Sept. 20, 1971 C. R. CABELLO 3,605,222

VARIABLE FRICTION DRIVE FOR STUFFER CRIMPER

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FIG. 1

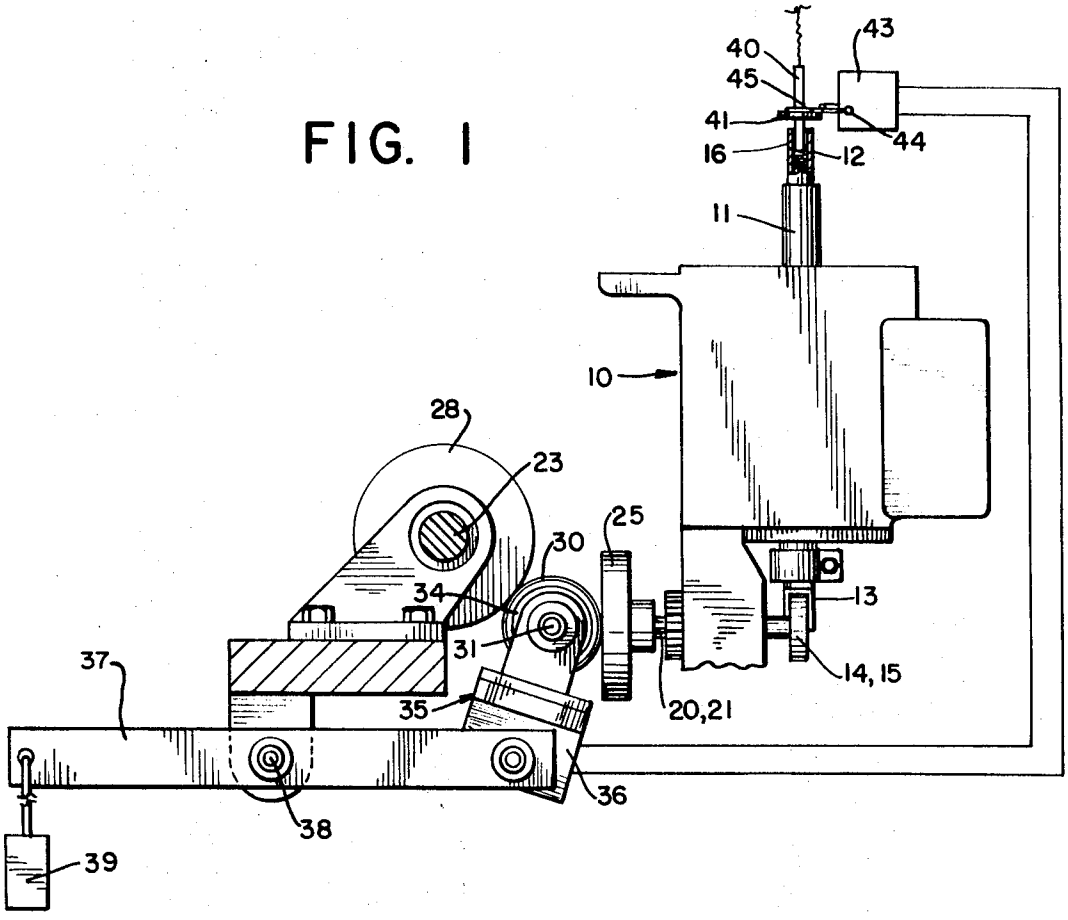

