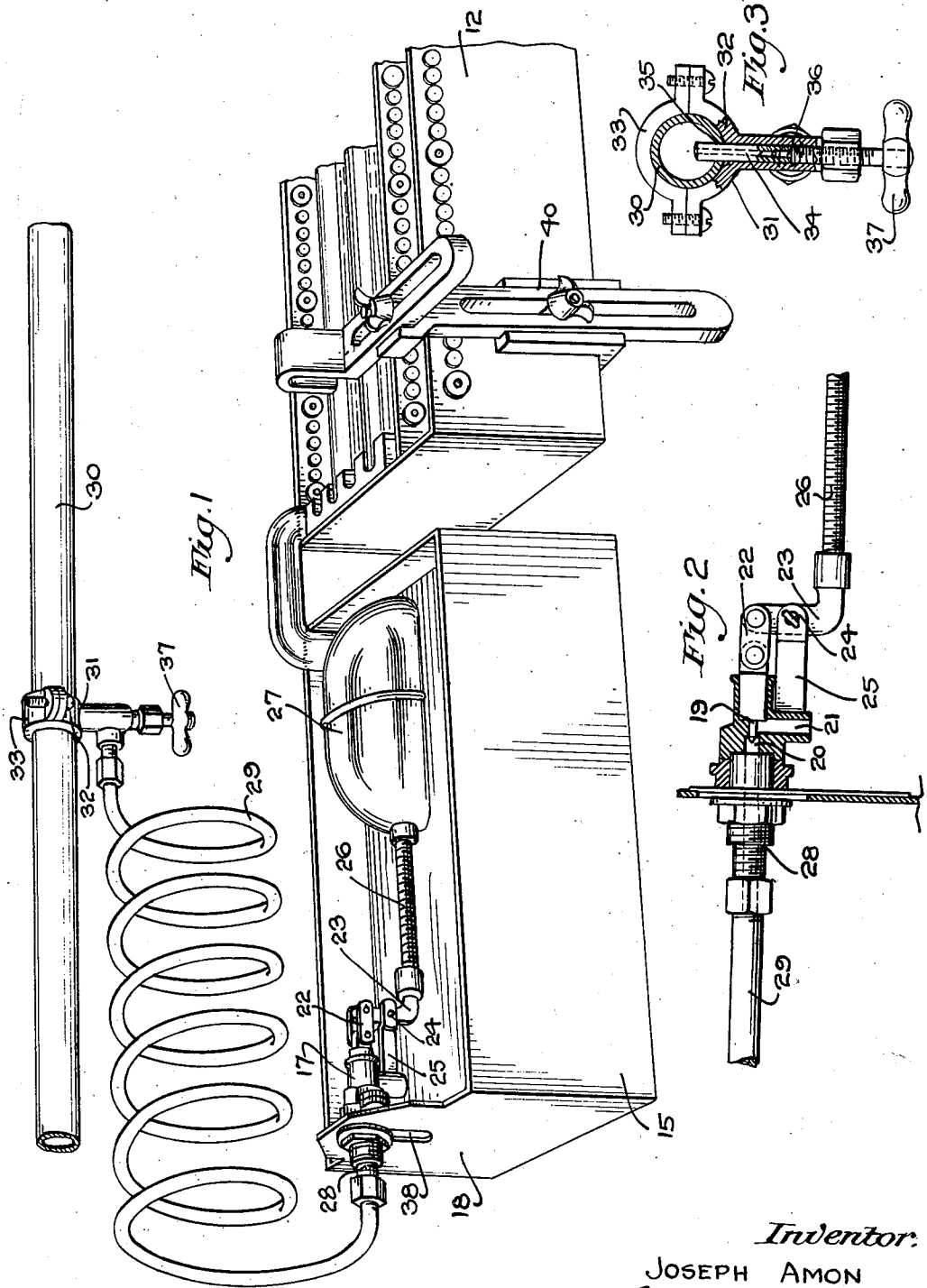
Nov. 12, 1940. J. AMON 2,221,293

AUTOMATIC WATER LEVELER

Filed Oct. 10, 1938 2 Sheets-Sheet 1



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AUTOMATIC WATER LEVELER

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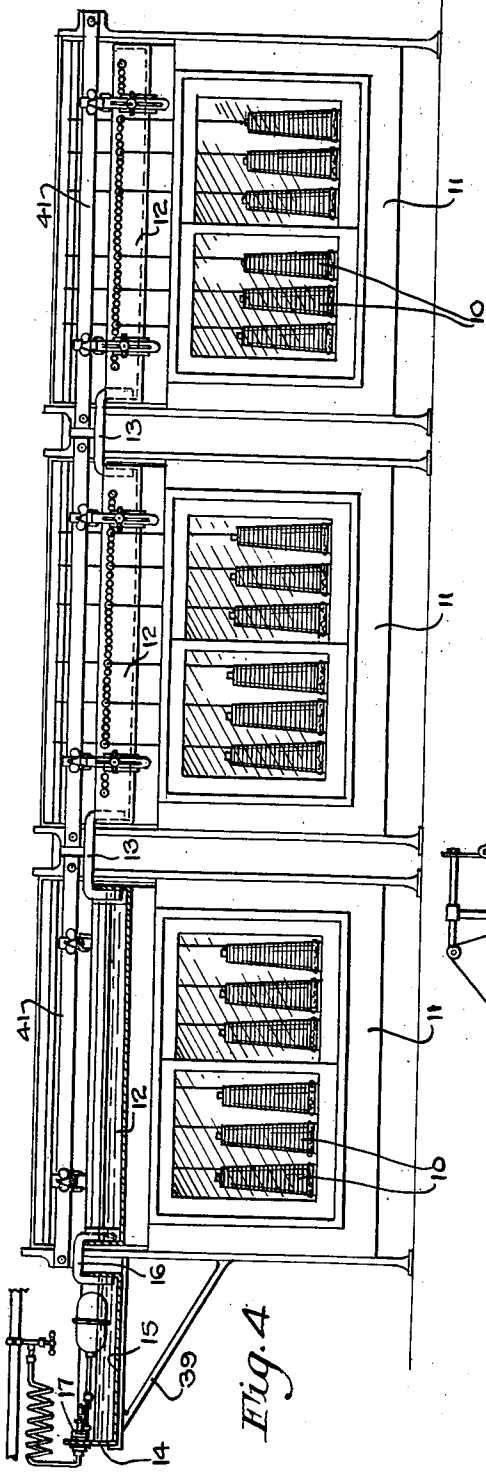


