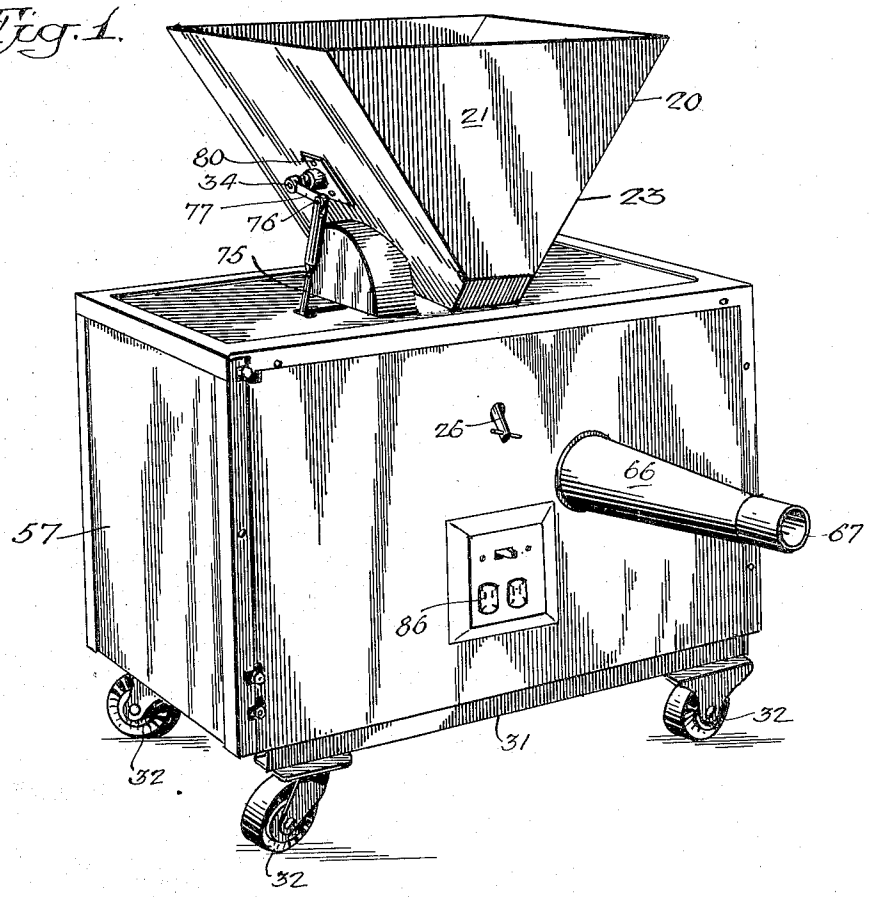
April 24, 1951 E. JACOBSEN 2,550,354

MECHANISM FOR APPLYING FIBERS

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Fig. 1.



