

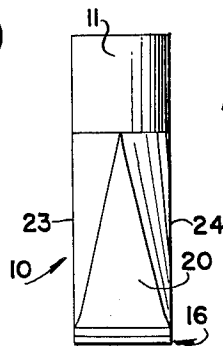
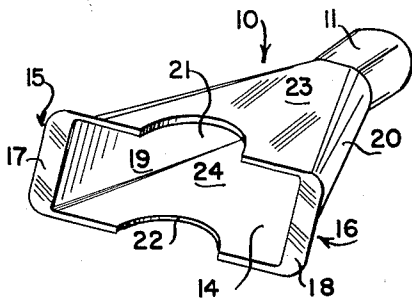
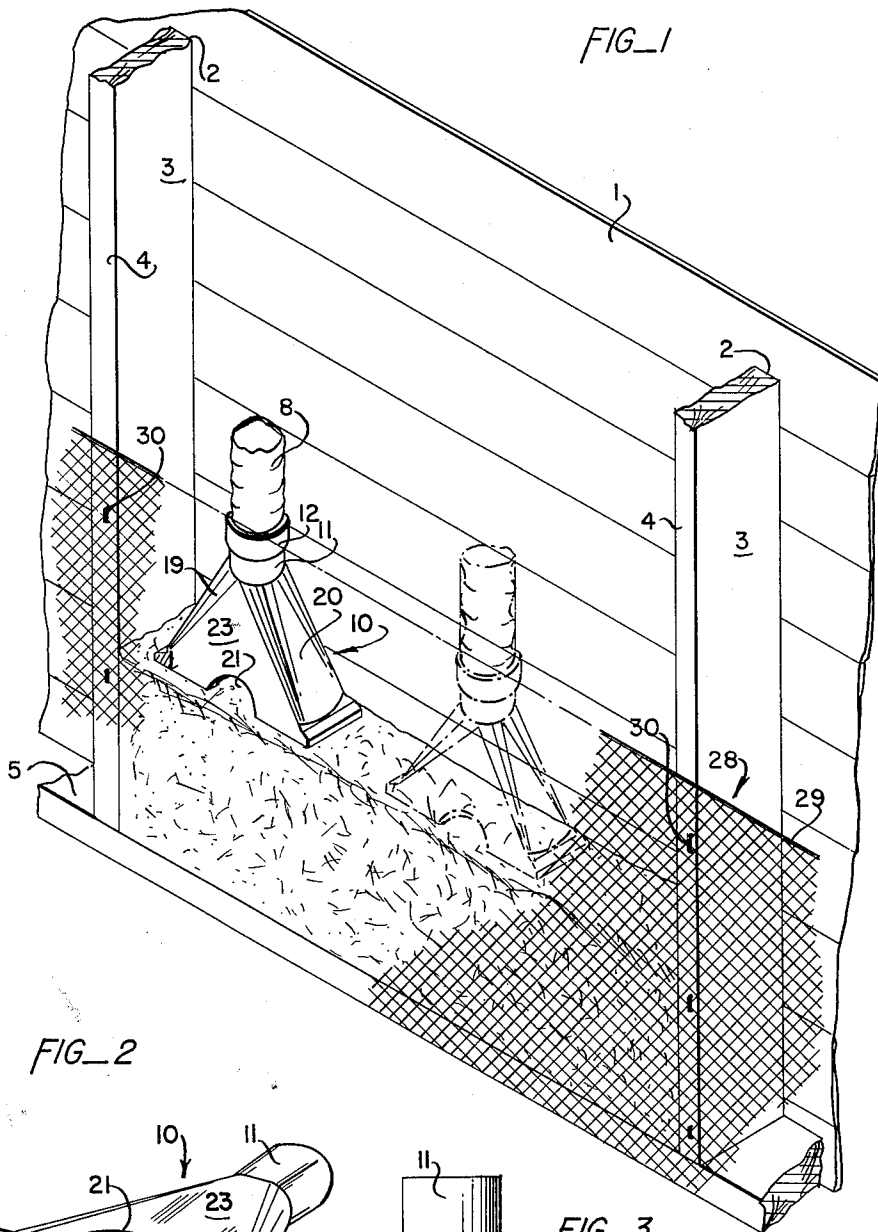
June 27, 1961

