April 2, 1957 J. S. KELLEY 2,787,241

ADHESIVE APPLYING APPARATUS

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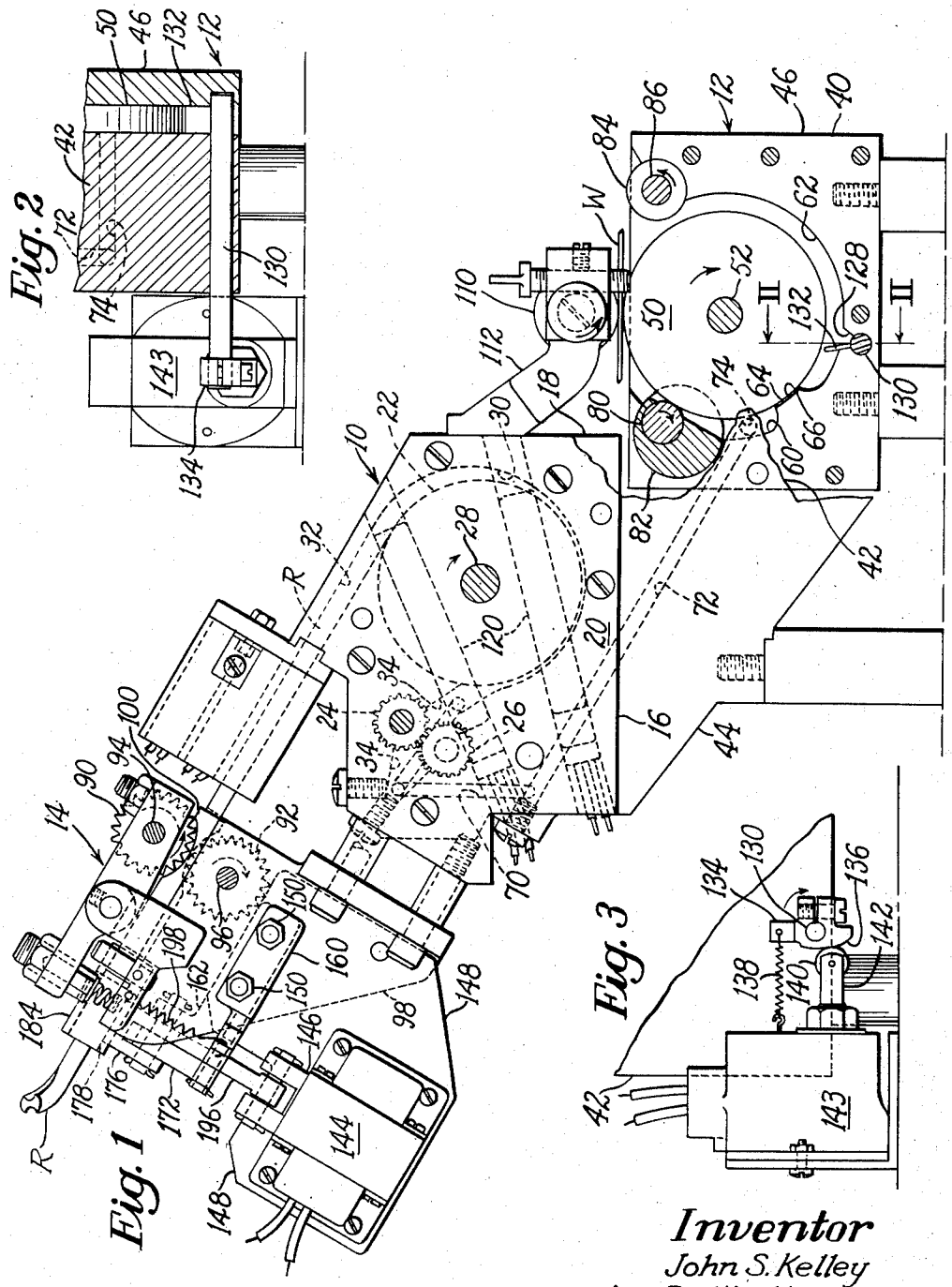

