April 21, 1959 H. BUDDECKE 2,882,673

COILING HEAD FOR YARN PACKS

Filed April 21, 1954

Fig. 1

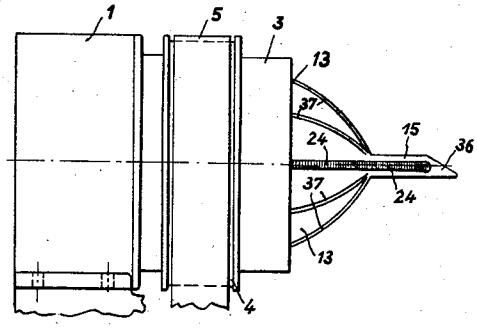


Fig. 2

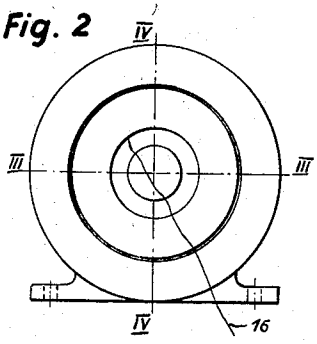


Fig. 3

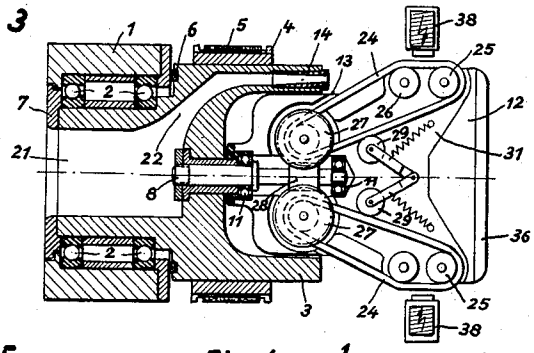


Fig. 5

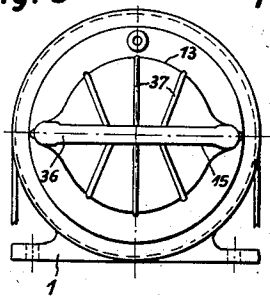


Fig. 4

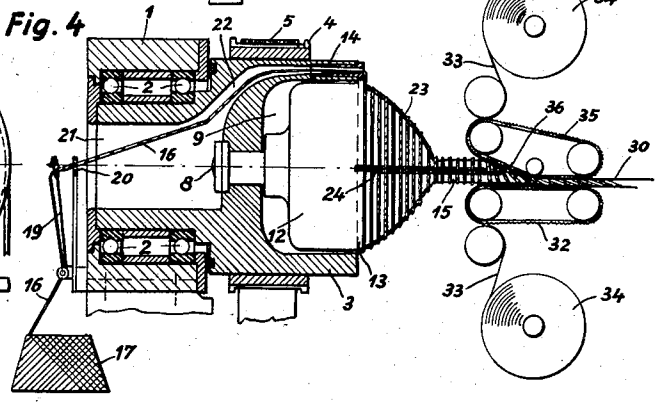


Fig. 6a

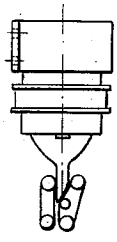


Fig. 6b

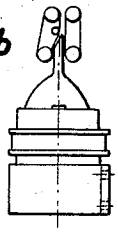
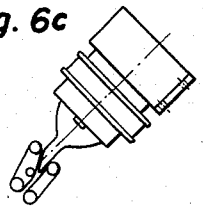


Fig. 6c



Inventor:

Heinrich Buddecke.

United States Patent Office 2,882,673 Patented Apr. 21, 1959

2,882,673

COILING HEAD FOR YARN PACKS

Heinrich Buddecke, Gutersloh, Westphalia, Germany

Application April 21, 1954, Serial No. 424,683
Claims priority, application Germany April 30, 1953
12 Claims. (Cl. 57—1)

The invention refers to a coiling head for the manufacture of yarn layers consisting of oblong helicoidal coils, formed into yarn packs by interposition of separating leaves. The yarn layers are made by coiling the yarn on one end of the mandrel, from where it goes to the other end and where it is taken off.

An already proposed device of this kind has a prismatically formed mandrel and a uniform, oblong-round section. When the yarn is wound up on the mandrel, the latter is subject to a strongly changing pulling speed. The pulling speed is greatest when winding up is done edgewise. In view of the tensile strength of the yarn the velocity of revolution of the mandrel is limited by the maximum pulling speed, and a relatively long period is necessary to produce a certain coil strip. Another disadvantage of the coil-head already proposed is the fact that the yarn is taken off by a spool revolving with the coiling head so that only a limited quantity of yarn can be worked up with an uninterrupted running of the head.

