May 20, 1952 F. M. O'BRIEN 2,597,519

THREAD NIPPER

Filed June 21, 1949

FIG. 1.

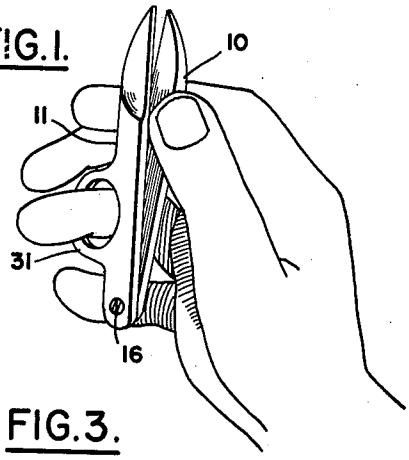


FIG. 2.

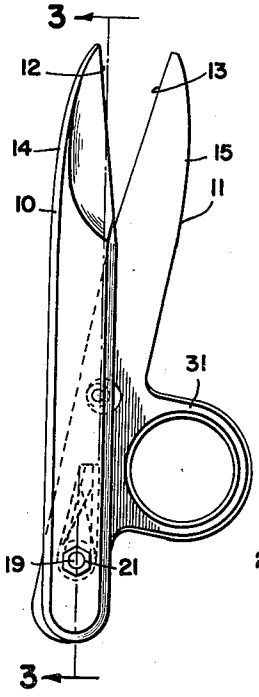
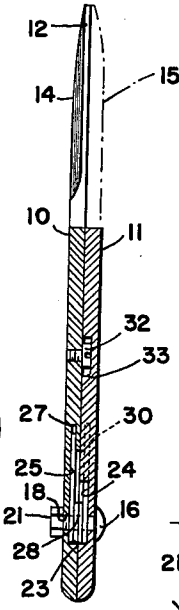


FIG. 3.



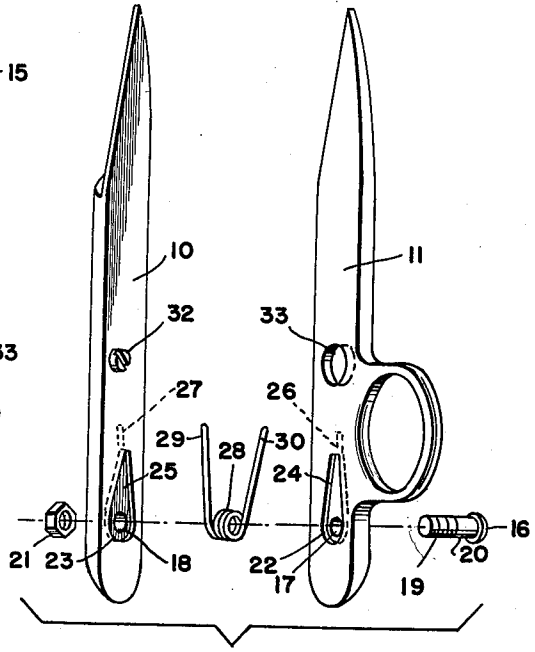


FIG. 4.

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THREAD NIPPER

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1 Claim. (Cl. 30—253)

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In common with the implement of that prior patent, the present invention aims to provide a conventional scissors in which a concealed spring functions to maintain the cutting blades in an open position and to return the blades to this open position after each manual actuation to close the blades upon the thread; there being also included a limit stop to restrict the extreme movements of the scissors blades in both open and closed positions.

In the prior patent referred to the pivot C on which the blades A and B relatively rock is displaced from all parts of the spring *e* and particularly and critically from the hinge portion of the spring which connects the two arms of the spring and about which these arms move in the flexing of the spring. This offsetting of the spring hinge from the blade pivot puts a twisting motion and a strain on the entire spring during the operation of the thread nipper which shortens the life and actually impairs the action of the spring.

An object of the invention is to so reorganize and reconstruct the parts of the blades which receive the spring and the pivot that the spring hinge is brought into coincidence with the pivot. This new location of the spring on a common center with the pivot point eliminates the undesirable twisting of the spring parts and strain to which the same has been heretofore subjected.

It is another object of the invention to revise the form of spring over that disclosed in the prior patent aforesaid in that the spring hinge is in the form of a helix with the spring arms coming off offset ends of such helix; this feature of improvement residing not merely in the provision of a helical spring but where the spring hinge is coincident with the blade pivot that helical form of spring hinge cooperates with the pivot pin to enable the pivot pin to pass through the helix as a post or bearing shaft for the coil, supporting and holding the spring in place and rendering the action of the assembly much smoother and snappier, and also requiring less finger pressure on the part of the operator to close the nipper, while assuring that the blades open with extraordinary quickness.

