United States Patent [19]

Dahmen

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[54] **LACING DEVICE FOR STRANDING MACHINES**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **57/12**; 57/18; 57/19

[51] **Int. Cl.** **D07b 3/02**; D07b 3/06; D07b 7/00

[58] **Field of Search** 57/3, 6, 10–14, 57/17–19, 58.3–58.38

[56] **References Cited**

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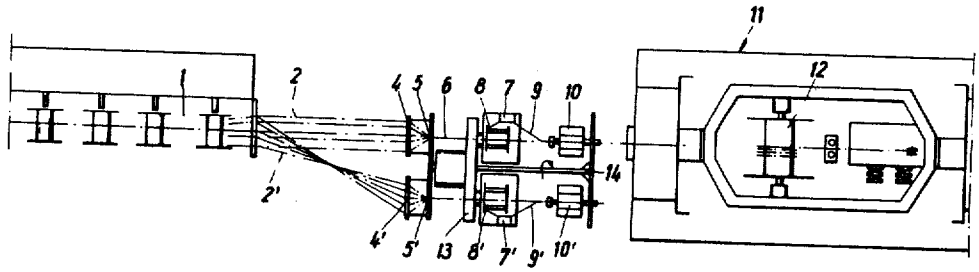
Primary Examiner—John W. Huckert
Assistant Examiner—Charles Gorenstein
Attorney, Agent, or Firm—Holman & Stern

[57] **ABSTRACT**

A wrapping device for stranding machines, in which reserve units comprising optionally operable units comprising a stranding disc and spinning head, rotatable on a common axis into an operative position, whereby one or the other, not in an operable position, can be resupplied with supply core or spools so that shut-down time is minimized.