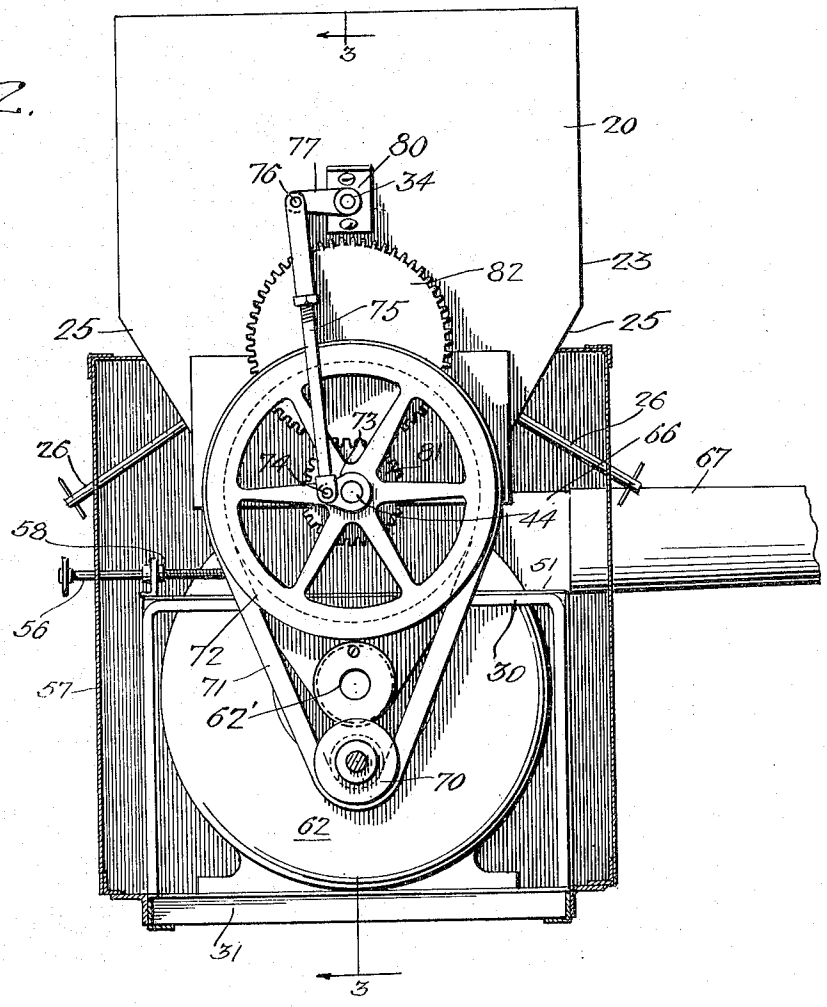
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Fig. 2.



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Fig. 3.

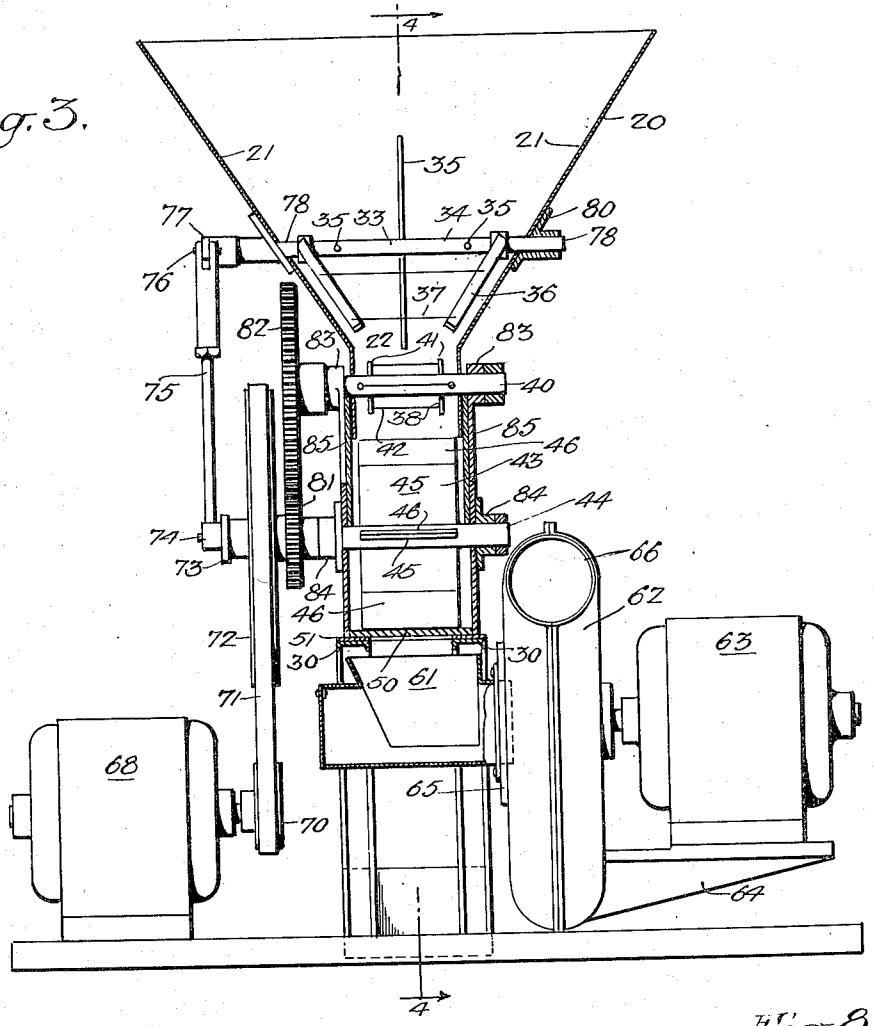


Fig. 6.

