Feb. 4, 1964 W. H. HILLS 3,120,048

CRIMPING APPARATUS

Filed April 24, 1961 2 Sheets-Sheet 1

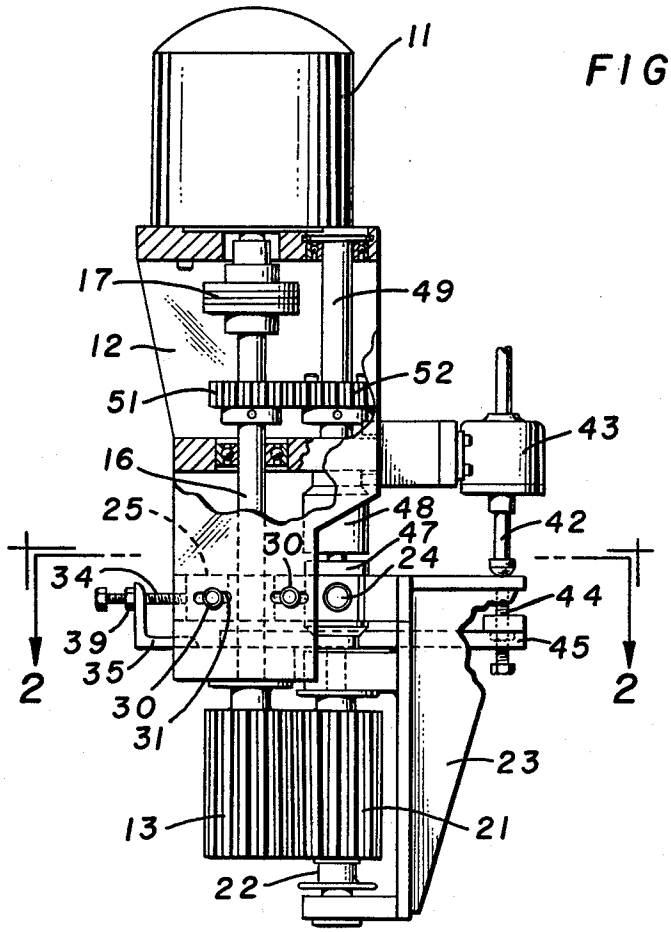


FIG. 1.

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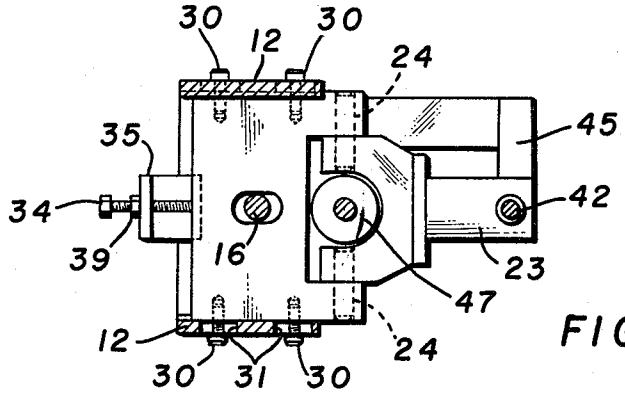


FIG. 2.

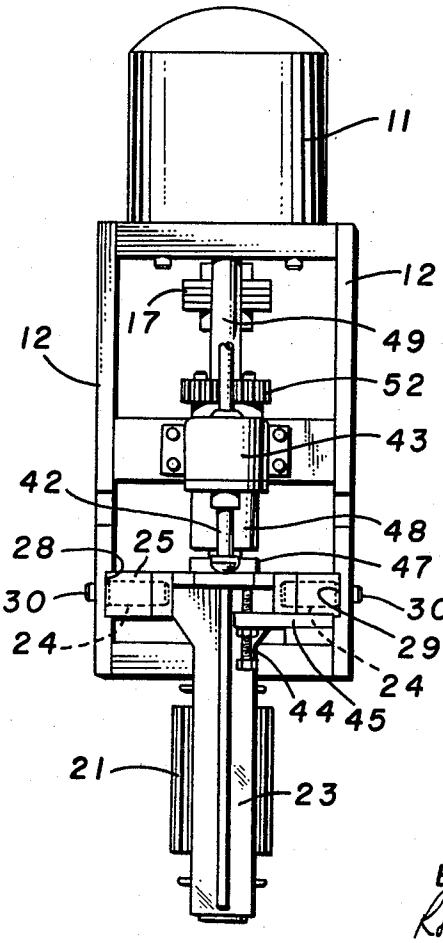


FIG. 3.

