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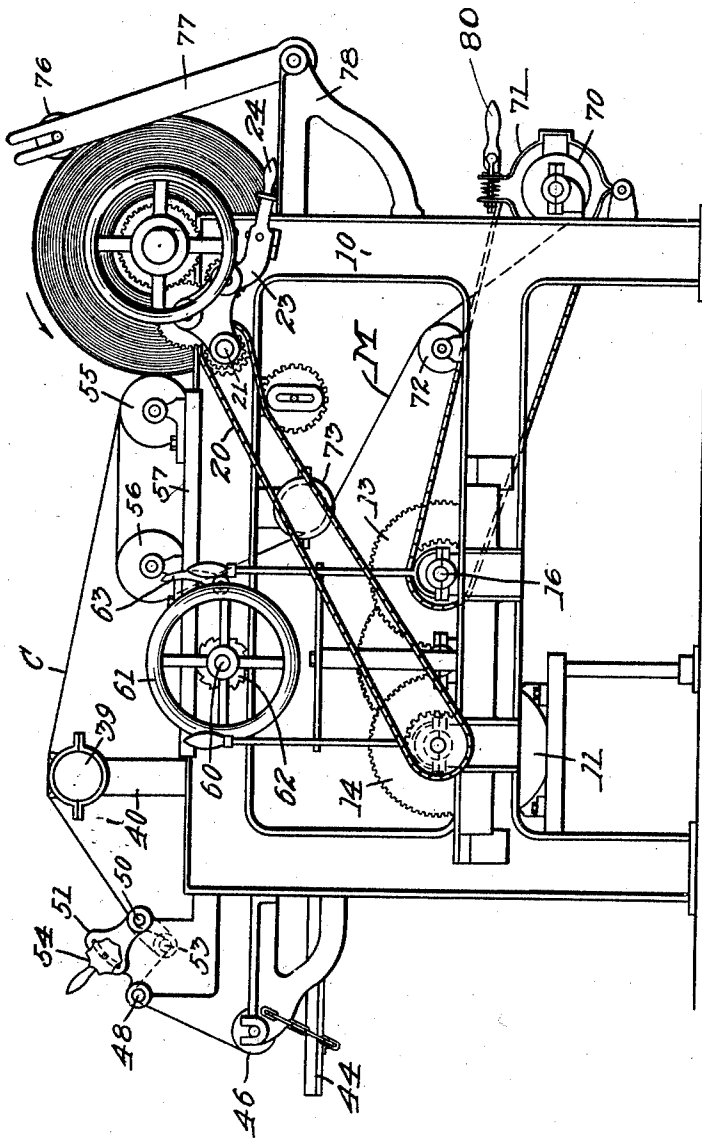
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1,738,837

