Sept. 10, 1935. M. STEIN ET AL. 2,013,770

WARP FRAME HAVING A DEVICE FOR RECHARGING DURING OPERATION

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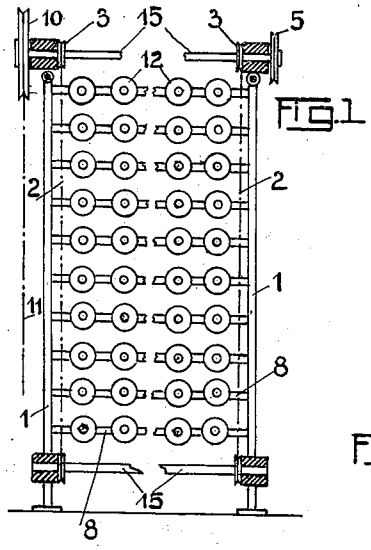


Fig. 1

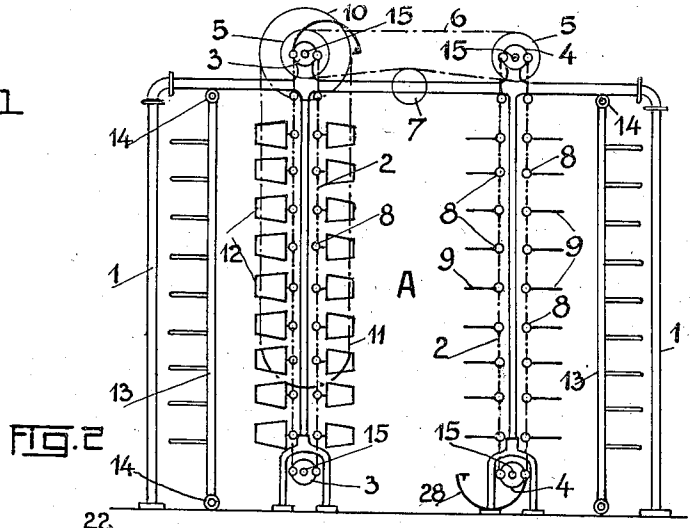


Fig. 2

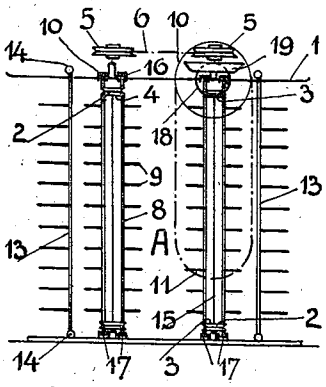


Fig. 3

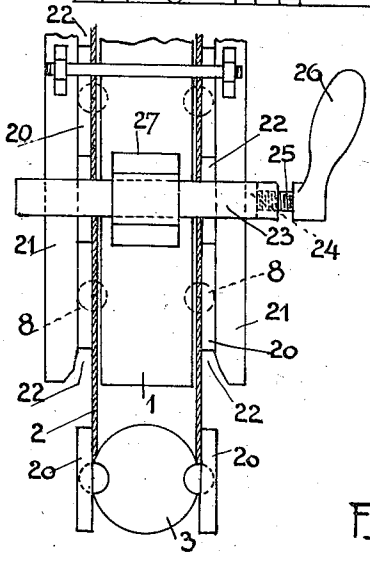


Fig. 5

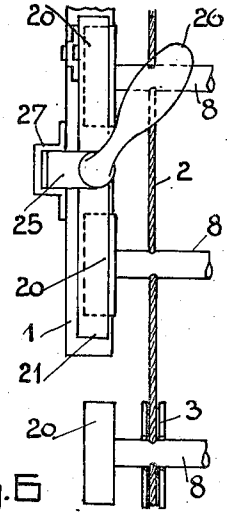


Fig. 6

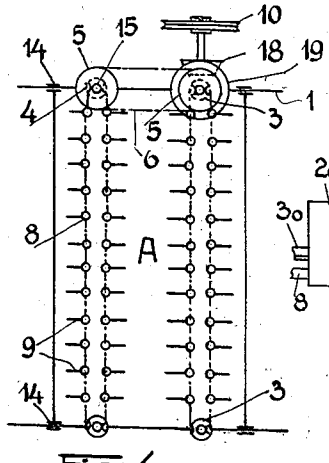


Fig. 4

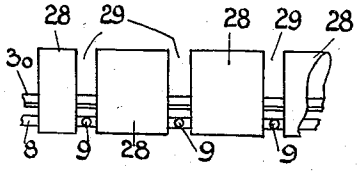


Fig. 7

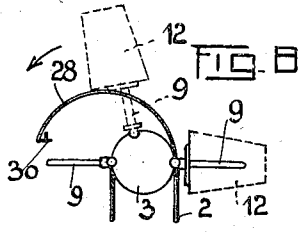


Fig. 8

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WARP FRAME HAVING A DEVICE FOR RECHARGING DURING OPERATION

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6 Claims. (Cl. 242—131)

This invention relates to creels for holding cops, cones, bobbins or packages of yarn, thread and other strand material for delivery to various processes of the textile art. The invention relates more particularly to a creel having a plurality of supply-holders for holding cones or other packages of yarn arranged thereon in position for delivery of the material and shiftable in multiple to a recharging station for re-creeling fresh supplies.

