

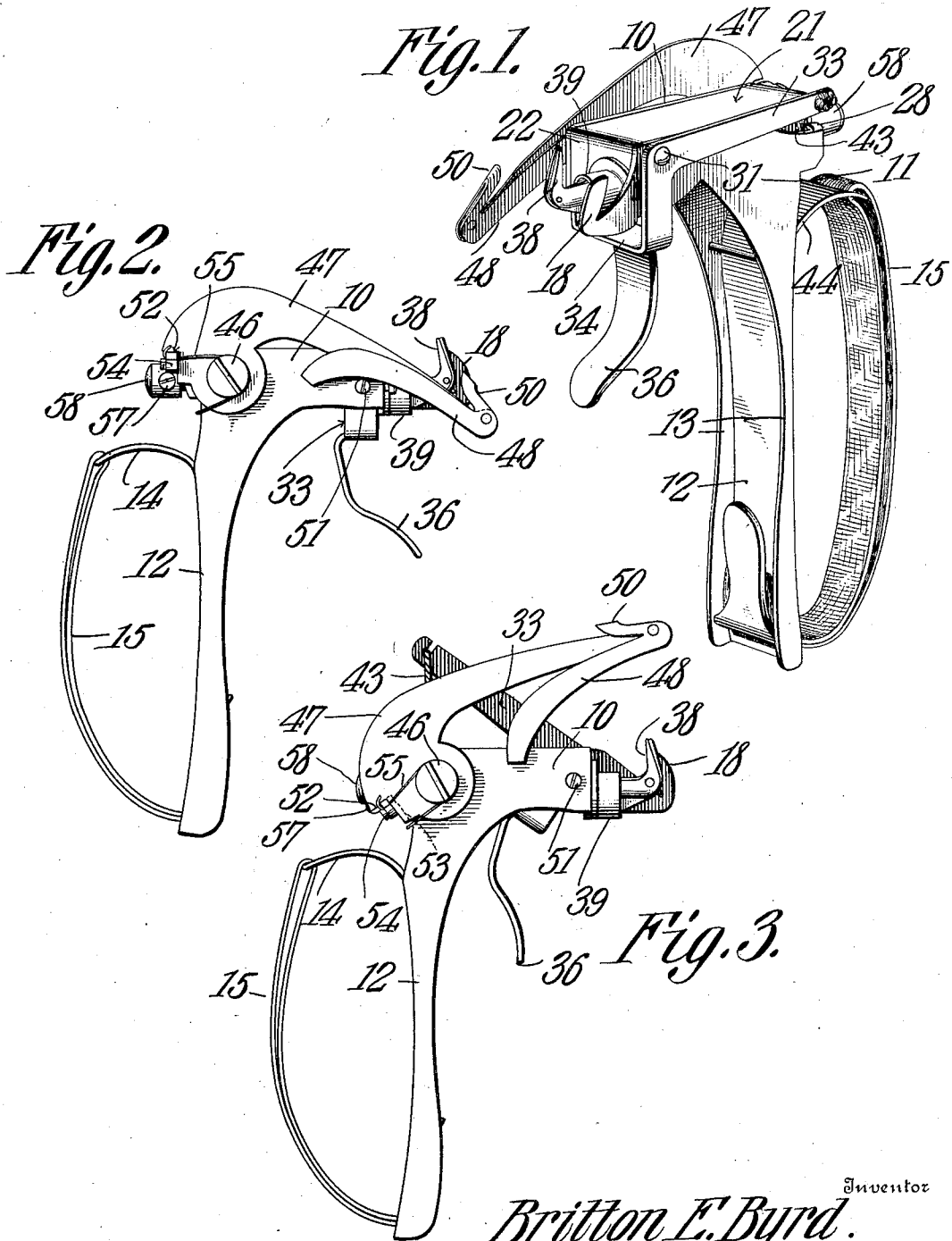
B. E. BYRD.
KNOTTER.

APPLICATION FILED JAN. 14, 1908.

Patented Sept. 14, 1909.

2 SHEETS—SHEET 1.

934,388.



