June 19, 1956 S. BAILEY, JR 2,750,781

APPARATUS FOR TREATING AND FINISHING HOSIERY

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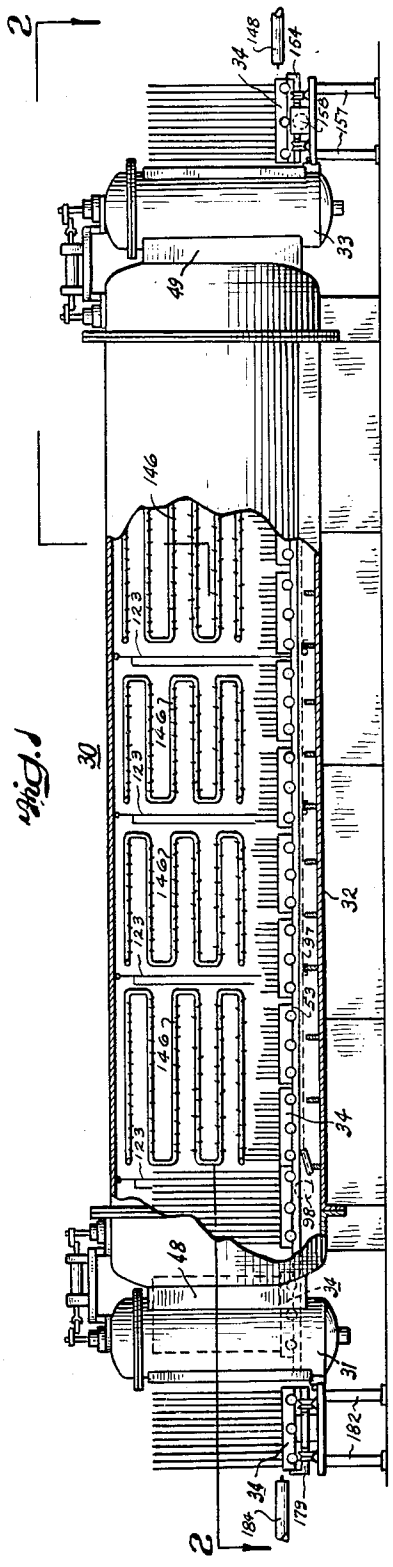


Fig. 1

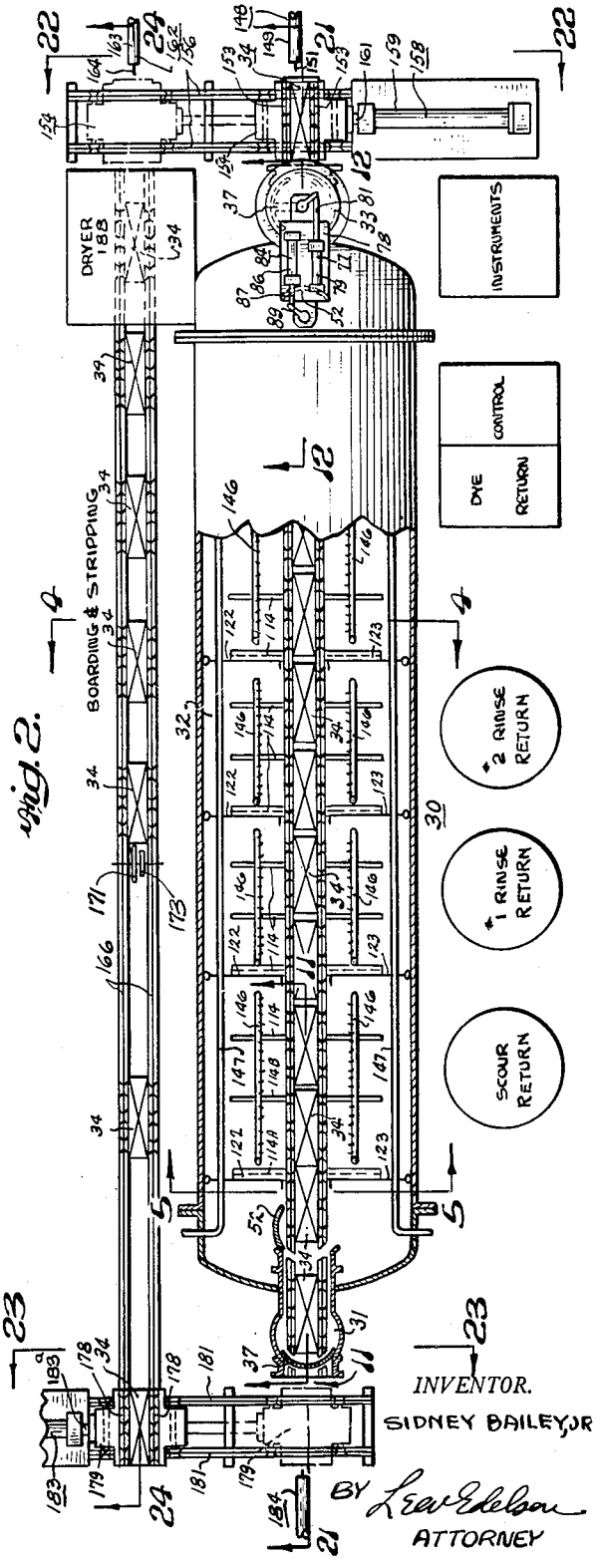


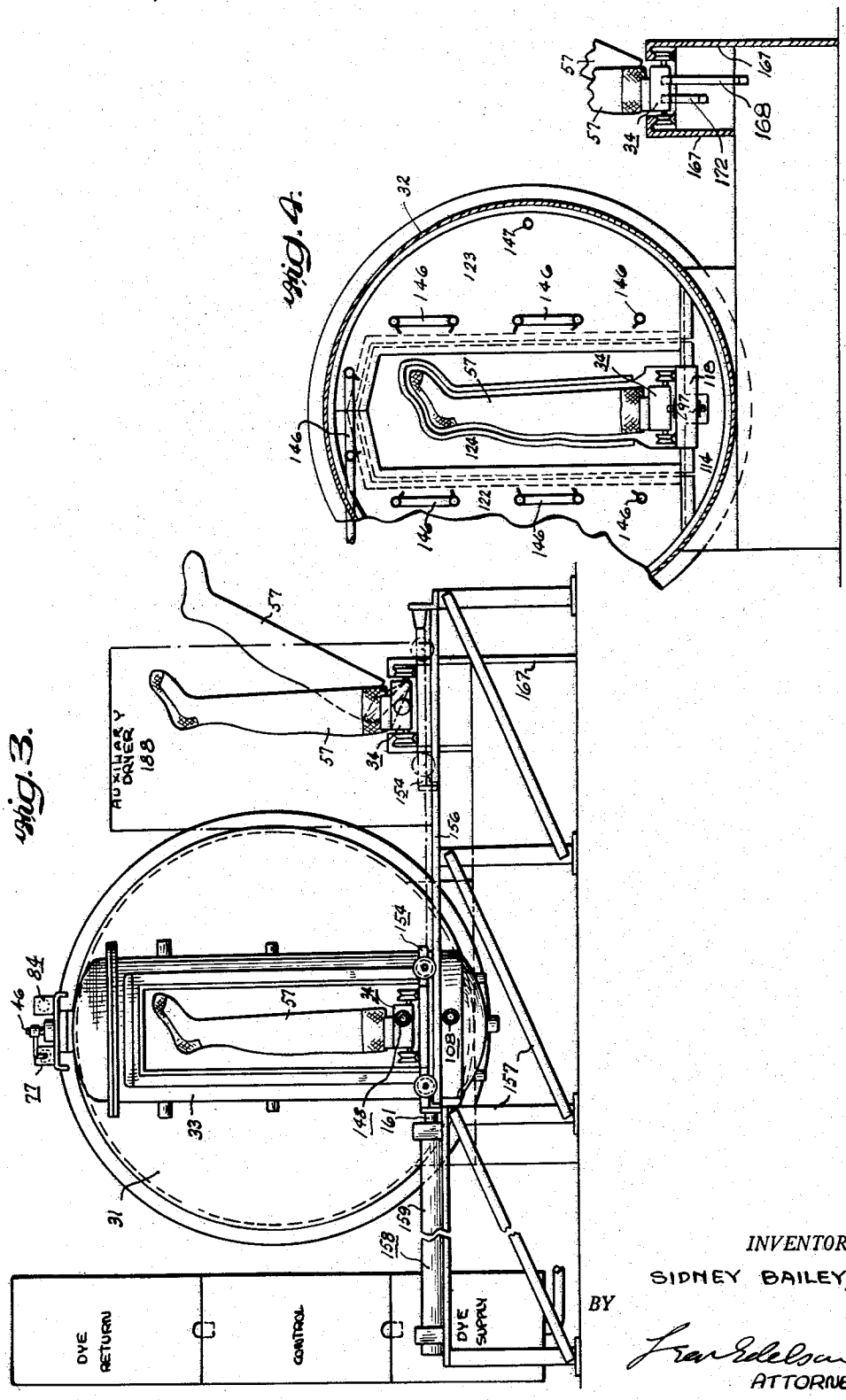
Fig. 2.

