April 18, 1950 J. L. KEMPTHORNE 2,504,533

HOPPER

Filed Jan. 9, 1947 2 Sheets-Sheet 1

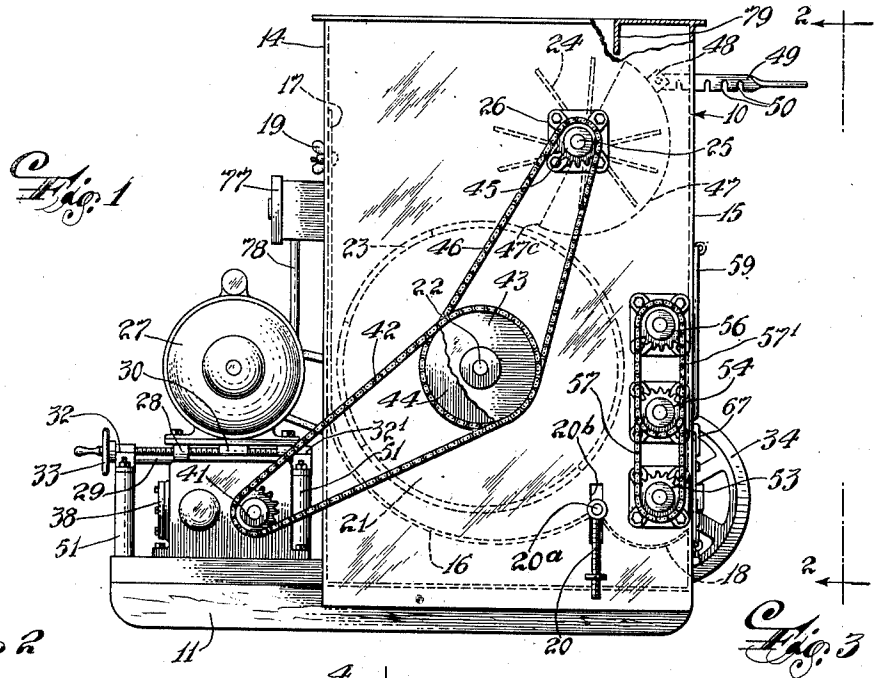


Fig. 1

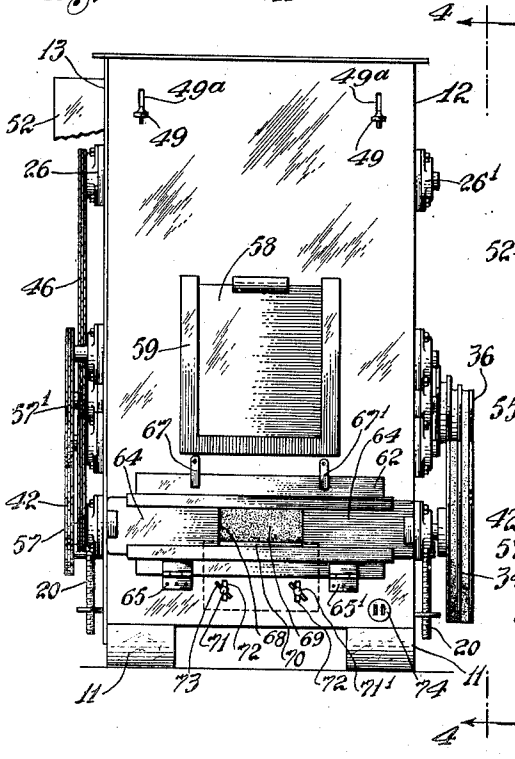


Fig. 2

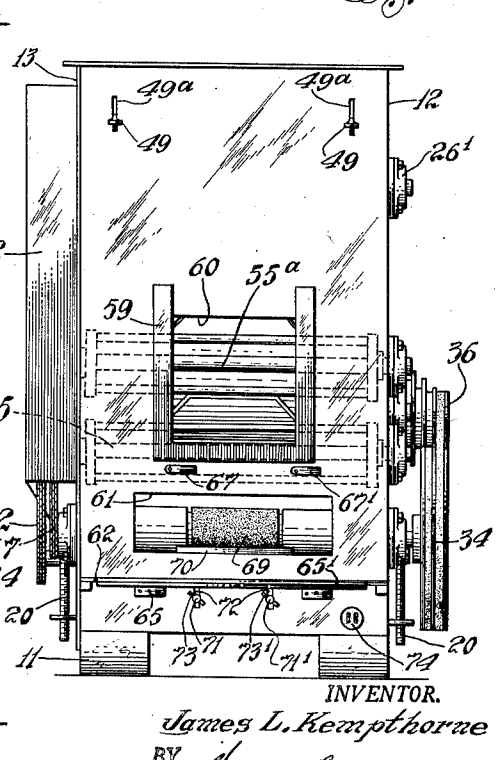


Fig. 3

INVENTOR.
James L. Kempthorne
BY
ATTORNEY

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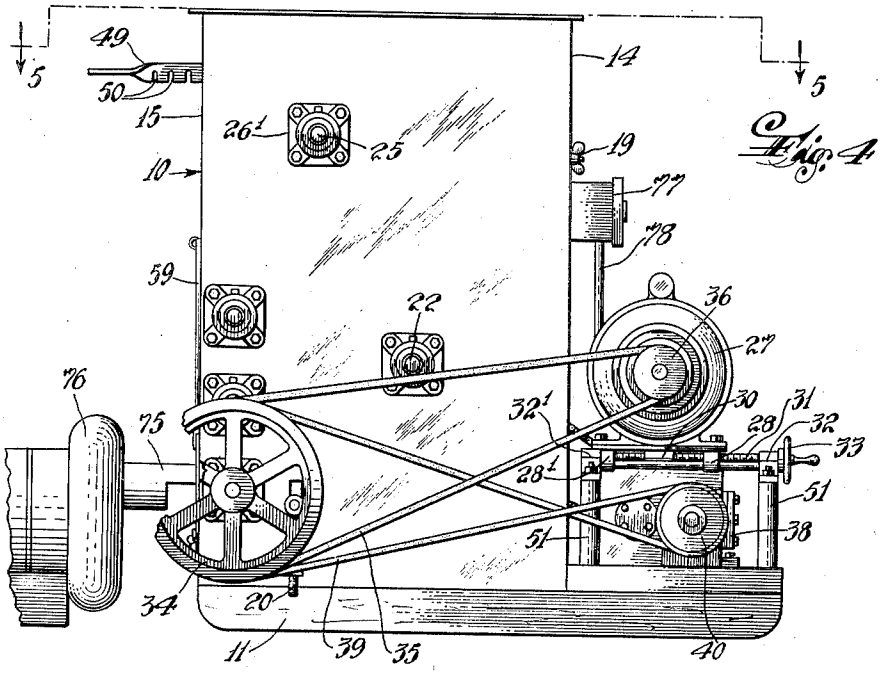


Fig. 4

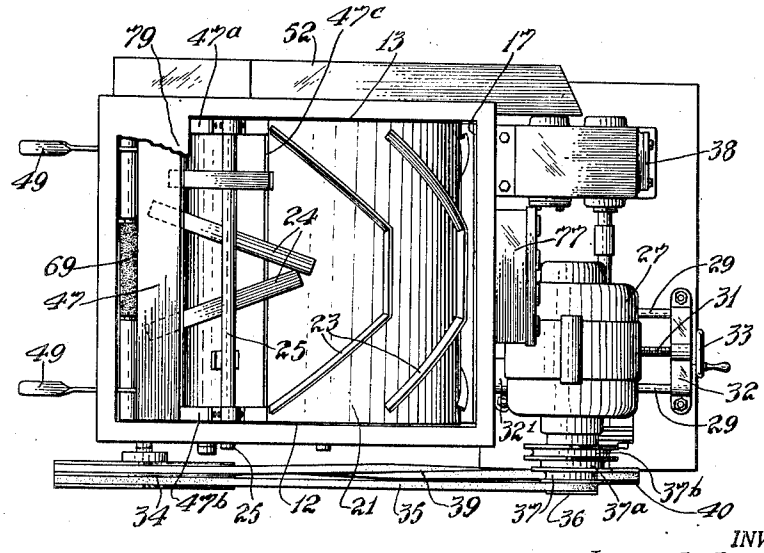


Fig. 5

INVENTOR.
James L. Kempthorne
BY
ATTORNEY

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HOPPER

James L. Kempthorne, Montclair, N. J.

Application January 9, 1947, Serial No. 721,132

8 Claims. (Cl. 19—67)

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This invention relates to improvements in hoppers, such as are used in the spraying of fibrous materials onto surfaces for sound and heat insulation purposes.