MANTLE STEAMING AND AIR COOLING MACHINE

Filed March 11, 1927

5 Sheets-Sheet 1



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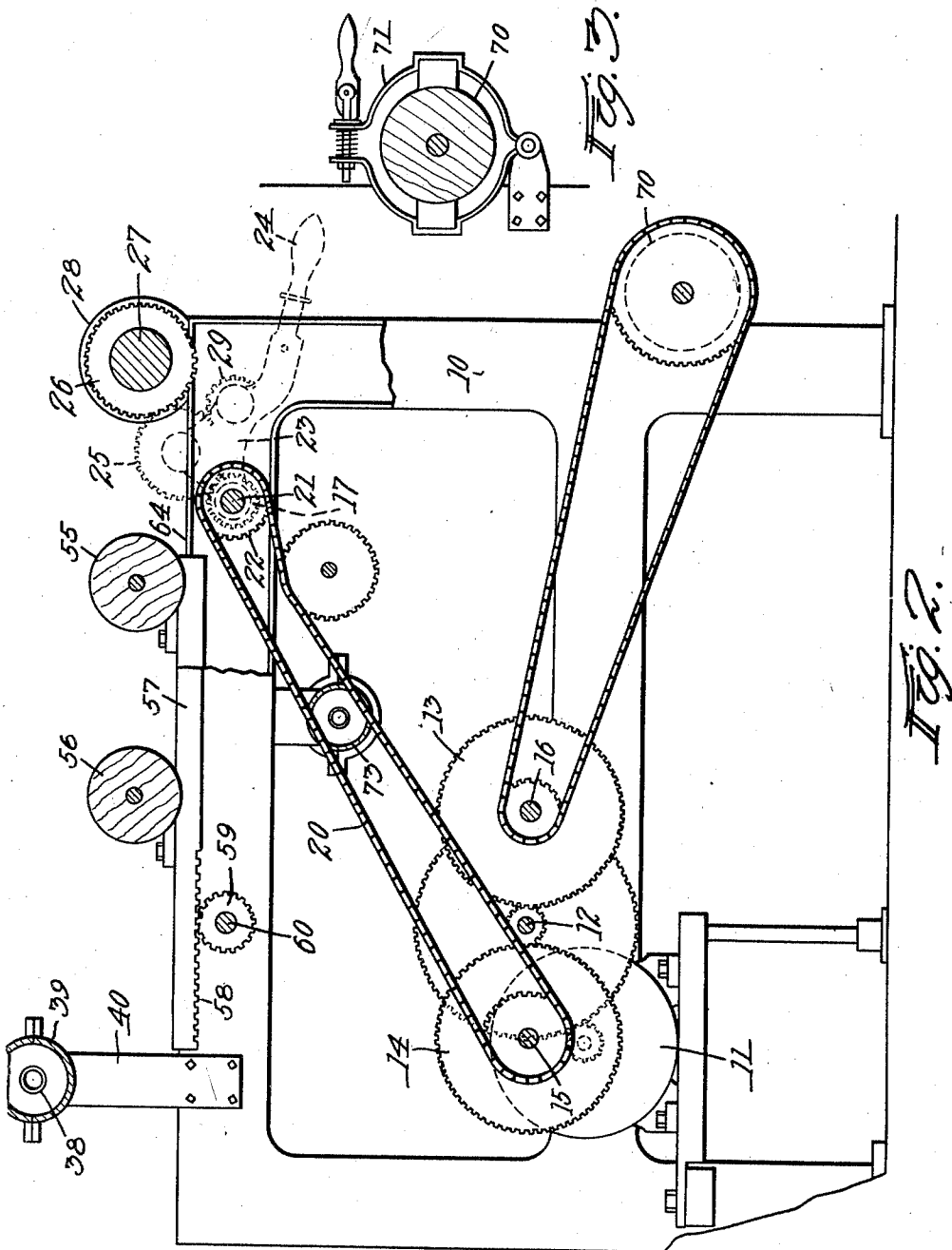
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