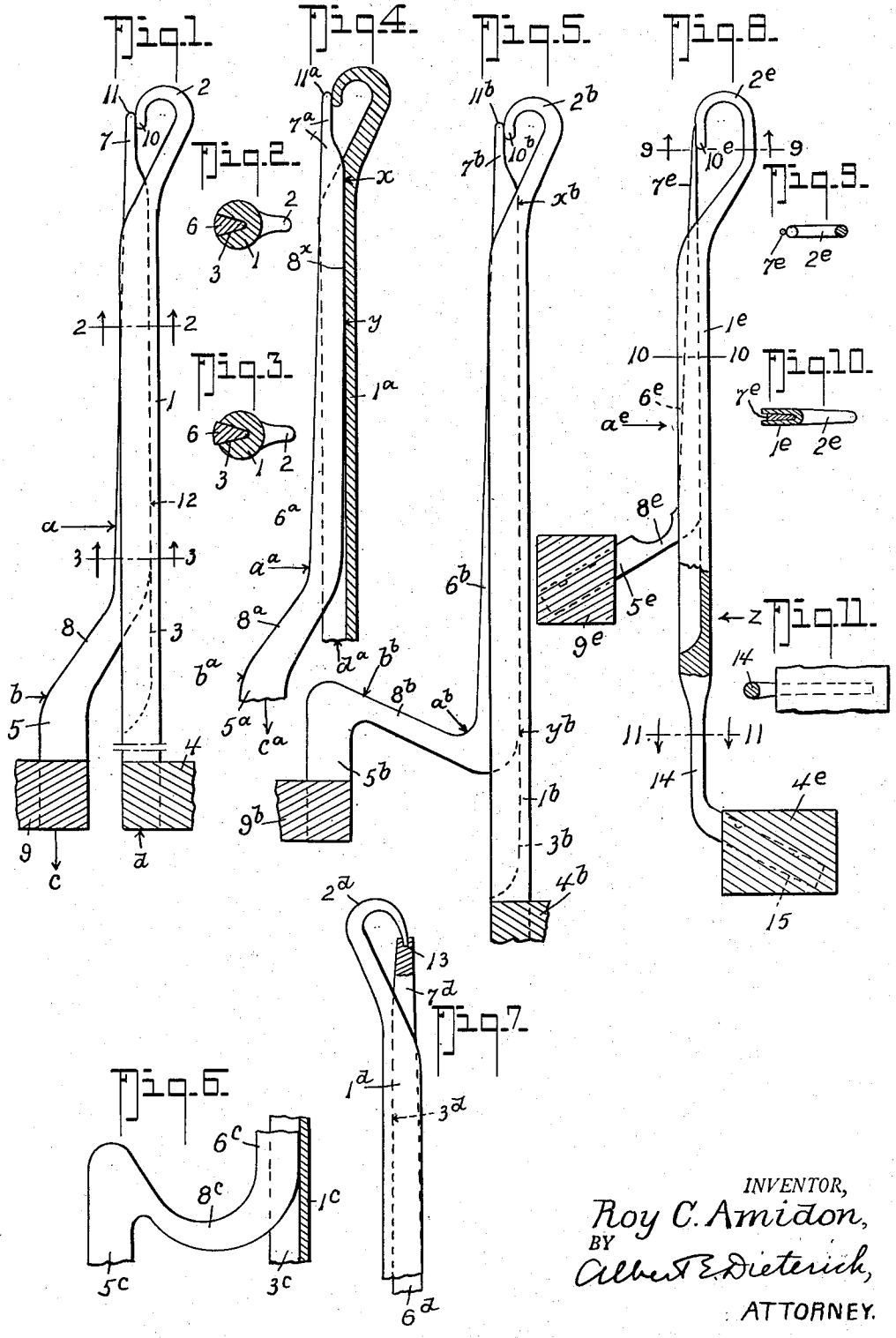
Sept. 12, 1950 R. C. AMIDON 2,522,335

KNITTING MACHINE NEEDLE

Filed Oct. 25, 1948



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Patented Sept. 12, 1950 2,522,335

UNITED STATES PATENT OFFICE

2,522,335

KNITTING MACHINE NEEDLE

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Application October 25, 1948, Serial No. 56,285

9 Claims. (Cl. 66—116)

1

My invention, which relates to knitting machine needles of the sliding tongue type, has for its objects:

1. To provide a knitting machine needle of the sliding tongue type whose tongue will always function properly.

2. To provide a knitting machine needle having a sliding tongue, whose tongue has a self-contained means to maintain the tongue at all times in proper operative position with respect to the needle proper.

