

# United States Patent [19]

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[11] 3,794,263

[45] Feb. 26, 1974

[54] SUPPORT ARRANGEMENT FOR A HANK OF THREAD, AND HANKS EQUIPPED WITH SAID SUPPORT

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[22] Filed: June 29, 1972

[21] Appl. No.: 267,681

## Related U.S. Application Data

[63] Continuation of Ser. No. 108,454, Jan. 21, 1971, abandoned.

## Foreign Application Priority Data

Feb. 20, 1970 France ..... 70,06210

[52] U.S. Cl. .... 242/127, 242/53

[51] Int. Cl. .... B65h 54/56, B65h 49/30

[58] Field of Search ..... 242/53, 96, 127, 104, 54

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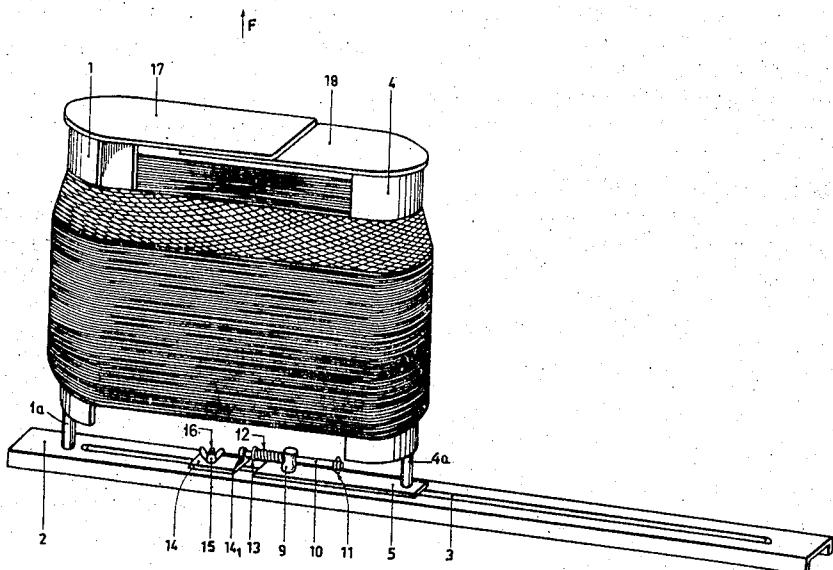
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[57]

## ABSTRACT

The invention relates to a support arrangement for a hank of thread and to hanks fitted with this support arrangement, which ensures correct unwinding and is made up basically of a fixed arm and a movable arm on which the coiled thread is arranged, the mobile arm co-operating with a spring and adjustable stop so as to maintain the coiled thread under tension.