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FIG. 3

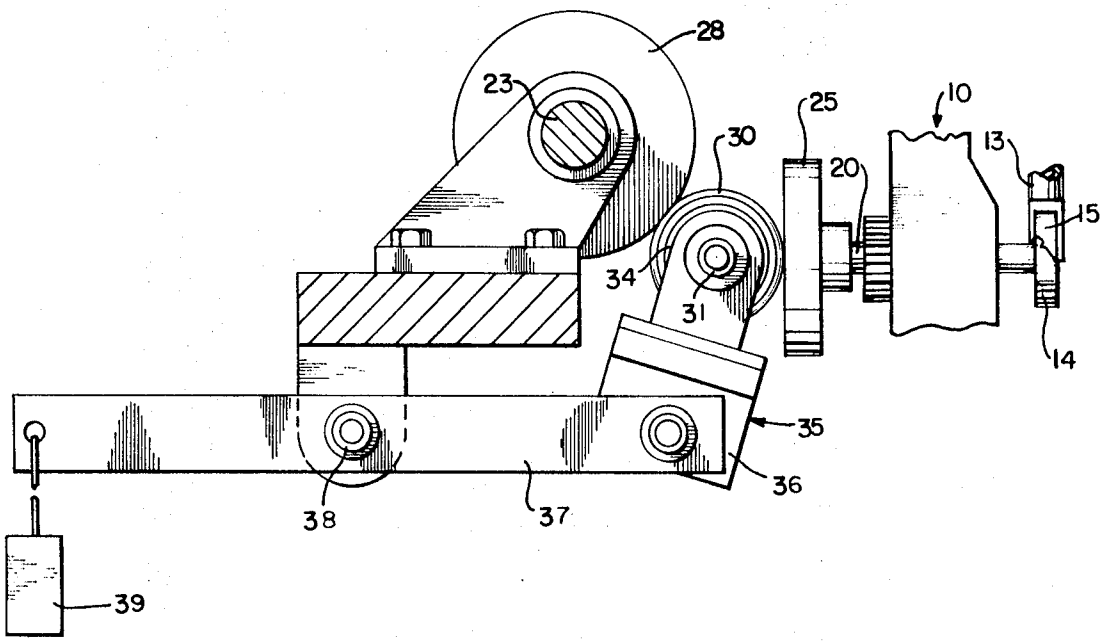

FIG. 2

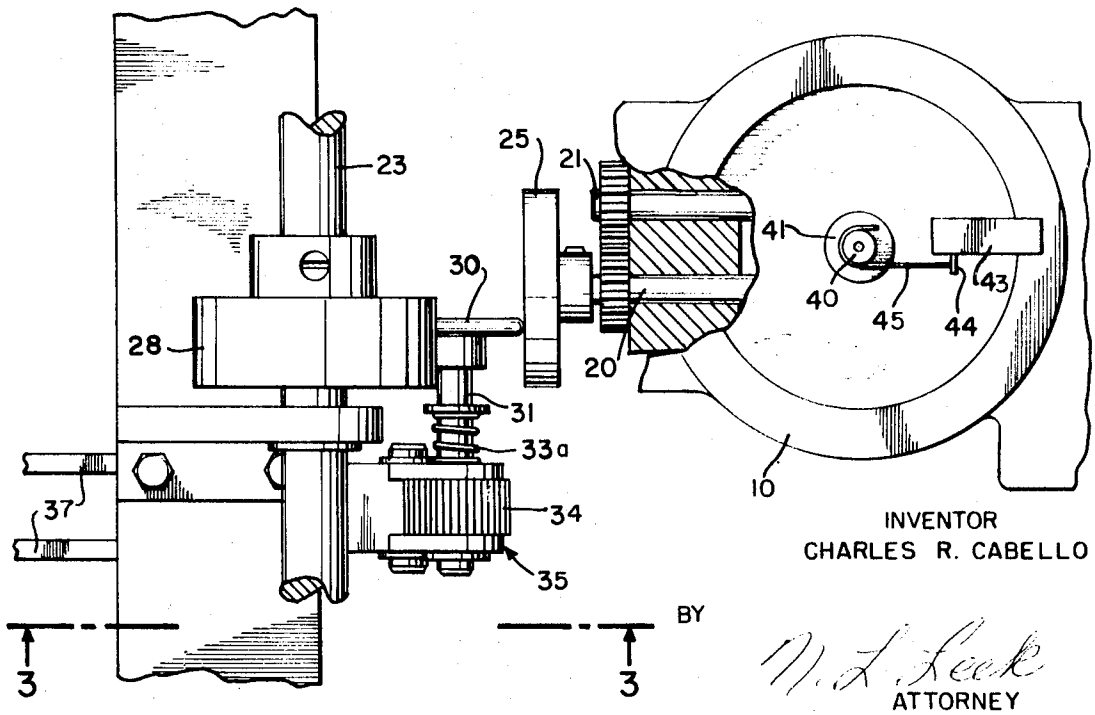

