May 16, 1961 J. W. ROBERTS ET AL 2,984,172

APPARATUS FOR PACKING ASBESTOS FIBERS AND THE LIKE

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Fig. 1.

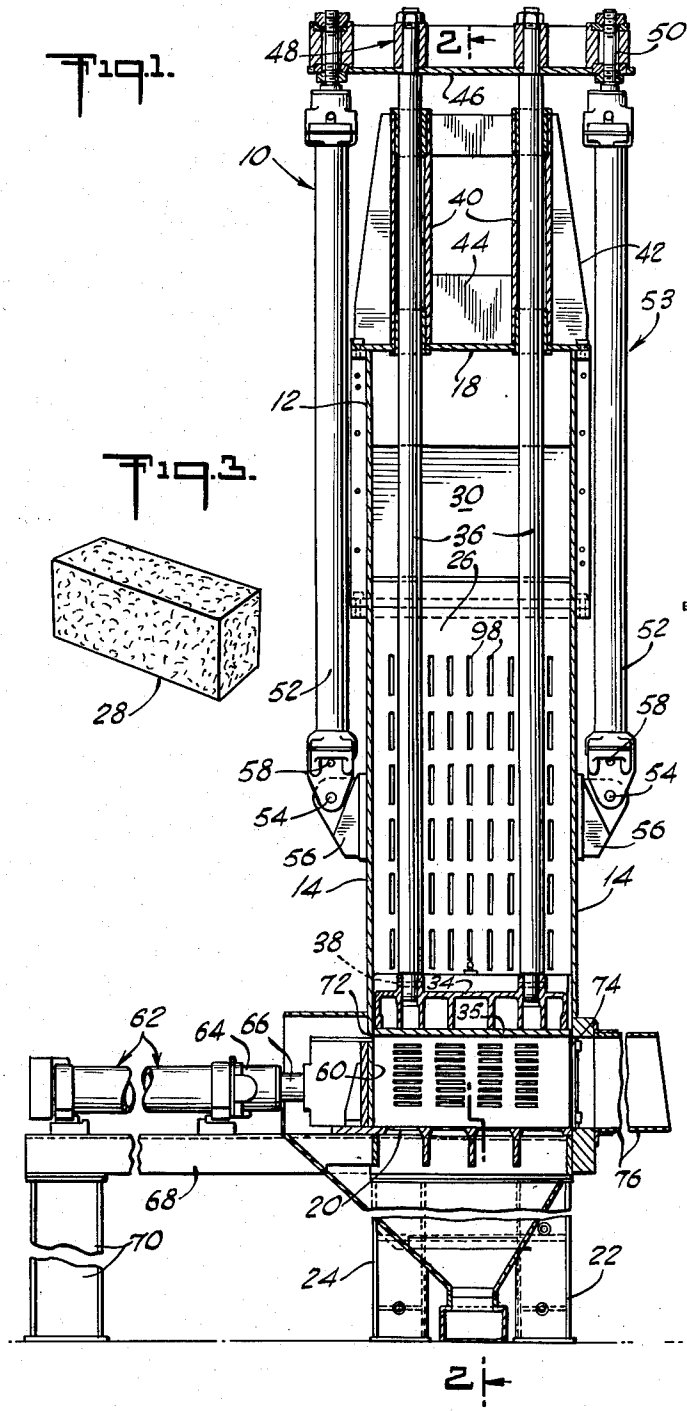
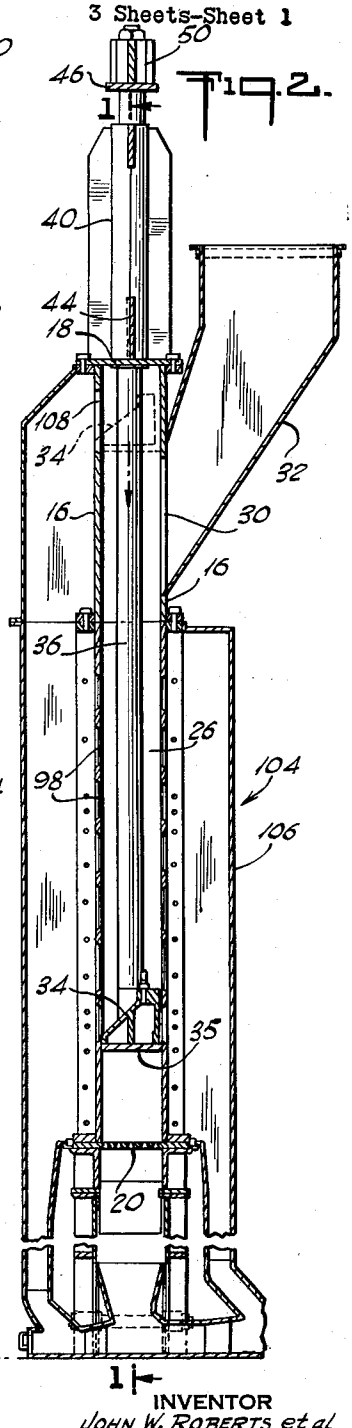