Fig. 1

Fig. 2

Fig. 3

Inventor
John S. Kelley
By his Attorney

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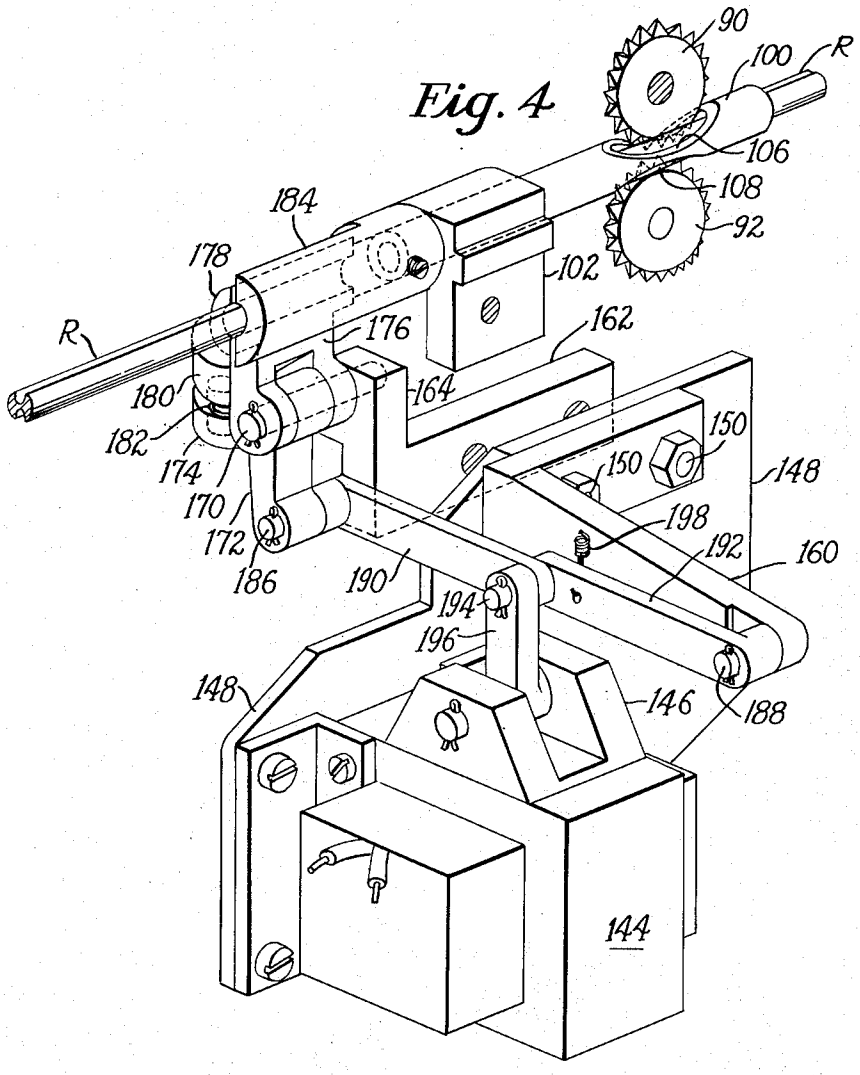
Fig. 4



Inventor
John S. Kelley
By his Attorney

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2,787,241

ADHESIVE APPLYING APPARATUS

John S. Kelley, Wenham, Mass., assignor to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey

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10 Claims. (Cl. 118—7)

This invention relates to adhesive applying apparatus and is herein illustrated as embodied in an adhesive applying apparatus of the type disclosed in an application for United States Letters Patent Serial No. 519,844, filed July 5, 1955, in the names of Herbert Johnson and George F. C. Burke. It will be understood, however, that in its broader aspects the invention is not limited to use in apparatus of this particular type or to the exact mechanical arrangement shown.

In adhesive applying apparatus of the mentioned type molten adhesive is supplied to an applying unit, including an applicator roll, by means of a melting unit in which adhesive in rod form, fed to the melting unit by means of a feeding device, is rendered molten and flowable. More specifically, the molten adhesive from the melting unit is supplied to a recess formed in a suitably heated casing which contains the applicator roll and adjacent to the periphery of the roll so as to apply a coating of adhesive on the periphery of the roll. During use, work pieces are fed past and in contact with the periphery of a portion of the applicator roll which projects outwardly beyond the casing, and the rate of feed of the rod adhesive into the melting unit and the rate of delivery of the molten adhesive to the applying unit are just sufficient to replenish the supply in the aforementioned recess as the adhesive therein is picked up by the applicator roll and applied to successive work pieces. However, when, as may frequently occur, the rate of application of adhesive to successive work pieces decreases as, for example, when the feeding of the work pieces is slowed down or halted, or if the thickness of the band of adhesive applied by the applicator roll is decreased, there will be a tendency for the above-mentioned recess to fill up entirely and eventually for the adhesive to overflow from the applicator roll casing.