3. To provide a needle tongue with a springy section that tends to keep that portion of the tongue which operates in the needle groove against springing out of the groove.

4. To provide a needle tongue with a springy section that tends to keep that portion of the tongue which operates in the needle groove and that portion of the tongue which bridges the hook opening against displacement.

5. To provide a knitting machine needle so constructed that that portion of which with which the tongue engages will not bow or bend out of alignment.

6. To provide a grooved knitting needle with a hook and shank, that portion of the shank having the groove being rigid and that portion below the groove being springy.

7. To provide a grooved needle and a cooperating tongue, those portions of the needle and tongue which interengage being rigid while a springy portion is provided between the rigid portions and their respective bases which are embedded in the respective leads.

Other objects will in part be obvious and in part will be pointed out hereinafter.

To the attainment of the aforesaid objects and ends, invention further resides in the novel details of construction, combinations, and arrangements of parts, all of which will be first described in detail and then be specifically pointed out in the appended claims, reference being had to the accompanying drawing, in which:

Fig. 1 is a side elevation of a needle embodying my improvements, the leads in which the needle proper and its tongue are mounted being shown in section and parts being broken away.

Fig. 2 is a cross section on the line 2—2 of Fig. 1.

Fig. 3 is a cross section on the line 3—3 of Fig. 1.

Fig. 4 is a detail view similar to Fig. 1 with the needle proper shown in vertical section.

Fig. 5 is a view similar to Fig. 1 showing a modification of the invention.

2

Fig. 6 is a detail view, partly in vertical section, of a further modification.

Fig. 7 is a detail side elevation of another modification.

Fig. 8 is a side elevation (parts being broken away) of another embodiment of my invention in which both the tongue and needle parts which interengage are rigid, there being springy portions between said rigid parts and the tongue and needle bases.

Figs. 9, 10 and 11 are respectively sections on the lines 9—9, 10—10 and 11—11 of Fig. 8.

In the accompanying drawing, in which like numerals of reference indicate like parts in all the figures, 1 represents the needle proper, 2 the hook of the same, 4 the usual lead in which the needle proper is mounted, and 3 indicates a longitudinal groove in which the tongue 6 is held to slide up and down.

The tongue 6 has a hook closing end 7, and a base portion 5 offset from the needle proper by a springy connection 8. Preferably, the groove of the needle proper and the tongue portion that rides in it are of V-shape in cross section (see Figs. 2 and 3), although the cross-section may be varied as may be found most convenient. The base portion 5 of the tongue is mounted in the usual lead 9.

The needle proper is tempered or otherwise made as a rigid body, as is also that portion of the tongue 6 which works in the slot 3 and that portion 5 of the tongue which is mounted in the lead 9, while that portion 8, between approximately the places indicated by the arrows *a* and *b*, is so tempered as to be springy, the spring action tending to keep the tongue 6 seated in the groove 3 in order that the tip 7 of the tongue will always engage the hook end 10 when the hook is closed. The extreme end 10 of the hook and the extreme end 11 of the tongue are preferably rounded so that they will not fail to slide by one another as the tongue is moved to close the hook.

In practice, the movements between the needle proper and the tongue take place in parallel directions, indicated by the arrows *c* and *d*, respectively.

The tongue 6 in the embodiment of Fig. 1, tapers from the portion 8 toward the tip 7 with its inner edge 12 held throughout in contact with the bottom of the groove 3.

In the embodiment shown in Fig. 4, only that portion of the edge 12^a, marked 8^x, extending between the positions of arrows *x*, *y* (approximately a length equal to the opening of the hook of the needle proper), works against the bottom

of the groove 3^a. In Fig. 4 those parts which correspond to like parts in the preceding figures bear the same numerals or letter, plus the index letter *a*, so a further description of Fig. 4 is thought to be unnecessary.

The structures shown in Figs. 5 and 6 differ from that shown in Fig. 1 only in the shapes of the portion 8. Those parts in Fig. 5 which correspond to like parts in Fig. 1 bear the same reference numerals or letters, plus the index letter *b*, while corresponding parts in Fig. 6 bear the same numbers or letters of reference, plus the index letter *c*.

