June 28, 1938. H. JANSSEN 2,122,098

KNITTING MACHINE YARN HOUSING STRUCTURE

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Fig. 1.

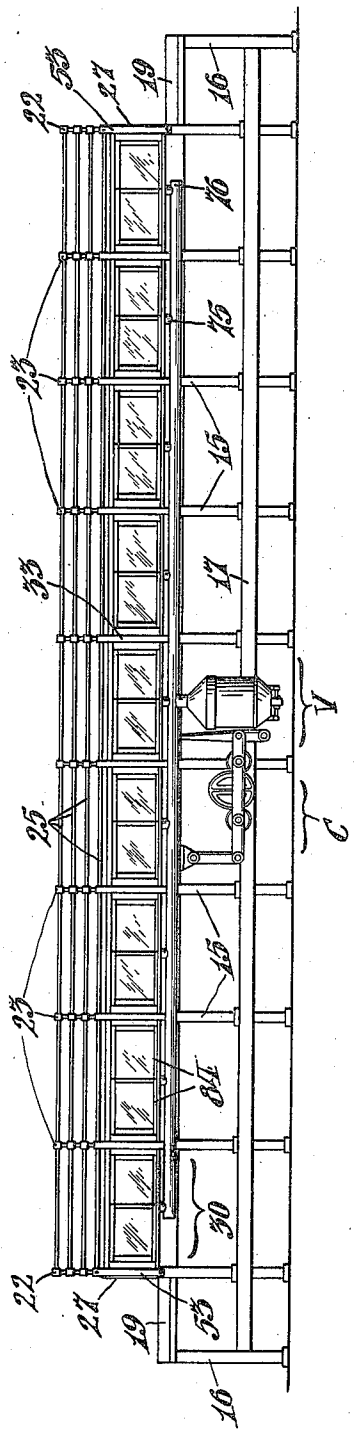


Fig. 5.

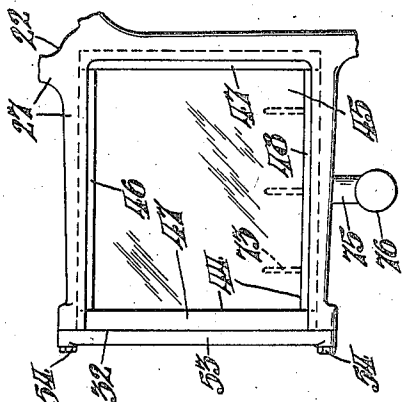


Fig. 4.

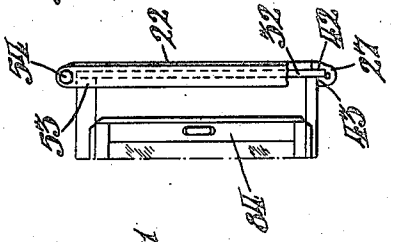


Fig. 3.

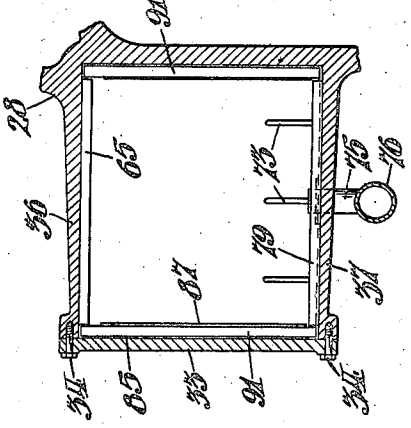
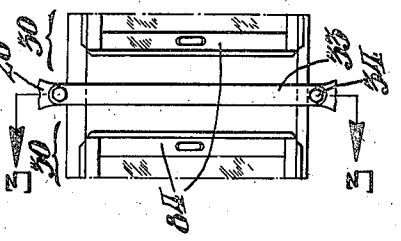


Fig. 2.



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KNITTING MACHINE YARN HOUSING STRUCTURE

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Fig. 6.

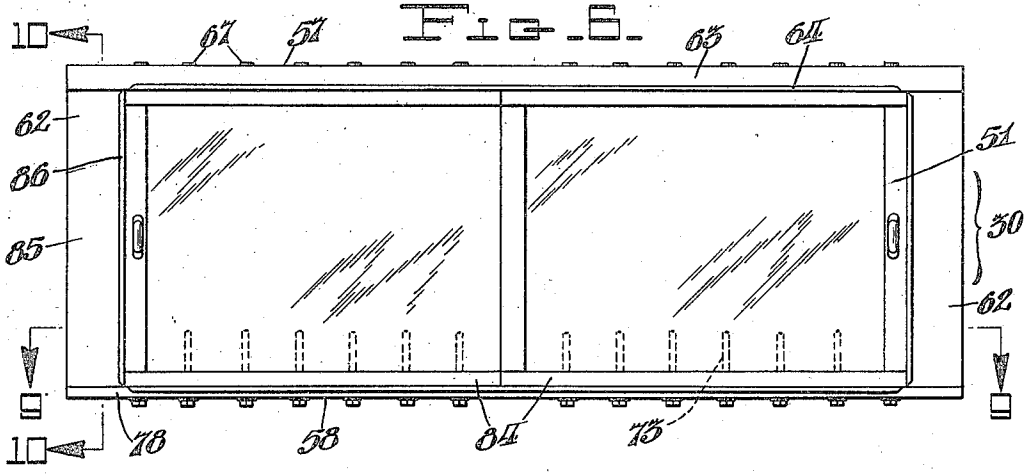


Fig. 8.

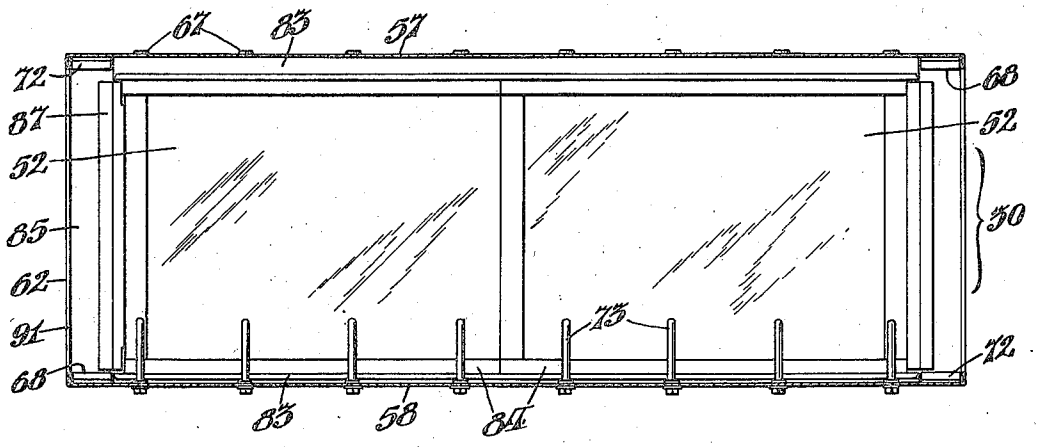
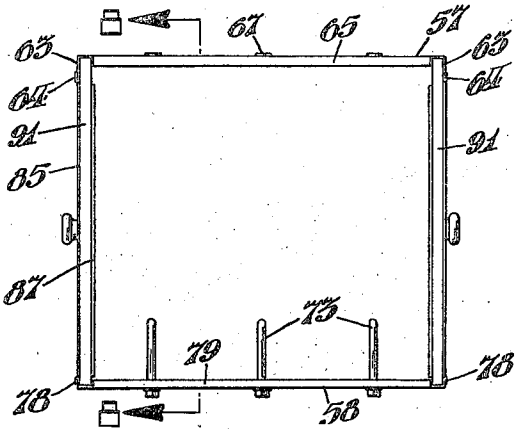


Fig. 7.



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KNITTING MACHINE YARN HOUSING STRUCTURE

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Fig. 9.