One object of the invention is to provide a creel in which opposite sets of supply-holders are mounted upon an endless conveyor to adapt them to be moved in unison whereby when the supplies of one set are exhausted their holders may be shifted to a charging station and a whole set of fresh supplies advanced into delivering position.

Another object of the invention is to provide a pair of endless conveyors arranged in opposition on the creel frame whereby the area therebetween may constitute a charging station for both conveyors to convenience the operation of re-creeling supplies thereon.

Another object of the invention is to provide for the interconnection of the endless conveyors of the creel whereby they may be operated from a common station.

Another object of the invention is to provide means for automatically doffing the empty yarn carriers or tubes during their advancement from delivery position to the charging station without delaying such advancement.

Another object of the invention is to provide means for locking the endless conveyors during the delivery of the material and recharging of the supply-holders.

Further objects of the invention are, in general, to provide a creel from which the yarn, thread or other strand material may be warped or transferred at maximum speed; in which re-creeling during delivery may be efficiently carried out; and wherein the supply-holders may be simultaneously advanced by manual control exercised at one point of the frame.

Other objects of the invention are set forth in the following specification which describes a preferred and one modified form of the invention, by way of example, as illustrated by the accompanying drawing. In the drawing:

Fig. 1 is a vertical, longitudinal, sectional view of a creel constituting the preferred embodiment of the invention and showing a vertical or columnar disposition of the horizontal carriers for the supply-holders;

Fig. 2 is an end view of the same, showing two parallel columnar series of supply-holder carriers and common means for actuating the same;

Fig. 3 is an end view of a modified form of the creel in which the supply-holders are disposed in rows on vertical carriers adapted to be moved in a horizontal direction;

Fig. 4 is a top plan view of the structure shown in Fig. 3;

Fig. 5 is a front view of the clamping-device for preventing displacement of the supply-holder carriers;

Fig. 6 is a side elevation of the device shown in Fig. 5;

Fig. 7 shows by way of example one form of stripper for removing the empty cone tubes from their holders; and

Fig. 8 is a front elevation of the stripper shown in Fig. 7.

Referring first to Figs. 1 and 2 of the drawing, the preferred form of the invention, as herein described and illustrated, comprises a rigid framework 1 having a pair of spaced vertical uprights at each side connected by a pair of parallel cross members secured to the top of the vertical uprights. To strengthen the framework vertical stanchions forming a part thereof extend from the floor to the upper cross members in spaced relation to the end uprights of the framework. At the stanchions the framework 1 supports two vertically movable endless conveyors, which may comprise parallel straps or chains 2—2. The endless conveyors are spaced from each other to provide sufficient area therebetween for a charging station indicated at A in Fig. 2.

The parallel chains 2 of each conveyor are connected by and support a plurality of horizontal rods 8 which serve as carriers for any desired number of cone- or supply-holders 9 arranged in rows therealong. The supply-holders 9 support the yarn supplies which are preferably in the form of crosswound cones, cops or packages 12. These cones of yarn may be wound by any suitable method and preferably they are supported on wooden cores or paper tubes provided with axial bores for receiving the holders 9 which may be in the form of spindles. It will be understood that the carriers 8 and the supply-holders 9 on each of the carriers are spaced sufficiently far apart to permit the ready placement of full cones 12 thereon, and the free and unhampered withdrawal therefrom of the strands to be delivered.

Each of the endless conveyors comprising the parallel chains 2 is driven from upper and

lower horizontal shafts 15 journaled in bearings on the stanchions of the framework 1. The chain 2 of the left-hand conveyor, as viewed in Fig. 2, passes over sprockets or pulleys 3, while the right-hand conveyor chain is similarly arranged on spaced wheels or pulleys 4. The carriers 8 are preferably disposed on each conveyor in two sections or series, one of which sections is adapted to be on the right and the other on the left of the vertical plane of the shafts' axes whereby, when the shafts 15 are rotated in a clockwise direction as viewed in Fig. 2, the carriers on the left constitute the ascending flight and those on the right the descending flight of the conveyor.

