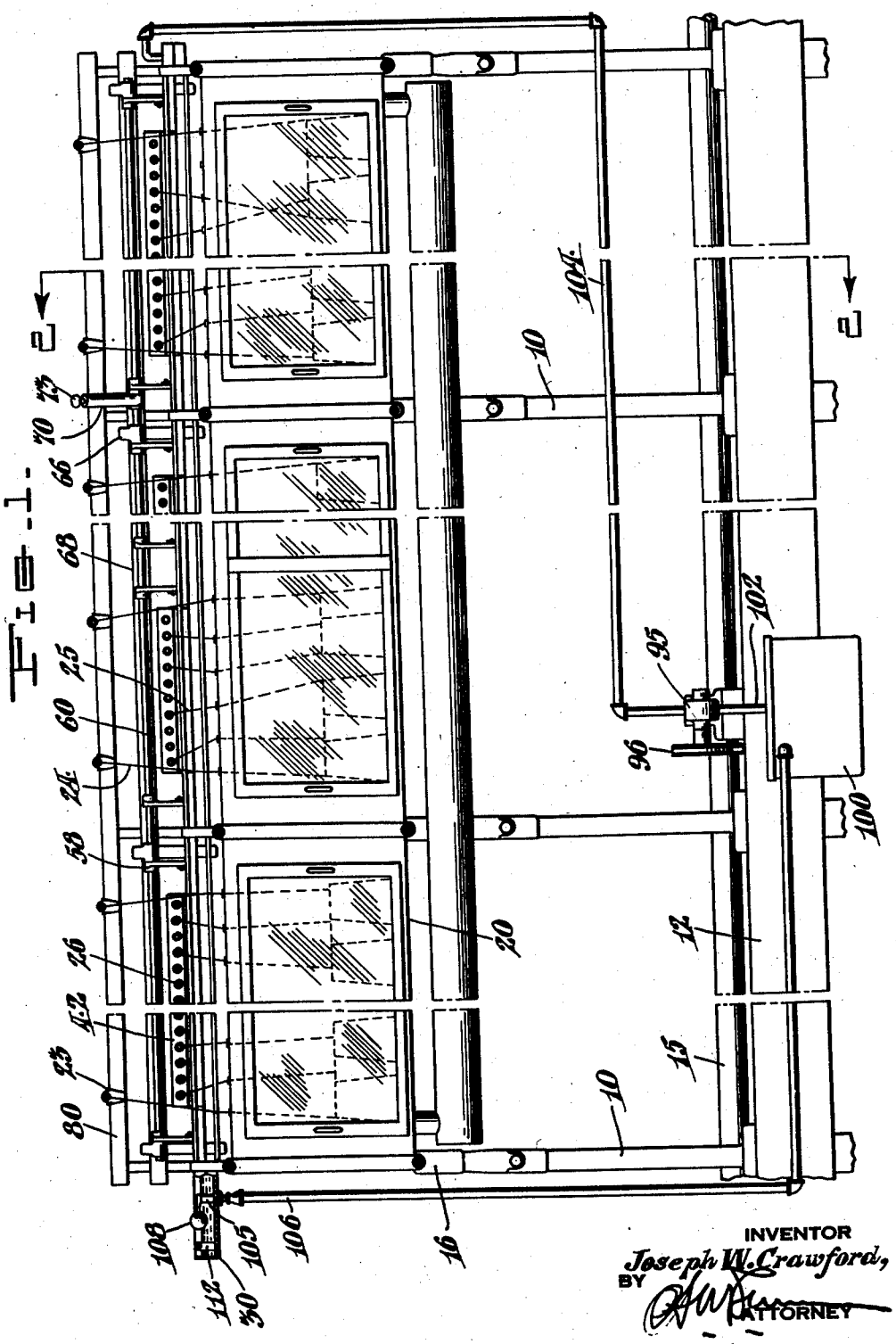
Sept. 12, 1950 J. W. CRAWFORD 2,522,211

YARN CONDITIONING APPARATUS FOR KNITTING MACHINES

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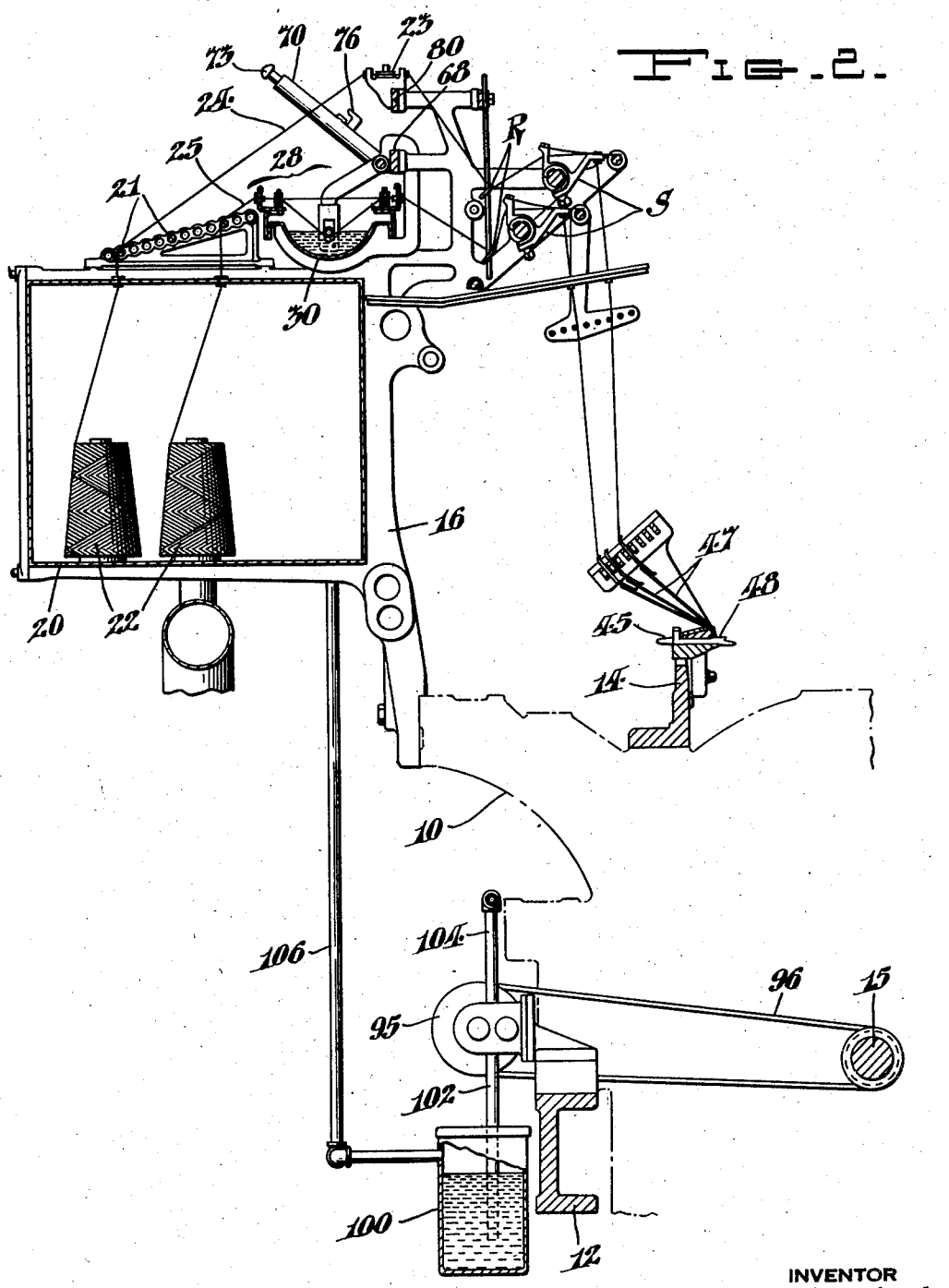
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YARN CONDITIONING APPARATUS FOR KNITTING MACHINES