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FIG. 5

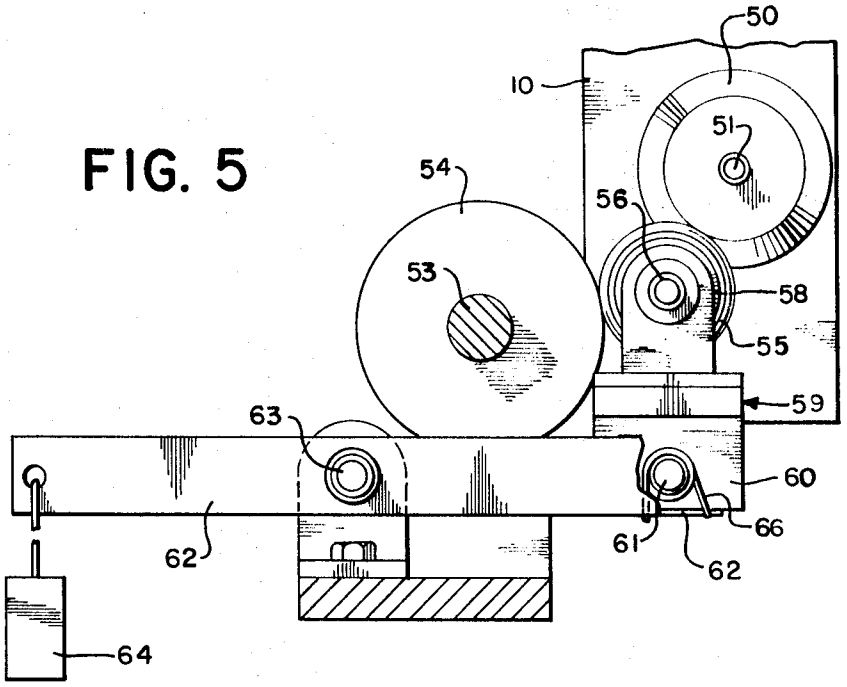

FIG. 6

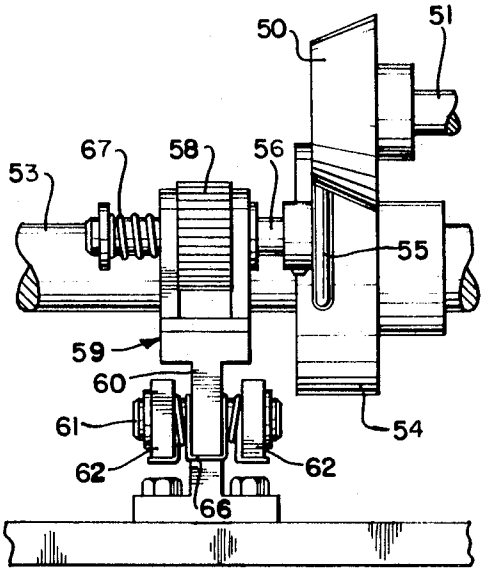

FIG. 4