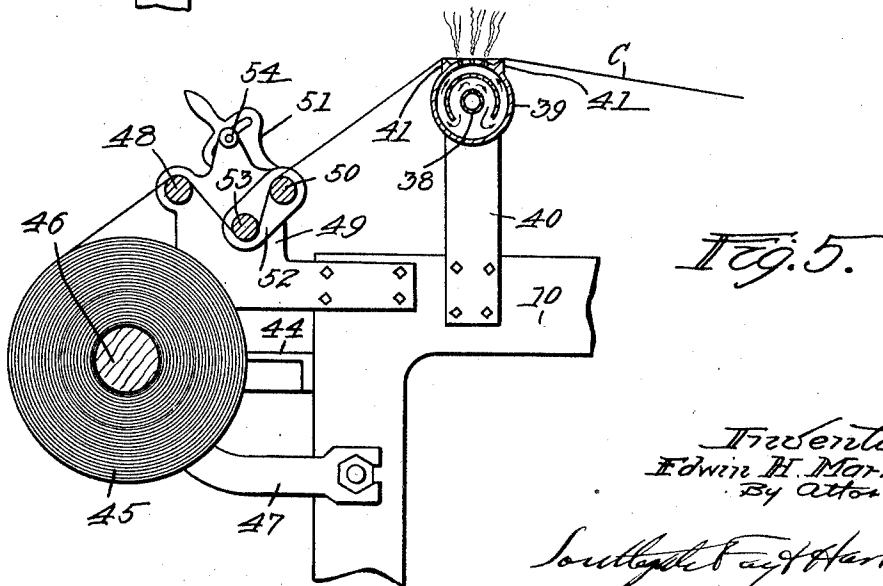
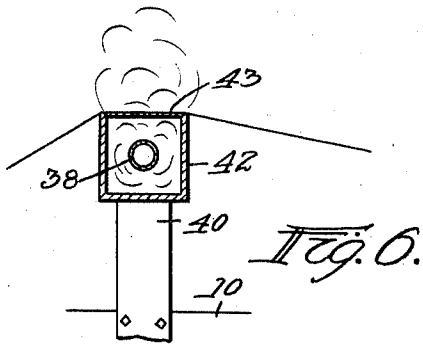
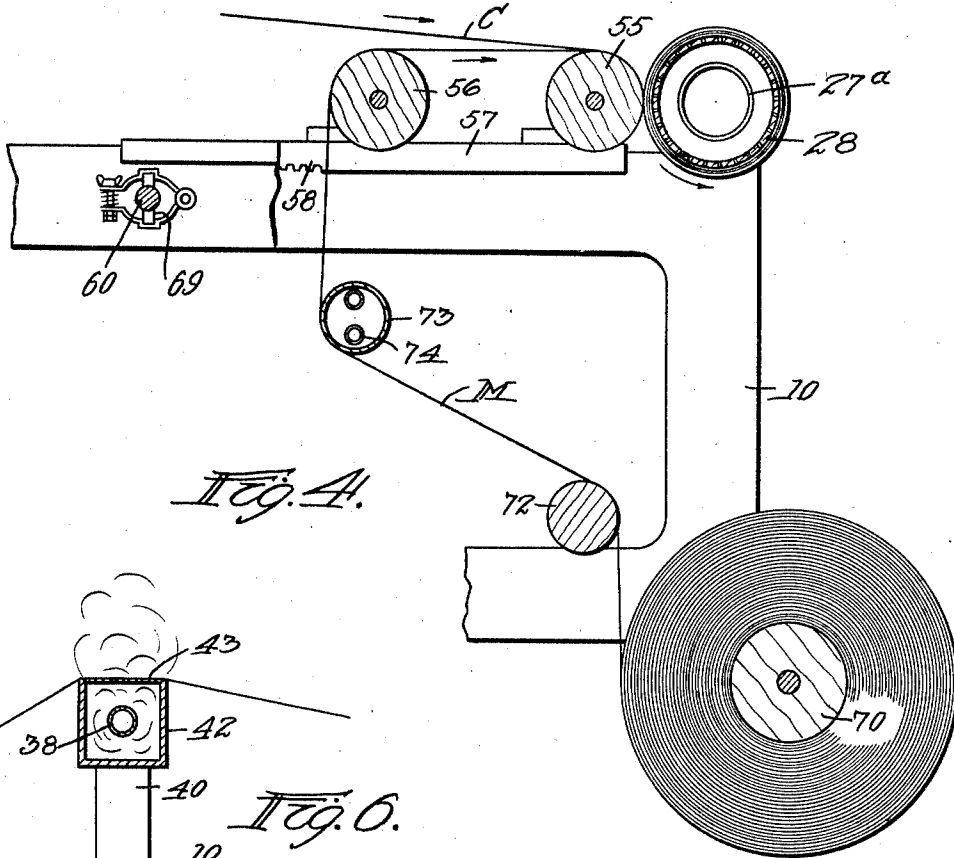
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MANTLE STEAMING AND AIR COOLING MACHINE

