

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) YARN SENSING DEVICE FOR STUFFER CRIMPER

(71) We, JOSEPH BANCROFT & SONS Co., a Corporation organised and existing under the laws of the State of Delaware, United States of America of P.O. Box 245, Wilmington, Delaware, 19899, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a sensing device for sensing the extent of a core of crimped fibres in a stuffer crimper.

According to a first aspect of the present invention we provide a stuffer crimper according to any one of the claims of Patent No. 1,219,505 wherein the sensing device surface means are disposed entirely within the crimping chamber.

According to a second aspect of the invention we provide a method of crimping yarn comprising feeding yarn to a stuffer crimper chamber according to the first aspect of the invention, causing the yarn to be folded against a core of yarn already in the chamber, sensing the extent of the core of crimped yarn by means of the slidable sensing device and withdrawing the yarn from the leading end of said core past the sensing device. A third aspect of the invention provides yarn crimped by the above method or apparatus.

In order that the invention may more readily be understood, the following description is given, merely by way of example, reference being made to the accompanying drawing, in which:

FIGURE 1 is a plan view of the sensing device embodied in a stuffer crimper.

FIGURE 2 is a section taken on the line 2—2 of Figure 1; and

FIGURE 3 is a sectional view similar to Figure 2 illustrating a further embodiment of the invention.

The stuffer crimper is of standard type including a crimping chamber in the form of a tube 20 into which yarn is fed by feed rolls to be folded over and crimped against a core

34 of previously crimped yarn in the tube.

The discharge end only of the crimping and setting tube 20 is shown in the drawing.

In the embodiment of Figures 1 and 2 the crimping tube 20 is shown as having in its lower portion a bore 21 of smaller diameter and in its upper portion a bore 22 of larger diameter, the bores 21 and 22 meeting in a shoulder 23. A sensing element 24 has an outer cylindrical surface 25 fitting loosely within the upper bore 22 of the tube 20 and has an inner coned surface 26 tapering upwards to a central opening 27 and having at its lower end a diameter at least equal to, in this case greater than, the bore 21 of the tube 20. Two pins 28 extend outwardly from the cylindrical surface 25 of the sensing element 24 through longitudinal slots 29 in the upper part of the tube 20. A bracket 30, adjustably mounted on the tube 20 carries a microswitch 31 having an actuating arm 32 in the form of a wire ending in a loop 33 which extends loosely around the tube 20 and rests upon the projecting portions of the pins 28 so that the micro-switch 31 is actuated by vertical movement of the sensing element 24. The conical inner bore 26 is shown as extending over and around the top portion of the core 34 of crimped yarn in the tube 20. The diameter of the lower portion of the conical bore 26 is such that the top portion of the core enters the bore and assumes a similar tapered form from which the crimped yarn is extracted through the centre opening 27. The yarn is not impeded at the point of extraction from the core and hence, it is pulled out of the tube with a minimum of tension without contacting a heated surface which would otherwise tend to iron out the crimp. Also the sensing device is extremely light in weight and does not introduce appreciably back pressure onto the core.

In an alternative embodiment the tube 20 may be made of a uniform inside diameter if desired, in which case the inside diameter of the lower end of the coned interior of the sensing element should be such that it spans

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the top of the core and rests around rather than on the upper end of the core which will then be confined within the coned interior of the element. In such an embodiment the tube
 5 20 and the sensing element will together confine the core and serve as a telescopic crimping chamber.

It is to be understood that the micro-switch 31 may be connected to control the rate of
 10 operation of the feed rolls (not shown) or a take-up winder (not shown), so as to maintain the top of the core at a substantially constant level within the chamber.

