

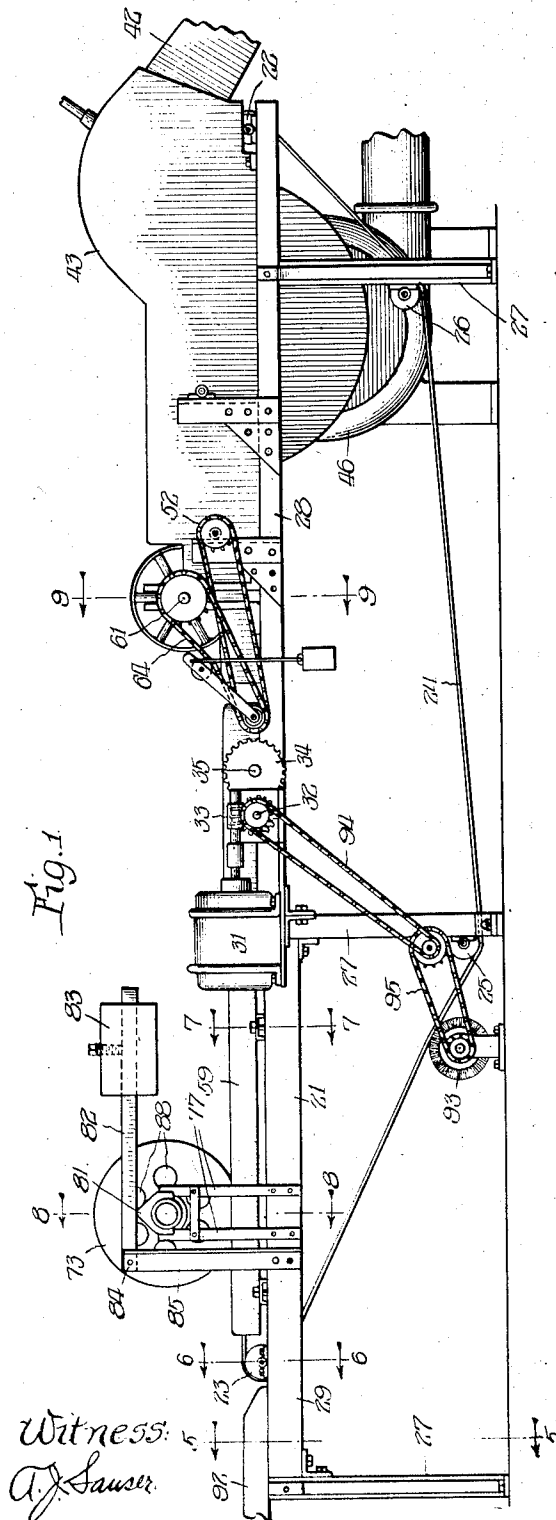
June 5, 1934.

H. R. WILLIAMS

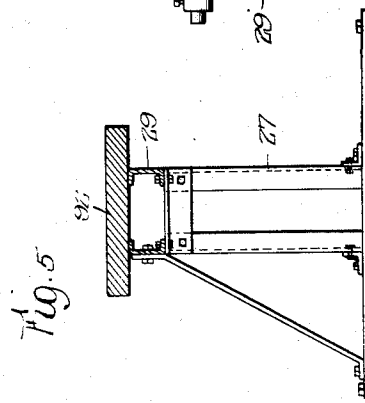
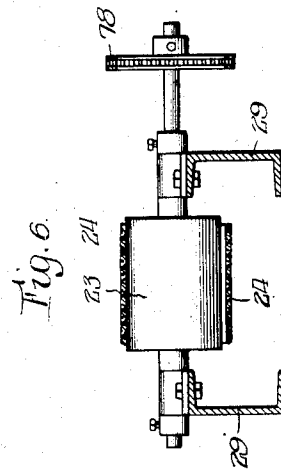
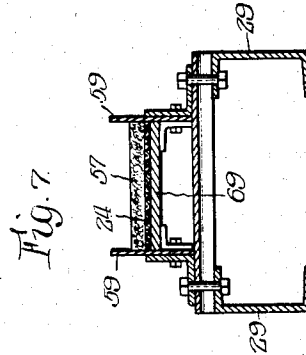
1,961,272