Fig. 3.

Fig. 2.



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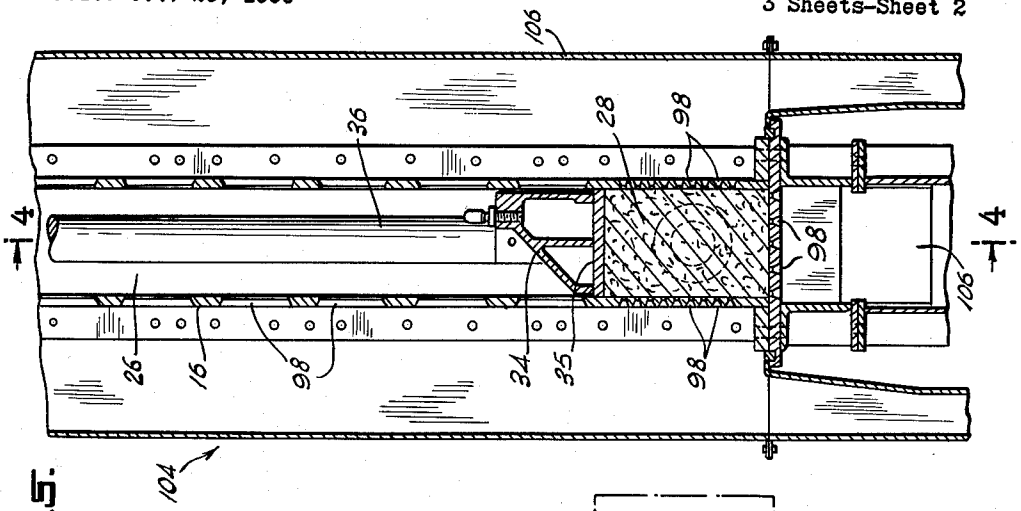


Fig. 5.

