June 27, 1961 W. ISKEN ET AL 2,990,088

HOSIERY TREATING SYSTEMS

Filed July 8, 1957 4 Sheets-Sheet 1

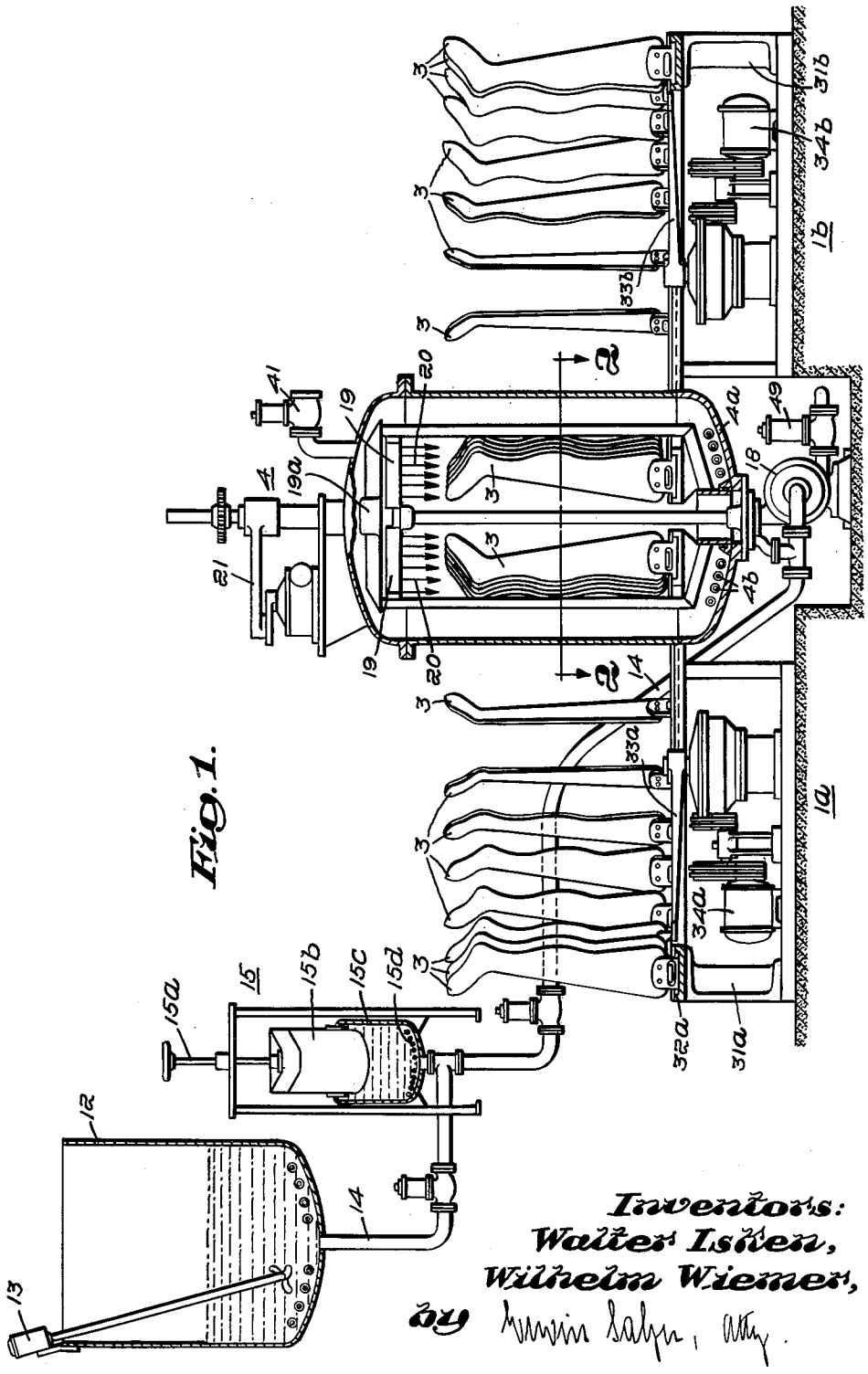


Fig. 1.

Inventors:
Walter Isken,
Wilhelm Wiemer,
by Irwin Salpeter, Atty.