FELTING MACHINE

Original Filed Feb. 12, 1926 4 Sheets-Sheet 1



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FELTING MACHINE

Original Filed Feb. 12, 1926 4 Sheets-Sheet 2

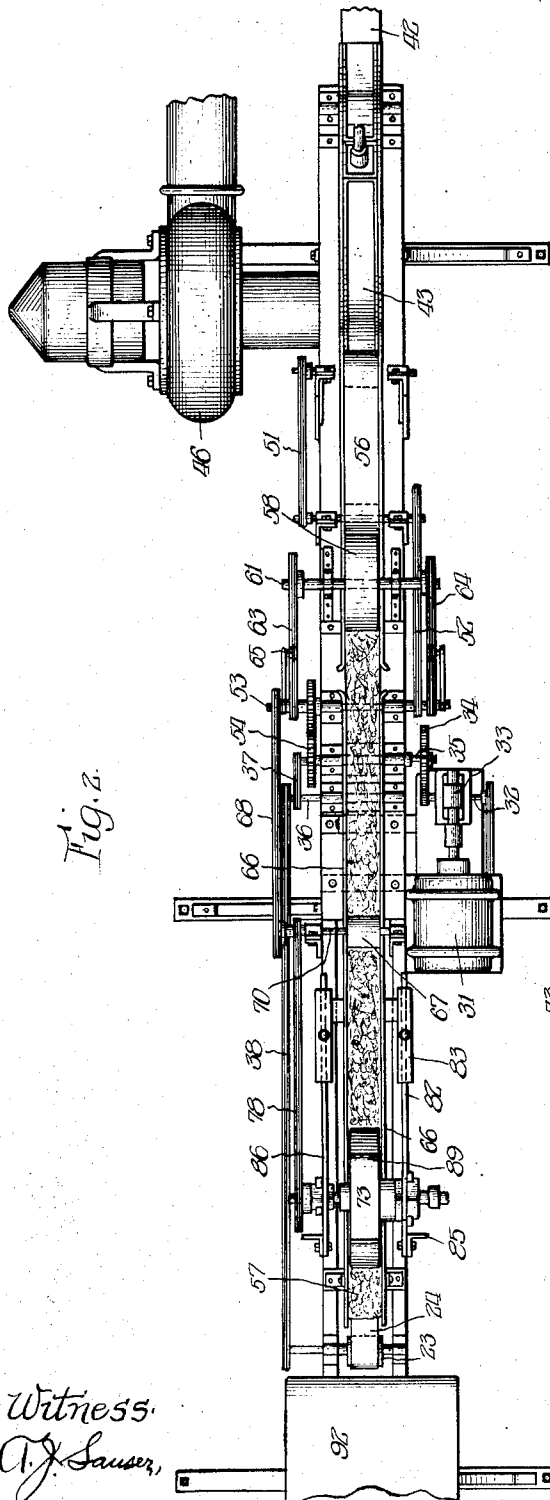


Fig. 2.

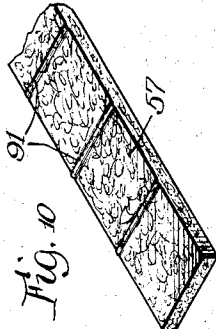


Fig. 10

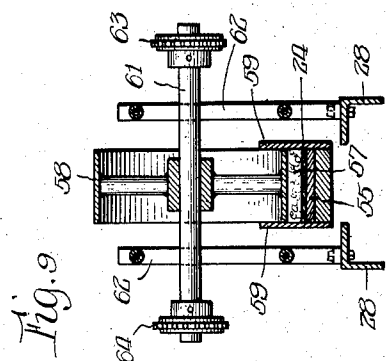


Fig. 9

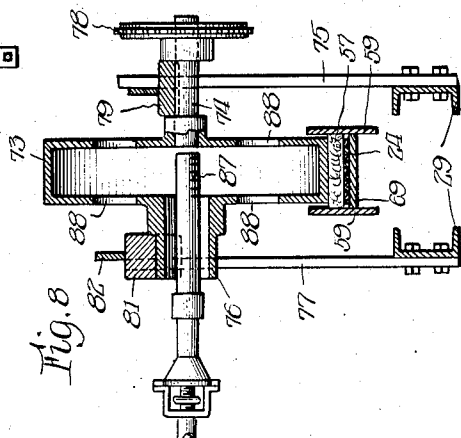


Fig. 8

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June 5, 1934.

