April 21, 1931. H. A. GUSTAFSON 1,801,739

MACHINE FOR MAKING PAPER BOXES

Original Filed Aug. 8, 1923 4 Sheets-Sheet 1

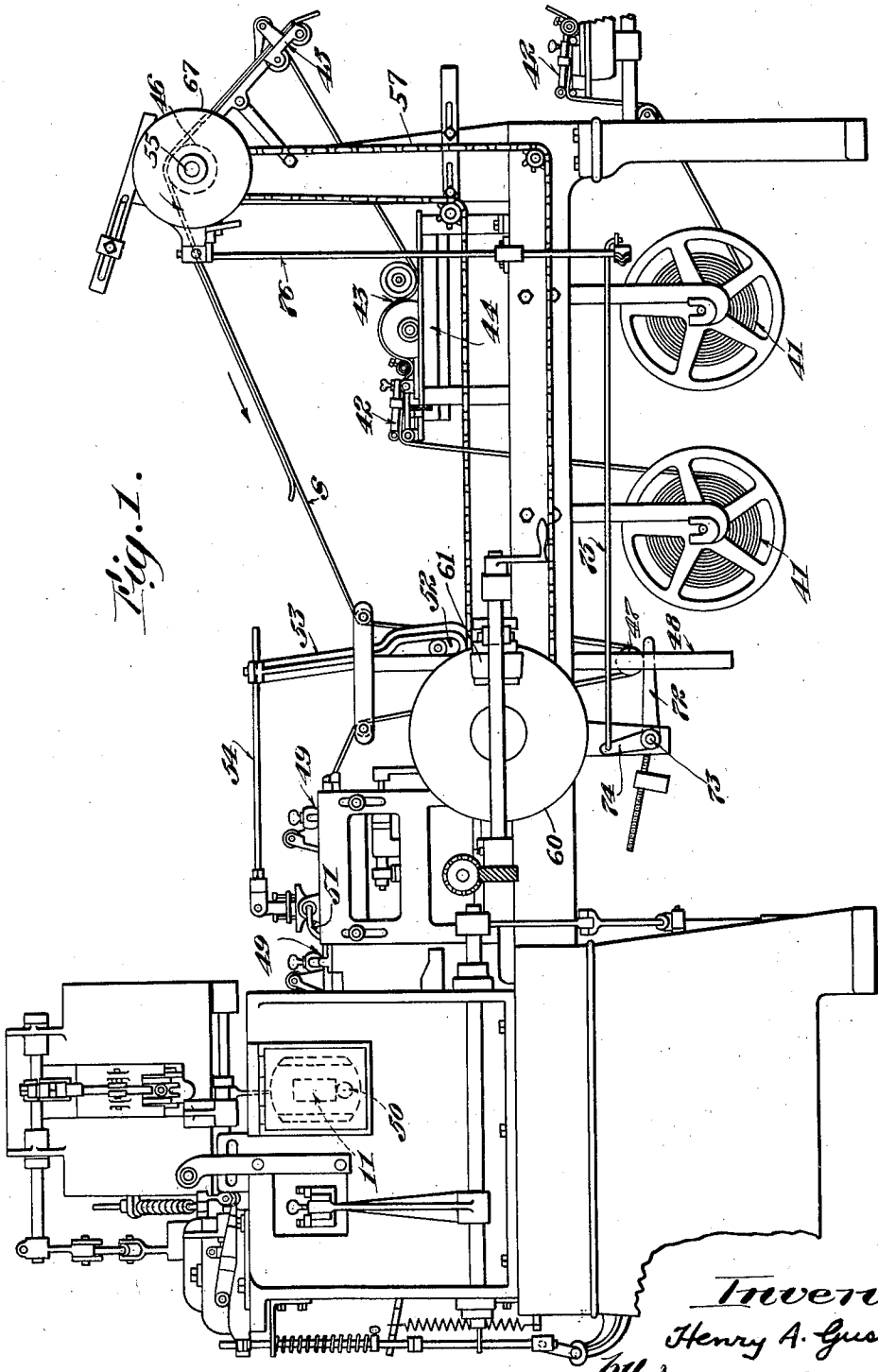


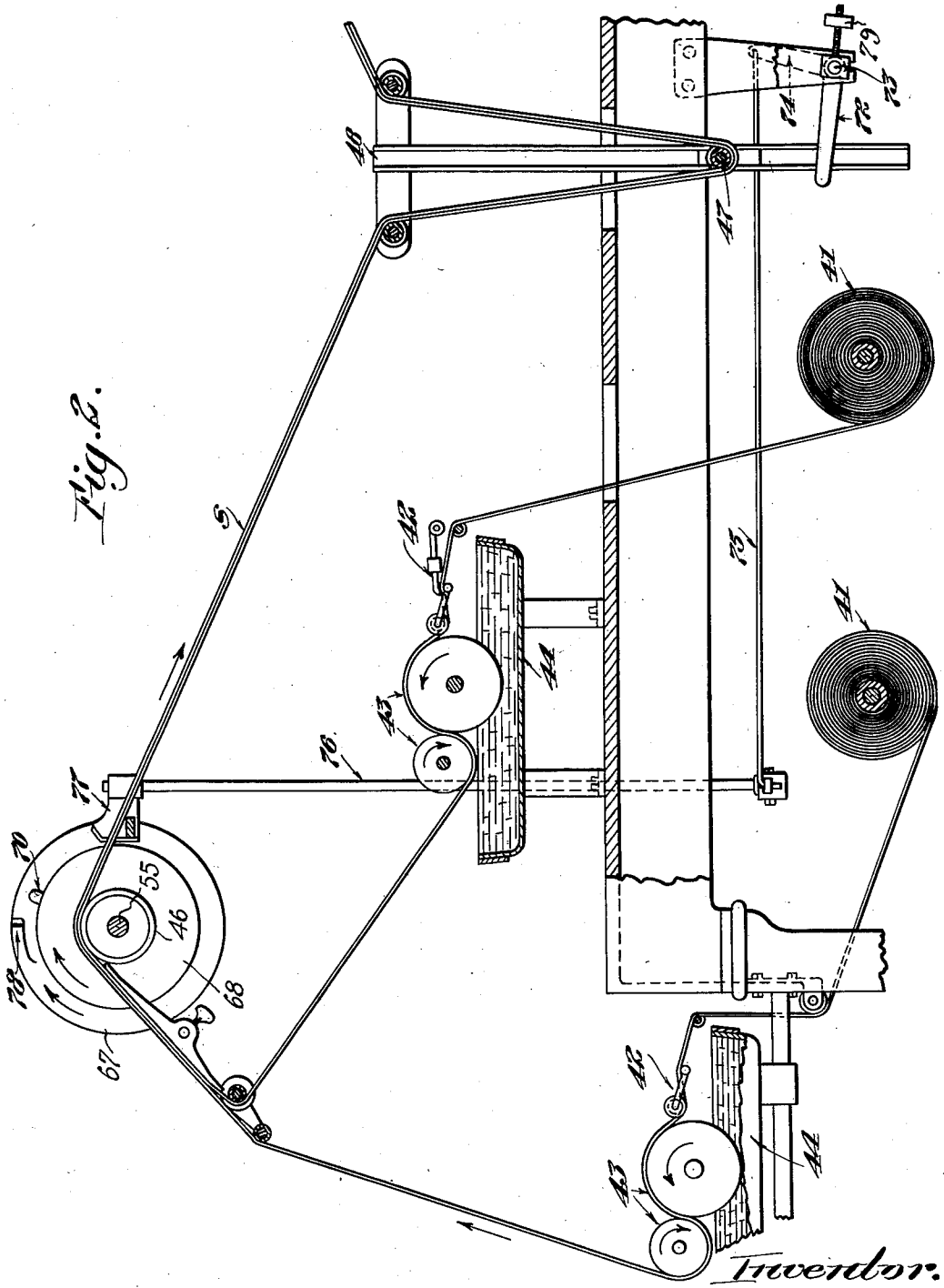
Fig. 1.

Inventor.
Henry A. Gustafson
By J. Stanley Churchill
Atty.

April 21, 1931. H. A. GUSTAFSON 1,801,739

MACHINE FOR MAKING PAPER BOXES

Original Filed Aug. 8, 1923 4 Sheets-Sheet 2



Inventor.
Henry A. Gustafson
By J. Stanley Churchill
Atty.