5 Claims, 10 Drawing Figures



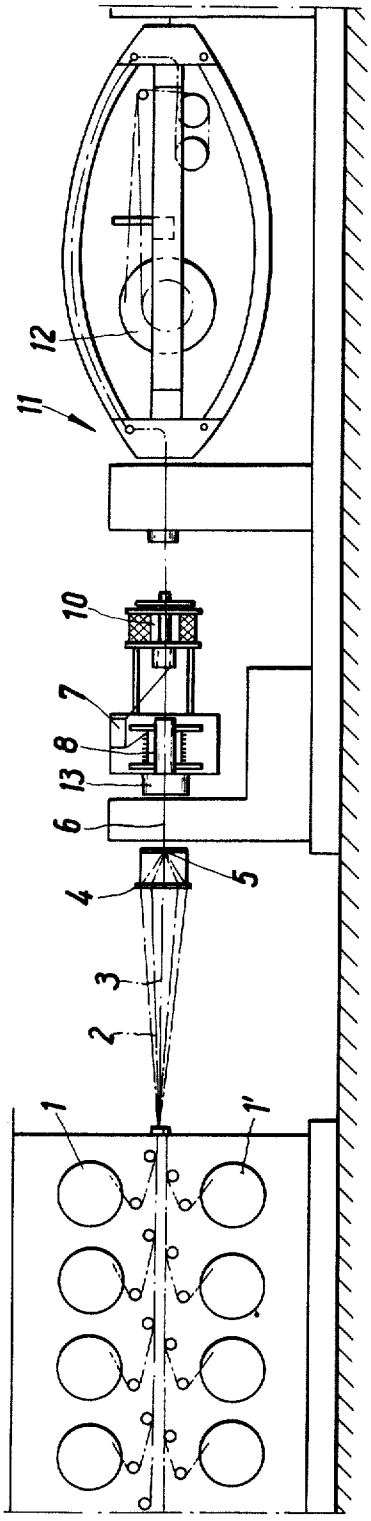


Fig. 1

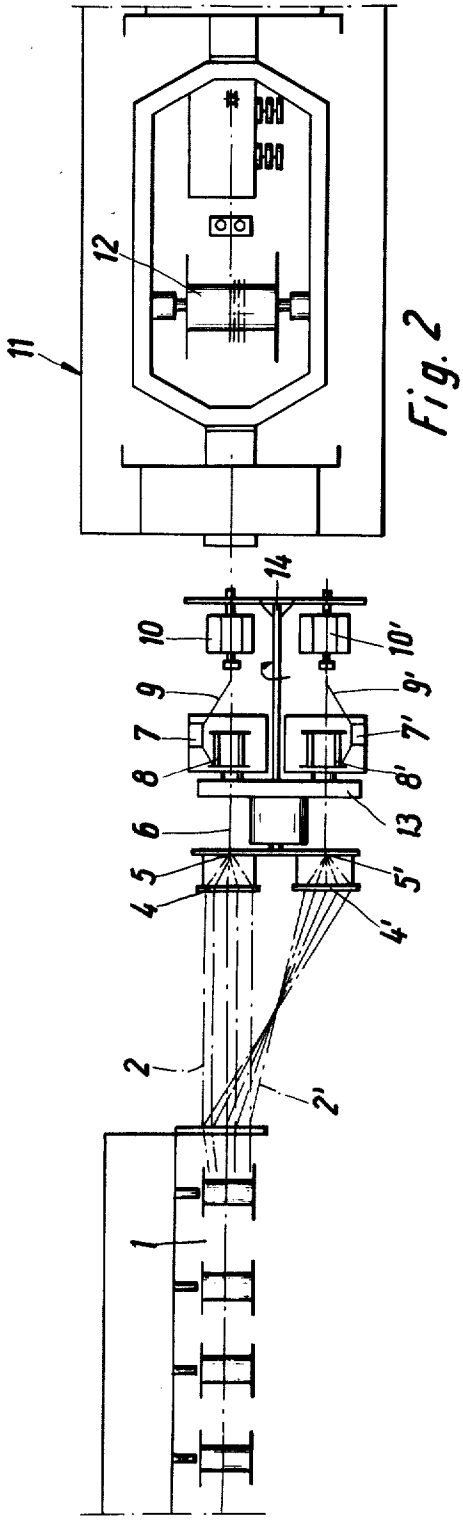


Fig. 2

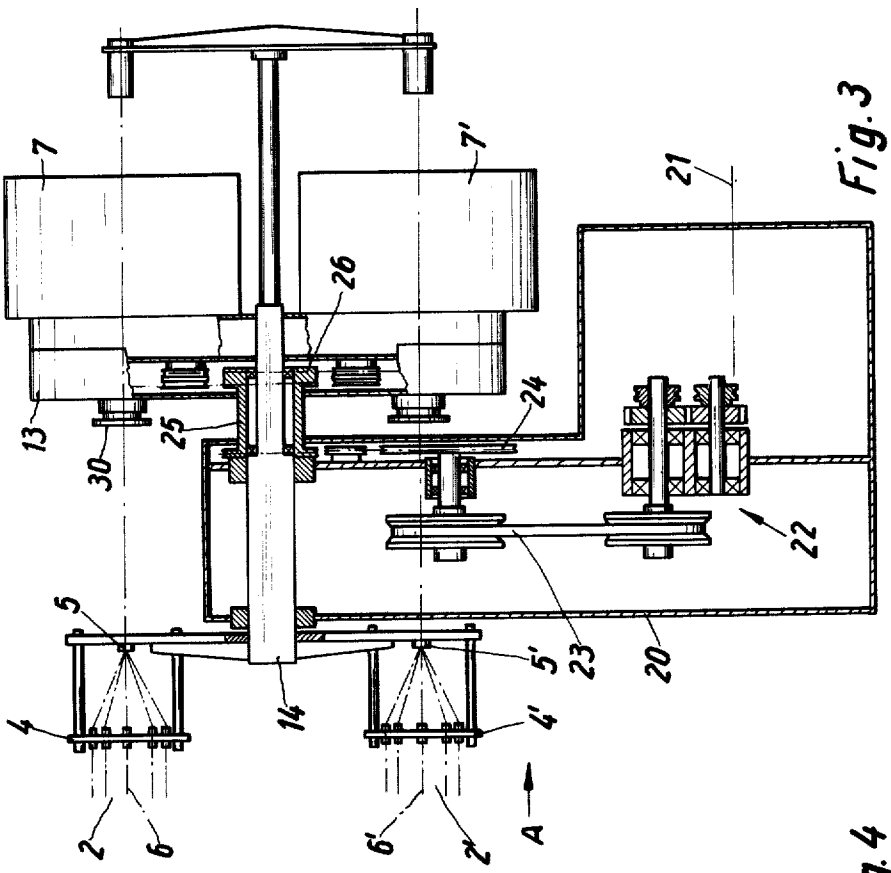


Fig. 3

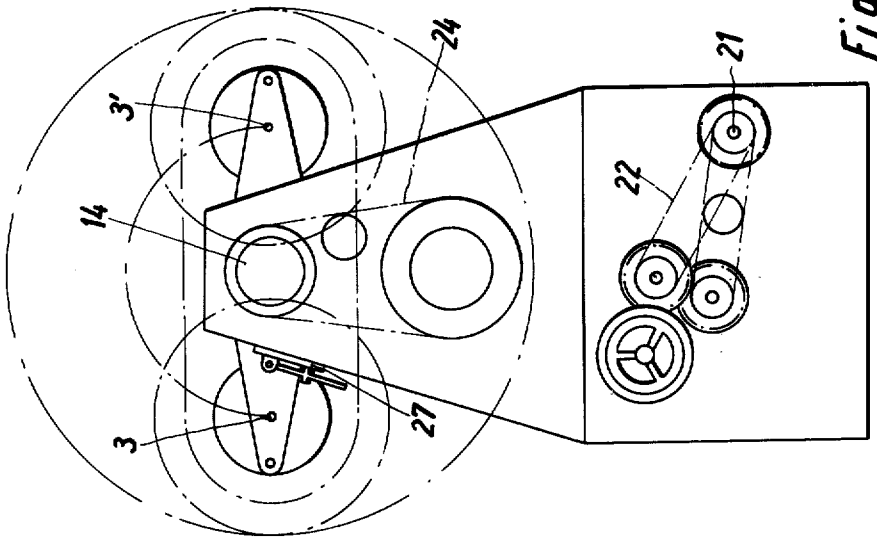


Fig. 4

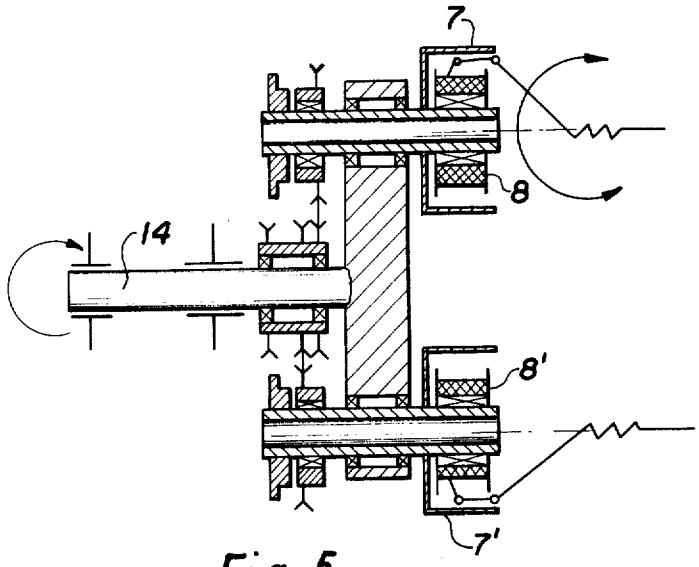


Fig. 5

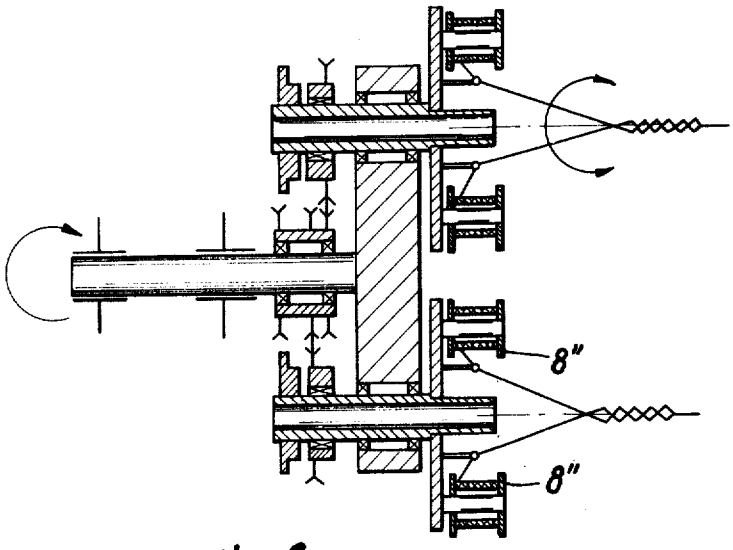


Fig. 6

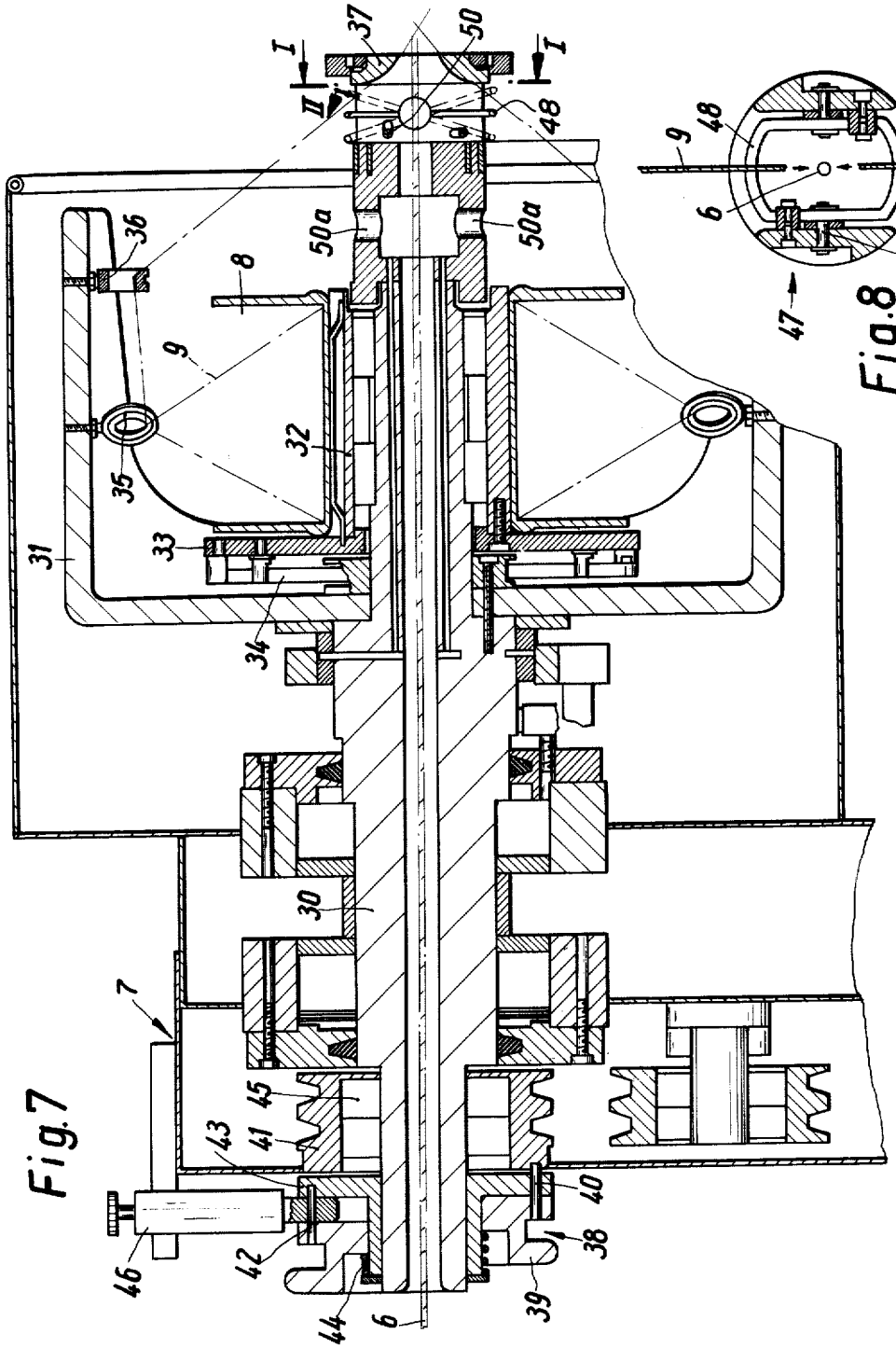

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Fig.7

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Fig.8

Fig. 9

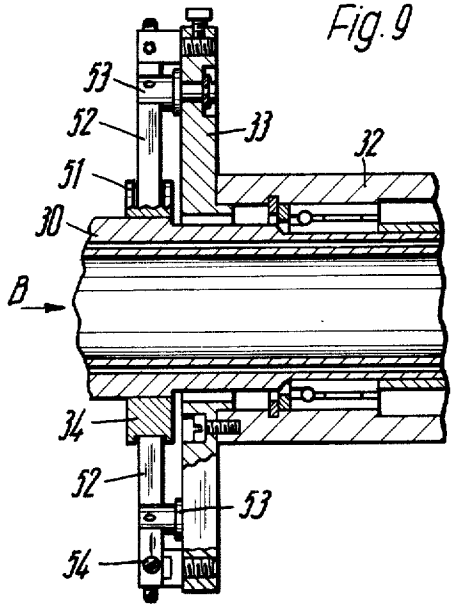
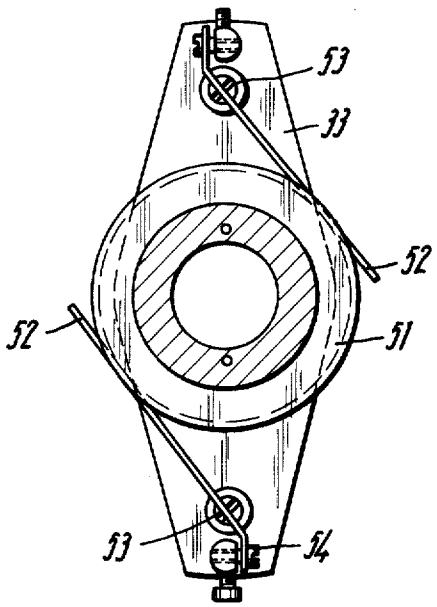


Fig. 10



LACING DEVICE FOR STRANDING MACHINES

The invention concerns a wrapping device for stranding machines with a unit consisting of a stranding disk and a spinning head for braiding the strands. In particular such a unit has a stranding disk, a stranding nipple and a spinning head consisting of a spool and spinning can, one behind the other.