8 Claims, 6 Drawing Figures

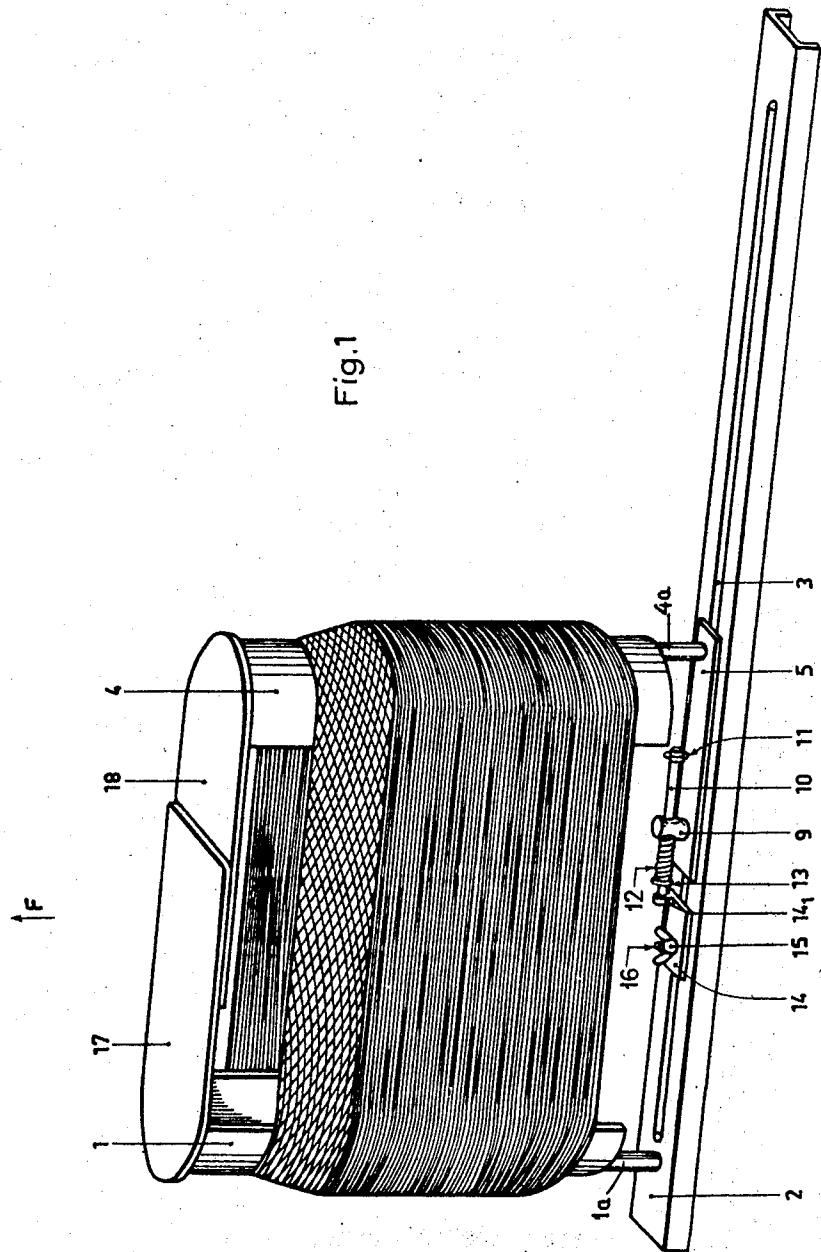


PATENTED FEB 26 1974

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Fig.1



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Fig.3

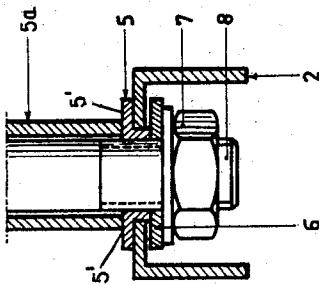
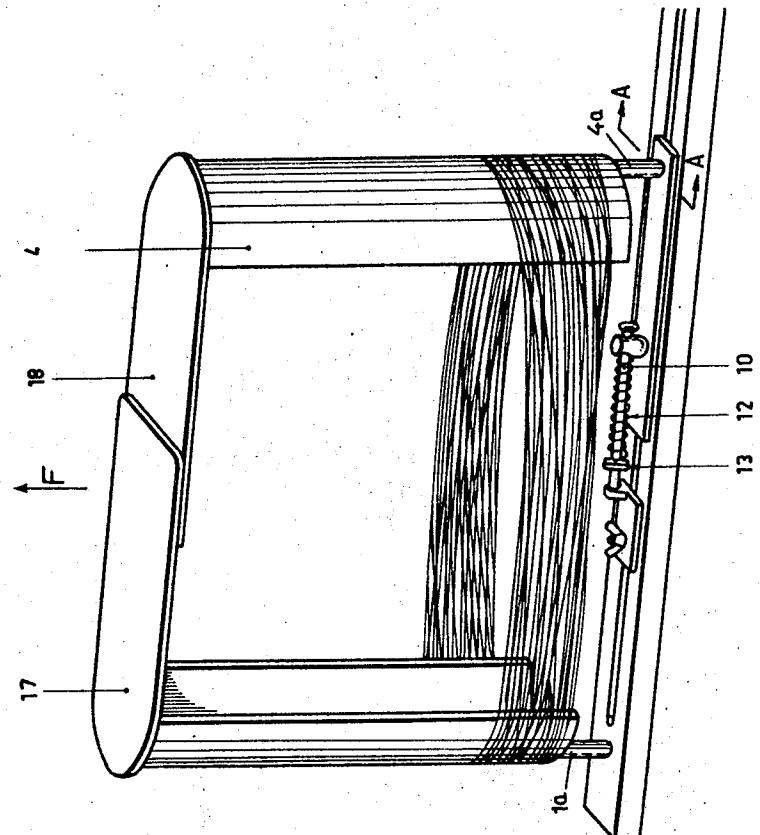


