March 2, 1954 C. S. RUDEEN 2,670,977

PRESSURE VARYING DEVICE FOR TWINE KNOTTERS

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Fig. 1

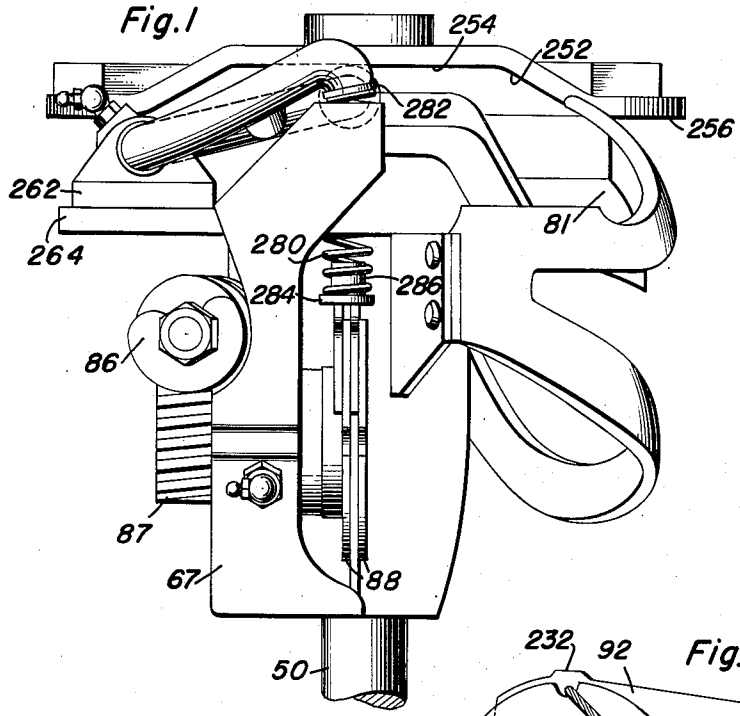


Fig. 5

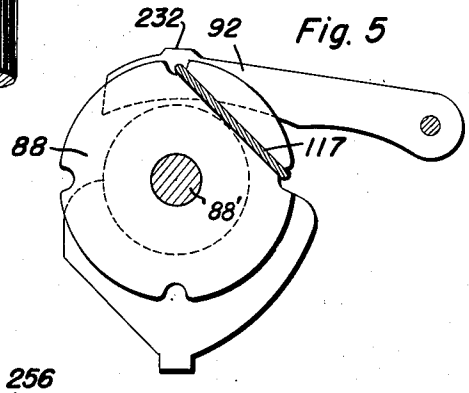
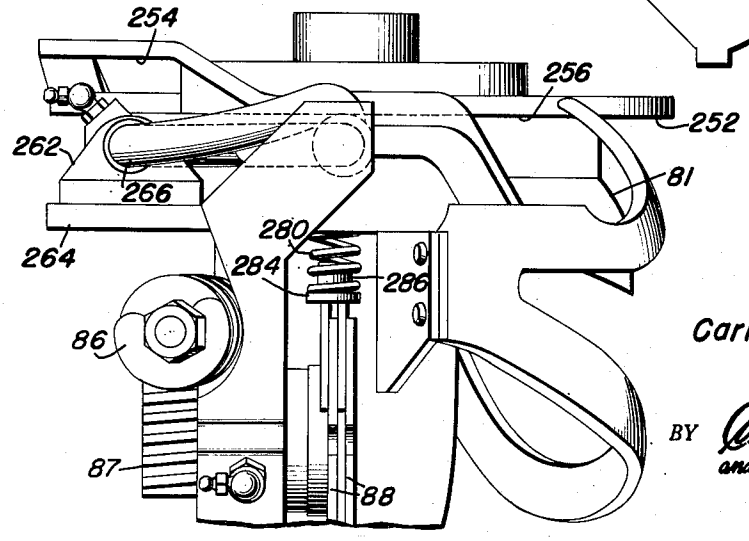