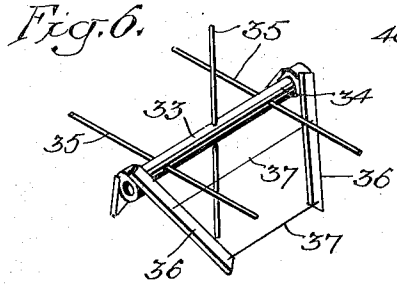


Fig. 7.

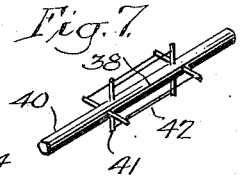
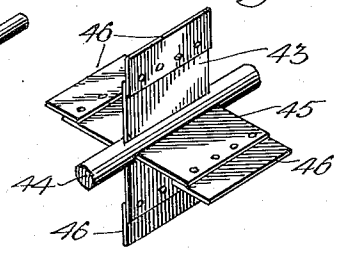


Fig. 8.



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Fig. 4

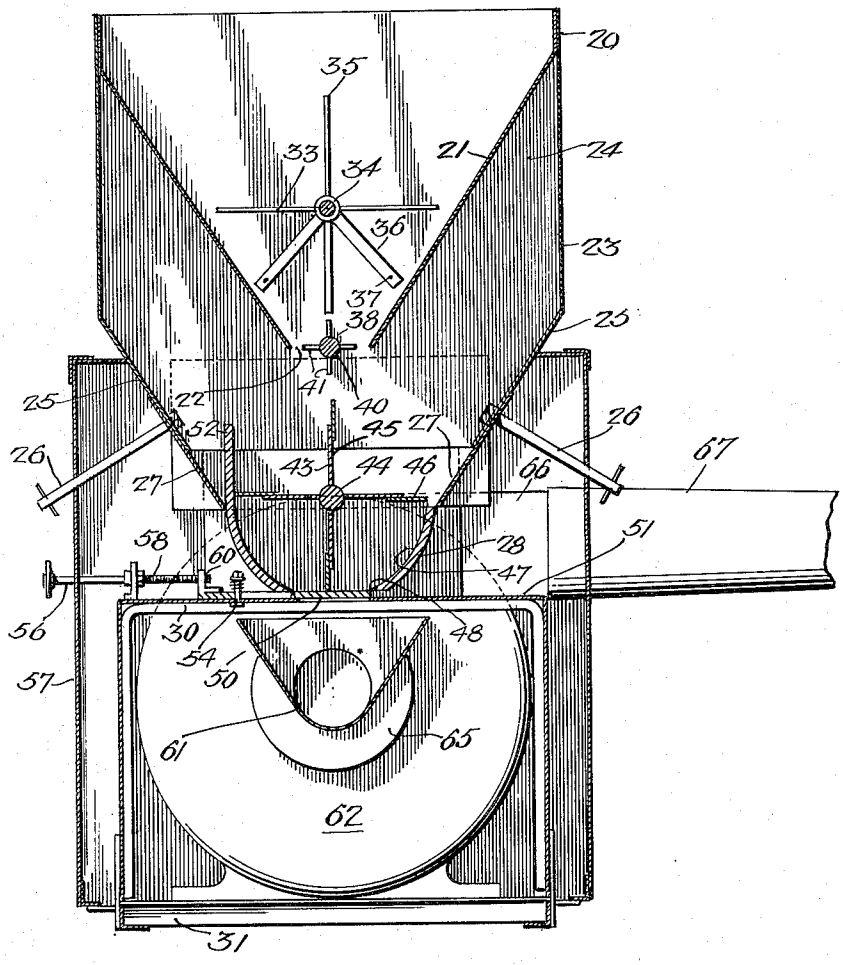
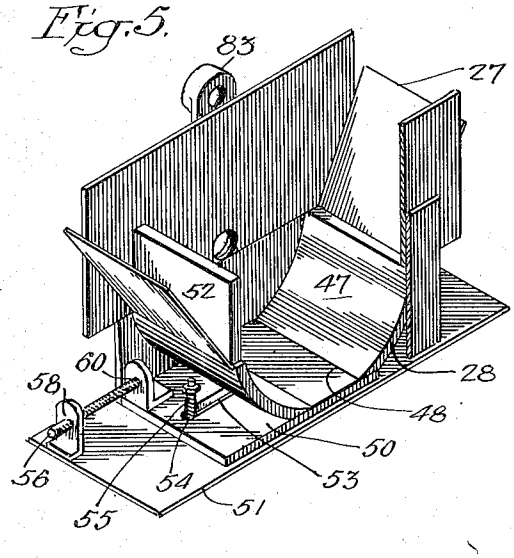