Fig.2



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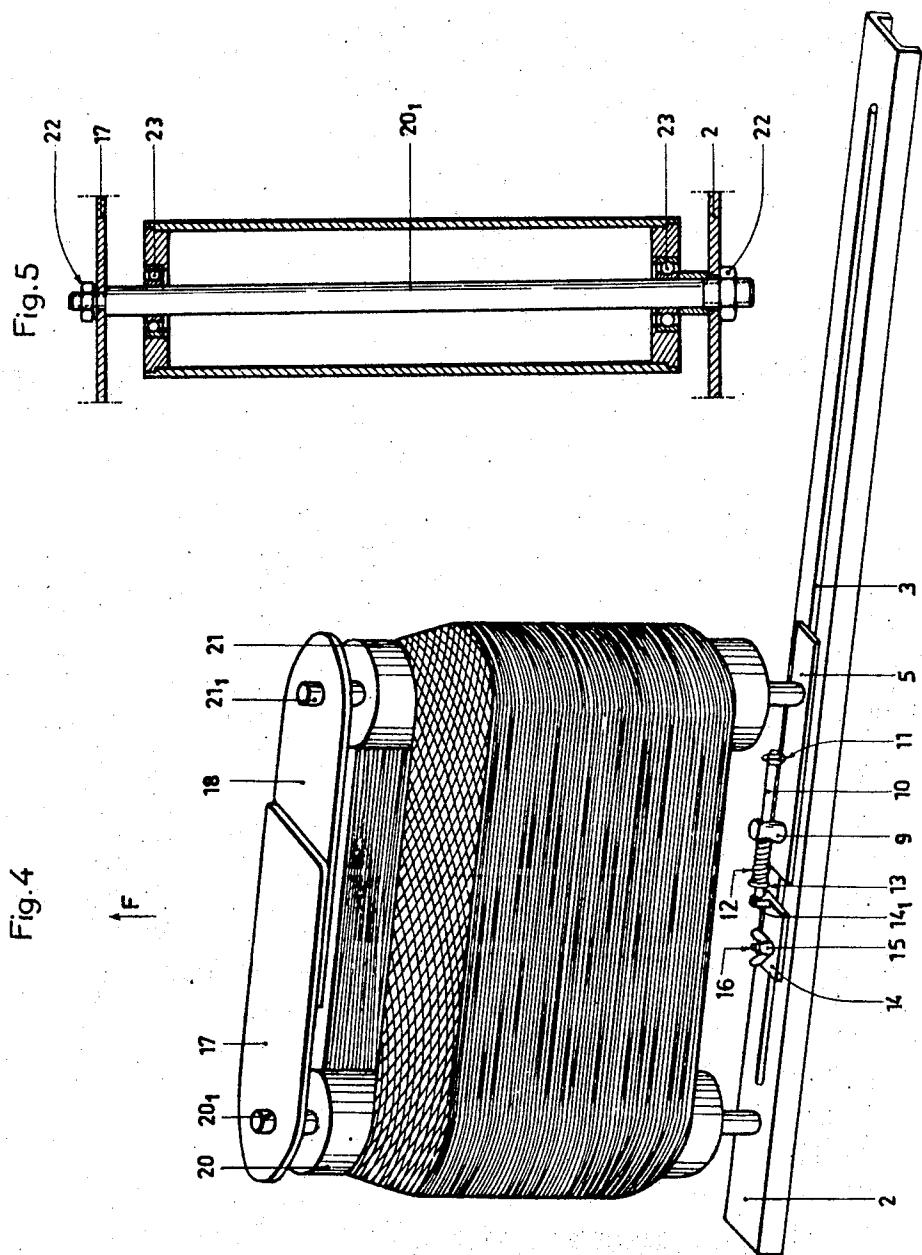
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