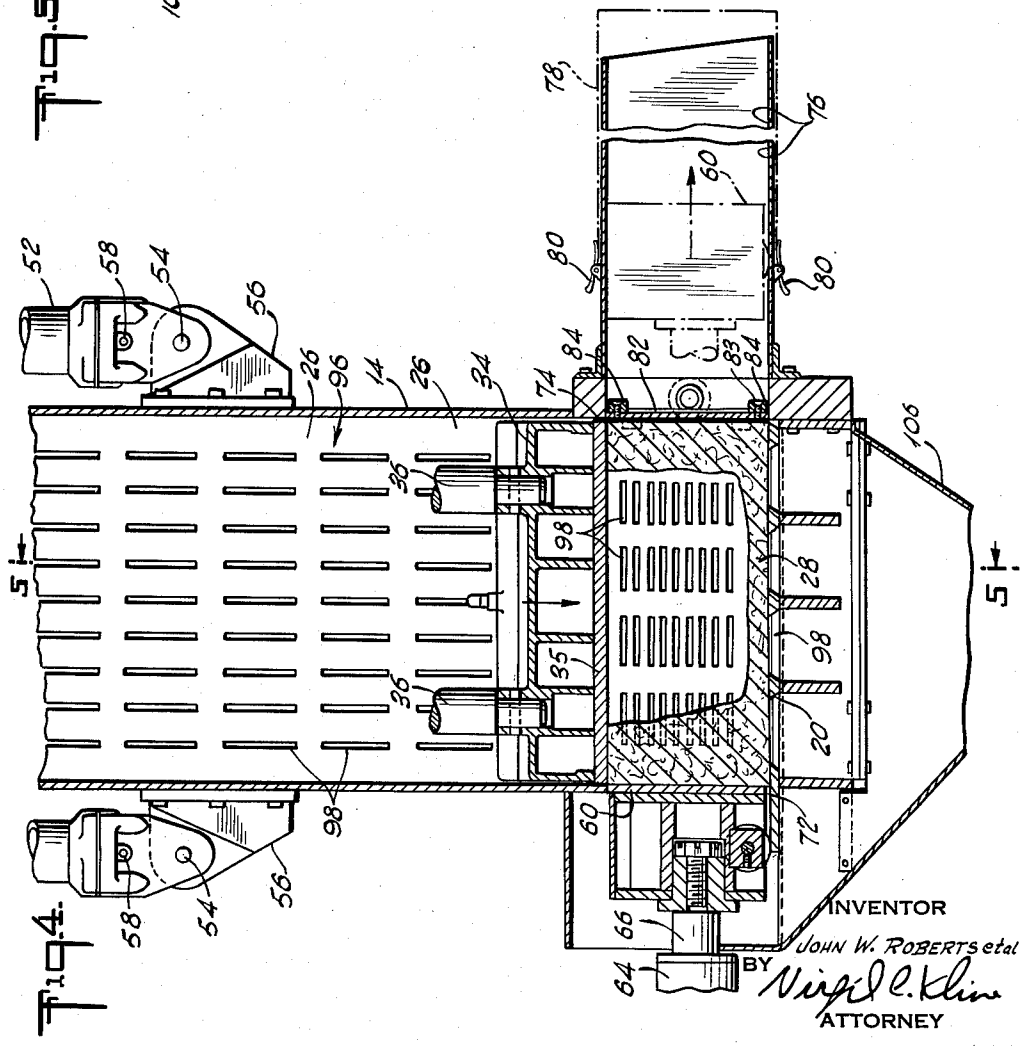


Fig. 4.

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Fig. 6.

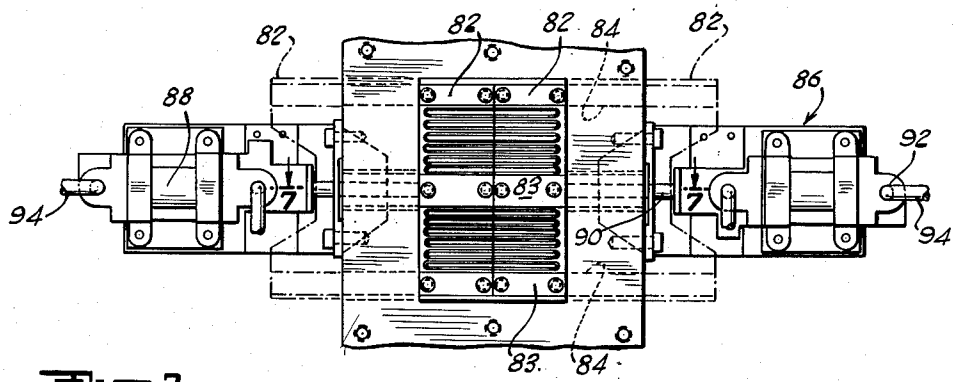


Fig. 7.