April 21, 1931. H. A. GUSTAFSON 1,801,739

MACHINE FOR MAKING PAPER BOXES

Original Filed Aug. 8, 1923 4 Sheets-Sheet 3

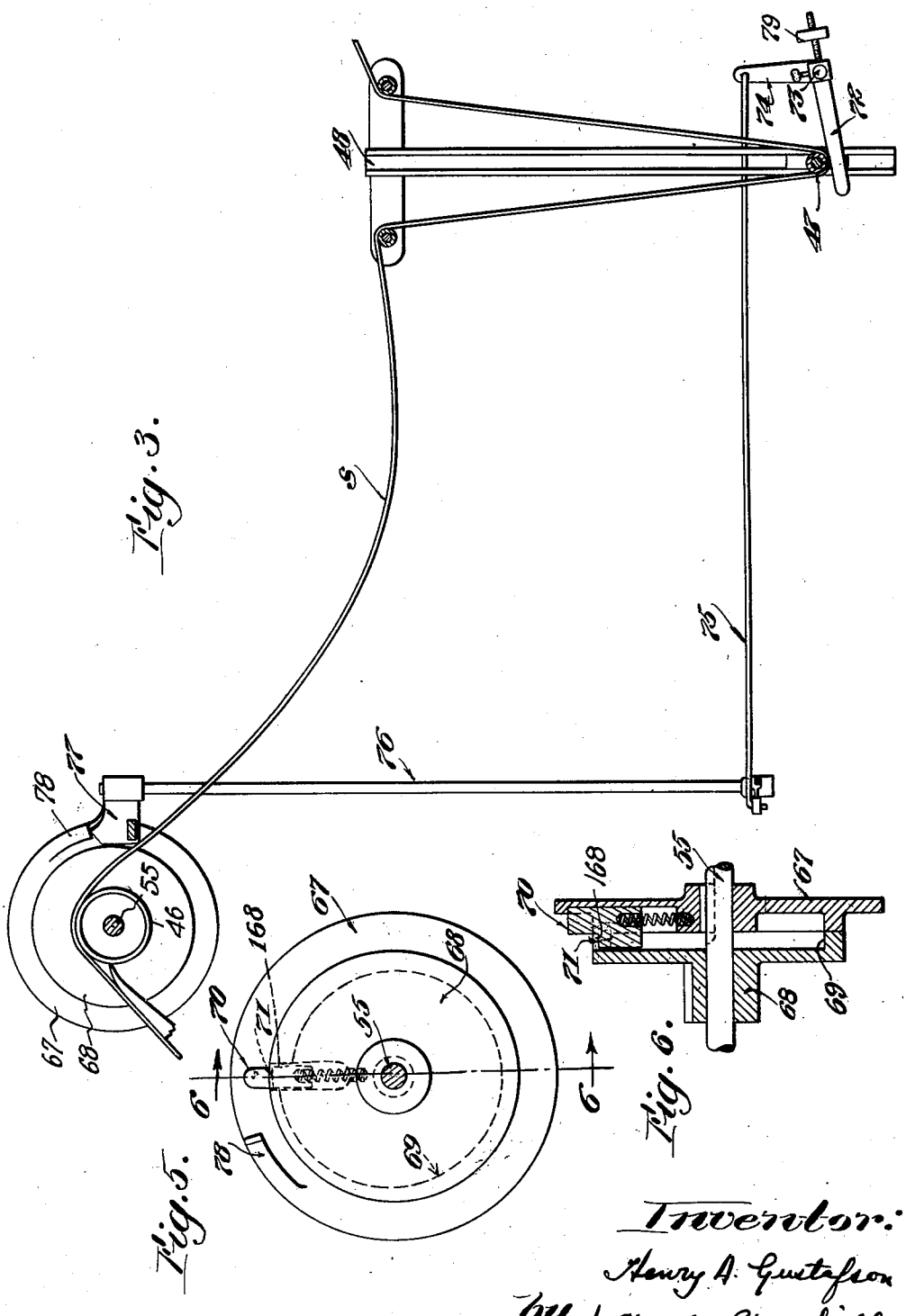


Fig. 3.

Fig. 5.

Fig. 6.