BACKGROUND OF THE INVENTION

1. Description of the Prior Art

A wrapping device is known in the form of a braiding device for cables with long strands in the German AS 1,510 102, to achieve a maximum strand length, it is suggested that a magazine holder, fitted coaxially to the cable cord, should take several strand wheels arranged one behind the other, which can be uncoiled without stopping the central strand winder by through connection and routing the strands in a particular way. When the strand has been used, or at the latest when a particular length of cable or stranded cord has been produced the whole system must be stopped until the new stranding core has been received on the stranding spindle, new spools have been added to the strand spinners in the stranding axis, and the strands or yarns have been laid on the cable cord, the time taken to accomplish this considerably impairs the productive operating time of the expensive stranding machines.

SUMMARY OF THE INVENTION

The object aim of the invention is to construct a wrapping device for stranding machines of the type mentioned so that the time expended to re-equip the system is kept to a minimum and optimum use is made of the machine.

The invention achieves this aim by having a reserve unit consisting of a stranding disk and spinning head, the two units being rotated like a dial around a common shaft in the stranding axis. In the preferred embodiment, a common shaft is arranged with its axis parallel to the stranding axis and there are two units at 180° to the axis of the shaft. In this way, while one unit is being used, the other can be sufficiently re-equipped by attaching cores and adding spools, so that at the end of the operating cycle it can be simply oriented into the operating position, i.e., into the stranding axis. The whole system is immediately ready for use again and the next operating cycle can begin.

In this preferred embodiment, the spinning can of every spinning head has a gear which can be selectively driven by a common drive.

In a practical embodiment especially suitable for stranding cords of small diameter, the spinning head consisting of a spool and spinning can is arranged coaxially to the stranding cord axis, and the strand is fed via a strand guide fixed to the spinning can to the stranding cord. It is advisable to provide the spool with a casing and a support, which is connected to the spinning head via a braking device which is dependent on the speed. In another practical embodiment especially suitable for lacing stranded cords of large diameter, the spool of the spinning head is arranged outside the stranding cord axis on a disk which can be rotated concentrically to the stranding cord axis.

