

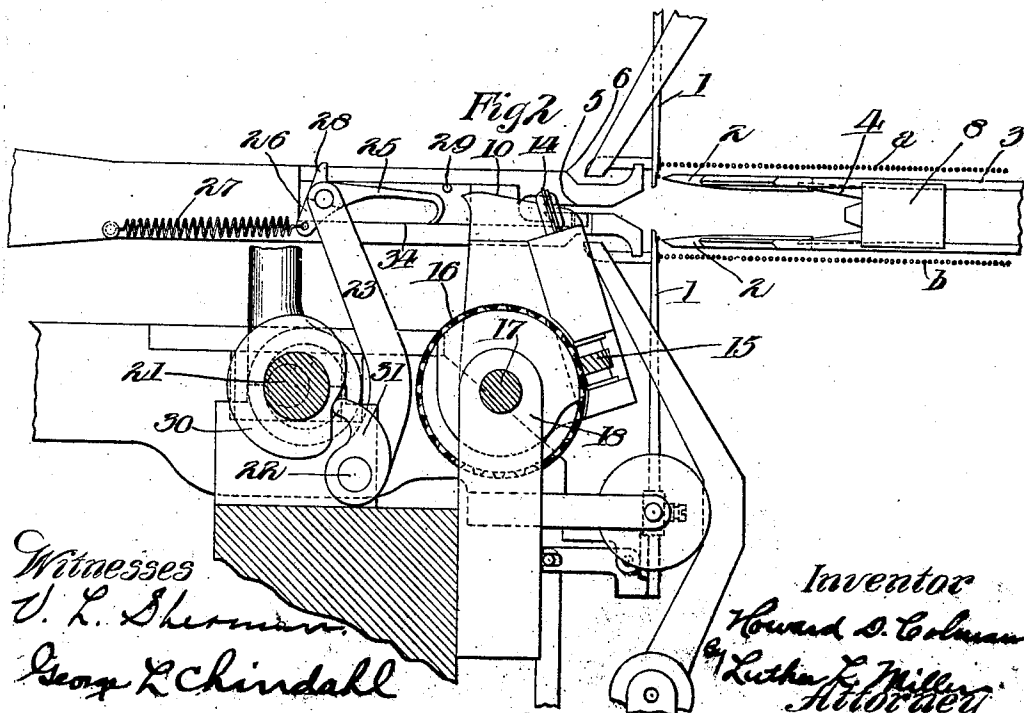
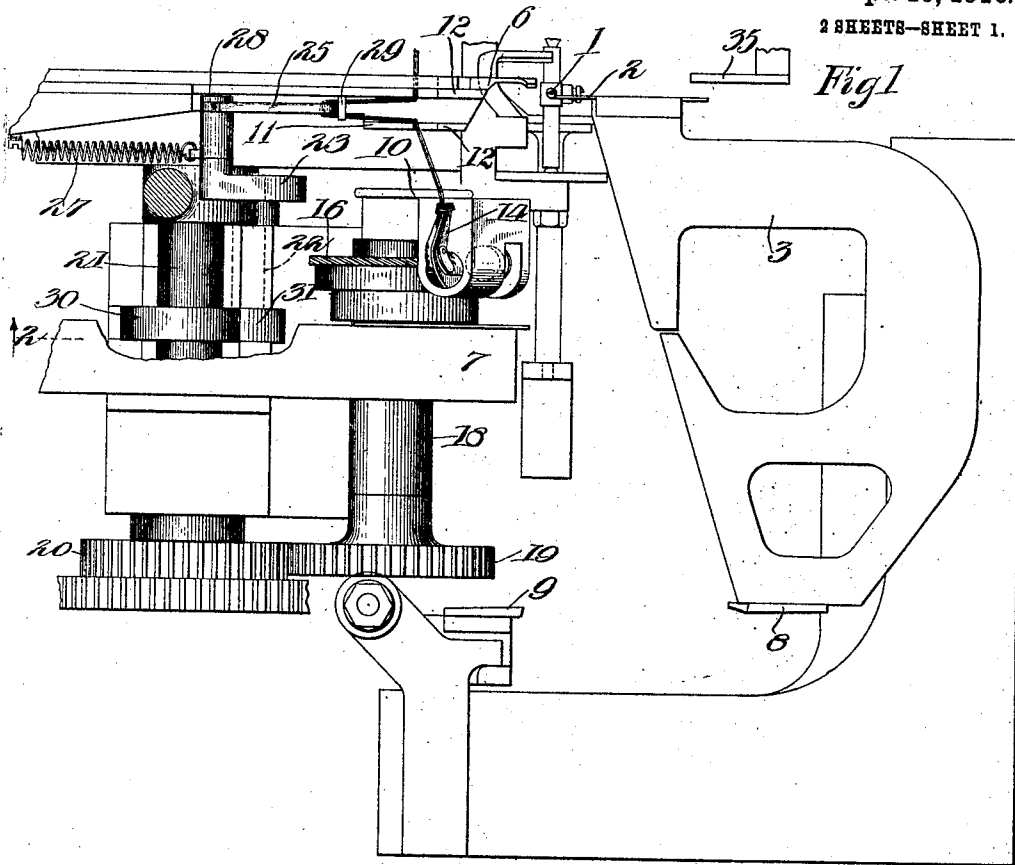
H. D. COLMAN.
KNOTTER.