Inventor:
Henry A. Gustafson
by J. Stanley Churchill
Atty.

April 21, 1931. H. A. GUSTAFSON 1,801,739

MACHINE FOR MAKING PAPER BOXES

Original Filed Aug. 8, 1923 4 Sheets-Sheet 4

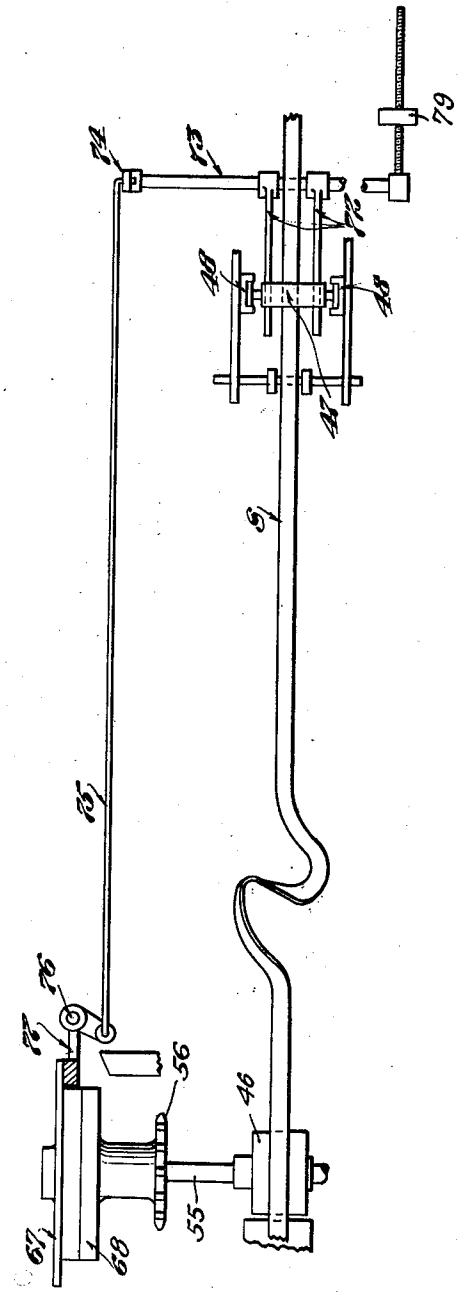


Fig. 4.

Inventor:
Henry A. Gustafson
By J. Stanley Churchill
Atty.

Patented Apr. 21, 1931 1,801,739

UNITED STATES PATENT OFFICE

HENRY A. GUSTAFSON, OF DORCHESTER, MASSACHUSETTS, ASSIGNOR TO PNEUMATIC SCALE CORPORATION LIMITED, OF QUINCY, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

MACHINE FOR MAKING PAPER BOXES

Original application filed August 8, 1923, Serial No. 656,374. Divided and this application filed October 9, 1925. Serial No. 61,457.

This invention relates to machines for making paper boxes, and particularly to a machine of the type disclosed in the patent to Hogfeldt, No. 1,016,266, granted February 6, 1912, to which reference is made as illustrating a machine of the same general character involved herein.

One feature of the invention consists in the provision of automatic mechanism for controlling the feed of the banding strip, whereby the strip feed will be automatically discontinued whenever slack develops in the strip, and will be automatically resumed when the slack is taken up.

Heretofore, whenever slack developed in the banding strip, the strip would become entangled and broken unless the operative reduced the speed of the strip feed until the slack was taken up. If then, the operative did not again adjust the speed of the feed, the pull of the box on the strip was apt to break the strip. This necessitated constantly changing the speed of the strip feed. My invention avoids this defect by automatically stopping the strip feed whenever slack developed, and will be automatically resumed when the slack is taken up.

This, and certain other features of advantage which will appear more particularly hereinafter, are secured in the machine of the present invention. As illustrative of the principles involved, I shall show and describe a form of machine which has been found satisfactory in actual use and well adapted to the requirements of manufacture. Throughout the accompanying specification and drawings like reference characters are correspondingly applied and in the drawings:

Fig. 1 is a front elevation of a paper box making machine in accordance with my invention; Figs. 2 and 3 are fragmentary stripped views particularly showing the gravitating tension device which actuates the automatic clutch mechanism for the banding strip feed whenever a slack condition exists in the strips, Fig. 2 showing the operative and Fig. 3 the inoperative position of said tension device; Fig. 4 is a view illustrating the action of the automatic clutch mechanism whenever a slack condition exists in the banding strip; Figs. 5 and 6 are detail views of the clutch forming a part of the banding strip safety feed mechanism, Fig. 6 being a section on the line 6—6, Fig. 5.

