

Oct. 7, 1930.

E. J. GEARHART

1,777,610

RUNNER KNITTER

Filed Dec 14, 1929

Fig. 1. *Fig. 2.* *Fig. 3.*

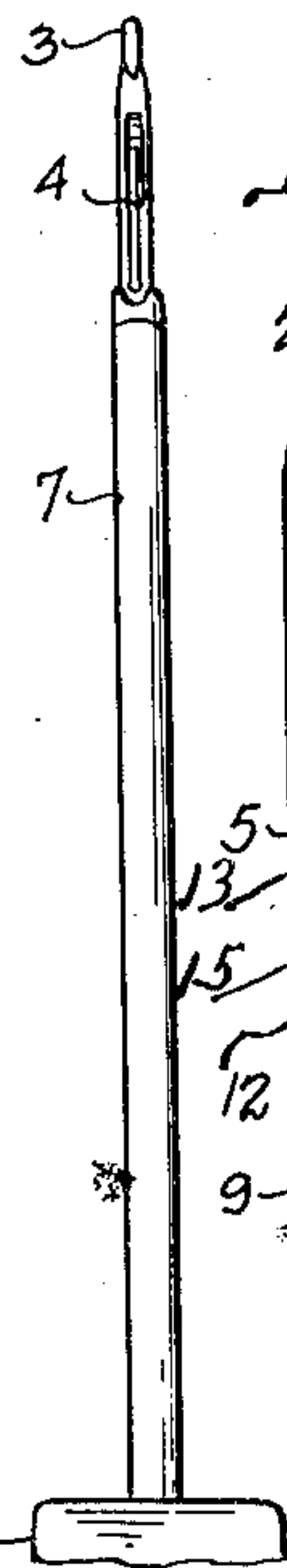
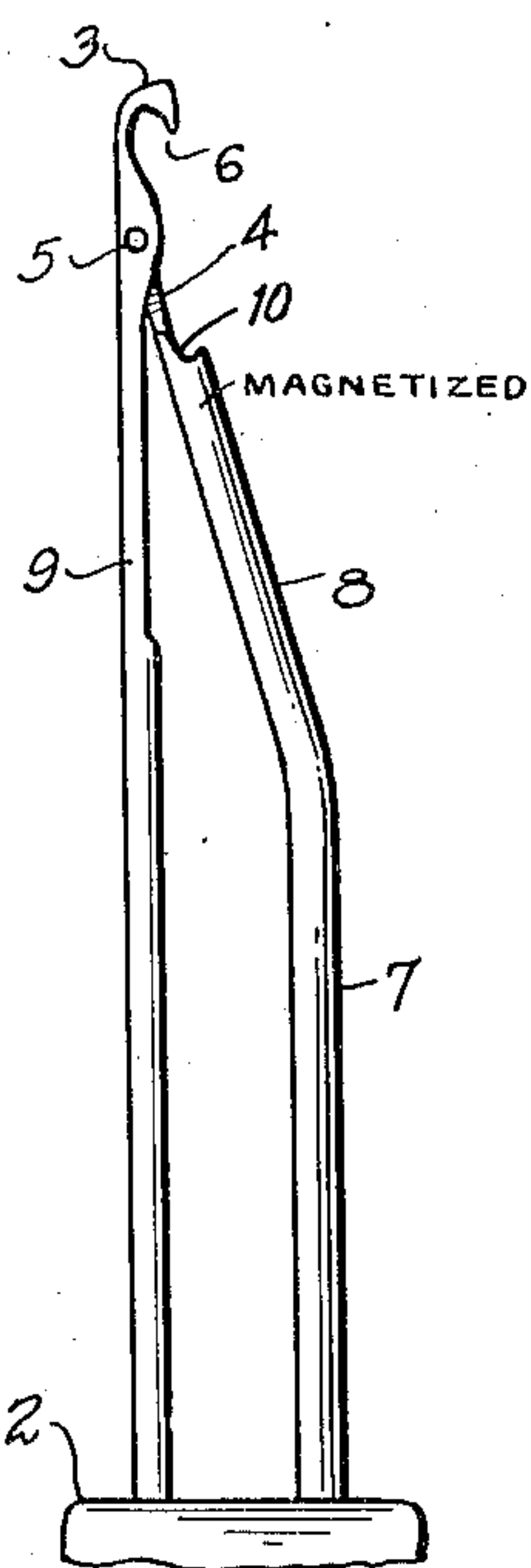
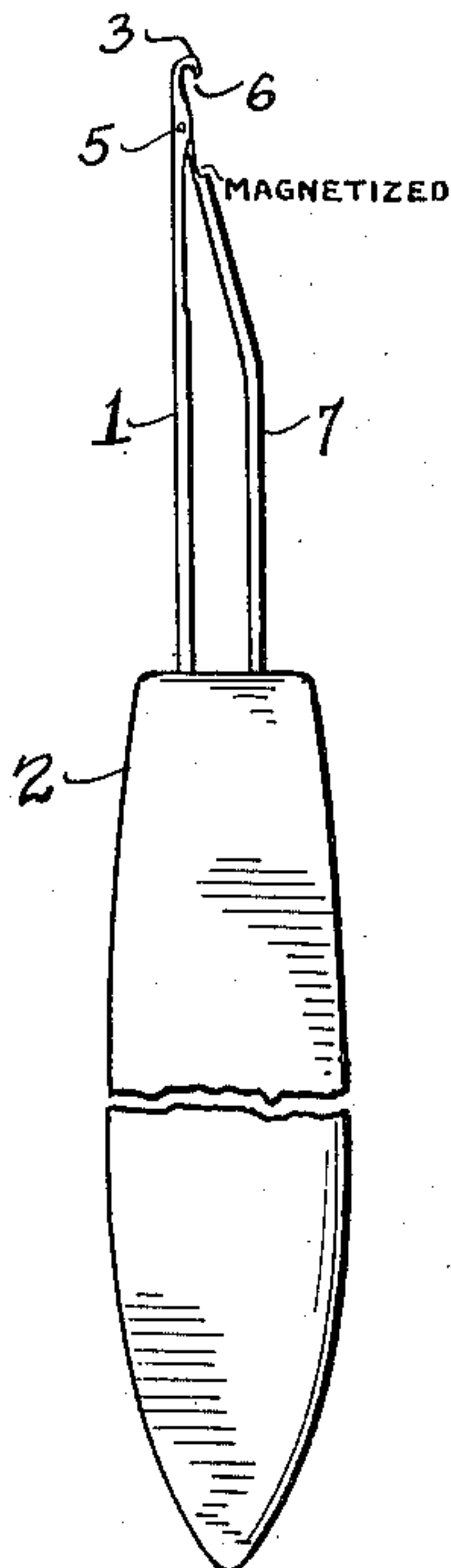