An object of the invention is to provide a hopper provided with novel means for fluffing and expanding the fibre and for metering the fibre into the blower.

A further object of the invention is to provide a hopper having novel means for the control of the feeding of the fibre to the brush mechanism thereof.

A further object of the invention is to provide a hopper which automatically continues in operation after being initially filled, in a smooth and uniform manner, without requiring further attention until it is empty.

A further object of the invention is to provide a hopper having a novel feed control pan to control the feeding of the proper amount of fibre over the hopper drum and into the beater members, which break up the lumps of fibre and discharge the same onto the revolving brush, the latter opening the fibres and metering the same in an even stream to the blower opening.

A further object of the invention is to provide a hopper having novel means for adjusting the lipping action of the brush and for adjusting the position of the bottom pan relative to the drum and brush of the hopper, and having an adjustable clean-out trap door and means to permit inspection and replacement of the brush.

An embodiment of a structure employing my invention is shown in the accompanying drawings and described in detail in the ensuing specification. This embodiment is merely by way of example; my invention is not limited thereto but includes all other forms which would come within the scope of the appended claims.

In the drawings,

Fig. 1 is a side elevational view of a hopper embodying my invention,

Fig. 2 is an end elevational view thereof, partly fragmentary, taken on line 2—2 of Fig. 1,

Fig. 3 is a similar view, showing the plate member in its open position,

Fig. 4 is a side elevational view taken on the line 4—4 of Fig. 2, with the blower unit shown fragmentarily, and

Fig. 5 is a top plan view taken on line 5—5 of Fig. 4, with the blower unit not shown.

As shown in the drawings, the hopper of my invention comprises a casing 10 secured to base members 11 which may serve as rails to facilitate movement of the hopper. The hopper casing is

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provided with side walls 12 and 13 and with end walls 14 and 15 and with a bottom pan 16 extending between the side walls, the opposite ends 17 and 18 of said pan being rigidly fixed to the end walls 14 and 15 of the hopper casing, or being adjustably secured thereto, as by means of latch members 19. The pan 16 is medially vertically adjustable by means of bolt members 20 fixed to shaft 20a to which the pan may be secured, the ends of said shaft 20a being movable within slots 20b in the side walls of the hopper casing, whereby the main, arcuately disposed portion of the pan 16 may be adjusted relative to the drum 21 which is axially journalled in bearings 22 in the side walls of the hopper. The end portion 18 of the pan 16 may be arcuately formed as shown in Fig. 1 and, being fixed to the shaft 20a, moves in unison with the pan proper 16, is adjustable by means of the bolt members 20 relative to the brush 69 of the hopper, which is more particularly described hereinafter. The drum 21 is provided with rib members 23 of generally V-shaped outline to facilitate carrying the fibre along the drum. The hopper is provided with a fibre feeder agitator 24 which may be formed of individual bladelike members fixed to the axle 25 which is journalled in bearings 26, 26' in the side walls of the hopper. The function of this agitator is to displace any fibrous material which may tend to accumulate in the arcuate feed control pan 47, to be referred to further hereinafter, and to eject this material over the edge 47c of the feed control pan 47 onto the drum 21, rather than to disintegrate any lumps which may be present in the material, this latter being the function of beater elements associated with the drum 21, which also will be referred to hereinafter. The various bearings described herein are preferably antifriction bearings.

The drum 21 is driven by the motor 27 which is provided with lugs 28, 28' depending therefrom (see Figs. 4 and 5) to slidably receive the rails 29 on which the motor may be moved. The motor is further provided with an internally threaded plate 30 depending therefrom and adapted to threadedly receive the threaded shaft 31 which is journalled in bearings 32, 32' on the spacer posts 51 on the base 11. By rotating the hand wheel 33 which is keyed to the shaft 31, the motor 27 may be reciprocated relative to the pulley 34 to conform to the particular diameter of the pulleys 36, 37, 37a and 37b on the motor armature shaft, over which the belt 35 may be entrained, said belt being also entrained over the pulley 34. Variations in driving speed of the hopper may