In general, in a machine of the type shown herein, the box blanks are of rectangular form and are stacked edgewise in a magazine from which they are ejected singly and passed to a box holder where their notched flaps are turned inwardly to form the four sides of the box, the main body portion of the blank forming the bottom of the box. One or more lengths of banding strip is then laid around the corners of the box in a complete turn, the box being rotated relative to the strip until the banding has been substantially completely wound around the box, after which it is severed from the strip, and the box holder is then advanced axially towards a folder which folds the back or outer extensions of the strip against the bottom face of the box.

The box holder is thereupon again advanced axially to a laterally sliding matrix within which the box is stripped from the holder and set over laterally into line with a fold setting plunger, and during such set over the inside or front extensions of the banding strip are turned over at right angles to the flaps of the box. When the box reaches alinement with the fold setting plunger, said folds are sealed down to the inside faces of the box flaps. The box is then compressed to set it to shape, and afterwards ejected from the machine. The construction and mode of operation of the parts of the machine thus far described for performing the banding operation upon the box, may and preferably will comprise those illustrated and described in the said Hogfeldt patent, to which reference has previously been made.

The banding strip S is carried upon a supply roll 41 depending from the frame of the machine. As shown in Fig. 1, two supply rolls 41 are provided so that differently colored strips, or a linen and a paper strip, for example, may be simultaneously fed. For convenience of description, however, it will be assumed that only one strip roll is in operation.

The strip is drawn by a feed pulley 46 from the supply roll 41 through a tension device 42 past a pair of glue rolls 43 operating in a glue pan 44, and through a second tension device 45. From the pulley 46, the strip is passed around a gravity roll 47 which operates in guideways 48 and is adapted to cause the feed of the strip to be discontinued whenever slack develops, as indicated diagrammatically in Fig. 4.

From the gravity roll 47 the strip is passed through a tension device 49 (Fig. 1) to a reciprocable presser roll 50, which lays the strip against the box in the holder 11. In its passage through the tension device 49, the strip is positively fed forward by means of a feed finger 51, which is rocked at each cycle of the machine by a cam 52 mounted on a cam shaft (not shown) and connected by a cam lever 53 and rod 54 with said feed finger.

The banding strip feed pulley 46 is fast on a shaft 55 which is constantly driven by a sprocket 56 thereon, a chain 57, the latter running around a sprocket (not shown) driven by a variable speed drive comprising a friction disk 60 and a friction cone 61, as illustrated in Fig. 1.

The feed of the banding strip is automatically disconnected whenever slack develops in the strip and automatically resumed whenever the slack is taken up. To this end, I provide an automatic clutch mechanism operated from the gravity roll 47, and comprising fast and loose clutch members 67 and 68, respectively, on the pulley shaft 55.

The inner face of the loose clutch member 68 has an eccentric shoulder 69 formed annularly thereabout, and the fast clutch member 67 carries on its inner face a spring-backed dog 70, which is provided with a shoulder 71.

Normally, when the banding strip is taut, as in Fig. 2, the dog 70 engages a slot 168 formed in the clutch member 68 and the clutch member 68 drives the member 67 and the pulley shaft 55 which is secured thereto. When slack develops in the strip, however, the gravity roll 47 will contact with a pair of levers 72, fulcrumed on a horizontal rock shaft 73, and rock said shaft, as shown in Fig. 3, and the rocking motion of said shaft is transmitted through an arm 74 fast on said shaft 73 and connected by a rod 75 with a vertical rock shaft 76 to a stop arm 77 on the upper end of the shaft 76. Upon actuation of the levers 72, therefore, the stop arm 77 will be rocked into the path of the clutch dog 70 of the clutch member 67, and the contact of said arm and dog will force the dog downwardly, against the tension of its backing spring disengaging said dog from the slot 168 in the clutch member 68 and thereby disconnecting the clutch parts 67 and 68. Further rotation of the clutch member 67 is prevented by the contact of a stop lug 78 on the face of the clutch member 67 with the stop arm 77.

