

PATENT SPECIFICATION

(11) 1208 187

DRAWINGS ATTACHED

- (21) Application No. 52635/68 (22) Filed 6 Nov. 1968
 (31) Convention Application No. 700 268 (32) Filed 24 Jan. 1968 in
 (33) United States of America (US)
 (45) Complete Specification published 7 Oct. 1970
 (51) International Classification F 16 c 23/00
 (52) Index at acceptance

F2A 7D1
 D1F 40A1 40AY 40Y



(54) ADJUSTABLE ROLL SUPPORT

(71) We, JOSEPH BANCROFT & SONS CO., a corporation organized and existing under the laws of the State of Delaware, United States of America, of Rockford, Wilmington 99, Delaware, 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 an adjustable roll support, and more especially to an adjustable roll support for the feed rolls of a stuffer crimper.

In the production of feed rolls for use on stuffer crimpers, it is very difficult to maintain the close tolerances of the mating surfaces of the feed rolls necessary to make them satisfactory for stuffer crimping yarn uniformly. Many times a view of the longitudinal cross section of the feed rolls will show the feed rolls to have a tapered look. Moreover, any slight eccentricity in the holes in the feed roll shaft bearings will also tend to effect the parallel alignment of the feed rolls. In the case of cantilever mounted shaft type feed rolls, feed roll pressures used in stuffer crimping may spring the shafts and cause misalignment of the feed roll surfaces.

For example, it has been discovered in stuffer crimping 1040 denier 68 filament nylon 66 yarn in a stuffer crimper having 2½" diameter feed rolls of 3" width where the yarn is reciprocated across the feed roll surfaces while it is being fed into the stuffer crimping chamber that an error as small as 0.0005 in. in the parallel alignment of the feed rolls in the horizontal plane will make it difficult to crimp commercially acceptable uniformly crimped yarn.

According to the present invention there is provided an adjustable support for a roll comprising a shaft by which the roll is supported, a member carrying a bushing in which the shaft is journaled, the bushing having a cylindrical outer periphery mounted in the member, and a cylindrical inner bearing surface eccentric with respect to the said outer

periphery, the shaft having an end bearing portion eccentric with respect to the axis of the shaft, the end portion being seated in the inner bearing surface of the bushing, the bushing and shaft being independently adjustable angularly for varying the position of the axis of the shaft with respect to the center of the bushing the roll being journaled in a bracket and the bracket being mounted on the shaft for swinging movement about the axis of the shaft, and means for fixing the bracket to the shaft in various adjusted positions of the shaft.

In a preferred form of the invention, as later described in detail, the roll support is used for supporting one end of a feed roll of a stuffer crimper, the other end of the feed roll being mounted for rotation in a concentric bushing. The other roll of the pair of feed rolls is mounted for rotation in fixed bushings. The roll support provides a double eccentric by means of which the axis of the shaft can be adjusted to any desired angle within the range of movement of the eccentrics so as to bring the contacting surfaces of the rolls into parallelism in both the horizontal plane and in the vertical plane. This is to be distinguished from a single eccentric mounting which would permit movement of the axis of the shaft in a circular path only.

An illustrative embodiment of the invention will now be described with reference to the accompanying drawings, in which:—

Figure 1 is a partial front elevation of one form of stuffer crimper;

Figure 2 is a vertical section taken on the line 2—2 of Figure 1 showing the eccentric bushings;

Figures 3, 4 and 5 are diagrams illustrating three different adjusted positions of the parts; and

Figures 3a, 4a and 5a are diagrams illustrating the different angular positions of the axes of the shaft produced by the adjustments of Figures 3, 4 and 5 respectively.

Referring now to the drawings in more detail the stuffer crimper there shown is of the general type described in more detail in

United States Patent Specification No. 2,734,251. Such a stuffer crimper includes a pair of feed rolls disposed to feed a yarn into the lower end of a stuffer crimper chamber to be folded over and crimped against a mass of previously crimped yarn held compacted in the chamber. The present drawings show only the details of such a stuffer crimper as is necessary for an understanding of the present invention.