A principal object of this invention is to provide a novel and improved adhesive applying apparatus wherein the aforementioned difficulty is wholly avoided. With this end in view, and in accordance with features of the invention, in the herein illustrated adhesive applying apparatus the heated casing in which the applicator roll is located is provided with two communicating recesses adjacent to the periphery of the applicator roll, to one of which recesses the molten adhesive is supplied, for example, by means such as a melting unit of the type shown in the above-mentioned application, together with means for interrupting the action of this supplying means. Located in the other of said recesses are means responsive to adhesive flowing into this other recess from the first-mentioned recess, and arranged to control the action of the means for interrupting the delivery of adhesive by the supplying means. More particularly, the means for supplying molten adhesive includes a melting chamber and mechanism for feeding a solid rod or strip of adhesive into this chamber, while the means for interrupting the action of the adhesive supplying means comprises an electromagnetic means for gripping the rod of adhesive thereby to prevent movement of the rod by the feeding means. Preferably, and as herein illustrated, the means for controlling the action of the adhesive supplying means includes a vane, rotatably mounted within the said other recess and adapted to be swung in a direction to close a switch thereby to energize the electromagnetic rod gripping means in response to adhesive flowing into that recess from the first-mentioned recess.

The above and other objects and features of the invention will appear in the following detailed description of the preferred embodiment thereof which is illustrated in the accompanying drawings, and will be pointed out in the appended claims.

In the drawings,

Fig. 1 is a view in side elevation, with certain parts broken away, of a cement applying apparatus embodying the features of this invention;

Fig. 2 is a view of a portion of the apparatus shown in Fig. 1 in vertical section substantially on line II—II of Fig. 1 and looking in the direction of the arrows;

Fig. 3 is a view in side elevation of certain parts which are broken away in Fig. 1; and

Fig. 4 is a perspective view of an enlarged scale of control mechanism associated with the apparatus shown in Fig. 1.

Referring to these drawings, and especially to Fig. 1 thereof, the cement applying apparatus therein disclosed comprises a melting unit **10**, an applying unit **12**, and a feeding device **14** which are generally of the same construction disclosed in the above-mentioned application to which reference may be made for details not herein described. The melting unit includes a casing **20** having a cover **16** and a recessed member **18** in which there is rotatably mounted a melting disk **22**, and a pump including gears **24** and **26**. The disk **22**, which is carried by a shaft **28**, is received within a recess **30** formed in the member **18** and having an inlet **32** and an outlet **34**, the aforementioned pump being located within the outlet as shown.

The applying unit includes a casing **40** having a cover **42** formed integrally with the recessed member **18** of the melting unit and joined thereto by means of an intermediate web **44** and a recessed member **46**. Rotatably mounted within the casing **40** is an applying roll **50** which is carried by a shaft **52** and which projects a short distance beyond the upper surface of the casing. The casing **46** is so shaped as to provide two recesses **60**, **62** adjacent to the periphery of the roll **50** and these recesses are in communication one with the other through a passage **64** formed between an arcuate surface **66** and the periphery of the roll. The recess **60** is connected to the outlet **34** of the melting device through passageways **70**, **72** and **74** (Figs. 1 and 2). Adhesive supplied to the recess **60** is applied on the periphery of the roll **50** and to a thickness which is determined by a doctor roll **80** which is rotatably mounted in a location adjacent to one end of the recess **50** in an adjusting bushing **82**. At one end of the recess **62**, where the roll **50** re-enters the casing **40**, a so-called string breaker roll **84**, carried by a shaft **86**, is mounted.

The feeding device **14** includes a pair of feed rolls **90**, **92** which are carried, respectively, by shafts **94**, **96** mounted in a supporting bracket indicated generally by the reference character **98**, this bracket being supported on the cover portion **16** of the casing **20**, as shown in Fig. 1. Associated with the feeding device is a guide tube **100** which is carried by a supporting member **102**, Fig. 4, this tube being cut away as indicated at **106**, **108** to expose a rod of adhesive R therein to the action of the feed rolls **90**, **92**. The melting disk **22**, pump gears **24**, **26**, applying roll **50**, doctor roll **80**, string breaker roll **84**, and the two feed rolls **90**, **92** are driven by mechanism including gearing which is not shown herein but which is similar to that disclosed in the aforementioned application. In this

manner, molten adhesive is continuously supplied to the recess 60 and applied to the periphery of the roll 50 to a thickness determined by the setting of the doctor roll 80, all as is explained in detail in the aforementioned application. The applying roll 50 is used to apply a stripe of adhesive to a work piece W which may be held against the periphery of the roll by means of a pressure roller 110 mounted on an arm 112, associated with the unit 10, and fed along past the roll in any convenient manner. As will be understood, the units 10 and 12 are each heated by means of electrical heating units, two of which appear in Fig. 1 of the drawings where they are shown associated with the unit 10 and are identified by the reference character 120. The corresponding units for heating the unit 12 are in that portion of the front cover 42 which is broken away and hence do not appear in the drawings.

