

May 13, 1947.

W. COLEMAN

2,420,355

MOISTENING APPARATUS FOR KNITTING YARNS

Filed Sept. 18, 1946

3 Sheets-Sheet 1

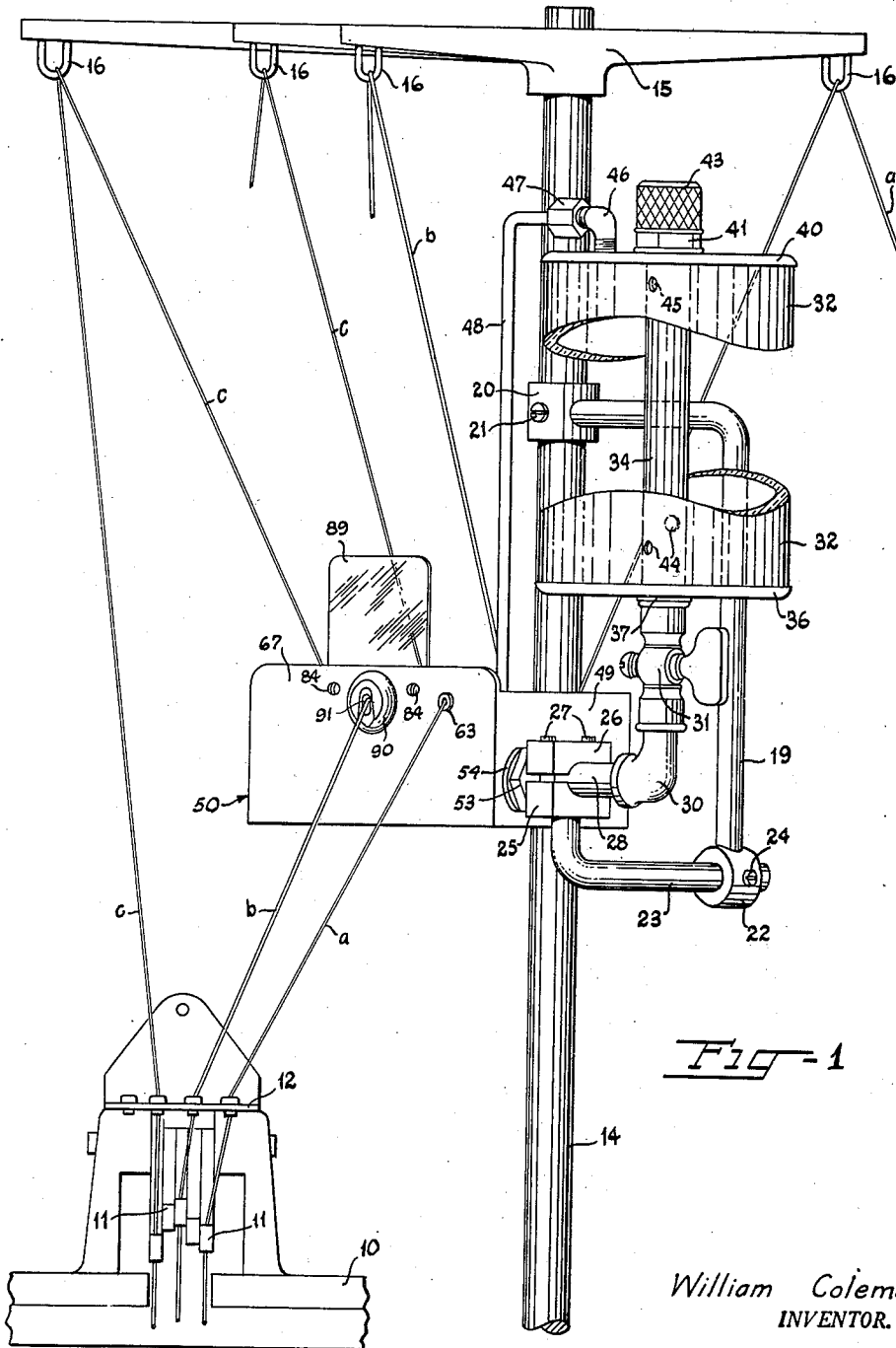


Fig-1

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3 Sheets-Sheet 2