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# CRIMPING APPARATUS

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This invention relates to crimping apparatus and more particularly to apparatus having adjustable gears for crimping bundles of filaments.

In a filament crimping operation the alignment of the crimping gears has a great deal to do with the appearance of the finished product. For that reason it is important that crimping gears be properly aligned. Conventional crimpers provide for movement of one crimping gear away from the other but do not provide for alignment of the axis of one gear relative to the other gear. In some operations it may be desirable to operate the crimping gears with the axes parallel while in other operations it may be more desirable to operate the crimping gears with the axes at an angle to each other. The reason for the latter is that in some cases where a filament or yarn is wrapped several times around a crimping gear and a spaced roll it is desirable that the successive wraps be made under decreasing tension. By adjustnig the angle between the axes of the crimping gears, the degree of mesh will vary along the gears so that a first wrap of the yarn may pass between the gears at a point of maximum mesh and successive wraps will pass between the gears at points of decreasing mesh. Naturally, the tension in the yarn or filament bundle will vary with the degree or amount of mesh, the degree of mesh being the amount of overlap between the addendum circles of the gears. With this in mind, one of the objects of this invention is to provide a novel and improved crimping apparatus.

Another object of this invention is to provide a crimping apparatus wherein the position of one crimping gear may be adjusted relative to the other crimping gear.

A further object of this invention is to provide an apparatus for crimping a bundle of filaments wherein the distance between the axes of the crimping gears may be adjusted.

Still another object of this invention is to provide a crimping apparatus wherein the angle between the axes of the crimping gears may be adjusted.

A still further object of this invention is to provide a crimping apparatus wherein the position of one crimping gear relative to the other may be adjusted without a major overhaul and reconstruction of the apparatus.

Still another object of this invention is to provide a crimping apparatus wherein the angle and distance between the axes of a pair of crimping gears can be adjusted.

One embodiment of the invention contemplates a crimping apparatus wherein a first crimping gear is rotatably supported on a frame while a second crimping gear is carried by a yoke which is pivoted to a plate slidably mounted on a frame. Movement of the plate on the frame adjusts the distance between the crimping gears while movement of the yoke on the plate adjusts the angle between the axes of the gears. This provides for an accurate and easy adjustment of the position of one crimping gear relative to the other.

Other objects and advantages of the invention will become apparent when the following detailed description is read in conjunction with the appended drawings, in which

FIGURE 1 is a top view of the apparatus showing the manner in which an adjustable gear is supported.

FIGURE 2 is a cross-sectional view taken along line 2—2 of FIGURE 1 showing the arrangement for supporting the plate on the frame and the yoke on the plate, and

FIGURE 3 is a side view of the device showing an air cylinder which urges the yoke to carry one of the crimping gears into cooperation with the other.



Referring now in detail to the drawings, a motor 11 mounted on a frame 12 is shown driving a first crimping gear 13 through a shaft 16 and a coupling 17. A second crimping gear 21 mounted on a shaft 22 cooperates with the first crimping gear 13 to crimp a yarn or bundle of filaments passed therebetween.

