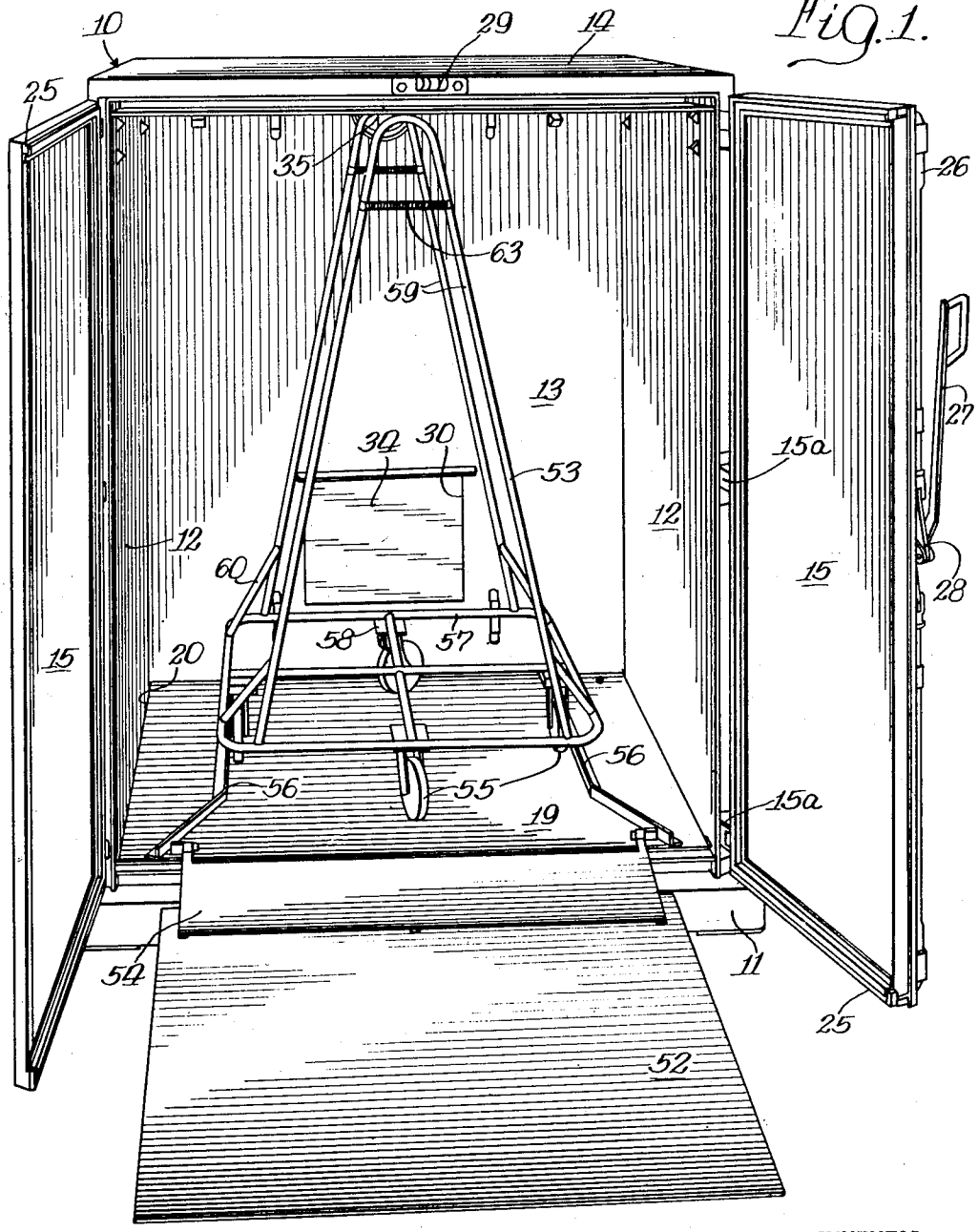
Oct. 30, 1951 H. RICHTER 2,572,893

PRESETTING CABINET

Filed Aug. 27, 1947 5 Sheets-Sheet 1

Fig. 1.



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Oct. 30, 1951 H. RICHTER 2,572,893