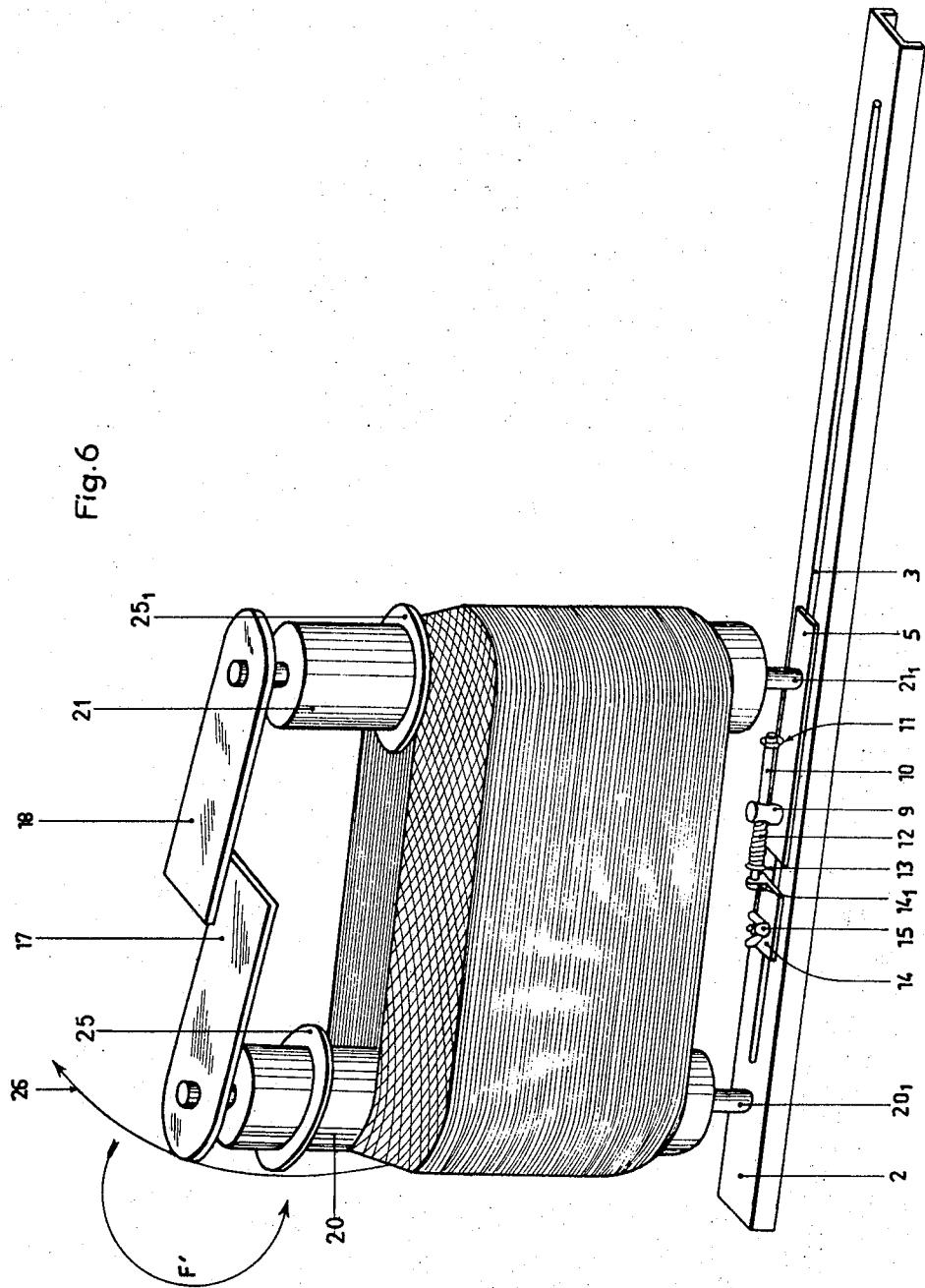
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Fig. 6



