump communicate at spaced intervals with said air chamber so as to maintain a uniform pressure throughout the air chamber.

A V-shape divider is preferably located in the discharge end of the hopper or bin, dividing the same into two diverging legs, there being a discharge slot in the adjacent end wall at the terminal end of each leg.

A motor is mounted beyond the other end of the hopper or bin and operatively connected, as by sprocket wheels and chain, with the air pump for driving the same. A main drive shaft is located centrally below the air chamber and also connected by sprocket wheels and chain with the motor.

A spaced pair of transversely disposed plates are located forwardly from the discharge end of the hopper or bin and extend entirely across the discharge end thereof. Between these transverse plates are located fans, one near each end of the plates.

Each fan is centered relative to one of the discharge outlet slots in the adjacent end wall of the hopper or bin. An opening is formed in the first of the two plates, concentric with each fan, and a U-shape trough extends between each discharge outlet slot and the corresponding opening.

One of the fans is connected directly to the main drive shaft, as by sprocket wheel and chain drive, and the other fan is connected to the drive shaft through a reversing gear, so that the fans rotate in opposite directions.

Having thus briefly described the invention, reference is now made to the accompanying drawings illustrating a perferred embodiment of the invention, in which;

FIGS. 1*a* and 1*b* are a plan view of the new rock duster apparatus, with parts broken away for the purpose of illustration;

FIGS. 2*a* and 2*b* are a side elevation with parts broken away;

FIG. 3 is an elevation of one end of the apparatus, showing the motor, and the starter box;

FIG. 4 is an elevation of the opposite end of the apparatus, showing the fans;

FIG. 5 is a section on the line 5—5, FIG. 1*b*; and

FIG. 6 is a section on the line 6—6, FIG. 5.

The apparatus is designed to be moved through mine tunnels and the like, and is adapted to be mounted on a vehicle which may be arranged to be conveyed upon a railroad track by means of a locomotive or otherwise. The vehicle is not illustrated as it in itself forms no part of the invention.

The apparatus comprises a rectangular frame, indicated generally at 1, adapted to be mounted upon the vehicle. This frame includes longitudinally disposed

angle members 2, joined at their rear ends by a transversely disposed angle member 3, and at their forward ends by the transversely disposed plate 4, to which the vertical angle members 5 are also attached.

Vertical angle members 6 are connected to the rear transverse member 3 and at their upper ends are connected by a transverse angle member 7. A pair of vertical angle members 8 are mounted upon the longitudinal members 2, at points spaced forwardly from the rear end of the apparatus, and a transversely disposed plate 9 is connected at opposite ends to the upper portions thereof.

A transversely disposed angle member 10 is connected to the upper edge of the transverse plate 9. Longitudinally disposed angle members 11 are located between opposite ends of the transversely disposed angle members 7 and 10, and a centrally located angle member 11*a* is located between the central portions of the transverse angle members 7 and 10, forming a support for a cover plate 12 for the rear portion of the frame.

A spaced pair of transversely disposed angle members 13 are mounted at opposite ends upon the longitudinally disposed frame members 2, at a point spaced forwardly from the rear transverse angle member 3, and provide a support for the motor 14, the flanged feet 15 of which are mounted upon angle members 13 and connected thereto by bolts 16.

Spaced, transversely disposed angle members 17 and 18 are located forwardly of the angle members 13 and connected at their opposite ends to the longitudinal angle members 2. A short angle member 19 is mounted upon one end portion of the member 17.

An air pump 20 is provided with flanged feet 21 connected to the angle members 18 and 19 by bolts 22. Sprocket wheels 23, upon the shaft 24 of the motor 14, are connected by chains 25 with sprocket wheels 26 upon the main drive shaft 27 which is longitudinally centrally located through the frame.

The shaft 27 is journalled in a bearing 28 mounted upon the transversely disposed angle member 17 and in bearings 29 and 30 mounted upon the transversely disposed angle members 31 and 32. Bolts 33 and 34 attach the bearings 29 and 30 to the angle members 31 and 32.