In order to avoid these disadvantages the cross-section of the mandrel, according to the invention, is round at the winding-up end for the yarn, changes into an oblong-round section at the issue-end, the length of circumference of the different sections of the mandrel remaining the same. As a result of this measure the yarn is wound up on the round winding-up end of the mandrel, whereby a continually and rapidly changing of the pulling speed and breaking of the yarn are avoided. In this way the coiling speed surpasses more than ten times the speed of the hitherto existing form. The mandrel is dome-shaped at the winding-up end and prismatic with oblong-round cross-section at the issue-end, the length of the oblong-round cross-section being greater than the diameter of the dome.

The yarn thread is brought on the mandrel by means of a fixed cross spool over a yarn loop arranged axially parallel to the axis of rotation of the mandrel, and a yarn loop attached to the outer circumference of the mandrel head and rotating around the mandrel. The result is that the thread can be taken from a considerably larger yarn bobbin and the mandrel head can be in working order for a longer period.

The description given below is an example of the device according to the invention.

In the drawing:

Fig. 1 is a side-view of the coiling head,

Fig. 2 is a view of Fig. 1 taken from the left side,

Fig. 3 is a section through the coiling head along line III—III of Fig. 2,

Fig. 4 is a section along line IV—IV of Fig. 2, the mandrel not being shown in section,

Fig. 5 is a frontal view of Fig. 4, taken from the right hand side,

Figs. 6*a*, 6*b*, and 6*c* are different views of the coiling head.

The coiling head consists of a stationary machine frame **1**, wherein a winder body **3** is revolubly supported

by means of ball bearings and is revolved by a belt **5** acting upon a belt-drive surface **4**. The ball bearings **2** are tightened by packings **6** and a packing cover **7**. A bearing bolt **8** is screwed into the axis of rotation of the winder body **3**; the bearing bolt projects into a concentric chamber **9** of the winder body. Here a coiling mandrel **12** is mounted on ball bearings **11**, easily revolving.

The part of the coiling mandrel jutting out of chamber **9** is intended for winding up the yarn thread. In the winding up zone **13**, where it comes out of chamber **9** of the winder body, its cross-section is circular, so that, when the thread is wound up and comes out of loop **14** at the circumference of the winder body **3**, its speed is uniform, no acceleration of the speed arises. The insignificant mechanical stress allows the winding speed to be quickened ten to fifteen times the speed of coiling mandrels with a non-circular winder zone.

The coiling mandrel changes, beginning at the winding up zone **13**, from its dome-shaped form into the oblong-round section form at the free end **15**, the height of the section in the perpendicular middle plane according to Fig. 2 continually diminishing, and the breadth increasing in the horizontal middle plane. The charge in breadth and height and in the extension of the different oblique planes must be proportioned in a way that the length of circumference of the coiling mandrel remains the same as in the different vertical section planes, so that the wound up thread can be easily removed forward and picked up by the prismatic part of the coiling mandrel.

Thread **16** (see Fig. 4) is taken from a stationary big cross-wound spool **17** and arrives at the above mentioned loop **14** over a thread tensioner **19**, which sets free a stopping device for the machine when the thread breaks, through a stationary loop **20**, on the same axis as winder body **3**, and a broad middle opening **21** of winder body **3**, and finally through communication canal **22**.

The winder body is driven by belt-drive **4**, **5** setting the winder-body in rotation, whereas coiling mandrel **12**, being connected with winder body **3** by means of ball bearings **11**, is held against rotation relative to machine frame **1**. Loop **14**, rotating around coiling mandrel **12** therefore winds up the thread on the coiling mandrel.

A continual shifting of the wound up coils **23** towards the front part **15** of the coiling mandrel is caused by endless band-conveyers **24**, guided by leader rolls **25**, **26** (Fig. 3) and driving rolls **27**. The band-conveyers are driven by worm **28** fixed on bearing bolt **8**. The driving wheels **27**, constructed as worm-wheels, gear into the worm, so that when bearing bolt **8** turns with winder body **3** the driving wheels **27** also turn uniformly, taking the wound up parts of the yarn thread, lying on belts **24**, forward. The strain of the endless band-conveyers is controlled by rolls **29**, influenced by springs, the rolls being located, the same as the other rolls **25**, **26**, **27**, and band-conveyers **24**, in a recess or slit **31** of the horizontal middle plane of coiling mandrel **12**.

The yarn-strip **30** that is formed at the front end, the coils of which have in the meanwhile assumed the desired oblong-rounded shape, is supported on its lower side by an endless band-conveyer **32** when going off the coiling mandrel, and at the same time a separating strip **33** is introduced between the endless band-conveyers **32** and yarn strip **30**, the separating strip being taken off a stationary roller **34**. Above the yarn strip a second endless band-conveyer **35** is provided for; its purpose being to flatten the yarn strip, so that the screw-shaped coils are laid one upon another in scale like manner. In order to facilitate the process the coiling mandrel has on its front part (see Fig. 1) a bevelled end **36**. A second separating strip **33** may, if desired, be introduced also between

band-conveyer **35** and the yarn strip **30**, for instance when artificial silk yarn is wound up.