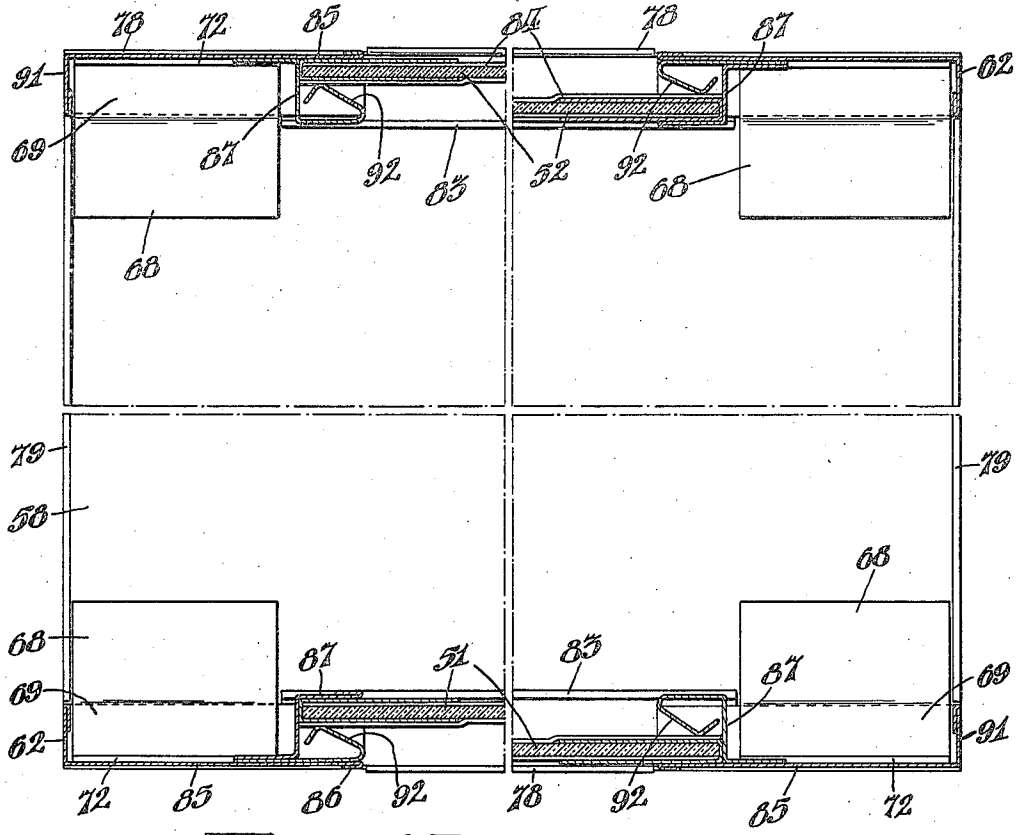
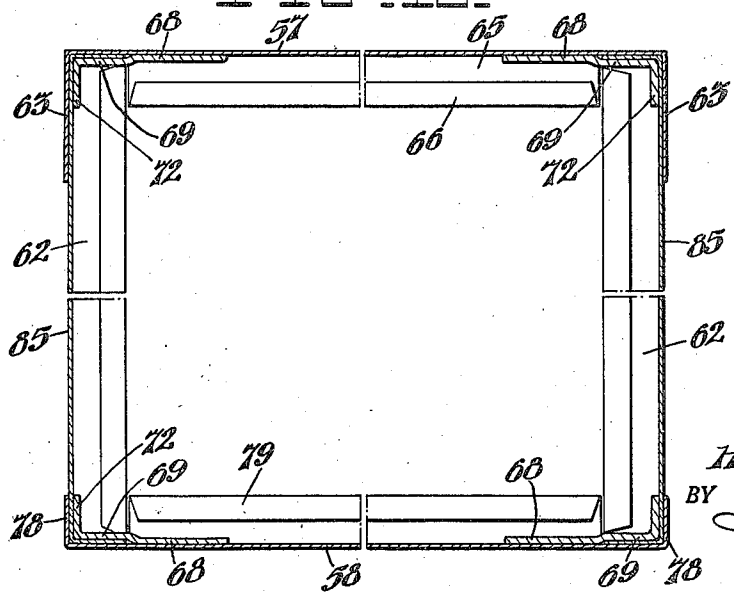


Fig. 10.



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KNITTING MACHINE YARN HOUSING STRUCTURE

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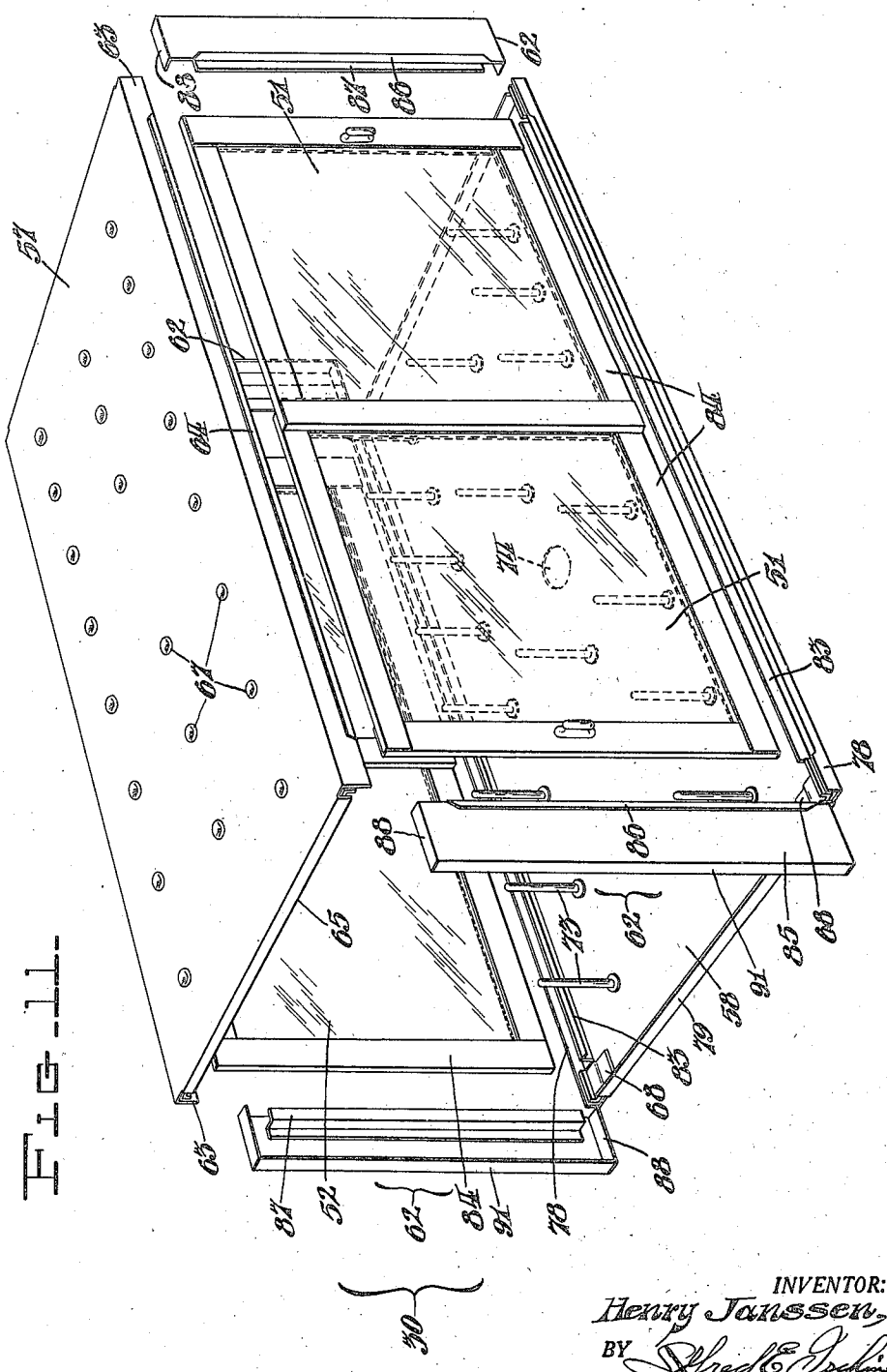


Fig. 11.