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FELTING MACHINE

Original Filed Feb. 12, 1926 4 Sheets-Sheet 4

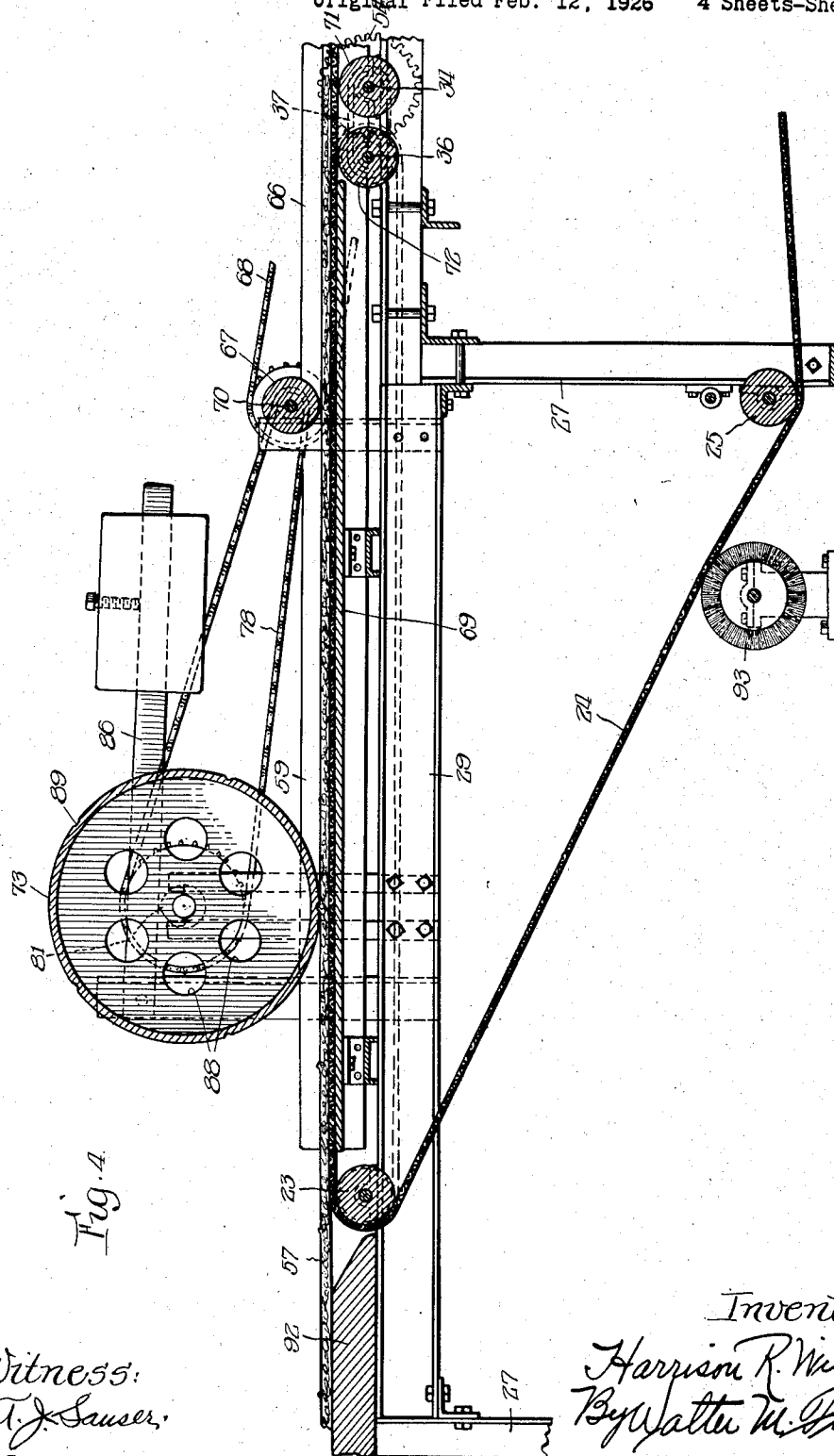


Fig. 4.

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UNITED STATES PATENT OFFICE

1,961,272

FELTING MACHINE

Harrison Robert Williams, New York, N. Y.

Application February 12, 1926. Serial No. 87,808

Renewed July 6, 1932

7 Claims. (Cl. 154—29)

My present invention concerns machines for forming carded wood-pulp or similar light and fluffy material into a highly absorbent strip which may be severed into suitable lengths for use as sanitary or surgical pads.

The carded or shredded wood-pulp in dry condition and in extremely light form, resembling a snow storm, is drawn by suction on to a fine-mesh, endless, traveling screen or conveyor, and is charged with binding and deodorant or antiseptic materials, which are applied thereto in spray form before the disintegrated pulp becomes felted or condensed into pad or web condition, whereby the introduced ingredients permeate the material undergoing treatment.