Fig. 5.



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UNITED STATES PATENT OFFICE

2,550,354

MECHANISM FOR APPLYING FIBERS

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Application November 8, 1948, Serial No. 58,863

6 Claims. (Cl. 91—8)

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The present invention relates to applicators for fiber, such as asbestos, rock-wool and fiber-glass, of the character which project the fiber in an air stream against a wall, ceiling or other surface, for the purpose of acoustical treatment, fireproofing or the like.

A purpose of the invention is to assure adequate dispersion of the fibers in the air stream and to avoid projection of lumps or noils of fiber which mar the surface applied to the wall or other portion of the building.

A further purpose is to provide a finer, and more even and fluffy deposit of fibers on the surface of a building or the like.

A further purpose is to assure that the feeding of fibers is accurately controlled, and that the fibers, after feeding, are beaten by a paddle having a volume considerably in excess of that of the feeding, desirably at least twice that of the feed, so that a large amount of air will be incorporated in the fiber mass before it enters the blower.

A further purpose is to control the feed of the fibers to the blower very accurately by a valve located between the paddle and the blower.

A further purpose is to oscillate the fibers in a hopper prior to feeding the fibers from the hopper throat to the paddle.

A further purpose is to provide elastic ends on the paddle, suitably of rubber or leather.

A further purpose is to extend a paddle housing upwardly beyond the axis on the side at which the blades move upward, while limiting to a position below the axis the upward extent on the side at which the blades move downward.

Further purposes appear in the specification and in the claims.

In the drawings I have chosen to illustrate one only of the numerous embodiments in which my invention may appear, choosing the forms shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

Figure 1 is a perspective of the complete machine according to the invention, omitting the extra length of blower discharge pipe and the nozzle used therewith.

Figure 2 is an enlarged end elevation of the drive for the oscillator rotary feed and paddle.

Figure 3 is a section of Figure 2 on the line 3—3.

Figure 4 is a section of Figure 3 on the line 4—4.

Figure 5 is an enlarged fragmentary sectional perspective of the paddle housing and valve, omitting the paddle rotor.

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Figure 6 is a detailed perspective of the oscillator.

Figure 7 is a detailed perspective of the rotary feed.

Figure 8 is a detailed perspective of the paddle.

In the drawings like numerals refer to like parts throughout.

Describing in illustration but not in limitation and referring to the drawings:

In the prior art considerable difficulty has been caused in the spraying of sound-proofing, fireproofing, sheet insulating and other fibers, particularly on walls, ceilings, and other surfaces of buildings, due to the tendency of the existing machines to pass lumps, tufts or noils of fiber through the machines without adequate dispersion or fluffing of the fibers. This lack of uniformity in the distribution of the fiber in the air stream has not only been wasteful, since fibers sprayed as a lump are not efficiently employed, but it has reduced the effectiveness of the acoustical treatment, and often spoiled the appearance. The most effective layer from the standpoint of acoustical treatment and fireproofing, and also from the standpoint of heat insulation, is one having a uniform low density or fluffy character, and the inclusion of high density fiber masses in the layer reduces the effectiveness from the standpoint of soundproofing, fireproofing and heat insulation.