Fig. 4

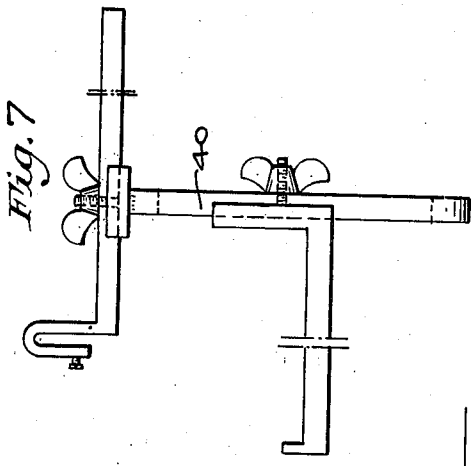


Fig. 7

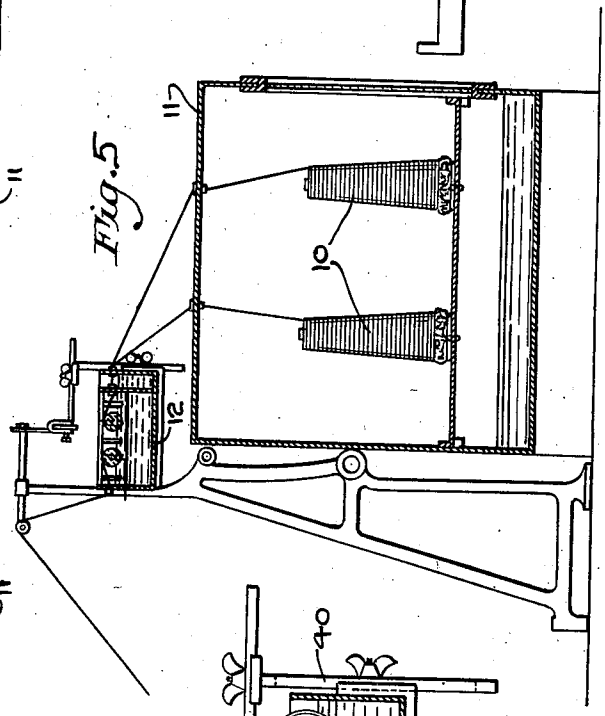


Fig. 5

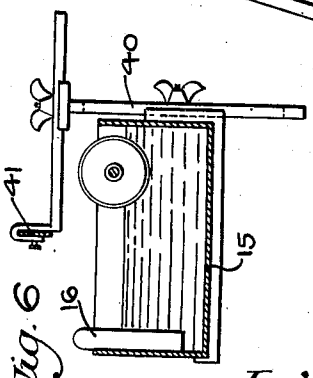


Fig. 6

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UNITED STATES PATENT OFFICE

2,221,293

AUTOMATIC WATER LEVELER

Joseph Amon, Rahway, N. J.