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be attained by the means described herein or by any other suitable means. Speed change unit 38 is provided intermediate the motor 27 and the drum 21, said speed change unit being driven by a belt 39 entrained on the pulley 34 and over the pulley 40 of the speed change unit 38. The speed change unit is provided with a sprocket 41 driven by the motor means above described; chain 42 or the like is entrained over sprocket 41 and sprocket 43 keyed to the axle of the drum 21, said axle also having keyed thereto a sprocket 44 which drives the sprocket 45 keyed to the axle 25 of the feeder agitator 24 by means of a chain 46 or the like. An arcuate feed control pan 47 is rotatably journalled in the casing 10 adjacent the drum 21. For that purpose the pan 47 is provided with end portions 47*a*, 47*b* freely journalled on the axle 25 of the feeder agitator and is further provided with lugs 48 which pivotally receive the levers 49 which project through slots 49*a* in end wall 15 and are recessed as at 50 to selectively engage said end wall 15 to adjust the position of the arcuate feed control pan 47 relative to the hopper drum 21. The arcuate feed control pan 47 is concentric with the shaft or axle 25 of the agitator 24 and has a radius sufficiently short to prevent its actually engaging the drum 21, even in the lowest possible position of adjustment of the feed control pan.

By the arrangement described, when the fibrous material is deposited into the hopper 10 through the open upper end thereof, the opening defined by the lower edge 47*c* of the feed control pan 47 and the drum 21 may be varied to regulate the amount of material fed around the drum and onto the beaters 55, 55*a*. The hopper may be provided with a guard casing 52 to cover the sprockets and chains at the side wall 13 thereof, as shown in Fig. 3. The sprocket 54 is keyed to the shaft of the beater 55. Sprocket 54 drives the sprocket 56 of the beater 55*a*, chains 57, 57′ or the like being connected between the respective sprockets 53, 54, 56 as shown in Figs. 1 and 2. Each of the beaters 55, 55*a* consists essentially of a plurality of rods secured together circumferentially in parallel, spaced relation. The beaters 55, 55*a* are arranged in cascade series, the lower beater 55 receiving by gravity material operated upon by the upper beater 55*a*, and assuring further opening of any material incompletely acted upon by the upper beater 55*a*. The end wall 15 of the hopper is provided with a clean-out aperture 60 which is normally closed by the clean-out trap door 58 slidable in the frame 59 defining said opening. A second aperture 61, which is provided as a fibre discharge opening for permitting discharge of fibrous material from the hopper is provided in the end wall 15 below the aperture 60, said aperture 61 being normally covered by the open plate 62 which is hinged to said end wall as at 65, 65′ and which normally overlies the same and is closed thereagainst by pivoted latch members 67, 67′ or the like. The plate 62 is provided with doors 64 slidably arranged therein and adapted to be moved relative to each other to constrict and define therebetween the fibre discharge opening 68. Brush 69 is rotatably journalled in the walls of the casing in alignment with the fiber opening 68 in the plate 62. The shaft of said brush has the sprocket 53 and pulley 34 keyed thereto. A flat lip plate 70 is provided with bolts 71 which pass through slots 72 in the end wall 15 of the hopper, said bolts being adapted to be engaged by wing nuts 73, 73′ or the like, whereby the upper edge of the lip plate may be aligned with the fibre opening 68 and adjustably positioned relative to the brush 69 to adjust the lipping action of the latter thereon.

The hopper is adapted to be used for the discharge of the fibre through the fibre opening 68 and to the inlet port 75 of the blower 76 or other receiver, and thence through the usual means, such as hose and nozzle connections, onto the surface to be coated. The motor 27 is connected to any suitable source of current, by means of the cable 78 or the like, and, if desired, said cable may have cut thereinto, the electric control unit 77, provided with suitable fuse, light and other conventional elements. The cable 78 may be provided with suitable switch and other control means for the convenience of use of the operator, as is customary in such devices. A partition 79 (Figs. 1 and 5) may be secured to the hopper adjacent the upper end of the feed control pan to prevent the material deposited into the hopper through the upper end thereof from piling up and being pushed over the top of the feed control pan.

The hopper may be provided with a receptacle 74 to which the blower 76 may be electrically connected, in the conventional manner. The showing of the motor 27 and electrical controls therefor is merely by way of example of a conventional means for energizing the hopper parts. Any other source of power may be used to that end.

In operation the hopper is filled with material, such as fibrous materials, to be sprayed, by depositing said material into the open upper end of the hopper. By means of the levers 49, the position of the lower edge 47*c* of the feed control pan relative to the drum 21 is fixed to regulate the quantity of material fed into the hopper. The material is agitated by the agitator 24 and carried by the drum and dropped into the beaters 55, 55*a*, which break up the lumps of the fibre and draw the fibre onto the revolving brush 69 which opens the fibre and meters the same in an even stream to the blower 76. The levers 49 permit of precise adjustment of the feed control pan 47 to assure an even flow of the fibre to obtain the proper texture of the finished product. After initially filling the hopper as above described, the device will operate smoothly to feed the material uniformly through the fibre opening 68 until the hopper is empty.