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APPARATUS FOR TREATING AND FINISHING HOSIERY

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APPARATUS FOR TREATING AND FINISHING HOSIERY

Filed Dec. 8, 1951 7 Sheets-Sheet 3

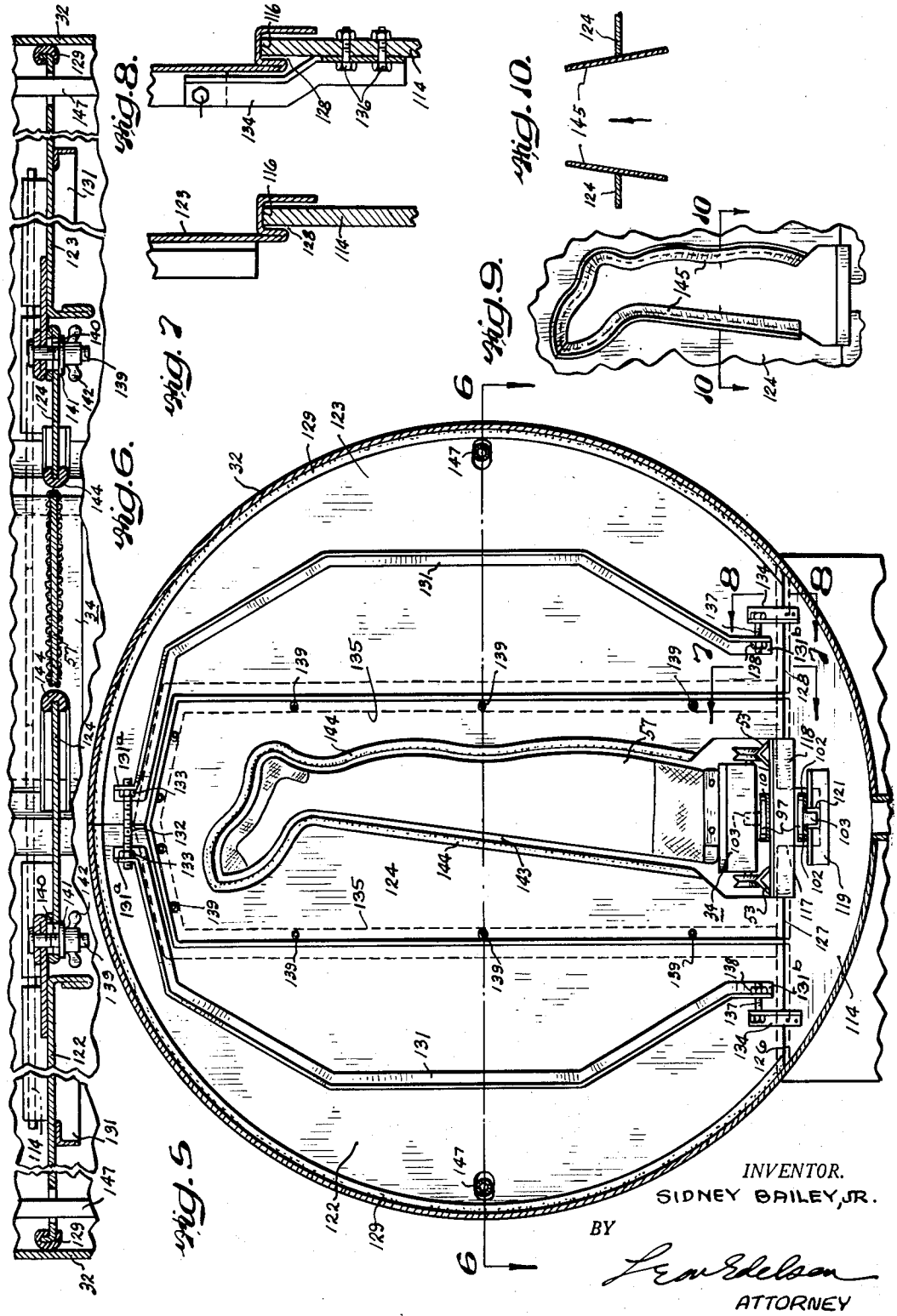


Fig. 5

Fig. 6

Fig. 7

Fig. 8.

Fig. 9.

Fig. 10.

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APPARATUS FOR TREATING AND FINISHING HOSIERY

Filed Dec. 8, 1951 7 Sheets-Sheet 4

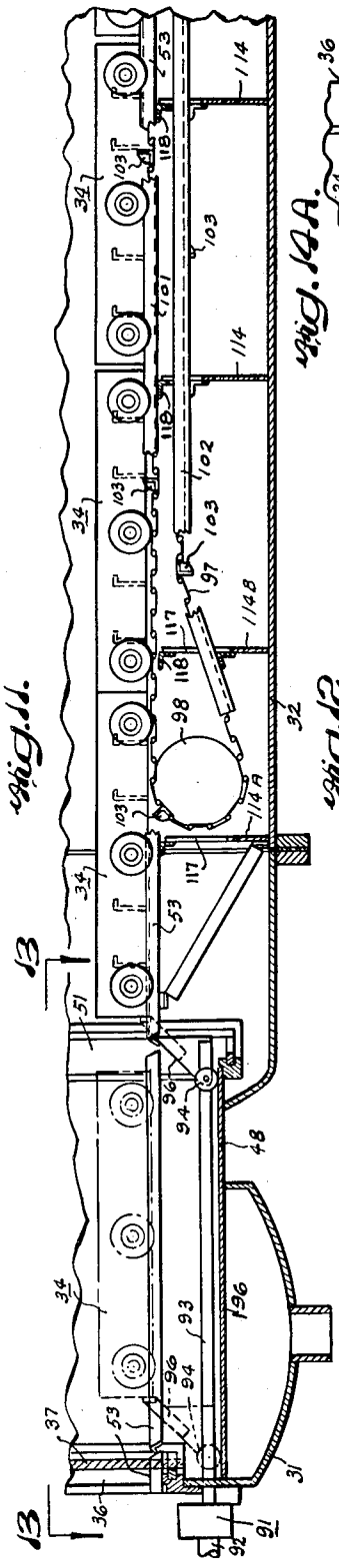


Fig. 11.

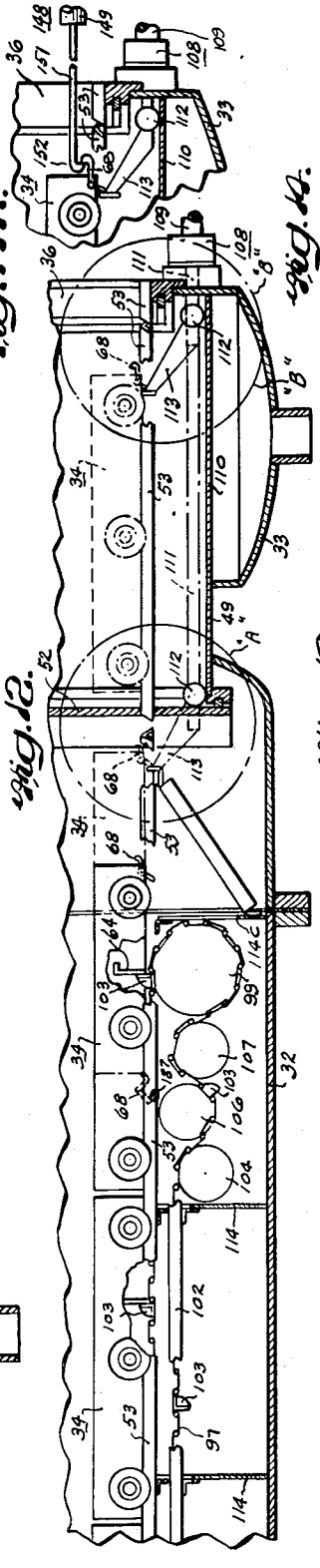


Fig. 12.

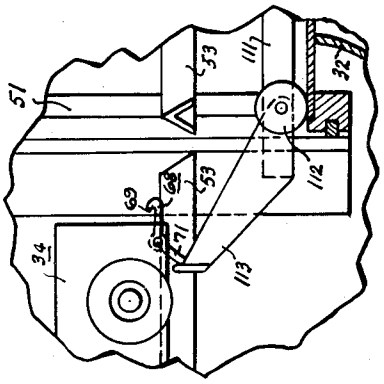


Fig. 14.

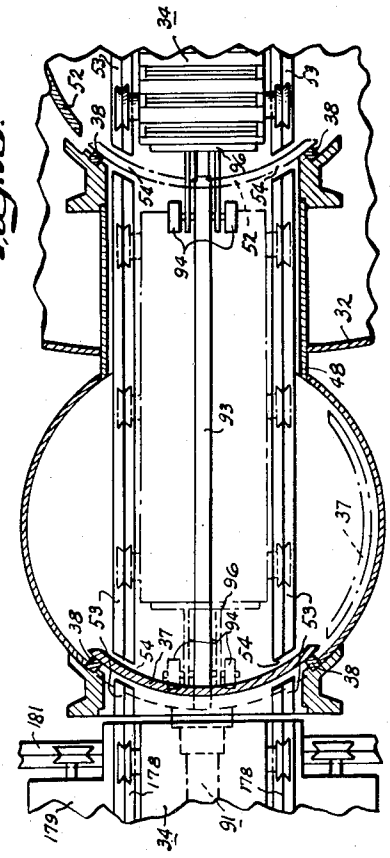


Fig. 13.

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APPARATUS FOR TREATING AND FINISHING HOSIERY

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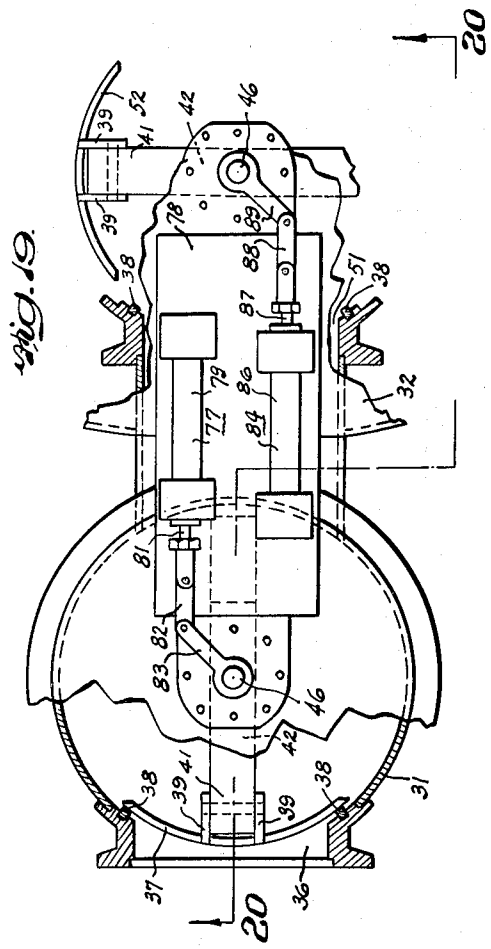


Fig. 19.

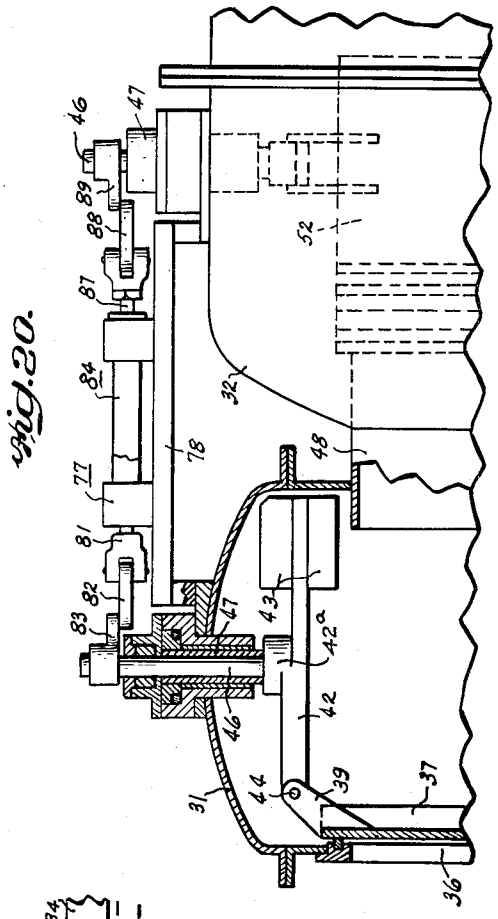


Fig. 20.

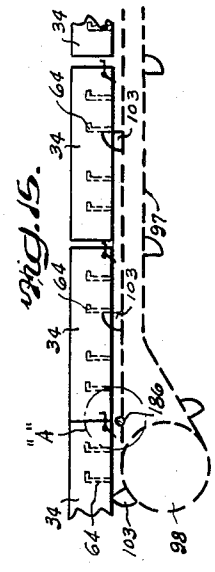


Fig. 15.

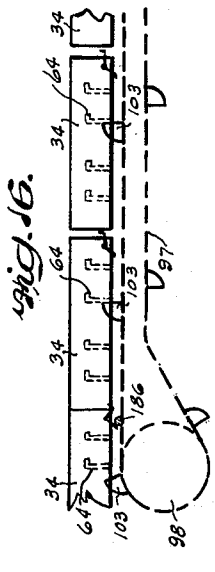


Fig. 16.