APPLICATION FILED JUNE 24, 1907.

Patented Apr. 19, 1910.

955,384.

2 SHEETS—SHEET 1.



Witnesses
V. L. Sherman
Georg L. Chindahl

Inventor
Howard S. Colman
By Luther F. Miller
Attorney

H. D. COLMAN.

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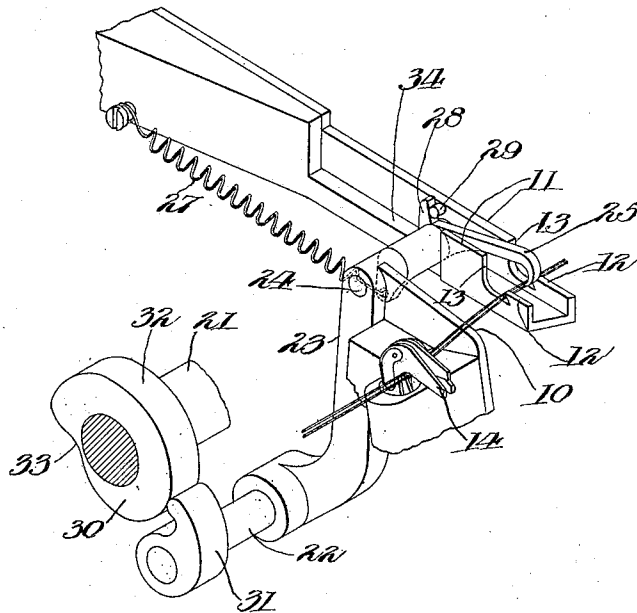
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Fig 3



Witnesses:
V. L. Sherman
George L. Chindahl

Inventor
Howard D. Colman
By Luther L. Miller
Attorney

UNITED STATES PATENT OFFICE.

HOWARD D. COLMAN, OF ROCKFORD, ILLINOIS, ASSIGNOR TO BARBER-COLMAN COMPANY, OF ROCKFORD, ILLINOIS, A CORPORATION OF ILLINOIS.

KNOTTER.

955,384.

Specification of Letters Patent*. Patented Apr. 19, 1910.

Application filed June 24, 1907. Serial No. 380,405.

To all whom it may concern:

Be it known that I, HOWARD D. COLMAN, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Knotters, of which the following is a specification.

This invention relates to mechanisms for tying knots, and refers particularly to an improved means for tightening the loops of the knot and stripping the knot off the loop-forming device.