A sprocket wheel 35, upon the shaft 27, is connected by chain 36 with sprocket wheel 37 upon the shaft 38 of the air pump 20. A hopper, indicated generally at 39, is formed within the frame 1 between the transverse walls 4 and 9 which form the front and rear end walls for the hopper, the longitudinal side walls of which are shown at 40.

The bottom wall of the hopper is slightly inclined forwardly and downwardly from the rear wall 9 toward the front wall 4. This bottom wall 41 is porous and preferably flexible and, as best shown in FIGS. 5 and 6, is preferably formed of several layers of canvas supported by a heavy wire mesh 42 which is supported upon the transverse angle members 43. The longitudinal edges of the canvas 41 are turned up against the side walls 40 and are clamped thereagainst by the longitudinal bars 41*a* and bolts 41*b*.

A gas chamber 44 is located below the hopper and coextensive therewith. The front and rear end plates 4 and 9 respectively form the front and end walls of the gas chamber and the lower portions 45 of the side walls 40 form the side walls thereof.

The lower terminal edge of the side walls 40 are turned inwardly as shown at 46 in FIG. 5 and the bottom wall 47 of the gas chamber is attached thereto and supported on the transverse angle members 48.

Air or other suitable gaseous medium under pressure is discharged from the air pump 20 through the pipe 50 which is connected to the two longitudinally disposed pipes 51 located beneath the gas chamber 44 near opposite sides thereof and connected at spaced intervals to the gas chamber as indicated at 52.

A V-shape or triangular divider 53 may be located in the forward end of the hopper dividing this end of the hopper into two diverging legs indicated at 54 and 55 in FIG. 1*b*. A discharge outlet slot 56 is formed in the end wall 4 at the end of each leg 54 or 55 and at the floor level thereof as shown in FIGS. 5 and 6.

Longitudinally diagonally disposed angle members 57 are located upon the bottom wall 47, directly below the bottom edges of the V-shape divider 53, as best shown in FIGS. 1*b* and 5. The inner edges of the canvas 41, and wire mesh 42, are located upon the corresponding angle members 57 and clamped thereupon by bolts 58 located through the horizontal flanges 59 at the lower edges of the V-shape divider 53 and through the angle members 57.

The end of the canvas 41 is located through the corresponding discharge outlet slot 56 and extends down along the front face of the end plate 4 as indicated at 60. Each end portion 60 of the canvas is clamped against the front face of the end plate 4 by the corresponding bearing block 61 and bolts 62 (FIGS. 1*b* and 6).

Two vertically aligned transversely disposed plates 63–63′ are located in front of the end plate 4 and spaced therefrom, and the transversely disposed plate 64 is spaced forwardly from the plates 63–63′.

A pair of similar fans 65–65′ are provided. The fan 65 is located between the plates 63 and 64 and the fan 65′ is located between the plates 63′ and 64. The shaft 66 of fan 65 and the shaft 81 of fan 65′ each has one end journalled in a bearing 67, which may be a roller bearing or ball bearing, located in a bearing block 61. The other end of the shaft 66 of the fan 65 is journalled in a bearing 68, mounted upon an angle member 69 carried by the plate 64.

A sprocket wheel 70 is fixed upon the forward end of the shaft 66 of the fan 65 and connected by chain 71 with sprocket wheel 72 upon the forward end of the main shaft 27, which is journalled in a bearing 73, mounted upon a bracket 74, carried by the angle member 69.

The reversing gear box 75 is mounted upon a bracket 76 carried by the transverse plate 64. A sprocket wheel 77, upon the shaft 78 of the reversing gear, is connected by chain 79 with sprocket wheel 80 upon the main drive shaft 27. The shaft 81, of the fan 65′, is connected within the reversing gear box 75, the other end thereof being journalled in a bearing 67 located within the corresponding bearing box 61.

Each plate 63 and 63′ has an opening 82 therein concentric with the corresponding fan shaft 66 and 81. A substantially channel-shape trough 83 is located in front of each outlet slot 56, being mounted upon the corresponding bearing block 61, and extends to a point adjacent the corresponding opening 82 in the transverse plate 63 or 63′ as the case may be.