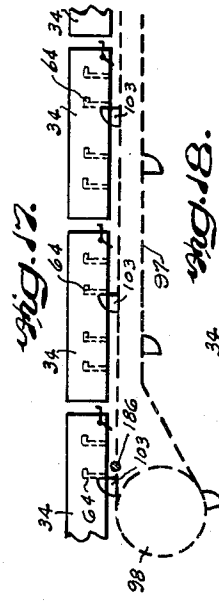


Fig. 17.

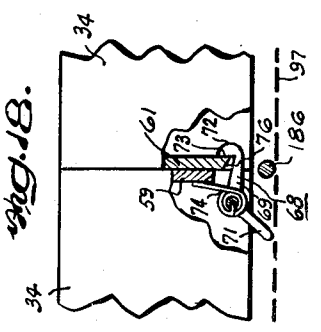


Fig. 18.

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APPARATUS FOR TREATING AND FINISHING HOSIERY

Filed Dec. 8, 1951 7 Sheets-Sheet 6

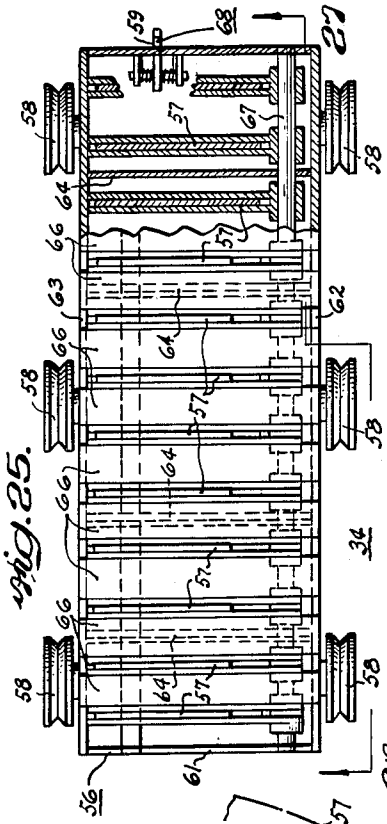


Fig. 25.

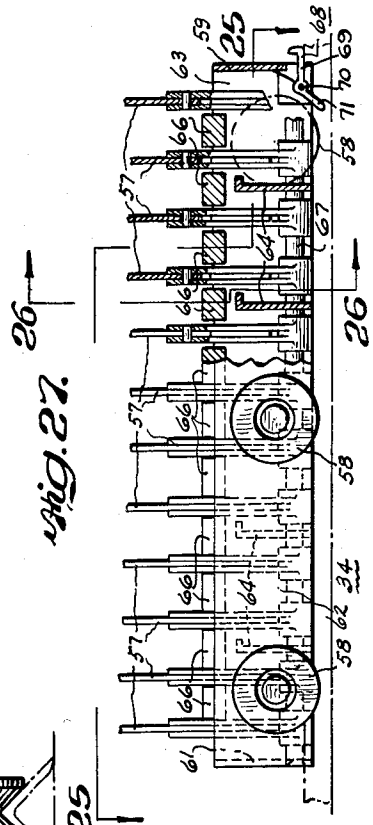


Fig. 27.

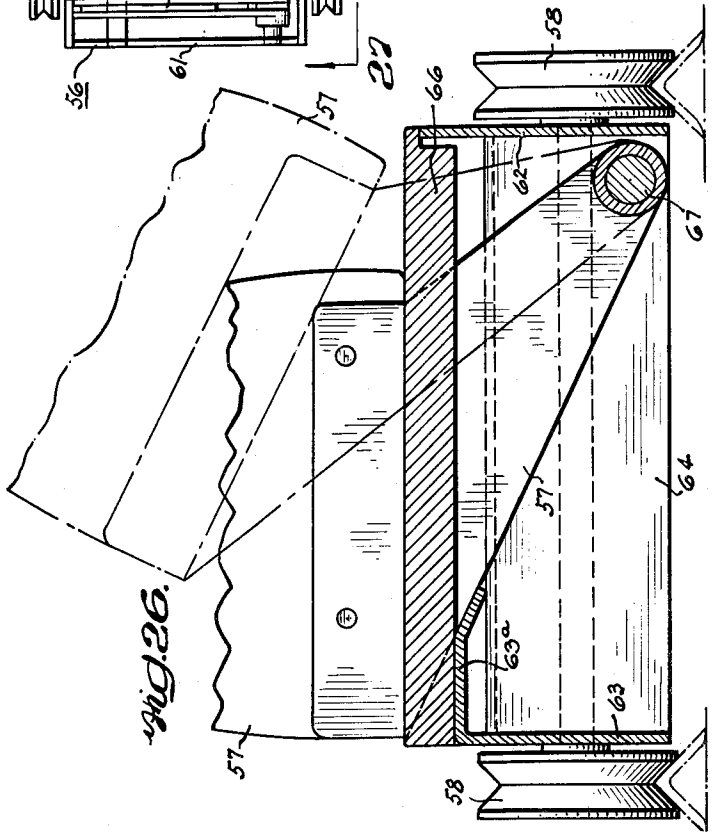


Fig. 26.

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APPARATUS FOR TREATING AND FINISHING HOSIERY

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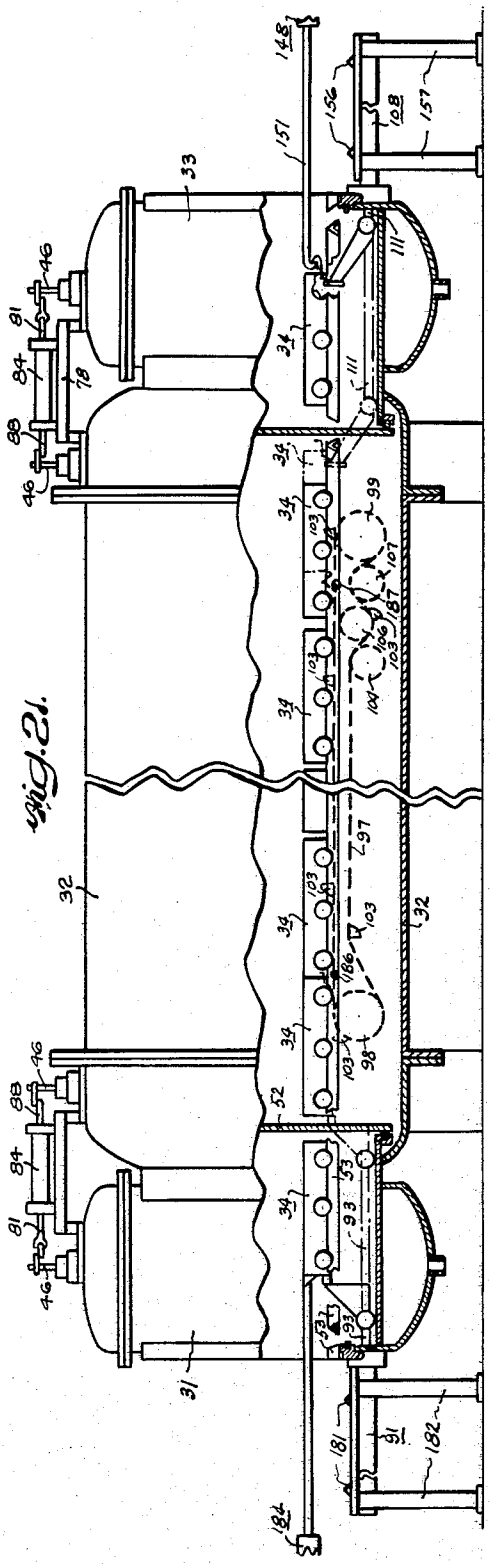


Fig. 21.

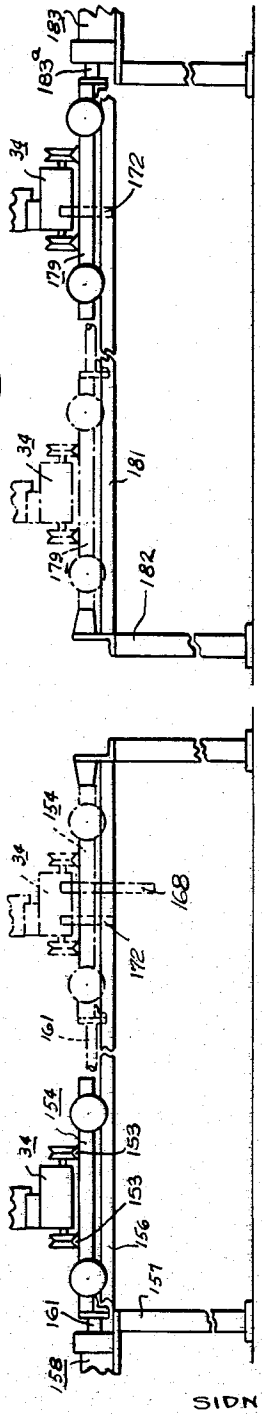


Fig. 22.

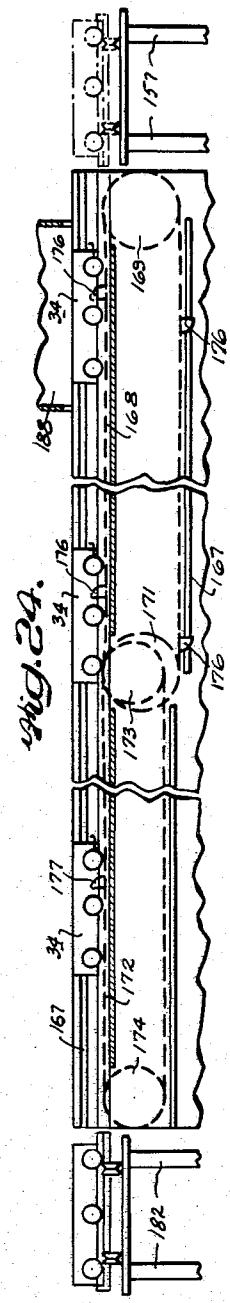


Fig. 24.

Fig. 23.

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United States Patent Office 2,750,781 Patented June 19, 1956

2,750,781

APPARATUS FOR TREATING AND FINISHING HOSIERY

Sidney Bailey, Jr., Philadelphia, Pa.

Application December 8, 1951, Serial No. 260,613

11 Claims. (Cl. 68—20)

This invention relates generally to apparatus for and a method of treating articles of textile material, particularly goods knitted or woven of synthetic yarns capable of being "set" by a heated fluid medium, the present application being directed to an apparatus and method which incorporates improvements over the disclosure of my copending application Serial No. 181,127, filed August 17, 1951, now abandoned, and my Patent No. 2,641,120, issued June 9, 1953.

