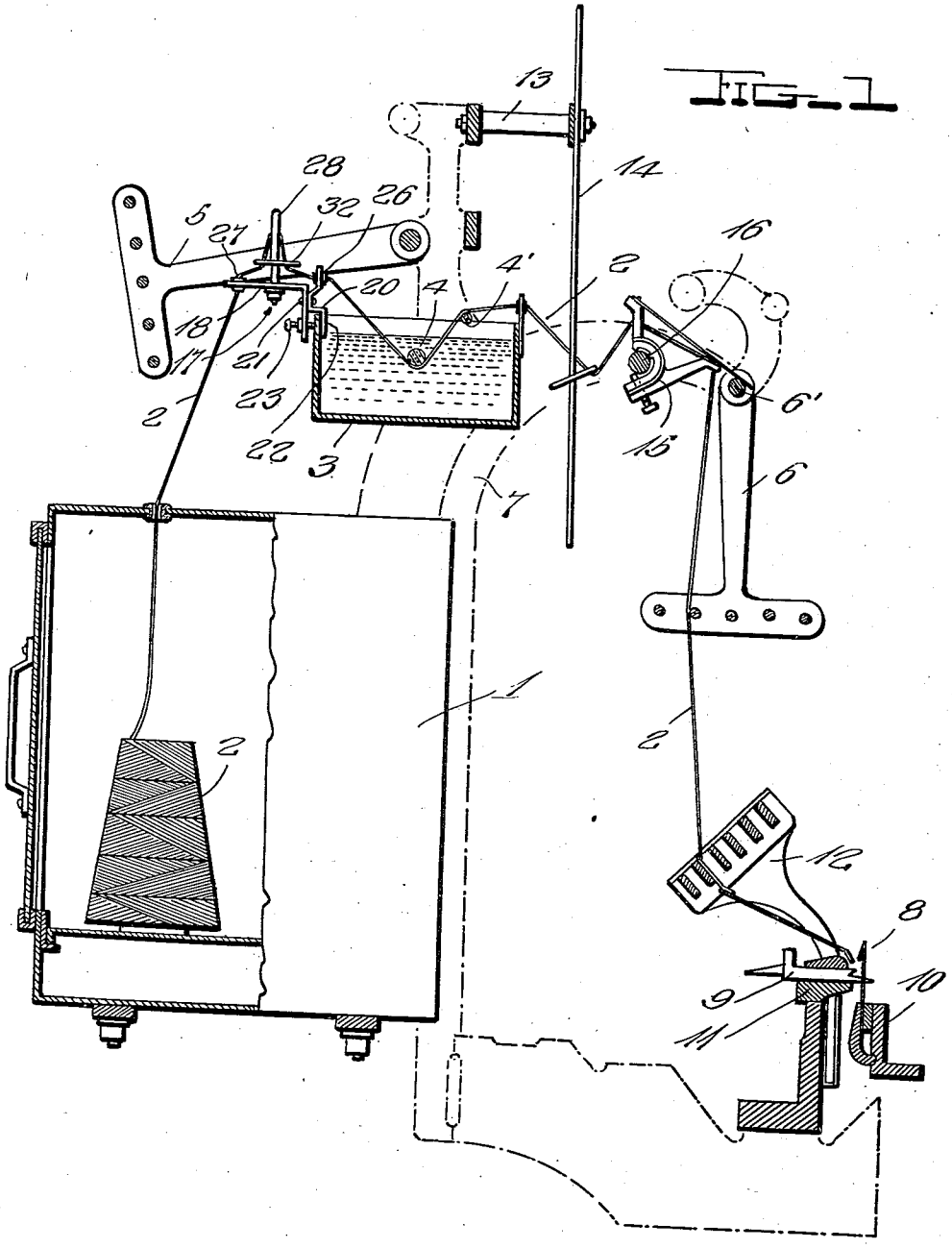
April 28, 1942. W. J. FREER 2,281,427

THREAD TENSIONER

Filed Jan. 16, 1941 3 Sheets-Sheet 1

FIG. 1



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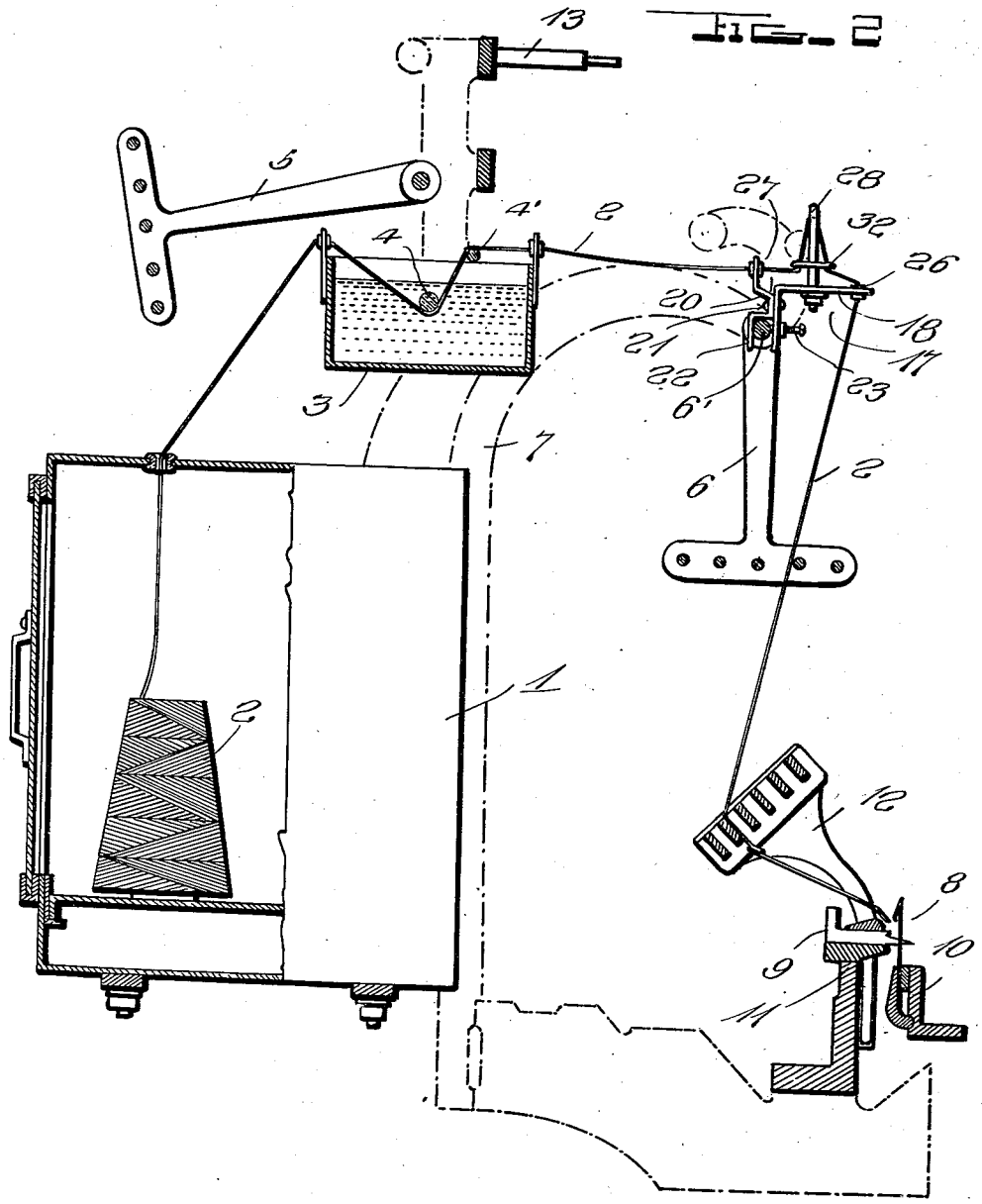
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THREAD TENSIONER

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FIG. 2



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THREAD TENSIONER

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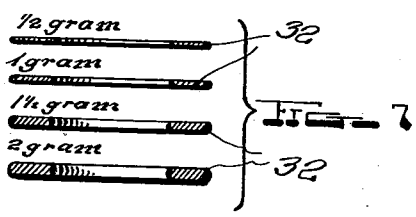