A chain-wheel or pulley is located on the outer end of each upper shaft 15 and an endless flexible transmission member 6, such as a belt or chain, is led therearound to connect the two upper shafts 15—15 and adapt the two conveyors to be driven in unison. A peripherally grooved disk or wheel 10 is fast on the end of one of the upper shafts 15, preferably that shown at the left in Fig. 2, and any flexible endless drawing member 11 such as a rope, belt or chain is suspended in the groove thereof. The flexible member 11 is preferably of sufficient length to permit it to be grasped by an operator standing on the floor, preferably by a person located at the charging station A, see Fig. 2.

From the foregoing it will be observed that the operator standing at the station A, by pulling downwardly on the adjacent length of the flexible member or rope 11, may rotate the disk 10, shafts 15 and sets of pulleys or wheels 3, 4 and 5 in a clockwise direction. Since the charging station A is between the two conveyors, and they are traveled in the same direction, the charging flight of one moves in a direction opposite to the charging flight of the other. For instance, as shown in Fig. 2, the supply-holders 9 of the left-hand conveyor move downwardly and those on the right-hand conveyor simultaneously move upwardly in passing through the charging station A.

Rotatably journaled in any suitable manner on a shiftable axis extending between and preferably parallel with the upper shafts 15 is a take-up pulley 7 which is provided whereby sufficient tension is maintained on the flexible transmission member 6 to transmit motion from one shaft to the other.

Vertical rods 13 are arranged in advance of each vertical row of supply-holders 9 adapted to support suitable thread-guides or tension-devices, not herein illustrated, for the yarns delivering from the supplies. The rods 13 may be slidably mounted on rollers 14 to adapt the tension-devices to be adjusted toward or away from the supply-holders 9.

The embodiment of the invention shown in Figs. 3 and 4 constitutes an alternative form of creel which differs from the form first described in that the carriers 8 for the supply-holders 9 are disposed vertically and mounted on endless conveyor bands or chains 2 which move in a horizontal direction for shifting the supply-holders. A pair of bevel-gears 18, 19 transmit the rotation of the wheel 10 to the shaft 15. Both ends of the shafts 15 may be arranged to slide at the top and bottom on the framework 1 by means of rollers 16, 17.

To render it convenient to secure the conveyors and carriers 8 in fixed position on the creel during the charging and unwinding operations, a locking device such as that shown in Figs. 5 and 6 may be used. Only one locking device is herein shown and described, but it is to be understood that several may be used at a plurality of spaced points on the frame. Each locking device includes a pair of vertically-extending bars 21 connected by a cross-yoke 23. The bars 21 extend along the creel-frame, being separated therefrom on each side by a space or channel area 22 which receives the T-shaped heads 20 on the ends of the carrier-rods 8. A channel-shaped bearing bracket 27 is secured on the frame 7 between the bars 21 for receiving the cross-yoke 23. Jaws 24 formed at each end of the yoke 23 straddle the sides of the bars 21 and a screw 25 on a handle 26 is adapted to be set up against one of the bars to draw the two together. By turning the handle 26 the bars 21 may be clamped against the framework 1 whereby the heads 20 of the carrier-rods 8 will be secured against movement in the channel areas 22. When the conveyors are anchored in this manner the re-creeling of fresh supplies at the charging station A and the simultaneous delivering of the material from the active supplies may take place without chance of displacement of the supply-holders.

The stripper device illustrated in Figs. 7 and 8 serves the purpose of removing exhausted supplies from the holders 9 as the latter are returned to the charging station A. As herein illustrated, the stripper comprises an arcuately-shaped member or plate 28 suitably mounted on a cross-rod or angle-iron 30. The plates 28 are spaced along the rods 30 with openings 28 therebetween through which the spindles or supply-holders 9 pass as the conveyors 8 are traveled on the creel-frame. As will be observed by reference to Fig. 2, a stripper 28 is positioned at one end of each conveyor so that as the supply-holders 9 are traveled by the conveyors the base-ends of the cone-tubes or yarn-receivers will ride along the edges of two opposite plates 28 to be lifted off from the spindles or holders in the manner illustrated in Fig. 8. In this manner the exhausted or nearly run out cone, or in other cases the empty cone-tube or yarn-receiver, is doffed automatically upon the return of each supply-carrier to the charging station A. Through this provision the operation of re-creeling fresh supplies is expedited and rendered more convenient.

In the operation of the creel one set of supply-holders 9 carried by each pair of conveyor-chains 2 is fixed in stationary position in opposition to the other set in the charging station A at the center of the creel-frame. A supply of cops, cones or other packages of yarn or the like are placed on these supply-holders or spindles 9 extending in rows along the carrier-rods 8. The operator then grasps the rope or cord 11 and pulling down on the length nearest the charging station turns the wheel or pulley 10 in a clockwise direction as viewed in Fig. 2, whereby the conveyor-chains 2 will be traveled around their pulleys or sprocket-wheels 3—3 and 4—4; it being understood that the two shafts 15 carrying the pulleys or chain-wheels 3 and 4 for the opposite chains are connected by the belt or chain 6 so that they rotate together.