Witnesses

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C. J. Smith

Inventor
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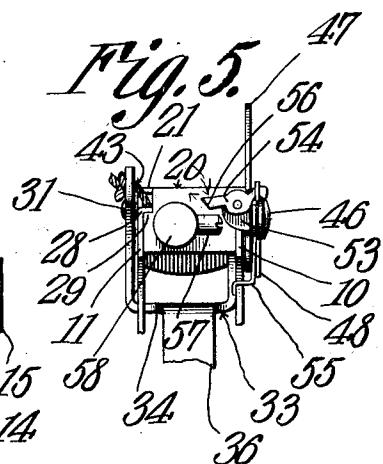
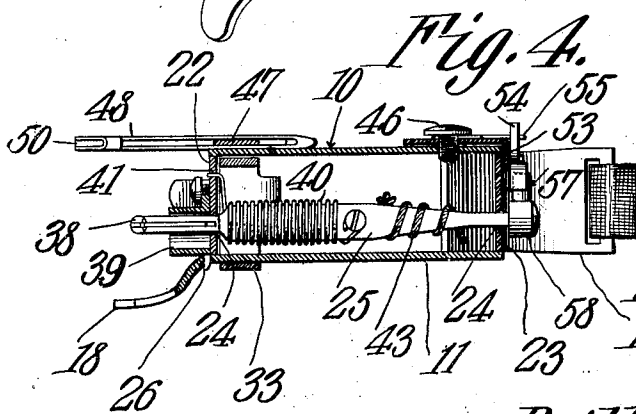
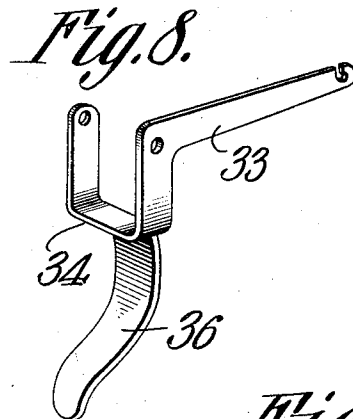
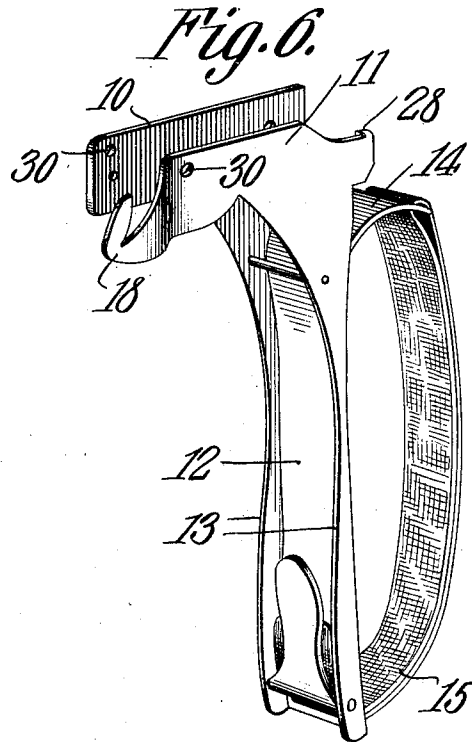
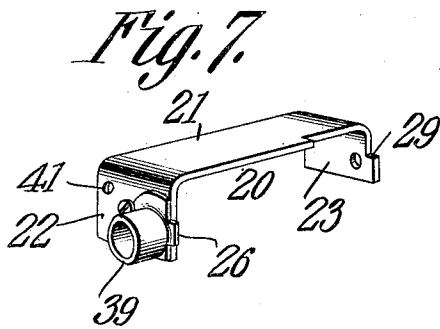
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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KNOTTER.

934,388.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed January 14, 1908. Serial No. 410,820.

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 materially simplify and cheapen the construction of such devices.

A further object of the invention is to increase the efficiency of the device and render its operation more certain and positive by the elimination of the numerous cam and gear mechanism which have heretofore been found necessary in the operation of devices of this type.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a perspective view of a knotter constructed in accordance with the invention. Fig. 2 is a side elevation of the knotter in position to receive the thread or yarn to be knotted. Fig. 3 is a similar view showing the position of the parts at the completion of the knotting operation. Fig. 4 is a sectional plan view of the knotter. Fig. 5 is a rear end elevation. Fig. 6 is a perspective view of the handle member of the frame. Fig. 7 is a similar view of the top portion of the frame. Fig. 8 is a perspective view of the actuating lever.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The main frame of the knotter is formed of a single piece of stamped sheet metal, that is so bent as to form a pair of side plates 10 and 11, and a handle 12, the rear portions of the side plates curving downward and being reduced in width to form reinforcing flanges 13 at the opposite edges of the handle.

The metal at the upper portion of the handle is split and bent outward and rearward to form a tongue 14, having an eye for the passage of the handle strap 15, the lower end of the latter being secured to the bottom of the handle in the usual manner. The outer or forward end of the side plate 11 is curved outward and forward and so shaped as to constitute a guide 18 that receives the yarn or thread to be tied.