Fig. 4.

Fig. 5.

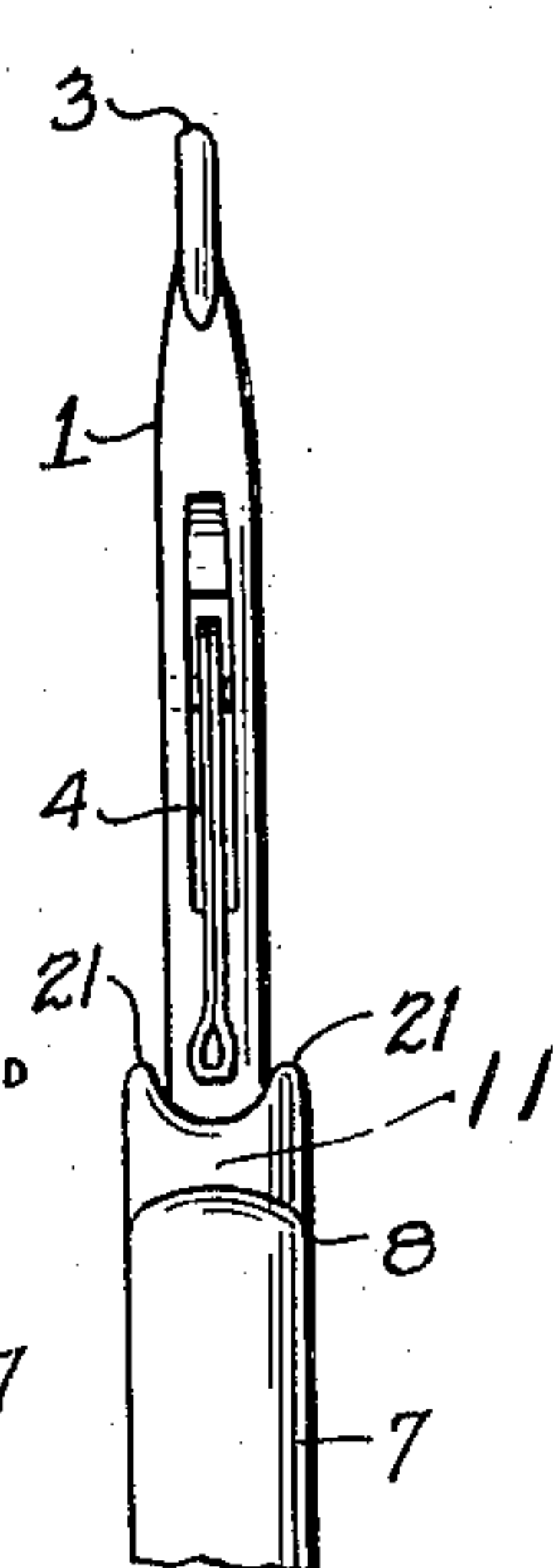
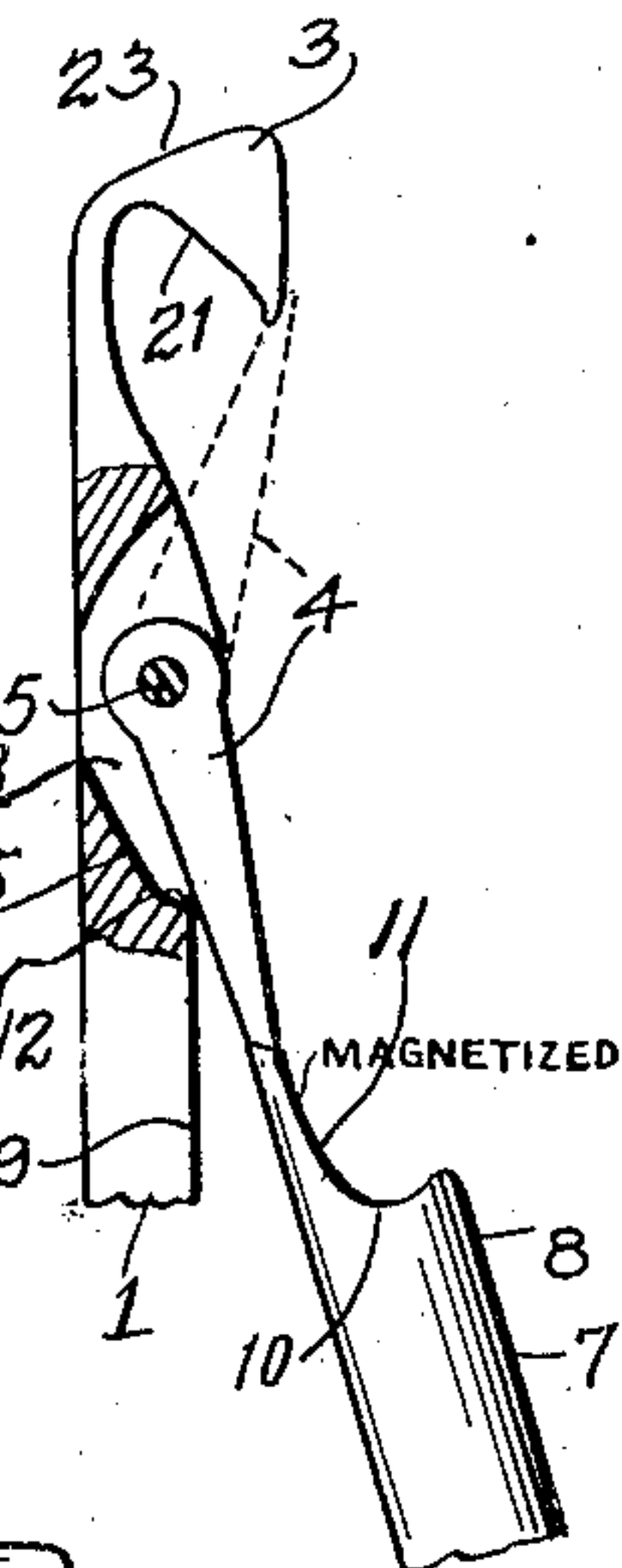


Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 6.

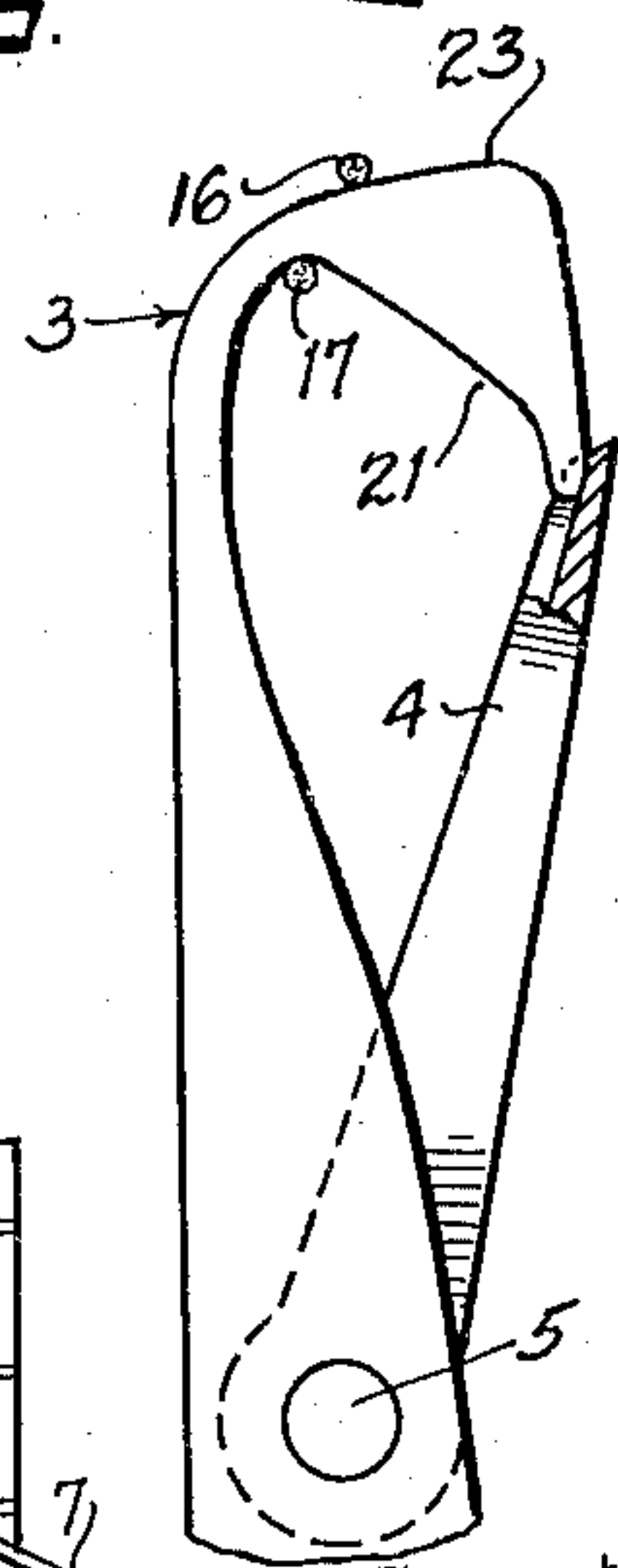