Dense lumps projected on the layer may result in loosening the relatively fluffy deposit, and causing it to drop off, and often will cause pits or cavities in the deposit or nodules sticking out on the surface. Inspection of the work is usually stringent and it is required that these dense lumps be taken out by hand, and the locations of removal patched up by respraying. This work is very time consuming and adds greatly to the expense.

The present invention is designed to obtain more accurate preliminary fluffing of the fiber mass, followed by accurate metering of the fiber, and then by preliminary dispersion to assure that the fiber becomes uniformly airborne before it enters the blower in which it will be distributed in a large volume of air. Thus the likelihood of a lump of fiber passing through the machine without being broken down is greatly decreased, and the uniformity of the fluffy character of the spray is improved in accordance with the present invention.

Referring to the drawings, the fiber, such as asbestos, rock-wool, slag-wool, fiber-glass or the like is initially placed in a hopper 20 at the top

of the machine, having converging lower walls 21, and terminating at the bottom in a throat 22. The hopper is desirably supported in a hopper housing 23 which provides a chamber 24 to the sides of the throat. The hopper housing 23 has downwardly sloping walls 25 which are joined by bolts 26 to downwardly sloping walls 27 mounted on a paddle housing 28, which is supported on brackets 30 on the main frame 31. The main frame may be suitably positioned on casters 32 for easy transport of the device.

The hopper 20 is desirably of rectangular horizontal cross section and mounted therein and extending across between the converging walls is an oscillator 33 on an oscillator shaft 34.

The oscillator is provided with radially extending arms 35 intermediate the ends and converging arms 36 adjacent the ends, cross connected by longitudinally extending wires 37. Thus as the oscillator moves back and forth in the hopper the fiber is broken up and fluffed out.

Located in the throat 22 and extending lengthwise thereof is a rotary feeder 38 on a shaft 40 having radial feeder arms 41 cross connected at the ends by longitudinally extending wires 42. The volume included in the cylindrical space occupied by the feeder path is comparatively small, so that the amount of fiber metered by the feeder will be definitely limited and such fiber can be dispersed in a large volume of air by the paddle.

Located below the feeder and below the throat is a paddle 43 or a shaft 44 having radial blades 45, provided at their ends with suitable rubber, leather or other flexible extensions 46. Thus the blades can exert a slight beating action at the ends and in case a substantial amount of fiber crowds between the blades and the housing no harm will be done to the paddle. It will be noted that the cylindrical space occupied by the paddle when in motion is greatly in excess of the cylindrical space occupied by the rotary feeder, so that even if the two were moving at the same number of revolutions per minute, the comparatively small amount of fiber fed by the feeder is dispersed by the paddle in a very large volume of air. The volume occupied by the paddle should be at least twice that of the feeder, and preferably at least ten times that of the feeder.

Besides its function of introducing air into the fiber, the paddle tends to break up the lumps of fiber not only by striking against the same but also by rubbing or abrading the lumps between the pliable ends of the blades and the paddle housing 28.

The lower portion of the housing 28 (below the axis) is curved at 47 down to a valve throat 48 provided with a slide valve 50, guided on a plate 51 having an opening for the throat 48. On the side on which the blades move downward the housing is discontinued above the axis, but on the side on which the blades move upward, an upward extension 52 is provided from the curved housing portion 47, which tends to retain the fiber in the path of the paddle as it is travelling with the paddle.

The valve slide 50 is slotted at 53 and guided on a bolt 54 and urged downwardly by a spring 55. The valve is adjusted by a screw 56 accessible outside the wall of the outer container 57, and having a nut 58 mounted on the plate 51 as well as a socket bracket 60 on the slide valve. Thus the slide valve can be set to a desired rate of feed of the fiber independently of the adjustment of the nozzle at the end of the pipe.

From the throat 48 of the valve the fiber passes through a blower duct 61 below the throat, which extends longitudinally into a centrifugal blower 62 having an internal rotor not shown, having an air intake 62', and driven by a motor 63 mounted on a bracket 64 upon the blower. The blower is mounted from the frame by a flange 65. The blower has a discharge 66 to a pipe 67 which suitably connects to a nozzle, not shown, for application to the building surface.