June 27, 1961 W. ISKEN ET AL 2,990,088

HOSIERY TREATING SYSTEMS

Filed July 8, 1957 4 Sheets-Sheet 2

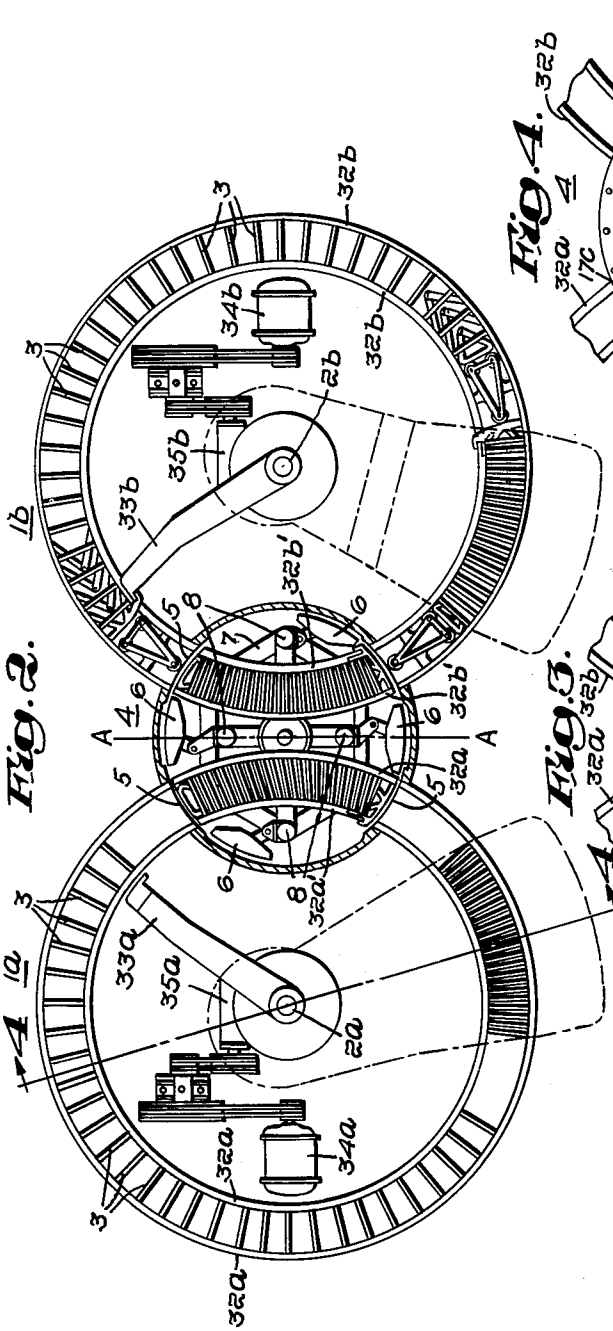


Fig. 2.

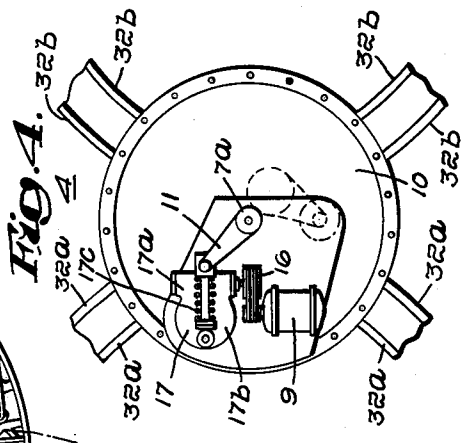


Fig. 4.

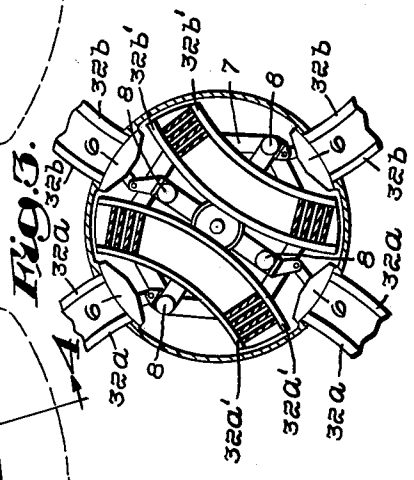


Fig. 3.

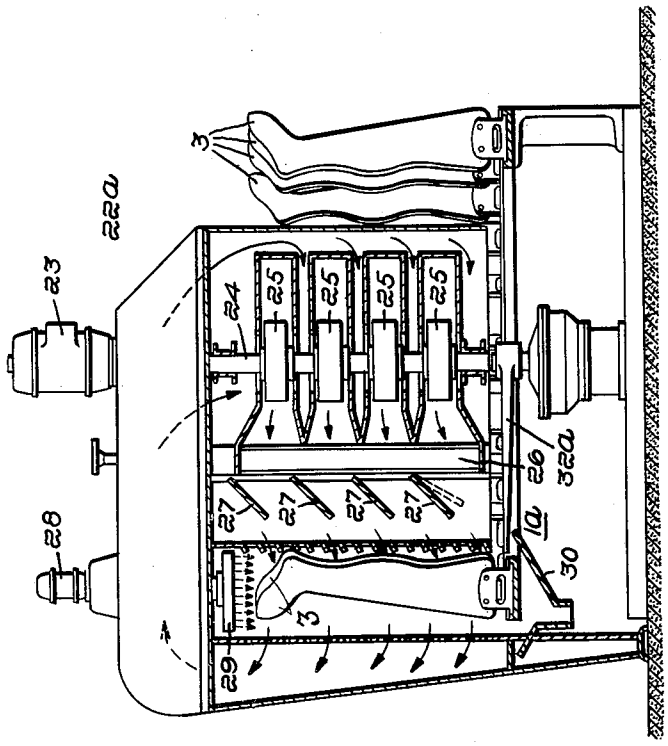
Inventors:
Walter Isken,
Wilhelm Wiemer,
by Irwin Lahn
Attorney

June 27, 1961 W. ISKEN ET AL 2,990,088

HOSIERY TREATING SYSTEMS

Filed July 8, 1957 4 Sheets-Sheet 3

Fig. 5.