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5 Sheets-Sheet 3



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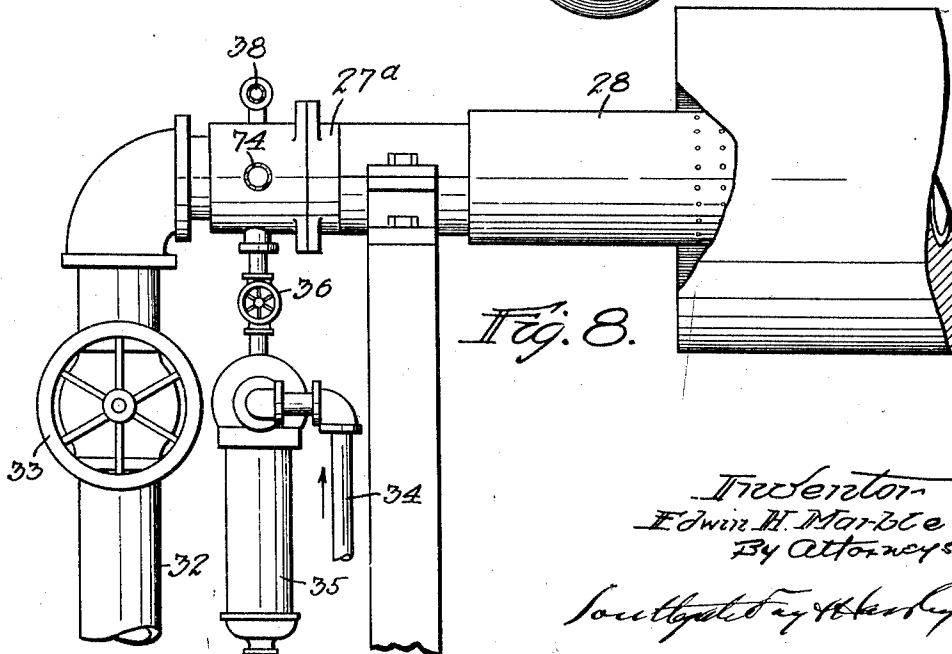
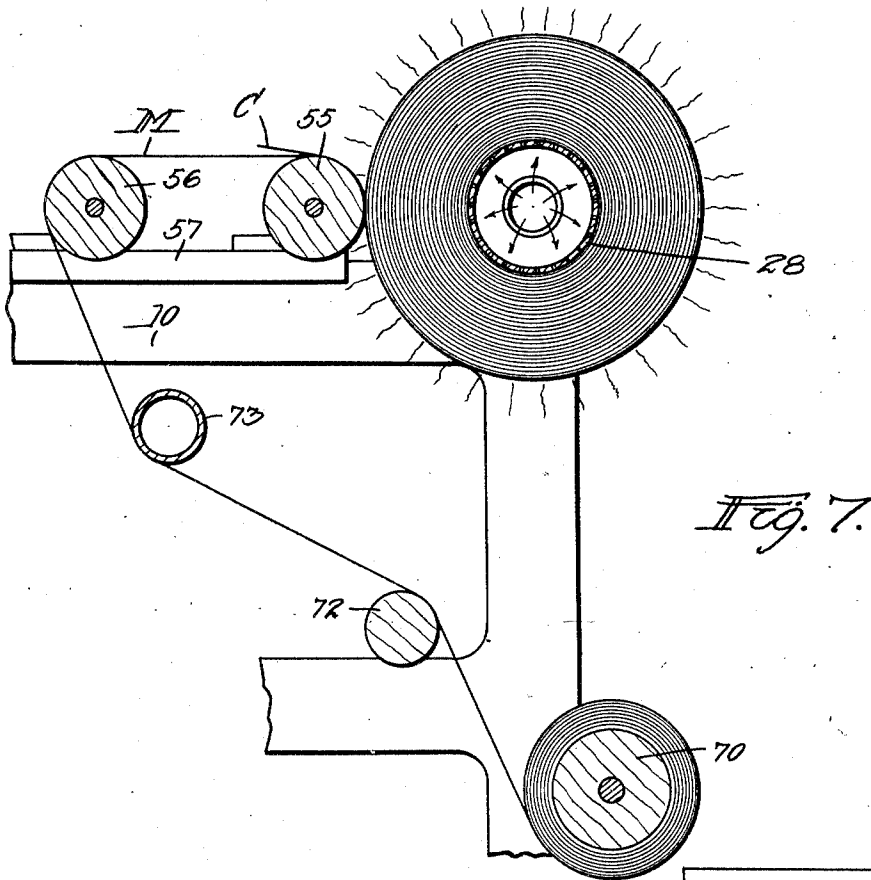
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MANTLE STEAMING AND AIR COOLING MACHINE

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MANTLE STEAMING AND AIR COOLING MACHINE

