

[54] **COMBINED THREAD-GUIDE AND
THREADING DEVICE**

[72] Inventors: **Heinz Treptow**, Ennepetal-Milspe; **Karl Bauer**, Remscheid-Lennep, both of Germany

[73] Assignee: **Barmag Barmer Maschinenfabrik Aktiengesellschaft**, Wuppertal, Germany

[22] Filed: **Dec. 22, 1969**

[21] Appl. No.: **886,883**

[30] **Foreign Application Priority Data**

Dec. 27, 1968 GermanyP 18 17 084.8

[52] U.S. Cl.57/106, 28/62, 57/34 HS, 226/92

[51] Int. Cl.D01h 13/04, D02j 13/00

[58] Field of Search28/62, 1.6; 226/91, 92; 242/47.03; 57/106, 34 HS

[56] **References Cited**

UNITED STATES PATENTS

3,015,872 1/1962 Jones57/34 HS X

3,094,761 6/1963 Dudzik.....57/106 X
3,321,904 5/1967 Horvath et al.57/34 HS X
3,448,572 6/1969 Meronen57/106

FOREIGN PATENTS OR APPLICATIONS

1,536,866 7/1968 France.....28/1.6

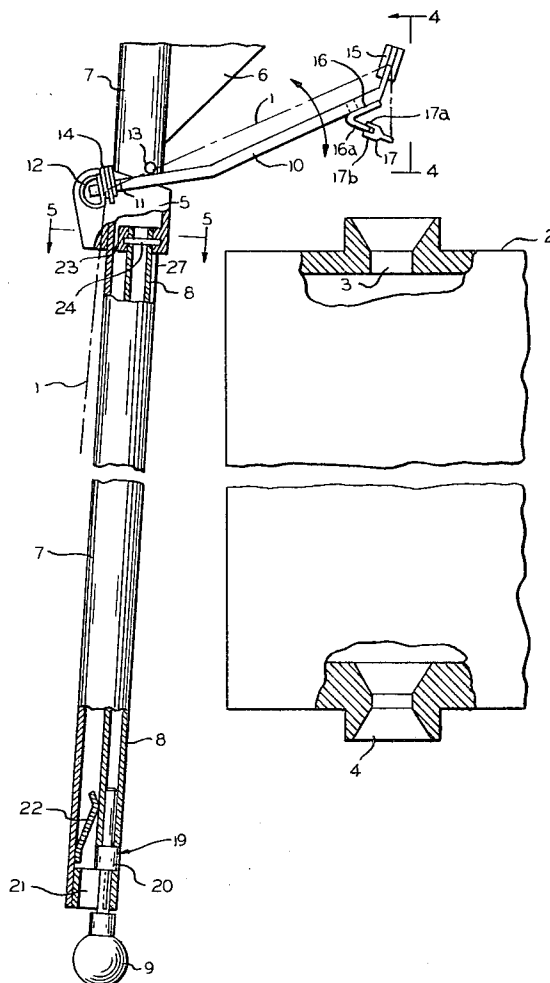
Primary Examiner—Robert R. Mackey

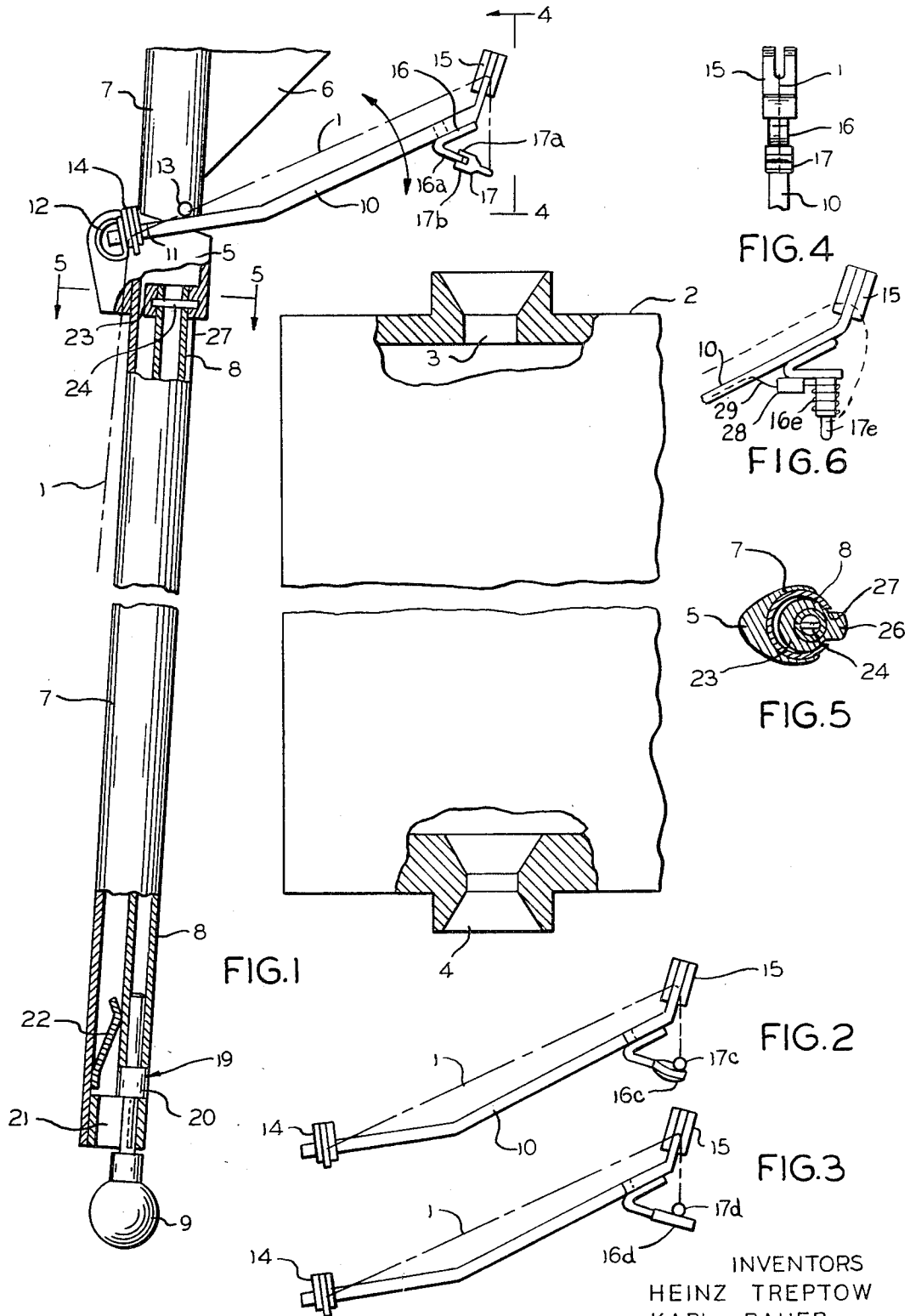
Attorney—Johnston, Root, O'Keeffe, Keil, Thompson & Shurtleff

[57] **ABSTRACT**

Combined thread-guide and threading device for heating chambers in textile machines, in particular in false-twist crimping machines, embodying a staff with a rod for moving a slidable head, which carries a pivotable arm held by a spring in steeply inclined position. The arm strikes a stop on reaching its highest position, in which process it tips out of its initial steep position into a less steep position. On the free end of the arm a holding device for a weight, which is fastened to a thread, holds the weight securely in the steeply inclined position of the arm and casts it off into a heating chamber in the less steep or castoff position of the arm.

8 Claims, 6 Drawing Figures





INVENTORS
HEINZ TREPTOW
KARL BAUER
BY *Johnston, Rock, O'Kosoff*
Kearl, Thompson & Schuttloff
ATTORNEYS

COMBINED THREAD-GUIDE AND THREADING DEVICE

In numerous treatments of textile threads, especially of synthetic polymer threads, the thread is heated to a predetermined temperature. This is the case, for example, in false-twist twisting machines, in which the running thread passes through a rapidly rotating false-twist spindle. A temporarily imparted twist is fixed by heating the thread to a temperature a little below its softening point before the false twist is nullified. As the result of such a treatment the thread leaves the treatment device in a crimped state.

Other treatments of textile threads also involve a heat treatment. Thus, for example, it is a known practice to stretch highly crimped threads with high bulk elasticity by a predetermined amount and to heat them in this state in order hereby to reduce the crimp of the thread to the desired measure. All these cases require devices in which the running thread can be heated.