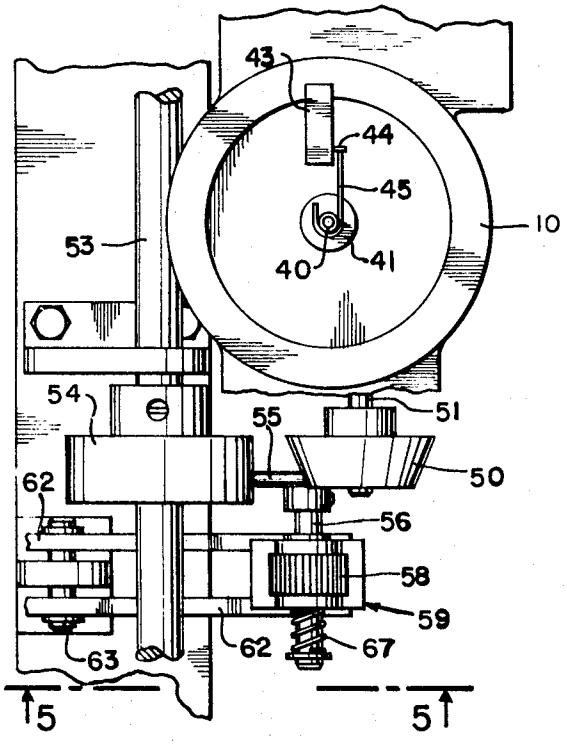

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FIG. 7

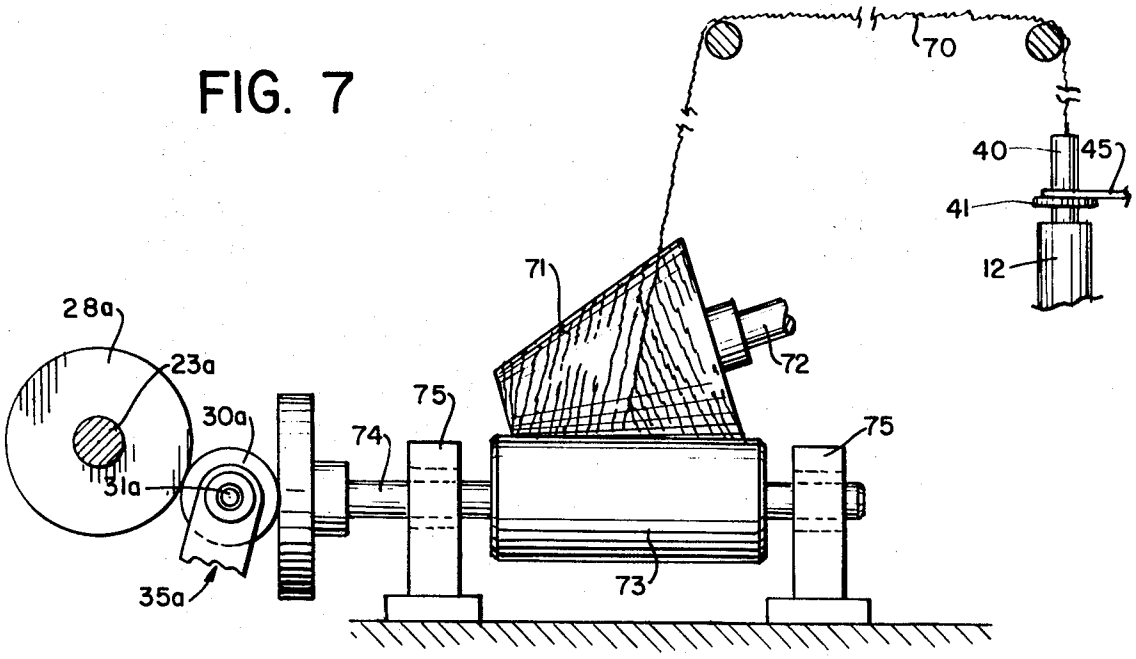
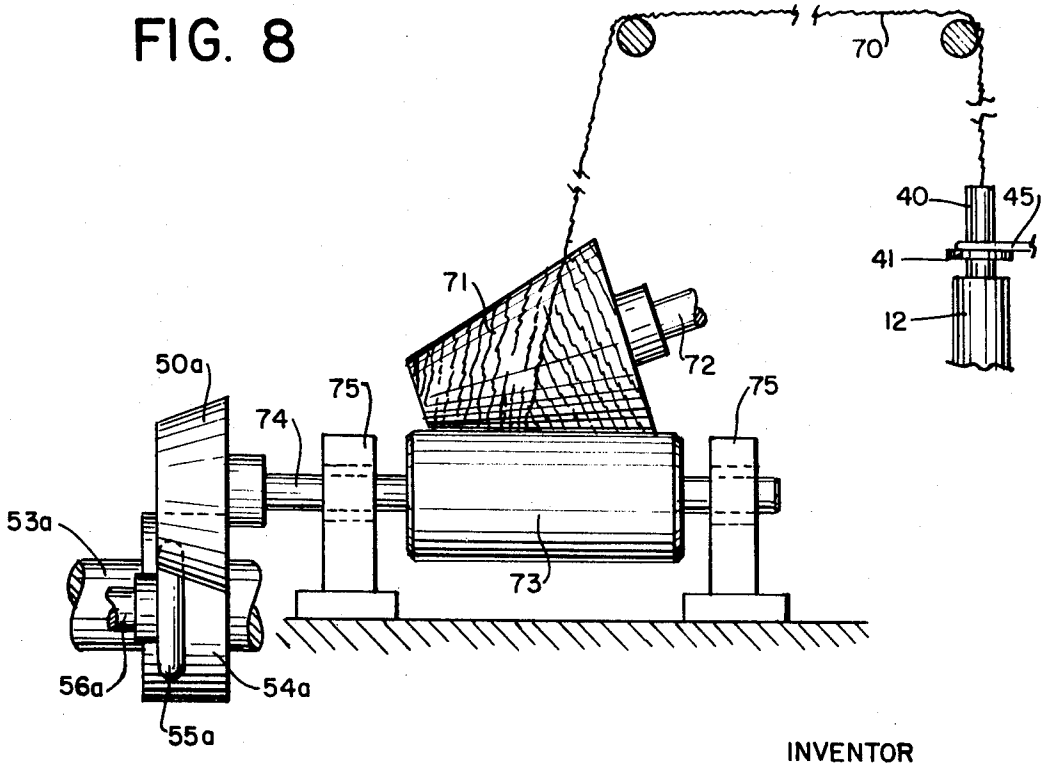