J. A. BROWN
APPARATUS AND METHOD FOR APPLYING
AND PACKING FIBROUS MATERIAL

2,989,790

Filed June 10, 1957

4 Sheets-Sheet 1



INVENTOR.
JUDD A. BROWN

BY

Bayless, Mohler & Wood

ATTORNEYS

June 27, 1961

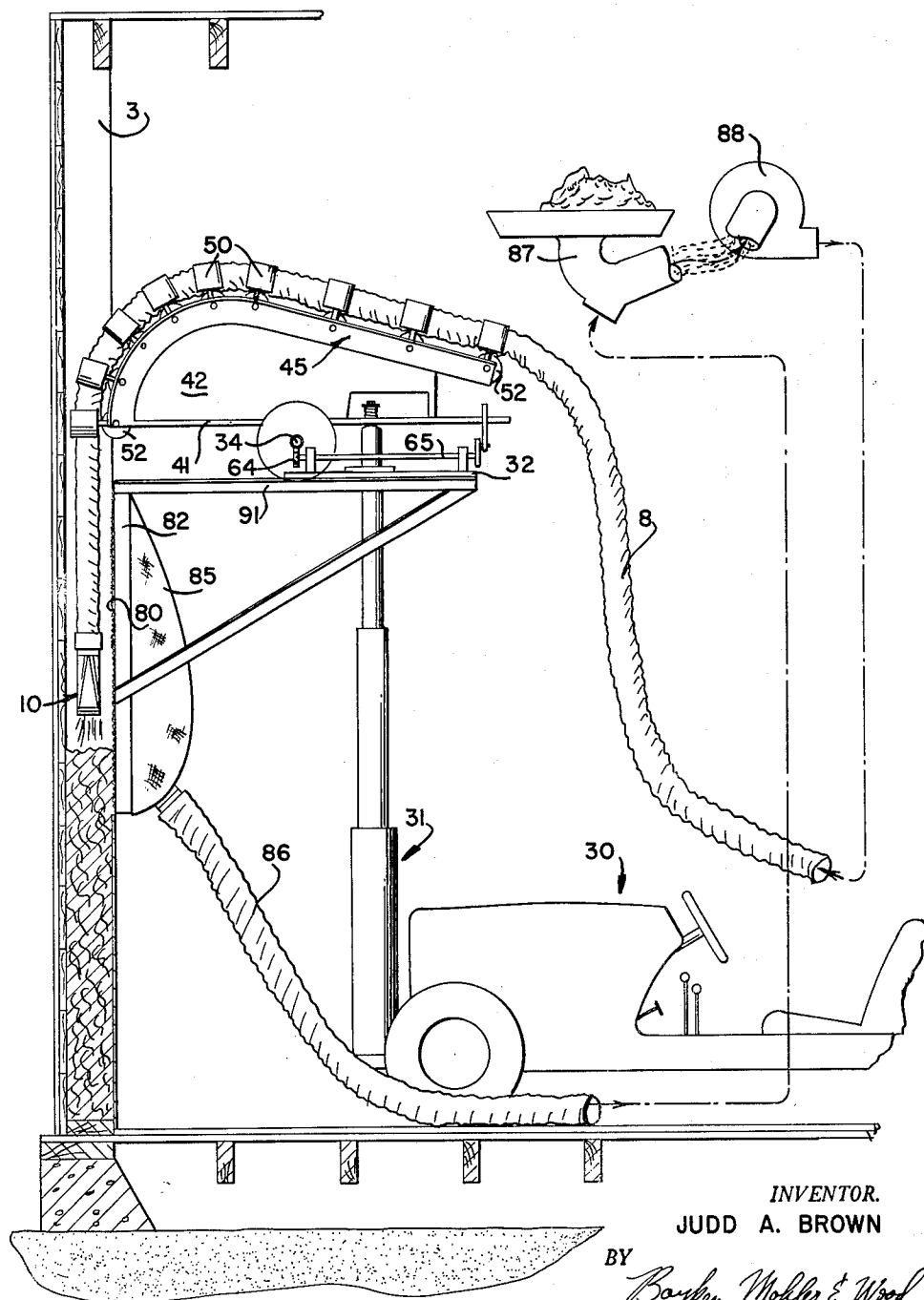
J. A. BROWN
APPARATUS AND METHOD FOR APPLYING
AND PACKING FIBROUS MATERIAL

2,989,790

Filed June 10, 1957

4 Sheets-Sheet 2

FIG. 4



INVENTOR.
JUDD A. BROWN
BY *Bayken, Mohler & Wood*
ATTORNEYS

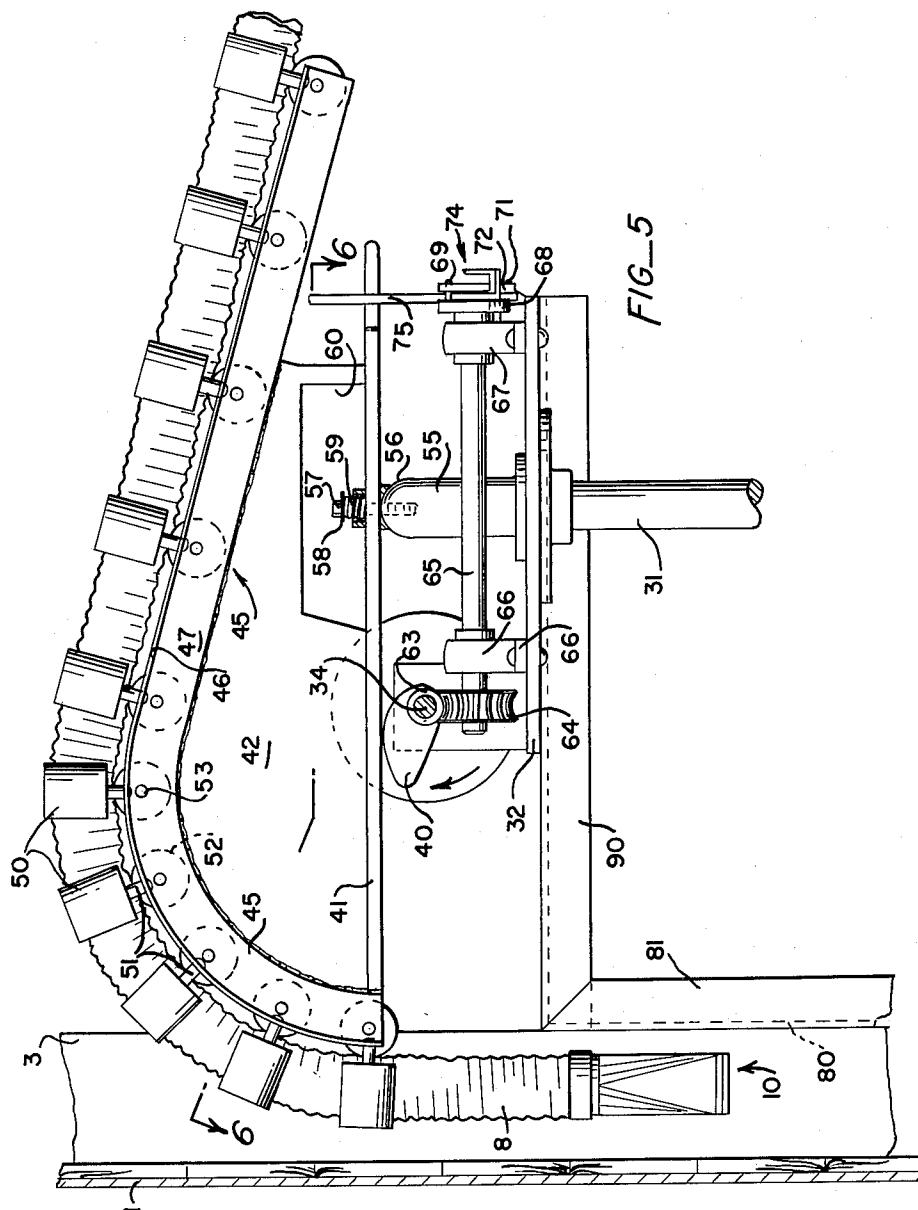
June 27, 1961

J. A. BROWN
APPARATUS AND METHOD FOR APPLYING
AND PACKING FIBROUS MATERIAL

2,989,790

Filed June 10, 1957

4 Sheets-Sheet 3



INVENTOR.
JUDD A. BROWN
BY *Bayken, Mohler & Wood*
ATTORNEYS

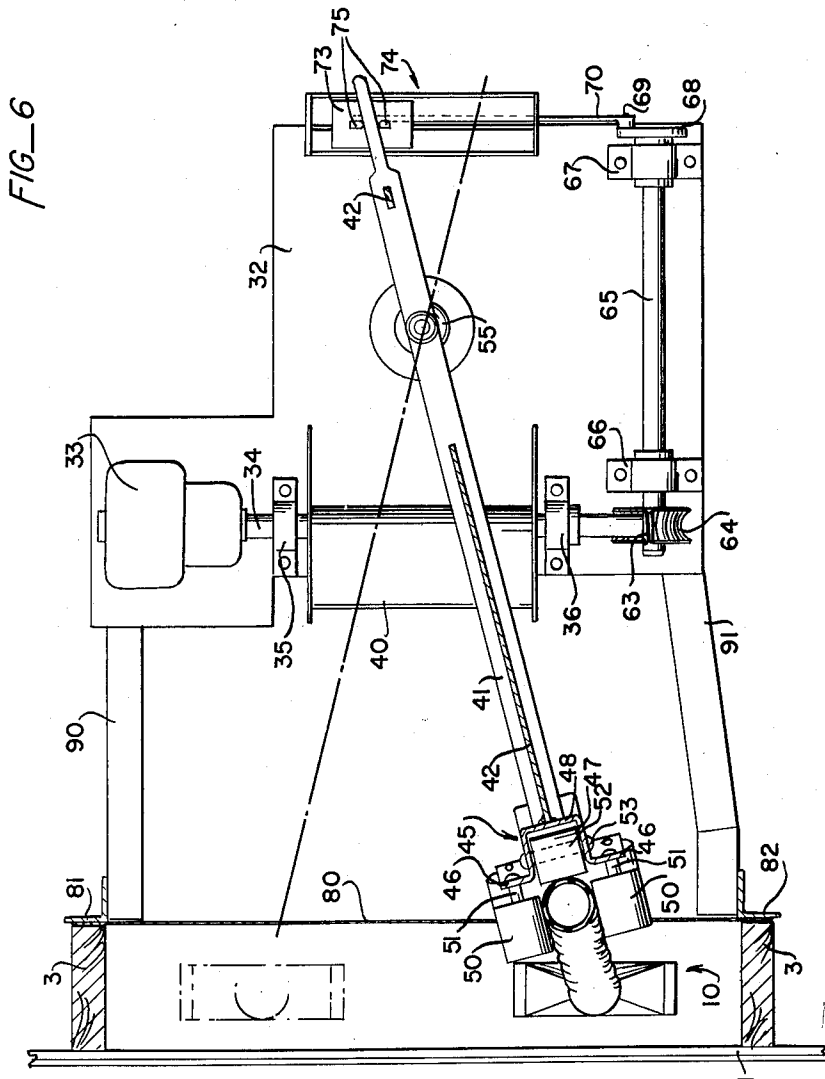
June 27, 1961

J. A. BROWN
APPARATUS AND METHOD FOR APPLYING
AND PACKING FIBROUS MATERIAL

2,989,790

Filed June 10, 1957