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FIG. 2.



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YARN CONDITIONING APPARATUS FOR KNITTING MACHINES

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FIG. 3.

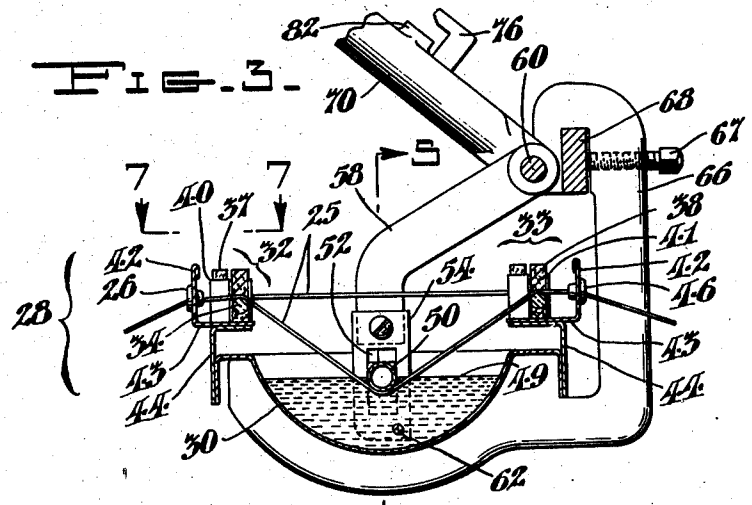


FIG. 4.