It is expedient to arrange these heating devices, which often have the form of more or less large and therefore space-demanding chambers, in the upper part of the machine. This has the advantage that the hot air, rising in any case, does not have to sweep past the other parts of the machine, and, in particular, cannot reach the supply spools. Furthermore, the mounting of the heating chambers in the upper part of the machine makes it possible to lead off the vapors arising, for example, from textile finishes or preparations without operating personnel being annoyed by them. Difficulties are caused in such installations exclusively in the threading of the threads to be treated, an operation which has to be carried out anew after each spool change or thread breakage.

In false-twist twisting machines, in which an electrically heated plate is used for the heating of the thread, combined thread-guide and threading devices are known which consist of a vertically movable rod or the like. On the upper end thereof is a slide piece shiftable by the rod. The slide piece carries an extended arm, which is pivotable and held by a spring in a steep position. On the arm there are several thread guides, generally two, over which the thread to be threaded is laid when the arm has been drawn down with the aid of the rod into the working range of the operating personnel. The arm together with the thread is pushed up and, in the process, as soon as it reaches its end position, it strikes against a stop which lets the arm pivot out of its initial steep position into a less steep position. The device is arranged in such a way that the thread, in the process, is automatically placed in the predetermined position (German Utility Pat. No. 1,958,183). Devices of this type have proved successful per se, but they are suited only for laying of a thread on the surface of a heating plate or for the placing of a thread in an electrically heated channel which is open toward one side over its entire length.

For the heat treatment of running textile threads, however, there are also known devices which consist of a chamber virtually closed on all sides, the upper plate and lower plate of which have passage openings opposite to one another. The chamber is heated by suitable means in its interior, for example, by introduction of hot air or hot vapors or by heating elements disposed in the interior of the chamber, which heat the thread by radiation or also by convection. In other forms of such heating chambers the heating of the thread is carried out by dielectric means, by a system in which the thread in its passage through the chamber is conducted through between two electrodes which are connected to an electric voltage source, which generates an alternating voltage of sufficiently high frequency. In all these cases it is necessary to thread the thread in the heating chamber, which is virtually closed on all sides, from underneath upward. In the known forms, a rod is pushed upwardly through the chamber, on which rod the thread is fastened and with which it is threaded through the chamber. The threading is carried out thereafter by hand, for which reason it was hitherto necessary to arrange heating chambers of this type in the reach of the operating personnel. For the reasons explained above, however, here, too, there exists the wish to be able to accommodate the heating chambers in the upper part of the machine.

With this state of technology there exists the problem of providing a device with which the thread can be threaded without difficulties to and through a heating device which is virtually closed on all sides and is mounted in such a place of the machine that it cannot be reached directly by the operating personnel.

THE INVENTION HEREIN

This problem is solved according to the invention by a combined thread-guide and threading device which is characterized by a pivotable arm, on the free swinging end of which is a holding device for a weight attached to the end of the thread or yarn to be threaded. In the steep or substantially vertical position of the arm the holding device holds the weight securely. In a less steep or more horizontal position of the arm, the device lets go of the weight and casts it off. The holding device can in the simplest case be a wire bow, a fork or the like, the prongs of which form with the arm an angle such that the prong or prongs in steeper position of the arm are inclined with respect to the horizontal and in the less steep position of the arm slope downwardly with respect to the horizontal. In further development of the invention it is also possible for the holding device to be a bowl, a spoon or the like, whose steepest, peripheral wall sections fulfill the function of holding and casting off. This means that the steepest wall sections form with the arm an angle such that in the steep position of the arm they are inclined with respect to the horizontal and consequently hold securely the weight situated in the spoon, bowl, etc., and in the less steep position slope downwardly with respect to the horizontal, so that the weight can slip out of the bowl, spoon, etc.

In further development of the invention it is possible for the holding device to be a magnet, preferably an electromagnet switchable on and off or a permanent magnet. In the event that it is a permanent magnet, this can be dimensioned with respect to its force in such a way that it is capable to hold the weight fastened to the thread when the arm stands in the steeper position. When the arm is pivoted into the less steep or castoff position, then the force of gravity vector overcomes the magnetic-holding vector sufficiently to permit the weight to slide off the surface on which it is held magnetically.

