(No Model.)

W. M. HOLMES.

TENSION DEVICE FOR HARVESTER BINDERS.

No. 328,887. Patented Oct. 20, 1885.

FIG. 1.

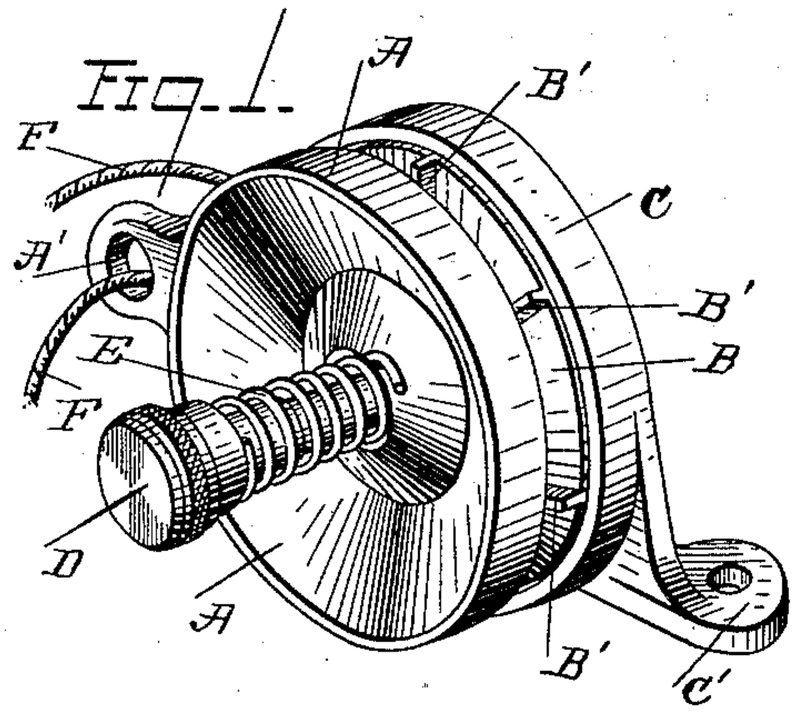


FIG. 2.