4 Sheets-Sheet 4



INVENTOR.

JUDD A. BROWN

BY

Boyle, Mohler & Wood

ATTORNEYS

1

2,989,790

**APPARATUS AND METHOD FOR APPLYING
AND PACKING FIBROUS MATERIAL**
Judd A. Brown, 101 Hilldale Drive, San Anselmo, Calif.
Filed June 10, 1957, Ser. No. 664,633
4 Claims. (Cl. 20—101)

This invention relates to an apparatus and method for installing and packing fibrous material. Although the invention will be described in connection with the operation of applying redwood bark in fiber form against the wall of a building, such as a cold storage room, it will be understood that the invention may be applied to other materials and to other installations.

A popular method of insulating buildings is to apply fibrous insulating material in bulk within the wall of the structure to be insulated. Materials capable of use in this manner are, redwood bark, rock wool, glass wool and other fibers of either organic or inorganic composition. Although use of such materials in batt form facilitates installation, this procedure involves additional expense without enhancing the insulating qualities of the materials. However, no suitable economical and fast method of installing such material in bulk has heretofore been developed.

One conventional method presently employed, in addition to installation by hand, is to blow the material into the space between the outer and inner walls. In such a case a flexible conduit is employed attached at one end to an air source such as a blower. Between the air source and the conduit there is provided means for mixing the air with loose fill type of insulation in fiber form so that the latter is carried in suspension in the air stream through the flexible conduit.