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5 Sheets-Sheet 5

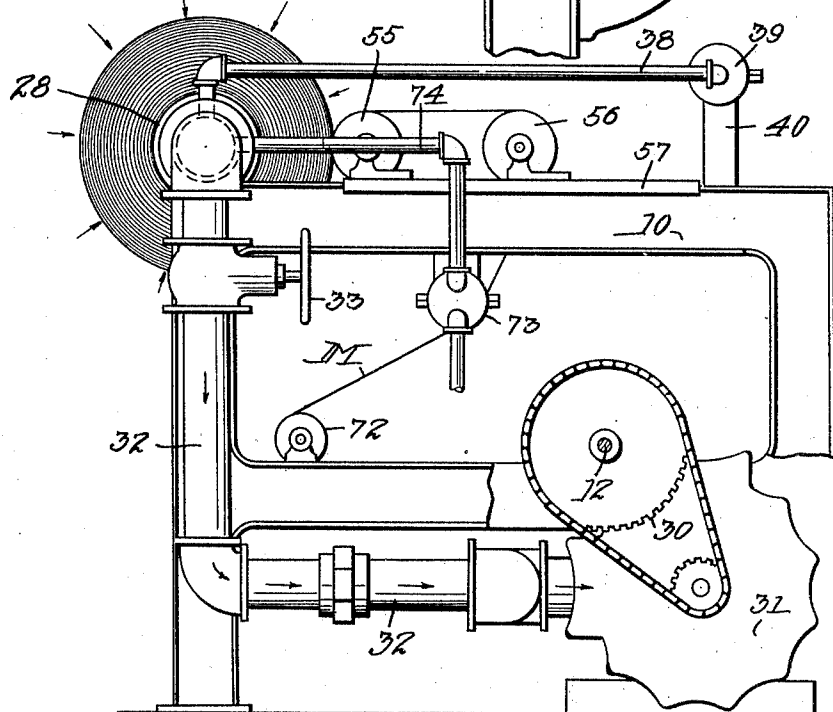
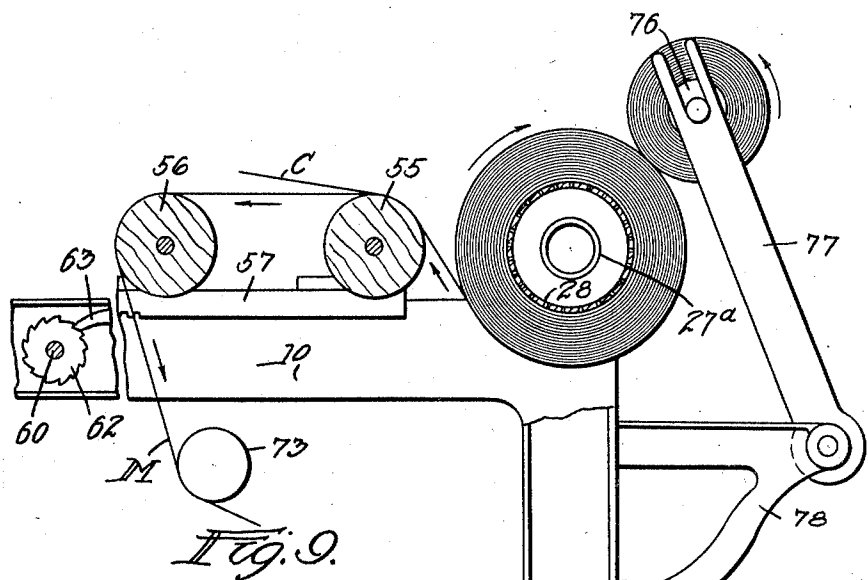


Fig. 10.

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UNITED STATES PATENT OFFICE

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MANTLE STEAMING AND AIR-COOLING MACHINE

Application filed March 11, 1927. Serial No. 174,573.

This invention relates to a machine for steaming and air cooling textile fabrics with the use of a mantle interposed between the layers of fabric.

5 The principal objects of the invention are to provide several improvements in the machines heretofore on the market and particularly to provide means whereby the increasing demand for a more permanent treatment
10 of fabrics in the clothing industry can be satisfied; also to provide means whereby the same machine can handle various fabrics from tropicals to heavy overcoating; to provide a forward and reverse drive for the
15 steaming cylinder so as to control the direction of rotation thereof independently of the backward or unrolling action of the mantle; to provide in combination with these several features a means for constantly and uni-
20 formly pressing the fabric against the cylinder on which it is being wound and to utilize the mantle itself, which is under tension, for providing this pressure; to provide disengageable means for holding a pressure roll
25 back from the steam cylinder for unwinding, and to provide a machine which can perform all functions now desired in this type of cloth treatment and yet can be operated with the omission of one or several of the functions by
30 running the rest of the machine without operating those parts not desired. This invention involves the combination of these several features and other features of construction as will appear.

35 Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which

40 Fig. 1 is a side view of a mantle steaming and air cooling machine constructed in accordance with this invention;

Fig. 2 is a longitudinal sectional view of the same behind the front frame and on enlarged scale;

45 Fig. 3 is a sectional view of a friction device used on the machine;

Fig. 4 is a view similar to Fig. 2 but showing the course of the mantle through the machine particularly;

50 Fig. 5 is a sectional view of the tension and

steaming devices at the intake end of the machine;

Fig. 6 is a sectional view of a modification of the steaming device shown in Fig. 5;

Fig. 7 is a view similar to Fig. 4 but showing the roll of cloth wound up;

Fig. 8 is an elevation of the steaming roll with the steam supply connections shown in position;

Fig. 9 is a view similar to Figs. 4 and 7, but showing the unrolling of the cloth and mantle; and

Fig. 10 is a side view of the machine, taken from the side opposite from that shown in Fig. 1 and illustrating the steam connections.

The art of sponging cloth to condition it for cutting up is a very old one. It has been carried out largely according to the ideas of the individuals who do the work, and no very definite standards are connected with it.

The variety of materials which are subjected to this and similar processes is also very great, and any mechanical steaming means that would be suitable for one would not be suitable for another grade of goods unless adjustable in several different particulars.