I have herein shown my invention as forming part of a warp-tying machine such as is shown in my copending application Serial No. 208,779, filed May 19, 1904, but it will be understood that the invention is adapted for use in various other connections.

In the accompanying drawings, which illustrate an embodiment of my invention, Figure 1 is a top plan view of a knotter and certain of those parts of the warp-tying machine which coöperate directly with the knotter. Fig. 2 is a vertical sectional view taken substantially on the plane of dotted line 2 of Fig. 1. Fig. 3 is a perspective view illustrating the stripper device.

In the warp-tying machine to which reference has been made, the two warps *a* and *b* to be tied together are arranged in parallel horizontal planes, as indicated in Fig. 2.

1 are the selectors by means of which pairs of warp threads are selected, one thread from each of the warps, and moved inwardly a sufficient distance for the wings 2 of the reciprocatory separator device 3 to enter between the selected threads and the warps for separating said threads from their warps. The separator device 3 carries a fork 4 by means of which the two selected threads are brought closer together and inserted into a key-hole slot 5 formed in a stationary guide 6. Said separator device also carries means (not shown) for inserting the selected threads into the forward end of an exhaust air tube 7 in which they are held during a portion of the knot-forming operation, and by means of which the waste ends clipped from the knot are carried off. Previous to being inserted in said tube,

the warp threads are severed, to form loose ends, by a shear comprising a blade 8 fixed to the reciprocatory separator device 3 and a relatively stationary shear blade 9. When the threads are thus placed in the guide 6 and the suction tube 7 said threads lie beneath the tying bill to be hereinafter described and extend over a bearing edge 10 and across two guides 11. Said guides have hooked forward ends 12 adapted to prevent displacement of the threads in one direction, and shoulders 13 to prevent displacement of said threads in the opposite direction. The guides 11 are slightly spaced apart and between them moves a stripper device to be hereinafter described.

The knotter comprises a rotatory tying bill 14 having shearing and clamping jaws, said bill being rotated by means of a spiral-gear pinion 15 fixed upon the shaft of said tying bill and a spiral gear 16 fast to a shaft 17 rotatably mounted in a bearing 18. Upon one end of the shaft 17 is fixed a gear 19 meshing with a gear 20 rigidly mounted upon a shaft 21. Power is transmitted to the shaft 21 in any suitable way.

The means for tightening the loops formed by the tying bill 14 in its rotations and for stripping the knot from said bill comprises a rock shaft 22 having an arm 23 fixed thereto. The arm 23 carries a pivot pin 24 upon which is mounted a hook 25, said hook being arranged to move between the guides 11. Upon the hub of said hook is a lug 26 to which is attached one end of a coiled spring 27, the other end of said spring being fixed to a stationary part of the machine. A lug 28 on the hook 25 is adapted to be engaged by a fixed pin 29 when the hook is near the forward end of its movement, for tilting said hook to permit the threads to be placed rearwardly of its forward hooked end by the fork 4.

The means herein shown for rocking the shaft 22 to reciprocate the stripper hook 25 comprises a cam 30 fixed upon the shaft 21 and engaging an arm 31 rigidly attached to the shaft 22. The cam 30 comprises the concentric portion or dwell 32 and the cam surface 33. The arm 31 is held against the

cam 30 by the spring 27, said spring also tending to move the stripper hook into the operative or thread-engaging position, as shown in Figs. 1 and 2. During the tightening and stripping movement of the hook its forward end slides upon the ledge 34.

35 is a fork traveling with the separator device 3 and serving to draw the completed knot away from the guides 6 and 11.