In cold storage structures it is customary to provide an outer wall supported by horizontal, uniformly spaced vertically extending studs and an inner wall in spaced, opposed relation to the outer wall and secured to the inner edges of the studs. This provides a plurality of vertically elongated spaces defined by said walls and adjacent pairs of studs.

By building the inner wall commencing at the floor it is possible to install the fibrous insulating material in bulk in said spaces as erection of the inner wall, usually plywood, progresses. In addition to the tedious manual method of installing the material the above described blower method has been attempted, but without much success.

One disadvantage of the above described method is that, although the material may be dispersed fairly uniformly in the air stream in the conduit, it is difficult to dispense the material into the spaces in a uniform manner. One reason for this is that the space has only one opening, and that is at the top. The result is that the air stream from the conduit reverses and, although there is some tendency for the fibers to remain in the space and build up, much of the material is carried upwardly by the reversed air current. By reducing the velocity of the air this latter tendency may be minimized but this necessarily slows the operation and frequently results in a stoppage or plugged blower line.

Furthermore, the necessary density of fibers is difficult to achieve by the above method and too loose a pack is likely to occur. This direct method within a confined space results in the air bubbling the insulation resulting in actual open voids within the insulation.

The manual method of application has its disadvantages, one of which is that uniform density of material is difficult to obtain thus resulting in some portions of the insulation being too sparse and other portions too dense. Since there is a preferred density for such materials that

2

gives optimum insulating qualities commensurate with cost, inefficiency results from the manual method.

The main object of the present invention is to overcome the disadvantages of prior art methods and apparatus for applying insulation in bulk.

Another object of the invention is the provision of a method and apparatus for applying redwood bark and other insulating materials with greater speed than has heretofore been possible, thus resulting in lower cost.

Still another object of the invention is the provision of a novel method and apparatus for applying fibrous insulation in bulk so as to achieve a uniform density through said insulation.

Yet another object of the invention is the provision of a novel packer head for facilitating the application and packing of the insulation to the end that maximum speed of installation and uniform density results.

Other objects and advantages will be apparent from the following specification and the drawings:

FIG. 1 is a perspective of a portion of a wall structure to be insulated showing the invention in use.

FIG. 2 is a perspective of the packer head;

FIG. 3 is an end elevation of the packer head of FIG. 2;

FIG. 4 is a side elevation of an assembly of an automatic form of the invention;

FIG. 5 is an enlarged side elevation of the upper end of the mechanism of FIG. 4; and,

FIG. 6 is a partly sectional top plan view of the mechanism of FIG. 5 taken along line 6—6.

In detail, and referring to FIG. 1, the invention is shown in use in installing insulation against an outer wall 1 which is shown secured to the outer edges 2 of studs 3. The inner wall (not shown) is secured against the inner edges 4 of the studs 3. It is contemplated that a floor plate such as indicated at 5 is provided on the floor of the building and that the insulation is progressively built up in the space between the inner and outer walls commencing at the plate 5.

By the present invention a conventional flexible pneumatic blower hose 8 is provided for carrying the fibrous insulating material from a source, subsequently to be described, to a packer head generally designated 10 (FIGS. 1, 2) which may be attached to the hose 8 by slipping the cylindrical inlet throat 11 of the packer head 10 into the free end 12 of the hose 8.

Packer head 10, as best seen in FIG. 2 is flared outwardly from throat 11 by a trapezoidal transition piece to form an enlarged outlet 14 (FIG. 2). The width of packer head 10 is uniform throughout its length as best seen in FIG. 3 and is of such a width that the head may readily fit within the space between the outer and inner walls. In other words, the packer head flares outwardly between the inlet 11 and outlet 14 in a direction parallel to the walls. The flared end 14 that constitutes the outlet of the packer head is provided with a pair of foot portions 15, 16 which may be cast solid with the remainder of the packer head to provide a pair of tamping or packing surfaces 17, 18. As will subsequently be described, said surfaces 17, 18 are employed to tamp or pack the insulation after the same is discharged into the space between the walls, such surfaces in effect constitute extensions of the smaller sidewalls 19, 20 of the transition piece.