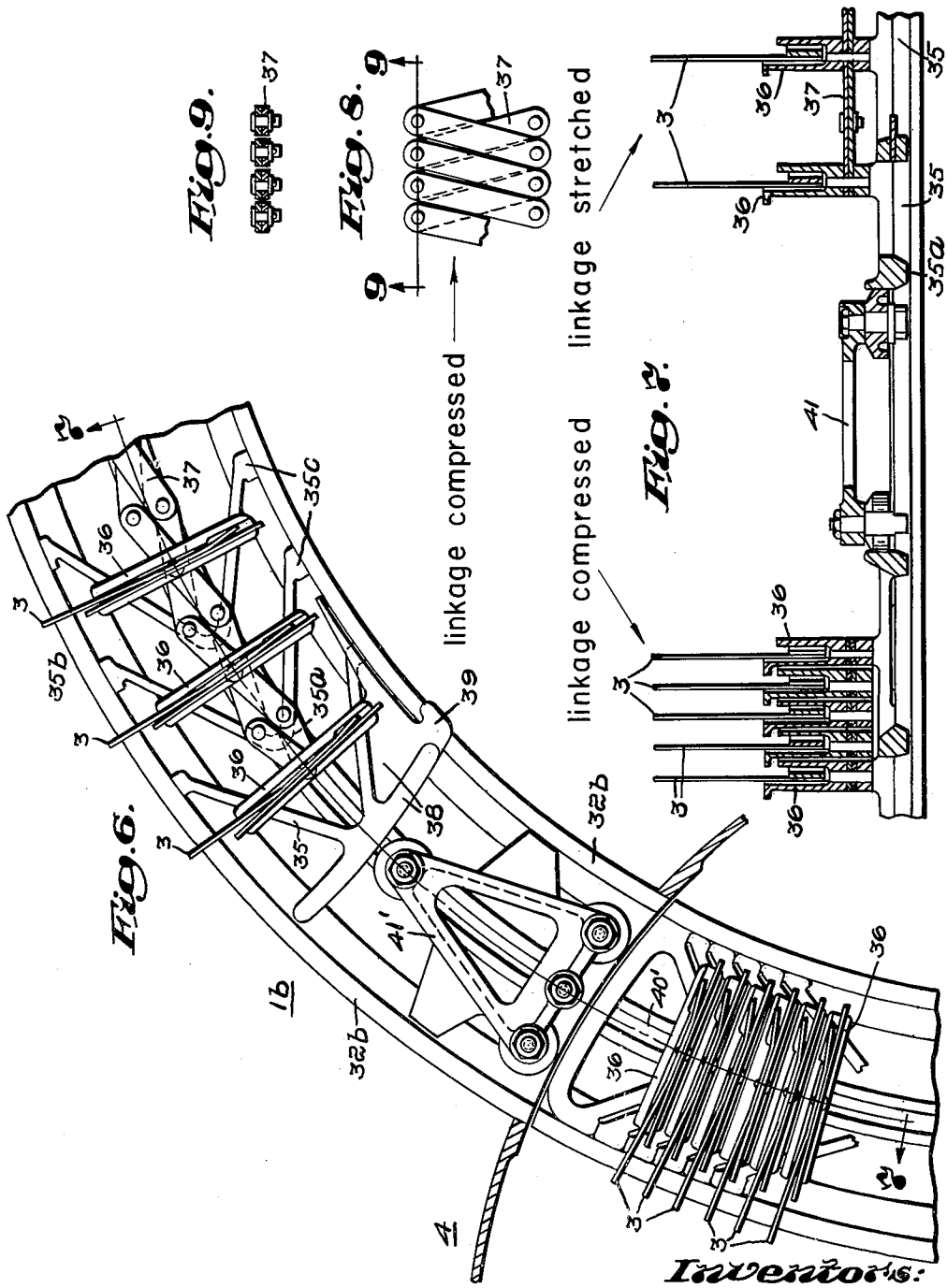


Inventors:
Walter Isken,
Wilhelm Wiemer,
by Irwin Lahn Attorney

June 27, 1961 W. ISKEN ET AL 2,990,088

HOSIERY TREATING SYSTEMS

Filed July 8, 1957 4 Sheets-Sheet 4



Inventors:
Walter Isken,
Wilhelm Wiemer,
by Lynwin Salyer
Attorney

United States Patent Office 2,990,088 Patented June 27, 1961

2,990,088

HOSIERY TREATING SYSTEMS

Walter Isken, Hagen-Haspe, and Wilhelm Wiemer, Schwerte, Germany, assignors to Emma Elfriede Bellmann, nee Vogelsang, Hagen-Haspe, and Ruth Kronsbein, nee Bellmann, and Friedhelm Bellmann, Hagen, Germany

Filed July 8, 1957, Ser. No. 670,615
Claims priority, application Germany July 18, 1956
6 Claims. (Cl. 223—76)

This invention has reference to systems for treating textile products, and more particularly to systems for treating hosiery.