Under usual operating conditions, the rate of feed of the rod R, speed of rotation of the disk 22 and the output of the gear pump 24, 26 are such that the amount of adhesive supplied to the recess 60 is just enough partially to fill this recess and to keep the roll 50 coated with molten adhesive as stripes of adhesive are applied to successive work pieces fed past the roll. However, if the rate of delivery of adhesive to the work pieces is reduced, for example, by adjusting the doctor roll 80 to decrease the thickness of the coating of adhesive on the periphery of the roll 50, by decreasing the rate at which work pieces are fed past the roll, or if the feeding of work pieces is halted, as adhesive is continued to be supplied to the recess 60, this recess will soon become entirely filled and the excess amount of molten adhesive will be forced through the passage 64 and into the recess 62. Eventually, the recess 62 would become entirely filled and adhesive would overflow out through the top of the unit 12. In order to avoid this difficulty, the following arrangement is provided in the herein illustrated apparatus.

Rotatably mounted in the lower portion of the cover member 42 and also in the lower part of the recessed member 46 is a shaft 130 which at one end projects outwardly beyond the cover 42, see Fig. 2. Secured to this shaft and projecting into the recess through a slot 128, is a vane 132. Fast on the outwardly projecting end of the shaft 130 is an arm 134 provided with an eccentrically disposed cam surface 136, Fig. 3. A coil spring 138 is arranged yieldingly to hold the vane 132 in the position in which it is shown in Fig. 1 and against one side of the slot 128. Resting on the cam surface 136 is a roller 140 which is carried by the plunger 142 of a microswitch 143 which is adapted to control the flow of electric energy from a suitable source, not shown, to the coil of a solenoid 144 having an armature 146, Fig. 4. This solenoid is fastened to a plate 148 which is secured to one side of the bracket member 98, mentioned above, by means of bolts 150, 150, Fig. 1. These two bolts also secure an L-shaped arm 160 to the plate 148 and a member 162, having an upstanding portion 164, to the bracket 98, it being understood that the latter, which is sandwiched between the plate 148 and the member 162, is omitted from Fig. 4 of the drawings to simplify the disclosure.

Projecting from the upstanding portion 164 of the member 162 is a pin 170 on which there are pivotally mounted an L-shaped lever 172 having a recessed arm 174 and a bifurcated gripper arm 176 carrying a semi-cylindrical movable gripping jaw 178 and an offset recessed projection 180. Interposed between the recessed arm 174 and the recessed projection 180 is a compression spring 182. Formed integrally with the member 162 is a semi-cylindrical stationary gripping jaw 184. Connected to the lever 172 by means of a pin 186 is a toggle link 190, and connected to the arm 160 by means of a pin 188 is a second toggle link 192, these two links being joined together by a pin 194 which is connected to the armature 146 of the solenoid 144 by means of a link 196. A spring 198 is arranged to break the toggle formed by the links 190, 192, in an upwardly direction, when the coil of the solenoid 144 is deenergized. When the toggle is thus broken, the movable jaw 178 will be swung away from the stationary jaw 184 thereby permitting the rod of cement R to be fed along by the feed wheels 90, 92.

Referring to Fig. 1 of the drawings, when the vane 132 is in the position there shown, there is a slight clearance between the outer edge of the vane and the peripheral surface of the roll 50. When the recess 60 becomes entirely filled with adhesive, in the manner explained above, molten adhesive will be forced through the passage 64 and will gradually fill up that part of the recess 62 which is to the left of the vane, as viewed in Fig. 1. As soon as this occurs, the molten adhesive attempts to flow out through the space between the vane and the periphery of the roll 50, but, in so doing, it causes the vane to be moved to the right, i. e., swung in a clockwise direction as viewed in Fig. 1. As a result of such movement of this vane, the microswitch 143 will be closed and the coil of the solenoid 144 will be energized, thereby straightening the toggle formed by the links 190, 192. As this toggle is thus straightened, the movable jaw 178 will be moved toward the stationary jaw 184 to grip the rod R and to prevent movement of the rod by the feed wheels 90, 92 which slip over the rod. With the feed of the rod to the melting unit thus arrested, the supply of molten adhesive to the recess 60 of the applying unit will likewise be cut off. Now, when the molten adhesive is removed from the recess 62 by the applicator roll 50, the vane 132 will soon be returned to its original position by spring 138, thereby causing switch 143 to open and the solenoid 144 to be deenergized. The toggle formed by links 190, 192 will then be broken by spring 198 and the rod R will be released for feeding into the melting unit by the feed rolls 90, 92.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an apparatus for applying adhesive, a casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of said recesses to apply a coating of adhesive on the periphery of the roll, means for interrupting the action of said adhesive supplying means, and means located in the other of said recesses and responsive to adhesive flowing into said other recess from said first-mentioned recess for controlling the action of said interrupting means.