Fig. 2



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PRESSURE VARYING DEVICE FOR TWINE KNOTTERS

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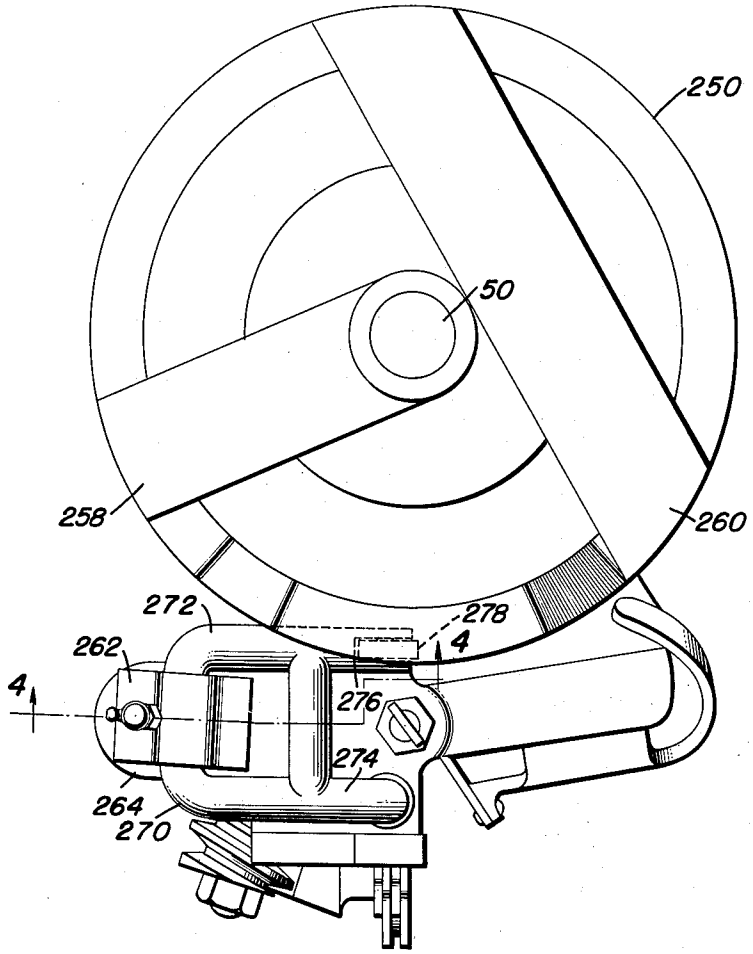


Fig. 3

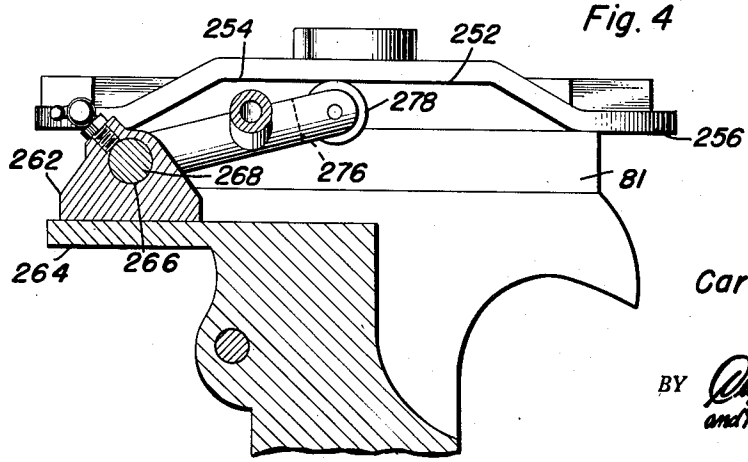


Fig. 4

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PRESSURE VARYING DEVICE FOR TWINE KNOTTERS

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Application March 19, 1951, Serial No. 216,360

8 Claims. (Cl. 289—14)

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This invention comprises new and useful improvements in a twine knotter or tier and is a continuation-in-part of my co-pending application, Serial No. 206,161, filed on January 16, 1951, now Patent No. 2,644,703 issued July 7, 1953.