The process of manufacturing knitted products made of synthetic fibers requires a relative large number of steps, or operations, some of which must be performed sequentially, and some of which must be performed simultaneously. Such steps, or operations, are known as pre-setting, scouring, dyeing, drying, etc. Some of the operations involved in making such textile products as hosiery can be carried out at atmospheric pressure, whereas others must be carried out at elevated pressures—such as, for instance, pre-setting—or under conditions of vacuum, i.e. at pressures below ambient pressure. The requirement of providing means for selective treatment at elevated pressures, or under conditions of a partial vacuum, briefly referred to as conditions of vacuum, calls for elaborate and bulky machinery, including fluid-tight tanks, which is relatively expensive to manufacture.

It is, therefore, one object of this invention to provide textile treating systems suitable for treating hosiery made of synthetic fibers which systems are less elaborate than comparable prior art systems, require less floor space than comparable prior art systems, and are less expensive to manufacture than comparable prior art systems.

The novel features that are considered characteristic of the invention are set forth in the appended claims. The invention itself, however, both as to structure and operation together with additional objects and advantages thereof will best be understood from the following detailed description of a preferred embodiment thereof when read in connection with the accompanying drawings wherein

FIG. 1 is in part a front view, and in part a vertical section, of a hosiery treating system embodying the present invention;

FIG. 2 is in part a top plan view of the system illustrated in FIG. 1 and in part a horizontal section along 2—2 of FIG. 1, some of the elements shown in FIG. 1 having been omitted in FIG. 2 and others added;

FIG. 3 shows a detali of FIG. 2 in a different position

FIG. 4 is a top plan view of the treating chamber shown in FIGS. 1 and 2 showing certain mechanisms arranged on the top of the treating chamber;

FIG. 5 is a vertical section along 4—4 of FIG. 2 showing details if an auxiliary treating chamber for effecting certain process steps at ambient pressure;

FIG. 6 shows a portion of FIG. 2 on a larger scale;

FIG. 7 is a section along 7—7 of FIG. 6;

FIG. 8 is a top plan view of a detail of the structure shown in FIG. 6 the constituent parts being shown in FIG. 8 in another position than in FIG. 6; and

FIG. 9 is a section along 9—9 of FIG. 8.

The particular embodiment of the invention shown in the drawings is an adaptation of the structure of U.S. Patent 2,811,032; October 29, 1957 to Eugen Bellmann, deceased, Textile Treating Chambers for the purpose of the present invention, and reference may be had to the aforementioned patent in regard to certain details of this kind of structure.

Referring now to the drawings, and more particularly to FIGS. 1 and 2 thereof, numerals 1*a* and 1*b* generally

indicate a pair of closed loop type conveyor lines. Each conveyor line 1*a*, 1*b* has a circular trajectory, the respective center of the trajectories of the two conveyor lines being indicated by the reference numerals 2*a* and 2*b*. The conveyor lines 1*a*, 1*b* may be of any desired construction, provided that each of both conveyor lines is adapted to move hosiery supports along its respective circular trajectory. Reference numeral 3 has been applied to indicate the individual hosiery supports movable along the circular trajectories of conveyor lines 1*a* and 1*b*. Each hosiery support 3 is adapted to maintain a piece of hosiery in raised inverted position. Conveyor lines 1*a*, 1*b* are arranged symmetrically in regard to the plane of symmetry A—A (FIG. 2). Reference numeral 4 has been applied to generally indicate a substantially fluid-tight treating chamber, i.e. a treating chamber adapted for both pressure treating and vacuum treating of hosiery. Treating chamber 4 is substantially in the shape of a cylinder having a vertical longitudinal axis. Treating chamber 4 is arranged to intersect with its vertical longitudinal axis the line 2*a*—2*b* interconnecting the centers of the circular trajectories of conveyor lines 1*a*, 1*b*. Chamber 4 is being bisected by the above referred-to plane of symmetry A—A of the two conveyor lines 1*a*, 1*b*. Treating chamber 4 has two pairs of door openings 5 for the passage of the two conveyor lines 1*a*, 1*b*. Numerals 6 indicate two pairs of door panels arranged inside chamber 4 for selectively closing and opening door openings 5. Door panels 6 are supported on a common support 7 adapted to rotate about the longitudinal axis of chamber or tank 4 to jointly move the four door panels 6 either to the closed position, or to the open position, thereof. Each door panel 6 is under the action of a crank mechanism 8 mounted on support 7 and adapted to move the respective door panel inside chamber 4 selectively radially inwardly and radially outwardly. FIG. 2 shows door panels 6 in their radially inner open position. FIG. 3 shows door panels 6 in their radially outer closed position, i.e. the position thereof causing closing of door openings 5. It will be apparent from FIGS. 2 and 3 that support 7 is being moved clockwise to close the open door panels 6 and counter clockwise to open the closed door panels 6.