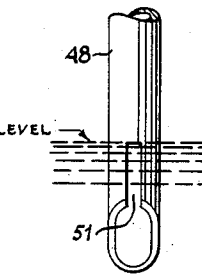
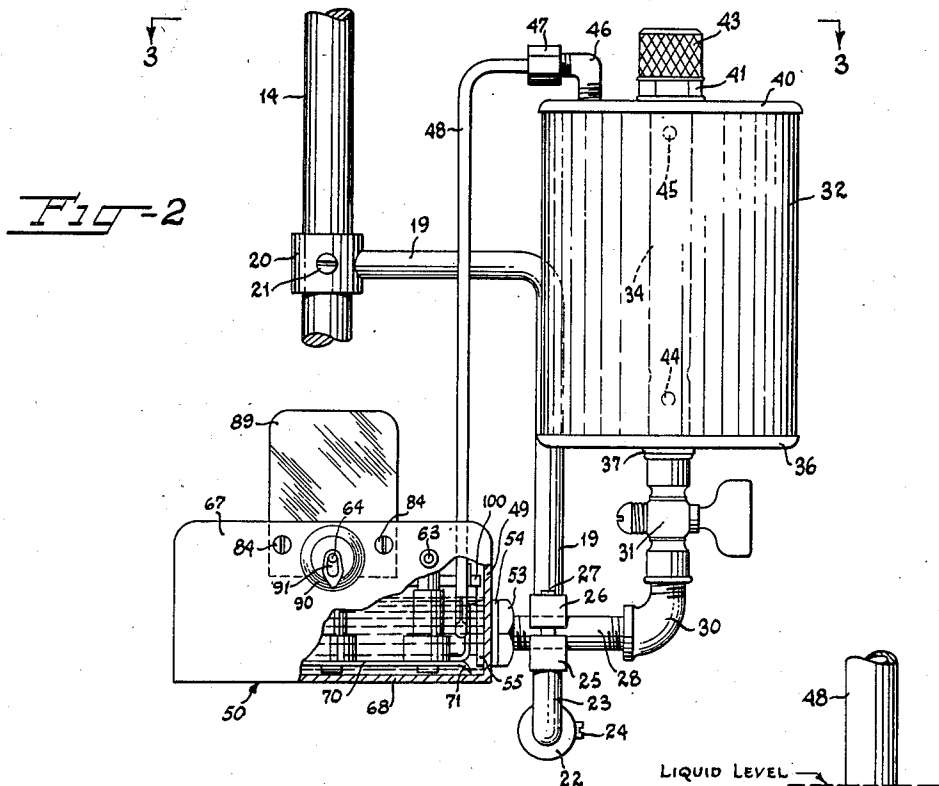


Fig- 4

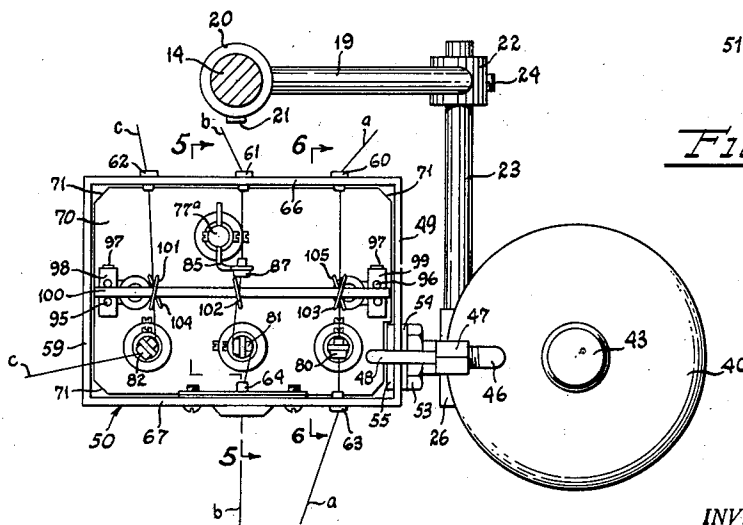


Fig-3

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May 13, 1947.