Under manual operation as above explained the sprockets or chain-wheels 3 and 4 will be rotated in a clockwise direction, as viewed in Fig. 2, whereby the conveyor-chains will be traversed thereover with the right-hand length of each chain moving downwardly and the left-hand length moving upwardly. Under this action the full cones on the left-hand conveyor will be car-

ried downwardly and then upwardly until the whole series of charged supply-holders are brought into position facing or pointing toward the outside of the creel-frame. Meanwhile, the right-hand conveyor will traverse the charged supply-holders upwardly and then downwardly into a corresponding position with respect to this side of the creel-frame.

The strands from the packages are then drawn off and led through the tension-devices or thread-guides supported from the uprights 13 and thence they are carried forwardly or endwise of the creel-frame to lead them to the warping or other machine in which the material is converted.

While the strands of yarn, thread or other material are being unwound from the cones or other supplies placed in delivering position in the manner as above explained, a fresh set of supplies is placed on the supply-holders last brought into position in the charging station A. Now, when the yarn is exhausted, or nearly so, from the delivering supplies the warping or other operation is arrested and the conveyors once more traveled on the creel frame to shift the supply-holders which have been charged with fresh cones into position previously occupied by the first set of cones. The ends are then threaded up and carried to the warping or other machine so that the transfer operation can be commenced immediately without delay for creeling the large number of cones or packages required in the warping or other process.

While the material is being delivered from the new set of supplies re-creeling takes place at the station A, the operator simply placing fresh cones on the supply-holders or spindles 9.

When the automatic strippers 28 are employed the return of the supply-holders carrying spent or exhausted cones to re-creeling position automatically doffs the empty cone tubes or other yarn receivers therefrom. The doffing operation is accomplished as the base ends of the cone tubes or yarn-carriers ride around the edges of the arcuate stripper plates 28 to lift them off from the spindles 9 in the manner as illustrated in Fig. 8 of the drawing.

It will be observed from the foregoing that the present improved creel is highly efficient in operation as providing for the automatic doffing of spent cones or other supplies and the re-creeling of fresh supplies while the delivery of the yarn or other strand material is progressing from previously creeled supplies. The warping or other transfer operation from the creel is therefore practically continuous, without relatively long periods of inaction during the re-creeling operations. That is to say, the warping or other transfer operation is arrested only for a sufficient interval to transfer the supply-holders with the exhausted cones to the recharging station while they are simultaneously replaced by supply-holders charged with fresh cones and thereafter the transfer operation may be immediately continued.

It will also be observed that the improved creel is extremely simple in construction and method of operation without requiring complication of automatic machinery for replacing the exhausted or spent supplies with fresh cones or packages.

While the improved creel is herein illustrated in a preferred form of construction and with one modified form shown, it is to be understood that further variations may be made in the structure and arrangement of the device without departing from the spirit or scope of the invention. Therefore without limiting ourselves in this respect, we claim:

1. In a creel, a frame, spaced groups of carriers arranged on opposite sides of the frame, supply-holders on the carriers, means for reversing the respective positions of the carrier groups on the frame, and means for engaging the spent supplies to doff them from the supply-holders during the reversing operation.

2. In a creel, a frame, a supply-holder carrier travelable thereon, a series of supply-holders on the carrier, and a releasable locking-device for anchoring the carrier against movement on the frame.

3. In a creel, a frame, a plurality of carriers, supply-holders arranged in rows on the carriers, stationary strippers on the frame between the rows of supply-holders, and means for advancing the carriers successively past the strippers to doff spent supplies from the holders.

4. In a creel, a frame, carriers movable in a predetermined path along the frame, supply-holders on the carriers, stationary arcuate plates mounted on the frame in the path of the carriers for doffing spent supplies from the supply-holders as the carriers advance, and means for moving the carriers.

5. In a creel, the combination of a frame, an endless conveyor on said frame, a series of supply-holders connected to be traveled by the conveyor, and a stripper engageable with the yarn-carriers held on the supply-holders to doff them from the holders as the latter are traveled by the conveyor.

6. In a creel, the combination of a frame, endless conveyors mounted to travel across the ends of the frame, carrier-rods connected to the conveyors and extending therebetween on the opposite sides of the frame, supply-holders on the carrier-rods, and strippers stationary on the frame to adapt them to engage the yarn-carriers carried by the supply-holders to doff the exhausted supplies therefrom as they are traveled by the carrier-rods.

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