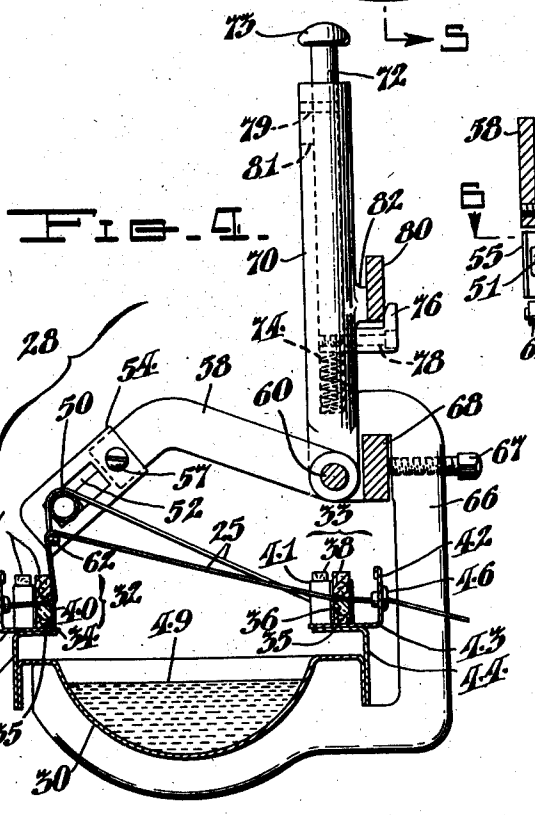


FIG. 5.

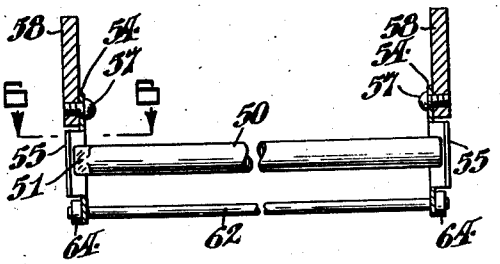
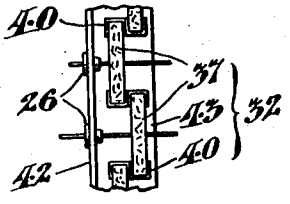


FIG. 6.



FIG. 7.



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2,522,211

YARN CONDITIONING APPARATUS FOR KNITTING MACHINES

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Application January 17, 1947, Serial No. 722,527

26 Claims. (Cl. 66—125)

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This invention relates to yarn conditioning apparatus for knitting machines and particularly to improvements in such apparatus whereby to provide for the circulation of a liquid treating medium therethrough, and having means adapted to facilitate the cleaning thereof.

The application of liquid to textile yarns to condition them for knitting or like fabricating operations has been practised for some time and a variety of apparatus have been devised for this purpose. Due to the dissolving of the sizing used on the yarn in passing through the treating liquid and the collecting of other foreign matters from the yarn and air, the ordinary yarn treating apparatus becomes very dirty and requires frequent cleaning. Heretofore, such cleaning operations required considerable manipulations of the parts of the treating apparatus and yarns passing therethrough necessitating extensive and costly shutdowns of the fabricating machines.

Further, in full-fashioned knitting machines such treating apparatus have usually been individual to each two knitting heads or to each machine section and while certain of these apparatus were provided with means for continuously supplying fresh liquid and including means for draining off the surplus liquid, the construction of the apparatus permitted little or no actual circulation of the fluid; consequently, all of the foreign matter collected in the treating liquid settled on and adhered to the parts of each individual apparatus submerged in the treating liquid and the cleaning of the conditioning mechanism for a multi-section knitting machine consisted of a series of individual cleaning operations for each section.

It is accordingly an object of the present invention to provide an apparatus for treating yarns with liquid to condition them for fabrication and which shall have an optimum convenience for cleaning.

Another object of the invention is to provide means in a yarn treating apparatus of the liquid type adapted to lift yarns passing above as well as yarns passing through the treating medium to a position above the treating apparatus to permit ready access to the interior of the apparatus.

Still another object of the invention is to provide means whereby the yarns passing through or above the liquid in a liquid treating apparatus may be raised to lift the yarns sufficiently for convenient cleaning of the apparatus and then latched or temporarily fastened in raised position to facilitate the cleaning operation.

A further object of the invention is to provide

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a liquid treating apparatus for fabricating machines in which the liquid container extends over the width of several knitting sections in one uninterrupted length along the machine.

Still a further object of the invention is to provide a liquid treating apparatus for fabricating machine in which the liquid container extends in one uninterrupted length along the machine and in which the treating liquid is continuously circulated through the container.

With these and other objects in view, which will become apparent from the following detailed description of an illustrative embodiment of the invention shown in the accompanying drawings, my invention resides in the novel elements, features of construction and arrangement of the parts in cooperative relationship, as hereinafter more particularly pointed out in the claims.

In the drawings:

Fig. 1 is a rear elevation of a full-fashioned knitting machine having the present invention applied thereto as well as a liquid circulating system, parts being broken out to reduce the length of the view and parts being shown in section for purposes of illustration;

Fig. 2 is a vertical sectional view taken substantially on the line 2—2 of Fig. 1 and looking in the direction of the arrows, parts being omitted for purposes of illustration;

Fig. 3 is a view similar to a portion of Fig. 2 but shown on a greatly enlarged scale relative thereto;

Fig. 4 is a view similar to Fig. 3 but showing the parts in different relative positions;

Fig. 5 is a sectional view taken substantially on the line 5—5 of Fig. 3 looking in the direction of the arrows;

Fig. 6 is a fragmentary sectional view taken substantially on the line 6—6 of Fig. 5, looking in the direction of the arrows; and

Fig. 7 is a fragmentary plan view as viewed in the direction of the arrows 7—7 of Fig. 3.

