

# United States Patent

Schreiber

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## [54] CONDITIONING APPARATUS FOR YARN OR THREAD

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## [56] References Cited

### UNITED STATES PATENTS

3,288,107 11/1966 Conrad.....118/234

2,561,155	7/1951	Thomas, Jr. et al. ....	242/46.21
2,728,972	1/1956	Drummond et al. ....	28/59 X
3,498,263	3/1970	De Toledo et al. ....	118/234
3,552,354	1/1971	Kershaw .....	118/234
2,304,564	12/1942	Gladding .....	118/234 X
1,578,243	3/1926	Johnson .....	68/202
2,615,738	10/1952	Johnson.....	287/DIG. 12
2,746,691	5/1956	Hoad .....	242/46.2 X

## FOREIGN PATENTS OR APPLICATIONS

852,425	10/1960	Great Britain.....	242/46.2
866,420	2/1953	Germany.....	74/210

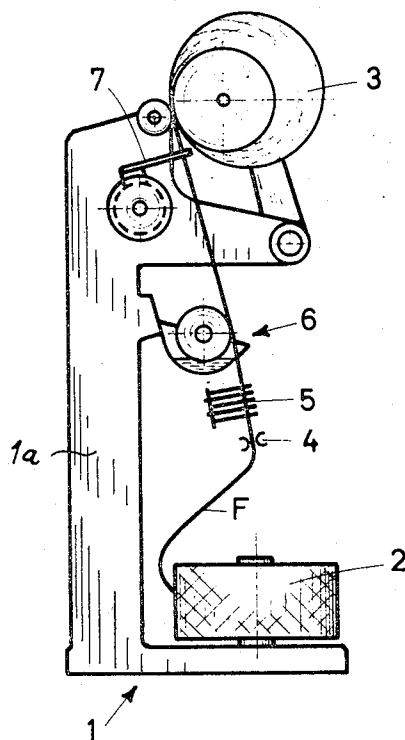
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## [57] ABSTRACT

A rotatable finishing roll, which is at least partially immersed in a conditioning agent contained in a trough, is removable and magnetically coupled to a drive shaft. Centering means, preferably formed as a flange on the finishing roll which overlaps a member attached to the drive shaft, maintains the finishing roll coaxial with the drive shaft without the necessity of performing separate alignment operations.

**6 Claims, 3 Drawing Figures**



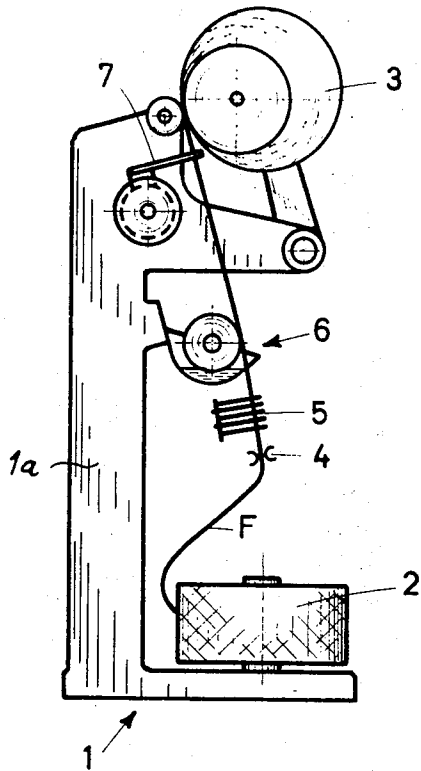


Fig. 1

Fig. 2

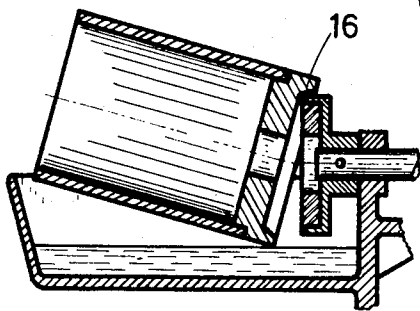
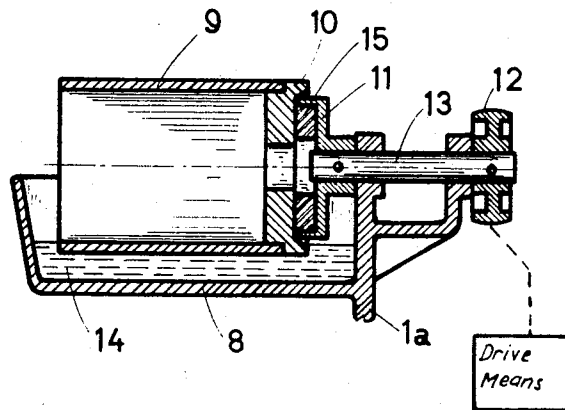


Fig. 3

## CONDITIONING APPARATUS FOR YARN OR THREAD

The present invention relates to a conditioning apparatus for yarn or thread winding machines, and more particularly to such an apparatus which provides at each spool site a driven finishing roll that is magnetically coupled in a rigid manner to a drive shaft, the finishing roll being at least partially immersed in a conditioning agent to impart the conditioning agent to the yarn or thread passed thereover.