To provide for adjustment of the second crimping gear 21 relative to the first gear 13, the shaft 22 is supported by a yoke 23 which is pivotally attached by pins 24 to a plate 25 which is slidably mounted in slots 28 and 29 in the frame 12. Set screws 30 extend through slots 31 in the frame 12 and are threaded into the plate 25 to lock the plate in the desired position. A set screw 34 threaded through a bracket 35 attached to the frame 12 and abutting the end of the plate 25 may be turned to move the plate 25 in the slots 28 and 29, a lock nut 39 being provided for locking the set screw 34 in place. It can be seen that movement of the plate 25 in the slots 28 and 29 will move the shaft 22 and the second crimping gear 21 toward or away from the first crimping gear 13.

The yoke 23 provides for an angular adjustment of the second crimping gear 21. A set screw 44 threaded through a bar 45 secured to the frame 12 engages a portion of the yoke 23 to limit pivotal or angular movement of the gear 21 toward the gear 13. An air cylinder 43 mounted on the frame 12 is provided with a plunger 42 which engages and urges the yoke 23 against the set screw 44. From the above it will be obvious that adjustment of the set screw 34 will adjust the spacing between the crimping gears 13 and 21 and adjustment of the set screw 44 will adjust the angle between the axes of the crimping gears.

The second crimping gear is driven through a pair of universal joints 47 and 48, the universal joint 47 being connected to the shaft 22 and the universal joint 48 being connected to a shaft 49 which is driven from the shaft 16 by means of gears 51 and 52. The use of the universal joints 47 and 48 allows the shaft 22 carrying the second crimping gear 21 to be moved laterally as well as to be pivoted.

In operation of the device, a yarn or bundle of filaments to be crimped is passed between the crimping gears 13 and 21. To provide the desired spacing between these crimping gears the set screws 30 are loosened and the set screw 34 is turned to position the plate 25 to give the desired spacing between the gears 13 and 21. To obtain a desired angle between the axes of the crimping gears 13 and 21 the set screw 44 is adjusted to pivot the yoke 23 about the pins 24. The plunger 42 of the air cylinder 43 insures that yoke will be held in the adjusted position. The air cylinder 43 also serves as a safety feature in the event that a knot or jumble of yarn passes between the rolls 13 and 21. If this occurs the resilience of the air in the cylinder 43 will permit the yoke 23 to push the plunger back into the air cylinder to thereby separate the crimping gears and permit the knot to pass therebetween.

It is to be understood that the embodiment of the invention disclosed herein is merely illustrative of the invention and that this embodiment may be amended or modified and that numerous other embodiments may be contemplated without departing from the spirit and scope of the invention.

What is claimed is:

1. An apparatus for crimping a strand, comprising a frame, a first crimping gear mounted on the frame, a yoke mounted on the frame for pivotal and sliding movement, a second crimping gear mounted on the yoke, means on the frame for slidably adjusting the position of the

yoke to adjust the spacing between the gears, resilient means engaging said yoke to resiliently bias said second gear into a position to define a preselected minimum angle between the axes of said gears, and means for driving said gears.

2. An apparatus for crimping a strand, comprising a frame, a first crimping gear mounted on the frame, a plate slidably mounted on the frame, a yoke pivotally attached to the plate, a second crimping gear carried by the yoke for cooperating with the first gear to crimp the strand, resilient means engaging said yoke to bias said second gear into a position to define a preselected minimum angle between the axes of said gears, and means for rotating the crimping gears.

3. An apparatus for crimping a yarn, comprising a frame, a first crimping gear mounted on the frame, a plate slidably mounted on the frame, a yoke pivotally attached to the plate, a second crimping gear carried by the yoke, means for securing the plate in a preselected position, means on the frame for limiting pivotal movement of the yoke, resilient means on the frame for urging the yoke against the limiting means to resiliently hold the second crimping gear in operating position, and means for driving the crimping gears.

4. An apparatus for crimping a yarn, comprising a frame, a first crimping gear mounted on the frame, a plate slidably mounted on the frame for movement along a path normal to the axis of the first crimping gear, a yoke pivotally attached to the plate for movement toward or away from the first crimping gear, a second crimping gear mounted on the yoke, resilient means on the frame for resiliently urging the yoke to carry the second gear toward the first gear, means on the frame for limiting movement of the yoke toward the first gear, and means for rotating the crimping gears.