FIG. 7

FIG. 3

FIG. 4

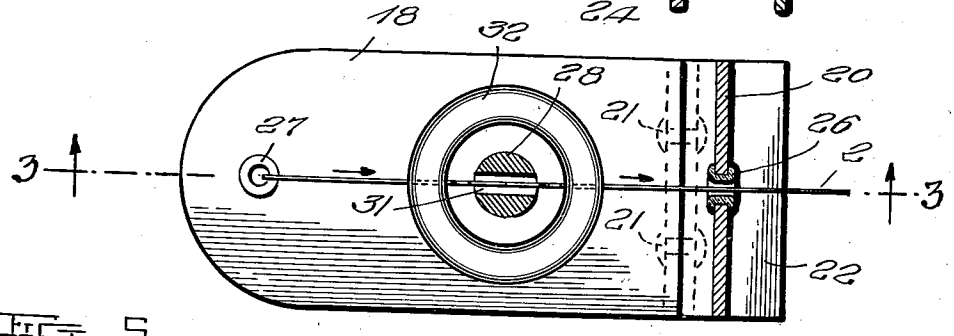
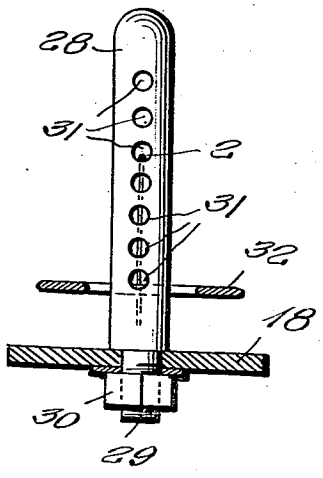


FIG. 5



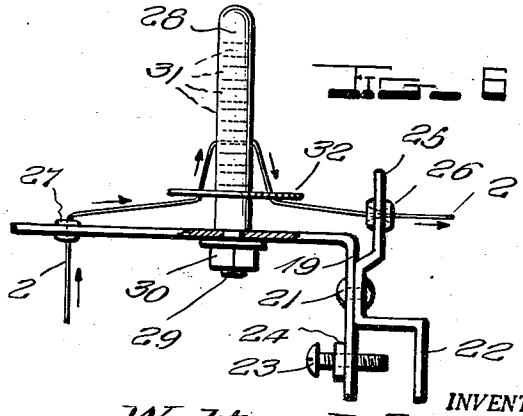


FIG. 6

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Patented Apr. 28, 1942

2,281,427

UNITED STATES PATENT OFFICE

2,281,427

THREAD TENSIONER

Walter J. Freer, Philadelphia, Pa.

Application January 16, 1941, Serial No. 374,755

6 Claims. (Cl. 66—146)

This invention relates to a thread tensioner particularly adapted for use on a hosiery knitting machine but it is to be understood that its use is not restricted to this particular type of machine as it is adapted for use on any machine wherein a thread must be kept under tension during operation of the machine.

While the improved device may be used for tensioning any type of yarn or thread such as silk, cotton, rayon, bemberg, or other specific types of thread or yarn, it is particularly useful on hosiery machines used for making artificial silk stockings. When knitting this kind of hosiery, trouble of various sorts occurs, such as loops, pressoffs, and curls in thread commonly known as pigtails. One of the commonest troubles is the formation of loops while splicing on a legger, and steps formed in soles on a footer. Ordinarily, in attempting to eliminate the loops, more tension is put on ends of the threads but, because of this extra tension, the number of pressoffs and spoiled stockings is materially increased and the formation of loops is not entirely eliminated. The formation of pigtails is also not eliminated.

Therefore, one object of the invention is to provide a tensioning device which may be mounted in such a position that it will act upon an intermediate portion of the thread moving toward or away from the water tank of the knitting machine and serve very effectively to apply predetermined tension to the thread as the thread advances toward the needles and thus prevent the formation of loops or other imperfections in a stocking during knitting of the stocking.

Another object of the invention is to so form the tensioning device that it may be applied either to a wall of the water tank for acting on thread advancing toward the tank, or applied to the rod carrying a thread guide toward which the thread moved after leaving the tank.

Another object of the invention is to provide a tensioning device including an upright stem or pin formed with a series of thread receiving openings and about which a disc of predetermined weight is loosely placed, the tension of the thread being controlled by selective use of a disc of the proper weight and by passing the thread through a selected one of the openings in the pin. It will thus be seen that the tension may be increased by use of a disc of greater weight or by shifting the thread from an opening through which it passes to a higher opening.