2. In an apparatus for applying molten thermoplastic adhesive, a heated casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of said recesses to apply a coating of adhesive on the periphery of the roll, means for interrupting the action of said adhesive supplying means, and means located in the other of said recesses and responsive to adhesive flowing into said other recess from said first-mentioned recess for controlling the action of said interrupting means.

3. In an apparatus for applying molten thermoplastic adhesive, a heated casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of said recesses to apply a coating of adhesive on the periphery of the roll including a melting chamber and means for feeding a solid rod of adhesive into said chamber, means for interrupting the action of said adhesive supplying means, and means located in the other of said recesses and responsive to adhesive flow-

ing into said other recess from said first-mentioned recess for controlling the action of said interrupting means.

4. In an apparatus for applying molten thermoplastic adhesive, a heated casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of said recesses to apply a coating of adhesive on the periphery of the roll including a melting chamber and means for feeding a solid rod of adhesive into said chamber, means for gripping the rod of adhesive thereby to interrupt the action of said feeding means, and means located in the other of said recesses and responsive to adhesive flowing into said other recess from said first-mentioned recess for controlling the action of said gripping means.

5. In an apparatus for applying molten thermoplastic adhesive, a heated casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of said recesses to apply a coating of adhesive on the periphery of the roll including a melting chamber and means for feeding a solid rod of adhesive into said chamber, electromagnetic means for gripping the rod of adhesive thereby to interrupt the action of said feeding means, and means located in the other of said recesses and responsive to adhesive flowing into said other recess from said first-mentioned recess for controlling the action of said gripping means.

6. In an apparatus for applying adhesive, a casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of said recesses to apply a coating of adhesive on the periphery of the roll, means for interrupting the action of said adhesive supplying means, and means including a vane rotatably mounted in the other of said recesses and responsive to adhesive flowing into said other recess from said first-mentioned recess for controlling the action of said interrupting means.

7. In an apparatus for applying molten thermoplastic adhesive, a heat casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of the recesses to apply a coating of adhesive on the periphery of the roll, means for interrupting the action of said adhesive supplying means, and means including a vane rotatably mounted in the other of said recesses and responsive to adhesive

flowing into said other recess from said first-mentioned recesses for controlling the action of said interrupting means.

8. In an apparatus for applying molten thermoplastic adhesive, a heated casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of said recesses to apply a coating of adhesive on the periphery of the roll including a melting chamber and means for feeding a solid rod of adhesive into said chamber, means for interrupting the action of said adhesive supplying means, and means including a vane rotatably mounted in the other of said recesses and responsive to adhesive flowing into said other recess from said first-mentioned recess for controlling the action of said interrupting means.

9. In an apparatus for applying molten thermoplastic adhesive, a heated casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of said recesses to apply a coating of adhesive on the periphery of the roll including a melting chamber and means for feeding a solid rod of adhesive into said chamber, means for gripping the rod of adhesive thereby to interrupt the action of said feeding means, and means including a vane rotatably mounted in the other of said recesses and responsive to adhesive flowing into said other recess from said first-mentioned recess for controlling the action of said gripping means.

10. In an apparatus for applying molten thermoplastic adhesive, a heated casing, a driven roll rotatably mounted within said casing and having a portion projecting from the casing for applying adhesive to a work piece, said casing being shaped to provide two communicating recesses adjacent to the periphery of said roll, means for supplying molten adhesive to one of said recesses to apply a coating of adhesive on the periphery of the roll including a melting chamber and means for feeding a solid rod of adhesive into said chamber, electromagnetic means for gripping the rod of adhesive thereby to interrupt the action of said feeding means, and means including a vane rotatably mounted in the other of said recesses and responsive to adhesive flowing into said other recess from said first-mentioned recess for controlling the action of said gripping means.

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