Instead of having the tip of the tongue lap over the end of the hook, the tip of the tongue 7^d may be recessed, as at 13, to fit over the end of the tongue, as shown in Fig. 7.

By providing the tongue with the resilient or springy portion (8, 8^a, 8^b, 8^c) the tip of the tongue will always cooperate properly with the end of the hook to close the hook and prevent the thread being caught between the lapped portions of the tongue and hook.

In Figs. 8 to 11 inclusive I have shown another modification in which the needle itself is provided with a springy portion 14 between the base portion 15 and the shank proper 1^e. In this embodiment the tongue is also provided with the springy portion 8^e. The portions of the needle from the springy portion 14 to the hook are stiff or rigid so that any pull on the hook which tends to bend the needle will not cause the shank to take on a bend, as would occur were the entire needle stiff. The "bend" always taking place at the springy portion 14 ensures that the needle will return to normal as soon as the tension is released.

By virtue of my improvements, the needle shank and hook and that portion of the tongue which works in the slot of the needle (including the hook-closing tip) and the base portions of the needle and tongue which are mounted in the leads can be made as stiff or rigid as an ordinary sewing needle for successful use in high speed machines.

This application is a continuation in part of my application filed September 14, 1948, Serial No. 49,220, and now abandoned.

What I claim is:

1. A knitting machine needle of the sliding tongue type, wherein is provided a longitudinally grooved needle proper having a hook: the improvement which comprises a hook closing tongue having a rigid portion to operate in the groove of the needle proper, and having a rigid base portion offset from the needle proper by a springy portion connecting said base portion with said rigid portion that operates in the groove of the needle proper.

2. A knitting machine needle of the sliding tongue type, wherein is provided a longitudinally grooved needle proper having a hook: the improvement which comprises a hook closing tongue having a rigid portion to operate in the groove of the needle proper, and having a base portion offset from the needle proper by a springy portion connecting said base portion with said portion that operates in the groove of the needle proper.

3. A knitting machine needle of the sliding tongue type, wherein is provided a longitudinally grooved needle proper having a hook; the improvement which comprises a hook closing tongue having a rigid portion to operate in the groove of the needle proper, and having a base

portion offset from the needle proper by a springy portion connecting said base portion with said rigid portion that operates in the groove of the needle proper, that portion of the tongue which works in the slot being tapered from said springy portion toward the tip of the tongue.

4. A knitting machine needle comprising a hook needle proper having a tongue receiving groove in combination with a tongue operating in part in said groove, said tongue having a rigid tip portion for closing the hook and having a rigid base and having a springy portion between the base and tip portion for continuously urging said tip portion into said groove to maintain said tip portion in effective cooperation with said hook in the hook-closed position.

5. A knitting machine needle of the sliding tongue type, wherein is provided a longitudinally grooved needle proper having a hook: the improvement which comprises a hook closing tongue having a rigid portion to operate in the groove of the needle proper, and having a rigid base portion connected to the tongue proper by a springy portion operating to keep the tongue seated in the needle groove.

6. A knitting machine needle and tongue of the sliding tongue type, the improvement which comprises a needle having a rigid hook, shank and base, with a springy section between the shank and base, and a tongue cooperatively associated with the needle.

7. A knitting machine needle and tongue of the sliding tongue type, the improvement which comprises a needle having a stiff hook, shank and base, with a spring section between the shank and base, said needle being grooved to receive a portion of said tongue, said tongue being rigid save for a portion between its base and the portion that is received in said groove, said saved portion being springy.

8. A knitting machine needle and tongue of the sliding tongue type, the improvement which comprises a needle having a rigid hook, shank and base, with a springy portion between the shank and base, in combination with a tongue having a shank in engagement with the needle, a base, and a springy portion between the shank and base of the tongue, said springy portions being constructed to oppose each other and thereby maintain contact regardless of which way the needle may be pulled in the plane in which the tongue and needle lie.

9. A knitting machine needle comprising a needle with a rigid longitudinally grooved tongue-receiving shank and a rigid hook, a sliding tongue having a rigid shank, said needle and said hook each having a rigid base and a springy portion connecting the base with the shank.

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