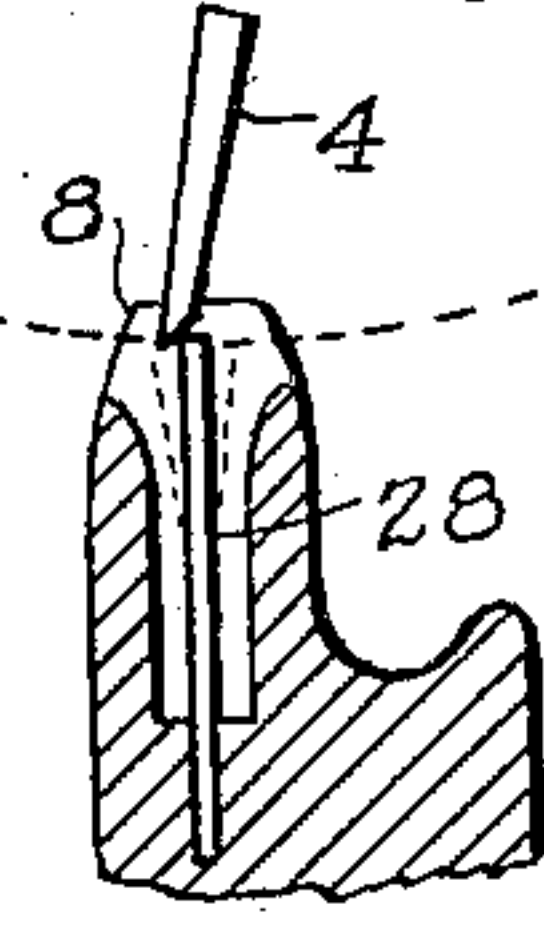
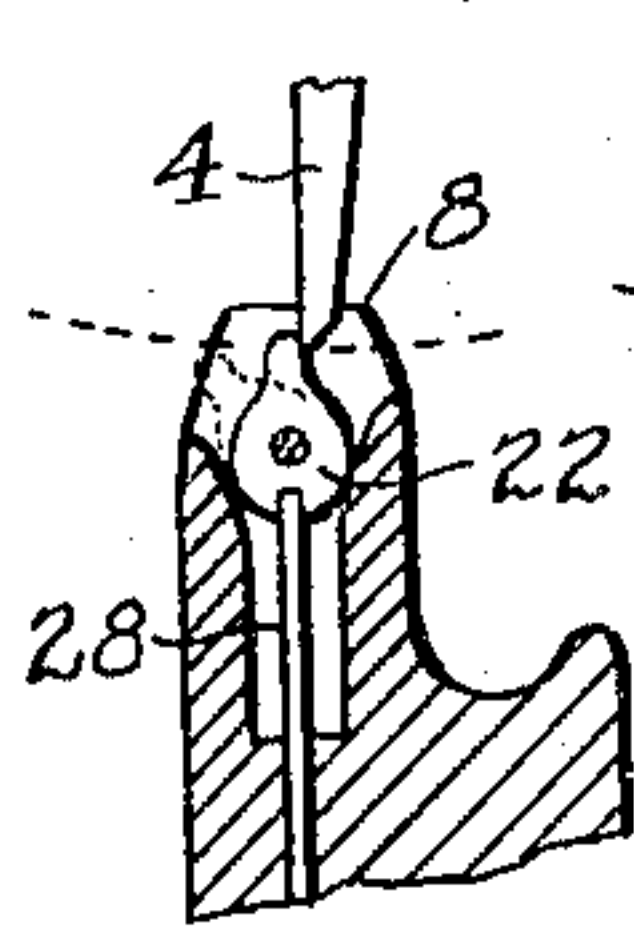