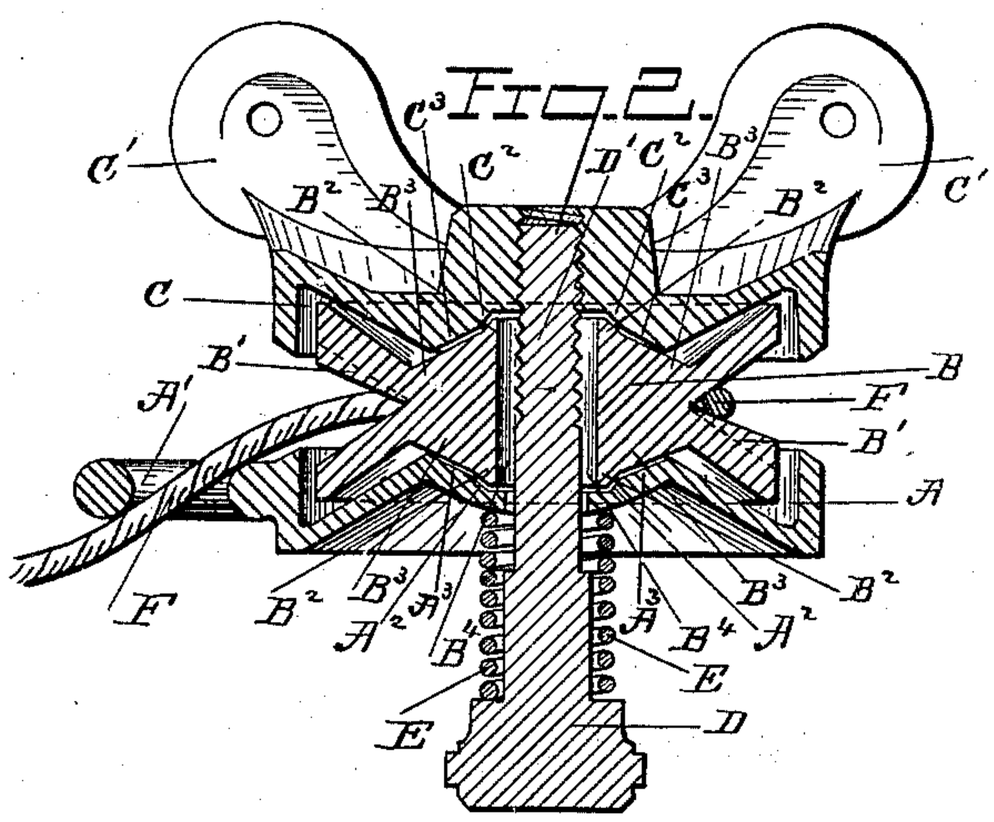


FIG. 4.

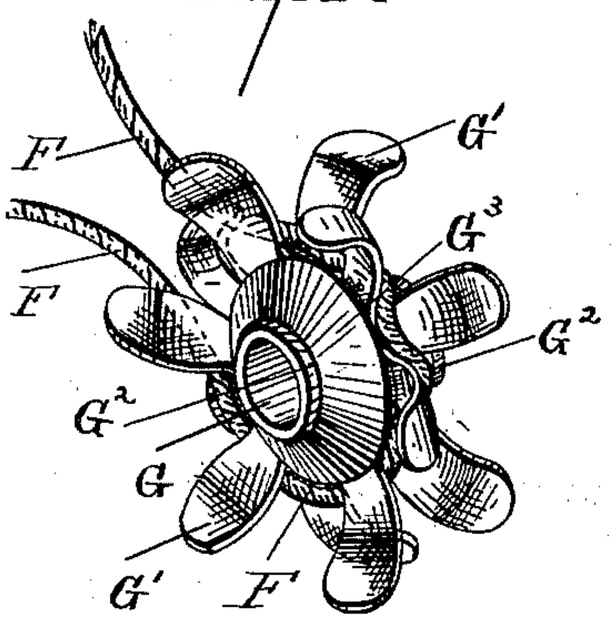
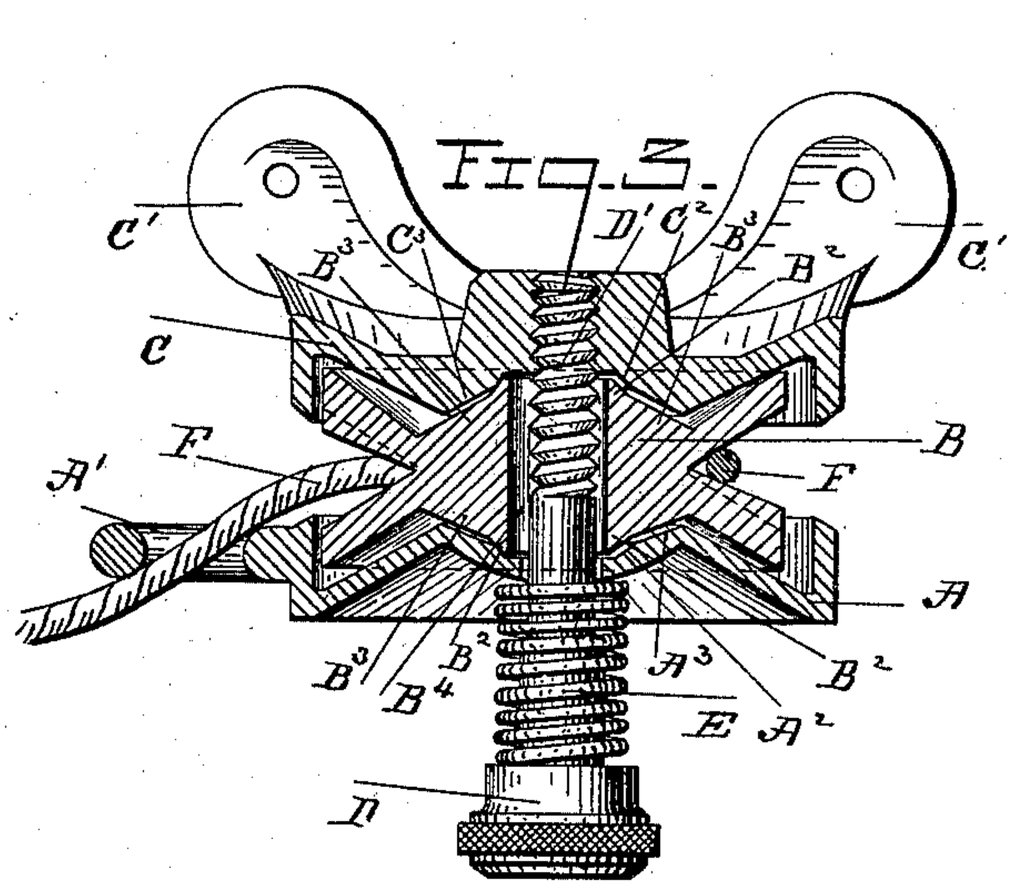