To more completely and thoroughly charge the felted material with the binding and deodorant ingredients, it is subjected to a hot ironing operation, which eliminates any moisture and causes an effective spreading of the charging materials therethrough, so that they can more adequately perform their intended functions.

In some instances, at least, the wood-pulp is so finely subdivided that it does not have sufficient cohesive and felting qualities for the purpose for which it is intended, and it is for this reason that the binding or adherent constituent is added while the pulp is in the very light and unfelted condition specified.

The pulp material thus treated, as it passes through the machine forming the subject-matter of this patent, is reduced in thickness or condensed, and is treated to the action of a hot, rotary iron to eliminate the moisture referred to and to perfect the cementing or adhering action of the introduced binder, and to leave the deodorant or antiseptic material in dry form.

To enable those trained in this art to have a full and complete understanding of the invention, both from structural and functional standpoints, in the accompanying drawings I have illustrated a present desirable and preferred embodiment of the invention, and, for simplicity, the same reference characters have been used to designate like parts throughout the several views of the drawings.

In the drawings,—

Fig. 1 is a side elevation of the novel and improved mechanism;

Fig. 2 is a plan view of the same;

Fig. 3 is an enlarged, vertical, substantially central, fragmentary, longitudinal section through the entrance end of the machine, that is, the part of the machine at the right-hand portion of Fig. 1;

Fig. 4 is a similar fragmentary section at the other end of the machine;

Fig. 5 is a vertical cross-section on line 5—5 of Fig. 1, the parts being viewed in the direction indicated by the arrows;

Fig. 6 is a similar, but enlarged, cross-section on line 6—6 of Fig. 1, the structural elements being viewed in the same direction;

Fig. 7 is also an enlarged cross-section on line 7—7 of Fig. 1, the parts being viewed in the direction indicated by the arrows;

Fig. 8 is a cross-section on line 8—8 of Fig. 1, on a scale of increased dimensions, the parts being viewed from the direction indicated by the arrows;

Fig. 9 is a similar cross-section, on line 9—9 of Fig. 1; and

Fig. 10 is a fragment of the felted web produced by and delivered from the machine.

As is clearly depicted in the plurality of views of these drawings, the novel and improved machine includes a suitable, elongated frame, characterized as a whole 21, having at its entrance end a suitably-journaled drum or pulley 22, and having at its opposite end a similar, power-rotated drum 23, a very fine-mesh, endless, conveyor screen 24 passing around and being actuated by such companion drums, the lower stretch or section of such screen extending around properly-supported, revoluble, idle guide drums or rollers 25 and 26.

The frame referred to includes suitable supporting legs or posts 27, 27, carrying at their tops spaced angle bars 28, 28, which line up with similarly separated channel bars 29, 29, the frame, of course, having appropriate cross-connecting members.

At one side, the frame supports an electric motor 31, which drives a shaft 32 through a worm and worm-wheel connection 33, the shaft, by gearing 34, rotating an appropriately-journaled cross-shaft 35, which in turn revolves an adjacent cross-shaft 36 by a sprocket wheel and chain connection 37, the latter shaft rotating the conveyor drum 31 by a sprocket wheel and chain arrangement 38.

The air-charged, finely divided or carded, dry, wood-pulp 41, which has previously undergone a process not necessary here to describe, enters the appliance from a carding or shredding machine, not shown, through a sheet-metal chute or conduit 42, the discharge end of which projects into a curved casing 43, above the conveyor-screen, of the shape shown in cross-section in Fig. 3, the forms or contours of these enclos-

ing or encasing members being such as to facilitate the passage of the air and its pulp in the manner required.

As is clearly shown, the side walls of the housing 43 extend down beyond, so as to enclose, the traveling screen, which, at this point, passes over a plurality of spaced, supporting cross-bars 44, 44.

Beneath such bars and below this front portion of the screen, a rounded, sheet-metal casing 45 is provided, an aperture through one side wall of which is connected to a suction pump 46 of the rotary type, whereby the dry, pulp-laden air is sucked or drawn through the tube 42 into the casing 43, and down on to the slowly-advancing screen 24, where the pulp is deposited, the air flowing on down through the screen into the lower compartment 45 and out through the rotary or vacuum pump 46.

The conveyor-screen, passing from beneath the discharge end of the upper casing 43, passes beneath an inclined, endless belt 47 extended around a pair of revoluble drums 48, 49, the shafts of which are connected together to be driven in unison by sprocket wheels and their co-operating sprocket chain 51, the shaft of drum or roller 49 being rotated by a sprocket wheel and companion chain connection 52, with a cross-shaft 53 geared at 54 to the shaft 35 previously mentioned as rotated by the electric motor.