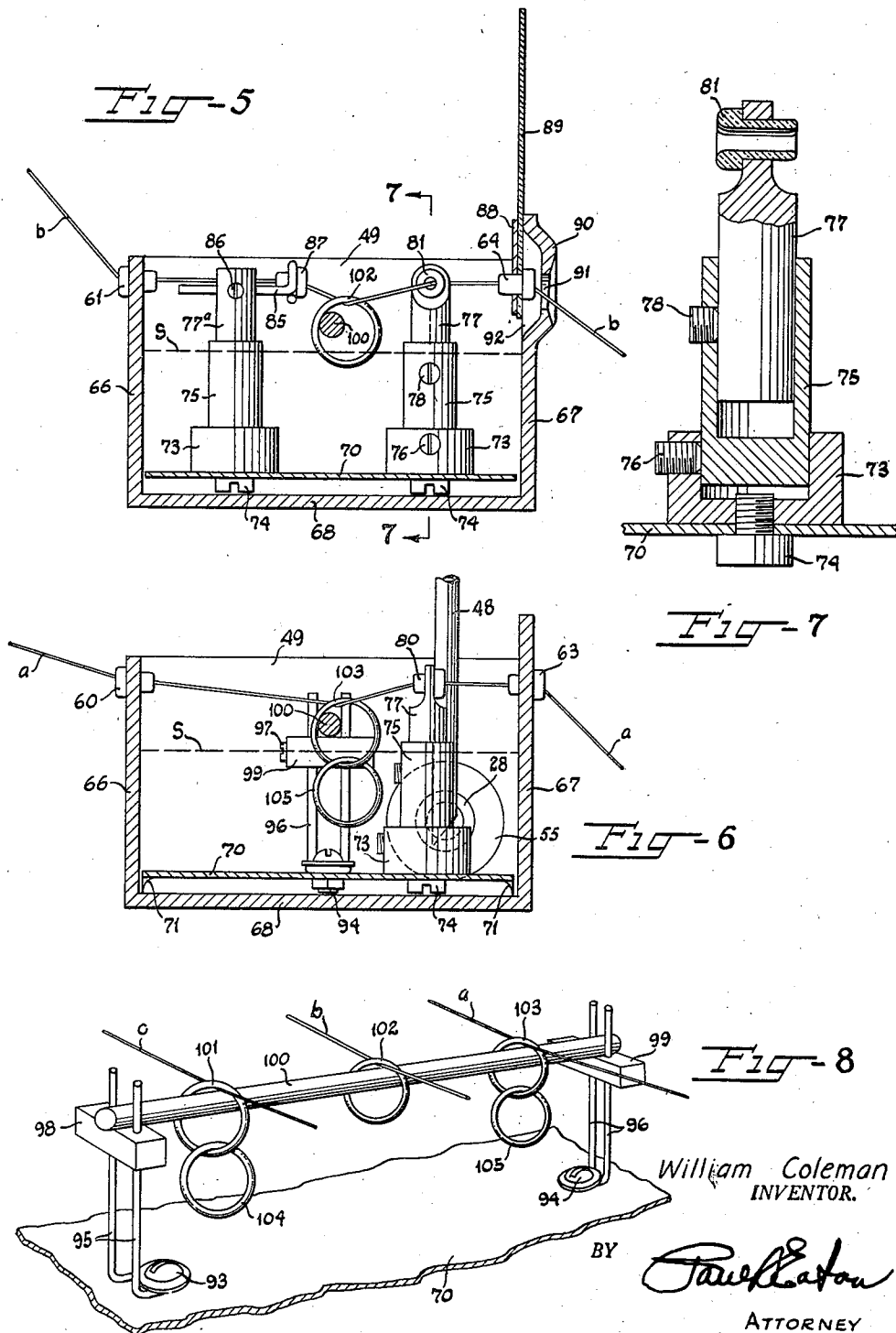
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MOISTENING APPARATUS FOR KNITTING YARNS

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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,420,355

MOISTENING APPARATUS FOR KNITTING YARNS

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17 Claims. (Cl. 66—125)

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This invention relates to a yarn moistening device and more especially to a device adapted to be associated with a knitting machine, such as a circular knitting machine, a full-fashioned knitting machine, and the like.

It is well known that yarns, especially nylon yarns, used in the knitting of stockings are sized, which makes them rather rigid and difficult to knit, and by use of my moistening device the size is softened in this yarn so that it does not plug up the needle latches and other parts of the machine. The invention comprises a container through which the yarn is passed. This container is adapted to hold a moistening and size softening solution and the yarn passes through suitable rings or weights which are rotated by the contact with the travelling yarn and the lower portion of these rings are disposed in the moistening solution but the yarn itself is not immersed in the moistening solution, but the travel of the yarn rotates the rings which not only causes them to bring up and deposit the moistening solution onto the yarn but also these rings serve as tensioning means for the yarn.