In the drawings and description, only the means necessary to a complete understanding of the invention are specifically set forth; further information as to the construction and operation of other related, usual and well known knitting machine elements, mechanisms, etc., may be found in one or more of the following publications:

1. Pamphlet entitled—Full-Fashioned Knitting Machines—published and copyrighted by the Textile Machine Works, Reading, Pennsylvania, in 1920.

2. Three catalogs entitled—The "Reading" Full-

Fashioned Knitting Machine Parts Catalog—published and copyrighted by the Textile Machine Works, in 1929, 1935 and 1940, respectively.

3. Booklet entitled—The "Reading" High Production Full-Fashioned Knitting Machine—which, forming a supplement to the above noted 1940 Parts Catalog of the Textile Machine Works, is a publication of the Textile Machine Works, copyrighted by the latter in 1940.
4. Pamphlet entitled—Knitting Machine Lectures—published by the Wyomissing Polytechnic Institute, Wyomissing, Pennsylvania, in 1935.

An apparatus or arrangement within the invention for applying liquid to or treating yarns with liquid to condition them for fabrication is shown in the drawings in connection with parts of a full-fashioned knitting machine but it will be understood that the present invention may be used with other forms of fabricating apparatus. However, it is of particular importance in connection with knitting machines because yarns for knitting often contain a sizing which dissolves in the liquid used for treating the yarn to condition it forming a slime which adheres to the inside of the yarn treating apparatus causing a gummy and unsanitary condition if the treating apparatus is not cleaned quite frequently.

In the arrangement shown in the drawings, certain of the yarns passing to the fabricating machine pass above the treating liquid and some pass through it. All the yarns, however, may be lifted from the levels they occupy while fabrication is going on to levels permitting ready access to the liquid container for cleaning and the elements by which the yarns are so lifted may be releasably fastened in elevated positions so that the yarns are maintained out of the way during the cleaning operation. As shown, the elements are arranged to turn about an axis so located that they swing to a position above and to one side of the liquid container as they raise the yarns. Suitable guiding means are provided for all the yarns and, preferably also, the guiding means for the yarns which contact the liquid have a tensioning effect as well as a wiping effect, while the trough or other liquid container is preferably of rounded section to facilitate cleaning operations.

Referring to Figs. 1 and 2 of the drawings there is shown a portion of a full-fashioned knitting machine including transverse frame members 10, a back beam 12 and center bed 14 connecting the frame members 10, a cam shaft 15, and gallows members 16 secured to the frame members and supporting a yarn box 20. The yarn box 20 has yarn packages 22 therein from which yarns 24 and 25 are drawn off for knitting. The yarns 24 are shown passing through apertures in the top of yarn box 20 and around guide rods 21 to plate type tension devices 23 and thence to the usual slidable tensioning rings R and snappers S. Certain of the yarns 25 are treated in a yarn moistening device 28 within the invention and pass, after leaving box 20, around rods 21 to and through eyelets 26, said eyelets forming parts of guide means associated with the device 28. The eyelets 26 are mounted along one edge of a trough 30 and each eyelet delivers a yarn to the first of a pair of yarn guide means, designated 32, Figs. 3 and 4, which has a guide rod 34 over which the yarn passes. Each guide means 32 delivers its yarn to a similar guide means 33 forming the other one of said pair and which is located on the opposite side of the trough 30 and which has a guide rod 36 similar to rod 34. The means 32 and 33 are shown as substantially identical and preferably act not only as guides but also as tensioning and wiping devices and, for these purposes, they have felt blocks 37 and 38 respectively held in channels 40 and 41 in a position causing blocks 37 and 38 to bear on the yarn crossing the tops of rods 34 and 36, to tension and wipe the yarns. The channels 41 will be understood to be identical with channels 40 so that the construction and arrangement of both means 32 and 33 will be fully understandable from Figs. 3, 4 and 7. The rods 34 and 36 are shown as resting on pads 35 of felt or cotton waste.

The eyelets 26 are shown as mounted at a given level in vertical portions 42 of members 43 on which are mounted said means 32 and 33 including channels 40 and 41. Members 43 rest on and are fixed to angle members 44 fixed in turn to the upper edges of trough 30, the members 43 and 44 in this instance extending across one knitting section as shown in Fig. 1. However, the means for supporting the eyelets and the combined means 32 and 33 may be parts of the trough proper or otherwise supported as desired.

From rods 34 of combined guide and tensioning means 32 all the yarns 25 run to the opposite side of trough 30. If desired, one or more of the yarns 25 extends across the trough 30 from guide means 32 to guide means 33 without deflection and each of the guide means 33 delivers its yarn to an eyelet 46 carried on a member 43 at the opposite side of the trough 30 from the eyelet 26. Each of the yarns pass from an eyelet 46 to one of the tension rings R and from the ring to one of the snappers S of the machine. From the snapper S the yarn is passed to a yarn carrier 47 three of which are shown in Fig. 2. Yarn carriers 47 lay the yarn on sinkers 48 and dividers 45 in the usual manner. The combined guide and tensioning means 33 and eyelets 46 are shown as mounted similarly to means 32 and eyelets 26. The means 33 not only have the functions of guiding and tensioning the yarns passing therethrough but, as will presently appear, certain of them also perform the function of wiping excess liquid from certain yarns and are therefore combined guiding, tensioning and wiping means.

