

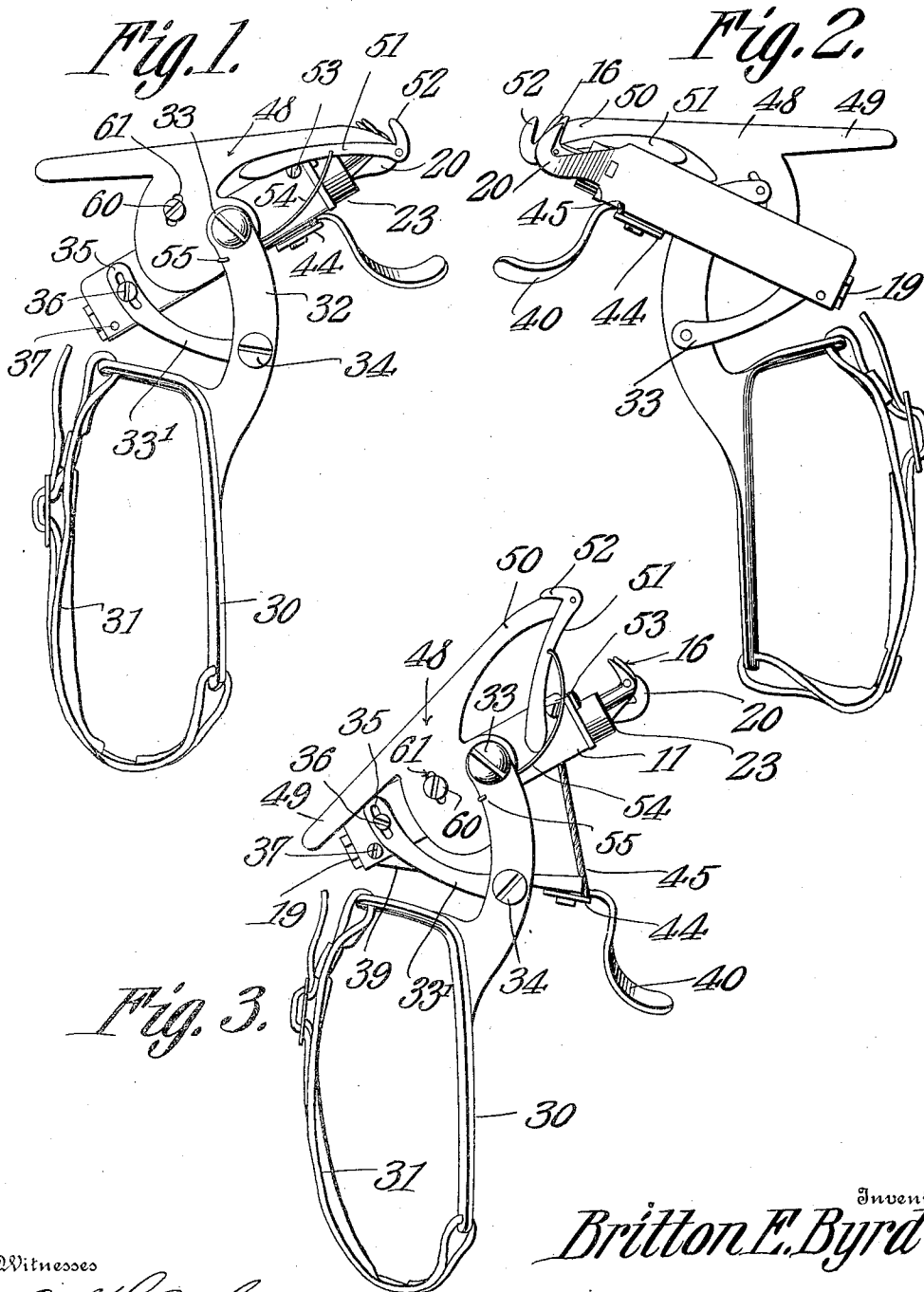
B. E. BYRD.
KNOTTER.

APPLICATION FILED NOV. 19, 1908.

934,389.

Patented Sept. 14, 1909.