It is, therefore, an object of this invention to provide a moistening apparatus adapted to be associated with knitting machines, wherein the sized yarns, such as sized nylon yarns and the like, are subjected to a moistening operation and deposits just the right amount of softening agent thereonto to soften the size and cause the yarn to knit better, and to also prevent its being subject to pull threads and the like as if it were knitted from the sized yarn and not softened before knitting.

It is another object of this invention to provide a moistening device associated with knitting machines through which the yarn on its travel from the yarn packages to the knitting machine needles is passed through a suitable moistening apparatus which not only moistens the yarn but which also serves to tension the yarn.

Some of the objects of this invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which:

Figure 1 is an elevation of the upper portion of a circular knitting machine and showing my invention applied thereto;

Figure 2 is a front elevation of the apparatus with parts broken away;

Figure 3 is a top plan view taken along the line 3—3 in Figure 2;

Figure 4 is a detailed view showing the lower

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end of the constant level tube immersed in the solution;

Figure 5 is a transverse sectional view taken along the line 5—5 in Figure 3;

5 Figure 6 is a sectional view taken along the line 6—6 in Figure 3;

Figure 7 is a vertical sectional view through one of the guiding eyelets and taken along the line 7—7 in Figure 5;

10 Figure 8 is an isometric view of the ring supporting rod and associated parts.

Referring more specifically to the drawings, the numeral 10 indicates a portion of a circular knitting machine having a plurality of feed fingers 11, and a guide plate 12 which is conventional. This apparatus is shown in connection with a circular knitting machine but it could as well be employed in association with a full-fashioned knitting machine, warp knitting machine and other types of knitting machines.

20 Rising upwardly from the conventional knitting machine frame 10 is a vertically disposed supporting rod 14 having a plurality of brackets thereon, such as star shaped bracket 15, having laterally extending arms, and having suitable guide eyes 16 or tension means if desired, and on the support rod 14 my apparatus is adapted to be supported.

30 The apparatus comprises a bracket arm 19 having a hub portion 20 secured to the standard or support 14 by any suitable means, such as a set screw 21. This bracket or arm 20 projects laterally and then downwardly and has a hub portion 22 in which another support 23 is secured by means of a set screw 24. This support 23 projects laterally and upwardly and has a semicircular bearing 25 on its free end, on which a cap bearing 26 is secured by any suitable means, such as screws 27 for clampingly engaging a pipe 28. 40 This pipe 28 has an elbow 30 therein, to the upper end of which is secured one end of a manually operated valve 31, and mounted above the upper end of valve 31 is a container, preferably made of glass or other transparent substance and 45 indicated at 32.

In the upper end of valve 31 is threadably secured a pipe 34, which passes through a bottom member 36 associated with the container 32 and having suitable washers of rubber or felt indicated at 37 above and below the bottom member 36 so as to provide an air-tight joint between the bottom 36 and the valve 31 and the pipe 34. This pipe 34 slidably penetrates a cap 40 fitting over the upper end of container 32 and a cap 41 is 55 threadably secured on the upper end of pipe 34

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to clamp the cover 40 against top of container 32 and to clamp the bottom edge of container 32 against the top of bottom member 36 and to force the lower surface of bottom member 36 against its associated washer 37.

Pipe 34 extends upwardly through nut 41 and has threadably mounted thereon a thumb cap 43 which can be removed for filling the container when desired without the necessity of dismantling the parts. The pipe 34 has a plurality of perforations 44 near the bottom of the container 32 and also a plurality of perforations 45 near the top thereof.

Extending out of the top 40 is an elbow 46 to which is threadably secured a nut 47 which joins a downwardly descending tube 48 to the elbow 46. This tube 48 extends downwardly into a container 50 to be presently described. The lower end of this tube 48 is bevelled, as shown in Figures 2, 4, and 6, and has a slot 51 extending upwardly a short distance to maintain a more positive control of the liquid level in the container 50.

The pipe 28 which is clampingly held by the clamp cap 26 is threaded on its end remote from the elbow 30 and has a nut 53 threadably secured thereon and also has a washer 54 thereon, and the pipe 28 penetrates a suitable hole in the end wall 49 of casing 50 and has a nut 55 threadably secured thereon to prevent leakage and to allow the moistening liquid to flow from the container 32 through valve 31, elbow 30 and pipe 28 into the container 50.

The container 50 has a plurality of eyelets 60, 61, and 62 in one of its side walls 66, and eyelets 63 and 64 in the side wall 67 which is opposed to the one in which the eyelets 60 to 62, inclusive, are disposed. The bottom is indicated by 68, and the end walls by 49 and 59.