It is also advantageous to arrange, instead of the permanent magnet, an electromagnet, whose excitation, for example, is switched off automatically, i.e., when the arm pivots out of the steeper position into the less steep, castoff position, e.g., by a mercury switch. Finally, it is also possible to use a movable permanent magnet, the magnetic holding force of which is negated by its movement upon tipping of the arm into the castoff position.

In the drawing there are illustrated several preferred forms of the invention.

THE DRAWINGS

FIG. 1 is a side elevation, partly sectioned, of the first embodiment of the invention and its relationship with a heating chamber;

FIG. 2 is a side elevation of an alternative form of a weight-holding device, in which a bowl or spoon is used;

FIG. 3 is a side elevation of another holding device, in which a magnetic plate is used;

FIG. 4 is an end elevation of the holding device of FIG. 1 as viewed from plane 4-4 of FIG. 1;

FIG. 5 is a sectional view taken on section plane 5-5 of FIG. 1; and

FIG. 6 is a side elevation of a further holding device wherein an electromagnet is used.

THE ILLUSTRATED EMBODIMENTS

The problem to be solved by the invention consists in threading the thread 1 into and through the heating chamber 2, which is closed on all sides, in such a way that this thread enters the chamber at the entry opening 3, drops through this chamber and emerges through the emergence opening 4.

The combined thread-guide and threading device according to the invention comprises the sliding head 5, which is slidably arranged on a staff, e.g., the tube 7, securely connected with the machine frame 6. In order for it to be possible to shift the head easily, it may be connected with a rod 8, e.g., a tube or the like, which, for example, is slidable in the interior of the rail or tube 7. This rod preferably has on its lower end a handle or knob 9 which serves for the easier operation.

The sliding head 5 carries an arm 10, which is pivoted at its base in a pivot joint 11. It is urged by a spring 12 into its normal, steep position, i.e., in substantially vertical orientation (not shown). When the head 5 has been shifted upward with the aid of the rod 8 so far that the arm has almost reached its end position, the arm strikes against a stop 13, whereby it is tipped against the force of the spring 12 out of its steeper position into a less steep, more horizontal position.

The arm carries, in the form represented in FIG. 1, two thread-guide pieces 14 and 15, which are attached to the arm's base and free swinging end. On the latter, a holding device 16 is mounted, which serves for the releasable holding of a weight 17. The weight is attached for the threading process to the lead end of the thread 1 to be threaded.

The holding device 16 can have, for example, the form of a wire bow, a fork or the like, as is represented in FIG. 1. The prongs 17a and 17b of the fork or of the wire bow form with the arm 10 an angle such that they are inclined with respect to the horizontal in the steep position of the arm, so that the weight loosely held on arm 16a of device 16 cannot fall off. As soon as, during the raising of head 5 and arm 10, the latter strikes against the stop 13, the arm pivots consequently into a less steep position. On reaching a position like that shown in FIG. 1, the prongs 17a and 17b slope downwardly with respect to the horizontal to a sufficient extent that they slide off the arm 16a. The weight falls through the heating chamber 2, in which process it draws along the thread 1 with it.

The threading process takes place as follows:

For the laying on of the thread 1 the sliding head 5 is first, with the aid of the rod 8, drawn downward far enough so that it can be reached by the machine operator. He fastens to the end of the thread the weight 17 and then lays the thread to be threaded over the thread-guide pieces 14 and 15. He then places the weight 17 on the holding device 16. Since the arm in the described position extends steeply upward, also the holding device assumes a position wherein the weight 17 cannot fall off. The sliding head 5 together with the arm 10 is pushed up with the aid of the rod 8 so far that the arm strikes against the stop 13. Here the arm begins to pivot from its initial steep position over into a less steep position, in which process the weight 17 fastened to the thread end falls from the holding device 16, and, in consequence of the corresponding arrangement of the device, falls through the entry opening 3 as well as the emergence opening 4 of the heating chamber 2. Hereby, the threading process is concluded.