The invention is described in more detail with reference to the drawing, as follows:

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 shows a schematic side elevational view of a stranding machine incorporating the wrapping device of the invention;

FIG. 2 is a top plan view the stranding machine of FIG. 1;

FIG. 3 is an enlarged fragmentary view of a portion of the stranding machine in FIG. 1 with portions broken away and show in section at the spinning heads which are rotatable through 90°;

FIG. 4 is a front elevation of FIG. 3 looking in the direction of the arrow A, comprising a simplified schematic representation, with the spinning head in an operational position;

FIG. 5 is a unit, partially in section showing two spinning heads, in which the spool lie centrally to the axis of the cable movement;

FIG. 6 is another unit similar to the unit in FIG. 5 showing two spinning heads, in which several spools are arranged eccentrically to the axis of the cable movement;

FIG. 7 is a further enlarged, axial section of the spinning head as in FIGS. 3 and 5;

FIG. 8 is a section on line I—I through the spinning head of FIG. 7;

FIG. 9 is an enlarged, fragmentary detail of FIG. 3,

FIG. 10 is an elevational view looking in the direction of arrow B of FIG. 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A double twist bunching machine, shown schematically in FIGS. 1 and 2, is used to manufacture stranded cables from cores, e.g., basic and main groups for signal cables, lines or other stranded cords, which require wrapping or a distinguishing feature in the form of spirals, on the surface.

From a group of feed spools 1, cores 2 are fed to a stranding disk 4 which lies in the stranding axis 3. After leaving a stranding nipple 5 on the stranding disk 4, the cores 2 run as a stranding cord 6 concentrically through a spinning head 7, where the stranding cord 6 is wrapped or wound round strand coming from a spool 8. A reserve spool 10 is arranged downstream of the spinning head 7, and the stranding cord 6 passes through it into the machine 11 with a winding spool 12 inside it. The spinning head 7 in the stranding axis 3 and the stranding disk 4, which also lies in the stranding axis, and the spool 8 form a unit, similar to another unit consisting of a stranding disk 4', a spinning head 7' and a reserve spool 8' arranged parallel to its axis see FIG. 2. The two units are connected to one another by a distribution gear 13 and can be rotated through 180° about a shaft 14 which lies between them. The second unit serves to wind an additional stranded cord 6', which is produced from the cores 2' of another group of feed spools 1' see FIG. 1. By rotating the two units 7, 7' through 180°' one unit can be brought from the stranding axis 3 into a position parallel with it, and the other unit brought into the stranding axis.

As soon as the end of the stranded cord is reached, i.e., the first group of feed spools 1 is empty and the cores coming from them are on the winding spool 12 as a stranded and wrapped unit, when the machine is at rest, the ends of the cord between the reserve spool 10 and the machine 11 are cut off. Then, the two spin-

ning heads 7, 7' are rotated through 180° about the shaft 14, so the spinning head 7' and the stranding disk 4' and the reserve spool as well as the cores which have been brought in and are payed out into an operational position, i.e., into the stranding axis. These cores are connected to the cord hanging out of the machine 11, and the whole system can then start operating again. As customary, the connecting point is allowed to run to the winding spool 12, the winding spool change is then made and the next operating cycle begins.

The operator servicing the machine can therefore renew the feed spools not being used, during the stranding process, and bring the cores of the new feed spools into the unit outside the stranding axis consisting of the stranding disk 4 or 4', the stranding nipple 5 or 5', the spinning head 7 or 7' and the reserve spool 10 or 10', and exchange empty spools while one or the other is operating for full spools.

FIGS. 3 and 4 show the spinning heads on an enlarged scale. The drive of the two spinning heads 7, 7' includes in housing 20 drive shaft 21, a transmission 22, intermediate drives 23 and 24; intermediate drive 24 driving the shaft 25 of drive 26. At 27 is a member for locking the spinning heads 7, 7' in an operational position.

The units 7, 7' shown in FIG. 5 with spinning heads, correspond to the units of the machine in FIGS. 1 and 2 and the units shown in FIGS. 3 and 4. Units with such spinning heads are able to wind a stranded cord with one strand. The two units shown in FIG. 6, however, are able to wind two strands round a cord, for this purpose several spools 8'' are provided excentrically to the winding head axis, and have a circular path on an axis parallel to the winding head axis. Apart from this different arrangement of the spools, the device is the same as those in the other figures and is used if thick cords are to be wound, it differs from the embodiments in FIGS. 1 to 5 in that its cord passage opening is not limited. Although the danger of imbalance is not so great, the spools 8'' are arranged symmetrically to the spinning head axis and thus to the cable axis and spools of equal size are used.