FIG. 8



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3,605,222

VARIABLE FRICTION DRIVE FOR STUFFER CRIMPER

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Int. Cl. D02g 1/12
U.S. Cl. 28—1.7 11 Claims

ABSTRACT OF THE DISCLOSURE

A variable friction drive for the feed rolls or the winder rolls of a stuffer crimper including a driving roll driven at a constant speed, a driven member mounted to drive said rolls and having areas of different radii, an idler member inter-connecting the driving roll and the driven member and shiftable to engage the driven member at areas of different radii for varying the drive ratio.

A switch actuated by a member that senses the level of the core of crimped yarn in the crimper is connected to shift the position of the idler member to vary the drive ratio so as to maintain the core at a uniform level in the crimper.

This invention relates to drive mechanism for the feed rolls or the winder rolls of a stuffer crimper and more particularly to a friction drive which may be adjustable for varying the rate of drive.

An object is to provide a mechanical drive of the above type having novel and improved features of construction.

Another object is to provide, such a drive which is dependable in operation.

Another object is to provide, in apparatus involving a plurality of crimping heads operated from a common drive shaft, means for effecting a positive and uniform control for the individual heads whereby the crimp levels in the resulting yarns in the respective heads are made more uniform.

Another object is to eliminate the use of individual drive belts which are subject to unpredictable variations in slippage and wear.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

The nature of the invention will be better understood from the following description taken in connection with the accompanying drawings in which specific embodiments have been set forth for purposes of illustration.

In the drawings:

FIG. 1 is an elevation of a stuffer crimper and drive mechanism embodying the present invention with parts in section for clarity;

FIG. 2 is a plan view of the apparatus of FIG. 1.

FIG. 3 is a section taken on the linet 3—3 of FIG. 2.

FIG. 4 is a plan view of a stuffer crimper illustrating a further embodiment of the invention;

FIG. 5 is a section taken on the line 5—5 of FIG. 4;

FIG. 6 is a elevation of the drive mechanism of FIGS. 4 and 5.

FIG. 7 is an elevation showing the variable speed drive of FIGS. 1 to 3 applied to the winder of a stuffer crimper; and

FIG. 8 is a similar view showing the drive of FIGS. 4 to 6 applied to the winder of a stuffer crimper.