The embodiment of Figure 3 is generally
 15 similar to that of Figures 1 and 2 except that the sensing element 45 is somewhat longer and extends above the top of the crimping chamber or tube 40. The tube 40 is formed with lower and upper bores 41 and 42 meet-
 20 ing at a shoulder 43 and the sensing element 45 has a cylindrical outer surface 46 extending upwardly above the top of the tube 40. The sensing element 45 is formed with a lower coned inner surface 47 terminating in a central
 25 bore 48. A flange 49 extends around the outer surface of the element 45. This flange 49 is adapted to rest upon the top of the tube 40 to form a lower stop to limit the downward movement of the element. The micro-switch
 30 51 is carried by a bracket 50 adjustably mounted on the tube 40 and having a control wire 52 ending in a loop 53 which extends loosely around the element 45 and rests upon the upper surface of the flange 49. The opera-
 35 tion of this embodiment is similar to that of Figures 1 and 2 described above.

Our copending British Patent Application No. 9479/68 (Serial No 1219505) describes a method of and apparatus for stuffer crimp-
 40 ing in which the core level is sensed by a sensing device disposed partly within and partly outside the chamber. The present invention thus provides a modification of that method and apparatus and accordingly this applica-
 45 tion is for a Patent of addition to the patent granted on the said copending Application No. 9479/68 Serial No 1219505.

WHAT WE CLAIM IS:—

1. A stuffer crimper according to any one
 50 of the claims of patent No. 1,219,505 wherein the sensing device surface means are disposed entirely within the crimping chamber.

2. A stuffer crimper according to claim 1,
 55 in which the lower part of said sensing device carries said surface means which are cone shaped and has a diameter suited to span the upper end of said core.

3. A stuffer crimper according to claim 2,
 60 in which said crimping chamber is circular in cross section and the chamber upper portion

in which said sensing element slides has a dia-
 meter greater than the lower portion of said
 chamber, said cone shaped surface means be-
 ing disposed around a bore having a diameter
 at its lower portion at least equal to the dia-
 meter of the lower portion of said chamber. 65

4. A stuffer crimper according to claim 3,
 wherein said sensing device carries a flange
 adapted to seat against the upper end of said
 chamber to limit the downward movement
 thereof and wherein the crimper includes a
 core control means having an actuating ele-
 ment resting upon and actuated by said flange
 as the sensing element rises and falls. 70

5. A stuffer crimper according to claim 1,
 75 wherein the upper portion of said sensing de-
 vice carries said surface means which is cone
 shaped so the core is confined within the lower
 portion of the sensing device but has its top
 end supporting the cone shaped surface means. 80

6. A stuffer crimper according to claim 5,
 wherein said sensing device is disposed entirely
 within said chamber and is provided with a
 pair of diametrically outwardly extending pins
 sliding in slots which extend longitudinally of
 said chamber. 85

7. A stuffer crimper according to claim 6,
 and including core control means having an
 arm resting on said pins.

8. A stuffer crimper according to claim 4
 90 or 7, wherein said core control means is effec-
 tive to control the extent of said core by vary-
 ing the rate of discharge of yarn from the
 chamber.

9. A stuffer crimper according to claim 4 or
 95 7, wherein said core control means controls
 the extent of said core by varying the rate of
 feed of yarn to said chamber.

10. A stuffer crimper substantially as herein-
 before described with reference to, and as illus-
 trated in, Figures 1 and 2 of the accompany-
 ing drawing. 100

11. A stuffer crimper substantially as herein-
 before described with reference to, and as
 illustrated in, Figure 3 of the accompanying
 drawing. 105

12. A method of crimping yarn comprising
 feeding yarn to a stuffer crimper as claimed
 in any one of claims 1 to 11, causing the yarn
 to be folded against a core of yarn already in
 the chamber, sensing the extent of the core of
 crimped yarn by means of the slidable sensing
 device and withdrawing the yarn from the
 leading end of said core past the sensing de-
 vice. 115

13. A method of crimping yarn, such
 method being substantially as hereinbefore
 described.

14. Yarn crimped by the method of claim
 12 or 13, or using the apparatus of claims 1
 to 11. 120



the top of the core and rests around rather than on the upper end of the core which will then be confined within the coned interior of the element. In such an embodiment the tube 20 and the sensing element will together confine the core and serve as a telescopic crimping chamber.