Application October 10, 1938, Serial No. 234,122

1 Claim. (Cl. 66—125)

This invention relates to an apparatus for moistening and conditioning yarn for use in knitting machines and more particularly to an arrangement for automatically insuring the maintenance of a uniform and constant liquid level in a plurality of yarn moistening troughs disposed in conventional end-to-end relation and in operative position with respect to the knitting machine.

As is well-known in the art to which this invention pertains, the straight or full-fashioned knitting machines such as are presently employed for knitting full-fashioned hosiery are customarily equipped with moistening troughs through which the yarns pass on their way to the thread carriers which deliver the yarns to the needles. These moistening troughs contain water or other suitable liquid which wet the yarns and so deliver them for efficient manipulation by the needles, sinkers and dividers during the knitting process. Inasmuch as the conventional flat knitting machine is provided with a plurality of longitudinally spaced banks of needles and associated mechanisms to provide for the simultaneous knitting on a machine of a plurality of knitted blanks, it has been the conventional practice to provide each bank of needles with a separate moistening trough through which the yarns are fed to said bank of needles. In order to insure that all of the yarns which are delivered to the several banks of needles of the knitting machine are subjected to the same conditioning treatment, it has been necessary for the operator of the machine to periodically examine the several yarn moistening troughs to see that each contains its requisite supply of yarn conditioning liquid because obviously variations in the wetting of the yarns passing through the several moistening troughs will result in a lack of uniformity in the several fabric blanks being knitted on the machine. Also, this need for examining and individually replenishing the supply of the yarn conditioning liquid in each of the moistening troughs is time consuming and at best does not insure such a constant maintenance of a uniform level of yarn conditioning liquid in all of the moistening troughs that all of the yarns which pass through the latter are uniformly saturated.

It is among the objects of the present invention to provide a means for insuring automatically the maintenance of a constant and uniform level of yarn conditioning liquid in all of the yarn moistening troughs, thereby eliminating the necessity of frequent inspections of the troughs by the operator at the same time that the several yarns which are delivered through the trough are insured a uniform moistening treatment.

It is among the objects of the present invention to provide means for insuring automatically the maintenance of a constant and uniform level of yarn conditioning liquid in all of the yarn moistening troughs, thereby eliminating the necessity of frequent inspections of the troughs by the operator at the same time that the several yarns which are delivered through the trough are insured a uniform moistening treatment.

Other objects and advantages of the invention will appear more fully hereinafter, it being understood that the present invention consists substantially in the combination, assembly, location and relative arrangement of parts, as shown in the accompanying drawings, as described more fully hereinafter, and as finally pointed out in the appended claim.

In the accompanying drawings:

Figure 1 is a perspective view showing the automatic liquid leveling device constructed in accordance with and embodying the principles of the present invention;

Figure 2 is a vertical cross-sectional view showing the details of the float-controlled valve by means of which the moistening troughs are supplied with water as required;

Figure 3 is a view partly in section showing a preferred means of connecting the mechanism of the present invention to an available water line;

Figure 4 is a rear view of a portion of a knitting machine showing the apparatus of the present invention operatively associated therewith;

Figure 5 is a transverse sectional view of a portion of the machine shown in Figure 4;

Figure 6 is a vertical sectional view through the master trough showing one means for supporting it in position; and

Figure 7 is a view of the supporting means which may be employed for supporting the yarn moistening troughs and the master trough in operative position.

Upon reference to the accompanying drawings, it will be observed that Figures 4 and 5 thereof illustrate the application of the present invention to a flat or full-fashioned hosiery knitting machine of which only three sections are shown, it being understood, of course, that each such machine may include as many as twelve or more identical knitting sections. Each of these sections is provided with its own supply of yarn which is conventionally in the form of a plurality of yarn bobbins 10 suitably disposed in a humidifying box or chamber 11, the yarn as

needed being supplied from this chamber to and through its associated yarn conditioning trough 12 from whence it emerges in moistened condition for immediate delivery to the knitting elements (not shown) of the machine. It is customary to provide as many yarn conditioning or moistening troughs as there are knitting sections to a machine, these troughs being supported at the rear of the knitting machine immediately above the humidifying boxes and disposed in end-to-end relation.

As clearly appears in Figure 4, the several troughs 12 are joined together by means of glass syphons 13 of inverted U-shape, these syphons being so operative that they insure a uniform liquid level throughout all of the troughs of a given machine.

The present invention provides for the maintenance of a constant level of the liquid in the several syphon-connected troughs and is designed to automatically supply water or other liquid to the yarn-conditioning troughs in a quantity necessary to maintain at all times a predeterminedly fixed level of the liquid in the troughs, it being apparent that without such automatic regulation the liquid level in the troughs would gradually drop due not only to withdrawal of the liquid from the troughs by the yarns passing therethrough but also to evaporation of the liquid.