The primary object of this invention is to provide a means for increasing the pressure on the baling strand during the bale chamber pressing operation and for sequentially decreasing the pressure during the knot-tying operation.

A more specific object of this invention is to provide a device for accomplishing the foregoing object in a more positive manner than methods heretofore known.

A specific improvement over my co-pending application, hereinabove cited, is the replacement of the centrally pivoted rocker arm and cam wheel having an outside cam surface by a U-shaped unidirectional arm bearing against a cam wheel having an inside cam surface.

Further, it has also been found that in order to provide a versatile pressure varying device whereby the same could be attached to all conventional baling machines without interference with the existing movable parts, a structure as herein described was needed.

These, together with the various ancillary features and objects of the invention which will later become apparent as the following description proceeds, are attained by the present invention, a preferred embodiment of which is illustrated, by way of example only, in the accompanying drawings, wherein:

Figure 1 is a side fragmentary view illustrating the structure of the present invention, the elements thereof being in the reduced pressure position;

Figure 2 is a side fragmentary view illustrating the structure of the instant invention, the elements thereof being in a position for exerting the maximum amount of pressure;

Figure 3 is an end fragmentary view illustrating in particular the shape of the improvement of the instant invention;

Figure 4 is a side sectional fragmentary view illustrating essential elements of the instant invention; and,

Figure 5 is a top sectional view illustrating the particular portion of the strand tying mechanism, on which the controlling elements of the instant invention are applied.

It will be appreciated by reference to my co-pending application, Serial No. 206,161, now Patent No. 2,644,703, that several features thereof might, in some instances, prove undesirable for

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the following reasons. These reasons are essentially based on the particular nature of the rocker arm in that it necessitates a central pivoted connection. On the one hand, the relative motion between the cam surface and cam wheel and the very fact that the rocker arm is centrally pivoted, all add in a tendency for the rocker arm to be subjected to an objectionable side thrust or sway. Further, whenever pressure is being applied to the trigger arm in the device of my co-pending application, the roller must necessarily be riding on the upper surface of the cam wheel thereby also subjecting the pivoted connection or bifurcated element and the journal bearing of the rocker arm to an upwardly directed stress. It has been determined that the results of these undesired forces or stresses are a reduction in the positive application of pressure and undue wear on the bearing surfaces. Further, it is believed that the structure is greatly simplified and it is a fact that the parts required are fewer with the present improvement.

Accordingly, reference is now made to the accompanying drawings and to the drawings of my co-pending application, hereinabove cited, wherein for purposes of clarity, like numerals will be used in all the elements with the exception of the improved parts specifically believed to be the inventive features of this application.

As will be noted in Figures 1, 2 and, more specifically, in Figure 5, there is illustrated a pair of holder disks or notched plates **88** which are rigidly secured for rotation on a shaft **88'** which is journalled in a knotter frame **67**. This latter shaft is secured to a worm wheel **87** engaging and being driven by a worm gear **86**. Further, the worm wheel **86** has a shaft extending therefrom being provided at the opposite end with a beveled gear, not shown, for synchronized rotating engagement with a toothed segment of the cam member **81**. Lastly, it will be appreciated that the cam wheel or member **81** is rotated through its fixed connection to the control shaft **50**.

The twine or strand **117** is fed or placed in the notches of the notched disk **88** by some means, such as the conventional needle **54** of my co-pending application hereinabove cited, and is held therein by means of the holder trigger **92** which is freely pivoted to the knotter frame **67** by means of a bolt connection.

Positioned adjacent the cam member **81** and also secured on the control shaft **50** is a cam track **250** having its camming surface **252** disposed on the inside, that is facing the cam mem-

ber 81. This cam surface 252 consists essentially of a circular track having segmental portions of different levels or dips. Specifically, it will be noted that the cam surface 252 consists of a dipped segment 254 and a raised segment 256, the latter comprising the greater arc of the circular surface. The reinforcing means 258 and 260 are also applied at desired positions around the periphery of the cam track 250.