Disposed within the container 50 is a false bottom member 70, having its corners downturned as at 71. These downturned corners are adapted to rest on the bottom 68 of the container. Mounted on top of this false bottom 70 is a plurality of eyelet supporting means which, in the main, are identical as to structure and like reference characters will apply. These eyelet supporting structures comprise a base 73 secured to the false bottom 70 by a screw 74 penetrating a hole in the false bottom 70 and threadably engaging a threaded hole in the bottom of the base 73. Adjustably mounted in the base 73 is a shell-like member 75 which is held in adjustable position by means of a set screw 76 disposed in base 73 and adjustably mounted in the shell-like member 75 in an eyelet supporting member 77 which is held in adjusted position by means of a set screw 78.

There are four of these supporting structures shown in the drawings, and, in the upper ends of three of them nearest the observer in Figure 3, there are disposed guiding eyelets 80, 81, and 82. The other supporting member 77a disposed on the upper side of Figure 3 differs from the members 77, described above, in that, it does not have an eyelet in the upper end thereof but has a wire 85 secured therein by means of a set screw 86, which wire is turned laterally and bent around a guiding eyelet 87.

The side wall 67, on the interior surface thereof, has a plate 88 suitably bolted thereto by bolts 84, which plate confines a transparent shield member 89 against the interior surface of the side wall 67. Disposed in the plate 88 and penetrating transparent shield 89 is the eyelet 64. The side wall 67 is bulged outwardly as at 90 and has

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an opening 91 therein through which the yarn passes. An opening 92 is provided below the plate member 88 and shield 89 so that excess moisture or liquid passing through the eyelet 64 will fall downwardly in the bulged portion 90 and return to the container 50 through the opening 92.

Secured on the top surface of false bottom 70 by means of bolts 93 and 94 are two U-shaped uprising members 95 and 96. Adjustably mounted on these members 95 and 96 by means of set screws 97 are blocks 98 and 99 which support a rod 100 on which are mounted the rings or annular members 101, 102, and 103, through which, passes the three yarns shown in the drawings. These three yarns are, respectively, the welt yarn, the leg yarn, and the heel and toe yarn, and are indicated, respectively, by reference characters a, b, and c. These rings are of any suitable material such as copper, brass, steel, or any other suitable material and they are shown in a position of rest in Figure 8, but are shown in the position they would occupy when the yarn is travelling therethrough in Figures 5 and 6. Also interlocked with rings 101 and 103 are other rings 104 and 105. Due to the fact that the leg yarn b has a higher twist than the other yarns, and, therefore, absorbs more moisture than the other yarns a and c, this ring 102, through which the leg yarn passes, does not have an additional ring thereon for weight purposes.

As the yarn travels through the apparatus from the cones or packages of yarn to the knitting machine, it causes the rings 101 to 103, inclusive, to rotate and, as their lower portions are immersed in the moistening solution S, they pick up the moistening solution and deposit it onto the yarn. They also serve as tension means in applying a weight to the yarn and rings 104 and 105 apply additional tension to yarns a and c and also immerse their associated rings 101 and 103 deeper into the treating solution, therefore, causing more treating solution to be deposited on the yarns a and c than on the yarn b which does not have this additional ring to lower the ring 102 deeper into the solution.

It is to be noted that in view of the fact that the leg yarn b absorbs more moisture than the other yarns, its associated eyelet 81 is turned at right angles to the travel of the yarn to add additional tension and to cause the yarn to bear against both ends of the eyelet to remove some of the excess moisture therefrom. The amount of fluid which is picked up by the rings can be determined by the size and weight of the rings used and which are suitable to particular conditions.

In the drawings and specifications, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. Apparatus for applying a liquid to yarns in a knitting machine while the yarns are travelling from yarn packages to the yarn feed fingers of the knitting machine comprising a container into which a liquid is adapted to be placed, a plurality of guide eyelets in opposed side walls of the container, through which the yarns are led, a rod disposed longitudinally of the container and above the liquid level therein, a plurality of rings mounted on said rod and through which the yarns

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are adapted to pass, the lower portions of said rings being submerged in the liquid in the container, passage of the yarn through the rings serving to rotate the rings and to thus elevate liquid into contact with yarns as they pass through said rings.