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KNITTING MACHINE YARN HOUSING STRUCTURE

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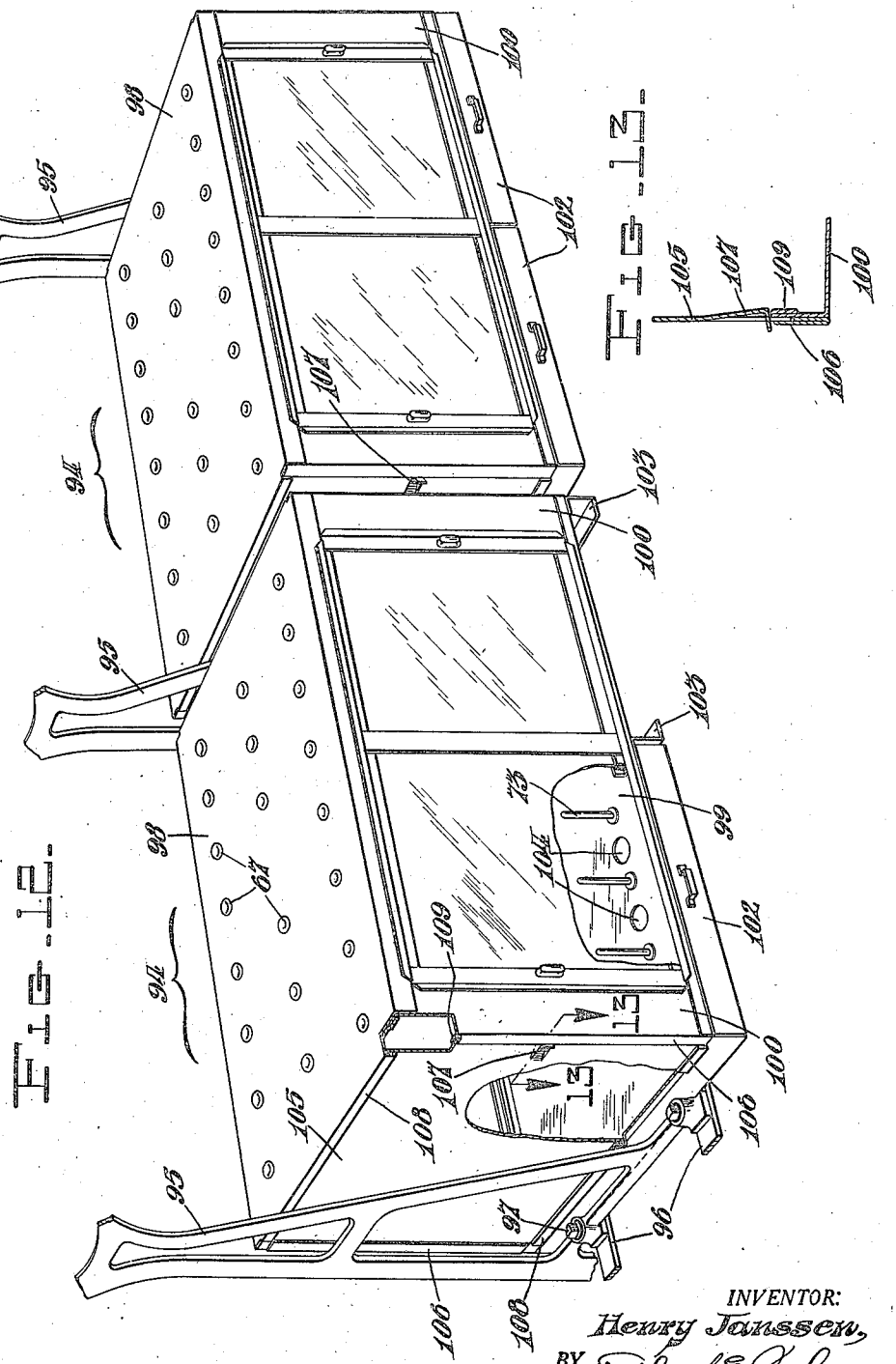


FIG. 12.

FIG. 13.

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KNITTING MACHINE YARN HOUSING STRUCTURE

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Fig. 14.

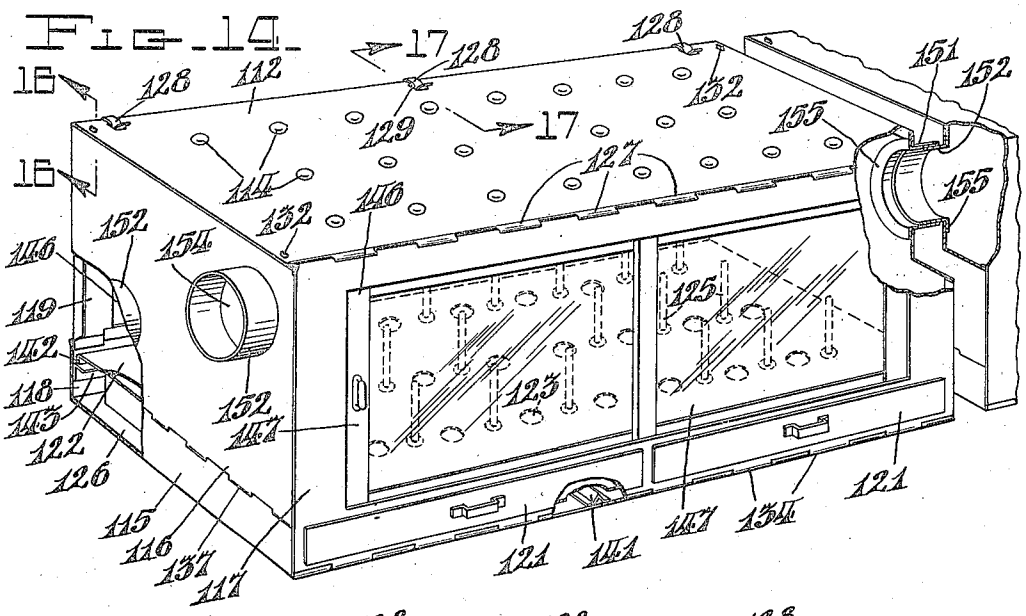


Fig. 15.

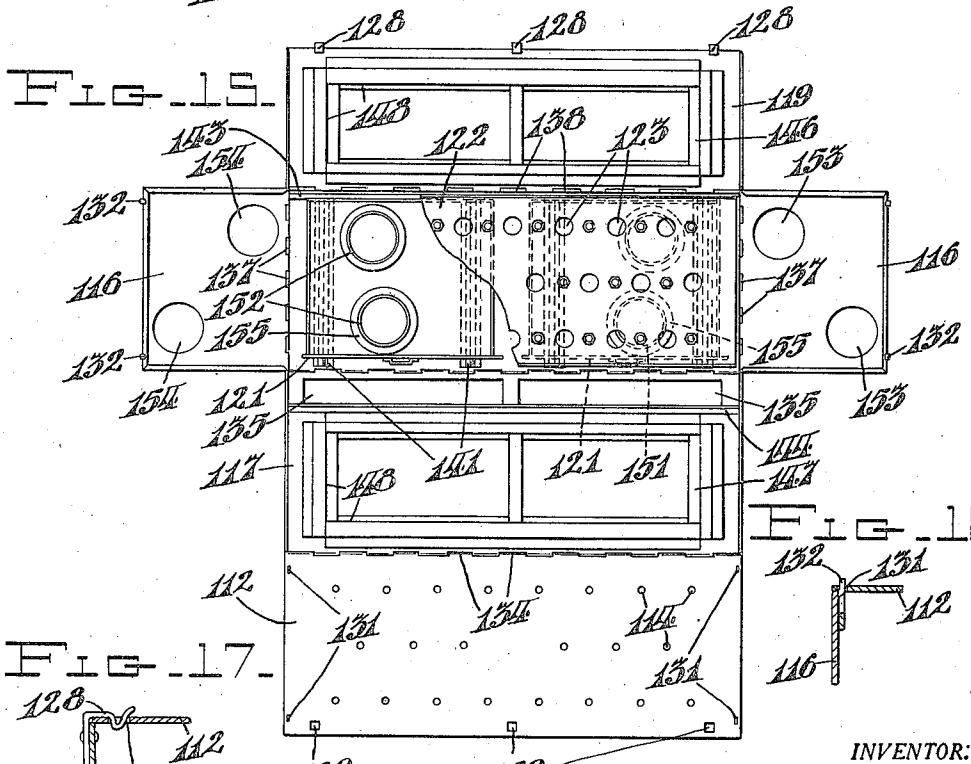
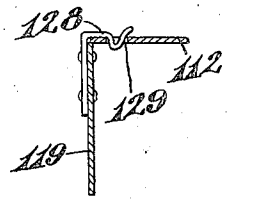


Fig. 16.