It is to be understood that the micro-switch 31 may be connected to control the rate of operation of the feed rolls (not shown) or a take-up winder (not shown), so as to maintain the top of the core at a substantially constant level within the chamber.

The embodiment of Figure 3 is generally similar to that of Figures 1 and 2 except that the sensing element 45 is somewhat longer and extends above the top of the crimping chamber or tube 40. The tube 40 is formed with lower and upper bores 41 and 42 meeting at a shoulder 43 and the sensing element 45 has a cylindrical outer surface 46 extending upwardly above the top of the tube 40. The sensing element 45 is formed with a lower coned inner surface 47 terminating in a central bore 48. A flange 49 extends around the outer surface of the element 45. This flange 49 is adapted to rest upon the top of the tube 40 to form a lower stop to limit the downward movement of the element. The micro-switch 51 is carried by a bracket 50 adjustably mounted on the tube 40 and having a control wire 52 ending in a loop 53 which extends loosely around the element 45 and rests upon the upper surface of the flange 49. The operation of this embodiment is similar to that of Figures 1 and 2 described above.

Our copending British Patent Application No. 9479/68 (Serial No 1219505) describes a method of and apparatus for stuffer crimping in which the core level is sensed by a sensing device disposed partly within and partly outside the chamber. The present invention thus provides a modification of that method and apparatus and accordingly this application is for a Patent of addition to the patent granted on the said copending Application No. 9479/68 Serial No 1219505.

WHAT WE CLAIM IS:—

1. A stuffer crimper according to any one of the claims of patent No. 1,219,505 wherein the sensing device surface means are disposed entirely within the crimping chamber.

2. A stuffer crimper according to claim 1, in which the lower part of said sensing device carries said surface means which are cone shaped and has a diameter suited to span the upper end of said core.

3. A stuffer crimper according to claim 2, in which said crimping chamber is circular in cross section and the chamber upper portion

in which said sensing element slides has a diameter greater than the lower portion of said chamber, said cone shaped surface means being disposed around a bore having a diameter at its lower portion at least equal to the diameter of the lower portion of said chamber.

4. A stuffer crimper according to claim 3, wherein said sensing device carries a flange adapted to seat against the upper end of said chamber to limit the downward movement thereof and wherein the crimper includes a core control means having an actuating element resting upon and actuated by said flange as the sensing element rises and falls.

5. A stuffer crimper according to claim 1, wherein the upper portion of said sensing device carries said surface means which is cone shaped so the core is confined within the lower portion of the sensing device but has its top end supporting the cone shaped surface means.

6. A stuffer crimper according to claim 5, wherein said sensing device is disposed entirely within said chamber and is provided with a pair of diametrically outwardly extending pins sliding in slots which extend longitudinally of said chamber.

7. A stuffer crimper according to claim 6, and including core control means having an arm resting on said pins.

8. A stuffer crimper according to claim 4 or 7, wherein said core control means is effective to control the extent of said core by varying the rate of discharge of yarn from the chamber.

9. A stuffer crimper according to claim 4 or 7, wherein said core control means controls the extent of said core by varying the rate of feed of yarn to said chamber.

10. A stuffer crimper substantially as hereinbefore described with reference to, and as illustrated in, Figures 1 and 2 of the accompanying drawing.

11. A stuffer crimper substantially as hereinbefore described with reference to, and as illustrated in, Figure 3 of the accompanying drawing.

12. A method of crimping yarn comprising feeding yarn to a stuffer crimper as claimed in any one of claims 1 to 11, causing the yarn to be folded against a core of yarn already in the chamber, sensing the extent of the core of crimped yarn by means of the slidable sensing device and withdrawing the yarn from the leading end of said core past the sensing device.

13. A method of crimping yarn, such method being substantially as hereinbefore described.

14. Yarn crimped by the method of claim 12 or 13, or using the apparatus of claims 1 to 11.

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