From rods 34 of means 32 certain of the yarns 25 are deflected downwardly so as to pass through and be immersed in a body of liquid 49 in trough 30 before reaching means 33. For so deflecting said yarns 25 a hollow guide rod or float member such as 50 is provided in the trough 30 under which the yarn passes and which normally floats on the liquid 49 so as to be partially submerged therein as shown in Fig. 3. For convenience a series of float guides 50, one for each knitting section of the machine, are used over the full length of the machine but only one guide 50 and its mounting is shown and will be described. The guide 50 has its ends arranged loosely in slots 52 in members 54, one end of said guide being provided with a square portion 51 to prevent the rod from turning in the slots 52, as shown in Figs. 5 and 6.

As best shown in Figs. 5 and 6, the plate members 54 are provided with a projecting portion 55 to limit the endwise movement of the rod 50. The members 54 are shown as fixed by screws 57 to the ends of arms 58 fixed in turn to a rod or

shaft 60 pivotally supported in fixed relation to the trough 30. Below the slots 52, members 54 are connected by a rod 62 which extends, parallel to guide 50, through apertures in the members 54, the rod having collars 64 to hold the rod in place as shown in Fig. 5. Rod 62 braces the ends of the members 54 but it also has another purpose which will appear hereinbelow.

The shaft 60 to which the arms 58 are fixed is pivoted in hanger members, one of which appears at 66 and which provide thereby a pivot for arms 58 and therefore for guide member 50 and rod 62 parallel thereto. Said members are carried on a bar 68 or like member fixed to the frame of the machine. The members 66 are also adapted to support the trough 30 and are held in fixed relation to the bar 68 by screws 67. Therefore, the arms 58 are maintained in definite predetermined relationship to the trough 30 when shaft 60 is turned on its longitudinal axis. When shaft 60 is so turned, the arms 58 are swung so as to lift the guide 50 and the rod 62 to thereby lift yarns which pass between eyelets 26 and 46 and facilitate cleaning the trough 30.

For turning shaft 60 a handle 70 is secured to shaft 60 so that when the handle 70 is turned in a clockwise direction the arms 58 move the guide 50 and rod 62 upwardly from the position shown in Figs. 2 and 3 to the position shown in Fig. 4. With this action the guide 50 lifts the yarn or yarns extending from the guide means 32 to guide means 33 and above the guide 50 while the rod 62 lifts the yarn passing beneath the guide rod 50, whereby cleaning of the trough is facilitated. Further, the handle 70 preferably has latch means associated therewith whereby the handle may be latched to hold the arms 58 and connected parts in lifted position as in Fig. 4. As shown, said latch means comprises a plunger 72 which is slidably mounted in a longitudinal socket in the handle and has an enlarged head 73 to facilitate pushing the plunger longitudinally of the handle when desired. A compression spring 74 is shown in dotted lines between the plunger 72 and the bottom of the socket in which it is mounted and a hook shaped latch member 76 is mounted on the outside of handle 70 but so as to move with the plunger 72, latch member 76 extending through a slot in the handle and being fixed to the plunger 72 by a screw 78 shown dotted in Fig. 4. The slot through which latch member 76 passes is sufficiently elongated to permit the spring 74 to move the latch member into latching engagement with a bar 80 fixed to a part of the machine frame and for releasing said latch member from the bar 80. A projection 82 on the handle is adapted to engage the bar 80 to determine the latching position of the handle. The plunger 72 is provided with a pin 79 extending from the plunger into a slot 81 in the handle 70, the slot 81 determining the limits of movement of the plunger in the handle. With this arrangement all of the guide rods 50, rods 62 and yarns over the full length of the machine may be simultaneously raised to the position shown in Fig. 4 and latched in such position until the trough 30 is cleaned.

In order to facilitate cleaning and the circulation of fluid 49 in the trough 30, said trough preferably extends uninterruptedly the full length of the machine, although it may be divided into several sections for convenient manufacture. With the trough 30 being continuous the liquid may be circulated from one end of the trough to the other. To circulate the liquid in the trough 30 the means provided, as shown in Figs. 1 and 2, comprises a pump 95 driven by a belt 96 from the cam shaft 15. Pump 95 lifts liquid from a sump 100 through a suction pipe 102 and forces it through a pipe 104 into one end of trough 30, the right end of the trough as shown in Fig. 1. The other end of trough 30 has an overflow valve 105 having a drain pipe 106 leading downward therefrom, the upper end of said pipe being controlled by the valve which is operated by a float member 108 which affects the valve 105 to regulate the position of the valve and thereby the overflow of liquid from the trough 30 to maintain constant the level of liquid in said trough. The float member is pivotally carried by a bracket 112 secured to the trough 30. The pipe 106 delivers the overflow liquid back to the sump 100.

The liquid 49 may be water or water containing one or another of certain mixtures or compositions of matter dissolved or colloidally dispersed therein, depending on the character of the yarn and the results sought. However, the invention is not limited to the use of an aqueous liquid in the trough 30.