Referring to the drawings more in detail a stuffer crimper is shown in FIGS. 1 to 3 having a housing **10** containing suitable heating means not shown and having a bore in which a sleeve **11** is secured. A tube **12** forming a crimping and setting chamber is disposed within the sleeve **11** and is provided with a saddle **13** registering with the nip of a pair of feed rolls **14** and **15** which are

adapted to feed yarn into the crimping chamber to be folded over and crimped against the core **16** of previously crimped yarn in said chamber.

The feed rolls **14** and **15** are mounted on shafts **20** and **21** which are geared together for operation in unison by suitable gears.

A driven disk **25** is mounted directly on the drive shaft **20** of the feed roll **14**. A driving roll **28** having an axial length at least equal to the radius of the disk **25** is mounted on a driven shaft **23** which may constitute a common drive shaft for a plurality of crimping heads. The heads are so arranged that the plane of the disc **25** is parallel to and spaced from the surface of the roll **28**.

An idler roll **30** is mounted on a shaft **31** the end of which is journalled in the core of a solenoid **34**. The solenoid **34** is mounted on a bracket **35** having a flange **36** which is pivoted to an arm **37**. This arm is pivoted at **38** and carries a weight **39** at its free end by which the bracket **36** is urged upwardly to hold the idler roll **30** in driving contact with the surfaces of the driving roll **28** and the disk **25**. The arrangement is such that when the solenoid is de-energized a spring **33***a* holds the idler roll **30** in an advanced position toward the center of the disk **25**. When the solenoid **34** is energized by closing of its contact by the slug due to a rise in the level of the core of crimped yarn in the crimping chamber, the idler roll **30** is retracted radially of the disk **25** so as to contact the same nearer its outer periphery and thus decrease the speed of the feed rolls **14** and **15**. When the level of the core of yarn falls sufficiently to open the contact the reverse action takes place to increase the speed of the feed rolls.

The crimped yarn is extracted from the end of the core **16** by a constant speed winder or other take-up device not shown. A slug **40** having a shoulder **41** rests on the end of the core **16** in the chamber **12** to rise and fall therewith. A microswitch **43** has a control shaft **44** which carries a feeler wire **45** which rests upon the shoulder **41** of the slug **40** to be actuated thereby. The microswitch **43** is connected to control the energization of the solenoid **34** as the level of the core **16** rises and falls.

In the embodiment of FIGS. 4 and 6 the drive is effected by means of a tapered roll. In this form a tapered roll **50** is mounted on the drive shaft **51** of one of the feed rolls. The drive shaft **53** carries a driving roll **54** which is disposed opposite but spaced from the tapered roll **50**. An idler roll **55** is mounted on a shaft **56** which is journalled in the core of a solenoid **58**. The solenoid is mounted on a bracket **59** having a flange **60** which is pivoted by a pin **61** to an arm **62**. The arm is pivoted at **63** and carries a weight **64** by which the bracket is urged upwardly to hold the idler roll **55** in driving contact with both the driving roll **54** and the tapered roll **50**. A spring **66** holds the bracket in proper position to maintain the rolls in contact. The idler roll **55** is advanced toward the smaller end of the tapered roll **50** by a spring **67** when the solenoid **58** is de-energized and is shifted toward the larger end of the tapered roll **50** when the solenoid **58** is energized.

The solenoid **58** is connected to be energized by the slug and the operation is otherwise the same as in the embodiment of FIGS. 1 to 3. It will be noted that in this embodiment the feed roll shafts extend parallel to the main drive shaft whereas, in the embodiment of FIGS. 1 to 3 the feed roll shafts extend normal to the main drive shaft. The arrangement used will depend upon the orientation of the heads in any particular installation.

In FIG. 7 the crimper tube **12**, slug **40** and feeler **45** are parts of a stuffer crimper as shown in FIGS. 1 to 3. Only the discharge end of the crimper is shown in FIG. 7. The other parts are similar to those above described.

In FIG. 7 the crimped yarn **70** is withdrawn from the discharge end of the tube **12** and, after passing over suitable guides, is fed to a package **71** carried on a spindle **72**. The package **71** rests upon and is driven by a drive roll **73** mounted on a shaft **74** journalled in brackets **75**.