In known conditioning apparatus of this type, a rotatable drive shaft is extended over a whole series of spool sites and for each spool site a finishing roll is mounted and is rigidly connected with the drive shaft by means such as a set screw. In other known winding machines there are conditioning devices in which the finishing roll is often mounted on its own individually driven drive shaft and is rigidly connected with the drive shaft by means such as a set screw.

In winding machines with such conditioning devices, it is unavoidable when the yarn breaks that the yarn unravels and winds up on the finishing roll, or that a slub surface forms on the surface of the finishing roll during the winding process. The removal of the yarn from the finishing roll as well as the necessary cleaning of said roll has heretofore involved a complicated procedure accompanied by much loss of time. This was because the finishing rolls over the greater part of their circumference are closely surrounded by the trough containing the conditioning agent, and the finishing roll generally is only accessible by removal of the trough from the machine. This is a time consuming operation.

A conditioning apparatus with moistening disks wherein the disks are driven by the moving yarn or thread is also known. This type of drive, however, leads to a high and uncontrollable yarn tension and is therefore undesirable and unsuitable for many applications.

The main object of the present invention is to provide apparatus for conditioning yarn or thread in which both the operations of removing yarn or thread that has unravelled and has wrapped around the finishing roll in the case of a yarn break, and the necessary cleaning of said roll, may be carried out in a very simple and expedient manner.

### SUMMARY OF THE INVENTION

In accordance with the present invention, the driving shaft for each finishing roll is removably and magnetically coupled to the finishing roll. A centering means is also provided to maintain the drive shaft coaxial with the finishing roll. In a preferred arrangement, the finishing roll includes a front flange formed of soft iron which magnetically engages with a holding disk carried by the drive shaft, the holding disk having a recess in which a magnetic disk is fitted. In a preferred centering arrangement, the soft iron disk has on its outer circumference a ring-shaped, axially extending projection having an outwardly widening inner surface. In addition to the magnetic coupling, the holding disk engages the ring-shaped projection so that the projection overlaps the holding disk (which is connected to the drive shaft), thereby maintaining the drive shaft coaxial with the finishing roll.

The apparatus of the present invention makes it possible, for purposes of cleaning the finishing roll or of removal of an unwound end of yarn therefrom, to easily

break the finishing roll loose from its magnetic attraction to the holding disk by simply grasping it with the fingers at the open free end of the roll, and lifting it out of the apparatus. With equal ease the finishing roll may be set back on the driving shaft, while the centering means automatically insures coaxial alignment of the finishing roll with the drive shaft.

The above and other objects and features of the present invention will become more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a schematic illustration of a winding machine embodying a conditioning device of the present invention;

FIG. 2 is a detailed illustration of a portion of the apparatus of FIG. 1 in vertical cross section which shows the conditioning device in more detail; and

FIG. 3 illustrates the device of FIG. 2 in the stage of the separation of the finishing roll from the driving shaft.

In the particular embodiment illustrated in FIG. 1, the winding machine 1 has a supply spool 2 of yarn located on the base of the frame 1a thereof. A thread F is drawn off from the supply spool 2 and is passed through a threading eyelet 4 and a yarn brake 5 to the yarn conditioning device 6. From the conditioning apparatus 6, thread F is fed to a thread guide 7 and then to take-up spool 3. As will be described in greater detail below, the thread F passes against a drum or roll of the conditioning device 6 and thereby takes up a conditioning agent such as so-called spool oil, or any other agent, which is conveyed to the thread F by the drum or roll.