With the hereinbefore described arrangement the yarn treating liquid is continuously pumped by the pump 95 into one end of the trough 30 from the sump 100 and returned to the sump through the overflow valve 105 when the liquid in the trough exceeds a predetermined level, as determined by the float member 108. It will be seen that the full stream delivered by the pump flows continuously along the trough the full length of the combined knitting sections and the quantity of liquid needed to treat the yarns on the entire machine is kept to a minimum. The yarn guiding and lifting means are such as to offer a minimum of obstruction to flow of the liquid so that local variations of rate of flow along the length of the trough are substantially avoided, thereby permitting a relatively high average rate of flow in proportion to the cross-section of the trough without materially disturbing the yarns passing through the stream of liquid. By this continuous circulation of the liquid through the trough the sizing dissolved from the yarn is continuously stirred and thereby prevented from settling to the surface of the trough or the yarn guiding means in the trough. In the sump 100, however, the sizing largely settles out, so that substantially clean liquid is delivered to the trough 30 by pump 95 throughout relatively long runs between cleanings.

When the liquid becomes too saturated with the sizing or other matter from the yarn, the trough is drained, the guides 50, the rod 62 and the yarns passing through and above the liquid are lifted from the trough by the handle 70 and latched in such position. The trough may then be cleaned and flushed out without disturbing the yarns, the sump drained and cleaned and the whole system again filled with fresh liquid. The handle 70 is unlatched from the bar 80 and the guides 50, rods 62 and the yarns again returned to operating position.

In the foregoing detailed description the trough 30 is extended throughout the length across the several sections of a multi-section full-fashioned knitting machine, and there is provided yarn guide and immersing means for each of said knitting sections. It is clearly within the concept of this invention to have the aforesaid guide and immersing means each individual to its respec-

tive knitting section or in multiples of two or more.

It is of particular significance in the present invention that the liquid containing trough extends over a plurality of knitting sections and being of such construction that upon the removal of the yarn guide and immersing means from operative position the said trough is without internal hindrance and left perfectly free for cleaning operations, i. e., when it is desired to clean the yarn conditioning trough the yarn guides and immersing devices are all lifted entirely clear of the trough and a cleaning implement may be employed from one end to the other of said trough without contact or interference with the yarn guiding devices.

In Fig. 1 of the accompanying drawings there is shown a single elongated trough **30** and a multiplicity of yarn guides and immersing devices one for each section of the knitting machine. It should be quite obvious that as the number of knitting sections may be increased the length of the movable elements including the shaft **60**, arms **58** and immersing devices **50**, **54** and **62** obtain considerable weight and it may be desirable to divide the shaft in more than one part and provide several operating handles **70** and latch members **76**. For the same reason, i. e., increasing the number of knitting sections and therefore the length of the machine, it may also be desirable to divide the trough **30** into several complete sections each of which is provided with a pipe **104** for carrying the treating liquid from the pump **95** to the trough, an overflow valve **105** and a drain pipe **106** for carrying the liquid from the trough to the sump **100**.

Of course, the improvements specifically shown and described, by which the above described results are obtained, can be changed and modified in various ways without departing from the invention herein disclosed and hereinafter claimed.

I claim:

1. In a knitting machine, yarn conditioning apparatus comprising in combination a trough containing liquid, guide means for yarn, one at each side of said trough, a longitudinal immersing guide between said two means, a longitudinal lifting member between which and said immersing guide are passed the yarns to be treated, pivot means on which said guide and lifting member are supported, and means common to said immersing guide and said lifting member for swinging them from the trough to free the trough for cleaning.

2. In a knitting machine, yarn conditioning apparatus comprising a trough containing liquid, a guiding means on one side of said trough, an immersing yarn guide at least partially submerged in said liquid and to which said means delivers yarn for immersion, a guiding means on the other side of said trough, spaced members in which said immersing guide is held, a member parallel to said immersing guide also held in said spaced members, pivot means on which said spaced members are supported, and means for lifting said spaced members from the trough by swinging them on said pivot means, said parallel member acting when said spaced members are lifted to lift yarn passing beneath said immersing member and to free the trough for cleaning.

3. In a knitting machine, liquid treating apparatus for yarns comprising in combination a trough for liquid, pairs of guide means arranged oppositely on the sides of said trough and cooperating in passing yarns threaded therethrough transversely of the trough, a yarn guide extending below the surface of the liquid in the trough to immerse yarns which pass beneath it, a rod parallel to said immersing guide and between which and the guide yarn is threaded, members for supporting said immersing guide and said rod, and arms fixed to said members, said arms pivoted on an axis enabling said immersing guide and said rod to lift yarn which passes beneath the immersing guide out of said trough, whereby the trough may be cleaned without unthreading the yarns.