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**SUPPORT ARRANGEMENT FOR A HANK OF THREAD, AND HANKS EQUIPPED WITH SAID SUPPORT**

**DESCRIPTION OF THE INVENTION**

This application is a continuation of U.S. application Ser. No. 108,454 filed on Jan. 21, 1971, now abandoned.

The invention relates to a support arrangement for a hank of thread and to hanks equipped with this support arrangement, the support arrangement ensuring correct spooling of the thread.

The spooling of hanks, particularly large hanks, presents difficulties. In effect, for good spooling, it is necessary that this hank should be taut. But if the tension is too great, the whorls of thread, entangled to some degree after dyeing operations, block each other, causing machine stoppages.

Several solutions exist for stretching out these hanks. However, it will be noted that if the full hank is satisfactorily taut, this tension becomes excessive as spooling progresses, that is to say, as the mass of material decreases. This tension becomes particularly excessive for the last layers of material to be unwound from the hank.

This happens when the tension on the hank is provided by any form of resilient means, for example a spring, whose effect is maintained permanently throughout the whole spooling operation. On the other hand, if the tension of the hank is provided by a part fitted, for example, between a fixed arm and an arm which moves by any means, after having stretched out the hank, it appears that the latter is no longer sufficiently taut when the last layers of thread are spooled, and they thus unwind in bundles.

An object of this invention is to remedy these drawbacks by providing to a support arrangement for a hank of thread comprising a fixed arm and a movable arm on which the hank of thread is placed, the said arrangement being characterized by the movable arm resting on an adjustable stop by means of a spring.

According to another characteristic of the invention, the fixed arm is an integral part of a groove in which the movable arm slides, this groove comprising furthermore the adjustable stop acting on the movable arm through the intermediary of a spring.

The invention also relates to hanks equipped with the support arrangement in accordance with the invention.

A support arrangement for a hank of thread is illustrated as a non-limiting example in the accompanying drawings, in which:

FIG. 1 is a perspective view of a support arrangement in accordance with the invention, with a full hank of thread wound thereon;

FIG. 2 shows the arrangement in FIG. 1, with the hank of thread almost completely removed therefrom during a spooling operation;

FIG. 3 is a section along A—A in FIG. 2;

FIG. 4 is a perspective view of an alternate embodiment of a support arrangement in accordance with the invention;

FIG. 5 is a diagrammatic section view of a support arrangement cylinder;

FIG. 6 is a diagrammatic perspective view of another embodiment of the invention.

The object of this invention is to produce a spooling arrangement which maintains a hank of thread under correct tension, neither too taut nor too slack, this tension becoming increasingly slack, yet at the same time remaining elastic, as the number of coils on the hank of thread decreases.

Referring initially to FIGS. 1-3, there is shown a support arrangement in accordance with the invention made up basically of a support arm 1 having a depending tubular post 1a fixed solidly on a support 2, for example an inverted U-shaped channel member, having a longitudinal opening or slot 3.

The spooling arrangement comprises in addition a movable arm 4 having another depending post 4a fixed on a plate 5 whose edge depending flanges 5' extend downwardly into the slot 3.

A second plate 6 (see FIG. 3) is arranged inside support 2, the group comprising movable arm 4, plate 5 and plate 6 being assembled by means of a nut 7 on the threaded rod 8, the latter being press fitted into the lower end of post 4a.