In the finishing of articles such as hosiery woven or knitted of synthetic yarns, e. g., nylon or other linear condensation polyamide yarns, it is common to subject the articles to a number of treatments, in accordance with more or less conventional practice, involving the use of heated fluid mediums, and in order to provide the articles with a satisfatcory feel and wrinkle-free appearance the first such treatment is commonly effected by subjecting the articles to a hot vaporous pressure medium, such as steam under pressure, to pre-set the woven or knitted yarns preliminarily to subjecting the articles to the others of such treatments. Inasmuch as the aforementioned treatments are effected by the use of heated fluid mediums, considerable time and labor has been consumed in the handling of the fabricated articles during their successive treatments, much of this time and labor being wasted in transferring the articles from one treatment apparatus to another.

The present invention has as its primary object the provision of an apparatus in the nature of an autoclave in which all of the treatments requiring the use of different heated fluid mediums are applied to the articles while the latter move continuously through the apparatus, each article being uniformly subjected to the same cycle of treatments, thereby assuring not only uniformity in the final result but also achieving for the treated articles a finish of uniformly high quality with an economical use of the several treating media and the expenditure of a minimum amount of time and labor.

Still another object of the present invention is to provide an autoclave type of apparatus having separate intercommunicating chambers through which the articles undergoing treatment move continuously so that they are pre-set while passing through certain of the chambers and undergo additional treatments while passing through other chambers, the articles being continuously subjected throughout the duration of the pre-setting and subsequent treatments to hot vaporous treatment media under superatmospheric pressure while being automatically conveyed through the several chambers in accordance with a predeterminedly fixed operational cycle.

Still another object of the present invention is to provide an autoclave type of apparatus of the character and for the purpose above described wherein the articles undergoing treatment, in their boarded state, serve in themselves to effectively separate the interiors of the several chambers of the autoclave as they pass through said chambers in succession.

And yet another object of the present invention is to

provide an autoclave type of apparatus of the character above described having suitable provision for varying the number of separate treating chambers in the autoclave with corresponding variation in the lengths of the chambers, thereby prolonging or decreasing the time required for traverse of the articles undergoing treatment through a given chamber without changing their linear speed of travel through the autoclave.

Still another and important object of the present invention is to provide a compartmented autoclave apparatus wherein the several compartments are arranged in intercommunicating series and are all charged with treating media in the form of vapor at the same superatmospheric pressure and temperature, the treating media introduced into the several compartments being of different kind depending upon the nature of the treatment which is required to be carried out in any particular compartment as a step in the whole process of finishing the articles passed through the autoclave. To this end, the articles, such as stockings, are first boarded to final shape and while so boarded are conveyed through the several compartments of the autoclave wherein they are successively treated to media operative to initially permanentize the set of the fabric yarn, to then scour and rinse the fabric preliminarily to dyeing thereof, and to finally dye the fabric to the desired shade. Inasmuch as all of these treatments are carried out by vaporous media under superatmospheric pressure and corresponding temperature sufficiently high to effect permanent setting of the fabric to shape, it will be apparent that such setting may be effected either prior to or during the scouring, rinsing or dyeing steps of the process. Thus, in the processing of the articles by the apparatus of the present invention, the so-called "pre-setting" of the fabric may be effected simultaneously as it is subjected to other treatment steps, the articles being completely treated when pre-setting to and through final drying thereof while in their originally boarded condition.

An additional object of the present invention is to provide an apparatus of the character and for the purpose above described having entrance and discharge gate means which are operative automatically in conjunction with suitable entrance and exit vestibules to maintain the required superatmospheric pressure of the different treating media in the several chambers of the autoclave as the articles are transferred successively from one to the other to not only insure full and adequate treatment for the articles while contained in a given chamber but to insure also the maintenance of an adequate pressure of the vaporous medium within the several chambers while the articles are being transferred from one to the other thereof, the internal operating pressure of the entrance and exit vestibules which afford ingress to and egress from the main treatment chambers of the apparatus being alternately exhausted of and charged with steam pressure by externally controlled means to afford such ingress and egress without undue loss of pressure of the vaporous media in said main treatment chambers.

Each of the aforesaid entrance and exit vestibule chambers, respectively affording ingress to and egress from the autoclave of the present invention, is provided with inner and outer closure gates for selectively sealing these chambers from the intervening or treatment chambers of the autoclave. In its general aspects, the autoclave is so designed and operated that as an individual truck containing a given number of the articles to be treated is moved into the entrance vestibule through its opened outer closure gate the interior of the vestibule is sealed off from the next adjoining compartmented chamber of the autoclave by closing the inner closure gate, the compartmented chamber being then charged with a vaporous medium at a relatively high pressure and temperature.

Upon disposition of the truck within the entrance vestibule, the outer closure gate thereof is closed, thereby sealing the interior of the entrance vestibule, following which steam under pressure equal to that of the vaporous medium in the autoclave proper is delivered into the sealed interior of said vestibule by way of a valve controlled conduit. In this condition of the apparatus, the interiors of the entrance vestibule and the compartmented chambers of the autoclave are under equalized internal pressure, thus permitting the inner closure gate to be opened and the truck shifted into the compartmented chamber of the autoclave.

After the truck is thus shifted from within the entrance vestibule into the autoclave proper, and while the internal pressures of the said vestibule and the autoclave are still equalized, the inner closure gate is again closed to seal off the entrance vestibule from the compartmented autoclave, following which the internal pressure of the entrance vestibule is reduced to that of atmosphere by exhausting the high pressure steam therefrom. The outer closure gate of the entrance vestibule is then opened to permit movement of a second truck of articles thereinto, the cycle of operation as just described being repeated for each truck successively fed into the autoclave.

As each truck of articles passes into the compartmented chambers of the autoclave, it is received by a conveyor which moves it therethrough toward the exit vestibule located at the far end of the autoclave, and it is during this movement of the articles through the several treatment compartments of the autoclave that they are successively subjected to the various treating media respectively introduced in the several compartments in the form of vapor sprayed thereinto under superatmospheric pressure and at a temperature above 212° F.

As in the case of the entrance vestibule, the exit vestibule is also provided with inner and outer closure gates, and when the latter are both closed the exit vestibule is also charged with steam under superatmospheric pressure equal to that of the vaporous treating media sprayed into the several compartments of the autoclave proper. As each truck-load of articles undergoing treatment completes its traverse through the autoclave, the inner closure gate of the exit vestibule is opened to permit free passage of the truck into said vestibule, whereupon said inner gate is reclosed and the internal pressure of the exit vestibule is reduced to that of the atmosphere by exhausing the high pressure steam by way of a suitably valved conduit. Thereupon the outer closure gate of the exit vestibule is opened to permit discharge of the finished articles from the autoclave, each truck being successively shifted to and through the exit vestibule when the articles have been completely treated in the compartmented section of the autoclave. Thus, the exit vestibule operates in a manner similar to that of the entrance vestibule to successively accept the several trucks of articles without effecting any reduction of the pressure and temperature of the treating media within the several intercommunicating compartments of the autoclave.

It will be understood, of course, that it is among the objects and aims of the present invention to provide an apparatus which will efficiently operate as above described and that still other objects and advantages will be apparent from the detailed description of the present invention as hereinafter set forth.

It will be understood also that the present invention consists not only in the combination, construction, location and relative arrangement of parts as shown in the accompanying drawings, but also in the novel continuous method of treatment made possible by the apparatus of the present invention, all as will appear more fully hereinafter and as finally pointed out in the appended claims.

In the accompanying drawings, which are illustrative of a preferred form of apparatus constructed in accordance with and embodying the principles of the present invention:

Figure 1 is a side elevation view of the autoclave of the present invention, part of the compartmented section thereof being shown broken away to expose its interior;

Figure 2 is a plan view, partly in section, taken along the line 2—2 of Figure 1, showing the autoclave operatively associated with external conveying means for the articles delivered to and from the autoclave;

Figure 3 is a rear end elevational view of the apparatus showing the transfer mechanism associated with the discharge end of the autoclave;

Figure 4 is an enlarged transverse sectional view taken along the lines 4—4 of Figure 2;

Figure 5 is a more greatly enlarged transverse sectional view taken along the line 5—5 of Figure 2;

Figure 6 is a horizontal sectional view as taken along line 6—6 of Figure 5;

Figure 7 is a vertical sectional view as taken along line 7—7 of Figure 5;

Figure 8 is a vertical sectional view as taken along line 8—8 of Figure 5;

Figure 9 is a view showing a modified construction of the passageway through the transverse partitions of the autoclave;

Figure 10 is a horizontal sectional view taken on line 10—10 of Figure 9;

Figure 11 is a vertical sectional view as taken along line 11—11 of Figure 2;

Figure 12 is a vertical sectional view as taken along line 12—12 of Figure 2;

Figure 13 is a horizontal sectional view taken along line 13—13 of Figure 11, part of the transfer truck being shown opposite the entrance to the autoclave;

Figure 14 is an enlarged view of the encircled part "A" of Figure 12 showing a truck about to be pulled into the exit vestibule of the autoclave;

Figure 14A is a view of the encircled part "B" of Figure 12 showing the truck in the exit vestibule about to be pulled therefrom;

Figures 15 to 17 are schematic elevational views showing progressive relative positions of the trucks as they are shifted from the entrance vestibule into and through the compartmented section of the autoclave;

Figure 18 is an enlarged view, partially in section, of the parts shown in the dotted circle "A" of Figure 15;

Figure 19 is a plan view, partly in section, of the portion of the apparatus shown in Figure 20;

Figure 20 is an elevational view, partly in section, as taken along line 20—20 of Figure 19;

Figure 21 is a schematic elevational section as taken along line 21—21 of Figure 2;

Figure 22 is a schematic elevational view as taken along line 22—22 of Figure 2;

Figure 23 is a schematic elevational section as taken along line 23—23 of Figure 2;

Figure 24 is a schematic elevational section as taken along line 24—24 of Figure 2;

Figure 25 is a plan view of the article-supporting truck, shown partly in section, as taken along line 25—25 of Figure 27, certain parts being omitted or broken away for the sake of clarity;

Figure 26 is an end elevational view, partially in section, as taken along line 26—26 of Figure 27; and

Figure 27 is a side elevational view, partly in section, as taken along line 27—27 of Figure 25.

Referring now more particularly to the drawings, it will be observed that the present invention is essentially in the form of an autoclave, designated generally by the reference numeral 30, having a plurality of chambers 31, 32 and 33, each of which is adapted to be closed to the atmosphere and sealed off from one another. As appears most clearly in Figures 1 and 2, the chambers 31, 32 and 33 are arranged in series, the intermediate chamber 32 being comparatively large and having the chambers 31 and 33 disposed at opposite ends thereof for communication therewith.

The front end chamber 31 serves as an entrance vestibule through which the boarded truck-supported articles to be treated by the apparatus of the present invention gain access to the normally sealed intermediate compartmented chamber 32 of the autoclave, while the rear end chamber 33 serves as the exit vestibule through which the treated articles pass upon discharge from the sealed interior of the chamber 32. This latter chamber is that in which the articles receive their required treatment, said chamber being maintained sealed to atmosphere and being adapted to be charged in successive zones thereof with different treating media consisting of suitably prepared solutions introduced into the chamber by spray nozzles at suitable superatmospheric pressure and at a temperature sufficiently high to form vaporous media capable of permanentizing the "set" of the fabricated articles as shaped upon their sustaining forms.