For the purpose of permitting the escape of air from the packer head even when the latter is resting on the packed insulation, openings are provided on the sidewalls of the packer head communicating with discharge outlet 14. Two such openings 21, 22 are shown in the drawings (FIGS. 1, 2) formed in the larger sidewalls 23, 24 respectively, however it will be understood that such openings may take various forms and more than

3

two openings may be provided if desired. In this connection the total area of the openings should approximate and preferably exceed the area of the conduit hose 8 so that there will be no danger of a back pressure on the blower being created when the discharge outlet of the packer head is resting on the insulation.

An important feature of the invention is the provision of a perforate screen against the inner edges of the studs 3. Such a screen is generally indicated at 28 (FIG. 1) and is preferably of about one inch expanded metal and may be provided with a marginal reinforcing strip 29. Said screen may extend horizontally over as many pairs of studs as desired and may be of any convenient height.

In the form of the invention now being described the screen 28 may be releasably secured to the studs 3 by means of staples 30, nails, or in any other convenient manner.

The above described apparatus may be employed manually by a person positioned alongside the wall to be insulated. It will be understood that the installation of the insulation commences at the bottom of the wall and continues upwardly. A plurality of screens 28 may be secured in place or one screen may be moved upwardly as the work progresses.

The function of screen 28 is to hold the insulating material in place as it builds up and at the same time permit the air which carries the material to escape laterally outwardly of the space leaving the material behind. The surprising result of the present invention is that the actual fibers of insulating material, although extremely fine compared to the mesh of the screen 28 have practically no tendency to pass through the screen and only the extremely fine dustlike material does in fact escape from the space between the studs. This result is attributable in part to the fact that the fibers being carried vertically downwardly by the air stream from the head 10 tend to stop rather than change direction and move laterally outwardly. In addition, since the screen affords a large area for the escape of the air the velocity of the air discharge from head 10 is suddenly arrested so that there is less likelihood of the fibers being carried along in the air stream. Such is not the case, of course, if the inner wall is imperforate since an air stream of fairly high velocity is forced upwardly out of the space.

In operation, an operator, standing alongside the wall and holding the hose 8 in his hands directs the stream of material downwardly moving the head 10 back and forth between the studs defining the space to be packed. At the same time the operator moves the head up and down tamping the material so as to pack it to the desired density. In this connection it will be noted that the foot portions 15, 16 of the head constitute from about one fifth to one quarter of the entire area of the outlet 14 thus providing adequate tamping area to achieve uniform packing. At the same time, it will be noted that air is permitted to escape at all times because of the presence of vent openings 21, 22. After the material reaches about the top of screen 28 the latter may be removed and moved upwardly to define a new space or an additional screen may be secured in place as the operation progresses upwardly. After the material is installed from floor to roof, the screens 28 may be removed and replaced by plywood or whatever other material is desired for the inside wall.

Mechanical packing device

FIGS. 4-6 illustrate a modified form of the invention in which the tamping is done mechanically and by which it is not necessary to secure screens to the studs.

Referring to FIG. 4, a conventional lift truck, generally designated 30 is provided with a hydraulic telescopic lift generally designated 31 which may be operated in the conventional manner by the operator seated in the truck 30.

Rigidly secured to the upper end of the lift 31 (FIGS.

4

4, 5) is a horizontally disposed flat plate platform 32 on which is mounted the operating mechanism including a relatively slow gear motor 33 (FIG. 6) provided with an output shaft 34 rotatably supported in spaced bearings 35, 36 which in turn are supported on platform 32.

Mounted on shaft 34 is an elongated cam 40 the cross section of which is best seen in FIG. 5. Cam 40 is adapted to cooperate with the pneumatic hose support which consists of a horizontal flat bar base 41 resting on cam 40. Rigidly secured to base 41 and extending upwardly therefrom is a plate 42, the shape of which is best seen in FIG. 5. Secured to the upper periphery of plate 42 is a generally U-shaped bracket 45 which is adapted to support the supporting rollers for the pneumatic hose 8.

Bracket 45 is shown in cross-section in FIG. 6. A pair of outwardly extending flanges 46 are secured perpendicularly to the opposed sides 47 of the bracket. The bottom 48 of the bracket is secured to the plate 42 as by welding. The flanges 46 are provided on the bracket 45 so as to form supports to which a plurality of side rollers 50 may be rotatably secured to as by means of axle shafts 51. The rollers 50 mounted on both flanges 46 are spaced apart a sufficient distance to receive hose 8 therebetween. Rotatably mounted within the U-shaped portion of bracket 45 defined by side walls 47 and bottom 48 are a plurality of horizontally extending rollers 52 adapted for rotation about the axis of shafts 53. Rollers 52 are provided to receive the bottom side of hose 8.