While I have shown in the drawings and described in the above specification, a convenient form of structure embodying my invention, it will be apparent from such disclosure that the invention is capable of many modifications without departing from the spirit and scope thereof, as set forth in the appended claims.

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

1. A hopper comprising a casing, a drum rotatably positioned therein, a rotatably mounted, arcuate feed control pan positioned therein adjacent said drum, means engaging the pan and hopper casing to adjust the position of the pan relative to the drum, and rotary agitator means in said feed control pan, the said control pan being rotatable about the axis of the agitator means, and having a radius sufficiently short to prevent engagement of the arcuate feed control pan with the drum in all positions of adjustment.

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2. A hopper comprising a casing, a drum rotatably positioned therein, a rotatably mounted arcuate feed control pan positioned therein adjacent said drum, levers pivotally engaging the pan and engaging the hopper casing to adjust the position of the pan relative to the drum, a fibre feeder agitator in said feed control pan, and rotatable mounting means for the agitator, the said means mounting the agitator concentrically with the arcuate feed control pan.

3. A hopper comprising a casing, a drum rotatably positioned therein, said casing having a clean-out aperture, a clean-out trap door slidably arranged on said casing relative to said aperture for controlling the aperture, said casing having a fiber discharge opening adjacent said aperture, a control plate for the fibre discharge opening secured to said casing and adapted to overlie said fibre discharge opening, doors slidably arranged on said plate to constrict said fibre discharge opening, and a brush positioned in said casing in alignment with said fibre opening for expelling material from the hopper through the fibre-discharge opening.

4. A hopper comprising a casing, a drum rotatably positioned therein, rib members on said drum, said casing having a clean-out aperture, and having a fibre discharge opening, a plate secured to said casing and adapted to overlie said fibre discharge opening, doors slidably arranged on said plate to control said fibre discharge opening, and a brush positioned in said casing in alignment with said fibre opening for expelling fibrous material from the hopper through the fibre discharge opening.

5. A hopper comprising a casing, a brush rotatably arranged in said casing, a flat lip plate mounted on the casing adjacent the brush, means to secure said plate to said casing in predetermined position relative to said brush, said casing having a fiber discharge opening and means on the casing to control the area of said opening, said plate and brush being aligned with said opening for expelling controlled amounts of material through the opening.

6. A hopper comprising a casing, a brush rotatably mounted in said casing, a flat lip plate mounted on the casing adjacent the brush, means engaging said plate and casing to secure said plate to said casing in predetermined position relative to said brush, said casing having a fiber discharge opening means on said casing to control the area of said opening, said plate and brush being aligned with said opening.

7. A hopper comprising a casing, a feed drum rotatably mounted therein, an agitator mounted in said casing adjacent said drum for agitating and supplying material to the drum, beaters mounted in said casing adjacent the drum for receiving material fed by the drum, and a brush mounted in said casing adjacent said beaters, said casing having a fiber discharge opening aligned with said brush, means to constrict said opening, a bottom pan in said casing, and means engaging said pan and casing to adjustably secure the pan to the casing for adjusting the pan relative to the drum, the brush aligned with the fiber discharge opening being arranged to eject material through the fiber discharge opening.

8. Apparatus for distributing fibrous material onto surfaces for sound and heat insulation purposes, which comprises a casing adapted to receive the material, an arcuate feed control pan rotatably mounted in the casing for receiving the material supplied to the casing, means secured to the casing adjacent the feed control pan for inhibiting material supplied to the casing into the feed control pan from piling up in the pan and being pushed over the top of the pan, agitator means in the feed control pan for agitating the material therein and ejecting the material from the feed pan, a drum rotatably mounted in the casing and disposed adjacent the feed control pan for receiving the material ejected from the feed control pan, the casing having a fiber discharge opening for enabling fibrous material to be discharged from the casing, a rotary brush mounted in the casing adjacent the fibre discharge opening for ejecting the material through the opening, and common driving means for the agitator in the feed control pan, for the drum, and for the brush.

JAMES L. KEMPTHORNE.

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