The second member 20 of the body portion of the knotter is, also, formed of stamped sheet metal and comprises a plate bent to form a flat top 21 and front and rear ends 22 and 23 that are disposed at a right angle to the top, these end plates having bearing openings 24 for the reception of the knotter shaft 25. One edge of the forward plate 22 is provided with a laterally projecting tongue 26 that extends through a suitable opening formed in the adjacent side plate 11, and is thence bent in order to secure the members together, and the rear end of the side plate 11 has an inwardly bent tongue 28 that is turned over a shoulder 29 formed at one side of the rear wall 23 of the member 11.

The opposite side plates 10 and 20 are provided with openings 30 for the reception of a pin or screw 31 which extends completely across the frame and serves as a reinforcing means. This screw or pin serves, also, as a pivot for the reception of an operating lever 33. The lever is formed of a single piece of stamped sheet metal bent into U-shape at the front end as indicated at 34 that extends under the forward portion of the knotter, one of the arms of the lever being arranged at one side of the plate 11 and extending rearward to a point slightly beyond the end wall 23 of the frame. From the rear of the cross bar of the U shaped portion of the lever depends a thumb piece 36 that is arranged in convenient position to receive the thumb of the operator.

The knotter shaft 25 is of uniform diameter at its forward end, and has a threaded opening to receive the stem of the knotter 38, the latter being of the structure usually employed, and having a centrally located cutting and clamping member that is provided with a cam wing operated by an eccentrically disposed ring 39. The cylindrical portion of the shaft 25 receives a torsion spring 40, one end of which is permanently

secured to the shaft, while the opposite end extends through an opening 41 formed in the front wall 22 of the frame. The rear end of the knotter shaft is tapered, reducing slightly from the cylindrical forward and toward the rear end and thence being abruptly reduced at the point where it passes through the opening in the rear wall 23 of the frame, so as to form a shoulder that will prevent endwise movement of the shaft. Coiled around the tapered portion of the shaft is a flexible member 43 one end of which is secured to the shaft at a point near the largest diameter thereof, while the opposite end, which extends from the portion of smallest diameter, is secured to the end of the operating lever 33. As the lever is operated, the flexible member 43 will be unwound from the shaft and the latter will be rotated thereby turning the knotter to effect the tying operation.

It will, of course, be understood that as the movement of the lever progresses, the resistance offered by the spring will proportionately increase, so that greater exertion is required toward the latter end of the movement than is necessary at the commencement of the tying operation. This is compensated for by the gradual increase in diameter of the winding surface of the shaft, inasmuch as the radial distance of the winding surface, and therefore the leverage force, gradually increases as the unwinding movement progresses and the speed of operation of the lever may, therefore, be gradually reduced and it will be in most cases involuntarily reduced without lessening the speed of rotation of the knotter. The U-shaped lever further operates as a stop for limiting the movement of the knotter, the cross bar of the lever coming into contact with the curved wall of the side plate 11 of the main frame when the knotting operation is complete.

Projecting from the rear portion of the side plate 10 is a screw 46 which forms a pivot for the reception of a lever 47 that is curved upward and forward and which carries at its free end a thread clamping arm 48. This arm is hollow, being preferably formed of sheet metal bent in such manner as to receive the lever 47, and from the forward end of the arm extends a tongue 50 that is arranged to coact with the upper edge of the forward end of the lever when clamping the thread and holding the same during the knotting operation. The rearwardly projecting end of the arm acts as a weight, and this end of the arm normally rests against a stop pin 51 that limits its downward movement. When the lever is raised, (Fig. 3) the weighted end of the arm will remain down at first in engagement with the stop pin, and then rising from the pin as the upward movement continues so

that the tongue 50 will be moved downward over the outer end of the lever 47, and if a thread is in place, the thread will be clamped and held during the operation of the knotter.

At the rear of the pivoted end of the lever is a shoulder 52, and under this shoulder the metal of the lever is bent inward to form a tongue 53. On this tongue is pivoted a small lever 54, the outer arm of which extends under the shoulder 52, and is engaged by one end of a spring 55 that is coiled around the screw 46, the opposite end of said spring being secured to a fixed part of the frame. The tendency of the spring operating through the lever 54 is to maintain the lever 47 in initial position, that is to say, in the lowermost position with the weighted end of the thread clamping arm 48 resting against the stop 51.

The inner arm of the lever 54 has a tapered lower face 56, and this arm of the lever is arranged in the path of movement of a pin 57 that projects from a collar 58 that is adjustably secured to the reduced end portion of the knotter shaft.