As is indicated in Fig. 3, the screen passes over a table portion 55 and beneath such belt 47, the latter being inclined downwardly in the direction of movement of the screen, the object or purpose of the belt being to assist in feeding the layer or strip of pulp on the screen with the latter out of the suction chamber and to somewhat compress or felt the light pulp stratum.

Belt 47 is located within a secondary casing 56 having top and side walls which preclude the objectionable entrance of air around the belt into the vacuum chamber.

Just beyond this endless, top belt, the screen and its layer of pulp 57 pass beneath a wheel or roller 58 bearing on the top face of the pulp strip between side walls 59, 59, constituting extensions of the corresponding walls of the housing 56, this wheel being mounted on a shaft 61 slidable vertically in guide bearings 62, 62, whereby the weight of the wheel is imposed directly on the top face of the pulp layer to assist in condensing or compressing it the required amount and to assure its proper travel with the conveying screen.

Both ends of the shaft 61 are driven from shaft 53 by sprocket wheels and correlated sprocket chains 63, 64, fitted with appropriate idlers 65 to take up the slack, as the position of the wheel may vary somewhat since it is free to move up and down.

Further on the layer of dry pulp passes between a pair of side bars 66, 66 and beneath a small roller 67, which tends to compress it somewhat, smooth it out, and even out possible irregularities or inequalities.

The shaft 70 of such roller is rotated in suitable bearings from shaft 53 by a sprocket wheel and chain connection designated as 68.

While passing below the roller 67, the screen and its layer of pulp material rest upon the top surface of a table portion 69, and at one end of the latter the shafts 34 and 36 are fitted with rollers or drums 71 and 72 to assist in feeding the belt, contacting with its under surface, and to prevent the belt from sagging.

Reverting to the casing or housing 43, its top

wall is equipped with a nozzle 100 downwardly inclined in the direction of travel of the stream of pulp.

Through such member a spray of combined binding and deodorant or antiseptic material is played into the light, fluffy pulp, but owing to the fact that this spray is discharged into the top portion of such material, it may not be fully and completely mixed throughout the thickness thereof.

It is applied at this point, because then the pulp is in its most open and downy condition, which facilitates its impregnation in material degree.

It is necessary or desirable to so treat the soft, cottony, charged layer of pulp that it will be thoroughly laden with the binding material and deodorant or antiseptic ingredient in dry form throughout its entire thickness.

This may be accomplished by ironing the top surface of the traveling pulp layer with a hot iron, which drives out the moisture and forces the specified materials downwardly through the whole thickness of the pulp stratum.

The binding material acts in some degree to increase the adhesion of the pulp particles or strands with one another, so that the layer or the finished pad will have sufficient and adequate cohesive properties.

To this end, the machine includes a hollow, cylindrical, rotary ironer 73, fitted at one side with a shaft 74 by which it is rotated through a sprocket wheel and chain connection 78 with the shaft 70, the bearing 79 for such shaft being vertically slidable in a guideway 75 upstanding from one side of the framework.

The opposite side of the ironer has a hollow trunnion whose bearing 81 is similarly vertically slidable in the guide member 77, and in order that the ironer may bear with sufficient pressure on the top face of the felted layer traveling on the screen-conveyor, the bearing 81 is pressed downwardly by an arm 82 fitted with a weight 83 and fulcrumed at 84 on an upstanding bracket or bar 81, the under face of the lever or arm 82 pressing directly on the top of the bearing block 81, as is completely shown in Fig. 1.

The bearing block 79 at the other side of the rotary ironer is similarly forced downwardly by a like weighted arm 86.

In order that this ironer may be properly heated, a gas burner 87 projects thereinto through the hollow shaft or trunnion 76, and to permit the combustion of the gas in such ironer, the side walls of the latter are apertured at 88 for the escape of the products of combustion.

The pressing and heating action which the ironer performs on the top of the pulp layer assures a complete drying of the latter and a forcing of its incorporated ingredients throughout its entire thickness.

If desired, the ironer 73 may be provided with slight cross-grooves 89, so that the issuing strip of material 57 will have a series of cross ridges 91 indicating the points where the continuous strip is to be cut or severed to divide it into individual or separate pads.

Obviously, the ironer may be perfectly smooth, if preferred, with the accompanying omission of such ridges.