It will be noted that these chambers 31, 32 and 33 are so correlated as to permit the articles to be treated to be successively passed in a continuous line therethrough, each article being thus uniformly subjected to the same sequence of treatments. Preferably, the intermediate treatment chamber 32 of the autoclave is in the form of a large cylindrical shell disposed horizontally for accommodating a plurality of article-supporting trucks 34 placed end to end, while each of the entrance and exit vestibules 31 and 33 essentially comprises a cylindrical shell 31a, disposed vertically with its inner side in suitable communication with the adjoining end wall of the chamber 32.

Each of the vestibule chambers 31 and 33 is provided a gateway 36 in its outer side adapted to be closed by a pivotally mounted outer closure gate 37. The outer gateway 36 is generally rectangular in shape and is disposed vertically lengthwise of the associated vestibule chamber, while its closure gate 37 is similarly shaped, the latter being curved in transverse cross section to the same radius as that of the cylindrical part 31a of the associated vestibule chamber and disposed interiorly of said cylindrical part for engaging an inwardly facing gasket element 38 suitably disposed about the perimeter of the outer gateway 36. The outer closure gate 37 of each vestibule chamber is provided with a pair of relatively spaced ears 39—39 formed integrally with a central upper end portion thereof and projecting inwardly therefrom, and disposed between the ears 39—39 is an end portion 41 of a horizontally disposed member 42 also extending inwardly from the outer closure gate 37 diametrically across the cylindrical part of the associated vestibule chamber, the freely extending opposite end of member 42 being provided with a counter-weight 43. Alined openings in the ears 39—39 and in the end portion 41 of the member 42 receive a pivot pin 44 which affords free swinging movement of the outer closure gate 37 about the horizontal axis of said pivot pin from which the gate is suspended.

Formed in the member 42 intermediate the ends thereof is a socketed boss 42a which fixedly receives the lower end of a vertically extending shaft 46 disposed with its axis coincident with that of the cylindrical part 31a of the vestibule chamber, the shaft 46 being journaled in a member 47 suitably supported in the top end of said cylindrical part 31a for pivotal movement about a vertical axis by means of operating mechanism to be presently described, the outer closure gates 37—37 being each thus operative to be swung through arcs of approximately 90° to close or open each of the outer gateways 36—36 of the vestibule chambers 31 and 33.

The vestibule chambers 31 and 33 are respectively suitably connected to the opposite end walls of the intermediate chamber 32 of the autoclave by tunnels 48 and 49, each of the latter being rectangular in transverse cross-section and extending well through the proximate end wall of the chamber 32. Each of the tunnels 48 and 49 corresponds in transverse cross-section with that of the outer gateways 36—36 of the vestibule chambers 31 and 33, the said tunnels being disposed in longitudinal alinement with said gateways 36—36 for movement of the trucks 34 continuously through the autoclave 30.

The open inner ends of the tunnels 48 and 49 which are located interiorly of the chamber 32, are respectively adapted to be closed or opened by inner closure gates 52—52, which are respectively similar to the outer closure gates 37—37 and are mounted in a similar manner, being moved into opened or closed position by suitable operating mechanism to be presently described. The outer closure gates 37—37, when closed, serve to hermetically seal the interior of the autoclave from atmosphere when the autoclave is internally charged with treating media introduced at superatmospheric pressure, preferably at a temperature of 220° F. or more and at a superatmospheric pressure of 5 pounds or more. The inner gates 52—52 serve to seal off the entrance and exit vestibule chambers 31 and 33 from the interior of the intermediate chamber 32 of the autoclave when one or the other of the outer closure gates 37—37 is open, thereby maintaining within the chamber 32 the desired operating temperature and pressure of the vaporous media employed in the treatment of the articles passing through the autoclave.

In this connection, suitable means, not shown, are provided for exhausting the internal superatmospheric pressure of either vestibule chamber 31 and 33 before opening the outer closure gate 37 associated therewith, and for re-establishing the pressure in the exhausted chamber to that in the chamber 32 when such outer closure gate 37 is closed and the associated inner gate 52 is to be opened. The internal superatmospheric pressure referred to may be exhausted to atmosphere or to chamber 32, while the means for re-establishing the pressure in either vestibule chamber to equalize that in the treatment chamber 32 may be independent of that employed for injection of the vaporous pressure medium into chamber 32. It will be apparent, of course, that neither of the outer closure gates 37—37 will be tightly sealed except when the pressure in the associated vestibule chamber exceeds that of atmosphere, nor will either of the inner closure gates 52—52 be tightly sealed except when the pressure in the intermediate chamber 32 exceeds that in the particular vestibule chamber with which the inner closure gate is operatively associated.

As most clearly shown in Figures 5, 11, 12 and 13, the autoclave 30 is suitably fitted with a guide track arranged to receive trucks 34 for movement in a continuous line therethrough. This guide track comprises a pair of rails 53—53, each of the latter being simply formed of a suitable length of right-angular metal stock disposed horizontally to provide a rail of inverted V-shape. The rails rails 53—53 are continuous throughout the autoclave apparatus except in the immediate regions of traverse of the closure gates 37—37 and 52—52, the continuity of the rails being there broken, as at 54, to permit movement of the gates into their opened and closed positions.

Figures 25, 26 and 27 show a preferred form of one of the trucks 34 comprising a wheeled frame 56 mounting article-carrying forms 57, which, in the illustrated instance, are hosiery forms. The frame 56 is rectangular in top plan and is preferably supported on three pairs of suitably mounted longitudinally spaced wheels 58 having grooved rims which engage the rails 53—53. The frame 56 is provided with transversely extending, longitudinally spaced front and rear members 59 and 61, longitudinally extending, transversely spaced side members 62 and 63, and longitudinally spaced, transversely extending stiffener members 64, all being secured together, as by welding, to form a rigid frame structure. Preferably, the several forms 57 are spaced apart by spacer plates 66.

A shaft 67, which extends longitudinally through the stiffener members 64 in close proximity to one side member 62 of the truck, is rigidly secured at its opposite

ends to the transverse front member 59 and the transverse rear member 61. The article-carrying forms 57, which are suitably mounted for independent pivotal movement on the shaft 67, are adapted to be swung into their full line position shown in Figure 26, in which position they are supported by an inwardly turned flange 63a formed along the upper edge of the side member 63 of the truck, or into their inclined dotted line position also shown in Figure 26.

An intermediate portion of the transversely extending front member 59 disposed to one side of the central longitudinal axis of frame 56 suitably mounts a spring-pressed latch member 68 for pivotal movement about a horizontal transverse axis. This latch member is provided with a pair of angularly related arms 69 and 71, the former extending forward from the pivotal axis 70 and under transversely extending front member 59, and the latter extending rearward and downward from the pivotal axis, as best shown in Figures 18 and 27. The forward end portion of arm 69 terminates in a hook-shaped element having a rounded front end 72 and a straight rear edge 73, the latch being normally biased for counter-clockwise pivotal movement by a suitably mounted coil spring 74, as best shown in Figures 18 and 25. The bottom edge of an intermediate portion of the transversely extending rear member 61 of each truck is beveled, as at 76 (see Figure 18).

Operatively associated respectively with the outer gates 37—37 of the chambers 31 and 33 are operating mechanisms 77—77, suitably mounted on base plates 78—78 each of which is rigidly supported on the top of the autoclave 30, as clearly appears in Figures 1, 2, 19 and 20. Each mechanism 77—77 includes a fluid-pressure cylinder 79 having a piston 81 operatively connected to the pivot shaft 46 of the associated gate 37 through a link 82 and a lever 83. Upon operation of the cylinder 79, through suitable pressure fluid operatively delivered thereto by way of suitable conduits (not shown), the shaft 46 may be actuated to alternately close and open its associated outer closure gate 37.

Similarly mounted upon the base plates 78—78 are operating mechanisms 84—84 for respectively closing and opening the inner closure gates 52—52, these latter operating mechanisms being in all material respects identical to those just described for operation of the outer closure gates. Thus, each includes a fluid pressure cylinder 86 and a reciprocable piston 87, which latter is operatively connected to its associated pivot shaft 46 by a link 88 and a lever 89. The operation of the mechanisms 77—77 and 84—84 for closing and opening the outer closure gates 37—37 and the inner closure gates 52—52 of the chambers 31 and 33 may be effected by any desired control means (not shown) located at any point convenient to the operator in charge of the apparatus, which control means may be in the form of manually or electrically operable valves for controlling the supply of the pressure fluid to the pressure cylinders 79—79 and 84—84 of the operating mechanisms and for timing the operation thereof.

In order to shift the truck 34 with its load of articles to be treated through the chamber 31 of the entrance vestibule, the apparatus of the present invention includes a fluid-pressure-operated pusher mechanism 91 (see Figures 11 and 13) essentially consisting of a fluid-pressure cylinder 92 mounted upon and extending outwardly from the front end wall of chamber 31. Operatively associated with this cylinder 92 is a horizontally reciprocable piston 93 having a free end fitted with a roller 94 and with a truck-engaging pusher member 96 pivotally connected to said piston for swinging movement about a horizontal axis, said pusher member 86 being normally spring-pressed upward to engage behind the truck 34 when the latter has been shifted into its position within the chamber 31, as shown in Figure 11. It will be apparent that upon projection of the piston 93 under the influence of its fluid-pressure-operated cylinder 92, the free end thereof will move from the broken line position into the full line position shown in Figure 11, during all of which movement it will be supported by the roller 94, upon the floor 196 of the tunnel which extends from the interior of the cylindrical shell 31a into the interior of the main chamber 32 of the autoclave.

To move the truck 34 through the chamber 32, the apparatus of the present invention is provided with a conveyor essentially consisting of an endless chain 97 trained over suitably supported idler sprocket 98 and a drive sprocket 99, the sprocket 98 being disposed adjacent the fore end of the chamber 32 and the sprocket 99 being disposed adjacent the opposite or rear end of said chamber. The upper run of the conveyor chain 97 is supported, as best shown in Figure 5, by a suitably mounted channel member 101 (see Figure 5), while the lower run of chain 97 is suitably supported by a pair of angle members 102—102. The conveyor chain 97 is provided with equally spaced pusher elements 103, and to properly tension the chain 97, the lower run thereof is trained over suitably arranged additional idler sprockets 104, 106 and 107.

To shift the truck 34 through the exit vestibule 33, the apparatus of the present invention includes a fluid-pressure-operated puller mechanism 108 essentially consisting of a fluid pressure cylinder 109 mounted upon and extending outwardly from the rear end wall of chamber 33. Operatively associated with the cylinder 109 is a horizontally reciprocable piston 111 having its free inner end fitted with a roller 112 and with a truck-engaging puller member 113 rigidly associated therewith and adapted to engage the latch member 68 of each truck 34 when the latter has been advanced into its position in chamber 32 shown in broken lines in Figure 12. It will be apparent that upon retraction of the piston 111 under the influence of its fluid-pressure-operated cylinder 109, the free end thereof will move from its broken line to its full line position shown in Figure 12, during all of which movement it will be supported by the roller 112 upon the floor 110 of the tunnel 99 which extends from the interior of the chamber 32 into the cylindrical shell 33a of the exit vestibule 33.