10 Assuming the parts to be in the position shown in Fig. 3, the operation is as follows: The tying bill 14 is rotated, forming loops in the two threads, the arm 31 meanwhile being held against the concentric portion or dwell 32 of the cam 30 by the spring 27 and the stripper hook 25 standing in the tilted position shown in said figure. When the tying bill has completed the formation of the knot, and has clipped and clamped the ends of the knot, the cam 30 has been rotated into position to permit the spring 27 to draw the hook 25 rearwardly, said hook swinging downwardly and catching the threads as its rearward movement begins. The rearward movement of the hook 25 draws the threads between the guides 11 as shown in Fig. 1, tightening the knot and stripping it from the tying bill 14. The fork 35 moving forward (*i. e.* to the left, Fig. 1) with the separator device at this time draws the knotted ends out of the throatway 5. Meanwhile the cam 30 returns the hook 25 to its forward position, said hook being tilted upwardly by the engagement of the lug 28 with the pin 29 as another pair of threads are brought up to the knotter by the separator device.

It will be apparent to those skilled in the art that various mechanical embodiments of the invention are possible, and I therefore do not wish to be limited to the arrangement and construction shown.

I claim as my invention:

1. In a knot-tying mechanism, in combination, means for forming a knot; two members across which the knotted threads extend; and a hook adapted to draw the knotted threads into the space between said members to strip said knotted threads from the knot-forming means.

2. In a knot-tying mechanism, in combination, means for forming a knot; two members across which the knotted threads extend; and a reciprocatory hook adapted to draw the knotted threads into the space between said members.

3. In a knot-tying mechanism, in combination, means for forming a knot; a pivoted arm; a hook pivotally mounted on said arm and adapted to engage the knotted threads; a fixed pin; a lug on said hook adapted to engage said pin for tilting said hook; a spring tending to pivotally move

said hook and to move said arm in one direction; and a cam for moving said arm in the opposite direction.

4. In a knot-tying mechanism, means for forming a knot, and a hook having sliding movement to and from the knot-forming means and adapted to engage the knotted strands at a point to one side of the knot-forming means.

5. In a knot-tying mechanism, a knot-forming means, a hook-actuating means, and a hook carried by said actuating means movable toward and away from the knot-forming means, said hook being pivoted on its actuating means.

6. In a knot-tying mechanism, the combination with a knot-forming means, of a reciprocatory and swinging hook for moving the threads from the knot-forming means, and means for imparting a swinging movement to the hook at about one limit of its reciprocatory movement.

7. In a knot-tying mechanism, the combination with a knot-forming means, of a reciprocatory thread-engaging means having a swinging movement at approximately the limit of its reciprocatory movement in one direction, so as to engage the thread and remove it from the knot-forming means.

8. A tightening and stripping mechanism for knotters comprising a member across which the threads extend, said member having a shoulder thereon to limit the movement of the threads in one direction, and a reciprocatory hook adapted to engage and pull the threads over said shoulder.

9. A tightening and stripping mechanism for knotters comprising a member across which the threads extend, said member having a shoulder thereon to limit the movements of the threads in one direction, and a reciprocatory hook adapted to swing upward to pass over the threads, said hook being arranged to engage and pull the threads over said shoulder.

10. A tightening and stripping mechanism for knotters comprising two shouldered members across which the threads extend, and a reciprocatory hook arranged to draw the threads into the space between said members.

11. A tightening and stripping mechanism for knotters comprising a reciprocatory hook, means for reciprocating said hook and means for raising said hook to pass over the threads.

12. A tightening and stripping mechanism for knotters comprising a reciprocatory hook, means for reciprocating said hook, and means for swinging said hook with relation to its reciprocating means, to pass over the threads.

13. A tightening and stripping mechanism

ism for knotters comprising a shouldered member across which the threads extend, a movable member, a hook mounted on said movable member, a spring tending to move said movable member in one direction and rock said hook in one direction, means for moving said movable member in the opposite direction, a part along which said hook is arranged to slide, a stationary lug, and a lug on said hook adapted to engage said stationary lug for rocking said hook in one direction. 10

HOWARD D. COLMAN.

Witnesses:

ALBERT E. MEGGISON,
ROY HANSTROM.