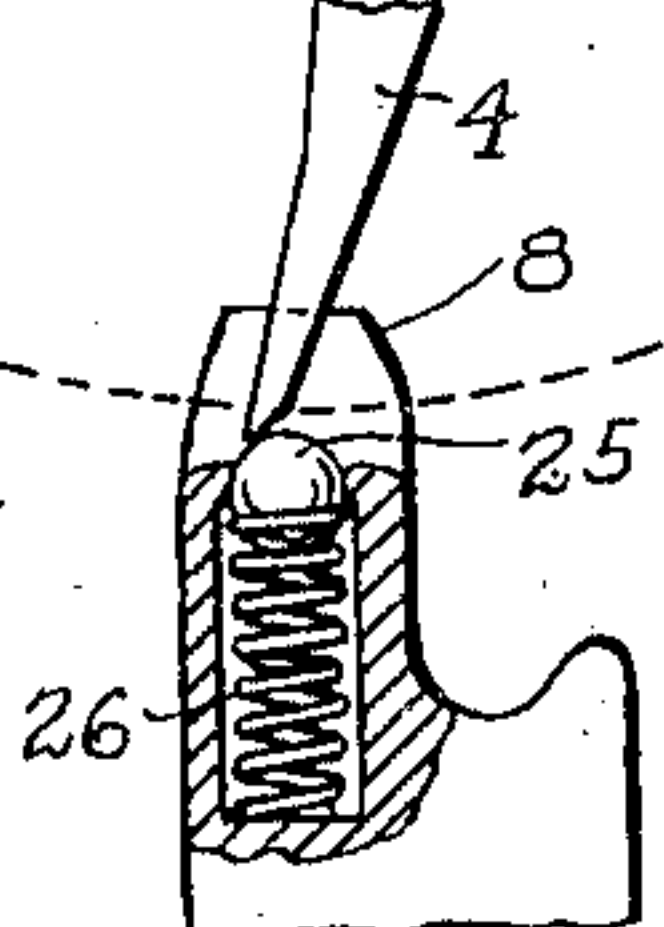
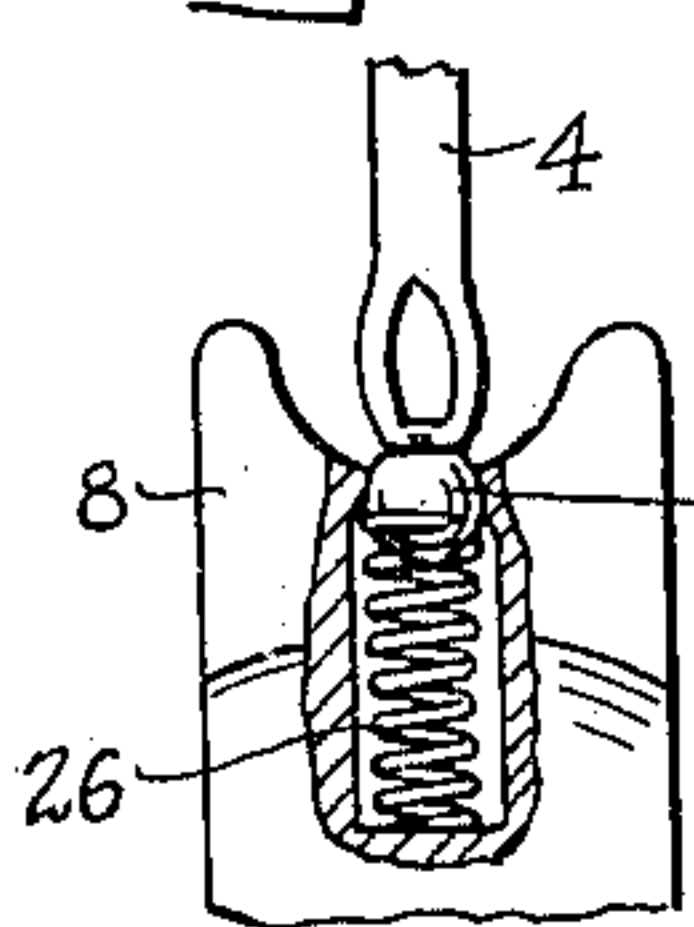
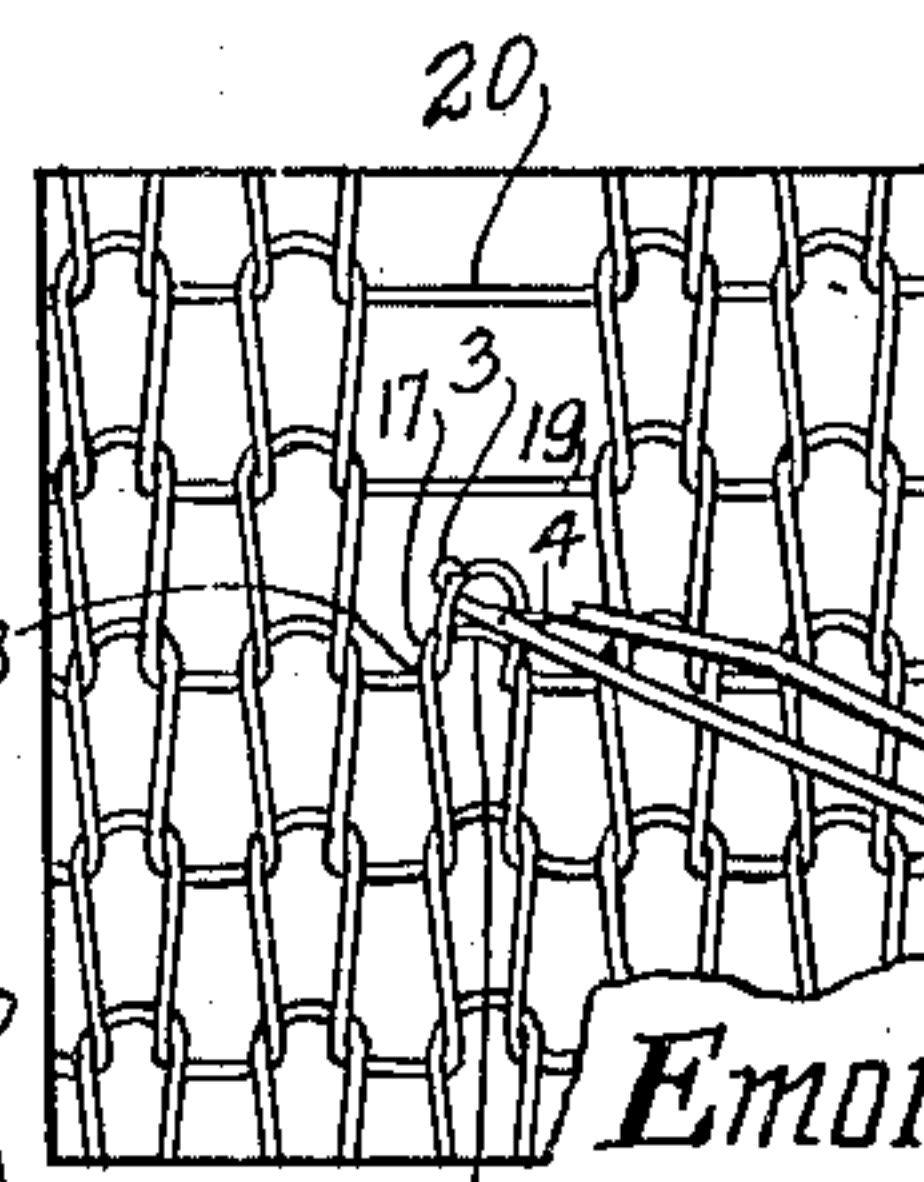