In this way this group becomes rigid and may slide freely along the slot 3, which guides it.

A stud 9, inside which a rod 10 can slide freely, is provided on plate 5. This rod 10 has at one end a stop washer 11, while its other end is also fitted with a stop washer 13 which holds a spring 12 compressed between said washer 13 and the stud 9.

The end of rod 10 bearing washer 13 comes into contact with the stop 14<sub>1</sub> on a plate 14 which is also placed so that it can be adjusted in groove 3.

For this purpose, the wing nut 15 is screwed onto a screw 16 which is, moreover, solidly joined to a face-plate (not shown) positioned against the other side of support 2.

In this way, by tightening nut 15, the plate 14 and face-plate are gripped against the U-shaped support 2, thus firmly immobilizing stop 14<sub>1</sub>.

Likewise, the upper ends of arms 1 and 4 are fitted with small plates 17 and 18 which overlap in order to facilitate spooling of the thread yet at the same time allowing the movable arm to move in relation to the fixed arm without allowing the thread in the process of being spooled to stay hooked or form a loop on arms 1 and 4.

This arrangement operates as follows:

FIG. 1 shows a full hank placed on the support in accordance with the invention; this hank is sufficiently tensioned by pushing stop 14<sub>1</sub> against the end of rod 10, after having unscrewed nut 15. Since the force needed to stretch out the full hank is distinctly greater than the force required to fully compress spring 12, the latter is fully compressed when stop 14<sub>1</sub> is moved in order to move mobile arm 4 and stretch out the hank. When the hank is stretched out in this way, nut 15 is tightened, fixing stop 14<sub>1</sub>, so that the hank remains taut at a constant pressure, this pressure being distinctly greater than that of spring 12 which is negligible in comparison.

When the greater part of the thread has been spooled from the hank in the direction of the arrow F (FIG. 2), the pressure exerted by the hank, tending to bring mobile arm 4 closer to fixed arm 1, decreases, so that the slackening pressure of the spring exerted on stop 9 becomes increasingly greater in comparison with the pressure of the hank.

On that account, when the hank is almost completely removed during a spooling operation, spring 12 begins to progressively and resiliently expand, leading to the creation of a suitable tension which decreases as the last layers of thread unwind; in this way, the entire hank is correctly spooled.

In accordance with FIGS. 4 and 5, the fixed and mobile arms 20 and 21 are made up of cylinders and rotate freely on axes or portions of axes 20<sub>1</sub>, 21<sub>1</sub>.

The free ends of axes 20<sub>1</sub> and 21<sub>1</sub> receive the small plates 17 and 18, which overlap and enable cylinders 20 and 21 to move without letting the thread remain caught up in the course of spooling.

Axes 20<sub>1</sub> and 20<sub>2</sub> are fixed, on the one hand to supports 2 or 5, on the other hand to small plates 17 or 18 by means of nuts 22, while cylinders 20 and 21 are mounted on their axis by means of ball-bearings or the like 23.

This arrangement facilitates spooling of the hank placed on cylinders 20 and 21 by making one of the cylinders 20 or 21 turn on its own axis.

In this manner, the hank of thread, drawn in rotation, also draws the other cylinder in rotation, like a belt.

In this way, the hank is better spread out on the support so as to facilitate spooling.

Thus, if at any moment whatsoever during spooling the thread lodges inside the mass of the hank and is wedged between the latter and one of the rollers 20 or 21, the fact of turning one of the cylinders 20 or 21 allows the wedged area to be moved and brought to a place where the mass of the hank is no longer gripped against these cylinders 20 and 21.

The thread can then disentangle itself easily from the mass of the hank without undergoing too high a tension, which in another case would risk causing this thread to break.

In accordance with the embodiment in FIG. 6, each roller 20 or 21 has rings 25 and 25<sub>1</sub> whose internal diameters are large enough, in comparison with the diameters of these rollers, to enable them to slide thereon and rest freely on the thread forming the hank. In this way, as spooling progresses, rings 25 and 25<sub>1</sub> descend with the thread and force it to disentangle itself from the truncated cone-shaped layers without rubbing along the material making up the hank.