FIG. 3.



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WATSON M. HOLMES, OF HOOSICK FALLS, NEW YORK.

TENSION DEVICE FOR HARVESTER-BINDERS.

SPECIFICATION forming part of Letters Patent No. 328,887, dated October 20, 1885.

Application filed August 13, 1884. Serial No. 140,445. (No model.)

To all whom it may concern:

Be it known that I, WATSON M. HOLMES, of Hoosick Falls, in the county of Rensselaer and State of New York, have invented a new and useful Improvement in Tension Devices for Harvester-Binders; and I do declare the following to be a full, clear, and accurate description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a view in perspective of the device complete. Fig. 2 represents a cross-section of the same, except that portion by which the device is fastened to the machine, which is shown in elevation. Fig. 3 represents the device in cross-section on the same line as shown in Fig. 2, and the same parts in elevation, with the bolt and spiral spring in elevation, the parts being in different position with reference to each other, this different position being caused by the action of the cord upon the tension device under certain circumstances more fully hereinafter described. Fig. 4 represents in perspective a different form of sheave or pulley from the one shown in Figs. 1, 2, and 3.

Similar letters of reference refer to the same parts in the several figures.

In automatic binders it is necessary that the cord should, during the operation of putting the same around the bundle and tying the knot, be held taut in order to prevent its being tangled, and should not be fed from the ball or spool faster or in larger quantities than is required to complete the operation. The reason for this is apparent. Again, it is desirable that the tension device should be so regulated and constructed that when the cord or twine is drawn through, the twist put into the twine when manufactured should not be taken out by drawing it between flat surfaces, as the taking of this twist imparts more twist to the portion between the tension device and the ball or spool and causes the twine to kink and get snarled, and thus stop the operation of the binder. It also frequently happens that the twine sticks in the ball or spool by reason of the fibers of the staple being interwound with the strands, and it draws out at times quite hard. The tension device should be so constructed as to yield when this takes place and impose less strain upon the twine, in order that the force may be utilized to withdraw the twine from the ball.

The nature and object of my invention is to provide a simple and efficient means for giving proper and uniform tension to the binding-cord and accomplish the desired results heretofore set forth. To do this I have made a novel and efficient rotary tension device. The tension device is located on some convenient part of the harvester or binder, between the ball or spool of cord and the binding-arm, and is fastened thereto by means of bolts passing through the ears C′, attached to a circular disk, C. On the edge of this disk is cast an annular ring or flange. Within this annular ring is placed the grooved pulley or sheave B, which is of somewhat less diameter than the ring, and upon and around this sheave B is placed a flanged disk, A, similar to C, provided with an eye, A′, through which the binding-cord passes from the ball or spool to the sheave B, the sheave B being held between the two disks C and A. A screw-bolt, D, passes through the disk A and sheave B, and is provided at one end with a screw-thread, D′, which screws into the hub of the disk C, which is made long enough to receive more or less of the screw part of the bolt D and hold the disks and sheave together more or less closely. The hole in sheave B through which the bolt D passes is considerably larger than the diameter of the bolt and larger than the hole in A, so that the sheave may move from one side to the other of the inner surfaces of the flanges on A and C. This bolt has coiled around it a spiral spring, E, one end of which abuts against the hub of disk A, and the other end abuts against the head of the bolt D, and as the bolt D is screwed in or out of the hub of disk C the pressure of the parts against each other will be increased or diminished accordingly, the spiral spring E pressing against the disk A with more or less force, according to the amount of tension required on the cord.