PRESETTING CABINET

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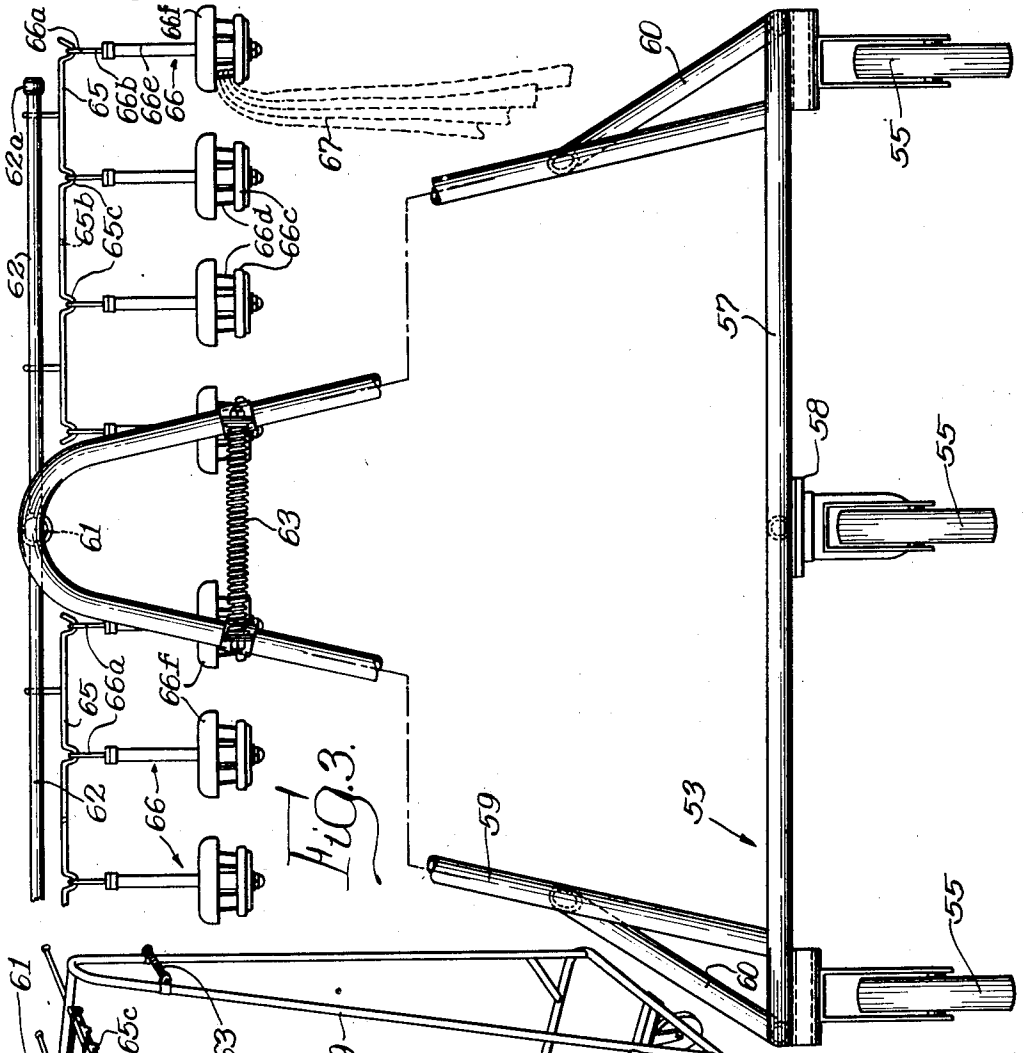


Fig. 3.

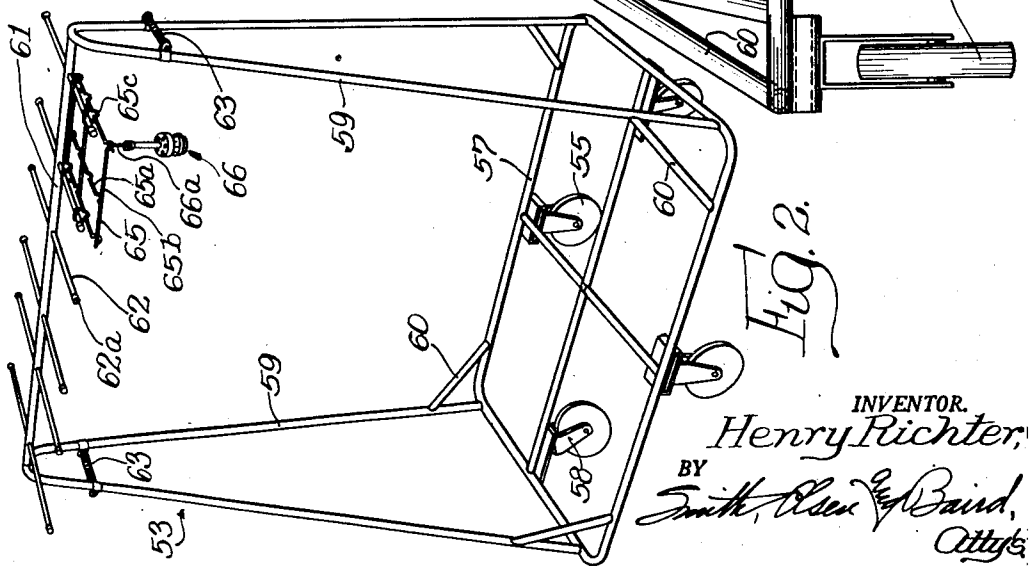


Fig. 2.