The bottom of chamber 32 is divided into a plurality of separate basins by transversely extending, vertically disposed partition plates 114, the bottom edges of the latter being respectively shaped to fit the interior of chamber 32, and being suitably secured thereto, as by welding. The upper edge 116 of each plate member 114 is straight and disposed horizontally, each of said edges being centrally cut out, as at 117, to provide a series of longitudinally alined notches. Rigidly secured to each member 114 is an angle member 118 disposed with its upper branch in horizontal position to bridge the notch 117 of the member 114. Also secured rigidly to each partition plate member 114 in vertically spaced, paraliel relation to the member 118 is a second angle member 119, which is centrally notched, as at 121. As most clearly shown in Figure 5, the transversely extending angle members 118 support thereon the longitudinally extending rails 53—53 and the guide channel 101 for the upper run of the conveyor chain 97, while the transversely extending angle members 119 support thereon the angle members 102—102, the latter being disposed with their co-planar horizontal legs in laterally spaced relation. The upper run of the conveyor chain 97 moves over channel member 101 with the pusher elements 103 extending upward therefrom, while the lower run thereof moves over the angle members 102—102 with the pusher elements 103 extending downward therefrom and passing between the laterally spaced toes of the angle members 102—102 and through the notches 121 of the members 119. The partition members 114a, 114b and 114c are all generally similar to members 114, but are modified somewhat to meet the

special conditions existing at the opposite ends of the conveyor chain 97.

The main chamber 32 of the autoclave is divided into a number of adjoining compartments by a plurality of partitions each comprising three substantially co-planar panel members 122, 123 and 124 adapted to be mounted in vertical extension of each of the transverse base members 114. The members 122 and 123 are similar but opposite hand, and are disposed on opposite sides of the central member 124. The lower end portions of members 122, 123 and 124 are respectively shaped to provide downwardly presenting channel portions 126, 127 and 128 adapted to be seated upon the upper edge 116 of their supporting base member 114, as best shown in Figure 7. The outer edges of the members 122 and 123 are shaped in general conformity with the interior of the chamber 32, and are suitably fitted with gasket elements 129. Welded to each of the plate members 122 and 123 is a reinforcing and stiffening member 131 of the general shape best shown in Figure 5, each such member 131 being provided with a pair of oppositely extending terminals ends 131^a and 131^b. The upper terminal ends 131^a—131^a are provided with alined openings to freely receive a threaded bolt 132 having a pair of nuts 133—133 which operate in association with the bolt to press the plate members 122 and 123 away from each other and into firm peripheral edge contact with the internal side walls of the chamber 32. The lower terminal ends 131^b—131^b of the stiffening members 131—131 are disposed respectively in inwardly spaced relation with respect to a pair of laterally spaced brackets 134—134 rigidly secured, as by bolts 136 (see Figure 8), to each of the base members 114. Take-up bolts 137—137 project through alined openings in the brackets 134—134 and the lower terminal ends 131^b—131^b and are fitted with nuts 138—138 which operate, when tightened, to draw the plate members laterally apart and into firm peripheral edge contact with the internal wall surface of the chamber 32.

The co-planar plate members 122 and 123, which are transversely expanded as above described to snugly and firmly fit across the circular interior of the chamber 32, are respectively cut away along their inner edges to provide a rectangular opening, generally delineated by the dotted line 135 in Figure 5, over which is fitted the central plate member 124 of the partitioning assembly. The marginal edges of this latter member overlap the corresponding edges of the rectangular opening 135, the overlapped edges being secured together by bolts 139 passing through registering oversized openings 140 in said edges, each bolt being suitably provided with a washer 141 and a wing nut 142, all as best shown in Figure 6.

The central plate member 124 is centrally cut out, as at 143, to provide an opening through which the articles undergoing treatment may pass as they traverse the autoclave, this opening being generally of a shape conforming more or less closely to the shape of the boarded article, e. g., a stocking as shown. Preferably, the perimetral edge of the opening 143 in each of the transverse partition assemblies is fitted with a gasket 144 of rubber or other suitable material to protect the fabric of the boarded article against possible injury should it engage the edge of the opening during its passage therethrough. As most clearly appears in Figure 5, the openings 143 are each enlarged at their bottom ends to provide adequate clearance for passage therethrough of the trucks 34 upon which are mounted the boarded articles (e. g., stockings as shown).

In certain instances, it may be desirable to provide each of the transverse partition assemblies (conjointly formed of the members 122, 123 and 124) with a cowl arrangement as illustrated in Figures 9 and 10 and which consists generally of a sheet metal plate member 145 extending about and disposed transversely with respect to the marginal side and top edges of the opening 143. The plate member 145, when employed, is of a width sufficient to project a substantial distance beyond opposite sides of the transverse plane of the partition assembly and is further so inclined relatively to the line of travel of the articles through the autoclave as to provide a flared opening through which the boarded articles pass from one compartment to another of the autoclave. This flared cowl 145 serves not only to protect the articles during their passage through the partition assembly, but also serves to restrict the vaporous treatment medium employed in a given compartment from passing into the next adjoining compartment.

As is best shown in Figures 1 and 2, the main chamber 32 of the autoclave is divided by the above described partition assemblies into four main treatment compartments, namely, scour, #1 rinse, #2 rinse and dye compartments. Each of these compartments is suitably piped for spraying with a suitable solution the articles as they pass therethrough, the spray system for each compartment including spraying coils 146, a return tank for the sprayed solution as shown in Figure 2, and a heater and pump (not shown). In this connection, it is to be noted that the chamber 32 is also suitably piped for spraying the interior thereof with cold water, the pipes therefor being designated by the reference numeral 147 and running substantially the full length of the chamber.

In order to shift the truck 34 out of the exit vestibule 33, the apparatus of the present invention is provided with a fluid-pressure-operated pulling mechanism 148 essentially consisting of a suitably mounted fluid-pressure cylinder 149 operatively associated with a horizontally reciprocable piston 151 having a free end portion 152 adapted to engage the arm 69 of the latch 68. The truck 34 is thus pulled off rails 53—53 on to a pair of rails 153—153 on a wheeled lateral transfer truck 154, the said rails 153—153 being adapted for alinement with the autoclave fixed rails 53—53. The lateral transfer truck 154 is arranged for movement on fixed rails 156—156 which extend transversely relative to the longitudinal axis of the autoclave 30, and which are mounted on a suitable frame structure 157.

It may be pointed out that any suitable conveyor mechanism may be employed for handling the trucks 34 as they are successively discharged from the exit vestibule 33 and re-delivered to the entrance vestibule 31 of the autoclave. One such form of handling mechanism is schematically shown, such mechanism including a lateral transfer mechanism, including the aforementioned transfer truck 154, at the discharge end of the autoclave 30, another substantially similar transfer mechanism at the receiving end of the autoclave 30, and an endless chain conveyor means between the aforementioned lateral transfer mechanisms.

In order to move the lateral transfer truck 154 and the truck 34 carried thereby along the lateral rails 156—156, there is provided a fluid-pressure-operated mechanism 158 essentially consisting of a fluid-pressure cylinder 159 suitably mounted on the frame structure 157, the cylinder 159 being operatively associated with a piston 161 horizontally reciprocable under the influence of cylinder 159 and having a free end portion connected to the transfer truck 154 for movement thereof between the full line and broken line positions shown in Figure 3.

In order to move the truck 34 off the lateral rails 153—153, when the transfer truck 154 is in the broken line position shown in Figure 3, there is provided another fluid-pressure-operated pusher mechanism 162 essentially consisting of a suitably mounted fluid pressure cylinder 163 operatively associated with a piston 164 horizontally reciprocable under the influence of cylinder 163 and having a free end portion adapted to engage the article-supporting truck 34 for shifting the latter from the lateral rails 153—153 on to a pair of fixed rails 166—166 extending lengthwise of and parallel to the autoclave 30, the rails 166—166 being suitably supported on a frame structure 167.

In order to move the truck 34 along the external return rails 166—166, two endless chain conveyors are provided, one essentially consisting of an endless chain 168 trained over sprockets 169 and 171, and the other essentially consisting of an endless chain 172 trained over sprockets 173 and 174. The chain 168 is provided with a number of suitably spaced pusher elements 176, while the chain 172 is provided with only one such element 177.

Upon completion of its movement along the rails 166—166, the truck 34 is received by a pair of rails 178—178 carried by a wheeled lateral transfer truck 179. The latter is similar in construction to lateral transfer truck 154, being arranged to move over a pair of fixed rails 181—181, which are suitably supported on a frame structure 182. A fluid-pressure-operated mechanism 183, similar in construction to the fluid-pressure-operated mechanism 158, is provided to shift the transfer truck 179 along the rails 181—181, while a fluid-pressure-operated mechanism 184, similar to the fluid-pressure-operated mechanism 162, is provided to push the truck 34 from the rails 178—178 on to the rails 53—53 and into the entrance vestibule 31 of the autoclave.

In operation it will be seen that the article-supporting truck 34 is moved from the broken line position thereof within the entrance vestibule 31 (as shown in Figure 11) to the next preceding full line position thereof in chamber 32 by extension of piston 93 from the broken line position into the full line position thereof. In the full line position of truck 34 just referred to, the front end thereof abuts the rear end of the next preceding truck 34, these trucks being thereby coupled together by engagement of the hooked arm 69 of latch 68 of the trailing truck with the rear member 61 of the leading truck, as most plainly shown in Figure 18. In this connection, it will be noted that while the said trailing truck is not positively engaged by any of the pusher elements 103 of the endless conveyor chain 97, as is apparent from a study of Figures 11 and 15, the truck immediately ahead of it is in position to be engaged by one of said pusher elements of the conveyor chain. As the latter truck is thus engaged by the conveyor and is moved forwardly through the chamber 32, it pulls the coupled trailing truck with it until the arm 71 of the aforesaid latch 68 engages a fixed trip bar 186 (see Figures 15 and 18), whereupon the arm 69 of said latch 68 is freed to swing downward out of engagement with the rear member 61, of the leading truck, the trucks being thus uncoupled, as plainly shown in Figures 16 and 17, from which it will also be seen that the uncoupled trailing truck is not positively engaged by a pusher element 103 of the conveyor chain until it is separated somewhat from the leading one of the uncoupled trucks.

When an article-supporting truck 34 reaches a position slightly in advance of the last full line position thereof shown in Figure 12, the conveyor chain pusher element 103, which has moved it to such position, moves downward out of engagement therewith, whereupon said truck is engaged by the next following truck and is pushed by the latter into its broken line position shown in Figure 12, the engaged trucks being meanwhile re-coupled by the latch member 68. As the leading truck assumes its last-mentioned dotted line position, the latch member 68 is again tripped by a suitably positioned fixed trip bar 187, whereupon the trucks are again uncoupled, as shown in Figure 12.

In the broken line position of the truck-pulling piston 111 shown in Figure 12, the extension 113 thereof engages the arm 71 of the latch member 68, as most plainly shown in Figure 14, whereupon when the piston 111 is retracted to its full line position thereof, the article supporting truck 34 is pulled into the exit vestibule 33 wherein it assumes the dotted line position as shown. In this position, the arm 69 of latch member 68 is engaged by the freely extending hooked end 152 of the

piston 151, as plainly shown in Figure 14A, which latter, when retracted, operates to pull the article-supporting truck out of the exit vestibule 33 onto the rails 153—153 of the lateral transfer truck 54. This latter truck, which is moved to and fro along rails 156—156 by extension and retraction of the piston 161, may thus be disposed in position so that the rails 153—153 carried thereby are in alinement with the external rails 166—166 (see Figure 2) whereupon, by projection of the piston 164, the article-supporting truck 34 is shifted from the rails 153—153 on to the rails 166—166.