The clutch member 68 is, however, constantly rotated and the shoulder 71 of the dog 70 is engaged by the annular shoulder 69 of said clutch member until the clutch member 68 makes one complete revolution and the slot 168 again comes into alignment with the dog 70. If, in the meantime, the slack in the banding strip has been taken up by the box banding mechanism, the gravity roll 47 will be lifted by the banding strip away from the levers 72, permitting a counterweight 79 associated with said levers to return the parts to their normal positions. This withdraws the stop arm 77 from the path of the dog 70 and permits the spring engaging said dog to force said dog radially outwardly in the slot 168 to again couple the clutch member 68 to the member 67 and resume the feed of the strip. The annular shoulder 69 is formed eccentric to the shaft 55 to withdraw the dog 70 from contact with the stop arm 77 to permit the stop arm to be more readily withdrawn from the path of said dog when the slack in the banding strip has been taken up.

The present application is a division of my application Serial No. 656,374, filed Aug. 8, 1923, for Machine for making paper boxes.

Having thus described the invention, what is claimed is:

1. In a banding machine, in combination, a banding strip feeder, a gravitating tension device past which the strip is fed, an automatic clutch mechanism for said banding strip feed including fast and loose clutch members, one of said clutch members having an eccentric shoulder extending annuluarly thereabout and the other clutch member having a spring-backed dog provided with a shoulder adapted to normally ride on the eccentric shoulder of the cooperating clutch member, a clutch shifter disposed in the path of said gravitating tension device for actuation by said device whenever slack develops in the strip and effective upon such actuation to move said dog away from said eccentric shoulder and thereby disconnect the pair of clutch members, and means for returning the clutch shifter to original position when the slack in the banding strip is taken up, whereby to automatically reconnect the pair of clutch members.

2. In a banding machine, in combination, a banding strip feeder, a gravitating tension device between said box blank holder and said strip feeder and past which the strip is fed, an automatic clutch mechanism for said banding strip feed including fast and loose clutch members, one of said clutch members having an eccentric shoulder extending annularly thereabout, and the other clutch member having a spring-backed dog provided with a shoulder adapted to normally ride on

the eccentric shoulder of the cooperating clutch member, a clutch shifter disposed in the path of said gravitating tension device for actuation by said device whenever slack develops in the strip, and operative connections between said clutch shifter and said clutch parts including a stop arm movable into the path of the clutch dog upon actuation of said clutch shifter by said tension device, whereby to disconnect said dog from said eccentric shoulder.

3. In a banding machine, in combination, a banding strip feeder including a feed pulley, a gravitating tension device between said box blank holder and said strip feeder and past which the strip is fed, an automatic clutch mechanism for said feed pulley including fast and loose clutch members on the pulley shaft, one of said clutch members having an eccentric shoulder extending annularly thereabout, and the other clutch member having a spring-backed dog provided with a shoulder adapted to normally ride on the eccentric shoulder of the cooperating clutch member, a clutch shifter disposed in the path of said gravitating tension device for actuation thereby whenever slack develops in the strip, and effective upon such actuation to move said dog away from said eccentric shoulder and thereby disconnect the pair of clutch members, and means for returning the clutch shifter to original position when the slack is taken up, whereby to automatically reconnect the clutch members.

4. In a banding maching, in combination, a banding strip feeder including a feed pulley, a variable speed drive for said pulley, a gravitating tension device past which the strip is fed, an automatic clutch mechanism for said feed pulley including fast and loose clutch members on the pulley shaft, one of said clutch members having an eccentric shoulder extending annularly thereabout, and the other clutch member having a spring-backed dog provided with a shoulder adapted to normally ride on the eccentric shoulder of the cooperating clutch member, a clutch shifter disposed in the path of said gravitating tension device for actuation thereby whenever slack develops in the strip, and effective upon such actuation to move said dog away from said eccentric shoulder and thereby disconnect the pair of clutch members, and means for returning the clutch shifter to original position when the slack is taken up, whereby to automatically reconnect the clutch members.

In testimony whereof I have signed my name to this specification.

HENRY A. GUSTAFSON.