These rings 25 and 25<sub>1</sub> are sufficiently thin so that if, for any reason whatsoever, it is desired that this ring should not rest on the thread, it is possible to tilt and jam the ring on the roller (see ring 25 in FIG. 6). Given this construction, these rings may, if desired, be brought closer to the hank by hand as spooling progresses. The axes 20<sub>1</sub> and 21<sub>1</sub> of these rollers 20 and 21 have at their upper end small plates 17 and 18 which are orientable on these axes and may, thereby, be placed obliquely, as illustrated in FIG. 6, so that the thread 26 unwinding in the direction of the arrow F<sup>1</sup> passes round rollers 20 and 21, then climbs the slope formed by the edge of small plates 17 or 18 in order to facilitate unwinding of the thread. The thread then falls sharply against the edge of the other small plate 18 or 17, in this way causing a jolt which aids spooling and facilitates the passing round the rollers and, if need be, the passing round the rings.

It should be understood that the invention is not limited to the embodiments described and represented hereinabove; from these it is possible to foresee other

forms and embodiments which in no way exceed the scope of the invention.

What is claimed is:

1. In a support arrangement for a hank of thread wherein the hank is wound around first and second laterally spaced arms, the improvement comprising: a base member, said first arm being fixed to and extending upwardly from said base member; a carrier member mounted on said base member for movement towards and away from the said first arm, the second arm being fixed to and extending upwardly from said carrier member; spring means mounted on said carrier member; and a stop member adjustably mounted on said base member for movement between said first arm and said carrier member, the position of said stop member relative to said spring means being such that movement of said stop member towards said carrier member will cause said spring means to be compressed, thus urging the second arm member away from said first arm member.

2. The apparatus as claimed in claim 1 further characterized by an elongated slot in said base member, said first arm member being positioned at one end of said slot, said carrier member and said stop member being slidable along and guided by said slot.

3. The apparatus as claimed in claim 1 further characterized by an upwardly protruding stub on said carrier member, a shaft extending through and movable axially relative to said stub, the axial movement of said shaft relative to said stub being limited by radially extending stop means adjacent to the ends of said shaft, said spring means comprising a coiled spring mounted on said shaft between said stub and one of said stop means, one end of said shaft being positioned for engagement by said stop member upon movement of the latter towards said carrier member.

4. The apparatus as claimed in claim 1 wherein said arm members are comprised of cylinders rotatable about vertical axes.

5. The apparatus as claimed in claim 1 further characterized by ring members slidable vertically on said arms.

6. The apparatus as claimed in claim 1 further characterized by overlapping means for bridging the gap between said arms, said means comprising plate members pivotally mounted on the upper ends of said arms.

7. Apparatus for supporting a hank of thread comprising in combination: an elongated base member; a carrier member mounted on said base member for movement along the length thereof; first and second arm members extending upwardly respectfully from said base member and said carrier member, said arm members being arranged in a laterally spaced relationship to support a hank of thread wound thereon; a spring mounted on said carrier member and, means including an adjustable stop member on said base member arranged to contact said spring on said carrier member for resiliently urging said second arm member away from said first arm member.

8. Apparatus for supporting and unwinding in a direction parallel to its axis a hank of thread comprising in combination: a base; a first arm member mounted on said base; a carrier member mounted on said base for movement in opposite directions towards and away from said first arm member; a second arm member mounted on said carrier member for movement therewith, said first and second arm members being in later-

ally spaced substantially parallel relationship; stop means for limiting the movement of said carrier member towards said first arm member, thus establishing a minimum lateral spacing between said first and second arm members when a full hank of thread is tightly wound thereon; and, resilient means capable of urging

said carrier member and the second arm member mounted thereon away from said first arm member only when the subsequent unwinding operation of the hank of thread comes near to the end.

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