This invention is designed to provide a machine which will combine several features heretofore employed in a general way, and which can be used for all purposes and with all kinds of goods on the market, and can be adjusted, and parts left in a non-working condition, although remaining on the machine, to permit of the operation of the same machine when their functions are not required. In short, the machine is designed to be suitable for use in a sponging plant or in a clothing manufacturing establishment capable of producing whatever results the operator may desire, and more thoroughly and uniformly conditioning the goods that are put through it. The fact that the moisture is applied evenly and uniformly and that the entire cut of cloth will be removed from the machine with practically the same treatment throughout is an important feature.

The machine is shown as comprising a frame 10 for supporting the various parts and a motor 11 for driving all parts of the machine. The shaft of this motor is connected

by gearing with the main shaft 12 which, as shown in Fig. 2, drives a pair of gears 13 and 14. The gear 14 is on a shaft 15 which drives the steaming cylinder 28 as will appear. The gear 13 is on a shaft 16 which drives the mantle roll 70. The shaft 12 extends across the machine and drives the pump 31.

The shaft 12, running clockwise, drives the two shafts 15 and 16 in the counter clockwise direction. The other gears on the shafts 15 and 16 are loose and adapted to be connected to them by clutches (not shown).

A belt or chain 20 operated by the shaft 15 constantly turns counter clockwise a shaft 21 on which is a gear 22. Also pivotally mounted on the shaft 21 is a sweep 23 adapted to be turned by a handle 24 having upon it a gear 25 constantly meshing with a gear 17 on the shaft 21. This gear 25 swings around the center of the shaft 21. When the machine is running forward, this gear 25 meshes with the gear 26 on the shaft 27 of the steam cylinder 28 and drives it to wind the cloth up thereon. When the frame 23 is raised, the gear 25 still meshing with the gear 17, drops out of mesh with the gear 26 but continues to drive a gear 29 on the sweep 23 but in the opposite direction. This gear 29 then comes into mesh with the gear 26 and drives the steam roll backwardly as indicated by the arrows in Fig. 9 to unwind the fabric and mantle.

The steam cylinder 28 is in the form of a cylinder having numerous perforations for permitting steam to pass through and act on the cloth which is wound upon it. The steam cylinder is mounted at one end on a hollow gudgeon 27^a and the steam is admitted through the gudgeon into this cylinder 28 as will appear.

On the shaft 12 is a gear 30 driving a pump 31. This pump consists of an exhaust fan which is adapted to draw the steam and air from the interior of the steam cylinder or roll 28. For that purpose it is provided with an intake pipe 32 controlled by a valve 33 and connected with the end of the gudgeon 27^a and cylinder 28. This steam cylinder is supplied with steam from any source of supply through a pipe 34, to which is connected a separator 35 to remove the surplus moisture in the steam and a valve 36. The steam supply enters the journal of the steam roll 28 and forces steam into the space therein and out through the perforations in the cylinder. In that way it steams the cloth wound on the cylinder. After the cloth has been treated by the steam and while it is being unrolled, it is desired to remove part or all of the moisture. It is for that reason that the pump 31 is employed to pump the live and condensed steam, and then air, back through the cloth and mantle.

Connected with the journal 27^a of the steam cylinder 28 is a pipe 38 which supplies steam

to a box 39. This box is mounted on brackets 40 carried by the frame. In the form shown in Fig. 5 it comprises a hollow cylindrical body in stationary position with perforations in the top surface and longitudinal projections 41 at both sides of the top surface to guide the cloth along, slightly out of contact with the steam heated metal surface itself.

In place of this an open tank 42 can be employed supplied by steam from the pipe 38 and having an open top, covered with a piece of felt 43 for transmitting the moisture of the steam more gently to the cloth as it passes over it.

The cloth to be treated may be brought to the machine in folded form, in which case it is placed on a platform 44 or the like at the back of the machine. This may be either permanent or pivoted as may be desired. However, the cloth is usually brought in the form of a roll 45 which is mounted on a spindle 46 supported by brackets 47 at the rear end of the machine. The cloth is taken from this roll 45 over the box 39 or 42 as the case may be, and then to the steam cylinder 28 in a manner to be described.

It has been desired generally to present the fabric to the steam roll in smooth condition without tension, but in cases where it is desired to subject the fabric to some tension before it comes into contact with the steaming cylinder, I have provided means for that purpose. I have shown this in the form of a guide-roll or bar 48 mounted on brackets 49 on the machine frame between the roll 45 and the steam box. At the same level as the idle roll or guide 48, is another guide-roll or bar 50 which constitutes a pivot for a frame having an operating arm 51 and a second arm 52 carrying the tension roll 53. By turning this frame 51—52, the tension on the cloth may be adjusted as desired. The adjustment is secured by a slot and screw connection 54 in an obvious manner.