A further object of the invention is to provide a thread nipper of the character above described in which the reconstruction and rearrangement referred to makes the assembly and disassembly easier and otherwise improves the device as a commercial article.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claim appended hereto.

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In the drawings, wherein the symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a perspective view of a thread nipper constructed in accordance with the present invention and shown held in a position of operation.

Figure 2 is a side elevation, taken on an enlarged scale of the device in normal open position.

Figure 3 is a longitudinal section taken on the line 3—3 in Figure 2, and

Figure 4 is an exploded view showing in perspective the blades, spring and pivot bolt separated.

Referring more particularly to the drawings, 10 and 11 represent the two blades or members constituting the scissors and having the cutting edges 12 and 13 respectively. The outer edges of the blades opposite the cutting edges are flared or otherwise operated upon to produce the pads 14 and 15 for the comfort of the finger or thumb when used in compressing the scissors.

The two blades 10 and 11 are pivoted together by the pivot screw 16 or other suitable means, the head of which fits against one of the members 11 and also through a perforation 18 in the other member or blade 10. The pivot bolt 16 is provided with an outer threaded portion 19 and an inner plain unthreaded portion 20. At least a part of the outer threaded portion 19 projects beyond the outer face of the blade or member 10 where the same receives a nut 21 for binding the pivot bolt 16 in place.

As shown more particularly in Figure 4 the blade 11 is formed with a partial socket 22 which is adapted to overlie and complement a similar partial socket 23 in the companion blade 10; it being understood that these sockets are made in the mutually inner faces of the blades 11 and 10 and that when these blades are assembled together the sockets 22 and 23 will mate and produce a closed cavity coaxial with the perforations 17, 18 and coaxial with the axis of the pivot bolt 16. The sockets 22, 23 communicate with elongated recesses 24 and 25 respectively in the inner faces of the blades 11 and 10 and these recesses, like the sockets 22 and 23 open out on the inner faces of the blades but are concealed by the outer portions of the blades. These recesses extend off their respective sockets in directions longitudinally of the blades which are angular to one another when the blades are assembled together. In Figure 4 the longitudinal direction of both recesses 24 and 25 is shown inclining upwardly toward the right from the respective sockets 22 and 23 but when the blade 11 is turned over to mate

with its companion blade 10 the recess 24 will not accurately mate throughout its area with the recess 25 but will be slightly angularly offset therefrom.

The recesses 24 and 25 preferably taper in the direction away from the sockets 22, 23 and cavities or bores 26 and 27 are made in the blades 11 and 10 respectively communicating with the upper narrower ends of the recesses 24 and 25.

A spring helix 28 is adapted to be received in the sockets 22, 23 and about the shank of the pivot bolt 16. This helix 28 has spring arms 29 and 30. One spring arm comes tangentially off one end of the helix 28 while the other spring arm 30 comes tangentially off the other end of the helix. The tangent points are preferably substantially diametrically offset one another so that at the end convolutions of the spring helix or spring hinge 28 the arms 29, 30 are in relatively angularly displaced positions with the arms 29 and 30 preferably diverging to such an extent that when assembling these arms 29 and 30 will have to be moved together on the circle of the helix 28 in order to cause both such spring arms to register with the recesses 24 and 25 which are designed to receive these spring arms with the terminal ends of the arms fitted into the cavities 26 and 27. This helix or coil stack is preferably formed from a single strand of resilient wire coiled intermediate its ends into a suitable number of convolutions. The spring is wholly concealed and protected by the blades 10 and 11. The potential energy and torsion given the spring is such that when the same is in the position shown in Figure 4 alone and apart from the pocketed construction of the blades 10 and 11, the spring arms 29 and 30 will inherently seek an angular outstretched position which is greater than the distance by which the recesses 24, 25 are offset. This arrangement requires that the spring arms 29, 30 be moved angularly together to bring the same in alignment with the recesses 24, 25 in which they are inserted and this action places the helix 28 under the necessary tension. The spring tends to open at all times and to spread the spring arms 29 and 30 which react against the side walls of the recesses 24, 25 and also against the walls of the cavities 26, 27, thus biasing the blades 10 and 11 to the open position shown in Figure 2.