Another object of the invention is to provide a tensioning device which is simple in construction, easy to apply to a knitting machine, and not liable to get out of order or become broken or slip loose after being applied to the machine in position for use.

In the accompanying drawings:

Fig. 1 is a view showing the improved tensioning device applied to a wall of the water tank of the knitting machine.

Fig. 2 is a view similar to Fig. 1, showing the tensioning device applied to the rod from which the thread guide is suspended.

Fig. 3 is a view showing the tensioning device principally in vertical section and partially in elevation.

Fig. 4 is a view on the line 4—4 of Fig. 3.

Fig. 5 is a view on the line 5—5 of Fig. 3, the pin or stem being in elevation.

Fig. 6 is a view on a reduced scale showing the tensioning device in side elevation.

Fig. 7 is a group view showing weights of different thicknesses in section.

The improved thread tensioning device has been shown applied to a hosiery knitting machine of conventional construction including the usual damp box 1, in which a cone of thread or yarn 2 is mounted in the usual manner. There has also been provided the usual water can or trough 3 equipped with rollers 4 and 4' so that the thread may be directed through the water in the trough. When silk is being used, the thread is directed through water in the trough but when artificial silk or other yarn, which should not be moistened, is in use, the rollers 3 and 4 are removed and the thread directed over the trough without passing through the trough and the water therein. The thread guides 5 and 6 are carried by the usual upright support 7, indicated in dotted lines, and there have also been shown the usual needles 8 and associated sinkers or dividers 9, the needles being carried by the needle bar 10 in the usual manner and the sinkers being mounted through the usual sinker bar or head 11. Over the sinker bar there has been shown the usual thread carrier 12 and at the top of the upright support there has been shown an arm or stem 13 for carrying a fiddle-stick 14. In Fig. 1, there has also been shown a snapper 15 carried by its supporting rod 16 but in Fig. 2, these elements are omitted as they are not used when the tensioning device is mounted as shown in Fig. 2, the fiddle-stick being also shown removed in this figure.

The tensioning device, which is indicated gen-

erally by the numeral 17, may be mounted on a wall of the water can 3, or on the rod 6' from which the thread guide 6 is suspended, but, in either case, it is located intermediate the length of the thread between the carrier 12 and the damp box 1 so that it may serve effectively to place the thread under predetermined tension and prevent the formation of loops, pressoffs, curls, and the like, during operation of the knitting machine.

The tensioning device is illustrated in detail in Figs. 3 through 7, and referring to these figures, it will be seen that it has a base 18 constituting a portion of a bracket which is formed from sheet metal, preferably stainless steel, and has one end portion bent downwardly to form a shank 19. A clamp 20, which is also formed of stainless steel, is secured against the shank 19 by rivets 21 and has its lower portion bent to form a jaw 22 which cooperates with the set screw 23 carried by the lower portion of the shank. This set screw is threaded through the lower portion of the shank and when it is tightened to effect gripping of a wall of the water can, as shown in Fig. 1, or gripping of the rod 6', as shown in Fig. 2, the lock nut 24 will be tightened and the bracket or base will be firmly held in the selected mounted position. The upper portion 25 of the metal strip from which the clamp is formed projects upwardly above the base and carries an eye or thread guide 26 through which the thread 2 passes, the thread being also passed through a similar guide or eye 27 carried by the free end portion of the base. The eyes 26 and 27 may be formed of glass, porcelain, hardened nickel-steel, or any other suitable material.

At a point intermediate its length and width, the base bracket 18 carries a post or tension pin 28 which is formed of glass, hardened metal such as stainless steel, or other suitable material. This pin is disposed in an upright position with its reduced and threaded lower end or neck 29 passed through the base and firmly secured by a nut 30. A plurality of openings 31 are formed transversely through the pin in vertical spaced relation to each other and through a selected one of these openings is passed the portion of the thread 2 between the eyes 26 and 27. Therefore, when a selected one of the discs 32, which serve as weights, is disposed about the pin, portions of the thread at opposite sides of the pin, will be carried downwardly by the disc or weight in use and drag will be exerted on the portion of the thread passing through the pin and also upon portions of the thread upon which the weight rests. Edges of the discs and portions of the pin at ends of the openings 31 are rounded so that frictional wear on the thread will be reduced to a minimum and fraying of the thread prevented. The weights may be formed of glass, stainless steel, or other suitable material, and while there have been shown four weights in Fig. 7, it is to be understood that any number desired may be provided as set. In the illustrated set, the thinnest disc weighs ½ gram, the next 1 gram, the next 1½ grams, and the thickest disc 2 grams, but any variation in weight may be provided.