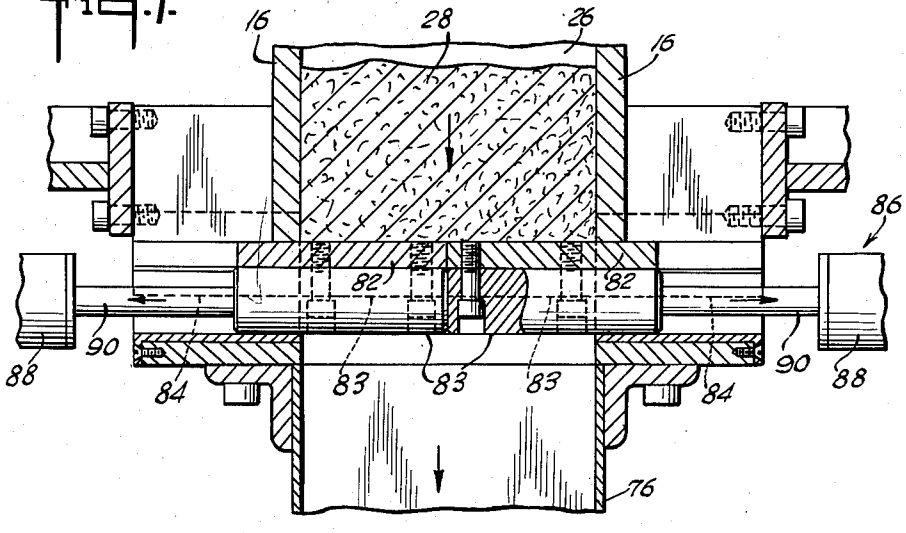


Fig. 8.

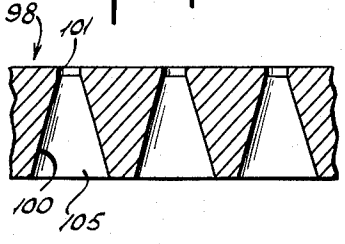
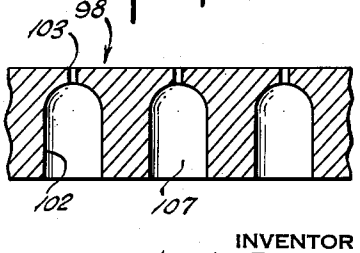


Fig. 9.



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United States Patent Office 2,984,172 Patented May 16, 1961

2,984,172

APPARATUS FOR PACKING ASBESTOS FIBERS AND THE LIKE

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Filed Oct. 23, 1956, Ser. No. 617,873

3 Claims. (Cl. 100—90)

This invention relates to a packing apparatus, and more particularly, to an apparatus of the type employed for packing under pressure loose fibrous material, such as asbestos and the like.

In packaging asbestos fiber heretofore, it has been customary to pack loosely the fibrous material, as by gravity, into a wrapper, such as a burlap sack or the like, for protecting the material during storage and shipment and for easily handling such fibrous material. However, by packaging the asbestos fiber in this manner, a relatively large volume of air is usually entrapped between the fibers, which prevents the fibers being packed closely together in the wrapper, and as a result, the sacks are not only sagging, for not being fully packed with the fibrous material, but the same amount of the material requires more containers than if the fibers were firmly packed therein. Furthermore, the handling and, particularly, the stacking of sagging wrappers containing the fibrous material becomes extremely difficult.

It is therefore the main purpose of the present invention to provide a new and improved system of packaging fibrous material, such as asbestos fiber and the like, whereby the handling and storing of such fibrous material is greatly facilitated, and the cost of packaging and shipping of the fibrous material is considerably reduced.