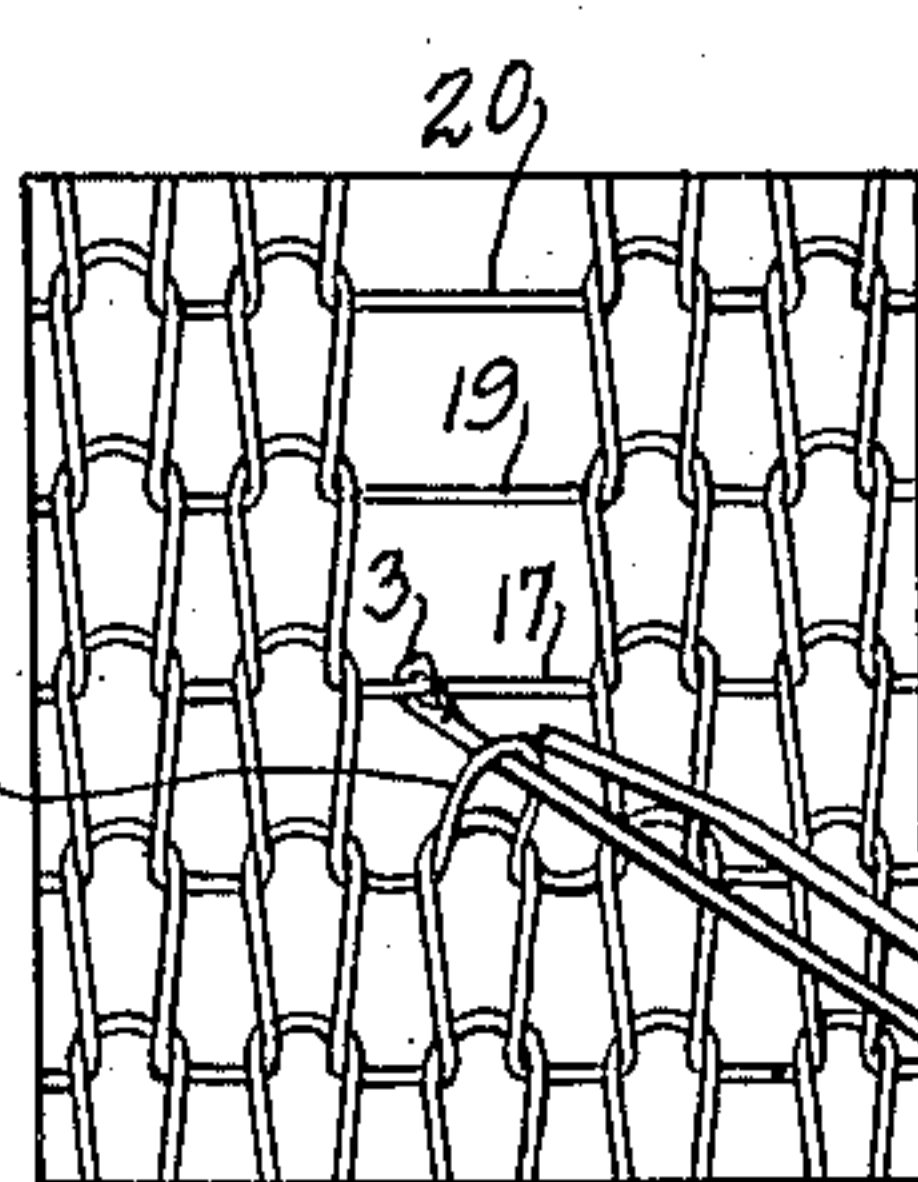
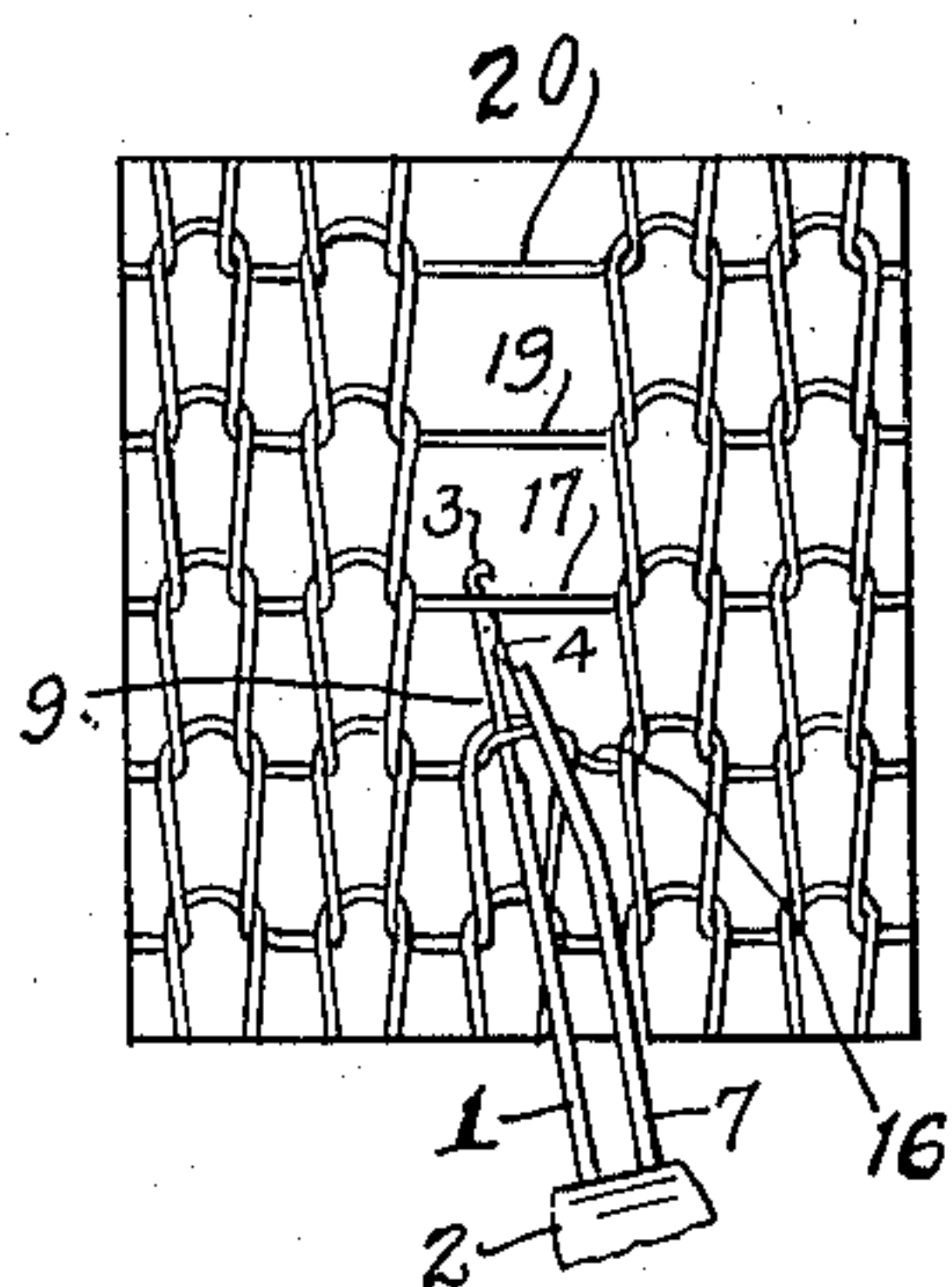