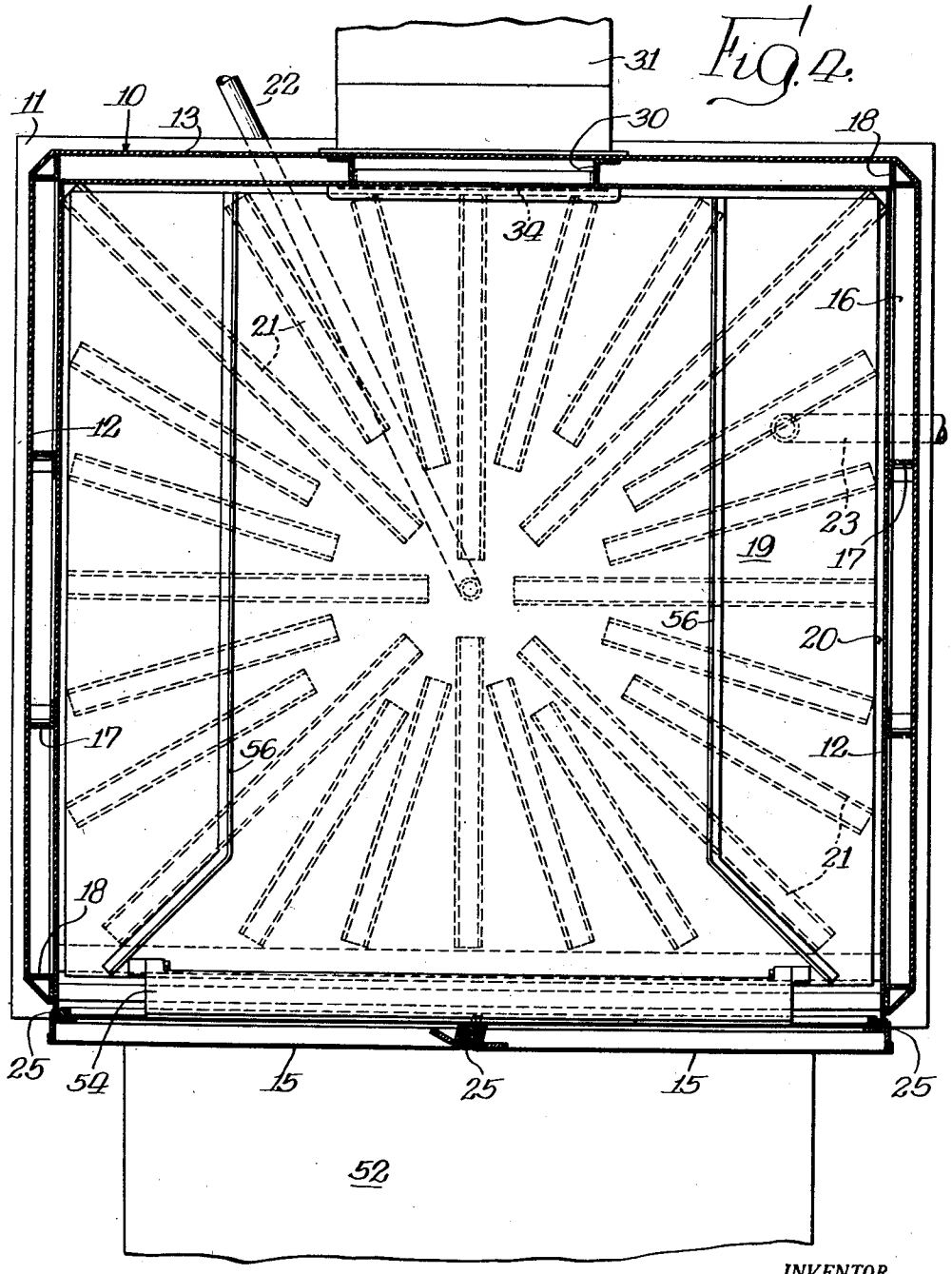
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Oct. 30, 1951 H. RICHTER 2,572,893

PRESETTING CABINET

Filed Aug. 27, 1947 5 Sheets-Sheet 3

Fig. 4.



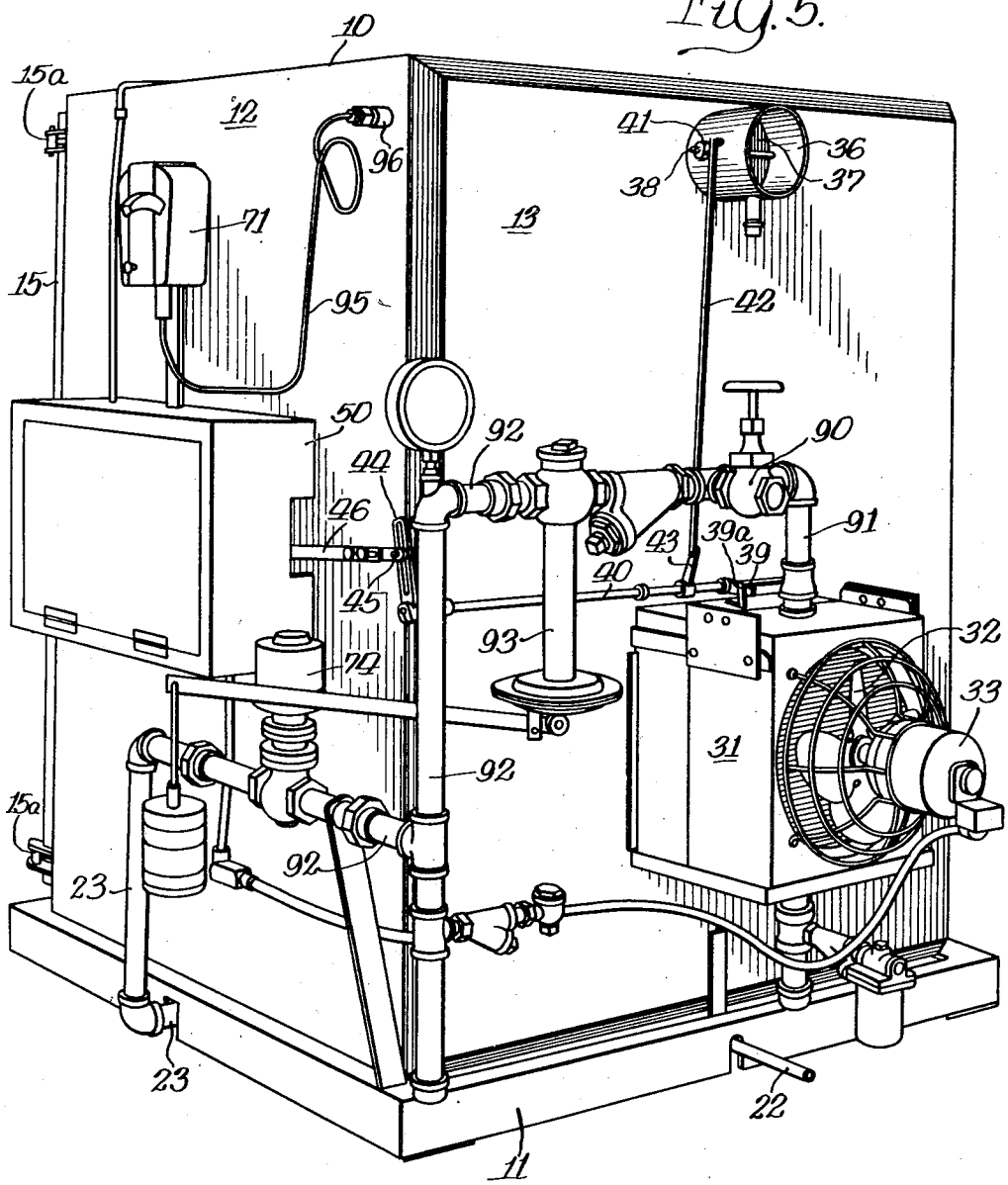
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PRESETTING CABINET