It is further the purpose of the present invention to provide an automatic pressure packing system in which the fibrous material to be packaged is first compressed into a relatively firm block and then transferred into a wrapper, which wrapper retains the firmness of the packed material and is very easily handled.

According to the present invention, a pressure packing apparatus consists of a pair of hydraulically operated plungers arranged to reciprocably operate vertically and horizontally, respectively, in an enclosed chamber, wherein a load of fibrous material is laterally compressed and longitudinally ejected from the chamber into a wrapper. The chamber is also provided with air bleeding means for bleeding the air entrapped between the fibers during compression of the material thereby forming a firm block of such material.

These and other features of the present invention are described in detail below in connection with the accompanying drawings wherein like numerals designate like parts, and in which:

Fig. 1 is a side elevation, partly in section, of a pressure packing apparatus embodying the present invention, the section being taken substantially along the line 1—1 in Fig. 2;

Fig. 2 is a vertical section taken substantially along the line 2—2 in Fig. 1;

Fig. 3 is a perspective view of a compressed fiber block produced by the apparatus of Fig. 1;

Fig. 4 is an enlarged fragmentary vertical section of the compression chamber taken substantially along the line 4—4 in Fig. 5;

Fig. 5 is an enlarged fragmentary vertical section of the compression chamber taken substantially along the line 5—5 in Fig. 4;

Fig. 6 is a fragmentary front elevation of the apparatus of Fig. 1 showing a gate arrangement for the compression chamber;

Fig. 7 is an enlarged fragmentary horizontal section taken substantially along the line 7—7 in Fig. 6;

Fig. 8 is an enlarged fragmentary view, in section, showing one type of slot construction useful in the apparatus of the instant invention; and

Fig. 9 is a view similar to that of Fig. 8 showing a modified construction slot.

Referring now in detail to the drawings, the illustrated embodiment of the pressure packing apparatus of the present invention is indicated generally by the reference numeral 10, and, as shown, comprises a box-like, hollow casing 12 of substantially rectangular shape completely enclosed by side walls 14 and 16, a top wall 18, and a bottom wall 20. The casing 12 may be supported in an upright position on suitable pedestals 22 and 24 as shown in Figs. 1 and 2. While the cross-section of the casing 12 is shown as being rectangular, it may, however, be of any other desired shape depending on the desired final shape of the compressed fibrous materials. Also, the casing 12 may be disposed horizontally as well as vertically, but the vertical disposition is preferred, since the feeding may be done by gravity thereby simplifying the operation.

The interior of the casing 12 is arranged to serve as a compressing chamber 26 for the compression of loose fibrous materials therein, such as asbestos fibers and the like, into a relatively firm block 28, as shown in Fig. 3. The fibrous material to be compressed may vary in form from a coarse to a fine fiber, or it may be even of powder-like form. An opening 30 in the side wall 14 adjacent to the top of the casing 12, may serve as an entrance for the material to be compressed. A downwardly inclined chute 32 may be provided for feeding the fiber through the opening 30 from a hopper, not shown.

Compression of fibrous material may be obtained by a ram or plunger 34 consisting of a plate 35 of a substantially rectangular shape disposed in the chamber 26 and arranged to reciprocate vertically therein. A pair of reciprocating rods 36 extending longitudinally in the chamber 26 are secured at their lower ends, respectively, to the plate 35 of the plunger 34 by pins 38. The rods 36 are further supported for slidable movement by a pair of sleeves 40 extending vertically above the top wall 18 and rigidly supported thereon by end plates 42 and cross plates 44. The rods 36 are secured at the upper ends thereof, respectively, to a horizontally extending bar 46, as by a bolt and nut arrangement, as indicated at 48, for vertical movement therewith. The bar 46 is further connected at its ends, as at 50, to a pair of piston rods arranged to reciprocate in cylinders 52 of a pair of fluid motors 53. The cylinders 52 extending vertically along the outside of the side walls 14 and disposed substantially in parallel relation thereto, are pivotally mounted at the lower ends thereof, as at 54 on lugs 56 extending laterally from the outer faces of the opposed side walls 14. The fluid motors are further arranged for actuation so as to reciprocate the plunger 34

by the cylinders 52 being connected through ports, as indicated at 58 to a conventional hydraulic pressure system, not shown. Also, an electrically controlled system (not shown) may be provided for automatically controlling the operation of the plunger 34.