2 SHEETS—SHEET 1.



Witnesses

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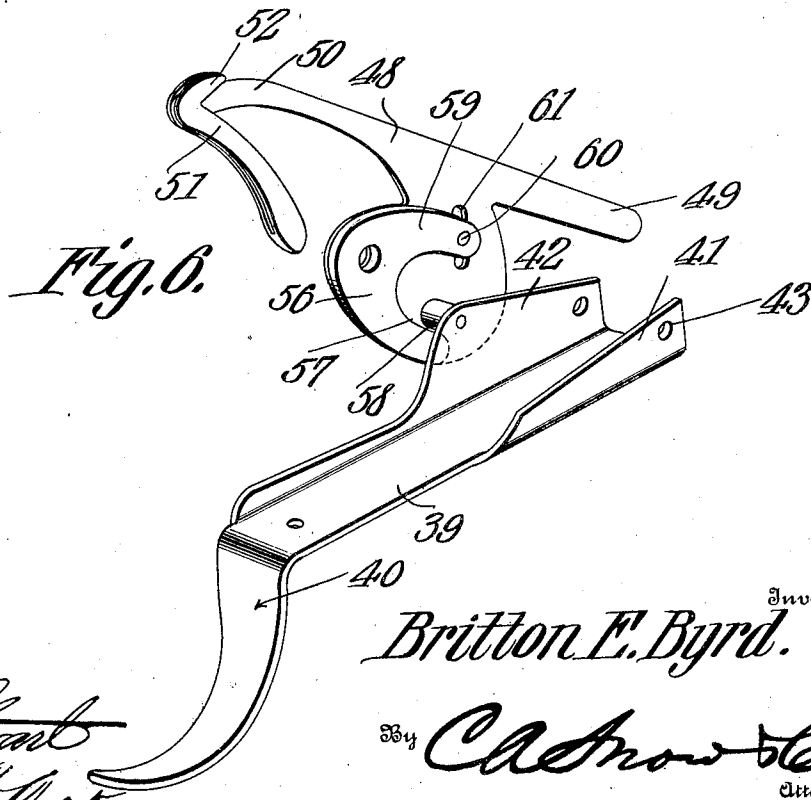
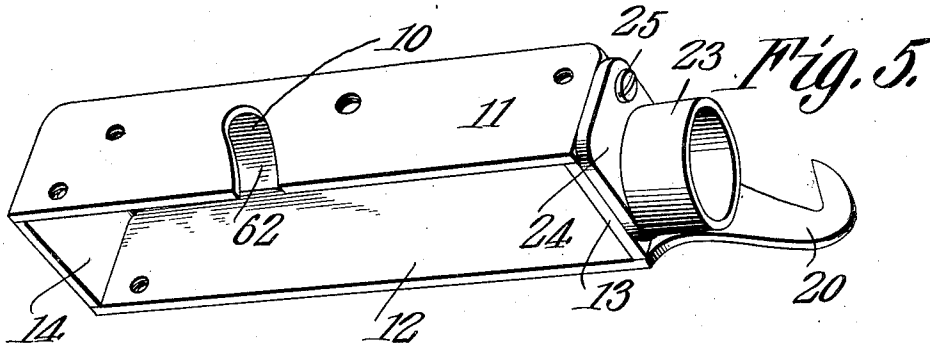
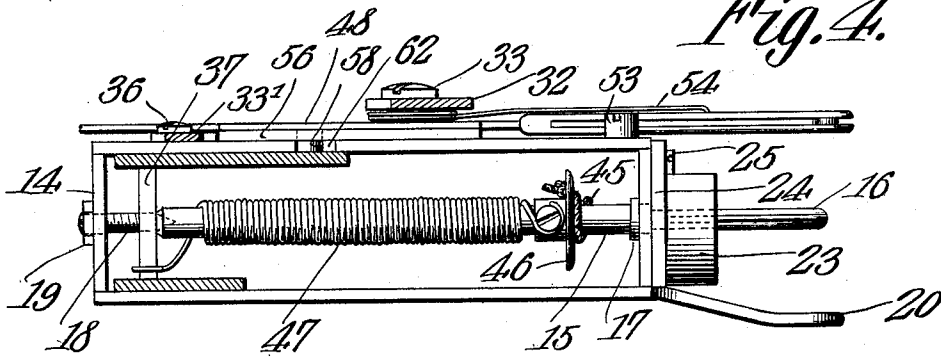
KNOTTER.