The drive of the oscillator, rotary feed and paddle is accomplished by a motor 68 mounted on the frame, having a pulley 70 driving belt 71 to pulley 72 on the paddle shaft 44. The pulley 72 has a crank 73 thereon, which pivotally connects at 74 to an adjustable connecting rod 75 which pivotally connects at its opposite end 76 with a lever 77 suitably mounted on the oscillator shaft 34, mounting the oscillator in bearings 80.

The paddle shaft 44 carries a gear 81 which intermeshes with a desirably larger gear 82 on the shaft 40 of the rotary feeder. The shaft 40 is suitably mounted in bearings 83 and the shaft 44 is supported in bearings 84. The gear ratio is preferably such that the rotary feeder turns at half the speed of the paddle, thus further differentiating between the volume of the path of the rotary feeder and the volume of the path of the paddle. The bearings are secured to end wells 85 in the lower portion of the housing.

Electrical connections to the respective motors are provided at 86 on the outside of the machine. The detail of the electrical connections otherwise has been omitted.

In operation it will be understood that fiber placed in the hopper is manipulated by the oscillator, separating one fiber from another and introducing air among the fibers to a limited extent. Fiber which has passed through an oscillator is picked up by the rotary feeder and subjected to further manipulation and breaking up. It is fed by the rotary feeder downwardly into the paddle. In the paddle there is extensive manipulation, including working of the resilient ends of the blades on any lumps or noils, to separate them, and introduction of a considerable amount of air among the fibers, so that the fibers are at least partially airborne as they leave the paddle and can be more effectively projected by the blower. The valve setting is adjusted so as to obtain the desired thickness of deposit on the building surface, in accordance with the particular conditions being encountered on the job.

From the valve the fiber is picked up by the blower and here becomes fully airborne and is projected by the air stream through a pipe to the work.

It will be understood that according to normal practice the fiber passing through the machine will be dry and will normally contain a dry adhesive which has previously been incorporated therein. In accordance with normal practice, which forms no part of the present invention, the fiber will normally be moistened to activate the adhesive at the point at which it is about to leave the nozzle.

It will be evident that by the invention a high degree of uniformity in feed is obtained, largely avoiding the difficulties previously encountered through spraying of fiber in the form of lumps.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying

the structure shown, and I, therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a fiber applicator, a fiber hopper having a throat at the bottom, a rotary feeder in the throat, a drive for the rotary feeder, a rotary paddle having a volume occupied by the paddle in motion in excess of that of the rotary feeder and connected to the throat and a blower communicating with the paddle at the discharge side of the paddle.

2. In a fiber applicator, a fiber hopper having a throat at the bottom, a rotary feeder in the throat, a drive for the rotary feeder, a rotary paddle having a volume occupied by the paddle in motion in excess of that of the rotary feeder and connected to the throat, a blower connected with the paddle at the discharge side of the paddle, and a valve between the paddle and the blower.

3. In a fiber applicator, a fiber hopper having a throat at the bottom, an oscillator in the hopper, a drive for the oscillator, a rotary paddle positioned below and connected to the throat and a blower in communication with the paddle at the discharge side of the paddle.

4. In a fiber applicator, a fiber hopper having a throat at the bottom, an oscillator in the hopper, a drive for the oscillator, a rotary paddle positioned below and connected to the throat, a blower connected with the paddle at the discharge side of the paddle, and a valve between the paddle and the blower.

5. In a fiber applicator, a fiber hopper having a throat at the bottom, a rotary feed in the throat having a relatively small diameter, a drive for the rotary feed, an oscillator in the hopper, a drive for the oscillator, a rotary paddle below the throat having a relatively great diameter, a drive for the rotary paddle at a speed at least as great as the speed of the rotary feed and a blower in communication with the paddle at the discharge side of the paddle.

6. In a fiber applicator, a fiber hopper having a throat at the bottom, a rotary feed in the throat having a relatively small diameter, a drive for the rotary feed, an oscillator in the hopper, a drive for the oscillator, a rotary paddle below the throat having a relatively great diameter, a drive for the rotary paddle at a speed at least as great as the speed of the rotary feed, a blower in communication with the paddle at the discharge side of the paddle, and a valve between the paddle and the blower.

EINAR JACOBSEN.

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