The pressure packing apparatus 10 is further provided with a reciprocating plunger 60 disposed horizontally and operated by a fluid motor 62 consisting of a cylinder 64 and a piston rod 66 connected to a piston in a cylinder 64 at one end thereof and at the other end connected to the plunger 60. The cylinder 64 is horizontally disposed and supported on a platform 68 extending laterally from the lower end of the casing 12 and mounted at the free end thereof on the pedestal 70. The plunger 64 disposed horizontally is arranged to reciprocably extend laterally in the chamber 26 through an opening 72 in the side wall 14 adjacent the bottom wall 20. Directly across the opening 72, the opposed wall 14 of the casing 12 is provided with an opening 74 arranged for passage of the compressed block 28 of the fibrous material therethrough and into a chute 76 extending laterally and outwardly from the wall 14, as shown best in Fig. 4. The chute 76 is arranged for supporting a wrapper or bag, as indicated at 78, slidably fitted thereon. A set of clamps 80 may be provided on the chute 76 for engaging and retaining the bag 78 in place.

As shown in Figs. 6 and 7, the casing 12 is provided with closure means including a pair of doors or gates 82 for closing the opening 74. The gates 82 are provided with guide bars 83 arranged to be slidably supported in slots or slideways 84. The gates 82 are further arranged to be operated by fluid motors 86 having cylinders 88 and piston rods 90, piston rods 90 being connected to the respective gate 82 and to a piston in the respective cylinder 88. Operation of the gates is likewise obtained by actuation of the fluid motors 86 by fluid pressure of the hydraulic system of the apparatus 10. Fluid under pressure is supplied to the cylinders 84 through ports 92 connected by piping 94 to the hydraulic pressure system, not shown.

The apparatus 10 is further provided with fluid bleed means 96 for permitting the air between the asbestos fibers to be expelled therefrom during compression of the fibrous material to produce a relatively firm block, such as indicated at 28. The fluid bleed means 96 consists of a series of apertures 98 in both side walls 16, in the bottom wall 20, and in gates 82. The apertures 98 may be either of a substantially conical shape, as indicated at 100 in Fig. 8, particularly adapted for coarser fibers, or of a substantially cylindrical type with a narrowed down portion, as indicated at 102 in Fig. 9, particularly adapted for finer fibers. Either type, as indicated at 100 or 102, of aperture 98 is particularly adapted for self-cleaning by being formed with a portion of relatively narrow cross-section, as indicated at 101 and 103, respectively, for only a short length, while the remaining portion extending for the rest of the length of the aperture 98 is formed with a relatively larger cross-section, as indicated at 105 or 107, thereby preventing clogging of the apertures 98 with the fibers and permitting free flow of air therethrough. The apertures 98 are further arranged with the relatively narrow cross-section portion 101 or 103 extending from the inner side of each wall of the chamber 26, thereby preventing the fibers from easily passing through the apertures 98. However, any fibers that may pass through the narrow cross-section portion 101 or 103 will be easily drawn from the larger cross-section portion 105 or 107, and thereby clogging of the apertures 98 will be prevented.

In order to prevent any fibers or dust which might escape through the apertures 98 from accumulating in the area around the casing 12, the apparatus 10 may be also provided with dust proof means 104 consisting of sheet metal exhaust hoods 106 attached to the side walls 16 and completely covering the perforated portion of the side walls 16 and the bottom wall 20. A fan system, not shown, may be provided for drawing the air through the apertures 98, and any fibers or dust escaping through the apertures 98. One of the side walls 16 may also be provided with an opening 108 at the upper portion thereof and adjacent to the top wall 18 for likewise drawing any fibers or dust accumulated in the upper portion of the casing 12.