When the tensioning device is in use, it is mounted on the water tank or the rod 6' and the thread passes through the eyes 26 and 27 and a selected one of the openings 31 of the pin. When the thread is passed through a high opening, the tension on the thread is increased and the tension will also be controlled by use of a light or heavy weight. If it is found that too much tension is being applied to the thread, it is merely necessary to remove the weight in use and substitute a lighter weight, or the thread may be transferred from one opening 31 to another, the thread being transferred to a lower opening to decrease tension and to a higher opening if tension is to be increased. It will be understood that a tensioning device will be provided for each thread. If the thread on one bobbin is wound tighter than others, this condition will be equalized, due to the fact that the tighter the thread is wound, the higher the weight will be lifted by portions of the thread upon which it rests at opposite sides of the pin, and as the weight is shifted upwardly, the frictional drag and resulting tension will be decreased. Therefore, the threads may automatically equalize their tension within limits controlled by the weight of the disc in use and the location of the opening 31 through which the thread passes.

The fact that tension of the threads may be equalized is very important when making three-carrier ringless stockings as when one bobbin is looser or tighter than the others, and the threads are not under equal tension, the stocking will be spoiled by formation of what is known in the trade as a "washboard." This occurs more often when making three-carrier ringless loops on selvage and is due to the laying still of one carrier while the others make a course. Use of the improved tensioning device eliminates this since as soon as a carrier stops the disc drops all the way down to the base and holds the thread taut so that the thread cannot sag and loops form. The fact that tension can be perfectly controlled prevents cuts on selvage due to tension being too tight.

Having thus described the invention, what is claimed is:

1. Means for placing the thread of a knitting machine under predetermined tension comprising a vertically disposed member formed with a thread-receiving passage through which an intermediate portion of the thread passes, and a weight fitting loosely about the said member and freely shiftable vertically thereon for holding said intermediate portion of the thread crimped and under predeterminded tension.

2. Means for placing the thread of a knitting machine under tension comprising a member formed with a plurality of passages through a selected one of which an intermediate portion of the thread passes, and a weight for fitting loosely about said member and resting on the thread at opposite sides thereof to crimp the thread and place it under predetermined tension.

3. Means for placing the thread of a knitting machine under tension comprising a mounting for engagement with a support, a pin extending upwardly from the mounting, said pin being formed with openings in vertical spaced relation to each other and through a selected one of which an intermediate portion of the thread passes, and a weight fitting loosely about the pin for resting upon portions of the thread at opposite sides of the pin to exert dragging force downwardly upon the portion of the thread passing through the pin and place the thread under predetermined tension.

4. Means for placing the thread of a knitting machine under tension comprising a base hav-

ing a portion bent to form a depending arm and a U-shaped clamp carried thereby, a set screw for holding the clamp in gripping engagement with a support, a pin disposed vertically over the base with its lower end secured through the base, said pin having thread-receiving openings spaced vertically, and a weight for fitting loosely about the pin and resting upon portions of a thread at opposite sides of the pin and exerting drag upon the thread to place the thread under tension.

5. Means for placing the thread of a knitting machine under tension comprising a base formed from sheet metal and having a portion bent to form an arm and a clamp carried thereby, a finger extending from said arm, the finger and the base being provided with thread-receiving eyes, a pin extending vertically from the base and having a stem at its bottom passing through the base, a fastener carried by the stem, the pin being formed with thread-receiving openings spaced vertically from each other and through a selected one of which is adapted to be passed a thread having portions passing through said eyes, and a series of discs of different weights, a selected one of the discs being fitted loosely about said pin for resting upon portions of a thread at opposite sides of the pin and exerting drag on the thread to place the thread under predetermined tension.

6. Thread tensioning means for a knitting machine comprising an elongated member adapted to be mounted vertically in position for sliding engagement by a portion of the thread intermediate the source of supply and the needles, and a weight loose about said member for resting upon portions of the thread at opposite sides of the member and urging the engaged portions of the thread downwardly to tension the thread.

WALTER J. FREER.