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Fig. 5.



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PRESETTING CABINET

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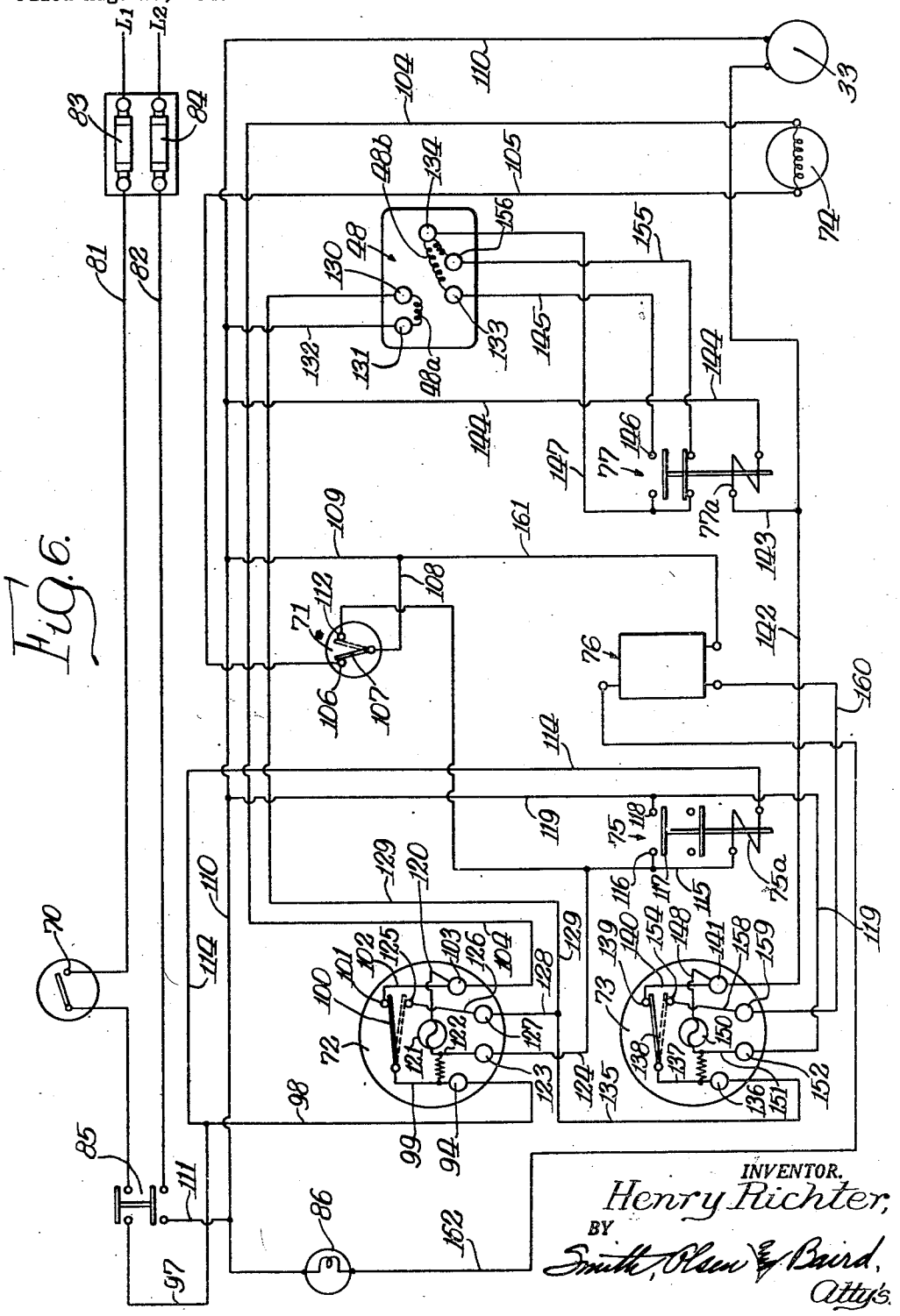


FIG. 6.