The spinning head 7, shown in more detail in FIG. 7 has a shaft 30 to which is screwed a spinning can 31. Inside the spinning can 31 on the shaft 30 is a movable casing 32, which is connected to the spinning can 31 via a support 33 which is firmly connected to it and extends in a radial direction as well as via a braking device 34. The spool 8 lies firmly on the casing 32 and is set in motion with the casing by the feeding of the strand 9. For this purpose, the strand 9 runs first through a ring nipple 35, which is so arranged and secured on the inner walling of the spinning can 31 that a constant sideways feeding angle is achieved from both spool flanges. At a distance from this, is a further ring nipple 36 which is also secured at the spinning can 31 and passes the strand through a tulip-like centering nipple 37 in the spinning axis to the stranding cord 6 which runs concentrically through the centering nipple. The rotation of the spinning can 31 gives the spiral wrapping of the cord. As the spinning can 31 rotates very fast, imbalances can easily occur due to unequal mass distribution. For this purpose, the spinning can 31 can be provided with further ring nipples diametrally to the two ring nipples 35 and 36 (as shown in the diagram), which can also be used during reversal of the direction of rotation.

On the driven side of the shaft 30 is a spring-loaded clutch 38 for separating the unit not being used from the drive 26 (FIGS. 3 and 7). The clutch 38 consists of an axially adjustable ring member 39, which has several axial projections 40 arranged radially and in the engaged position is positively connected to a drive pulley 41 comprising part of the drive 26. In the disengaged position after a slight turn of the ring member 39, the projections 40 are held in bores 42 of an axially fixed centre plate 43 by a spring 44.

So that frictional forces in the bearings 45 of the centre plate 43 do not give rise to uncontrollable corotation, an additional restraining device 46 is provided for the spinning head 31 which is released from the drive.

In FIG. 8 a device 47 for automatic warning of strand breaks is disclosed, which device is installed near the tulip-like centring nipple 37. This device consists essentially of a hoop 48 which is carried by bolts 49. The hoop 48 is forced to stay in the solid line position shown in FIG. 7 by the strand 9, which is under load. If the strand breaks, the hoop leaves this position and rights itself by means of the centrifugal force resulting from its rotation with the spinning can and takes up the dotted position II. It thus touches a contact 50 in a circuit 50*a* and causes a signal to switch off the whole system via electrical controls not described or shown here in detail.

In FIGS. 9 and 10 the braking device 34 for stopping the spool 8 is described in more detail. It consists essentially of a braking plate 51 which is connected firmly to the shaft 30, and on which two brake shoes 52 of spring steel band slide. The brake shoes are held by rotatable bolts 53 which are firmly connected to the support 33. To achieve a braking effect between the braking plate 51 and the support 33 bearing the brake shoes 52 which rotate at different speeds, the brake shoes are held and set by screws 54 in such a way that, turned about the centre of rotation of the bolts 53, they exert a corresponding pressure on the braking plate.

The braking device 34 gives a completely symmetrical arrangement of all moving parts and thus an even mass distribution.

The braking device also gives constant strand tension as, at a high relative speed of rotation, i.e., when the support is rotating at a high speed, the centrifugal force acting outwards is directed against the spring loading and thus causes a reduction in the braking effect. The different speed of rotation of the support is a result of a strand uncoiling from a spool with a varying diameter at a constant speed.

The features of the invention can naturally be used not only with the double-twister bunching machine described but also with single twister machines. Instead of two turret-type units of stranding disk and spinning head coupled together several turret-type units coupled together can be provided.

I claim:

1. In a stranding machine including a unit for winding stranded cord consisting of a stranding disk including a stranding axis and a spinning head, characterised in that as a reserve for the unit there is at least one further unit consisting of a stranding disk and a spinning head further including common shaft means connecting the units so they can be alternatively rotated into the stranding axis.

2. In a stranding machine as claimed in claim 1, characterised in that the common shaft is arranged parallel to the stranding axis and has two units arranged at 180° to one another.

3. In a stranding machine as claimed in claim 1, characterised in that each spinning head includes a spinning can and a gear, and drive means selectively engagable with the gears of the respective spinning heads.

4. In a stranding machine as claimed in claim 1, characterised in that the spinning heads include spools outside the stranding axis, said spools being arranged on a rotatable disk concentrically to the stranding axis.

5. In a stranding machine as claimed in claim 1, in which said spinning heads include a plurality of spools arranged on a rotatable disc concentric to the stranding axis.

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