At this point the article-supporting truck 34 is engaged by a pusher element 176 on the endless chain of the conveyor 168 (see Figure 24) and moved at a comparatively slow rate along the external rails 166—166 to allow sufficient time for the operations of drying the treated stockings and of stripping the dried stockings from the forms 57 and replacing them with other stockings to be treated. Preferably, the conveyor 168 traverses a suitably heated drying chamber 188 to complete the drying of the stockings as soon as possible after their transference to the conveyor 168. When the truck 34 has traveled about half the length of the rails 166—166, the pusher element 176 of the chain conveyor 168 moves downward out of engagement therewith following which the single pusher element 177 on the endless chain of the conveyor 172 engages such truck and moves it at a comparatively fast rate over the remainder of the rails 166—166 and on to the rails 178—178 of the transfer truck 179, which latter is then moved along the transverse rails 181—181 by projection of the piston 183a of the fluid-pressure-operated mechanism 183. When retracted, such piston 183a positions the transfer truck 179 so that the rails 178—178 carried thereby are in alinement with the rails 166—166, and when extended, such piston positions the transfer truck 179 so that the rails 178—178 thereof are in alinement with the rails 53—53 extending through the autoclave. In this latter position of the transfer truck 179, the piston of the fluid-pressure-operated mechanism 184 is projected to push the truck 34 off the rails 178—178 and along the rails 53—53 to the broken link position shown in Figure 11.

Of course, while the truck 34 is passing into the entrance vestibule 31, the outer gate 37 of the latter must be open, and while this outer gate 37 is open, the inner gate 52 of said vestibule will be closed. When the article-supporting truck 34 has assumed the broken line position in the vestibule 31, as shown in Figure 11, the outer gate 37 is closed behind it. As the truck 34 enters the vestibule 31, the piston 93 is in its retracted position, while its pivoted spring-pressed arm 96 is in the broken line position shown in Figure 11. Continued movement of the truck 34 into the entrance vestibule brings it into contact with the sloping back of the arm 96, which is depressed by the truck while the latter passes over it, following which the pivoted arm 96 springs upward to engage the back end of the truck, as shown in Figure 11.

While the truck 34 is passing from the main chamber 32 of the autoclave into the exit vestibule 33, the inner gate 52 of the latter is open, and the outer gate 37 thereof is closed. When the truck 34 has assumed the broken line position thereof in the exit vestibule 33 shown in Figure 12, the inner gate 52 is closed behind the truck and the outer gate 37 is opened before it. As will be apparent, numerous breaks occur in the rails 53—53, and additional breaks occur between the latter and the rails 166—166 on the one hand and the rails 153—153 and 178—178 on the other. In order to provide for smooth passage of the truck 34 over these breaks, the truck 34 is fitted with a set of six wheels 58 instead of only four wheels with the wheel spacing such that at least four of the wheels will bear solidly on the rails at all times.

Each of the treatment materials is preferably circulated through a separate conduit system, the piping of

which interiorly of the autoclave chamber 32 is suitably bent and disposed as shown in Figures 1 and 2 to provide laterally spaced spray nozzle manifolds. The dye solution is passed through a heater that heats it to the desired temperature and thence through a pump for discharge from the spray nozzles at superatmospheric pressure. The other treatment solutions, such as those employed for scouring, rinsing, etc., are similarly delivered to and discharged from the spray nozzles at the desired elevated temperature and superatmospheric pressure, the interior of the compartmented autoclave chamber 32 being thus constantly charged throughout with a hot vapor at superatmospheric pressure capable of setting the synthetic yarn fabric into its boarded shape. Of course, the spray nozzles are arranged so that the spray therefrom reaches every part of the stockings being treated. The excess of the treating media sprayed upon the articles collects in the bottom wells of the several compartments from whence it is suitably drawn off in solution form. In the case of the sprayed dye solution, the excess of the latter is preferably returned to the supply tank therefor wherein it may be periodically checked for quality, concentration and quantity and supplemented as desired with additional dye solution. When it is desired for any reason to cool the apparatus quickly, the interior of the autoclave may be sprayed with cold water by any suitable means, such as, for example, cold water spray conduits 147—147.

It will be apparent that the number and size of the several compartments in the main chamber 32 of the autoclave are variable. For example, the panel 122, 123 and 124 of any partition assembly may be removed entirely to make one less compartment, or an additional set of such panels may be added for association with any one of the fixed plate members 114 to make up still another compartment. Or, such partition assemblies may be relatively disposed otherwise than as shown to change the size of the compartments in the autoclave. Of course, when the size and/or number of compartments is changed it will be necessary to make corresponding changes in the arrangement of the spraying coils. At times it may be convenient to use more than one compartment for a single treatment rather than one large compartment.

In erecting the panels 122, 123 and 124 to complete a partition, it will be apparent that the gasket elements 129 may be forced tight against the internal wall of chamber 32 by properly manipulating the threaded members 132 and bolts 137. The panel 124 is made removable so that it can be replaced by another such panel which will accommodate a differently shaped form, and it will be noted that as the stockings or other articles pass therethrough they operatively complete the separation of the compartments from one another.

Inasmuch as a given article-supporting truck 34 functions to pull its next succeeding truck into position to be engaged by the pusher element 103 of the endless chain conveyor 97, at the same time that it functions to push the next preceding truck into position to be engaged by the arm 113 rigidly fixed to the pull piston 111 operating within the exit vestibule 33, it will be apparent that the apparatus requires the use of a plurality of trucks 34 moving in tandem relation along a continuous line of travel through the autoclave proper. However, it will be understood that not all the trucks need be loaded with articles to be treated, the unloaded trucks serving merely to advance the preceding and following trucks in properly timed sequence.

In operation of the apparatus as hereinbefore described, it will be understood that prior to entry of any of the boarded articles to be treated into the main chamber 32 of the autoclave, the several treating media to which the articles are to be subjected will be sprayed in finely subdivided form at the required elevated temperature and superatmospheric pressure in the separate compartments of the main treating chamber, thereby charging the whole interior of the latter with a hot vaporous medium capable of "setting" the articles permanently into the shape determined by their supporting forms. Of course, when the treating media is so introduced into the autoclave chamber 32, the inner closure gates 52—52 will be in their closed positions and will be pressed tightly against their respective gateways by the superatmospheric pressure of the vaporous medium in said chamber 32 to maintain it hermetically sealed off from atmosphere.

In this initially internally charged condition of the autoclave, the outer closure gate 37 of the entrance vestibule 31 will be open to permit the entry into said vestibule of a suitably loaded article-supporting truck 34, this truck being propelled into the entrance vestibule by the piston of the fluid-pressure-operated mechanism 184. Once said truck 34 is disposed entirely within the entrance vestibule 31, the outer closure gate 37 thereof is closed (by the means hereinbefore described) and the interior of said vestibule is then charged with steam at superatmospheric pressure substantially equal to the pressure of the medium contained in the main chamber 32 of the autoclave. Upon so equalizing the pressures within the chambers 31 and 32, the inner closure gate 52 may then be opened, following which the given truck 34 is propelled by the fluid-pressure-operated piston 93 into the chamber 32 where it is engaged by the chain conveyor 97 for continued movement through the several compartments of the main treating chamber 32 of the autoclave.

Upon such movement of the truck 34 from the entrance vestibule 31 into the autoclave chamber 32, the inner closure gate 52 is reclosed, the internal pressure of said vestibule is exhausted (to atmosphere or otherwise), and the outer closure gate 37 is then reopened to permit entry of a second truck into the entrance vestibule, which, by the same procedure as above described, is subsequently moved into the autoclave chamber 32 without any reduction in the internal operating pressure of the latter.

It will be understood, of course, that the inner closure gate 52 is opened only when the outer closure gate 37 is closed and the chamber therebetween is charged with steam at a pressure sufficient to equalize that of the main chamber 32 of the autoclave; and that the outer closure gate 37 is opened only when the inner closure gate is closed and after the pressure in the chamber therebetween is reduced to that of atmosphere. These same conditions operate both for the entrance vestibule 31 and the exit vestibule 33.

As each truck in the continuous line series thereof is moved into the autoclave chamber 32, it latches on to the next preceding truck and remains so latched until it is pulled into position to be itself engaged by the chain conveyor 97. When a given truck in the line of the conveyor-propelled trucks approaches the exit end of the autoclave chamber 32, the inner closure gate 52 at said exit end opens (by the means hereinbefore described) and said truck is then pulled by the piston 111 of the fluid-pressure-operated mechanism 108 entirely within the exit vestibule 33, which latter was charged with steam at a pressure equal to that of the autoclave proper. Thereupon the said closure gate 52 is reclosed, the internal pressure of the exit vestibule 33 is exhausted (to atmosphere or otherwise), and the outer closure gate 37 at the exit end of the exit vestibule is then reopened to permit withdrawal of the truck 34 by means of the puller piston 151 of the fluid-pressure-operated mechanism 148, which latter operates to position the article-supporting truck 34 upon the lateral transfer carriage 154.

This latter carriage shifts back and forth along the lateral rails 156—156 to successively shift the several article-supporting trucks 34 from a position in line with the autoclave tracks 53—53 into a laterally displaced position in line with the external conveyor tracks 166—166, onto which latter tracks each of the article-supporting

trucks 34 is successively propelled by the piston 164 of the fluid-pressure-operated mechanism 162.

The several trucks 34 are then propelled successively along the external tracks 166—166 through the drying, stripping and boarding zone first at a reduced speed and thence at an increased speed to the station whereat the article-supporting trucks are transferred to the lateral transfer carriage 179 which is shifted back and forth, by the piston of the fluid-pressure-operated mechanism 183, along the laterally extending tracks 181—181, the several article-supporting trucks 34 being thereby successively disposed in position for transfer, by the piston of the fluid-pressure-operated mechanism 184, into the entrance vestibule 31 of the apparatus.

It will be understod, of course, that the trucks 34 move continuously, that the timing of the apparatus as a whole must be such that the piston of each truck 34 at a selected instant during the operation of the apparatus is occupied by the next following truck 34 within a selected period of time, and that the operation of closure gates 37—37 and 52—52 and the exhaustion of, and the building up of, the pressure in the entrance and exit chambers 31—33 must be properly timed in relation to the movement of trucks 34.

Of decided advantage in the practice of the present invention is the fact that the apparatus hereinbefore described facilitates "pre-setting" of articles knitted of synthetic yarn, such as nylon, while in their boarded condition and during the course of treatment in the apparatus. Ordinarily, this pre-setting is effected during the period that the boarded articles remain in the entrance vestibule leading into the main treatment chamber of the autoclave, the entrance vestibule constituting in itself a form of autoclave the interior of which is filled with steam or other vaporous medium under superatmospheric pressure and at a temperature elevated sufficiently to insure setting of the fabric stitches into permanentized relation and shape.