4. In a knitting machine, liquid treating apparatus for yarns comprising in combination a trough for the liquid, pairs of guiding means arranged oppositely on said trough and passing yarns transversely of the trough, a yarn guide parallel to the trough and extending below the surface of the liquid in the trough to immerse yarns which pass beneath it, a rod parallel to said immersing guide and between which and the guide yarn is passed, members within the ends of the trough to which said immersing guide and said rod are connected, arms fixed to said members whereby said members may be swung out of the trough and so that the rod is adapted to lift yarn which passes beneath the immersing guide to a position whereby the trough may be cleaned without unthreading the yarns.

5. In a knitting machine, apparatus for treating yarns with liquid and comprising in combination a trough for holding a treating liquid, members having slots therein, a float member in and having only limited end play in said slots and extending below the surface of the liquid in the trough to immerse yarns which pass beneath the float member, a rod connected to said members and arranged so that yarn passes between said float member and said rod and pivoted arms connected to said members whereby said members may swing said float member and rod out of the trough.

6. In a knitting machine, apparatus for treating yarns with liquid and comprising in combination a trough for holding a treating liquid and mounted on framework of the machine, members having slots therein, a float member in said slots and extending below the surface of the liquid in the trough to immerse yarns which pass beneath it, means associated with said slots for limiting the end play of the float member in said slots, a rod connected to said members and having yarn threaded between itself and the float member and pivotally supported arms connecting said members, said arms pivoted on an axis in said framework and arranged to lift the float member and rod out of the trough.

7. In a knitting machine, apparatus for conditioning yarns and comprising in combination a trough for holding a treating liquid, a longitudinal yarn guide parallel to the trough and extending below the surface of the liquid in the trough to immerse yarns which pass beneath it, and guiding means for the yarns and placed on each side of said trough having each a rod across the top of which the yarn passes and a felt bearing on the top of said rod and on yarn passing thereover.

8. In a knitting machine, apparatus for conditioning yarns and comprising in combination a trough for holding a treating liquid, a yarn guide parallel to the trough and extending below the surface of the liquid in the trough to immerse yarns which pass beneath it, guiding means for the yarns on one side of said trough and com-

bined guiding and wiping means for the yarns on the other side of said trough, said means having each a rod across the top of which yarn is adapted to pass and a felt having a substantially plane face bearing on top of said rod and yarn passing thereover.

9. In a knitting machine, apparatus for conditioning yarns and comprising in combination a trough for liquid extending uninterruptedly the length of all the knitting sections, having a rounded section and relatively shallow in proportion to its width, float guide means extending below the surface of the liquid in the trough to immerse yarns which pass beneath it, means to pass liquid through said trough from end to end thereof, and means to position said float means in use constructed and arranged to minimize resistance to the flow of liquid along the trough.

10. In a knitting machine, apparatus for conditioning yarns and comprising in combination a trough for treating liquid having yarn guide means mounted on each side thereof and cooperating in passing some yarns at least through the liquid in the trough, a float member parallel to the trough and acting as a guide to yarns passing through the liquid, members normally extending into the trough and in which said float member is guided, a rod connecting said members and spaced from said float member, pivoted arms connected to said members adapted to raise said float member and said rod out of said trough and means adapted to hold said arms in raised position.

11. In a knitting machine, apparatus for delivering conditioned yarns comprising in combination a trough for liquid having a rounded section and relatively shallow in proportion to its width, a yarn guide member parallel to the trough and extending below the surface of the liquid therein to immerse yarns which pass beneath it, guide means at the sides of the trough directing yarn to and receiving yarn from said yarn guide member, members normally within and generally transverse to the trough to which said yarn guide member is connected, said transverse members pivotally supported and adapted to be swung above the trough, and a yarn lifting member also connected to said transverse members in parallel relation to said guide member.

12. In a knitting machine, yarn treating apparatus comprising in combination a trough for treating liquid, guide means adapted to pass yarns from one side to the other of said trough above the level of the liquid therein, guide means adapted to pass other yarns through said liquid, and means adapted to lift all said yarns, and means to latch said lifting means to hold the yarns in positions permitting ready cleaning of the trough.

13. In a knitting machine, yarn treating apparatus comprising in combination a trough for treating liquid, guide means adapted to pass yarns through said liquid in a path leading from one side to the other of said trough, a portion of said guide means acting to wipe excess liquid from yarns passing therethrough, mechanical means adapted to lift said yarns, and means to latch said lifting means to hold the yarns in positions permitting ready cleaning of the trough.

14. In a multi-section knitting machine, yarn conditioning apparatus comprising a trough adapted to contain liquid and which extends uninterruptedly the length of all the knitting sections, guide means associated with the said trough to direct a plurality of yarns to each said knitting section transversely of such trough,

means for immersing a plurality of said yarns for each section in the liquid, said last means being so constructed and arranged to lie beneath the upper surface of said trough, unitary means for removing the entire immersing means and all the yarns affected thereby from the trough, and means for circulating the liquid through said trough from end to end thereof.

15. In a knitting machine, apparatus for treating yarn in a straight bar knitting machine comprising in combination a trough having a body of liquid for treating yarn, guide means for yarn to be treated in said liquid portions of which are mounted at a level above the edge of the trough and a portion of which extends longitudinally of the trough and is normally immersed in the treating liquid, a shaft parallel to the trough and journalled above the yarn guide means, spaced connections between said shaft and said normally immersed longitudinal portion of the guide means, a longitudinal member joining said connections below said longitudinal portion when the portion is in the liquid, a handle for said shaft for swinging said longitudinal portion and member upward to free the trough for cleaning, and latch means for holding said spaced connections in elevated position.