FIG. 4 shows an electric motor 9 mounted on the top of chamber or tank 4 adapted to operate a crank mechanism 11 which, in turn, is adapted to move door support 7 selectively in door opening and in door closing direction. Motor 9 operates pulleys 16 which, in turn, operate a worm gear 17. The worm wheel of the latter operates crank mechanism 11. Reference numeral 17*a* has been applied to indicate that part of the housing of worm gear 17 which accommodates the worm thereof and reference numeral 17*b* has been applied to indicate that part of the housing of worm gear 17 that accommodates the circular worm wheel thereof. The left arm (as seen in FIG. 4) of crank mechanism 11 is surrounded by helical spring 17*c* preventing breakage of the door-operating-mechanism in case that jamming of any constituent part thereof should occur. The right lever (as seen in FIG. 4) of crank mechanism 11 is mounted on hollow shaft 7*a* which carries the aforementioned common support 7 for door panels 6. When motor 9 turns the left lever of crank mechanism 11 to its right limit position crank mechanism 8 inside of tank 4 moves door panels 6 from their open positions shown in FIG. 2 to their closed positions shown in FIG. 3. Closing and opening of door openings 5 by door panels 6 involves a rotary motion of the worm wheel of worm gear 17 of about 180 degrees.

Reference numeral 12 has been applied to indicate a storage tank for preparing treating liquids which tank is provided with an electric stirring device or mixer 13.

Pipes 14 connect the bottom of tank 12 with the bottom of treating chamber 4. The measuring device 15 for liquids is interposed between tank 12 and chamber 4 and comprises a screw threaded spindle 15*a* adapted to be operated manually by a hand wheel to selectively raise or lower a piston or plunger 15*b* adapted to project more or less into measuring cup 15*c*. The higher the position of piston or plunger 15*b*, the larger the internal volume of cup 15*c*, and vice versa. Cup 15*c* is provided at the bottom thereof with heating coils 15*d* to raise the temperature of the liquids intended to be supplied to chamber 4 to the required level. The pre-measured quantities of treating liquid are supplied from the measuring device 15 to chamber 4 by means of the motor driven pump 18. Pump 18 raises the treating liquid to the upper level of chamber 4 from where it is distributed by a system of spray nozzles 19. Reference numeral 20 has been applied to indicate sprays of liquid streaming down from nozzles 19 upon the hosiery on supports 3 arranged below nozzles 19. It is desirable to subject nozzles 19 to an oscillatory movement to better distribute the treating liquid upon the hosiery below nozzles 19. This can be achieved readily by means of a crank mechanism mounted on the top of treating chamber or tank 4. This crank mechanism has been omitted in FIG. 4 but is shown in FIG. 1 and indicated by reference character 21. The treating liquid dropping down is collected at the bottom 4*a* of tank 4 and re-circulated by means of pump 18. In FIG. 1 numeral 41 has been applied to indicate a valve for venting chamber 4 and numeral 49 has been applied to indicate a valve for admitting steam to chamber 4. Heating coil 4*b* in the bottom 4*a* of chamber 4 enables to maintain the treating liquid, or liquor, at the required temperature level. The mechanism for imparting an oscillatory motion to nozzles 19 has not been shown in detail. In FIG. 1 numeral 19*a* indicates a bearing for nozzles 19 allowing an oscillatory motion thereof around the vertical longitudinal axis of tank 4. This motion may be imparted to nozzles 19 by an eccentric roller (not shown) rotating in a horizontal plane and adapted to impart periodic push actions upon nozzles 19. The latter may be under the action of resetting springs (not shown). The oscillatory motions of nozzles 19 may be very small, i.e. be in the order of the spacing between contiguous nozzles, or in the order of ½ inch. The means for admitting fluid from pump 18 to nozzles 19 may include a length of flexible hose (not shown). Since the amplitudes of the oscillations of nozzles 19 may be very small, a short length of flexible hose affords ample freedom of motion to make it possible to supply nozzles 19 with treating fluid or liquor.

In some instances it is desirable to treat hosiery—in addition to its treatment inside of tank 4—at normal pressure, and this can, therefore, be effected in relatively inexpensive treating devices. One kind of treatment which can generally be effected at normal or ambient pressure is drying of the goods following their previous fluid treatment inside of chamber 4. In some instances it is desirable to subject hosiery to several liquid treatments of which some require elevated or lowered pressures, while others can be effected at ambient pressure. The system shown in FIG. 2 is adapted to comply with these requirements by the provision of two auxiliary devices 22*a* and 22*b* of which each is operatively related to one of the two conveyor lines 1*a*, 1*b*. In other words, each of the conveyor lines 1*a*, 1*b* is adapted to move the stocking supports 3 which it carries through one of the auxiliary devices 22*a*, 22*b* whose presence is optional rather than mandatory. Each of the auxiliary devices 22*a*, 22*b* is primarily a drier but can also be used for fluid treatment of hosiery at ambient pressure.