Fig. 17.



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KNITTING MACHINE YARN HOUSING STRUCTURE

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Fig. 18.

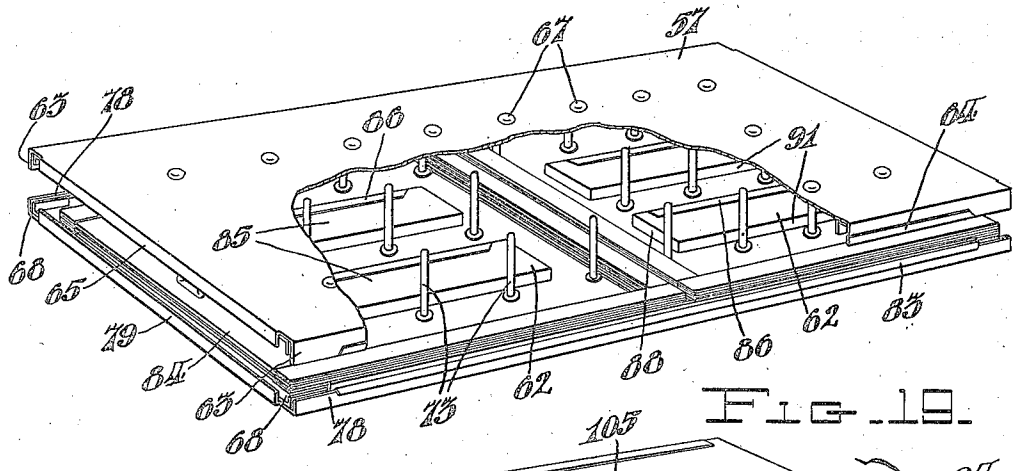


Fig. 19.

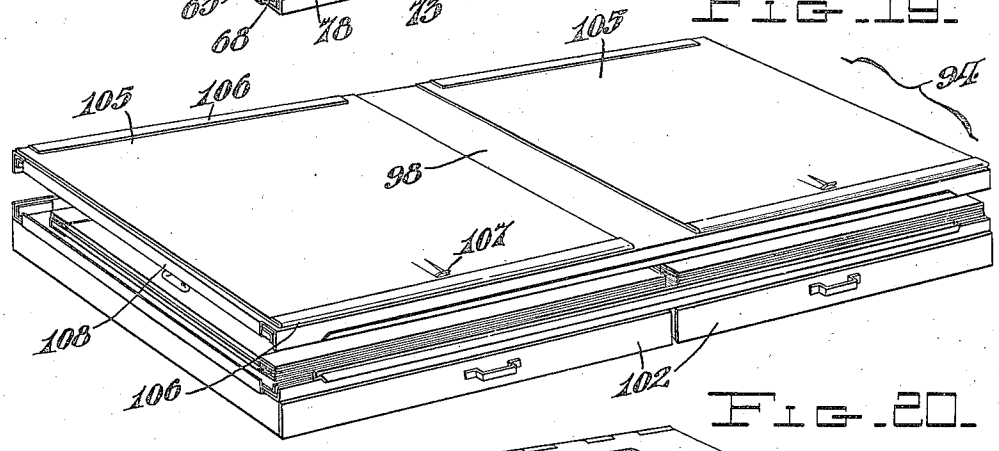
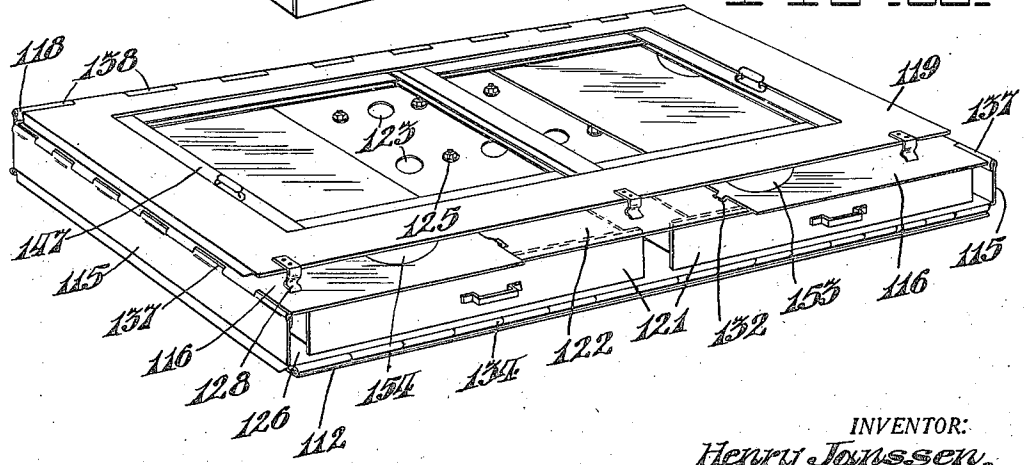


Fig. 20.



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Patented June 28, 1938 2,122,098

UNITED STATES PATENT OFFICE

2,122,098

KNITTING MACHINE YARN HOUSING STRUCTURE

Henry Janssen, Wyomissing, Pa., assignor to Textile Machine Works, Wyomissing, Pa., a corporation of Pennsylvania

Application October 23, 1936, Serial No. 107,118

20 Claims. (Cl. 66—125)

My invention relates to housing structures in which yarns are conditioned, as in textile operations, and particularly to structures of this character in which the yarns are subjected to treatment by a medium, such as vapor for feeding to full-fashioned stocking, and other straight, knitting machines.

Knitting machines, of the above-indicated character, have been provided with housings constructed of sheet metal and glass, in which yarn cones are subjected to humid air emanating directly from stationary water pools. These housings, in a multi-section machine, have usually been provided one for each pair of sections.

In my copending application, Serial No. 13,858, filed March 30, 1935, for the "Method of, and means for, effecting vapor treatment of yarn in a yarn fabricating machine", issued January 5, 1937, as Patent No. 2,066,781, it is suggested, first, that, instead of, or in addition to, the pools, a means, such as a power operated unit, be provided for producing vapor in the housings, and second, that one housing be provided instead of the several housings, or the latter be united into one, to maintain the vapor pressure and density for all the yarns substantially constant at any adjusted value.

In either construction, the housings, or housing sections, are subject to considerable interior fouling from the cumulative effects of continued wetting and the collection of lint from the yarns being fed therefrom, so that they should be cleaned frequently to ensure efficient working conditions and a good product.

Housings as heretofore constructed, with the body structure elements permanently fixed to each other, are not well adapted for cleaning, particularly in the corners and angles close to the intersections of the walls, where certain foreign matter and fungi may develop and remain, even after cleaning in a usual effective manner.

Machines having a housing for each pair of sections have been employed for many years, and from the origin thereof, and from the origin of the unit housing for all sections, the housing structures, to the best of my knowledge, have all been assembled, as by having the walls thereof, soldered, welded, crimped, or otherwise permanently sealed to each other. Injury to a casing sealed in this manner may require scrapping the casing, or destroying and renewing the permanent seals.

The casings, as thus constructed, require a greater variety of designs for the initially separate elements, thereby rendering the manufacture and assembly expensive. In a multi-section unit, this construction also requires the housing sections to be of three distinct species, namely a right-hand end section, a left-hand end section, and intermediate sections. Thus, if an operator desires to have on hand spare sections in case of injury to an installation, he is required to have at least a section of each species.

The housings or housing sections having the initially separate elements thereof permanently secured together, that is, in a way which requires a tearing apart, or some such destructive action, to disassemble them, although being of comparatively light weight, are unduly large and expensive to transport, compared to a group in which the elements may be arranged before assembly. It would be impractical to transport the separate parts of housings for such permanent assembly at the knitting mills.