APPLICATION FILED NOV. 19, 1908.

934,389.

Patented Sept. 14, 1909.

2 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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KNOTTER.

934,389.

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To all whom it may concern:

Be it known that I, BRITTON E. BYRD, a citizen of the United States, residing at Durham, in the county of Durham and State of North Carolina, have invented a new and useful Knotter, of which the following is a specification.

This invention relates to hand operated knotters and has for its principal object to provide a novel construction of knotter in which practically all the parts are formed of stamped sheet metal, and therefore may be produced at a minimum expense.

A further object of the invention is to provide a construction of knotter in which the operating mechanism is so arranged as to follow a natural movement of the thumb so that the knotter may be operated without fatigue.

A further object of the invention is to improve and simplify the general construction of the frame and the thread clamping mechanism.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

In the accompanying drawings forming a part of this specification:— Figure 1 is a side elevation of a knotter constructed in accordance with the present invention. Fig. 2 is a similar view looking at the opposite side of the knotter, the parts being in normal position and in readiness to receive a thread to be knotted. Fig. 3 is a view similar to Fig. 1, showing the parts in the positions assumed at the completion of the knot tying operation. Fig. 4 is a vertical plan view with the lower portion of the frame in section. Fig. 5 is a detail perspective view of the upper main frame detached. Fig. 6 is a detail perspective view of the thumb actuated lever, showing the manner of mounting the thread clamping lever in position thereon.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

The main frame illustrated in Fig. 5 is formed of a single sheet of metal which may be die stamped and bent to form a top 10, a pair of parallel side walls 11 and 12 and a pair of front and rear walls 13 and 14, the

whole being in the form of an approximately rectangular box open at the bottom.

The front wall 13 is provided with an opening for the reception of the forward end of a tying-bill shaft 15 which carries at the front end a tying-bill 16 of the type usually employed in machines of this class and near the front end of the shaft is a fixed collar 17 which holds the shaft from forward endwise movement.

The rear end of the shaft has a slight recess for the reception of the pointed end of a bearing pin 18 that is mounted in a threaded opening formed in the rear wall 14 of the main casing and locked in place by a nut 19.

The side wall 12 of the casing is extended longitudinally beyond the front wall 13 and thence bent laterally and upwardly to produce a bill 20 which forms a guide for the thread or yarn during the tying operation.

The clamping or cutting member of the tying-bill is actuated as is usual by a ring 23 that is mounted eccentrically with respect to the tying bill shaft, and this ring has a base flange 24 which, in the present instance is confined in place by one or more clamping screws 25.

The handle 30 is preferably stamped or otherwise formed from a single plate of sheet metal bent to conform to the shape of the hand and having its opposite ends provided with openings for the reception of an attaching strap 31.

Formed integral with and extending laterally from the handle 30 is an upwardly curved arm 32 which is connected to the side wall 11 of the main frame by a screw or similar fastening device 33.

Extending between the arm 32 and the rear end of the main frame is an arcuate arm 33', one end of which is fastened to the arm 32 by a screw 34, while the opposite end thereof is provided with a segmental slot 35 for the reception of a relatively small screw 36. Thus it will be seen that by loosening the screw 36 the main supporting frame may be adjusted at an angle or inclination with respect to the handle and securely locked in adjusted position, said main frame swinging on the screw 33 as a pivot.

Pivotally mounted at 37 on the main frame is an actuating lever 39 which forms a closure for the open end of the main frame

and has one end thereof bent downwardly to produce a thumb-piece 40, there being flanges 41 and 42 extending vertically from the opposite longitudinal edges of the actuating member and provided with transversely aligned openings 43 for the reception of the pivot pin 37, as shown.

To the lower side of the forward end of the lever 39 is secured a small clamping plate 44 which serves to hold the lower end of a flexible actuating member preferably in the form of a cord 45 that is wound around the shaft 15 and is secured at its end to a collar 46 on said shaft.