More specifically, the drawings show a housing 10 forming a crimping chamber mounted in a support block 11. A pair of feed rolls 12 and 13 are disposed below the housing 10 in a position to feed a yarn 14 into the crimping chamber.

The feed roll 12 is mounted on a shaft 15 which is journaled in bushings 16 in a bracket 17 carried by the block 11. The feed roll 13 is mounted on a shaft 18 journaled in bushings 19 in a bracket 20 which is mounted on a shaft 21.

The shaft 21 is mounted concentrically at one end in a bore 22 in a flange 24 of the block 11. At its other end the shaft 21 is reduced in diameter to form a bearing area 25 which is eccentric with respect to the axis of the shaft 21. This bearing area 25 is journaled in an eccentric bearing surface 26 of a bushing 27 having an outer periphery 28 which is mounted for rotational adjustment in a flange 29 carried by the block 11. The eccentricity of the bearing surface of the bushing 27 is the same as the eccentricity of the bearing area 25 of the shaft 21 with respect to the axis of the shaft 21.

The feed roll 13 is held in feeding engagement with the yarn 14 by a cord 32 one end of which is secured to the bracket 17 and which extends around a roll 33, on the bracket 20 and returns over a roll 34 on the bracket 17 and carries a weight, not shown, by means of which the rolls are held in predetermined pressure engagement with the yarn. The rolls are geared together by gears 35 and 36 for operating at the same peripheral speeds and are driven by suitable means (not shown).

The bushing 27 is provided with a flange 46 which has a series of marks 40 located thereon to facilitate adjustment and resetting further, an adjusting pin 41 may be provided for insertion in suitable holes in the bushing flange 46 for manual adjustment of the bushing. The flanged portion 46 of bushing 27 is clamped against the outer surface of flange 29 by means of a clamp element 44 held in position by a screw 45. The shaft 21 may be provided with a screw driver slot 42 in its exposed end for adjustment and may be secured to the bracket 20 in the set position by set screws 43.

In operation, if the various parts are correctly aligned and the surfaces of the feed rolls are accurately ground, the contacting surfaces of the rolls would be in exact parallelism

when the axis of the shaft 21 coincides with the axis of the outer peripheries of the bore 22 and bushing 27, as shown in Figure 4. If any nonparallelism should develop, it can be readily corrected by adjusting both the position of the bushing 27 in the flange 29 and the position of the shaft 21 in the bushing 27.

Figures 3, 4 and 5 illustrate three possible adjustments of the eccentric bushing 27 and of the shaft 21 in the bushing. In Figure 4 the bushing 27 is set so that the centre B of the eccentric bearing surface is directly below the centre A of the outer peripheral surface of the bushing, and the shaft is set so that its centre C is directly above the centre B of its eccentric bearing portion 25. The point C thus coincides with the point A and the shaft is centred with respect to the outer peripheral surface of the bushing 27. Since the other end of the shaft is centred in the bore 22, the axis of the shaft coincides with the axis of the outer peripheries of the bore and bushing. This position of the shaft is indicated in Figure 4a wherein T represents the centre of the bore 22 and A the centre of the outer periphery of bushing 27, and C the axis of the shaft 21.

In the diagram of Figure 3 the bushing 27 has been rotated clockwise through an angle of 90 degrees as indicated by the arrow B' to bring the point B into horizontal alignment with the point A and the shaft 21 has been rotated about the point B by 180 degrees in a counterclockwise direction as indicated by the arrow C' to bring the point C into horizontal alignment with the points A and B. This produces the maximum range of adjustment of the point C to the left side of the point A. Figure 3a illustrates the angular shifting of the axis of the shaft 21 produced by this adjustment. The position of the shaft 21 in the bore 22 does not change. Hence, the point D remains fixed, and the line DA represents the axis of the outer periphery of the bushing 27, and the axis of the shaft 21 has been shifted to the line DC.