An object of the invention is to provide a knitting machine yarn-containing housing structure that may be more readily and thoroughly cleaned than housings heretofore applied.

Another object of the invention is to render the permanent seals unnecessary, and to facilitate and economize manufacture, transportation, assembly, installation, repair, and replacement of parts, by providing a housing for transportation in disassembled condition with its elements grouped to occupy considerably less space than when operatively assembled, and which can be quickly assembled, and the elements attached to each other, without special tools or skill.

Another object is to provide a multi-section unit housing of the above-indicated character in which all the sections are interchangeable, irrespective of the positions thereof at end or intermediate portions of the unit, a novel end wall structure is provided, and other features are included to render the structure simple and durable in construction, economical to manufacture and effective in its operation.

With these and other objects in view, my invention resides in the elements of novel structure, combination and operation, exemplified by the drawings, and described in the specification and claims.

In the drawings:

Figure 1 is a view, in rear elevation, of a multi-section straight knitting machine, showing a multi-section yarn-treating housing of the invention;

Fig. 2 is an enlarged fragmentary detail view of an intermediate portion of the structure, as viewed in Fig. 1;

Fig. 3 is a view, taken along the line 3—3 of Fig. 2;

Fig. 4 is a view, similar to Fig. 2, of an end portion of the structure, as viewed in Fig. 1;

Fig. 5 is a view, in elevation, taken at right angles to Fig. 4;

Fig. 6 is an enlarged view, in elevation, of one of the housing sections, as viewed in Fig. 1;

Fig. 7 is a view, in end elevation, of the structure of Fig. 6;

Fig. 8 is a view, taken along the line 8—8 of Fig. 7;

Fig. 9 is an enlarged view, taken along the line 9—9 of Fig. 6;

Fig. 10 is a view, taken along the line 10—10 of Fig. 6;

Fig. 11 is an exploded perspective view of one of the housing sections of the multi-section housing of Fig. 1;

Fig. 12 is a perspective view, parts being broken away, of the invention in modified form;

Fig. 13 is an enlarged detail view taken along the line 13—13 of Fig. 12;

Fig. 14 is a perspective view, parts being broken away, of the invention in further modified form, in which the housings or housing sections, are of collapsible, or folding, construction;

Fig. 15 is a top plan view, on a reduced scale, of one of the housing structures of Fig. 14, opened out, from its operative condition of Fig. 14, onto the horizontal level of its bottom wall, in an intermediate folding condition for cleaning, or preliminary to final folding into a compact structure;

Fig. 16 is a detail view, taken along the line 16—16 of Fig. 14;

Fig. 17 is a view, taken along the line 17—17 of Fig. 14;

Fig. 18 is a perspective view, parts being broken away and omitted, of one of the unit housing sections of the invention shown in Figs. 1 to 11, inclusive, with certain body-structure members arranged in a disassembled compact group;

Fig. 19 is a perspective view of the structure of Figs. 12 and 13, also having certain body structure members arranged in a compact group; and

Fig. 20 is a view, similar to Fig. 19, of the structure of Figs. 14 to 17, inclusive, having certain body structure elements folded into a compact group, and other elements detached from associated parts and included in the group.

For clearness, only those elements, of a usual knitting machine for which the invention is adapted, are shown. Other elements of the machine, and the operation thereof, are shown and described in the "Reading" Full Fashioned Knitting Machine Catalogues, copyrighted 1929 and 1935, and published by the Textile Machine Works, Reading, Pennsylvania.

In practicing the invention in one form as a multi-section yarn-treating housing for a multi-section full-fashioned knitting machine, supporting means, such as upright brackets secured to the machine frame, are spaced from each other along the rear of the machine, with the intermediate upright brackets being like each other and of such width horizontally thereacross as to span, longitudinally of the machine, the vertical joints between adjacent housing sections. Each end bracket comprises means for receiving the corresponding end wall of the housing separately from the remainder of the housing. Clamps, cooperating with the brackets, hold the housing sections and the end walls in place.

Each housing section includes top and bottom walls having depending and upright edge flanges, respectively, extending toward the corresponding flanges on the other wall. Each corner of each wall is provided with means providing a telescopic joint for attaching the wall to one end of a corner upright supporting the top wall on the bottom wall. Grooves, extending longitudinally of the machine, at the front and rear of the top and bottom walls, provide slideways for metal-framed, slidable, glass-paneled doors. Bobbin pins on the bottom wall, and eyelets in the top wall, provide means for leading yarn from cones on the pins, through the eyelets, to the knitting mechanism.

The housing sections are arranged in end to end relation, in the form of a unit housing or receptacle for all of the yarns of a multi-section machine. Means including a vapor-producing device, and control mechanisms, not of this invention, are provided to simultaneously subject all of the yarns to the same vapor treatment.

The body structure elements of the housing are so selected, as to number and shape, for division, or ready separation from each other, as to enable them to be more readily, thoroughly and effectively cleaned individually, and effectively grouped to a size substantially less than the collective size thereof in operative assembly. This selection for division, in one form, takes into consideration the desirability of separately packing the glass door panels, and arranging the door frames around the bobbin pins, in an effective grouping with the other elements, which are not so readily subject to damage as the glass panels.

In this manner, cleaning, manufacture, transportation and assembly of the housing are greatly facilitated and economized, and a structure provided of which no counterpart has heretofore been known to me in the knitting art.

By having the housing or enclosure sections alike, and having separate end walls capable of cooperating with any of the sections, cleaning, manufacture, transportation and assembly are further facilitated and economized, in addition to rendering it unnecessary for an operator to have on hand, for a replacement, more than one species of housing section, as above mentioned.

A modification of the invention, from the structure briefly described above, is for use with a knitting machine of any desired type, or with only two sections of a multi-section straight knitting machine. Its elements, exclusive of its end walls, are substantially identical with the corresponding elements of one of the sections of the unit housing; the end walls being mounted directly thereon, and providing a certain rigidity to the housing and the structure having certain other novel features, to be hereinafter set forth. This structure likewise is adapted for separation of its body structure elements for effective cleaning individually, and for arrangement in a similar compact group.

The invention, in a further modified form, comprises a housing, or housing section, also for use with a knitting machine of any desired type, or with only two sections of a multi-section straight machine, and including certain body structure elements hinged to each other, and related to others, to facilitate cleaning the elements individually, and to enable them to be folded or moved into a compact group.

Referring to Fig. 1, a multi-section full-fashioned knitting machine comprises a support, and various working parts on the support, such as a coulier motion mechanism C, and others, which are not indicated. The support includes center frames 15, end frames 16, a back beam 17, and

a center bed 19. Gallows 22, secured to the machine frame at the ends of the machine, and gallows 23, secured to the machine frame intermediate the end brackets 22, support yarn-guide rods 25.

Brackets 27, secured to, or integral with, the end gallows 22, and brackets 28, similarly related to the intermediate gallows 23, support component sections 30 of the multi-section yarn-conditioning housing unit of my invention, which are interchangeable, and communicate with one another from an end wall 32, at one end of the multi-section housing unit, to a similar wall at the other end of the unit.

As indicated in Figs. 2 and 3, each intermediate bracket 28 is of substantially C-shape having its open side facing rearwardly of the machine, and its inner top, bottom and upright plane surfaces disposed in right-angular relation. An upright elongated clamp element 33 is secured, by screws 34, to top and bottom legs 36 and 37, respectively, of the bracket 28, and also has a plane inner face, which lies flat against plane side portions of the housing.

As better shown in Figs. 4 and 5, each end bracket 27 is also of substantially C-shape having its open side facing rearwardly of the machine, and its top, bottom and upright inner surfaces disposed in right-angular relation to each other.

However, instead of the flat-plane inner surfaces of the intermediate brackets 28, each end bracket 27 is provided with a pair of seats 42 and 43, the seat 42 of which slidably receives one of the end walls 32, and the seat 43 of which slidably receives the adjacent end of the adjacent housing section 30, independently of the corresponding end wall. The seat 42 has a groove into which the end wall 32 is thrust from the rear of the machine. After insertion, the end wall 32 cooperates with a flat-plane seat 43 to provide a rectangular corner seat for the adjacent housing section 30, and to seal the end of the housing.