As seen best in FIGS. 4, 5 the flexible pneumatic hose 8 is carried by rollers 52 and guided transversely by rollers 50. When supported in this manner hose 8 may be readily moved longitudinally. The packer head 10 is secured to the free end of the hose 8 as above described in connection with the manual operation. An operator seated in lift truck 30 may, at any time, feed the hose 8 in either direction as desired so that the packer head 10 can be moved up or down to suit the level at which the insulation is being applied. Because the packer head 10 is heavy relative to hose 8 it facilitates control of movement of said hose 8 by the operator.

Referring specifically to FIG. 5 it will be noted, upon rotation of shaft 34, that the configuration of cam 40 is such that the hose support (flat bar 41, plate 42, channel 45, etc.) is slowly raised and suddenly dropped. This imparts the same motion to packer head 10 thus effecting the tamping of the insulation. The packer head 10 is immediately raised after being dropped thus clearing the head of air before continuing its upward movement.

To permit the above described actions the flat bar 41 is pivotally supported on the side of cam 40 opposite the packer head 10 on a standard 55 which is provided with a convex upper surface 56 to permit swinging movement of flat bar 41. A bolt 57 is threadedly secured in standard 55 and is provided with a washer 58. A spring 59 interposed between washer 58 and the convex surface 56 yieldably restrains movement of flat bar 41. As best seen in FIG. 5 an opening 60 is provided in plate 42 to accommodate bolt 57.

Because the center of mass of the hose support (bar 41, plate 42, etc.) is forward of standard 55 and preferably over cam 40 it is seen that the said hose support is always kept in engagement with the surface of the cam 40.

In addition to the vertical tamping action of the hose support above described, means are provided for slowly oscillating the packer head 10 back and forth between the studs 3. Such means will now be described.

Mounted on output shaft 34 at the end opposite the gear motor 33 is a worm gear 63 which is in mesh with a worm wheel 64 mounted on one end of a shaft 65 mounted at right angles to output shaft 34 and rotatably received in bearings 66, 67 which in turn are secured to

5

the platform 32. The opposite end of shaft 65 is provided with a crank wheel 68 which is swingably connected by means of a pin 69 to one end of a crank arm 70. The opposite end of crank arm 70 is pivotally connected by pin 71 with a depending lug 72 integrally connected to a sliding block 73. Block 73 is slidably supported in a slide generally designated 74 secured to platform 32 (FIG. 6).

Block 73 is provided with a pair of upstanding retainer elements 75 which are adapted to receive therebetween the end of flat bar 41 that is opposite the packer head 10.

From the above described structure it will be apparent that an oscillatory movement of block 73 is effected which swings the packer head 10 back and forth between the studs 3 that define the space to be packed. In other words, the same tamping action is achieved as is set forth above in connection with the manual operation. It will be understood that the exact position of the packer head 10 at any particular time is controlled by the operator seated on truck 30 by controlling the feed of pneumatic hose 8.

A pair of horizontal, forwardly extending angle bar members 90, 91 rigidly secured to the lower side of platform 32 are provided to form supports for a pair of angle members 81, 82, respectively, which depend therefrom. The spacing of the angle members 81, 82 is such that the forward, outwardly extending flanges thereof coincide with the spacing of studs 3. A screen 80, the vertical edges of which is secured to angle bars 81, 82 is stretched therebetween and extends vertically the length of said angle bars 81, 82. In this manner it is unnecessary to secure the screen 80 to the pair of studs as all the operator need do is run his lift truck 30 up to the wall and place the screen where desired. Furthermore, when one portion of the insulation is completed it is merely necessary to back the truck 30 slightly away from the studs and then elevate the platform 32 to a new position and to continue the packing operation.

As stated above, the amount of fine material passing through the screen 80 is not objectionable. However, if desired, even this fine material may be captured by means of an impervious hood 85 arranged to cover the screen 80 and receive all of the air and entrained matter passing through screen 80.

As seen in FIG. 4 a suction hose 86 may be connected at one end to said hood 85, the other end of the hose 86 being connected to a fitting on an insulation feed hopper 87. The insulation is fed into the hopper 87 which then connects with the suction side of an air blower 88 which delivers the insulation to the packer head through hose 8. As shown schematically in FIG. 4, the insulating material is fed into the blower inlet through a hopper 87. The arrangement of blower and hopper is conventional and no claim is made thereto except in combination with the remainder of the apparatus and method above described.