2. Apparatus for applying a liquid to yarns in a knitting machine while the yarns are travelling from yarn packages to the yarn feed fingers of the knitting machine comprising a container into which a liquid is adapted to be placed, a plurality of guide eyelets in opposed side walls of the container, through which the yarns are led, a rod disposed longitudinally of the container and above the liquid level therein, a plurality of rings mounted on said rod and through which the yarns are adapted to be passed, the lower portions of said rings being submerged in the liquid in the container, passage of the yarn through the rings serving to rotate the rings and to thus elevate liquid into contact with the yarns as they pass through said rings, some of said rings having a weight attached thereto to increase the downward pressure on the rings and on the yarn passing therethrough and to submerge the rings in the liquid to a greater depth.

3. Moistening apparatus for supplying a liquid to yarns in a knitting machine comprising a container for holding a liquid, means for guiding the yarns on their travel from the yarn packages to the knitting needles through said container and above the liquid level therein, a plurality of annular members suspended in the container and having a portion thereof disposed above the liquid level and through which annular members the yarns are passed and whereby rotation will be imparted to the annular members by the travel of the yarns to cause the annular members to pick up liquids and deposit it onto the yarns during their travel, and means for supporting the annular members for rotation.

4. Apparatus for applying a liquid to yarns on their travel to the knitting needles of a knitting machine, comprising a container for holding liquid and having side walls and end walls and a bottom, a plurality of eyelets disposed in opposed side walls and through which the yarns are passed above the liquid level in the container, a horizontally disposed rod disposed in the container above the liquid level therein, said rod having a plurality of annular members of greater diameter than the rod loosely mounted on the rod and through which the yarns are adapted to travel through the container at a point above the liquid level therein whereby the travelling yarns will impart rotation to the annular members whose lower surfaces are immersed in the liquid in the container, to cause the liquid to be lifted by the annular members by the travel of the yarns.

5. Apparatus for applying a liquid to yarns on their travel to the knitting needles of a knitting machine comprising a container having side walls and end walls and a bottom, a plurality of eyelets disposed in opposed side walls and through which the yarns are passed above the liquid level in the container, a horizontally disposed rod disposed in the container above the liquid level therein, said rod having a plurality of annular members of greater diameter than the rod loosely mounted on the rod and through which the yarns are adapted to travel through the container at a point above the liquid level therein whereby the travelling yarns will impart rotation to the annular members whose lower surfaces are immersed in the liquid in the container, to cause

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the liquid to be lifted by the annular members and deposited onto the yarns due to the rotation imparted to the annular members by the travel of the yarns, a plurality of eyelet members disposed within the container and through which the yarns are passed to apply greater tension thereto, some of the eyelets being disposed at an angle to the line of travel of the yarn passing therethrough.

6. Apparatus for applying a liquid to yarns on their travel to the knitting needles of a knitting machine, comprising a container for the liquid having side walls and end walls and a bottom, a plurality of eyelets disposed in opposed side walls and through which the yarns are passed above the liquid level in the container, a horizontally disposed rod disposed in the container above the liquid level therein, said rod having a plurality of annular members of greater diameter than the rod loosely mounted on the rod and through which the yarns are adapted to travel through the container at a point above the liquid level therein, whereby the travelling yarns will impart rotation to the annular members whose lower surfaces are immersed in the liquid in the container to cause the liquid to be lifted by the annular members and deposited onto the yarns due to the rotation imparted to the annular members by the travel of the yarns, a plurality of eyelet members disposed within the container and through which the yarns are passed to apply greater tension thereto, some of the eyelets being disposed at an angle to the line of travel of the yarn passing therethrough, some of the annular members having a second annular member suspended therefrom and immersed in the solution to apply greater tension to the yarn and to immerse the first named annular members to a greater degree to cause a greater amount of liquid to adhere to the annular members to be deposited onto the yarns.

7. Apparatus for applying a liquid to yarns in a knitting machine while the yarns are travelling from yarn packages to the yarn feed fingers of the knitting machine comprising a container into which a liquid is adapted to be placed, a plurality of guide eyelets in opposed side walls of the container, through which the yarns are led, a rod disposed longitudinally of the container and above the liquid level therein, a plurality of rings mounted on said rod and through which the yarns are adapted to pass, the lower portions of said rings being submerged in the liquid in the container, passage of the yarn through the rings serving to rotate the rings and to thus elevate liquid into contact with yarns as they pass through said rings, a tank for holding a supply of liquid and a piped connection between the lower portion of the tank and one of the walls of the container and a pipe leading from the top of the tank to near the bottom of the container to maintain a constant liquid level in the container at all times.