The end wall 32 comprises a sheet metal frame 44, into which a glass panel 45 may be freely lowered, through a slot in its top cross member 46, into grooves in the upright and bottom members 47 and 48, respectively. The construction is similar to that of front and rear doors 51 and 52, Fig. 11, respectively, as heretofore constructed. However, the end walls of prior housings of this kind have not been constructed like the front and rear doors, nor have they contained slidably-mounted glass panels, so far as I am aware, but have been of sheet metal soldered or otherwise permanently fixed to the housing bodies. By my construction, the interior of the housing receives exterior light, irrespective of its direction and more of it, to further avoid mold.

A single means, for securing both the end wall and the adjacent housing end in position on the respective receiving means or seats 42 and 43 thereof, comprises a clamp 53, Fig. 5, similar to one of the clamps 33. The clamp 53 is similarly mounted, by screws 54, on the bracket 27, to hold the end wall 32 and the adjacent receptacle end in place. The upright clamp, as viewed in Fig. 4, spans across its width dimension, longitudinally of the machine, the vertical abutting front edges of the wall and the housing section, to assist in sealing the sections to each other.

As better seen in Figs. 6, 7, 8 and 11, each housing section 30, comprises, in general, sheet-metal elements including a top wall 57, a bottom wall 58, corner uprights 62, and the front and rear doors 51 and 52, respectively.

The top wall 57 is provided with depending front and rear flanges 63 extending the entire length of the wall, having upwardly return-bent reinforcing portions 64, terminating short of the wall ends adjacent to the corner uprights. Depending end flanges 65, extending nearly the full width of the top wall, have upwardly return-bent reinforcing portions 66 (Fig. 10). Eyelets 67, preferably of porcelain, are mounted, in openings in the top wall, for passing yarn from the housing to the knitting mechanism.

As better seen in Fig. 10, metal angle members 68 are fixed, as by welding, to the top wall 57. A horizontal leg of each angle member 68 has a portion welded in flat-plane engagement to the under surface of the top wall, and a portion 69, in downwardly offset parallel plane relation to the welded portion, providing a space between the top wall and the portion 69. A vertical leg 72 is disposed in offset parallel plane relation to a portion of the adjacent corner upright 62, thus cooperating with the above-mentioned space between the top wall and the portion 69 to form a slot of angle section, as better seen at the upper corners of Fig. 10, for the snug sliding, or telescopic, reception of a portion of corresponding angle section on the adjacent corner upright parallel to the plane of the adjacent door openings.

The bottom wall 58 supports bobbin pins 73, on which bobbins or cones of yarn are supported for feeding the yarn through the eyelets 67, and has a central opening 74 connected, by a short vertical conduit 75, to a long horizontal conduit 76, which communicates with a humidifier or vapor-producing unit V (Fig. 1). The bottom wall is provided with upturned front and rear flanges 78, similar to the top wall flanges 63, but of less vertical width. The wall 58 is also provided with end flanges 79 similar to the end flanges 65 of the top wall. Likewise, angle members 68 are provided on the bottom wall to form, in cooperation with the front and rear flanges 78, slots of angle section, for telescopically receiving bottom portions of the corner uprights. Intermediate the angle members 68, along each longitudinal edge of the wall 58, is an elongated angle member 83 (Fig. 11) facing oppositely to the angle members 68, and cooperating with the adjacent flange 78 to form a slideway or groove for the doors 51 and 52. Each of the doors 51 and 52 comprises two frames 84 in adjacent slidable side-by-side relation. The top wall 57 is also provided with angle members similar to the angle members 83, and cooperating with the front and rear flanges 63 to form an upper slideway for the doors 51 and 52.

Each of the corner uprights 62 has an oblong panel 85 having flanges normal thereto at three edges thereof, and a reinforcing portion 86 bent reversely around the fourth edge lengthwise of the panel. An upright element 87 of Z-section, secured to the front or rear wall 85, as by welding, cooperates therewith to provide a groove to receive an upright end edge of the adjacent door 51 or 52. A top edge wall 88 forms, with the wall 85, an angle element, which closely slidably fits the cooperatively paired angle groove element formed by the top wall 57, the flange 63, and the angle member 68 fixed to the wall 57. The bottom edge wall 89 forms, with the wall 85, an angle element which also closely slidably

fits the cooperatively paired angle groove element formed by the bottom wall 58, the flange 78 and the angle member 68 fixed to the wall 58. The edge walls 88, and the angle grooves therefor, are of sufficient length, in the direction of the telescopic fit thereof, to rigidly brace the body structure members or elements of the housing relative to each other. Also, a vertical flange 91, on the upright 62, operates to definitely limit the assembling telescopic movement of the paired telescopic elements above described.

In assembling one of the housing sections 30, the corner uprights 62 are first slid into the angle grooves at the corners of the bottom wall 58, and the top wall next placed, in detached temporary resting position on the tops of the uprights, near its operative position. Next, as permitted by inherent resiliency or play provided in the parts, the uprights are tilted about the bottoms thereof as fulcrums, sufficiently to admit the top ends into the top angle grooves. These operations are generally performed one after another by one operator, although they may be performed two or more at a time by more than one operator.

With the parts assembled, as aforesaid, the flanges 91, on the uprights 62, cooperate with the flanges 65 and 79, on the top and bottom walls, respectively, to form composite flanges disposed around the transverse perimeter of the housing, at each end thereof, for abutting relation to corresponding flanges on a next adjacent housing section, or to one of the end walls 32. The doors 51 and 52 may be inserted in position, before or after mounting the housing on the brackets. As shown in Fig. 9, spring clip-like elements 92 are provided as anti-rattle means for the doors. The vertical width of the flanges 63 is sufficient to permit the doors to be lifted, during insertion, to a relatively high position thereunder, and to be dropped into the lower channels, while still held by the flanges 63, in an operation which is old in the art.

The doors 51 and 52 comprise unit metal frames, into top slots of which the glass panels can be inserted as in the case of the end walls, above set forth, and forming no new part of the invention. Thus, in grouping the parts for transportation, the glass panels may be readily removed, packed specially, and handled separately from the metal members.

As indicated in Fig. 18, the metal members are grouped for transportation, as by placing the bottom wall in its natural, or horizontal-plane, position, with the bobbin pins projecting upwardly. The frames of the doors 51 and 52, and of the end walls 32, may be grouped about, or in the spaces between, certain of the bobbin pins, and the corner uprights placed in horizontal flat position in the group, under, over, or between, the door and end wall frames. This group is of substantially less overall size, compared to the collective size thereof in the operatively assembled housing, thus greatly facilitating handling and transportation, conserving the cost, and protecting the structure to a considerably greater extent against damage. Since there are only two end walls for the entire housing, these may be placed in the compact group of the parts of any of the housing sections, as are the end walls of individual housings indicated in Fig. 19.

In mounting the housing, the sections 30 may be placed one at a time, each between a pair of brackets. Each pair of brackets is made up of two of the intermediate brackets 28, or of one of the end brackets 27 and one of the intermediate brackets 28. With the clamps 33 and 53 in place, and the conduits 75 connected to the respective housing sections, the vapor-producing unit V may be operated, as in the above-mentioned copending application, to treat all of the yarns on bobbins or cones on the pins 73.

Although of self sustaining character, when assembled at a position away from the machine, sufficiently to enable them to be effectively handled and mounted, when the housing sections are mounted, they are further supported and rendered rigid and effective in service by the brackets and clamps which then form parts of the structure.

Figs. 12, 13 and 19 illustrate the application of my invention, in a modified form, to a multi-unit full fashioned knitting machine including a separate yarn-moistening housing or box 94 for each pair of machine sections, in which usual gallows 95, for mounting on the machine frame, are provided at lower positions thereof with a table or platform comprising horizontal bars 96 secured thereto by screws or bolts 97.