The plates 63, 63′ and 64 are supported from the front end plate 4 by means of the double partition indicated generally at 84. This partition is located between the fans 65 and 65′ and comprises the two parallel vertical portions 85 connected at their upper ends as at 86, each vertical portion 85 merging into a downwardly curved portion 87 which terminates below the outer side of the adjacent fan with forward and rearward cutouts 88 and 89 and reduced terminal portion 90 therebetween.

The double partition above described is welded to the end plate 4 at its inner edge as indicated at 91 and welded to the outer transverse plate 64 at its outer edge as at 92. The inner transverse plates 63 and 63′ are shaped to fit the contours of the two vertical portions 85 and curved portions 87 of the double partition.

An angle member 93 is attached to the upper edges of the inner transverse plates 63 and 63′ and to angle members 94 connected to the forward side of the end plate 4.

In the operation of the apparatus, the hopper is filled with rock dust and the vehicle carrying the apparatus is

conveyed to the location within a mine tunnel to be dusted. The motor 14 is then started operating the shaft 27 through the sprocket gearing 23–25–26.

The air pump 20 is thus operated through the sprocket and chain gearing 35–36–37 and the fans 65 and 65' are rotated in opposite directions by the sprocket and chain gearing 70–71–72, sprocket and chain gearing 78–79–80 and reversing gear 75.

Air under pressure is discharged from the pump 20, through the pipe 50 and tubes 51 and into the air chamber 44, at spaced points throughout its length, through the connections 52. The air under pressure is forced upwardly from the air chamber, through the porous bottom wall 41, maintaining the rock dust in such condition that it assumes the characteristics of a fluid emulsion.

The air under pressure passing up through the porous bottom wall 41 passes upward through the rock dust, separating each particle of rock dust from the other particles thereof.

The rock dust in this condition will be conveyed forwardly upon the porous bottom wall, being diverted by the triangular separator 53 into the two legs 54 and 55 of the hopper and discharged through the discharge outlet slots 56 and through the channel-shaped troughs 83 and the openings 82, into the rapidly rotating fans 65 and 65', which throw the rock dust upwardly and outwardly in opposite directions, uniformly coating the ceiling and side walls of the mine tunnel with rock dust, a sufficient number of the rock dust descending to the floor of the mine so as to adequately cover, or mix with, the coal dust thereon.

From the above it will be evident that a simple, efficient and easily operated apparatus is provided for rapidly and uniformly dusting the side walls, ceiling and floor of a mine tunnel or the like, without the difficulties and disadvantages of present rock dusting apparatus.

In the foregoing description certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention or discovery, the construction, the operation, and use of preferred embodiments thereof, and the advantages new and useful results obtained thereby; the new and useful construction, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in one end wall, a gas chamber below and coextensive with the bottom wall, means for introducing a gaseous medium under pressure into said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, and means for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

2. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in one end wall, a gas chamber below and coextensive with the bottom wall, means for introducing a gaseous medium under pressure into said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, and means for rotating the fans in opposite directions with the upper sides of the fans rotating toward each other, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

3. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in one end wall, a gas chamber below and coextensive with the bottom wall, means for introducing a gaseous medium under pressure into said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, said innermost transverse wall being spaced from said one end wall, a substantially channel-shape trough between each discharge outlet and the corresponding concentric opening, and means for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets into said channel-shape troughs and drawn from said troughs into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

4. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in one end wall, a gas chamber below and coextensive with the bottom wall, means for introducing a gaseous medium under pressure into said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a vertical partition between said transverse walls on the inner side of each fan, each of said partitions merging into an outwardly curved portion terminating beneath the corresponding fan, and means for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

5. A rock duster comprising a hopper having side walls, end walls, and a forwardly and downwardly inclined porous bottom wall, there being spaced discharge outlets in the forward end wall, a gas chamber below and coextensive with the bottom wall, means for introducing a gaseous medium under pressure into said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, and means for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

6. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in one end wall, a gas chamber below and coextensive with the bottom wall, means for introducing a gaseous medium under pressure into said gas chamber, a transversely disposed rotary fan located in

front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a vertical partition between said transverse walls on the inner side of each fan, each of said partitions merging into an outwardly curved portion terminating beneath the corresponding fan in a reduced terminal portion, and means for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

7. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlet in one end wall, a gas chamber below and coextensive with the bottom wall, means for introducing a gaseous medium under pressure into said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a vertical partition between said transverse walls on the inner side of each fan, each of said partitions merging into an outwardly curved portion terminating beneath the corresponding fan, means joining the upper ends of said vertical partitions, and means for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

8. A rock duster comprising a hopper having side walls, end walls, and a flexible porous bottom wall, there being spaced discharge outlets in one end wall, a gas chamber below and coextensive with the bottom wall, means for introducing a gaseous medium under pressure into said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, and means for rotating the fans in opposite directions, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

9. A rock duster comprising a hopper having side walls, end walls, and a forwardly and downwardly inclined flexible, porous bottom wall, there being spaced discharge outlets in the forward end wall, a gas chamber below and coextensive with the bottom wall, means for introducing a gaseous medium under pressure into said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, and means for rotating the fans in opposite directions, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

10. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in one end wall, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

11. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in one end wall, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans in opposite directions, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

12. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in one end wall, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a substantially channel-shape trough between each discharge outlet and the corresponding concentric opening, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets into said channel-shape troughs and drawn from said troughs into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

13. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in the adjacent end wall, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a vertical partition between said transverse walls on the inner side of each fan, each of said partitions merging into an outwardly curved portion terminating beneath the corresponding fan, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans, whereby rock dust will be conveyed along said porous

bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

14. A rock duster comprising a hopper having side walls, end walls, and a forwardly and downwardly inclined porous bottom wall, there being spaced discharge outlets in the adjacent end wall, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

15. A rock duster comprising a hopper having side walls, end walls, and a porous bottom wall, there being spaced discharge outlets in the adjacent end wall, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a vertical partition between said transverse walls on the inner side of each fan, each of said partitions merging into an outwardly curved portion terminating beneath the corresponding fan in spaced cutouts and a reduced terminal portion, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

16. A rock duster comprising a hopper having side walls, end walls, and a porous bottom wall, there being spaced discharge outlets in the adjacent end wall, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in spaced cutouts and the innermost transverse wall, a vertical partition between said transverse walls on the inner side of each fan, each of said partitions merging into an outwardly curved portion terminating beneath the corresponding fan in a reduced terminal portion, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans in opposite directions, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

17. A rock duster comprising a hopper having side walls, end walls and a porous bottom wall, there being spaced discharge outlets in the adjacent end wall, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a vertical partition between said transverse walls on the inner side of each fan, each of said partitions merging into an outwardly curved portion terminating beneath the corresponding fan in spaced cutouts and a reduced terminal portion, means joining the upper ends of said vertical portions, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

18. A rock duster comprising a hopper having side walls, end walls, and a flexible porous bottom wall, there being spaced discharge outlets in the adjacent end wall, a gas chamber below and coextensive with the bottom wall, and air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

19. A rock duster comprising a hopper having side walls, end walls, and a forwardly and downwardly inclined, flexible, porous bottom wall, means dividing said hopper into two legs, there being a discharge outlet in the forward end wall at the end of each leg, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

20. A rock duster comprising a hopper having side walls, end walls, and a forwardly and downwardly inclined, flexible, porous bottom wall, means dividing said hopper into two legs, there being a discharge outlet in the forward end wall at the end of each leg, a gas chamber below and coextensive with the bottom wall, an air pump, tubes communicating with the discharge side of the air pump and connected to said gas chamber, a transversely disposed rotary fan located in front of each discharge outlet, spaced transverse walls between which the

fans are located, the space between said transverse walls being unobstructed above each fan and at opposite ends of said transverse walls, there being openings concentric with the fans in the innermost transverse wall, a motor, a drive shaft operatively connected to said motor, means operatively connecting the air pump to the drive shaft, and means operatively connecting the fans to the drive shaft for rotating the fans in opposite directions, whereby rock dust will be conveyed along said porous bottom wall and through said discharge outlets and drawn into said fans and will be blown upwardly and outwardly thereby from between said transverse walls.

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