As the knotter shaft is rotated clockwise as shown in Fig. 5, the pin 57 will engage the upper edge of the lever just before the thread cutting operation is complete, and the lever 47 will be moved upward so that the tongue 50 of the thread clamping arm may move down and the yarn or thread will be caught and held between the tongue 50 and arm 57 during the remaining portion of the operation, that is to say, during the completion of the cutting operation and the withdrawal of the knotted thread from the bill of the knotter as is usual in devices of this type. The pin 57 will pass completely beyond the lever before the movement of the knotter is complete, said knotter making a stroke of one and one-fourth revolutions at each operation, and after the pin moves from engagement with the lever, the spring 55 is free to act to restore the thread clamp to the initial position which is immediately accomplished, and the knotted thread released. When the pressure of the thumb piece is relieved, the torsion spring 40 rapidly turns the knotter shaft in the opposite direction and winds up the flexible member 43 and as the knotter shaft turns the pin 57 will ride under the tapered end 56 of the lever 54 and will snap past the lever against the resistance offered by the spring 55, the lever then returning to place in engagement with the shoulder 52.

I claim:—

1. In a manually operable knotter, a frame, thread guiding and clamping means, a tying bill, a carrying shaft for the tying bill journaled in the frame and locked against longitudinal movement, an operating lever, a flexible member wound around the shaft and having one end connected to the lever, and

serving to effect movement of the shaft in one direction, and a spring for turning the shaft in the opposite direction.

2. In a manually operable knotter, a frame, a lever pivoted thereto, thread guiding and clamping means, a tying bill, a carrying shaft therefor, said shaft having a tapered winding surface, a flexible member mounted upon said surface and having one end secured to the shaft and the opposite end to the lever for effecting movement of the shaft in one direction, and a spring for turning the shaft in the opposite direction.

3. In a manually operable knotter, a frame, an operating lever pivoted thereto, a tying bill, a carrying shaft for said tying bill, the shaft being provided with a tapered winding surface, a flexible member wound around such surface and having one end secured to the largest diameter of the shaft, the opposite end of said flexible member extending from the smallest diameter of the shaft to the lever, said lever serving to effect movement of the shaft in one direction and a spring for turning the shaft to normal position.

4. In a manually operable knotter, a frame, thread guiding and clamping means supported by the frame, a revoluble tying bill, a shaft carrying the bill, a flexible member wound upon the shaft and having one end secured thereto, an operating lever having a U shaped end portion, and a depending thumb piece, said lever having a rearwardly extending arm to which the opposite end of the flexible member is secured, the frame being arranged to form stops for limiting movement of the lever in both directions, and a spring surrounding the shaft and serving to restore the parts to initial position after each operation.

5. In a device of the class described, a two part frame formed of sheet metal, one member being bent to form a pair of parallel side plates, and a downwardly extending flanged handle, the front end of one of the side plates being continued forward and shaped to form a thread guide, the second member being bent to form a top plate, and

a pair of end plates disposed at a right angle thereto, said end plates being provided with alining openings, a main shaft mounted in said openings, a tying bill secured to one end of the shaft, a flexible member wound upon the shaft, a lever pivoted to the side plates and having an arm connected to said flexible member, a torsion spring encircling the shaft and serving to restore the same to initial position, a thread clamp pivoted to the frame, and means on the rear end of the shaft for operating said thread clamp.

6. In a manually operable knotter, the combination with a frame, of a tying bill, a carrying shaft therefor, means for operating the shaft, a lever pivoted to the frame, and a counter-weighted gravity actuated thread clamp supported by said lever.

7. In a manually operable knotter, a frame, a tying bill, a shaft carrying the same, means for operating the shaft, a lever pivoted to the frame, means for operating the lever, a thread clamping arm pivoted to the free end of the lever and provided with a rearwardly extending hollow tongue arranged to embrace the upper edge of the lever, said clamping arm being counter-weighted to hold the clamping tongue in operative position by gravity.

8. In a manually operable knotter, a frame, a tying bill, a shaft carrying the same, a lever pivoted to the frame, a gravity actuated thread clamp mounted on the lever, a spring tending to hold the clamp against the stop, a two armed lever pivoted to and carried by the main lever, one of the arms being arranged to engage a shoulder on said main lever, and being held thereagainst by the spring, and a pin projecting from the shaft and arranged to engage the opposite arm of said lever for actuating the clamping device.

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:

SOUTHGATE JONES,
J. S. PERRY.