The shaft **74** carries a disc **25***a* corresponding to the disc **25** of FIGS. 1 to 3. A common drive shaft **23***a*, which may extend past several winders, carries a drive roll **28***a* which drives an idler roll **30***a* mounted on a shaft **31***a* and carried on a bracket **35***a*. The idler roll **30***a* engages and drives the disc **25***a* and is shiftable radially of the disc in response to variations in the level of the core of crimped yarn in the tube **12** as sensed by the slug **40** which actuates the switch **43** as described above.

In this embodiment the crimper feed rolls are driven at a constant speed and the drive ratio between the drive shaft **23***a* and the disc **25***a* is varied in response to actuation of the switch **43** so as to vary the rate of the winder in a sense to maintain the top of the core in the tube **12** at a constant level.

In the embodiment of FIG. 8 the winder **71** and associated parts are similar to those of FIG. 7. In FIG. 8 the shaft **74** carries a tapered roll **50***a* which is driven by an idler roll **55***a* carried on a shaft **56***a* and driven by a roll **54***a* mounted on a shaft **53***a* which may constitute the common drive shaft for a plurality of winders.

The idler roll **55***a* is shifted axially of the tapered roll **50***a* in response to actuation of the switch **43** in a sense to maintain the top of the core of crimped yarn in the tube **12** at a substantially constant level.

In this embodiment, as in the embodiment of FIG. 7, the crimper feed rolls are driven at a constant speed and the rate of the winder is varied as required. It is to be understood, of course, that any combination of drives of the type shown in the various figures may be used in accordance with the requirements of any particular case. Further, the winders of FIGS. 7 and 8 could be replaced by the type of winders in which the package is driven by the spindle which carries it in which case the disc or tapered roll would be mounted directly on the spindle shaft.

Obviously the idler rolls could be eliminated and the driven members could be driven directly from the driving rolls which would then have to be keyed to the drive shaft for shifting back and forth in response to actuation of the switch **43** by the slug.

Further, the solenoid means for shifting the idler roll could be replaced by a reversible motor device or other similar mechanism.

What is claimed is:

1. In combination with a stuffer crimper having a crimping chamber, a roll disposed to control the quantity of yarn in said chamber, and a sensing member disposed to sense the level of the core of crimped yarn in said chamber, a driven element, a driven shaft carrying said roll and said element, a driving shaft, a driving element mounted on said driving shaft, means coupling said driving element to drive said driven element and control means actuated by said sensing member to vary the drive ratio between said elements so as to vary the rate of drive of said roll in the sense to maintain said core at a substantially uniform level.

2. The combination set forth in claim **1** in which one of said elements comprises a roll and said coupling means includes an idler roll interconnecting said driving element and said driven element, and said control means is connected to shift said idler roll along said elements.

3. The combination set forth in claim **2** in which said driven element is a disk mounted on said driven shaft and said idler roll is shifted radially thereof by said control means.

4. A combination as set forth in claim **3** in which said driven roll constitutes a feed roll adapted to feed said yarn for crimping into said chamber.

5. A combination as set forth in claim **3** in which the driven roll is connected to drive a winder package.

6. The combination set forth in claim **2** in which one of said elements is a tapered roll and said idler roll is shifted axially thereof by said control means.

7. A combination as set forth in claim **6** in which said driven roll constitutes a feed roll adapted to feed said yarn for crimping into said chamber.

8. A combination as set forth in claim **6** in which the driven roll is connected to drive a winder package.

9. The combination set forth in claim **2** in which said control means includes a solenoid having a spring return connected to shift said idler roll along the driven element in a sense to vary the drive ratio.

10. The combination set forth in claim **9** in which a switch actuated by said sensing member is connected to control the energization of said solenoid.

11. Apparatus as set forth in claim **10** in which said sensing member comprises a slug resting on said core, and a wire adapted to actuate said switch is actuated by said slug.

References Cited

UNITED STATES PATENTS

2,734,229	2/1956	Shattuck	28—1.7
3,341,911	9/1967	Smith	28—1.7
3,353,242	11/1967	Schrader	28—1.7

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