The cloth passes from the steam box to the steam cylinder 28 over a compressor roll 55. This roll, together with a companion roll 56 when that is used, is mounted on the slide 57, and, as will appear, is pulled forward so that the roll 55 presses against the cloth on the roll 28 with some degree of pressure. The steam roll, being driven in the direction of the arrow in Fig. 1, will wind up the cloth thereon as will appear from comparison of Figs. 4 and 7. Throughout the proceeding, the steam is being forced through the cloth at all times. This slide 57 is provided with a rack 58 on the bottom which meshes with a pinion 59 on a shaft 60. On this shaft is an operating hand wheel 61 and also a ratchet wheel 62. There is a pivoted pawl 63 which is drawn up out of the way of the ratchet wheel when the cloth is running forward as shown in Fig. 1, but is moved down into the position shown in Fig. 9 to hold the ratchet

wheel when the cloth and mantle are moving backwardly. In the forward motion therefore, the ratchet wheel does not restrict the operation of the slide which moves in ways 64 on the machine frame and is free to be moved by the mantle M as will appear. There is a friction device 69 on the shaft 60 for preventing the rotation of this shaft rapidly and holding it back so as to add to the pressure with which it acts on the roll of cloth.

The mantle M is a length of finely woven heavy cotton cloth ordinarily, which is wound on the mantle roll 70. This roll is provided with a friction device 71 for holding it against spinning and putting such tension on the mantle as may be desired. This friction is put on and released by a spring lever and cam arrangement 80. The roll is positively driven, as stated, from the shaft 16 in a rearward direction to wind up the mantle on the roll, when the clutch is thrown in. When the machine is working forwardly, this roll is not driven, but the friction is put on it to put tension on the mantle and assist in the winding of the mantle evenly and smoothly on the steam roll between every two layers of cloth thereon. The mantle, it will be seen, passes over an idle roll 72 and under a stationary guide 73 in the form of a heater pipe which is heated by steam but does not moisten the mantle. The steam-heating pipes 74 are shown in Fig. 4. It then passes up over the roll 56 and over the surface of the roll 55 under the cloth C and then it is wound on the steam cylinder as a layer over the layer of cloth just being wound on. As the slide 57 is movable, it is obvious that the tension put on the mantle roll by the friction device will tend to pull the slide 57 up against the roll 28, or the cloth thereon, and exert a certain degree of pressure on the cloth being wound on the steam cylinder.

A roll 76, carried by freely pivoted arms 77 extending upwardly from a bracket 78 on the machine frame, rests on the cloth. This roll is used to wind the cloth off upon reversal.

In the above description, I have indicated how the cloth can be wound on the steam cylinder 28 under a slight tension from the tension roll 53 if desired and with a preliminary steaming from the box 39 or 42, whenever that is wished, and also with suitable pressure applied to it through the roll 55 introduced by the mantle M. On each convolution, a layer of cloth is laid on the cylinder and a layer of the mantle outside the same. The cloth is held as stated, in its compressed tensioned condition by the mantle and is steamed while being put on the cylinder 28 and for a considerable period of time afterwards. The degree of pressure is maintained uniform throughout the length of cloth and the duration of the operation.

Now, when it is desired to unroll the cloth and mantle, the end of the cloth is applied to the roller 76, a clutch on the shaft 16 is thrown in to drive the roll 70 backwardly, and the friction released. Now the mantle is drawn away in exactly the reverse direction to that previously described and the parts are in the position shown in Fig. 9, the pawl 63 being in engagement with the ratchet wheel 62 to hold the slide 57 against further motion forward or back. At the start of this unwinding, the roll 55 is in contact with the cloth on the cylinder 28 but just as soon as the latter has taken one turn, this contact ceases and there is no further contact between them. It is customary to draw the slide back, however, before starting the unwinding so that the first convolution of cloth will not receive any more pressure than the others. The cloth is wound up on the roll 76 by the friction of the rotating roll of cloth which supports it. No other rolling up has to be done, although the cloth can be taken out directly if desired and subjected to any action that may be suitable.

It will be understood that the pump 31 is started after the cloth has become sufficiently saturated. This draws the steam from the cloth on the cylinder 28 and outer air through it for the purpose of partially drying the mantle and bringing the cloth itself to a uniformly dehydrated condition. Also as the mantle passes down under the steam guide 73, it is further heated and dried so that it is restored to its roll 70 approximately in the condition in which it left it, as far as drying is concerned.