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Patented Oct. 30, 1951

2,572,893

UNITED STATES PATENT OFFICE

2,572,893

PRESETTING CABINET

Henry Richter, Kankakee, Ill., assignor to Paramount Textile Machinery Co., Kankakee, Ill., a corporation of Illinois

Application August 27, 1947, Serial No. 770,826

10 Claims. (Cl. 223—76)

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This invention relates to improvements in presetting cabinets for subjecting textile fabrics, such as hosiery, to a process of treatment in an enclosed chamber following the knitting operation, and it may be used with particular advantage in treating by the action of steam stockings knitted from synthetic linear polyamide fibres such as those known as nylon.

The principal object of the invention is to provide steam treating apparatus comprising a steam treating chamber in which large batches or groups of hosiery may be treated rapidly in successive treating periods or cycles during each of which the admission of the steam, the duration of the treatment and the duration of an operation of exhausting the steam and drying the hosiery are automatically effected and controlled. A further object is to provide steam treating apparatus having a cycle of operations which are automatically controlled and which are initiated by a manual operation of the attendant, such as the closing of the door of the cabinet in which the treatment takes place. Still another object of the invention is to provide steam treating apparatus for hosiery comprising a cabinet into which a large number of stockings may be moved while suspended on hangers carried by a truck, in combination with means for automatically admitting steam to the cabinet, measuring the duration of the steam treatment after a predetermined temperature is reached in the cabinet, shutting off the steam, admitting air under pressure to the chamber and exhausting the steam therefrom, and determining the period during which the exhaust takes place. Other objects relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be understood from the following specification taken with the accompanying drawings in which one embodiment is illustrated. In the drawings,

Figure 1 shows a perspective view of the front of the steam treating cabinet with the doors open and with a hosiery carrying truck in position within the cabinet;

Fig. 2 shows a perspective view of the hosiery carrying truck with a hosiery hanger rack supported thereon;

Fig. 3 shows an enlarged end elevation of the hosiery carrying truck, with parts thereof broken away, illustrating the hanger racks mounted thereon and the hosiery hangers suspended from the racks;

Fig. 4 shows a horizontal section through an

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intermediate part of the cabinet with the doors closed and with the hosiery carrying truck removed;

Fig. 5 shows a perspective view of the rear and one side of the steam treating cabinet shown in Fig. 1, illustrating the apparatus for controlling the admission and exhaust of steam, the admission of air and the control of successive steps of the cycle performed within the cabinet; and

Fig. 6 shows diagrammatically the circuit connections of the various units of apparatus by which the cycle of operation of the apparatus is effected and controlled.

As illustrated in the drawings, the invention comprises a cabinet 10, formed of metal, having a base 11 upon which are mounted the vertical walls comprising side walls 12 and a rear wall 13 which are connected at their upper edges by the top wall 14. The entire forward side of the cabinet is open but is adapted to be closed by the doors 15 which are carried by hinges 15a attached to the forward edges of the side walls 12. As shown particularly in Fig. 4, the side walls 12 and the rear wall 13 are formed as inner and outer sheet metal shells, thus providing intervening air spaces 16 which may, if desired, be filled with heat insulating material. The inner and outer shells are separated and spaced apart by vertical angle bars 17 and other angle bars 18 are connected to the inner and outer shells at the corners of the structure.

The bottom wall comprises a bottom plate located within the base 11 and this bottom plate has mounted above it the upper bottom shell 19 which is in the form of a flat plate extending continuously across the bottom of the cabinet but having its lateral edges spaced slightly from the side walls 12 and the rear wall 13 as shown at 20 in Fig. 4 to permit the flow of steam upwardly around the plate 19 from the space between the upper and lower shells of the bottom wall. These upper and lower shells of the bottom wall are spaced apart by a plurality of channel members 21 which radiate outwardly from the center of the bottom wall. The plate 19 is thus firmly supported and at the same time a number of channels are provided for distributing steam beneath the plate 19 and for facilitating the drainage of water of condensation along the bottom shell of the bottom wall toward the center of this plate which is depressed and which has connection with a drainage pipe 22. Steam is supplied to the space between the upper and lower shells of the bottom wall through a pipe 23 which

has an opening through the bottom shell of the bottom wall as shown in Fig. 4.

The doors 15 have the same formation as the outer walls of the cabinet, i. e., they have inner and outer shells forming an intervening closed air space which may be filled with heat insulating material if desired. The angle-shaped frame members at the edges of the door are provided with sealing strips 25 of rubber or other compressible material so that a fluid-tight joint is formed when the door is closed. Along the outer edges of the doors and along their upper and lower edges these strips 25 are adapted to engage the edges of the stationary walls of the cabinet. Along its inner edge one of the doors carries a sealing strip 25 which is mounted at an angle to the plane of the doors as shown in Fig. 4, so that it engages a corresponding angularly disposed surface on the edge of the other door when they are closed. The doors are adapted to be locked in closed position by a locking bolt 26 carried by the door which overlaps the other at its inner edge and which is adapted to be actuated by a handle 27 through a toggle connection 28 so that the parts of the bolt 26 may be moved vertically for engagement with apertured lugs 29 which are mounted at the upper and lower edges of the door opening.