A cylindrical member or lug 262 is bolted or otherwise secured to the depending ear 264 of the knotter frame 67 and is centrally provided with a bore 266. Journalled within this bore 266 is the web or bight portion 268 of a U-shaped member 270 also having a pair of arms 272 and 274.

At the outer end of arm 272 is a recess 276 wherein is journalled a roller 278 which is positioned for rolling engagement upon the cam surface 252.

The other arm 274 has attached at its outer end a spring means consisting of a spring 280 disposed between a pair of disks 282 and 284, each of the disks having inwardly directed projections 286 for guiding reception of the spring 280. The disk 284 bears directly on the flat surface 232 of the holder trigger 92. It should be noted that the spring 280 is received in a bore provided within the proper portion of the knotter frame 67.

In operation, when hay or the like is being forced into the baling chamber, not shown herein but clearly ascertainable in the drawings of my co-pending application hereinabove cited, it is desired to apply more pressure on the arm or holder trigger 92 than would be effected by its free operation and, accordingly, through rotation of shaft 50, the proper portion or segment, namely, 256 of the cam surface 252 is made to come in contact with the roller 278. This causes the U-shaped follower 270 to pivot inwardly thereby compressing the spring 280 against the surface 232 of the holder trigger 92.

This increased pressure is maintained on the strand 117 until such time as the needle or other feeding means has placed the other end of the strand in the holder disks and the knotting means has begun its operation. Accordingly, when tensioning of the strand 117 begins to take effect, that portion or segment 254 of the cammed surface 252 is presented to the roller 278. Since the follower 270 is freely journalled in the bore 266 the compressed spring 280 will urge the follower upwardly or outwardly, as the case may be, allowing the roller 278 to follow or roll along the dipped portion 254. As will be clearly evident, this will reduce the pressure of the holder trigger 92 on the strand 117 allowing the same to slip through the notched disks 88 whereby tensioning of the strand is relieved, preventing breakage.

From the foregoing, the construction of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art after a consideration of the foregoing specification and accompanying drawings, it is not desired to limit the invention to the exact structure shown and described, but all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. In a knotting mechanism including a billhook, a strand holder including peripherally notched holder plates, a pivoted holder trigger extending between said holder plates, a strand feeding needle for applying a strand to said holder plates and means for actuating said billhook, strand holder and strand feeding needle in timed relation, the improvement comprising; resilient means maintaining a yielding pressure urging said trigger between said holder plate for yieldingly clamping a strand in the peripheral notches, means for increasing the pressure of the resilient means upon the trigger during predetermined periods in the operation of the knotting mechanism, said resilient means including a spring operatively engaging said trigger, said pressure increasing means including a member having laterally offset arms, one of said arms engaging said spring for variably tensioning the same, the other of said arms being operatively connected to and driven by said actuating means.

2. The combination of claim 1 wherein said laterally offset arms lie in a common plane.

3. The combination of claim 1 wherein said laterally offset arms are parallel.

4. The combination of claim 1 wherein said member is U-shaped, comprising a central web from the opposite ends of which said arms extend, said web being journaled for rocking movement of said arms.

5. In a knotting mechanism including a billhook, a strand holder including peripherally notched holder plates, a pivoted holder trigger extending between said holder plates, a strand feeding needle for applying a strand to said holder plates and means for actuating said billhook strand holder and strand feeding needle in timed relation, the improvement comprising; resilient means maintaining a yielding pressure urging said trigger between said holder plate for yieldingly clamping a strand in the peripheral notches, means for increasing the pressure of the resilient means upon the trigger during predetermined periods in the operation of the knotting mechanism, said resilient means including a spring operatively engaging said trigger, said actuating means including a control shaft, said shaft having a cam thereon, said pressure increasing means comprising a member having a pair of laterally offset arms, one arm operatively engaging said spring for variably tensioning the same and the other arm being operatively connected to said cam.

6. The combination of claim 5 wherein said laterally offset arms lie in a common plane.

7. The combination of claim 5 wherein said laterally offset arms are parallel.

8. The combination of claim 5 wherein said member is U-shaped, comprising a central web from the opposite ends of which said arms extend, said web being journaled for rocking movement of said arms.

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