16. In a knitting machine, apparatus for treating yarns comprising in combination a float type yarn guide and a means in which said guide is held with limited end play and including a pair of similar plates having portions pressed out along one edge only to form slots in which said guide is held but is free to move longitudinally of the slots, said pressed out portions having parts standing at right angles to the bodies of the plates and parts parallel to the bodies of the plates to limit the movement of said guide longitudinally of its own axis.

17. In a knitting machine, apparatus for treating yarns comprising in combination a float type yarn guide, a means in which said guide is held with limited end play and including a pair of similar plates having portions pressed out along one edge only to form slots in which said guide is held but is free to move longitudinally of the slots, said pressed out portions having parts standing at right angles to the bodies of the plates and parts parallel to the bodies of the plates to limit the movement of said guide longitudinally of its own axis and a member connecting the plates and adapted to lift yarn passing below the guide.

18. In a multi-section knitting machine, the combination of a trough through which yarn treating liquid flows and which extends uninterruptedly the length of all the knitting sections, means for immersing yarns in said liquid arranged to minimize local obstructions to the flow of the liquid, means for circulating the liquid through said trough from end to end thereof, and valve means responsive to the level of liquid at the discharge end of the trough for controlling the rate of outflow from trough.

19. In a multi-section knitting machine, the combination of a trough through which yarn treating liquid flows and which extends uninterruptedly the length of all the knitting sections, means for immersing yarns in said liquid arranged to minimize local obstructions to the flow of the liquid, means for circulating the liquid through said trough from end to end thereof, and means outside the trough for taking impurities from said liquid.

20. In a multi-section knitting machine, the

combination of a trough through which yarn treating liquid flows and which extends uninterruptedly the length of all the knitting sections, means for immersing yarns in said liquid substantially free of means locally obstructing flow of the liquid, means for circulating the liquid through said trough from end to end thereof, and float valve means near the end of the trough at which liquid leaves the trough for controlling the discharge of liquid from the trough.

21. In a multi-section knitting machine, yarn conditioning apparatus comprising a trough adapted to contain liquid and which extends uninterruptedly the length of all the knitting sections, guide means associated with said trough to direct a plurality of said yarns to each said knitting section transversely of such trough, means for each section for immersing a plurality of said yarns in the liquid, said last means constructed and arranged to lie beneath the upper edge of said trough, unitary means for elevating a plurality of said immersing means and the yarns affected thereby to free at least a portion of the trough for cleaning, and means for circulating the liquid through said trough from end to end thereof.

22. In a knitting machine, apparatus for conditioning yarns and comprising in combination a trough for holding treating liquid, a yarn guide parallel to the trough and extending below the surface of the liquid in the trough to immerse yarns which pass beneath it, guide means at the sides of the trough directing yarn to and receiving yarn from said guide member, members normally within and generally transverse to the trough to which said yarn guide member is connected, said transverse members pivotally supported and adapted to be swung above the trough, and a yarn lifting member also connected to said transverse members.

23. In a knitting machine, apparatus for conditioning yarn and comprising in combination a trough for holding treating liquid, a yarn guide parallel to the trough and extending below the surface of the liquid in the trough to immerse yarns which pass beneath it, guide means at the sides of the trough directing yarn to and receiving yarn from said guide member, members normally within and generally transverse to the trough to which said yarn guide member is connected, said transverse members pivotally supported and adapted to be swung above the trough, and a yarn lifting member also connected to said transverse members in substantially parallel relation to said guide member.

24. In a knitting machine apparatus for conditioning yarn and comprising in combination a trough for holding treating liquid, a yarn guide

parallel to the trough and extending below the surface of the liquid in the trough to immerse yarns which pass beneath it, guide means at the sides of the trough directing yarn to and receiving yarn from said guide member, members normally within and generally transverse to the trough to which said yarn guide member is connected, said transverse members pivotally supported and adapted to be swung above the trough, and a yarn lifting member also connected to said transverse members but below said guide member.

25. In a knitting machine, a yarn treating means including an elongated trough for liquid, shelves connected to said trough and supporting yarn guides close to the verticals through the edges of the liquid in the trough, an immersing yarn guide extending centrally of the liquid in the trough to which yarn guides on the shelves deliver yarn and from which yarn guides on the shelves receive yarn, arms pivotally mounted at a level above said shelves and having said immersing guide connected thereto and adapted to swing to move said immersing guide upward and laterally of the trough away from the vertical through the immersing position of the immersing guide.

26. In a knitting machine, apparatus for conditioning yarns and comprising a yarn moistening means, guiding and tensioning means for yarns acting on yarns passing to said moistening means, and guiding and tensioning means acting on yarns passing away from said moistening means, each of said guiding and tensioning means composed essentially of a rod across the top of which the yarn passes and a non-rotating felt bearing on top of the rod and on yarn passing thereover.

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