Fig. 7.

Fig. 8.

Fig. 9.



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RUNN R KNITTER

Application filed December 14, 1929. Serial No. 414,138.

This invention relates to an improvement in needles designed for use in repairing runs or ravel in knitted goods, and is a continuation-in-part of my application, Serial No. 380,144, filed July 22, 1929.

The main object of the invention is to provide a device of this character of extreme simplicity and which can be very cheaply manufactured and operated with great rapidity in repairing runs, even in the finest kinds of knitted goods.

Other objects of the invention will become apparent as the detailed description thereof proceeds.

In the drawings:

Figure 1 is a side elevation of the needle;

Figure 2 is a fragmentary side elevation of the needle on a larger scale;

Figure 3 is a front elevation of the needle;

Figure 4 is a fragmentary side elevation on a still larger scale of the operative end of the needle, with parts broken away and shown in section for clearness of illustration;

Figure 5 is a fragmentary front elevation of the parts shown in Figure 4;

Figure 6 is a fragmentary side elevation, greatly enlarged, of the needle with the latch or bridge thereof in closed position.

Figures 7, 8 and 9 are views of the fabric showing the method of repairing a runner by means of this needle;

Figures 10 and 11 are, respectively, front and side fragmentary views showing the depressible snubber which in certain forms of my invention may be provided against which the latch rests when in open position and which said latch must pass in delivering the loop to the recess formed in the shank; and

Figures 12 and 13 are fragmentary side views of alternative forms of the snubber.

As shown in the drawings, the needle comprises a shank 1 suitably set into or otherwise secured to a handle 2. The needle terminates in a hook 3, and a latch 4 is mounted on shank 1 to swing about a pivot 5 in order to bridge the opening 6 between the end of the hook 3 and the shank 1.

A magnetized arm 7 is also secured to the handle 2 from which it extends with the greater part 7 of its length substantially par-

allel to the shank. The arm is bent between its ends to form the part 8 which is bent inwardly toward a thread receiving recess 9 formed in the shank opposite the free end of the latch 4 when the latter is wide open.

The free end of the arm is provided with a notch 10 which terminates on the inner face of said arm in a flat edge 11 which just clears the free end of the latch 4 when the latter swings to open position. The arm 8 is strongly magnetized to attract the latch 4 to hold it normally open as shown in Figures 1 and 2, and to prevent its snapping shut as soon as a thread riding over said latch has fallen from the end thereof into the recess 9.

The shank 1 is slotted near the hook end thereof to receive the pivoted end of the latch 4, and the inner end 12 of the slot 13 forms a stop against which the edge 15 of latch 4 contacts to limit its swing toward the shank 1 with the end of said latch closely adjacent to the end of the magnetized arm.

The operation of the needle is clearly illustrated in Figures 7, 8 and 9; which show, to a greatly enlarged scale, a run in fabric such as a stocking or sweater. The operator first inserts the hook 3 into the fabric so as to bring the last loop 16 into the recess 9 back of the latch 4. Then, the hook 3 catches the next thread 17, and the needle is withdrawn from the fabric.

During the withdrawal of the needle, the loop 16 slides down the recess 9 and engages the back of latch 4 to rotate it and close the opening 6, and thereby form a bridge over which the loop 16 slides, as shown in Fig. 7.

Continued withdrawal of the needle pulls the hooked thread 17 through the loop 16, which falls over the hooked end of the needle and becomes locked to the thread 17 which now becomes a loop 18 held in the hook 3. Just as soon as the loop 16 clears the end of the latch 4, the shedding of said loop causes the latch 4 to fly to the open position shown in the drawing. Since the loop 16 is just in the act of dropping off the latch 4 immediately adjacent the front face of the fabric, the latch 4 is swung back quickly without possibility of the latch engaging or in any

way catching in the next advanced thread 19 during its upward swing.

The needle is then again inserted in fabric to move the loop up and over the open latch 4 and into the recess 9, and to move the hook 5 into engagement with the next thread.

The end of the arm 8 is provided with a recess, confronting the end of the latch 4 when the latter is in the position determined by the magnet, the sides 21 of which recess extend beyond top end of the latch 4, as shown particularly in Fig. 5, so that the loop moving up from the hook over and around the latch is sure to be embraced between extended sides of the recess before it reaches the end of the latch so that it is directed with certainty into the recess 9 without any risk of lodging on the end of the arm 8 without going into the recess 9, and said arms 20 at the same time forming a bridge of maximum concentration between the end of arm 8 and latch 4.

The arm 8 is not a guard, it is primarily a means for positively preventing the latch 25 from engaging any of the forward cross threads during the withdrawal of the needle from the fabric, by causing the latch to fly to open position just as soon as the loop clears the end of the closed latch as the loop moves into locking engagement with the hooked thread 30.

The needle hook 3 of this invention is peculiarly shaped in order to make it impossible for the needle to reenter a loop just 35 formed by it. For this purpose, the needle has a hook differently shaped from the arcuate hook in common use. For example, the inside edge of the hook 3 is built up as an inclined plane 21, which, on the withdrawal 40 of the needle, causes the thread caught by the hook to slide down this plane to the back part of the inside of the hook. The tension of the thread 17, in its position at the back of the hook, forces the loop 16, after it slides, 45 free of the end of latch 4 to slide toward the back of the outside of the hook 3.