In FIG. 2 there is illustrated another form of the holding device 16. It has the form of a bowl or of a spoon 16c or the like, which is attached to the full swinging end of the arm 10. When the arm is in its steeper position, as shown in FIG. 2, then the ball weight 17c rests securely in the hollow of the spoon and does not fall out. For this to be possible it is requisite that the steepest wall sections of the hollow of the spoon form with the arm 10 an angle such that in the steep position of the arm these wall sections are inclined with respect to the horizontal. On the other hand, the angle which the steepest wall sections of the hollow (the peripheral areas thereof) form with the arm 10 has to be such that these slope downwardly with respect to the horizontal when arm 10 is pivoted to a position like that of FIG. 1 so that the weight 17c can roll by reason of the force of gravity out of the hollow of the spoon.

In FIG. 3, the holding device 16d is a magnetic plate. It is to be perceived that the magnetic plate is arranged in such a way that, in the steep position of the arm 10, its magnetic force is dimensioned in such a way that this force holds the weight

securely on plate 16d. When the arm 10 pivots upon striking against the stop 13 to a less steep position, then the magnetic force no longer suffices to hold the weight 17d, so that it slides off the plate and falls through the chamber.

In FIG. 6, the holding device is an electromagnet 16e which, when energized through conductor wires 29 and mercury switch 28, supports weight 17e. When arm 10 pivots to a less steep position, the mercury switch opens the electromagnet circuit, whereupon weight 17e is released and drops into the chamber.

Returning to FIG. 1, the tube 8 has in its lower end a plug 19 on which is mounted the handle or knob 9. The enlarged part 20 provides a shoulder adapted to rest on the ring 21 in the base of the tube 7 to hold tube 8 and head 5 in the raised position. The leaf spring 22 holds the part 20 in the illustrated orientation. To lower the tube 8, the operator pushes knob 9 against the pressure of spring 22 until the shoulder on enlarged part 20 clears the upper edge of ring 21.

The head 5 is connected to the upper end of tube 8 by the ring 23 and pin 24. The ring 23 and head 5 merge together on side 26, which projects through and slides up and down in slot 27 of the tube or channel 7.

It is thought that the invention and its numerous attendant advantages will be fully understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the forms herein disclosed being preferred embodiments for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. A device useful for threading heating chambers in textile machinery which comprises a substantially vertical staff, a slidable head vertically slidable on said staff, a pivot arm on said head, means urging said arm toward a normal, steeply inclined position, stop means positioned to contact said arm when said slidable head and said arm are raised into the uppermost region of vertical movement of said head on said staff, said stop means pivoting said arm from said steeply inclined position to a less steeply inclined position as said head and said arm are raised, a thread weight, and a holding device on the free swinging end of said arm oriented relative to said arm to hold said thread weight securely thereon when said arm is in said steeply inclined position and adapted to cast off said weight when said arm is pivoted into said less steeply inclined position whereby a thread attached to said weight may be pulled through associated textile apparatus by the falling weight when the latter is cast off said holding device.

2. A device as claimed in claim 1 wherein said weight has forked arms slidably received on said holding device.

3. A device as claimed in claim 1 wherein said holding device is a bowl-like member providing a hollow in which said weight rests, the steepest wall sections of said hollow being inclined upwardly with respect to the horizontal in said steeply inclined position of said arm and sloping downwardly with respect to the horizontal in said less steeply inclined position.

4. A device as claimed in claim 1 wherein said holding device embodies magnetic means holding said weight on said device.

5. A device as claimed in claim 4 wherein said holding device embodies an electromagnetic means for holding said weight thereon.

6. A device as claimed in claim 4 wherein said holding device embodies permanent magnetic means for holding said weight thereon, the magnetic strength of said magnetic means being insufficient to hold said weight thereon when said arm is in said less steeply inclined position.

7. A device as claimed in claim 1 wherein said holding device embodies electromagnetic means, and means to switch off automatically the electromagnetic means when said arm is in said less steeply inclined position.

8. A device as claimed in claim 1 wherein said holding means is a plate forming a steep plane, the inclination of which

becomes steeper with the pivoting of said arm toward said less steeply inclined position, and permanent magnetic means associated with said plate and having a magnetic strength sufficient to hold said weight securely on said plate in said steeply inclined position of said arm means but insufficient to hold 5 said weight on said plate against the force of gravity when said arm means is pivoted into said less steeply inclined position.

* * * * *

10

15

20

25

30

35

40

45

50

55

60

65

70

75