The rear wall 13 of the cabinet is provided with a rectangular opening 30 arranged to communicate with a housing 31 attached to the rear of the cabinet, shown in Fig. 5, and adapted to form a closure for a fan 32 driven by the fan motor 33. The opening 30 at the inner margin of the housing 31, which is normally closed by a louvre 34, provides a passage through which air driven by the fan 32 is projected into the cabinet when the motor 33 is in operation. The rear wall 13 of the cabinet is also provided with a circular opening 35 near its upper edge which communicates with a pipe 36 having mounted therein a damper 37 arranged to turn with its shaft 38 for the purpose of opening or closing the opening 35. This opening is provided for the purpose of permitting the steam within the cabinet to be ejected or exhausted when air is driven into the cabinet by the fan 32. This air is preferably heated in its progress through the housing 31 so that after the steam is ejected the hot air will have a drying effect upon the articles of hosiery which have been subjected to a steam treatment.

The louvre 34 is hinged at the upper edge of the opening 30 to swing inwardly so that it may be operated to open or close the opening 30 through an operating connection 39*a* extending to a crank 39 fixed on a horizontal shaft 40 pivotally mounted in bearings at the rear of the cabinet, as illustrated in Fig. 5. The shaft 38 has fixed thereon a crank arm 41 which is pivotally connected to a rod 42 extending downwardly and having a pivotal connection with a crank arm 43 fixed on the shaft 40. The end of this shaft has fixed thereon another crank arm 44 provided with a longitudinal slot which is engaged by a pin 45 fixed on the end of a rod 46 adapted to be moved endwise by the operation of a control motor 48 located in a casing 50 attached to the side wall 12. When the control motor 48 is operated the shaft 40 is turned to open the louvre 34 and at the same time open the damper 37 so that the steam and hot air will be discharged at the same time that the hot air is driven into the cabinet by the fan.

At the front of the cabinet there is provided an inclined ramp 52 over which there may be rolled the hosiery carrying truck 53 upon which the articles of hosiery are suspended during the heat treating operation. An inclined plate 54 is hinged on the lower edge of the bottom plate 19 of the cabinet and is adapted to be swung downwardly over the upper edge of the ramp 52 when the doors 15 are open so that the truck 53 may then be rolled into the cabinet on its wheels or rollers 55. The lateral wheels of this truck are adapted to travel between guide bars 56 which are secured to the bottom plate 19 and which diverge at their forward ends so that they direct the truck to a central position in the cabinet wherein the hosiery carried thereby will not contact with the walls of the cabinet.

The truck 53 comprises a rectangular lower frame 57 which is supported by the wheels 55 as shown in Figs. 1 and 2. The wheels are carried by brackets 58 which are mounted for pivotal movement about vertical axes, in the manner of casters, so that the wheels 55 may move angularly during the travel of the truck. To facilitate the turning of the truck and the movement of it into and out of the cabinet, the wheels 58 which are centrally located at the ends of the truck are at a somewhat higher elevation than the two wheels 55 at the sides of the truck so that the truck is adapted to be tilted on the side wheels and to travel normally on three wheels. At its ends, the truck is provided with end frame members 59 which are of inverted V-formation. These end frames are connected to the bottom frame 57 by inclined brace members 60 and are connected at their upper ends by a longitudinal bar 61 from which there extend in opposite directions a plurality of parallel rods 62 provided with enlargements 62*a* at their ends. Near the upper ends of the end frame members 59 there are provided transverse handles 63 by which the truck may be moved by the operator.

The rods 62 are adapted to support a plurality of hanger racks 65 from which the hosiery hangers 66 are suspended. These racks may preferably be of the form described and claimed in the copending application of George E. Dunn and Henry Richter, Serial No. 730,006, filed February 21, 1947, and the hosiery hangers suspended therefrom may preferably be of the form described and claimed in the copending application of William C. Wagener, Serial No. 715,801, filed December 12, 1946, now Patent No. 2,506,910, dated May 9, 1950. Each rack 65 comprises three longitudinal members 65*a* and three transverse members 65*b*. The longitudinal members are provided with recesses 65*c* at intervals for engagement by the hooks 66*a* of the hangers 66. Each hanger comprises a stem 66*b* having mounted at the lower end thereof a circular member 66*c* from which project upwardly a plurality of needles 66*d*. The stem has slidably mounted thereon a sleeve 66*e* which carries at its lower end a shroud 66*f* adapted to extend over the points of the needles when the articles of hosiery 67 have been placed thereon as shown in Fig. 3.

Since there are three pairs of projecting rods 62 on each side of the bar 61 of the truck, it is possible to mount six hanger racks 65 on the truck and, in the embodiment illustrated, each hanger rack is capable of carrying twelve hangers. It is normal practice to place four stockings on each needle and each of the hangers illustrated comprises six needles, so it is apparent that by the arrangement illustrated in the drawings it is possible to effect the steam treatment

of a very large number of stockings in one operation.