8. Apparatus for applying a liquid to yarns in a knitting machine while the yarns are travelling from yarn packages to the yarn feed fingers of the knitting machine comprising a container into which a liquid is adapted to be placed, a plurality of guide eyelets in opposed side walls of the container, through which the yarns are led, a rod disposed longitudinally of the container and above the liquid level therein, a plurality of rings mounted on said rod and through which the yarns are adapted to be passed, the lower portions of said rings being submerged in the liquid in the container, passage of the yarn through the

rings serving to rotate the rings and to thus elevate liquid into contact with the yarns as they pass through said rings, some of said rings having a weight attached thereto to increase the downward pressure on the rings and on the yarn passing therethrough and to submerge the rings in the liquid to a greater depth, a tank for holding a supply of liquid and a piped connection between the lower portion of the tank and one of the walls of the container and a pipe leading from the top of the tank to near the bottom of the container to maintain a constant liquid level in the container at all times.

9. Moistening apparatus for supplying a liquid to yarns in a knitting machine comprising a container for holding a liquid, means for guiding the yarns on their travel from the yarn packages to the knitting needles through said container and above the liquid level therein, a plurality of annular members suspended in the container and having a portion thereof disposed above the liquid level and through which annular members the yarns are passed and whereby rotation will be imparted to the annular members by the travel of the yarns to cause the annular members to pick up liquid and deposit it onto the yarns during their travel, means for supporting the annular members for rotation, a tank for holding a supply of liquid and a piped connection between the lower portion of the tank and one of the walls of the container and a pipe leading from the top of the tank to near the bottom of the container to maintain a constant liquid level in the container at all times.

10. Apparatus for applying a liquid to yarns on their travel to the knitting needles of a knitting machine, comprising a container for holding liquid and having side walls and end walls and a bottom, a plurality of eyelets disposed in opposed side walls and through which the yarns are passed above the liquid level in the container, a horizontally disposed rod, disposed in the container above the liquid level therein, said rod having a plurality of annular members of greater diameter than the rod loosely mounted on the rod and through which the yarns are adapted to travel through the container at a point above the liquid level therein whereby the travelling yarns will impart rotation to the annular members whose lower surfaces are immersed in the liquid in the container, to cause the liquid to be lifted by the annular members and deposited onto the yarns due to the rotation imparted to the annular members by the travel of the yarns, a tank for holding a supply of liquid and a piped connection between the lower portion of the tank and one of the walls of the container and a pipe leading from the top of the tank to near the bottom of the container to maintain a constant liquid level in the container at all times.

11. Apparatus for applying a liquid to yarns on their travel to the knitting needles of a knitting machine comprising a container having side walls and end walls and a bottom, a plurality of eyelets disposed in opposed side walls and through which the yarns are passed above the liquid level in the container, a horizontally disposed rod disposed in the container above the liquid level therein, said rod having a plurality of annular members of greater diameter than the rod loosely mounted on the rod and through which the yarns are adapted to travel through the container at a point above the liquid level therein whereby the travelling yarns will impart rotation to the annular members whose lower surfaces

are immersed in the liquid in the container, to cause the liquid to be lifted by the annular members and deposited onto the yarns due to the rotation imparted to the annular members by the travel of the yarns, a plurality of eyelet members disposed within the container and through which the yarns are passed to apply greater tension thereto, some of the eyelets being disposed at an angle to the line of travel of the yarn passing therethrough, a tank for holding a supply of liquid and a piped connection between the lower portion of the tank and one of the walls of the container and a pipe leading from the top of the tank to near the bottom of the container to maintain a constant liquid level in the container at all times.

12. Apparatus for applying a liquid to yarns on their travel to the knitting needles of a knitting machine, comprising a container for the liquid having side walls and end walls and a bottom, a plurality of eyelets disposed in opposed side walls and through which the yarns are passed above the liquid level in the container, a horizontally disposed rod disposed in the container above the liquid level therein, said rod having a plurality of annular members of greater diameter than the rod loosely mounted on the rod and through which the yarns are adapted to travel through the container at a point above the liquid level therein, whereby the travelling yarns will impart rotation to the annular members whose lower surfaces are immersed in the liquid in the container to cause the liquid to be lifted by the annular members and deposited onto the yarns due to the rotation imparted to the annular members by the travel of the yarns, a plurality of eyelet members disposed within the container and through which the yarns are passed to apply greater tension thereto, some of the eyelets being disposed at an angle to the line of travel of the yarn passing therethrough, some of the annular members having a second annular member suspended therefrom and immersed in the solution to apply greater tension to the yarn and to immerse the first named annular members to a greater degree to cause a greater amount of liquid to adhere to the annular members to be deposited onto the yarns, a tank for holding a supply of liquid and a piped connection between the lower portion of the tank and one of the walls of the container and a pipe leading from the top of the tank to near the bottom of the container to maintain a constant liquid level in the container at all times.