These positions of thread 17 and loop 16 are clearly shown in Fig. 6, from which it is evident that the tendency of this thread 17 and the loop 16 is to slide along the inside and outside back edges, respectively, of the needle, when the needle is again inserted in the fabric to catch up the next thread 19. It is practically impossible, therefore, for the needle 55 to reenter the newly formed loop just constructed from threads 16 and 17. It will be noted, in this connection that the outer edge of the hook 3 is also built up to form relatively inclined planes 22 and 23, which 60 force the thread of loop 16, under tension of the thread 17 to travel toward the back outer edge of the needle. It will be obvious from Fig. 9 that any forward thrust of the needle against loop 16 will cause that loop to travel 65 along the back edge of the needle; and this,

in turn, will cause the thread 17 to travel along the back inside edge of the needle and over the inside edge of latch 4 into the recess 9 at the back of the latch.

The contact point of the latch 4 is cut off at an acute angle to the edge 22 of the hook 3, in order to prevent the possibility of the thread 17, or any thread in advance of a loop, from sliding up along the edge 22 and over the outside edge of the latch 4, in case 75 the needle should have been inserted in the fabric with the latch accidentally closed. Obviously, as the thread 17 slides along the edge 22, it will contact with the inclined end of the latch 4 and force it open to permit 80 the thread 17 to enter the hook. When the loop 16 drops off the end of the point of the latch 4, the latter is snapped back to open position through its inherent resiliency.

The flat extreme end of needle 3 prevents 85 insertion of the needle if the operator tries to thrust it through the fabric too far in advance of the loop and directly over the next succeeding cross thread, as this end would rest on the top of the thread and prevent in- 90 sertion.

In a modified form of the invention indicated in Figures 10 and 11, the structure is essentially the same as that shown in the simplest form of the invention illustrated in 95 Figures 1 to 6, except that the arm 8 need not be magnetized, the change consisting in the addition of a snubber against which the latch 4 is detained when the latch is in open position and which takes the place of the mag- 100 netic detention.

The snubber comprises preferably, a ball detent 25 confined within a tubular bore in the end of the arm 8 and opening in the wall of the recess at the end of said arm, through 105 which opening the ball detent slightly projects so as to be in the path of the free end of the latch when the latter approaches its fully opened position. The ball detent is backed by a spiral spring 26 housed in the 110 said bore. When the needle is operated so as to transfer a loop along the top side of the latch 4 from the hook end to the free end thereof, the pressure of said loop pulls the free end of the latch against the slight 115 resistance of the ball detent, past said detent so that the loop is deposited in the recess 9. When the needle is reciprocated so as to cause the loop within the recess 9 to actuate the latch, the latter is forced outwardly 120 past the ball detent.

On account of the minuteness of the parts of the device, it may be desirable to adopt one of the modifications shown in Figures 12 and 13 in the former of which, the snubber 125 comprises a detent 22 pivoted with regard to the walls of the recess in the end of the arm 8, and maintained in an intermediate position by a fine wire or leaf spring 28 housed in a bore in the arm 8, from which interme- 130

diate position the detent 22 may be biased either inwardly or outwardly as indicated by the dotted lines in Figure 12.

It is also feasible to omit the detent 22 altogether, and to have the latch 4 detained by the end of the spring 28 itself, as shown in Figure 13.

The needle disclosed herein is extremely simple and is very efficient in operation, as it can be operated as fast as the hand can be vibrated, and the normally open latch is controlled so that it is impossible to catch on the advanced threads during the withdrawal of the needle from the fabric.

What I claim is:

1. A needle having a shank provided with a hook at the end thereof, an attractable latch pivoted to said shank to close said hook and to swing to open position, and magnetic means positioned to create a magnetic field operatively effective only at the point which the free end of the latch occupies when at the extreme limit of its range of swing, remote from said hook.

2. A needle having a shank provided with a hook at the end thereof, a latch of magnetizable nature pivoted to said shank to close said hook and to swing to open position, a stop for said latch determining its fully opened position, and magnetic means positioned to create a magnetic field operatively effective only at the region which the free end of the latch occupies when engaged by said stop, for repressing the resilient back-snap of said latch when it is released by the slipping of a thread from said latch to said shank.

3. A needle having a shank provided with a hook at the end thereof, a latch pivoted to said shank to close said hook, and an arm extending in front of said shank and magnetized to attract the said latch and hold it in open position, said arm having a notch at the end thereof and terminating adjacent the free end of said latch when the latter is fully opened.

4. A needle having a shank provided with a hook at the end thereof, a latch pivoted to said shank to close said hook in one position, and to assume a definite open position in abutment with a stop, said shank being provided with a recess at the rear of the opened latch, and magnetic means adjacent said recess and terminating close to the end of the opened latch for repressing the resilient back-snap of said latch when released by the slipping of the thread from said latch to said shank.

5. A needle having a shank provided with a hook at the end thereof, a latch pivoted to said shank to close said hook, and an arm extending in front of said shank terminating adjacent the position assumed by the end of the latch when the latter is in open position, said arm being magnetized to create an ef-

fective magnetic field only at the point which the free end of the latch occupies when in fully open position, to hold said latch in open position, said arm being provided with a recess confronting the free end of said latch in said fully open position of the latter to form a magnetic gap of maximum concentration.

6. A needle comprising a shank having a hook at one end and a thread actuated latch pivoted to said shank at such point as to close said hook in one position of said latch, and to abut against said shank when swung to its open position by an impelling thread, and a magnetized arm terminating adjacent the region which the end of said latch occupies when it is in abutment with said shank, for repressing the resilient back-snap of said latch, when it is released by the slipping of the impelling thread from said latch to said shank.

7. A needle comprising a shank having a hook at one end and a thread actuated latch pivoted to said shank at such point as to close said hook in one position of said latch, said shank being formed with an abutting shoulder engageable with said latch when the latter is swung to its open position by an impelling thread, and a magnetized arm terminating adjacent the region which the end of the said latch occupies when in contact with said abutment, for repressing the resilient back-snap of said latch when it is released by the slipping of the impelling thread of said latch to said shank.

In testimony whereof I affix my signature.
EMORY J. GEARHART.