The top and bottom walls 98 and 99, respectively, and the corner uprights 100, of the housings 94, are substantially identical to the corresponding members in the device of the previous figures. Similar eyelets 67, and bobbin pins 73, are also employed.

However, since these housings are not for cooperation with the humidifier unit V, but are of the static pool type, they are provided at the under sides, with drawer-like pans 102 for the pools, and channel members 103 as slideway supports for the pans. Openings 104 are provided in the bottom walls 99 for passing humid air, from the pools in the pans 102, to the interiors of the housings 94.

A major difference between the construction of the device of Figs. 12 and 13, and the unit housing structure of the previous figures, resides at the end walls 105 which, instead of being separately mounted in the brackets or gallows, are mounted directly on the housings. The end walls 105 are entirely of sheet metal, having return-bent double layer upright front and rear edge margins 106, and readily releasable spring clip-like or snap latch detents 107 thereon. This feature enables the housing to be entirely self sustaining, and requires it only to be held from the bottom, as distinguished from the bracing and support given by the brackets and clamps to the multi-section housing of the previous figures.

Top and bottom wall end flanges 108 are disposed in slightly offset plane relation to front and rear wall vertical double-layer flanges 109 of the uprights 100, whereby the end walls 105 may be thrust into position, with a relatively close fit, in front of the vertical flanges 109 and behind the horizontal flanges 108. In this position, the walls 105 lock the corner uprights 100 in position. The walls 105 are latched in position by the detents 107, which ride over double-layer flanges 109 on the uprights, and snap into position behind the flanges 109.

This structure, similarly to the structure first herein set forth, has its component members rendered separable in such form as to permit them to be thoroughly cleaned, and as indicated in Fig. 19, to be grouped for transportation in a substantially smaller space than occupied by them when operatively assembled. In the group of Fig. 19, the end walls 105 may be placed on top of the other members, or at a position inside the group

as shown. Also, in the form of the invention first described, the end walls 32 may be placed in the group of Fig. 18, similarly to the manner in which the end walls 105 are placed in the group of Fig. 19.

As illustrated in Figs. 14 to 17, inclusive, and 20, the invention is in the form of a foldable, or collapsible housing or housing sections, of sheet metal and glass including in general, a top wall 112, eyelets 114 in the top wall, end walls each made up of two portions 115 and 116, a front wall 117, a rear wall made up of portions 118 and 119, pans or drawers 121, an inner platform 122 having apertures 123 therein, and bobbin pins 125 thereon, and a bottom wall 126.

The top wall 112 is connected to the front wall 117 by hinges 127, and releasably secured to the upper rear wall portion 119 by snap latch members 128 on the portion 119 cooperating with apertures or dents 129 in the top wall, Fig. 17. The top wall also has slots 131 disposed one adjacent to each corner for fitting over upwardly projecting lugs 132 on the upper end wall portions 116, Fig. 16, by bracing the walls relative to each other.

The front wall 117 is held to the bottom wall 126, by hinges 134, and has apertures 135 for the reception of the pans 121.

Each lower end wall portion 115 is fixed in upright position to the bottom wall 126 and to the adjacent lower rear wall portion 118, which is also fixed in upright position to the bottom wall.

The upper end wall portions 116 are each connected to the corresponding lower end wall portion 115 by hinges 137. Likewise, the upper rear wall portion 119 is connected to the lower rear wall portion 118 by hinges 138.

The pans 121 rest on sheet metal rails 141 of inverted substantially V-sections having bottom flanges secured to the bottom wall 126, and extending from front to back of the housing, whereby the drawers may slide freely above the hinges 134.

The platform 122 has front and rear depending flanges 142 detachably resting on angle members 143 and 144 secured to the lower rear wall portion 118 and to the front wall 117, respectively.

The upper rear wall portion 119 and the front wall 117 are similarly provided with door openings in which glass-paneled, metal framed sliding doors 146 and 147, respectively, are disposed; these doors being slidably held in place, and limited in endwise movement, by metal strips 148 secured to the walls and therewith forming the horizontal slideways and uprights for the doors similar to the structures hereinbefore set forth.

The device of Figs. 14, 15, 16, 17 and 20 may readily be adapted to operate either as a multi-section unit housing, as in the form first described, or as a separate housing for each pair of machine sections, by either providing telescopically fitting tubular elements 151 and 152 one of which is disposed in each of two apertures 153 and 154, respectively, in each end wall, connecting it to an adjacent housing structure, or by merely covering, or omitting the apertures 153 and 154.

In the form shown in Figs. 14 and 15, the apertures 153 and 154 are provided, and the telescopically interfitting elements disposed in these openings. As better seen toward the right-hand end of Fig. 14, the elements 151 and 152 are simple sheet-metal tubes each having a flange 155 at one end farthest from the other, so that, when the elements are placed into position by thrusting them toward each other from the inside of the adjacent housings, they are telescopically fitted together, with the flanges 155 against the inner sides of the adjacent upper end wall portions 116. This construction provides communication between any number of the individual housing structures for vapor from the pans 121 or from a vapor producing unit, such as the unit V of Fig. 1, which may be connected to discharge air into the system through one or both of the apertures 153 and 154 of one or more of the housing structures, or through other passageway means.

The device may be operated with both the pans and the vapor-producing unit, whereby, with the unit inoperative as over week ends, the structure will still be provided with humid air from the pans.

As shown in Fig. 14, the device, except for the yarn cones on the pins 125, is set up, as in service, when water in the pans 121 gives off humid air to the interior of the housing through the openings 123 in the platform 122, or vapor is provided as above mentioned.

Whether the device be operated with either or both the pans and the vapor-producing unit, with the housing structure connected by the telescopic elements 151 and 152, the atmosphere of all of the yarns of the machine is the same, whereby failure of a water supply in any of the pans, does not rob the yarns of the corresponding housing of moisture, which is received from the adjacent housings. Also, the respective housing units may be individually employed with the pan or the vapor producing unit arrangement.

As shown in Fig. 15, one of the housing structures is opened up, as in position to facilitate cleaning the parts individually or to start placing the parts in a compact group for transportation; the telescopic elements 151 and 152 having been removed from operative position and placed in the pans 121. From the position of Fig. 15, the housing may be further folded, or collapsed, to the condition of Fig. 20, to start which action, the platform 122 is turned upside down to place the bobbin pins 125 in the pans 121, and to thereby conserve space. The upper end wall portions 116 are next folded inwardly about the hinges 137 to positions over the platform 122. With the glass panels removed, the metal frames of the doors 146 and 147 remain in place in the slideways over the platform 122 and the inwardly folded upper end wall portions 116. The upper rear wall portion 119 is next folded forwardly and downwardly about the axis of the hinges 138 to position over the upper end wall portions. The front wall member 117 is folded downwardly, rearwardly and upwardly about the axis of the hinges 134 to position against the underside of the bottom wall 126, and followed by folding the top wall 112 against the underside of the wall 117, thus completing the placing of the members in a compact group occupying substantially less space than the space occupied thereby in operative assembly.

In each of the forms, the invention economizes manufacture and assembly, facilitates cleaning the several members individually, and much better than the housings heretofore employed, reduces the cost, space and amount of handling required in transportation, conduces to effective operation and easy replacement and repair, and is an improvement generally in housing structures for treating or conditioning yarns, such as the fine silk yarns of a full-fashioned stocking, or

other, knitting machine, in which the above-mentioned accumulations of lint and other foreign matter occur.

In its form as a multi-section housing unit for a multi-section straight knitting machine, it has the additional advantage of the interchangeable housing sections, with the saving and convenience resulting from this feature, as well as the advantages of the novel separate end wall and other features.

In each of the two-broad general classes of the invention above set forth, that is, the structures of the completely separable part types of Figs. 1 to 13, inclusive, 18 and 19, and the structure of the collapsible or folding type of Figs. 14 to 17, inclusive, and 20, there is provided a knitting machine yarn housing including body structure elements certain of which, such as the top walls, bottom walls, end uprights and end walls, are stationary relative to each other throughout the normal service or operation of the housing. These structures also include elements, such as the doors, and the drawers, which provide for movement thereof during the normal operation of the housing.