The felted strip 57 is delivered from the traveling, endless screen on to a reception table 92, and it is on this that it is cut into parts by means not necessary to illustrate, as no portion of the invention is involved therewith.

In order to prevent the screen from becoming clogged so that it could not well perform its intended services, a rotary brush 93 (Fig. 1) bears against the under face of the lower stretch of the screen, such brush being rotated from the shaft 32 by the two sets of sprocket wheel and chain connections 94 and 95, arranged in series.

Thus, it will be understood that the extremely light and fluffy wood-pulp, as it enters the machine, is charged with the additional ingredients referred to, and is deposited on the traveling screen, being condensed and felted as it passes along, being ultimately ironed to eliminate all moisture and to force the added ingredients throughout the thickness thereof.

Many minor mechanical changes may be incorporated in this mechanism without departure from the underlying principles involved, and such changes fall within the scope of the invention as defined by the appended claims.

I claim:

1. In a machine of the character described, the combination of a perforated conveyor, means to actuate said conveyor, a casing on one side of said conveyor, an entrance flue for said casing for the admission of finely-divided pulp, means to apply suction to the opposite side of said conveyor to draw a current of pulp-laden air into said casing and to deposit its pulp on the conveyor, said entrance flue extending into said casing and means for injecting an ingredient into the fluffy pulp in the casing comprising a nozzle, said nozzle being adjacent to the end of the flue in the casing and directed obliquely in the general direction of the travel of the pulp in the casing.

2. In a machine of the character described, the combination of a conveyor, means to actuate said conveyor, means to deposit light fluffy pulp on said conveyor, means to charge said pulp before application to the conveyor with an ingredient, means to condense the body of pulp deposited on the conveyor, and a heated surface applied to one face of the pulp body on the conveyor to drive said ingredient throughout the thickness of said body.

3. In a machine of the character described, the combination of a conveyor, means to actuate said conveyor, means to deposit light fluffy pulp on said conveyor, means to charge said pulp before application to the conveyor with an ingredient, means to condense the body of pulp deposited on the conveyor, and a rotary heating surface means applied to a face of the pulp body on the conveyor to drive said ingredient throughout the thickness of said body.

4. In a machine of the character described, the combination of a perforated conveyor, means to actuate said conveyor, a casing above said conveyor, an entrance flue for said casing for the admission of finely-divided pulp, means to

apply suction to the underside of said conveyor to draw a current of pulp-laden air into said casing and to deposit its pulp on the conveyor, means to feed an ingredient into the fluffy pulp in said casing in the general direction of travel of the pulp in such casing, an endless belt above and inclined toward the conveyor in the direction of travel of the latter and bearing on the body of pulp deposited on the conveyor, means to drive said endless belt, and rotary heated means applied to one face of the pulp body on the conveyor to drive said ingredient throughout the thickness of said body.

5. In a machine of the character described, the combination of a perforated conveyor, means to actuate said conveyor, a casing at one side of said conveyor, an entrance flue for said casing for the admission of finely-divided pulp, means for applying suction to the opposite side of said conveyor to draw a current of pulp-laden air into said casing and to deposit its pulp upon the conveyor, an endless traveling imperforate surface moving in the same direction as said conveyor serving to assist in delivering the felted material on the conveyor from the casing and disposed so as to serve as the seal between said casing and said conveyor, and means to drive said surface.

6. In a machine of the character described, the combination of a perforated conveyor, means to actuate said conveyor, a casing at one side of said conveyor, an entrance flue for said casing for the admission of finely-divided pulp, means for applying suction to the opposite side of said conveyor to draw a current of pulp-laden air into said casing and to deposit its pulp upon the conveyor, such casing mentioned providing an opening between it and the conveyor and an endless imperforate belt extending in the same direction as said conveyor and sealing said opening and assisting the delivery of the felted material from the casing.

7. In a machine of the character described, the combination of a perforated conveyor, means to actuate said conveyor, a casing at one side of said conveyor, an entrance flue for said casing for the admission of finely-divided pulp, means for applying suction to the opposite side of said conveyor to draw a current of pulp-laden air into said casing and to deposit its pulp upon the conveyor, said suction means affording a suction area extending beyond the casing in the direction of travel of said conveyor, an endless traveling surface moving in the same direction as said conveyor and extending from said casing to beyond said suction area, said surface serving to assist in delivering the felted material on the conveyor from the casing and disposed so as to act as the seal between said casing and said conveyor.

HARRISON ROBERT WILLIAMS.