Inasmuch as the pressure and temperature of the several treating media sprayed into the main compartmented chamber of the autoclave are of substantially the same pressure and temperature of the pressure fluid introduced into the entrance vestibule (and into the exit vestibule), it will be apparent that the pre-setting may be completed at any desired stage during the course of travel of the boarded articles through the autoclave apparatus. Thus, pre-setting, if desired, may be effected during the period that the articles are temporarily confined within the entrance vestibule preliminarily to transfer thereof into the main treating chamber 32 of the apparatus, or such pre-setting may be effected only partially in the entrance vestibule and then completed in one or another of the compartments in said main treating chamber as the articles successively pass therethrough. In certain instances, the presetting may be completely effected during the scouring treatment, while in other instances, it may be desirable to delay complete presetting until a later stage of treatment of the articles in the chamber 32, as, for example, during the course of rinsing or dyeing the same. In any event, pre-setting of the article fabric is accomplished during the course of travel of the articles through the uniformly pressurized interior of the autoclave apparatus and while the articles are in boarded condition ready to be successively subjected to various treating media. Thus, the articles, once boarded, remain boarded throughout the entire course of treatment to which they are subjected and are stripped from their supporting forms only when they have been completely finished and are dried ready for labeling and packaging.

While it may be unncessary to establish a precise point at which "setting" of the article within the autoclave apparatus is completely effected, so long as such setting is actually effected prior to discharge of the articles from the exit vestibule of the apparatus, the point at which complete setting takes place may be advanced or retarded, as desired, by suitably changing the speed of travel of the boarded articles through the autoclave, or by changing the pressure and temperature of the fluent media introduced into the several chambers of the apparatus while maintaining the speed of travel of the articles therethrough at a predeterminedly fixed rate. Preferably, the apparatus of the present invention is operated with fluent media introduced at pressures of from 5 to 50 pounds above atmosphere and at temperatures of from 220° F. to 300° F. Of course, the period required for "setting" of the fabric decreases with increase in pressure and temperature of the fluent media employed, and vice versa, while as stated above, the overall period of confinement of the boarded articles within the several communicating chambers of the autoclave apparatus may be varied, as may be required in accordance with changes in the pressure and temperature of the fluent media, by changing the speed of travel of the articles through the autoclave apparatus.

It will be noted that the autoclave is provided with suitable devices (not shown) primarily for regulating and controlling the temperature of the treating media with which the main chamber 32 is charged, and incidently, the pressure thereof. In addition, it is provided with suitable devices (not shown) primarily for regulating and controlling the pressure of the steam introduce into the entrance vestibule 31 and the exit vestibule 33 so that such steam may be introduced at a pressure sufficient to equalize that of the media in the main chamber 32. As a safety precaution suitable pressure relief valves (not shown) may be provided.

While the autoclave of the present invention is intended for use particularly in the treatment of goods knitted or woven of synthetic yarns which preferably require so-called "pre-setting," it is to be understood that the autoclave apparatus is not limited to special use but instead is equally well adapted for the treatment of textile materials of all kinds and character, regardless of the nature of the yarn employed in their fabrication. For example, for the dyeing and drying of hosiery knitted of natural silk or other yarns which require no pre-setting, the autoclave would be employed exactly as herein before described, the chamber 31 serving merely as the receiving chamber for each truck 34 passed into and through the autoclave, the hosiery being successively scoured, rinsed and dyed in the chamber 32 and dried or partially dried in the chamber 33. Accordingly, it will be understood that it is not intended to limit the autoclave to solely the treatment of goods fabricated of yarns which require pre-setting; nor is it intended to so limit the present invention as to constitute the pre-setting treatment an indispensable step in the operation or operations capable of being performed by the autoclave apparatus of the present invention.

It will be understood, of course, that the present invention is susceptible of various changes and modifications which may be made from time to time without departing from the real spirit or general principles thereof, and it is accordingly intended to claim the same broadly, as well as specifically, as indicated in the appended claims.

What is claimed as new and useful is:

1. In an apparatus for treating textile articles, an autoclave comprising an elongated chamber and receiving and discharge chambers disposed at opposite ends thereof, all for receiving and containing respectively heated vaporous treating media under superatmospheric pressure, said chambers being inter-related for progressive passage of said articles therethrough and said elongated chamber being communicable with said receiving and discharge chambers, fluid-tight closure gates for selectively hermetically sealing the several chambers from each other and from atmosphere, means for exhausting the pressure medium from each of said receiving and discharge chambers

while all of said chambers are hermetically sealed from each other and from atmosphere, a plurality of partitions in said elongated chamber for division thereof into compartments, each of said partitions having an opening therein for passage of said articles therethrough, said opening being of an outline closely conforming to that of the article to be passed therethrough so that said opening is substantially closed by passage of the articles successively therethrough, said articles being subjected to a presetting treatment effected by said pressure media, and means in each of said compartments for subjecting said articles to additional treatments.

2. Apparatus for treating textile articles as claimed in claim 1 wherein the partitions in the elongated chamber comprise a first set of sections fixed in the bottom of said chamber to form therewith a number of basins and a second set of sections engageable with the sections of said first set, each of the sections of said second set being positionable for engagement with a selected section of the first set to vary the length of the compartments and being removable to vary the number thereof.

3. Apparatus for treating textile articles as claimed in claim 1 wherein the means for subjecting the articles to additional treatments comprises spray means in each compartment of the elongated chamber, and wherein means is provided for draining the liquid collecting in the bottoms of the compartments of said chamber.

4. In an apparatus for treating textile articles, an autoclave comprising an elongated chamber and receiving and discharge chambers disposed at opposite ends thereof, all for receiving and containing respectively heated vaporous treating media under superatmospheric pressure, said chambers being interrelated for progressive passage of said articles therethrough and said elongated chamber being communicable with said receiving and discharge chambers, a plurality of partitions in said elongated chamber for division thereof into compartments, each of said partitions having an opening therein for passage of said articles therethrough, said opening being of an outline closely conforming to that of the article to be passed therethrough so that said opening is substantially closed by passage of the articles successively therethrough, a conveying system for mounting said articles in upright position and moving the same in succession through said chambers, said articles being subjected to a presetting treatment effected by said pressure media, and means in each of said compartments arranged in vertically extending banks on each side of the path traversed by said articles for spraying said articles, the spray means for the several compartments being connected respectively to sources of spray solution different in kind for subjecting said articles to an additional different treatment in each of said compartments.

5. Apparatus for treating textile materials as defined in claim 4 wherein said chambers are arranged in straight line relation.

6. Apparatus for treating textile materials as claimed in claim 4 wherein the conveying system for mounting and moving the articles through the chambers comprises a series of article supporting members, and mechanism in each of said chambers to engage and move said article supporting members therein, the mechanism in the first chamber being constructed and arranged to move said article supporting members successively from the first chamber into operative engagement with the mechanism in the second chamber, the mechanism in said second chamber being constructed and arranged to move the article supporting members successively through the second chamber and into operative engagement with the mechanism in the third chamber, and the mechanism in said third chamber being constructed and arranged to move said supporting members from the second chamber into the third chamber.

7. Apparatus for treating textile materials as claimed in claim 4 wherein the conveying system for mounting and moving the articles through the chambers comprises a series of article supporting members, each provided with detachable coupling means for detachable coupling engagement with the preceding supporting member in the series, and mechanism in each of said chambers to engage and move said article supporting members therein, the mechanism in the first chamber being constructed and arranged to move said article supporting members successively from the first chamber into operative engagement with the mechanism in the second chamber, the mechanism in said second chamber being constructed and arranged to move the article supporting members successively through the second chamber and into operative engagement with the mechanism in the third chamber, and the mechanism in said third chamber being constructed and arranged to move said supporting members from the second chamber into the third chamber.

8. Apparatus for treating textile materials as claimed in claim 4 wherein the conveying system for mounting and moving the articles through the chambers comprises a series of article supporting members, each provided with detachable coupling means for detachable coupling engagement with the preceding supporting member in the series, and mechanism in each of said chambers to engage and move said article supporting members therein, the mechanism in the first chamber being constructed and arranged to move said article supporting members successively from the first chamber into operative engagement with the mechanism in the second chamber, the mechanism in said second chamber being constructed and arranged to move the article supporting members successively through the second chamber and into operative engagement with the mechanism in the third chamber, and the mechanism in said third chamber being constructed and arranged to move said supporting members from the second chamber into the third chamber, and wherein means is provided for automatically uncoupling the article supporting members.

9. Apparatus for treating textile materials as claimed in claim 4 wherein the conveying system for mounting and moving the articles through the chambers comprises a series of article supporting members, each provided with detachable coupling means for detachable coupling engagement with the preceding supporting member in the series, and mechanism in each of said chambers to engage and move said article supporting members therein, the mechanism in the first chamber being constructed and arranged to move said article supporting members successively from the first chamber into operative engagement with the mechanism in the second chamber, the mechanism in said second chamber being constructed and arranged to move the article supporting members successively through the second chamber and into operative engagement with the mechanism in the third chamber, and the mechanism in said third chamber being constructed and arranged to move said supporting members from the second chamber into the third chamber, and wherein the said coupling means comprises coacting latch elements in respectively opposite ends of each successive pair of the article supporting members.

10. Apparatus for treating textile materials as claimed in claim 4 wherein the conveying system for mounting and moving the articles through the chambers comprises a series of article supporting members, each provided with detachable coupling means for detachable coupling engagement with the preceding supporting member in the series, and mechanism in each of said chambers to engage and move said article supporting members therein, the mechanism in the first chamber being constructed and arranged to move said article supporting members successively from the first chamber into operative engagement with the mechanism in the second chamber, the mechanism in said second chamber being constructed and arranged to move the article supporting members suc-

cessively through the second chamber and into operative engagement with the mechanism in the third chamber, and the mechanism in said third chamber being constructed and arranged to move said supporting members from the second chamber into the third chamber, and wherein the said coupling means comprises coacting latch elements in respectively opposite ends of each successive pair of the article supporting members, said first-mentioned coupling means comprising coacting latch elements in respectively opposite ends of each successive pair of the article supporting members and said last-mentioned uncoupling means comprising a fixed member predeterminedly positioned for engagement by said latch elements.

11. In apparatus for treating textile materials, an autoclave having a set of three article-receiving chambers communicating with one another and arranged in straight line series relation and for containing vaporous treating media under superatmospheric pressure, and a conveying system for moving the articles in a straight line through said chambers, said system including a line of article supporting members, a pusher member within the first of said chambers, fluid-pressure operated means extending through a wall of said first chamber and carrying said pusher member, an endless conveyor within the second of said chambers, and a puller member shiftable fore and aft

within the third of said chambers, said pusher member being shiftable fore and aft within said first chamber and disposed in the path of said article supporting members for pushing the same successively from the interior of said first chamber into operative engagement with said conveyor in the second chamber and being arranged for yielding movement for passage of said article supporting members thereby, said conveyor being arranged to receive said article supporting members and to successively move the same through said second chamber into operative engagement with said puller member, and said puller member being arranged to receive said article supporting members from said conveyor and to pull the same successively into the interior of said third chamber.

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