In operation, the fibrous material to be compressed is fed into the chamber 26 from a hopper, not shown, through the chute 32 and opening 30, which fibrous material may be stacked on the bottom wall 20 up to substantially the level of the opening 30, while the plunger 34 has been raised to the upper end of its stroke, as shown by the dotted line in Fig. 2. After the chamber 26 has been filled with the fibrous material, the plunger 34 is started on its downward stroke, compressing the fibers, and when it reaches its lower position, as shown in Fig. 2, the fibrous material has been laterally compressed into the relatively firm block 28, as shown in Fig. 3. At the end of the downward stroke of the plunger 34, the plunger 60 may be automatically actuated, and the gates 82 be retracted into an open position thereby permitting the plunger 60 to eject the fibrous block 28 endwise from the chamber 26 into the chute 76. At the end of its stroke, as shown by a dotted line in Fig. 4, the plunger 60 has pushed the fibrous block 28 against the bottom of the bag 78, thereby sliding the bag 78 off the chute 76 with the fibrous block 28 therein. The bag 78 containing the fibrous block 28 may fall on a conveyor system, not shown, for carrying the same away. For the automatic operation of the plungers 34 and 60, and the gates 82 of the closure means, any well-known electrically controlled hydraulic system may be employed, such as disclosed in Letters Patent of the United States of America No. 2,682,-137, issued to C. W. Cox on June 29, 1954.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

What we claim is:

1. Apparatus for packing loose asbestos fibrous material, comprising an enclosed compression chamber having walls provided with slots circumferentially therearound, a vertically reciprocable plunger extending longitudinally in said chamber for laterally compressing loose asbestos fiber material contained in said chamber, said slots being relatively closely spaced and being much longer than they are wide adjacent the inner faces of said wall, said slots being arranged adjacent the upper portion of the compression chamber with the long dimension extending parallel to the direction of travel of said plunger and arranged adjacent the terminus of the compression chamber with the long dimension transverse to the direction of travel of said plunger, said wall slots permitting air to escape from said chamber during compression of the fibrous material, and said wall slots being of greater cross-sectional area at the outer portion of the chamber as compared to the cross-sectional area at the inner portion of the chamber, a horizontally reciprocable plunger extending laterally in said chamber for applying pressure to the compressed fibrous material endwise thereof, wrapper holding means extending laterally from said chamber and in communication therewith, and closure means in said chamber for permitting transfer of the compressed fibrous material from said chamber into a wrapper held by said wrapper-holding means.

2. Apparatus for packing asbestos fibers, comprising an elongated compression chamber enclosed by lateral walls, means within said chamber for admitting loose asbestos fiber into said chamber, plunger means for compressing the asbestos fibers, said walls having first and second slots therein which enlarge in cross-sectional area from the chamber-side of the walls to the exterior side of the walls, said first slots being elongated in the direction of travel of said plunger means and being located

along a substantial portion of the upper portion of the lateral area of said walls, said second slots being elongated transverse to the direction of travel of said plunger means and being located adjacent the terminus of the compression chamber, and all of said slots permitting air between the asbestos fibers to be expelled therefrom during compression thereof, thereby producing a substantially free-of-air relatively firm block of asbestos fibers.

3. Apparatus for packing asbestos fibers and the like as defined in claim 2, and dustproof means in communication with said compression chamber perforated walls

for arresting any fibers discharged through said slotted walls.

References Cited in the file of this patent

UNITED STATES PATENTS

801,963	Beaty	Oct. 17, 1905
1,135,309	Meakin	Apr. 13, 1915
2,532,947	Russell	Dec. 5, 1950

FOREIGN PATENTS

908,447	Germany	Apr. 5, 1954