The sheave B is made with a V-shaped groove in its perimeter to receive the twine F, and the sides of the groove are provided with lugs B′, cast thereon and set alternately with reference to each other, so that when the twine is placed around the sheave in the groove it will be slightly crimped between the lugs, assuming in a slight degree a zigzag line

around the sheave, and thus be prevented from slipping thereon. The ends of the hub of sheave B are beveled in shape inwardly, as shown, in a line diagonal to the line of the hole in its center, these faces thus formed lying in two planes, B^2 and B^3, at different degrees of inclination to and at different distances from the axis of the device.

The disks C and A on their inner faces are made in shape as to their hubs to correspond with the faces on the hubs of sheave B, so that when the twine is passing from the ball through the tension, then two surfaces on each end of the hub of the sheave will be in contact with the inclined faces of the hubs of the disks, and will bear on each with an amount of friction commensurate with the pressure of the spiral spring, graduated by the screwing in or out of the bolt D. Should the twine be held back by reason of its unwinding hard from the ball or other causes, the sheave B will be drawn toward the ball by reason of said tension, and the space given by the large hole in its center, through which the bolt D passes, as shown in Fig. 3, and the surfaces B^2 and C^2 nearest to the bolt on the side next the ball will remain in contact, while the surfaces B^3 and C^3 farthest from the bolt will be separated, and thus the leverage of the inner faces being smallest, the friction will be diminished for the reason that the friction due to the planes farthest from the center is removed, and by so much as it is diminished the force necessary to overcome this friction will be utilized to overcome the hold on the twine in the ball.

The sheave represented in Fig. 4 may be used instead of B, (shown in Figs. 1, 2, and 3,) in which the hubs are made of the same shape as in B, Figs. 1, 2, and 3, and the hubs on A and C the same shape, as shown, the remaining portions of the disks A and C beyond the hub being dispensed with by forming the groove of a series of lips, G′ and G^2, of thin metal, bent alternately outward from the center plane of the disk in opposite directions, which accomplishes the same result as to crimping the twine or cord as in the form shown in Figs. 1, 2, and 3.

The operation is as follows: One end of the twine is taken from the ball or spool and passed through the loop or eye A′, and passed around the sheave B once or more in the groove therein, resting on the lugs B′, and thence to the needle-arm, the bolt D being adjusted to give the required tension, as it is plain that the farther the bolt D is screwed into the disk C the greater will be the tension, and if any obstruction occurs in the ball or between the ball and the tension the sheave B will move backward or toward the ball, and the leverage or distance from the frictional surfaces to the axle or the tension will be diminished, as hereinbefore described.

Having thus fully described my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. A tension device composed of two disks having their inner faces oppositely inclined to their axis, in combination with a revolving sheave placed between the disks and having its lateral faces correspondingly inclined, the whole yieldingly connected by the bolt D and spring E, substantially as described.

2. The combination of the disks A and C, having their inner faces oppositely inclined to their axis, the bolt D, and spring E, the central sheave having its lateral faces correspondingly inclined and provided with lugs or their described equivalents, with the bolt D and spring E, substantially as set forth.

3. The combination of the disks A and C, the sheave B, bolt D, and spiral spring E, said sheave B provided with a large hole at its center to allow lateral movement on the bolt, substantially as described.

4. The combination of the disks A and C, having their inner faces oppositely inclined to their axis, and the inclination, as A^2, adjacent to the axis more acute than the outer inclination, as A^3, with a laterally-movable sheave, B, having its lateral faces correspondingly inclined, and a large central hole, the whole yieldingly connected by a spring-carrying bolt of smaller diameter than the central hole of the sheave, whereby the sheave can yield laterally and reduce any abnormal tension on the twine passing around the sheave by bringing its inclined frictional surfaces nearer the axle, substantially as described.

WATSON M. HOLMES.

Witnesses:
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EDMUND C. STROUD.