When a truck 53 has been loaded with the desired number of hanger racks 65 and hangers 66 having the stockings suspended therefrom, the truck 53 is rolled over the ramp 52 and the plate 54 into the chamber of the cabinet, where it occupies a position such as that illustrated in Fig. 1. The plate 54 is then turned upwardly into the cabinet and the doors 15 are closed, whereupon the locking bars 26 are operated to secure the doors in closed position. The closing of the doors 15 is adapted to set in operation the steps of the treating cycle which take place automatically in response to the operation of the circuit which is illustrated diagrammatically in Fig. 6. The controlling apparatus includes the fan 32, fan motor 33, louvre 34, damper 37, and control motor 48 which have previously been referred to and also various other pieces of apparatus which are illustrated in Fig. 5 and diagrammatically in Fig. 6. These additional units of apparatus include a switch 70 adapted to be closed by the operation of closing the door, a temperature controller 71 responsive to the temperature within the chamber of the cabinet for determining the point at which the steam treating operation begins, a timer 72 for controlling the duration of the steam treatment at the predetermined temperature which is fixed by the controller 71, a timer 73 for controlling the duration of the exhaust period throughout which the air is discharged into the cabinet by the fan 32, a solenoid operated steam valve 74 for controlling the admission of steam from a source of supply to the cabinet, a relay 75, a second relay 76 and a third relay 77. All of these parts are connected in an electric circuit comprising line conductors 81 and 82 which have fuses 83 and 84, respectively, connected therein, and which lead through the double pole switch 85 by which a connection is established with other conductors leading to the various devices connected in the circuit. This circuit also includes a pilot light 86 which is energized at the conclusion of the cycle to indicate to the operator that the cycle has ended.

As shown in Fig. 5, the steam is supplied through a pipe, not illustrated, leading to the valve 90 from which a pipe 91 leads to the housing 31 for heating a suitable radiator or the like by which the air discharged into the cabinet is heated. From the valve 90 another pipe 92 leads through a pressure regulator 93 to the solenoid valve 74 and from this valve the steam passes to the pipe 23, previously referred to, which leads through the lower shell of the bottom wall of the cabinet. The timers 72 and 73 as well as the control motor 48 are located in the casing 50 and the temperature controller 71 is mounted on the wall of the cabinet as shown in Fig. 5. This controller has a connection 95 extending to a thermostat 96 mounted in an aperture in the wall of the cabinet so that it is responsive to the temperature within the cabinet.

At the beginning of the operation of the apparatus, the switch 85 is manually closed, and then upon closing the doors 15 of the cabinet, the limit switch 70 is closed, thereby energizing the coil of the solenoid valve 74 through a circuit comprising the line conductor 81, switch 70, switch 85, conductors 97 and 98, contact 94, conductor 99, switch arm 100 of the timer 72, contact 101, conductor 102, terminal 103, conductor 104, solenoid valve 74, and conductor 105, contact 106 of the temperature controller 71, switch arm 107 of the temperature controller 71, and conductors 108, 109, 110 and 111 to the other line conductor 82.

The valve 74 is normally closed but when the temperature in the cabinet is below the predetermined value desired, the switch arm 107 engages the contact 106, as just described, thereby opening the valve and admitting steam to the cabinet promptly after the closing of the doors 15.

When the temperature in the cabinet arrives at the desired value, the switch arm 107 of the controller 71 moves into engagement with the contact 112, thereby causing the solenoid valve 74 to open and closing the relay 75 to start the operation of the timer 72 which controls the duration of the steam treatment. This circuit leads from the line conductor 81 through switch 85, conductors 97 and 114, relay coil 75a, conductor 115, relay contact 116, relay contact bar 117, contact 118, and conductors 119, 110 and 111 to the other line conductor 82. This circuit through the relay 75 maintains the circuit of the timer 72 even though the temperature drops in the cabinet after the timer is started in operation.

At the same time that the holding circuit just described is established the timer 72 starts operating to measure a period of duration of the steam treatment corresponding to the setting of the pointer of the timer. This timer operating circuit includes the line conductor 81, conductors 97 and 98, terminal 94, conductor 99, switch arm 100, contact 101, conductor 102, terminal 103, conductor 120, timer motor 121, conductor 122, terminal 123, conductors 124 and 115, contacts 116, 117 and 118, and conductors 119, 110 and 111 leading to the line conductor 82.

The timer 72 then operates through the steam treating period at the end of which the switch arm 100 of this timer drops down into engagement with the contact 125, thereby opening the circuit of the timer motor 121 and at the same time establishing the circuit of the field of the control motor 48. This last mentioned circuit includes the line conductor 81, switch 85, conductors 97 and 98, terminal 94, conductor 99, switch arm 100, contact 125, conductor 126, terminal 127, conductors 128 and 129, terminal 130 of the control motor 48, field winding 48a, terminal 131, and conductors 132, 110 and 111 leading to the other line conductor 82.

The control motor controls the operation of the damper, the fan motor and the louvre during the exhaust period. In order to operate the control motor it is necessary to complete the circuit of the wiring 48b connected between the terminals 133 and 134 and this is effected through the operation of the relay 77 through a circuit comprising a line conductor 97, switch 85, conductors 97 and 98, terminal 94, conductor 99, switch arm 100, contact 125, conductor 126, terminal 127, and conductors 128, 135, terminal 136 of timer 73, conductor 137, switch arm 138 of timer 73, contact 139, conductor 140, terminal 141, conductors 142 and 143, coils 77a of the relay, and conductors 144, 110 and 111 to the other line conductor 82.

When the coil 77a of the relay 77 is energized, the contacts 133 and 134 of the control motor are closed through a circuit comprising the conductor 145, the contacts 146, and the conductor 147. At this time, the timer 73 is also started in operation through a circuit which extends from the terminal 127 of the timer 72 through

the conductors 128 and 135, terminal 136, conductor 137, switch arm 138, contact 139, conductor 140, terminal 141, conductor 148, timer motor 150, conductor 151, terminal 152, and conductors 119, 110 and 111 extending to the line conductor 82.