It would be to the purpose to have the yarn coils supported not at the full surface of the coiling mandrel, especially not on its arched part, but only on ribs or wires **37** (Figs. 1 and 5), as hereby the sliding friction in the motion of the coils on the winder mandrel is considerably diminished. The ribs or wires can also be formed as parts of endless band-conveyers like band-conveyers **24**, in order to transport safely forward the yarn coils.

Instead of a horizontal disposition of the axis of the coiling mandrel the latter can be disposed, as shown in Figs. *6a*, *6b*, *6c*, in a perpendicular downwards or upwards or oblique position. Coiling mandrel **12** is held against turning with regard to machine frame **1** by the band-conveyers **32** and **35**, whereas the winder body **3** revolves with regard to machine frame **1**. Keeping the coiling mandrel **12** in a certain turning position in cases where the band-conveyers **32** and **35** cannot be used, can be done by magnets **38** (Fig. 3), placed in the broad axial plane of the coiling mandrel, equipped with soft iron pieces acting as armatures.

I claim:

1. In a coiling head for yarn packs of the class described, a coiling mandrel the winding-up end of which has a circular cross section changing into an oblong cross section at the issue end, a winder body for winding up the yarn-thread in coils, endless conveying belts running in a recess in the mandrel and shifting the wound coils towards the issue end, the outer part of the belts following the shape of the mandrel, means for taking the coils off the issue end, and means for pressing flat the issued coils.

2. In a coiling head according to claim 1, the coiling mandrel having ribs adapted to guide the wound coils for being shifted.

3. In a coiling-head according to claim 1, said endless band-conveyers being mounted on rollers within said recess.

4. In a coiling head according to claim 1, rollers within said recess supporting said endless band-conveyers, and idler pulleys cooperating with said belt conveyers inside said recess, and being movable and spring actuated towards the belt conveyors, whereby the belts will be kept under tension.

5. In a coiling head according to claim 1, a machine frame, a stationary yarn spool, said winder body being rotatably mounted in the machine frame having a yarn guide near its circumference leading the yarn-thread about the coiling mandrel, a stationary yarn spool, said winder body having a central opening communicated with said guide whereby the yarn-thread is guided from said stationary spool to said revolving guide.

6. In a coiling head according to claim 1, a machine frame, said winder body being rotatably mounted in the machine frame and having a central opening and a yarn guide near its circumference adapted to lead the yarn to

be coiled about the coiling mandrel, said coiling mandrel being revolubly mounted on the winder body at one of its ends, the other end being kept free for issuing the yarn-coils, and means for keeping the coiling mandrel stationary with respect to the machine frame.

7. In a coiling head according to claim 1, a bearing bolt centrally fixed to the winder body, ball bearings thereon revolubly supporting said coiling mandrel, said winder body having a central recess in its front end surrounding said bearing bolt, and the coiling mandrel having a cylindrical end entering said recess.

8. In a coiling head according to claim 1, a bearing bolt centrally fixed to said winder body and revolubly supporting said coiling mandrel, a worm fixed to said bearing bolt, worm wheels on one of the rollers for each belt cooperating with said worm whereby upon revolving the winder body relatively to the coiling mandrel the belts will be driven.

9. In a coiling head according to claim 1, said coiling mandrel being revolubly mounted on the winder body having its issue end free, said winder body having a groove in its circumferential surface for a rope rotating the winder body, said circumferential surface surrounding the path of the yarn thread to be coiled.

10. In a coiling head according to claim 1, a stationary yarn spool, said winder body being rotatably mounted and having a yarn revolving guide near its circumference leading the yarn thread about the coiling mandrel, and having a central opening communicated with said guide whereby the yarn-thread is guided from said stationary yarn spool to said revolving guide, a stationary thread guide behind said central opening, and a thread tensioner behind said stationary thread guide.

11. In a coiling head, according to claim 1, said coiling mandrel having a bevelled free end, a band conveyer pressing flat the issued coils against said bevelled end in order to superpose them upon one another in scale like fashion.

12. In a coiling head according to claim 1, said coiling mandrel having a bevelled end, an upper band conveyer and a lower band conveyer, two separating leaf strips, means for guiding one separating strip between the upper band conveyer cooperating with said bevelling and the issued coils, and means for guiding the other separating strip between the lower band conveyer and the issued coils, whereby the latter will be enclosed between said strips in flat pressed condition.

References Cited in the file of this patent

UNITED STATES PATENTS

1,872,971	Kingman	Aug. 23, 1932
2,463,689	Greenwood	Mar. 8, 1949
2,482,655	Cone	Sept. 20, 1949
2,551,098	Cone	May 1, 1951
2,735,250	Buddecke	Feb. 21, 1956