FIG. 5 illustrates one of the above auxiliary devices, say device 22*a*. Device 22*a* includes a frame structure and an electric motor 23 mounted on the top thereof driving a vertical shaft 24. Mounted on shaft 24 are four fans or blowers 25 adapted to blow air from right to left, as seen in FIG. 5. The air discharged by blowers 25 passes a heat exchanger 26, and is then guided by baffles 27 to conveyor line 1*a* passing between the hosiery which is being moved along the circular trajectory of conveyor line 1*a*. Auxiliary device 22*a* comprises further a small electric motor 28 adapted to oscillate a group of spray nozzles 29 arranged above conveyor line 1*a*. The liquid flowing down from spray nozzles 29 is collected in a trough 30 arranged below conveyor line 1*a* and may be recirculated by pump means (not shown). The means for imparting an oscillatory motion to spray nozzles 29 may be of the same kind as those for imparting an oscillatory motion to spray nozzles 19 described in connection with FIG. 1.

The economy inherent in the above system arises mainly out of the fact that a pair of conveyor lines 1*a*, 1*b* rather than one single conveyor line is operatively related to the expensive treating chamber 4, both conveyor lines 1*a*, 1*b* being adapted to jointly charge and jointly discharge treating chamber 4. It does not matter what type of closed loop conveyor lines are applied to move the hosiery in and out of chamber 4 and in and out of auxiliary devices 22*a*, 22*b*, provided that the conveyor lines are of such a nature as to permit substantially fluid tight closing of doors 5, 6 once chamber 4 has been charged.

The drawings show a type of conveyor lines which is widely used in the art, and which is particularly suited for carrying the invention into effect. Each conveyor line 1*a*, 1*b* comprises a frame structure 31*a*, 31*b* supporting on the top thereof a pair of circular rails 32*a*, 32*b* to guide the hosiery supports 3 along circular trajectories. Each rail 32*a*, 32*b* comprises a segment 32*a'*, 32*b'* which is supported by door support 7 rather than by the fixed frame structures 31*a*, 31*b*. Rail segments 32*a'*, 32*b'* are, therefore, jointly movable with door panels 6. FIG. 2 shows the rail segment 32*a'*, 32*b'* aligned with the rails 32*a*, 32*b*, which enables to move the hosiery supports 3 into and out of the treating chamber 4. FIG. 3 shows support 7, rail segments 32*a'*, 32*b'* and the hosiery supports 3 which rest on them turned or rotated in clockwise direction to effect registry between door panels 6 and the door openings 5 provided in treating chamber or tank 4. The hosiery supports 3 are joined together in groups by means of linkages (not shown in FIG. 2) and several of such groups are arranged on each conveyor line 1*a*, 1*b*. The left part of FIG. 2 and the right part of that figure show hosiery supports 3 whose spacing is relatively large, i.e. as large as the support-interconnecting linkages permit by which a plurality of individual hosiery supports 3 are held together to groups of such supports. The hosiery supports 3 which are situated inside of treating chamber 4 and inside of driers 22*a*, 22*b* are closely packed together, i.e. their spacing is as small as the support-interconnecting linkages permit by which a plurality of individual hosiery supports 3 are tied together to form groups of such supports. It will be apparent from FIG. 2 that the spacing between supports 3 is relatively large at such portions of the periphery of conveyor lines 1*a*, 1*b* where manual operations must be performed, such as charging conveyor lines 1*a*, 1*b* with hosiery. The spacing between the individual supports 3 is relatively narrow at such points of the trajectory of supports 3 where treating zones are formed, i.e. inside chamber 4 and inside driers 22*a*, 22*b*. Moving of supports 3 along their circular tracks 32*a*, 32*b* is effected by rotating arms 33*a*, 33*b* rotatable about center 2*a* and 2*b*, respectively. Arms 33*a*, 33*b* are being driven by electric motors 34*a*, 34*b* by the intermediary of transmissions including worm gears 35*a*, 35*b*. As seen in FIG. 2 arm 33*a* rotates in clockwise direction and arm 33*b* rotates in counterclockwise direction. The arms 33*a*, 33*b* comprise coupling means (not shown) for mechanically connecting the arms 33*a*, 33*b* to groups of hosiery

supports 3 and for disconnecting arms 33*a*, 33*b* from such groups. If one of the arms 33*a*, 33*b* is initially arranged between a compressed stack of hosiery supports 3 and an expanded stack of hosiery supports 3, and is moved in the direction from the compressed to the expanded stack of supports 3, the arm will compress the former by pushing it together and expand the latter by pulling it apart.

The structure shown might, if desired, be operated entirely manually but it is designed and intended for complete automation. This is true in regard to moving of the hosiery supports 3 along rails or tracks 32*a*, 32*b*, as well as to controlling the treating cycles, the condition of the treating liquors, such as temperature and pH-values, etc. Therefore suitable programming switches, automatic pH-value and temperature regulators, steam admission valves, vacuum pump control circuits, etc. form integral parts of the system shown. Since such automatic control means are well known in the art, and do not form part of the present invention, they need not be described here in detail.