This automatic regulation of the liquid level is obtained by the apparatus designated generally by the reference numeral 14 and which includes a master trough 15 adapted to be mounted, in any suitable manner, at either end of the knitting machine. This master trough 15 is so mounted that it is substantially level and in line with the several yarn conditioning troughs 12. A syphon tube 16, in all respects similar to the tubes 13, interconnects the master trough 15 with the next adjoining yarn conditioning trough 12 in consequence of which the liquid contained in all of the troughs, including the master trough, is maintained at a uniform level.

As appears most clearly in Figures 1 and 2, the master trough is equipped with a float-controlled valve mechanism 17 which is suitably mounted upon the end wall 18 of the trough. This valve mechanism, which may be of any desired construction, is preferably of the form shown in Figure 2 having a plunger type valve 19 for controlling the delivery of liquid into the trough 15 by way of the liquid delivery passage 20—21. This needle valve 19 is connected by a link 22 to one extremity of a bell-crank 23 pivoted, as at 24, to a relatively fixed arm 25, the opposite extremity of the bell-crank being connected to a float rod 26 to the end of which is threadedly secured a float 27.

Connected to the valve inlet, as at 28, is one end of a coiled and thereby extensible copper tubing 29, the opposite end of which latter is connected to a suitable source of water or other liquid supply such as the water pipe 30. Figure 3 illustrates a convenient and efficient means for effecting a connection to an existing water pipe consisting of a strap valve unit 31 formed of separable parts 32 and 33 designed to be clamped on to the water pipe and in which the part 32 constituting the valve body of the unit includes a tubular extension 34 adapted for projection into an opening 35 provided therefor in the water pipe. A plunger type valve 36, operated by a handle 37, controls the delivery of water from the pipe 30 to the master trough 15 by way of the connecting tubing 29.

In normal operation of the apparatus of the present invention, the valve 36 is normally open, while the valve 19 of the float-controlled valve mechanism 17 intermittently opens and closes in accordance with the demands imposed thereon by any fluctuations in the level of the liquid contained in the yarn-conditioning troughs 12. Having established the desired level to be maintained of the liquid in the troughs 12, the master trough is filled with liquid to that predeterminedly fixed level. As liquid is withdrawn from one or more of the troughs 12 so that the liquid level therein drops below that desired to be maintained, the level of the liquid in the master trough is correspondingly depressed with the result that the float 27 drops sufficiently to open the valve 19. Water is thereupon supplied to the master trough 15 from the pipe 30 or other supply until such time that the level in the trough 15 rises to the predeterminedly fixed point. Of course, as the level of the water rises in the master trough a corresponding rise occurs in all of the yarn conditioning troughs 12 so long as all of the troughs, including the master trough, remain interconnected by the syphon tubes 13 and 16. Conversely, a drop in the level of the liquid in any one or more of the yarn conditioning troughs results in a corresponding drop of the liquid level in the master trough, thus calling for a further supply of water from the main supply, such as the pipe 30. Consequently, the float-controlled valve mechanism 17 operates intermittently to maintain in the master trough 15 and correspondingly in the yarn conditioning trough 12 a constant level of liquid.

In order to provide for some adjustment in the level of the liquid to be maintained in the troughs, the float 27 is threaded upon the float rod for longitudinal adjustment thereon and, in addition, the valve mechanism and float assembly may be vertically adjusted bodily with respect to the master trough within the limits of the vertical slot 38 which is provided in the end wall 18 of the said trough.

The master trough 15 may be rigidly mounted in position upon the frame of the knitting machine by means of a supporting bracket 39, as shown in Figure 4, or by that type of adjustable supporting bracket 40, as illustrated in Figures 6 and 7, commonly employed for suspending the yarn conditioning troughs from an upper longitudinally extending bar of the knitting machine frame, such as the bar 41 in Figures 4 and 5.

It will be understood, of course, that the invention is susceptible of various changes and modifications from time to time without departing from the real spirit or general principles thereof and it is accordingly intended to claim the same broadly, as well as specifically, as indicated by the appended claim.

What is claimed as new and useful is:

In an apparatus for automatically controlling the level of yarn conditioning liquid contained in a plurality of yarn conditioning troughs arranged in longitudinally spaced end to end relation and independently mounted in position, in combination, a master trough adapted to contain a supply of yarn conditioning liquid, readily removable means loosely connecting said troughs for insuring a uniform level of liquid in all of said troughs, including said master trough, consisting of a plurality of removable

siphon tubes of inverted U-shape respectively disposed in straddling relation over the proximate ends of each pair of adjoining troughs, means for connecting said master trough to an external source of liquid supply, and a float-controlled valve mechanism operatively associated with said master trough and operative automatically to replenish the supply of liquid in said master trough when the liquid level therein drops below a predeterminedly established point to thereby raise to said point the level of the liquid in said master trough and correspondingly in said yarn conditioning troughs.

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