FIG. 2 is a cross-sectional view of a portion of the conditioning device 6 shown generally in FIG. 1. A finishing trough 8 is fixed to frame 1a of winding machine 1. A finishing roll 9 is located partially within the trough 8. The finishing roll 9 includes a front flange 10 of magnetic material which is magnetically coupled to a holding disk 11 via a ring-shaped magnetic disk 15 which is secured in a recess in the disk 11. Disk 11 is connected to one end of a shaft 13 which is rotatably journaled in the frame 1a. The other end of the shaft 13 is connected to a pulley 12 which is preferably driven by a drive belt stretched thereover or the like (not shown) to rotate finishing roll 9 via shaft 13. To insure coaxial alignment of finishing roll 9 to drive shaft 13, a centering shoulder 16 (FIG. 3) which widens conically outward is provided on front flange 10. Holding disk 11 engages flange 16 of the centering shoulder to provide proper alignment. The centering shoulder overlaps the holding disk 11 as shown in FIGS. 2 and 3. The finishing trough 8 is partially filled with a conditioning agent, such as a spool oil 14, and the rotatable finishing roll 9 is partially immersed therein. The trough 8 has walls which are high enough relative to the finishing roll 9 to prevent "spatter" due to rotation of roll 9 in the finishing oil 14.

The magnetic coupling provides an easily removable connection between the shaft 13 and the finishing roll 9 while providing a positive coupling to transmit torsion (i.e. rotation) from the shaft 13 to the finishing roll 9 without slippage. Alternatively the magnet 15 may be located in flange 10, or in both flange 10 and disk 11 with proper pole orientation.

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Other centering means can be used to insure coaxial alignment of roll 9 with shaft 10, such as an extension of shaft 13 in the form of a point which would then engage in a corresponding conical depression or the like in the center of front flange 10 of the finishing roll.

As is clearly shown in FIG. 3, the finishing roll 9 may be easily separated from driving shaft 13 without requiring complicated disassembly steps. Since the trough 8 is open on top, the finishing roll 9 is "broken away" against the magnetic attraction of magnet 15 and flange 10, and pulled up and out of finishing trough 8 away from the holding disk 11. With equal ease the finishing roll 9 may be re-connected to the holding disk 11, at which point the magnetic force between ring 15 and front flange 10 pulls the finishing roll 9 against the holding disk 11. By means of the conically widening centering shoulder 16, the finishing roll 9 is at this point automatically coaxially aligned with respect to the driving shaft 13.

As may be seen from the above-described preferred embodiment, yarn conditioning apparatus of the present invention is simple in construction, which assures sound operation for long periods of time and simple maintenance.

It should be clear that many variations could be made within the scope of the present invention as set forth in the accompanying claims.

I claim:

1. Yarn conditioning apparatus adapted to hold a source (2) of yarn, comprising
  - a yarn (7) conditioning device (6) for receiving yarn, said conditioning device including
  - a rotatable drive shaft (13) journaled in the apparatus;
  - a trough (8) adapted to contain a conditioning agent (14);
  - a finishing roll (9) removably and magnetically coupled to said drive shaft (13) and at least partially located within, and surrounded by the trough for immersion into the conditioning agent (14), said shaft imparting rotation to said finishing roll;
  - a disc-like flange (11) formed on the drive shaft (13)

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at an end thereof facing the finishing roll;  
 an end disc (10) formed on the finishing roll (9) at the end thereof facing the disc flange (11) of the drive shaft, at least one of said discs being formed with a centering means to center the finishing roll (9) with respect to the axis of the shaft (13);

and magnetic means in at least one of said discs, the other of the discs comprising magnetically responsive material;

and means (4, 5, 7) to guide said yarn (F) over the finishing roll to provide for contact of the yarn with the conditioning agent (14).

2. Apparatus according to claim 1 wherein the end disc formed on the finishing roll (9) comprises a flange formed of soft iron;

and the magnetic means comprises a magnetic member (15) secured to the drive shaft (13) at the location of the flange disc (11), engaging the end disc of the finishing roll.

3. Apparatus according to claim 1 wherein the centering means comprises a ring-shaped axially extending projection formed on the outer circumference of the end disc (10) the disc flange on the drive shaft fitting within the projection;

and the magnetic means comprises a magnetic member (15) located proximate to the end face of one of said discs.

4. Apparatus according to claim 3, wherein said projection has an outwardly widening inner side surface (16).

5. Apparatus according to claim 4, wherein the magnetic member is located within the inner diameter of the extending projection and said inner surface (16) of said projection overlaps said magnetic member (15).

6. Apparatus according to claim 1, wherein said centering means comprises a ring-shaped, axially extending projection formed on the outer circumference of said disc flange (10);

and the magnetic means is disc-shaped and forms the end disc (11) to retain said finishing roll (9) coaxial with said drive shaft (13).

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