Referring now to FIGS. 6 to 8, inclusive, FIG. 6 shows on a larger scale the portion of tank 4 and the portion of conveyor line 1*b* immediately adjacent thereto shown in FIG. 2 on the upper right. Each track formed by rails 32*b*, 32*b* may support 3 times 30 individual hosiery supports 3. Rails 32*b*, 32*b* guide a plurality of substantially V-shaped elements 35. The narrow end 35*a* of each element 35 is supported and guided by center rail 40', whereas the wide ends 35*b* of elements 35 engage rails 32*b*, 32*b*. Each element 35 is provided with clamping means 36 which, in turn, support the indivdual hosiery supports 3. Groups of elements 35 are interconnected by a parallelogram linkage 37 of the kind often referred to as lazy tongs. There are three such linkages on each conveyor 1*a*, 1*b* and consequently three groups of individual hosiery supports 3. FIGS. 2 and 5 show one linkage outside of tank 4 in expanded position in which the distance between supports 3 is maximal and one linkage inside of tank 4 in compressed position in which the distance between supports 3 is smallest. FIGS. 8 and 9 show the position of the individual or constituent links of a linkage 37 when compressed. The first V-shaped element 35 in each group of such elements is provided with elements 38, 39 forming part of a coupling cooperating with the radially outer ends of arms 33*a*, 33*b*. Each group of elements 35 is spaced from the adjacent group of elements 35 by a spacing member 41'.

Assuming one of the linkages 37 to be compressed and assuming that the radially outer end of arm 33*b* engages, or is coupled with, parts 38, 39 and moves in counterclockwise direction. As a result linkage 37 will assume the position which is marked as stretched position in FIG. 7. Thereupon arm 33*b* is caused to engage the parts 38, 39 of the group of elements 35 which is trailing the leading group of elements 35. Stretching of the linkage 37 of the first mentioned or trailing group of elements 35 by counterclockwise rotation of arm 33*b* causes compression of the linkage 37 of the last mentioned or leading group of elements 35. Hence all blocks 35 and forms 3 joined together by a linkage 37 move along rails 32*b*, 32*b* in a fashion similar to the movement of a caterpillar.

While the invention has been disclosed in accordance with the provisions of the patent statutes, it is to be understood that various changes and modifications may be made without departing from the spirit and scope of the invention. It is desired, therefore, that the appended claims be given broadest reasonable construction permissible in the light of the prior art.

We claim as our invention:

1. A treating system for hosiery comprising a tank defining a treating chamber substantially in the shape of a cylinder having a vertical longitudinal axis; a pair of conveyor lines having horizontal circular trajectories extending through said chamber, each of said pair of conveyor lines having a point of entrance into said chamber and a point of exit from said chamber, said pair of conveyor lines being arranged in such a way that the axes of rotation thereof are situated in a common plane with said vertical longitudinal axis of said chamber; a plurality of hosiery supports supported by each of said pair of conveyor lines, means associated with each of said pair of conveyor lines to move said plurality of supports along said pair of conveyor lines and through said chamber; said tank defining a first pair of door openings each situated at said point of entrance of one of said pair of conveyor lines into said chamber, said tank also defining a second pair of door openings each situated at said point of exit of one of said pair of conveyor lines from said chamber; two pairs of fluid-tight door panels for closing and opening said first pair of door openings and said second pair of door openings, and a power-driven operating mechanism for said two pairs of door panels to move said two pairs of door panels to closed positions and to open positions to allow treating of hosiery inside said tank at pressures different from atmospheric pressure with said door panels in closed positions and charging of said tank with hosiery by said pair of conveyor lines and discharging hosiery from said tank by said pair of conveyor lines with said door panels in said open positions.

2. A treating system for hosiery comprising a tank defining a treating chamber having a vertical plane of symmetry, a pair of horizontal circular tracks arranged symmetrically with respect to said plane of symmetry of said chamber and extending through said chamber, each of said pair of tracks having a point of entry into said chamber and a point of exit from said chamber, each of said pair of tracks comprising a fixed portion situated outside of said chamber and a movable portion situated inside of said chamber, a platform rotatable about a vertical axis arranged inside of said chamber and supporting said movable portion of each of said pair of tracks, a plurality of individual hosiery supports mounted on and slidably guided by each of said pair of tracks to slide along said pair of tracks, a pair of rotatable vertical shafts each arranged in the center of one of said pair of tracks, a pair of horizontal arms each supported by one of said pair of shafts, means associated with each of said pair of arms to move said plurality of individual hosiery supports along said pair of tracks into said chamber and out of said chamber, door openings defined by said chamber at said point of entry of each of said pair of tracks into said chamber and at the point of exit of each of said pair of tracks from said chamber allowing passage of said plurality of hosiery supports through said chamber, door panels arranged inside said chamber rotatable about said vertical axis relative to said tank into and out of registry with said door openings, and crank mechanisms adapted to move said door panels inside said tank radially inwardly and radially outwardly.