I am aware of the fact that some of the features above described have been used in machines for steaming and air cooling cloth but this particular combination has been devised as a result of extensive experimenting within a number of recent months. The textile industry has shown an increased demand to have its fabrics receive a more permanent treatment. This machine accomplishes that purpose. It is also adapted to handle fabrics of very different characters and to properly treat them according to the adjustments, the amount of steam and duration of its application to the goods, the amount of dehydration desired, and the speed of the machine.

It will be seen therefore, that the goods can be put through the machine with or without the application of preliminary tension by the adjustable tension device shown especially in Fig. 5, and with or without the preliminary steaming by the means shown in Figs. 5 or 6.

Furthermore the pressure with which the goods and mantle are applied to the steaming cylinder can be regulated and the drying of the mantle to any desired degree according to the speed of the mantle and the temperature of the heater pipe 73. Furthermore the

mantle is drawn off and the cloth unwound from the steaming cylinder by the mantle roll operating connections independently of the running of the steaming cylinder in the reverse direction. The slide 57 can be drawn back and held back as shown in Fig. 9 at the beginning of the unwinding operation, and that is usually the way of operating it. The goods can be put through the machine, if they come in a folded condition, by placing them on the shelf 44 with the same effects as if they came in a roll. The reversal of the steaming cylinder is accomplished in the simplest possible manner and also the adjustment of the slide 57, and its operation.

The method of drawing the air through the cloth from the atmosphere is also reduced to a very simple operation and of course is used only when desired by the operator. In fact the various features can be used in conjunction with each other or the main part of the machine can be used without some of them as the cloth may require or the user may deem advisable. The machine can be used also without the mantle itself for some kinds of work, in which that is not required.

It will be understood therefore that I do not wish to be limited to all the details of construction or all the combinations of parts shown herein, and that I understand that modifications can be made in the various elements and combinations without departing from the scope of the invention as expressed in the claims.

Having described a preferred embodiment of the invention, what I claim is:—

1. In a mantle steaming machine, the combination with a steaming cylinder and means for forcing steam through the cylindrical wall thereof to steam the cloth wound thereon, of a frame arranged to move freely toward the cylinder, two rolls on said frame, means for guiding a mantle from a stationary point around the roll more remote from the steaming cylinder and over the other roll into contact with the cloth on the steaming cylinder, said guiding means being so located as to subject the frame and rolls to pressure directly toward the steaming cylinder, only after a few turns have been wound thereon, and means for applying an adjustable tension to the mantle, whereby the mantle and cloth will be forced against the cloth on the steaming cylinder under adjustable pressure as they are wound thereon.

2. In a mantle steaming machine, the combination with a steaming cylinder and means for introducing steam therein and forcing it out to steam the cloth wound thereon, of a frame movable toward and from the cylinder, a roll on said frame over which the cloth passes to the cylinder, a mantle roll so arranged in relation to the first-named roll under the cloth as to apply the mantle on the outside of the cloth as it is wound on the cyl-

inder, means for driving the cylinder in a forward direction, means for applying a brake to the mantle roll to tension the same and force the frame and its roll toward the steaming cylinder to subject the cloth and mantle to pressure as they are wound thereon, said frame having a rack thereon, a pinion meshing with the rack, a shaft on which the pinion is mounted, and a friction device on the shaft for adding to the pressure on the cloth when desired.

3. In a mantle steaming machine, the combination with a steaming cylinder, and means for introducing steam therein and forcing it out to steam the cloth wound thereon, of a frame reciprocable toward and from the cylinder and freely movable toward it, a roll on said frame over which the cloth passes to the cylinder, a mantle roll, means for driving the cylinder, means for retarding the mantle roll to tension the same and force the frame and its roll toward the steaming cylinder to subject the cloth and mantle to pressure as they are wound thereon, said frame having a rack thereon, a shaft having a pinion meshing with the rack, a ratchet wheel on the shaft, and a pawl adapted to engage the ratchet wheel to hold the frame and its front roll back from the cloth on the steaming cylinder when the same is to be unwound.

4. In a mantle steaming machine, the combination with a steaming cylinder, of a roll over which the cloth passes to the cylinder, a mantle roll, means for retarding the mantle roll to tension the same and force the roll toward the steaming cylinder to subject the cloth and mantle to pressure as they are wound thereon, a ratchet wheel, and a pawl adapted to engage the ratchet wheel to hold the roll back from the cloth on the steaming cylinder when the same is to be unwound.

In testimony whereof I have hereunto affixed my signature.

EDWIN H. MARBLE.