When the lever is pulled down from the position shown in Fig. 1 the cord will be partly unwound from the shaft and the shaft will be turned a number of times sufficient to accomplish the tying operation. The shaft is then returned to normal position by a torsional spring 47 that encircles the shaft and has one end thereof secured to said shaft and its opposite end secured to a fixed point preferably the pivot 37.

Pivoted on the screw 33 is a main thread clamping lever 48 having its upper longitudinal edge disposed in a straight line and its forward portion terminating in an overhanging finger 49.

The rear end of the lever 48 terminates in a main clamping arm 50, to the extreme end of which is pivoted a clamping member 51 that straddles the clamping member 50 and is provided with a clamping hook 52 extending over the clamping edge of the arm 50 in such a manner as to firmly bite the thread.

The clamping member 51 extends rearwardly and is held at all times in contact with a pin or screw 53 that projects from the side plate 11. This clamping member 51 is engaged by one end of a spring 54, the opposite end of which is coiled around the screw 33 a number of times and thence is bent upward under the arm 32 of the handle as indicated at 55. The tendency of the spring is to maintain the two clamping arms in the position shown in Fig. 1 of the drawings and to assist in restoring the clamping arms or members to this position, after each operation. The screw 33 also forms a pivotal support for a small substantially segmental plate 56 having an inclined or cam face 57, which engages a pin or anti-friction roller 58 extending laterally from the flange 42 of the actuating lever 39, so that when the lever 39 is pulled down the roller 58 will ride on the cam face 57 and movement will be transmitted to the thread clamping member.

One of the arms 59 of the plate 56 is provided with a threaded opening for the reception of a screw 60, which latter also passes through an arcuate slot 61 formed in the lever 48, the slot being curved on an arc

structure from the axis of the screw 33 so that by manipulating the screw 60 the angular disposition of the lever 48 may be changed at will. This adjustable connection between the plate 56 and lever 48 also permits adjustment of said members so that the operation of the thread clamping members may be timed with the utmost accuracy.

In order to permit the passage of the roller 58 an arcuate slot 62 is formed in the wall 11 of the main frame, as best shown in Fig. 5 of the drawings.

The operation of the tying bill proper is familiar to all persons skilled in this art, and therefore needs no particular description.

When the operating lever 39 is pulled down the cord 45 is partly unwound from the tying bill shaft 15 and the latter unwound against the resistance offered by the spring 47, and when the pressure on the lever is relieved the spring restores the shaft to its usual position.

As the thumb lever 40 is pulled down the roller 58 will ride on the cam face 57 and movement will therefrom be transmitted to the thread clamping lever 48 causing the latter to move from the position shown in Fig. 1 of the drawings to that illustrated in Fig. 3 so that the threads will be gradually clamped between the members 50 and 52, the clamping action on the thread increasing as the operation progresses, and toward the latter part of the movement the knotted thread is pulled from the tying bill. It will be noted that the main frame is disposed at an obtuse angle to the general plane of the handle member 30 so that when the device is held in the hand in the usual manner the thread guide, thread clamp, and tying bill will be brought into more convenient position for operation. At the same time the actuating lever is arranged to swing downward so that the operator may move the thumb down toward the palm of the hand, the operation being much easier to accomplish than where, as in most machines of this class the movement of the thumb is in the direction of the fore-finger and therefore brings into play muscles which ordinarily are not exercised. It will also be noted that the overhanging arm or finger 49 of the lever 48 by engagement with the screw 36 serves to limit the tilting movement of said lever.

By having the main frame and its associated parts off-set with respect to the handle 30, the thumb-piece 40 is always in position to be engaged by the thumb of the operator without the necessity of bending the thumb at the first joint thereof.

Having thus described the invention what is claimed is:—

1. In a hand operated knotter, a frame including a handle member, a tying bill, a

tying bill shaft mounted in the frame, a thumb lever pivoted at its rear end to the frame and arranged to swing downward during the knot tying operation, and a flexible member wound around the tying shaft and connected to said thumb lever.

2. In a hand operated knotter, a frame including a handle member, a tying bill, a tying bill shaft journaled in the frame, a thumb lever pivoted at its rear end to the lower portion of the frame and arranged to swing downward during the knot tying operation, a flexible member wound around the shaft and connected to said thumb lever, a thread clamping member, and means for transmitting movement from the thumb lever to said thread clamping member.