Similarly, in Figure 5 the bushing 27 has been rotated counter clockwise by 90 degrees as indicated by the arrow B' and the shaft 21 has been rotated clockwise about point B by 180 degrees as indicated by the arrow C' to bring the points A, B and C into horizontal alignment, with the point C shifted by the maximum distance to the right. The axis of the shaft 21 has been shifted from the line DA to the line DC as shown in Figure 5a.

In the embodiment shown, the axis of the feed roll 13 remains parallel to the axis of the shaft 21 whether the shaft 21 supports the bracket 20 or supports the feed roll directly. Hence the line DC can be considered to represent the axis of the feed roll 13. The axis of the feed roll 12 is fixed and would

be parallel to the line DA due to the construction of the machine. It is thus evident that the respective axes of the feed rolls can be angularly adjusted between the positions illustrated in Figures 3a and 5a in order to compensate for any irregularity in grinding of the feed roll surfaces or any mechanical displacement of the parts due to wear or distortion.

It is to be understood that the range of adjustment has been greatly exaggerated in the drawings and in practice would be of the order of a few thousandths of an inch. It is to be noted that the shaft 21 turns with the bracket 20 to allow the feed roll 13 to vary its clearance to accommodate variations in yarn thickness. This angle of change, however, is so minute that its effect on the parallelism of the roll surfaces is negligible. If desired, the shaft 21 can be fixed in the bushing 27 and the bracket 20 journaled to rotate therearound although this refinement is usually unnecessary.

The fit of the shaft in the bore 22 usually provides for sufficient angular movement to accommodate the above described adjustment.

The adjustment for parallelism has been described as applied to the shaft 21. Obviously, the double eccentric mounting could be applied to the shafts carrying the feed rolls or either of them instead of the shaft 21, if found desirable in any particular instance. Also, a similar bushing may be mounted in the bore 22 to provide adjustment of both ends of the shaft 21, or the shaft may be mounted in a single bushing having a suitable axial length.

WHAT WE CLAIM IS:—

1. An adjustable support for a roll comprising a shaft by which the roll is supported, a member carrying a bushing in which the shaft is journaled, the bushing having a cylindrical outer periphery mounted in the member, and a cylindrical inner bearing surface eccentric with respect to the said outer periphery, the shaft having an end bearing portion eccentric with respect to the axis of the shaft, the end portion being seated in the inner bearing surface of the bushing, the bushing and shaft

being independently adjustable angularly for varying the position of the axis of the shaft with respect to the center of the bushing, the roll being journaled in a bracket and the bracket being mounted on the shaft for swinging movement about the axis of the shaft, and means for fixing the bracket to the shaft in various adjusted positions of the shaft.

2. An adjustable roll support as claimed in claim 1 in which the eccentricities of the bushing and of the shaft are identical whereby in one adjusted position the axis of the shaft is concentric with the outer surface of said bushing.

3. An adjustable roll support as claimed in claim 1 or 2 which includes a second roll and bearing means positioning the second roll to contact the surface of the first roll to form a bite therewith, the rolls being adjustable to adjust the parallelism of the axes of the rolls.

4. An adjustable roll support as claimed in any one of the preceding claims in which the shaft is journaled in a pair of spaced bearings in the support, one of the bearings having a fixed axis, and in which the bushing constitutes the other of the bearings, whereby the adjustment shifts angularly the axis of the shaft.

5. An adjustable roll support constructed and arranged substantially as described herein with reference to and as shown by the accompanying drawings.

6. A stuffer crimper having a pair of feed rolls of which at least one end of one of the rolls is supported by a roll support in accordance with any preceding claim.

7. A stuffer crimper as claimed in claim 7 in combination with a roll support as claimed in claim 3, with the crimping chamber of the stuffer crimper disposed to register with the bite of the rolls for receiving a yarn therefrom.

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being independently adjustable angularly for varying the position of the axis of the shaft with respect to the center of the bushing, the roll being journaled in a bracket and the bracket being mounted on the shaft for swinging movement about the axis of the shaft, and means for fixing the bracket to the shaft in various adjusted positions of the shaft.

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Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1970.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.



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