3. A treating system for textile products comprising in combination a pair of conveyor lines having spaced circular trajectories, a pair of separate treating posts for treating textile products on said pair of conveyor lines at ambient pressure each associated with one of said pair of conveyor lines, a common means for treating textile products on said pair of conveyor lines at a pressure different from ambient pressure, said common means comprising a single tank defining a treating chamber arranged in the path of movement of said pair of conveyor lines, each of said pair of conveyor lines entering said chamber and leaving said chamber, said tank defining door openings at the points of entrance of said pair of conveyor lines into said chamber and at the points of exit of said conveyor lines from said chamber, fluid-tight door panels cooperatively related to said door openings, and a power-driven operating mechanism for said door panels to move said door panels to closed positions and to open positions to allow treating of textile products inside said tank at pressures different from atmospheric

pressure with said door panels in said closed positions and charging said tank with textile products by said pair of conveyor lines and discharging textile products from said tank by said pair of conveyor lines with said door panels in said open positions.

4. A treating system for treating hosiery comprising in combination a pair of spaced horizontal circular tracks, a plurality of individual hosiery supports slidably mounted on and guided by each of said pair of tracks to slide along said pair of tracks, a pair of rotatable vertical shafts each arranged in the center of one of said pair of tracks, a pair of horizontal arms each supported by one of said pair of shafts, means associated with the radially outer ends of said pair of arms adapted to move said plurality of hosiery supports along said pair of tracks, a pair of separate treating posts for treating textile products on said pair of tracks at ambient pressure, each of said pair of treating posts being associated with one of said pair of tracks, a common means for treating textile products on said pair of tracks at a pressure different from ambient pressure, said common means comprising a single tank defining a treating chamber having a longitudinal vertical axis and being intersected by the trajectories of said pair of tracks, each of said pair of tracks entering said chamber and leaving said chamber, said tank defining door openings at the points of entrance of said pair of tracks into said chamber and at the points of exit of said pair of tracks from said chamber, fluid-tight door panels cooperatively related to said door openings, and a power driven operating mechanism for said door panels to move said door panels to closed positions and to open positions to allow treating of textile products inside said tank at pressures different from atmospheric pressure with said door panels in said closed positions and charging said tank with textile products by said pair of conveyor lines and discharging textile products from said tank by said pair of conveyor lines with said door panels in said open positions.

5. A treating system for textile products comprising a fluid-tight treating-chamber-defining tank adapted to withstand a predetermined difference in pressure between ambient pressure and internal pressure; means for establishing steam pressure inside said tank in excess of said ambient pressure; a pair of endless conveyor means each arranged on opposite sides of said tank and each having a circular horizontal trajectory extending through said tank, each of said pair of conveyor means having a point of entrance into said tank and a point of exit from said tank; said tank defining a first pair of door openings each situated at said point of entrance of one of said pair of conveyor means into said tank also defining a second pair of door openings each situated at said point of exit of one of said pair of conveyor means from said tank; two pairs of fluid-tight door panels for closing and opening said first pair of door openings and said second pair of door openings; and a plurality of supports for textile products to be treated inside said tank at elevated steam pressure carried by said pair of conveyor means and moved by said pair of conveyor means into said tank and out of said tank.

6. A treating system for hosiery comprising a fluid-tight treating-chamber-defining tank adapted to withstand a predetermined difference in pressure between ambient pressure and internal pressure, said tank being substantially in the shape of a cylinder having a longitudinal vertical axis and a predetermined diameter; means for establishing steam pressure inside said tank in excess of said ambient pressure; a pair of horizontal circular tracks having a substantially larger diameter than said diameter of said tank arranged on opposite sides of said tank, each of said pair of tracks having a point of entrance into said tank and a point of exit from said tank, each of said pair of tracks comprising a fixed portion situated outside of said tank and a movable portion situated inside of said tank, supporting means for said movable portion of each of said pair of tracks, a vertical shaft inside of said tank coextensive with said longitudinal axis thereof rotatably supporting said supporting means for said movable portion of said pair of tracks, said tank defining a first pair of door openings each situated at said point of entrance of one of said pair of tracks into said tank and said tank also defining a second pair of door openings each situated at said point of exit of one of said pair of tracks from said tank; two pairs of fluid-tight door panels for closing and opening said first pair of door openings and said second pair of door openings; a plurality of individual hosiery supports mounted on and guided by each of said pair of tracks and slidable along each of said pair of tracks, a vertical shaft arranged in the center of each of said pair of tracks, a horizontal arm rotatably supported by said shaft, and means associated with said arm to impart the rotary motion thereof to said plurality of individual hosiery supports to move said plurality of individual hosiery supports along said pair of tracks into said tank and out of said tank.

References Cited in the file of this patent

UNITED STATES PATENTS

2,574,970	Heldmaier	Nov. 13, 1951
2,646,194	Berger et al.	July 21, 1953
2,685,994	Haumiller et al.	Aug. 10, 1954
2,705,474	Siciliano	Apr. 5, 1955
2,811,032	Bellmann	Oct. 29, 1957
2,915,230	Brewin et al.	Dec. 1, 1959

FOREIGN PATENTS

702,434	Great Britain	Jan. 13, 1954
1,106,009	France	Dec. 12, 1955