3. In a hand operated knot tying machine, a main frame, and a handle frame disposed at an obtuse angle to each other, a tying bill, a tying bill carrying shaft journaled in the main frame, a thumb lever pivoted in the main frame and arranged to swing downwardly and toward the handle member during the knot tying operation, and a flexible member wound around the shaft and connected to said thumb lever.

4. In a hand operated knot tying machine, a main frame, a handle frame off set with respect to the main frame and disposed at an obtuse angle to the latter, a tying bill, a tying bill carrying shaft journaled in the main frame, a thumb lever pivoted in the main frame and arranged to swing downwardly during the tying operation, and a flexible member wound around the shaft and connected to said thumb lever.

5. In a hand operated knot tying machine, a substantially rectangular main frame, a handle frame having an integral curved arm rigidly secured to the main frame, a thumb lever pivoted at its rear end to the rear portion of the main frame and arranged to fit between the latter when in closed position, a tying bill, a carrying bill shaft journaled in the main frame, a flexible member wound on the shaft and connected with the thumb lever, a thread clamping member, and means for connecting the terminal clamping member to the thumb lever.

6. In a hand operated knot tying machine, a main frame, a thumb lever pivoted thereto, a tying bill actuated from the thumb lever, a thread clamping lever having a cam face, a projection extending from the thumb lever and engaging said cam face, and a secondary clamping member pivotally connected to and carried by said clamping lever.

7. In a hand operated knot tying machine, a main frame, a thumb lever pivoted thereto, a tying bill, means for actuating the tying bill from the thumb levers, a thread clamping lever, a plate adjustably secured thereto and provided with a cam face, a projection extending from the thumb lever and engag-

ing said cam face, a complementary clamping member carried at the free end of the lever, and means for limiting the swinging movement of said complementary clamping member.

8. In a hand operated knot tying machine, a main frame, a tying bill, a thumb lever for operating said tying bill, a main thread clamping lever, a plate pivotally connected with the clamping lever and provided with a cam face, adjustable means between the plate and lever, a projection extending from the thumb lever and engaging the cam face, a complementary member, and means serving to restore the clamping member and lever to initial position.

9. In a hand operated knot tying machine, a main frame, a handle off set with respect to the main frame, a connection between the handle and main frame for permitting adjustment of the latter with respect to said main frame, a thumb lever carried by the main frame, a tying bill actuated from the thumb lever, a thread clamping lever having a cam face, a projection extending from the thumb lever and engaging said cam face, and a secondary clamping member pivotally connected to and carried by said clamping lever.

10. In a hand operated knot tying machine, a main frame, a handle having an arm extending laterally from one longitudinal edge thereof and pivotally connected with the frame, a slotted arm forming a connection between the arm of the handle lever and the main frame to permit tilting movement of said main frame, a tying bill, a tying bill shaft mounted in the frame, a thumb lever pivoted at its rear end to the frame and arranged to swing downwardly during the knot tying operation, and a flexible member wound around the tying shaft and connected to said thumb lever.

11. In a hand operated knot tying machine, a main frame, a thread clamping lever pivotally mounted on the main frame and having one end thereof extended longitudinally to form a stop finger, a thumb lever, a tying bill actuated from the thumb lever, a plate having a cam face, and a projection extending laterally from the thumb lever and engaging the cam face for actuating the thread clamping member.

12. In a hand operated knot tying machine, a main frame having a slot formed in one side thereof, a handle member off set with respect to the main frame and secured to the latter, a connection between the handle and main frame to permit the angular adjustment of said main frame, a thread clamping lever, a thumb lever pivotally mounted on the main frame, a tying bill actuated from the thumb lever, a plate having a cam face, a projection extending laterally from the thumb lever and operating

within the slot in the main frame for engagement with the cam face of the plate, there being a segmental slot formed in the thread clamping lever, and a screw extending
5 through said slot and engaging the plate for adjusting the thread clamping lever relatively to said plate.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

BRITTON E. BYRD.

Witnesses:

J. S. PERRY,

W. H. McCABE, Jr.