By providing the operator with sufficiently long hoses 8, 86 the hopper 87 and blower 88 can be located at some convenient spot and then allowed to remain there throughout the insulating of the building.

It will be apparent, insofar as the method of the present invention is concerned, that the method of installing the insulation, including the use of the screen, the up and down tamping movement of the packer head and the sidewise movement of the same is the same in both the manual and mechanical arrangements. In either case the invention affords a means for installing the insulation at a faster rate than theretofore possible and results in a uniform predetermined density of the insulation effecting optimum insulating efficiency without any appreciable increase in cost.

It will be understood that the specific embodiments herein disclosed are not to be taken as restrictive of the invention since it is apparent that various modifications

6

in design may be resorted to by those skilled in the art without departing from the spirit of the invention.

I claim:

1. The method of installing fibrous insulating material against a building wall provided with horizontally spaced studs extending vertically upwardly from the floor of such building, comprising the steps of: providing a perforate screen extending between a pair of such studs at their lower ends and on the sides of said studs opposite said wall, directing a stream of air containing such material downwardly into the space defined by said wall, studs and screen whereby said air passes through said screen and said material builds up from said floor within said space, thereafter elevating said screen to a new position with the lower edge of said screen adjacent the top of said material in said space and directing said stream into the space and repeating said steps until the desired height of material has been achieved.

2. Apparatus for installing fibrous insulating material against a building wall provided with horizontally spaced, vertically extending studs, comprising: an elongated flexible conduit, means for effecting a flow of air through said conduit to a discharge end, means for mixing fibrous material with said air for discharge from said end, a perforate screen adapted to extend horizontally between adjacent studs at the sides of the latter opposite said wall, means for supporting said screen against said studs, means for supporting the discharge end of said conduit in a position directing the air therefrom downwardly into the space between said wall and screen, said supporting means for said screen and conduit being adjustable vertically to different positions along the length of said studs.

3. Apparatus for installing fibrous insulating material against a building wall provided with horizontally spaced, vertically extending studs, comprising: an elongated flexible conduit, means for effecting a flow of air through said conduit to a discharge end, means for mixing fibrous material with said air for discharge from said end, a perforate screen adapted to extend horizontally between adjacent studs at the sides of the latter opposite said wall, means for supporting said screen against said studs, means for supporting the discharge end of said conduit in a position directing the air therefrom downwardly into the space between said wall and screen, said supporting means for said screen and conduit being adjustable vertically to different positions along the length of said studs, a packer head mounted on said discharge end, means for oscillating said packer head vertically for tamping the material so discharged into said space.

4. Apparatus for installing fibrous insulating material against a building wall provided with horizontally spaced, vertically extending studs, comprising: an elongated flexible conduit, means for effecting a flow of air through said conduit to a discharge end, means for mixing fibrous material with said air for discharge from said end, a perforate screen adapted to extend horizontally between adjacent studs at the sides of the latter opposite said wall, means for supporting said screen against said studs, means for supporting the discharge end of said conduit in a position directing the air therefrom downwardly into the space between said wall and screen, said supporting means, for said screen and conduit being adjustable vertically to different positions along the length of said studs, a packer head mounted on said discharge end, means for oscillating said packer head vertically for tamping the material so discharged into said space, and means for oscillating said packer head horizontally simultaneously with said vertical oscillation for distributing said material uniformly between adjacent studs.

References Cited in the file of this patent

UNITED STATES PATENTS

927,449 Carnahan _____ July 6, 1909

(Other references on following page)

UNITED STATES PATENTS

			2,263,070
1,033,195	Robinson -----	July 23, 1912	2,318,744
1,898,385	Norton -----	Feb. 21, 1933	2,356,827
2,041,910	Ericson -----	May 26, 1936	2,439,602
2,200,713	Ericson -----	May 14, 1940	2,439,603
2,235,542	Wenzel -----	Mar. 18, 1941	2,439,605

5

Cusick -----	Nov. 18, 1941
Brown -----	May 11, 1943
Coss -----	Aug. 29, 1944
Heritage -----	Apr. 13, 1948
Heritage -----	Apr. 13, 1948
Pauley -----	Apr. 13, 1948