When the timer 73 starts to operate, the fan motor 33 is also caused to operate through circuit connections which extend from the line conductor 81 through the switch 85, conductors 97 and 98, terminal 94, conductor 99, switch arm 100, contact 125, conductor 126, terminal 127, conductors 128 and 135, terminal 136, conductor 137, switch arm 138, contact 139, conductor 140, terminal 141, conductor 142, fan motor 33, and conductors 110 and 111 leading to the other line conductor 82.

The fan motor 33 then operates to cause heated air to be driven into the cabinet and the steam and air to be withdrawn therefrom through the exhaust period which is determined by the setting of the pointer of the timer 73. At the end of this exhaust period, the contact arm 138 of the timer 73 drops down into engagement with the contact 154 of this timer to stop the timer motor 150 and at the same time the relay 77 is deenergized to stop the fan motor 33.

When the relay 77 is deenergized, its armature drops down and connects the conductor 147 with the conductor 155, thereby connecting the terminals 134 and 156 of the control motor which actuates the control motor to close the louvre 34 and the damper 37.

The stopping of the motor of the timer 73 establishes a circuit leading from the line conductor 81 through the connections of the timer 72 to the terminal 127 and thence, through the conductor 135, terminal 136, conductor 137, switch arm 138, contact 154, conductor 158, terminal 159 and conductor 160 to the heater element of the time delay relay 76, from which the conductors 161, 109, 110 and 111 lead to the line conductor 82. When the time delay relay 76 operates, the circuit of the pilot light 86 is established through the conductor 162 leading from the relay to the conductor 111 and the line conductor 82, thereby indicating to the operator that the doors 15 may be opened and the truck 53 with its load of hosiery removed from the cabinet.

Although one form of the invention has been shown and described by way of illustration it will be understood that it may be constructed in various other embodiments which come within the scope of the appended claims.

I claim:

1. In presetting apparatus of the class described, a cabinet, means in said cabinet for supporting fabric articles, means for introducing steam into said cabinet, means for thereafter exhausting said steam from said cabinet, means for automatically determining the duration of the introduction of steam, the duration of the exhaust and the interval between the introduction of steam and the exhaust, a signal, and means for automatically actuating said signal a predetermined interval after the termination of the exhaust.

2. In presetting apparatus of the class described, a cabinet having an air inlet port and an exhaust port, means for supporting fabric articles in said cabinet, means for introducing steam into said cabinet, means for introducing air through said inlet port and exhausting steam and air through said outlet port, and means for automatically controlling the opening and closing of said ports and said introduction of steam and said exhaust of steam and air.

3. In presetting apparatus of the class described, a cabinet having an air inlet port and an exhaust port, means for supporting fabric articles in said cabinet, means for introducing steam into said cabinet, means for introducing air through said inlet port and exhausting steam and air through said outlet port, means including a control motor for opening and closing said ports, means including motor driven timers for controlling the starting and duration of the steam introduction and exhaust periods, and an electric circuit including said motor and said timers.

4. In presetting apparatus of the class described, a cabinet having an air inlet port and an exhaust port, means for supporting fabric articles in said cabinet, means for introducing steam into said cabinet, means for introducing air through said inlet port and exhausting steam and air through said outlet port, means including a control motor for opening and closing said ports, means including motor driven timers for controlling the starting and duration of the steam introduction and exhaust periods, an electric circuit including said motor and said timers, and a signal device connected in said circuit and adapted to be actuated a predetermined interval after the termination of said exhaust period.

5. In presetting apparatus of the class described, a cabinet having a door opening, doors for closing said opening, means in said cabinet for supporting fabric articles, means for introducing steam into said cabinet, said cabinet having inlet and exhaust ports, means for introducing air under pressure through said inlet port and thereby causing steam and air to be exhausted through said outlet port, means for opening and closing said ports, means for automatically controlling the timed relation and the duration of said steam and air introducing means and said port opening and closing means, and means actuated by the closing of said doors for initiating the operation of said controlling means.

6. In presetting apparatus of the class described, a cabinet having a door opening, doors for closing said opening, a hosiery supporting truck movable through said opening into said cabinet, means for introducing steam into said cabinet, and means actuated by the closing of said doors for starting the operation of said steam introducing means.

7. In presetting apparatus of the class described, a cabinet having a door opening, doors for closing said opening, a hosiery supporting truck movable through said opening into said cabinet, means for introducing steam into said cabinet, means actuated by the closing of said doors for starting the operation of said steam introducing means, means for exhausting steam from said cabinet, and means for automatically controlling the duration of operation of said steam introducing means and said exhausting means.

8. In presetting apparatus of the class described, a cabinet having outer walls and upper and lower floor shells, said upper shell having its marginal edges spaced from said outer walls to provide a steam inlet, means for supporting fabric articles in said cabinet, and means for introducing steam into the space between said shells.

9. In presetting apparatus of the class described, a cabinet having outer walls and upper and lower floor shells, said upper shell having its

marginal edges spaced from said outer walls to provide a steam inlet, means for supporting fabric articles in said cabinet, means for introducing steam into the space between said shells, said lower shell having an outlet for steam condensate and having a slope toward said outlet, and spacing members between said shells radiating from said outlet.

10. In presetting apparatus of the class described, a cabinet, means in said cabinet for supporting fabric articles in a loose, unstressed condition within the cabinet, means for introducing steam into said cabinet in contact with said articles, said cabinet having an opening and an exhaust port in its wall, a housing communicating with said opening, and means in said housing for causing a flow of air under pressure through said opening into said cabinet.

HENRY RICHTER.

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