5. An apparatus for crimping a plurality of filaments, comprising a frame, a first shaft rotatably mounted on the frame, a first crimping gear secured to the first shaft, a plate slidably mounted on the frame for movement in a direction normal to the first shaft, a yoke pivotally attached to the plate for movement toward and away from the first crimping gear, a second shaft rotatably mounted on the yoke, a second crimping gear secured to the second shaft for cooperating with the first gear to crimp a plurality of filaments, a third shaft mounted on the frame at a fixed position, universal means interconnecting the second and third shafts, a pair of gears mounted on the first and third shafts and meshed with each other, means for rotating the first shaft, and means on the frame for positioning the yoke to adjust the position of the second crimping gear relative to the first gear.

6. An apparatus for crimping a bundle of filaments, comprising a frame, a first shaft mounted on the frame, a first crimping gear attached to the shaft, means on the frame for rotating the shaft to drive said first crimping gear, a plate mounted on the frame for movement in a direction normal to the first shaft, means on the frame for locking the plate in a desired position, a yoke pivotally attached to the plate, a second shaft rotatably mounted on the yoke, a second crimping gear attached to the second shaft for cooperating with the first gear to crimp a bundle of filaments passed therebetween, a third shaft mounted on the frame parallel to the first shaft and substantially coaxial with the second shaft, universal means interconnecting the second and third shafts for transmitting a rotative force from the third shaft to the second shaft, a pair of gears mounted on the first and third shafts and meshed with each other so as to cause the third shaft to be driven with the first shaft, and means on the frame for adjusting the position of the yoke on the plate.

7. A device for crimping a filament, comprising a frame, a first crimping element rotatably mounted on the frame, and a second crimping element rotatably mounted on the frame, said second element being mounted for pivotal movement about an axis so positioned that a plane perpendicular to said axis is substantially normal to a plane perpendicular to the axis of the first crimping element, resilient means operative to resiliently bias said second crimping element into a preselected position about said pivotal axis, said pivotal axis being movable on the frame.

8. A device for crimping a filament, comprising a frame, a first crimping element rotatably mounted on the frame, a first supporting member slidably mounted on the frame, a second supporting member pivotally mounted on said first supporting member, a second crimping element rotatably mounted on the second supporting member for cooperating with the first crimping element, resilient means engaging said second supporting member and operative to resiliently bias said second crimping element into a preselected position.

9. A device for crimping a filament, comprising a frame, a first crimping element rotatably mounted on the frame, a supporting member mounted on the frame for movement along a path lying in a plane normal to the axis of rotation of the first crimping element, a second supporting member mounted on the first supporting member for pivotal movement about an axis normal to said path, a second crimping element rotatably mounted on the second supporting member for cooperating with said first crimping element, and resilient means engaging said second supporting member and operative to resiliently bias said second crimping element into a preselected position.

10. A device for crimping a yarn, comprising a frame, a first crimping element rotatably mounted on the frame, a first support member mounted on the frame for movement along a path lying in a plane normal to the axis of rotation of the first crimping element, a second support member mounted on the first support member for pivotal movement about an axis normal to said path, means on the frame for holding the first support member in a predetermined position on the frame, a second crimping element rotatably mounted on the second support member, resilient means on the frame for engaging and resiliently urging said second support member in a direction to carry the second crimping element toward the first crimping element, and means on the frame for limiting movement of said second crimping element toward said first crimping element.

11. A device for crimping a yarn, comprising a frame, a first crimping element rotatably mounted on the frame, a plate mounted on the frame for translational movement in a direction normal to the axis of rotation of said first crimping element, a support member mounted on the plate for pivotal movement about an axis normal to said direction of translational movement, a second crimping element rotatably mounted on the support member for cooperation with the first crimping element, means on the frame for securing the plate in a predetermined position, and resilient means engaging said support member and operative to resiliently bias said second crimping element into a position to define a preselected minimum angle between said first and second crimping elements.

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