All of the elements, including the separable, or foldable, normally stationary elements, and the doors and drawer-like pans are capable, in addition to the normally operative relation thereof, whether stationary or movable, of movement relative to each other different from the operative movement of the doors and pans, or from the movement of any other element which is, or may be, part of the structure, such as would be the case if a movable door knob or some other element were provided for movement during the normal operation.

This additional movement, by permitting separation of the parts as in the first two forms, of the invention above set forth, and providing for folding, or throwing out of position, the parts of the third form, provides for effectively cleaning the elements individually, and/or for placing certain thereof (the metal parts, as distinguished from the glass parts) in a compact group occupying less space than the elements of the group in operative relation.

The telescopic angle members, slidable end walls, detents, hinge pins and other parts of the structures operate as means for maintaining the elements in operative relation, and for releasing them to provide for the above-mentioned different movement.

The improvements may be accomplished by means other than the specific examples shown and described, without departing from the invention set forth and claimed.

I claim:

1. A knitting-machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body-structure elements certain of which are stationary relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during the normal service of the housing, said elements being capable of movement relative to each other different from said first movement to provide outward exposure of the inner sides thereof for effectively cleaning said inner sides of the elements individually and for placing certain of the elements in a compact group occupying less space than the elements of the group in normal relation, and means for maintaining the elements in normal relation and providing for said different movement.

2. A knitting-machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body structure elements certain of which are stationary relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during the normal service of the housing, said elements being capable of movement relative to each other different from said first movement to provide outward exposure of the inner sides thereof for effectively cleaning said inner sides of the elements individually, and means for maintaining the elements in normal relation and providing for said different movement.

3. A knitting-machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body structure elements certain of which are stationary relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during the normal service of the housing, said elements being capable of movement relative to each other different from said first movement to provide for placing certain thereof in a compact group occupying less space than the elements of the group in normal relation, and means for maintaining the elements in normal relation for maintaining said medium in the housing and providing for said grouping movement.

4. A knitting-machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body structure elements certain of which are fixed relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during the normal service of the housing, said elements being capable of separation from each other, and means for maintaining the elements in normal relation for maintaining said medium in the housing and providing for separation of the elements.

5. A knitting-machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body structure elements certain of which are fixed relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during the normal service of the housing, said elements being capable of folding movement relative to each other, and means for maintaining the elements in normal relation for maintaining said medium in the housing and providing for said folding movement.

6. A knitting-machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body structure elements certain of which are fixed relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during normal service of the housing, said elements including elements capable of separation from each other, and elements capable of folding relative to each other, and means for maintaining the elements in normal relation for maintaining said medium in the housing and providing for the separation and folding movements.

7. A knitting machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body structure elements certain of which are fixed relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during normal service of the housing, said elements including elements capable of movement relative to each other different from said first movement, and readily operable interfitting means for holding said elements relative to each other in normal relation for maintaining said medium in the housing and releasing the elements for said different movement.

8. A knitting-machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body structure elements certain of which are fixed relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during normal service of the housing, said elements including elements capable of movement relative to each other different from said first movement, and readily operable interfitting means for holding said elements relative to each other for maintaining said medium in the housing and releasing the elements for said different movement, certain of said interfitting means locking others thereof in interfitting relation.

9. A knitting-machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body structure elements certain of which are fixed relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during normal service of the housing, said elements including elements capable of movement relative to each other different from said operative movement, and releasable snap fastener means for holding certain of said elements in position for maintaining said medium in the housing.

10. A knitting-machine yarn housing provided with means whereby a yarn treating medium may be supplied for the interior thereof and including body structure elements certain of which are fixed relative to each other throughout the normal service of the housing and certain of which provide for movement relative to each other during normal service of the housing, said elements including elements capable of movement relative to each other different from said first movement, readily operable means for holding said elements relative to each other for maintaining said medium in the housing and releasing them for said different movement, and releasable snap fastener means for holding certain of said relatively operable means in place.

11. A yarn-treating housing provided with means whereby a medium may be supplied to the interior thereof for treating the yarn of a knitting machine, the housing including top and bottom walls and corner uprights for connecting the top and bottom walls to each other, and interfitting means at the top and bottom of each upright for connecting the same to the top and bottom walls.

12. A yarn-treating housing provided with means whereby a medium may be supplied to the interior thereof for treating the yarn of a knitting machine, the housing including top and bottom walls and corner uprights for connecting the top and bottom walls to each other, and constituting panels of front and rear door openings of the housing, means at the top and bottom of each upright having telescopically interfitting movement for connecting the uprights to the top and bottom walls, respectively, end walls, and telescopically interfitting means at the top and bottom of each end wall for connecting the same to the top and bottom walls, respectively, and locking said corner uprights in telescopically interfitted relation to the top and bottom walls.

13. A multi-section yarn-treating housing, provided with means whereby a medium may be supplied to the interior thereof for treating the yarn of a multi-section straight knitting machine, the housing including top and bottom walls of each housing section having transverse end flanges for abutting relation to next adjacent end flanges of another housing section, corner uprights for connecting the top and bottom walls to each other and also having transverse housing section end flanges for abutting relation to next adjacent upright end flanges of said other housing section, and readily separable means at the top and bottom of each upright for connecting the same to the top and bottom walls, respectively.

14. A yarn-treating housing provided with means whereby a medium may be supplied to the interior thereof for treating the yarn of a knitting machine, the housing including a body structure having door openings, door frames for cooperation with the openings and for mounting on the housing readily separable therefrom, glass door panels for mounting in the frames readily separable therefrom, the body structure including elements readily separable from each other for placing, with the door frames, independently of the glass door panels, in a group of substantially reduced size from the collective size thereof in the operatively assembled housing and readily operable means for attaching said separable body structure elements to, and detaching the same from, each other.

15. A yarn-treating housing provided with means whereby a medium may be supplied to the interior thereof for treating the yarn of a knitting machine, the housing including a body structure having door openings, a bottom wall and bobbin supporting pins projecting upwardly from the bottom wall, door frames for cooperation with the openings and for mounting on the housing readily separable therefrom, glass door panels for mounting in the frames readily separable therefrom, the body structure including elements movable relative to each other for placing, with the door frames around the bobbin pins independently of the glass door panels, in a group of substantially reduced size from the collective size thereof in the operatively assembled housing, and means for holding said body structure elements to, and releasing the same from, each other.

16. A yarn-treating housing for a knitting machine, comprising means at the ends of the housing each having portions for separately receiving one of the end walls and the adjacent end of the remainder of the housing each in position for operative relation to the other.

17. A yarn-treating housing structure, for a knitting machine, comprising supports at the ends of the housing each having a pair of seats, one of the seats of each pair of which slidably receives one of the end walls and the other seat of each pair of which slidably receives the cor-

responding end of the remainder of the housing independently of the adjacent end wall.

18. A yarn-treating housing structure, for a knitting machine, comprising means at the ends of the housing each having portions for separately receiving one of the end walls and the adjacent end of the housing each in position for operative relation to the other, and a single means for securing both the end wall and the adjacent housing end to the corresponding receiving means.

19. A yarn-treating housing comprising top and bottom sheet-metal walls having front and rear flanges, each flange on each wall extending therefrom toward the other wall, metal angle elements including one adjacent to each end of said flanges having one leg secured to the adjacent wall and the other leg cooperating with the adjacent wall and flange to form a channel of angle section, and sheet-metal upright elements, including one at the front and one at the rear of each end of the housing, each having a portion of angle section at each end for telescopic reception into one of said channels.

20. A receptacle for cooperative association with a knitting machine and receiving yarn for feeding from the receptacle to the machine, the receptacle being adapted to maintain the yarn substantially free from matter adversely affecting the yarn tending to accumulate in the receptacle and comprising one or more movable walls for readily outwardly exposing the inner sides of the walls for cleaning, means for receiving a yarn supply in, and providing for its removal from, the receptacle, means for providing the yarn treating medium in the receptacle and operative for discontinuing the medium supply in the receptacle, and means for maintaining the receptacle in normal operative condition and providing for manipulation of a wall or walls thereof to effect outer exposure of the inner sides thereof.

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