13. Apparatus for applying a liquid to yarns on their travel to the knitting needles of a knitting machine, comprising a container for the liquid having side walls and end walls and a bottom, a plurality of eyelets disposed in opposed side walls and through which the yarns are passed above the liquid level in the container, a horizontally disposed rod disposed in the container above the liquid level therein, said rod having a plurality of annular members of greater diameter than the rod loosely mounted on the rod and through which the yarns are adapted to travel through the container at a point above the liquid level therein, whereby the travelling yarns will impart rotation to the annular members whose lower surfaces are immersed in the liquid in the container to cause the liquid to be lifted by the annular members and deposited onto the yarns due to the rotation imparted to the annular members by the travel of the yarns, a plurality of eyelet members disposed within the container and

through which the yarns are passed to apply greater tension thereto, some of the eyelets being disposed at an angle to the line of travel of the yarn passing therethrough, some of the annular members having a weight suspended therefrom and immersed in the solution apply greater tension to the yarn and to immerse the first named annular members to a greater degree to cause a greater amount of liquid to adhere to the annular members to be deposited onto the yarns.

14. Apparatus for applying a liquid to yarns in a knitting machine while the yarns are travelling from yarn packages to the yarn feed fingers of the knitting machine comprising a container into which a liquid is adapted to be placed, a plurality of guide eyelets in opposed side walls of the container through which the yarns are led, a support disposed above the liquid level therein, a plurality of rings mounted on said support and through which the yarns are adapted to pass, the lower portions of said rings being submerged in the liquid in the container, passage of the yarn through the rings serving to rotate the rings and to thus elevate liquid into contact with yarns as they pass through said rings.

15. Apparatus for applying a liquid to yarns in a knitting machine while the yarns are travelling from yarn packages to the yarn feed fingers of the knitting machine comprising a container into which a liquid is adapted to be placed, a plurality of guide eyelets in opposed side walls of the container through which the yarns are led, a support above the liquid level therein, a plurality of rings mounted on said support and through which the yarns are adapted to be passed, the lower portions of said rings being submerged in the liquid in the container, passage of the yarn through the rings serving to rotate the rings and to thus elevate liquid into contact with the yarns as they pass through said rings, some of said rings having a weight attached thereto to increase the downward pressure on the rings and on the yarn passing therethrough and to submerge the rings in the liquid to a greater depth.

16. Apparatus for applying a liquid to yarns on their travel to the knitting needles of a knitting machine, comprising a container for holding liquid and having side walls and end walls and a bottom, a plurality of eyelets disposed in opposed side walls and through which the yarns

are passed above the liquid level in the container, a support disposed in the container above the liquid level therein, said support having a plurality of annular members of greater diameter than the support loosely mounted on the support and through which the yarns are adapted to travel through the container at a point above the liquid level therein whereby the travelling yarns will impart rotation to the annular members whose lower surfaces are immersed in the liquid in the container, to cause the liquid to be lifted by the annular members and deposited onto the yarns due to the rotation imparted to the annular members by the travel of the yarns.

17. Apparatus for applying a liquid to yarns on their travel to the knitting needles of a knitting machine comprising a container having side walls and end walls and a bottom, a plurality of eyelets disposed in opposed side walls and through which the yarns are passed above the liquid level in the container, a support disposed in the container above the liquid level thereon, said support having a plurality of annular members of greater diameter than the support loosely mounted on the support and through which the yarns are adapted to travel through the container at a point above the liquid level therein whereby the travelling yarns will impart rotation to the annular members whose lower surfaces are immersed in the liquid in the container, to cause the liquid to be lifted by the annular members and deposited onto the yarns due to the rotation imparted to the annular members by the travel of the yarns, a plurality of eyelet members disposed within the container and through which the yarns are passed to apply greater tension thereto, some of the eyelets being disposed at an angle to the line of travel of the yarn passing therethrough.

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