By inserting a finger through the finger hold 31 and otherwise grasping the device in the manner generally indicated in Figure 1 and with the thumb and first finger exerting pressure on the pads 14 and 15, the cutting edges 12 and 13 may be closed by manual pressure against the influence of the torsion spring. During such movement the spring arms 29, 30 will be rotated together to further wind the spring convolutions 28 and to store energy in the spring. When released the spring will react to force the scissors blades 10 and 11 into the open position.

A stop screw or other abutment 32 may be carried by one of the blades, for instance the blade 10 in position to occupy a stop socket 33 produced in the inner face of the companion blade 11; it being understood that the diameter of the socket 33 exceeds that of the stop projection 32 by an amount preselected to limit the through or relative angular movement of the blades 10 and 11 in both opening and closing movements.

In assembly, the two blades are brought together on the spring with the ends of the spring arms 29 and 30 being slid upwardly into the cavities 27, 26 so that the spring arms fall into

the recesses 25, 24 while the spring helix or hinge is received in the socket 23, 22. The pivot bolt 16 is then inserted through the openings 17, 18 and it will be found that the open or hollow spring helix or hinge 28 is in registry with the openings 17, 18 so that the bolt 16 is also received therethrough. The nut 21 is thereupon run upon the projecting end of the bolt 19 and tightened up, the nut 21 being larger in diameter than the opening 18 and therefore abutting against the outside face of the blade 10. The nut 21 is tightened so that the correct cutting pressure is exerted on the cutting edges 12 and 13. This cutting pressure or shear is heightened by the fact that the coil stack 28 engaging against the inner walls of the sockets 23, 22 tends to move the blades 10 and 11 apart, this tendency being overcome by tightening the nut 21. The nut 21 and its companion bolt 16 therefore constitute not merely a form fastening or a pivot axis for the blades but the arrangement also serves to adjust the tension of the coil spring 28 insofar as it tends to move the blades apart and place tension shear on the cutting edges 12, 13. Thus the form of helix 28 has a double function, namely to place the spring arms 29 and 30 under a tension in a torsional or rotary sense to open the blades after release following each closing operation; but the spring coil is also of such axial length that it is put under compression when the nut 21 is finally tightened and its tendency to react and expand axially causes the blades to tend to move apart and thus places shear tension on the cutting edges 12, 13. Where the spring helix or hinge 28 is offset from the pivot axis it is necessary to insert the spring, hold the blades together with the openings in line and insert the bolt 16. This is difficult because the spring tends to push the blades apart.

With the new assembly in which the helix 28 is coaxial with the pivot 16 the assembly of the nipper is easier because the spring may be held by the bolt during the assembling operation. In other words the bolt 16 may be fitted through the perforation 17 and the spring helix 28 entered over the shank of the bolt and the threaded end 19 of the bolt afterwards passed through the opposed perforation 18 of the other blade 10, the nut 21 being subsequently run upon the outer end of this threaded portion 19. The spring arms 29 and 30 are of course sufficiently flexible to be bent or curved momentarily out of shape for the purpose of fitting the terminals thereof into the cavities 26, 27.

The reorganization and reconstruction of the device with the axis of the coil helix 28 and that of the pivot bolt 16 coincident has greatly improved the action of the thread nipper itself and in addition greatly prolongs the life of the spring for the reason that the bolt passing through the hollow helix itself adds considerable support to this member. The new method of construction also facilitates the replacement of springs when necessary.

The helix 28 preferably fits over the plain unthreaded portion of the pivot bolt 16 so that it may be free to rotate and to contract and enlarge without interference from the bolt but at the same time to receive internal support from the bolt.

Although I have disclosed herein the best form of the invention known to me at this time, I reserve the right to all such modifications and

changes as may come within the scope of the following claim.

What I claim is:

A tool of the character described comprising a pair of blades having complementary cutting ends and opposing hinged ends, said last ends being formed with registering transverse openings and partial sockets formed on the inner faces of the ends and arranged coaxial with the openings, said sockets communicating with elongated recesses which taper longitudinally of the blades from the sockets toward the cutting ends, said blades having longitudinally disposed bores communicating with the tapered ends of the recesses spaced from the openings, a spring having a helix coil and arms extending outwardly from the helix, said coil being seated in the sockets and arranged transversely between the blades with its ends disposed in the recesses and received at their free terminals in the bores,

the opening of said coil being aligned with the openings in the blades, a pivot passing through the openings and said coil, and means carried by the pivot for clamping the blades together.

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