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Zocher

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[54] **METHOD FOR MAKING LATCH NEEDLES**

[75] Inventor: **Josef Zocher,** Haaren, Aachen, Germany

[73] Assignee: **The Singer Company,** New York, N.Y.

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[21] Appl. No.: **410,949**

Related U.S. Application Data

[62] Division of Ser. No. 257,261, May 26, 1972, abandoned.

[52] **U.S. Cl.** **163/5,** 163/3

[51] **Int. Cl.** **B21g 1/10**

[58] **Field of Search** 163/3, 5

[56] **References Cited**

UNITED STATES PATENTS

140,150	6/1873	Mayne	163/5
184,833	11/1876	Burns	163/3
246,090	8/1881	Daniels	163/5
1,961,624	6/1934	Schneider	163/3
3,022,650	2/1962	Virtue	163/3 X
3,022,651	2/1962	Oberem	163/3

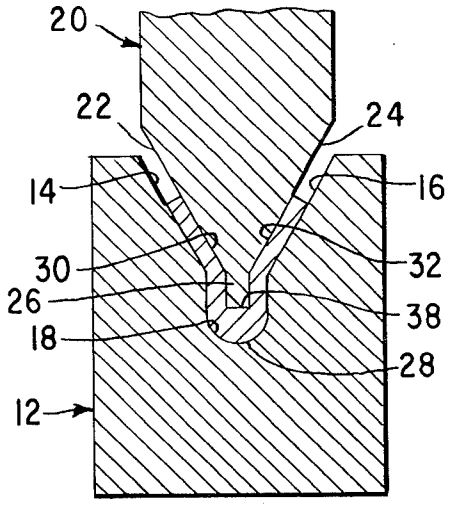
Primary Examiner—Granville Y. Custer, Jr.

Attorney, Agent, or Firm—Chester A. Williams, Jr.; Marshall J. Breen; Alan Ruderman

[57] **ABSTRACT**

A method of manufacturing latch needles by dieforming the exterior shape and a V-shaped recess including latch seats in a needle blank between a complemental punch and die, and fastening a preformed latch within the recess. The latch may be preformed with a pair of pins and fastened within the recess by pressing the walls of the recess against the respective pin to form bearing seats in the walls. The method may include the step of slotting the bottom of the recess during the dieforming operation.

4 Claims, 9 Drawing Figures



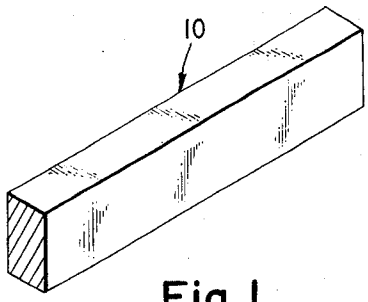


Fig. 1

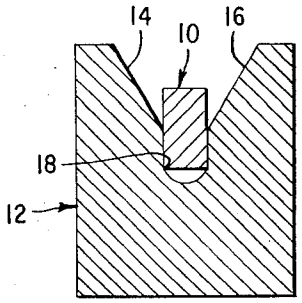


Fig. 2

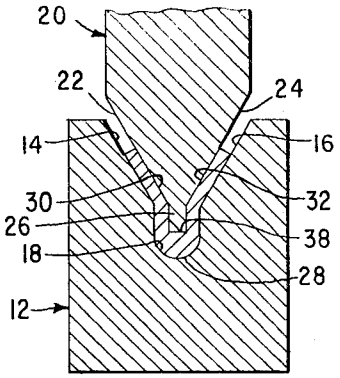


Fig. 3

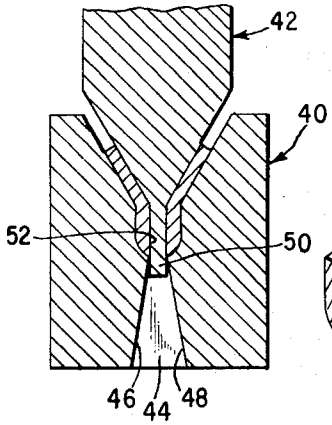


Fig. 3a

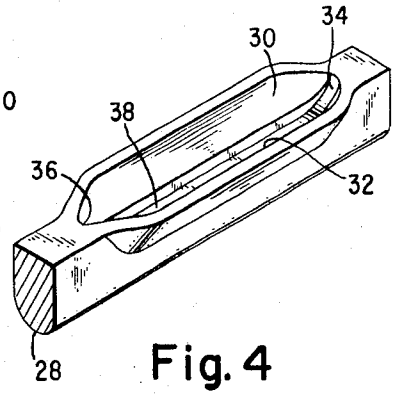


Fig. 4

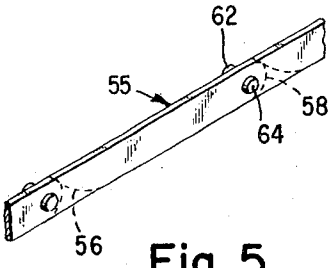


Fig. 5

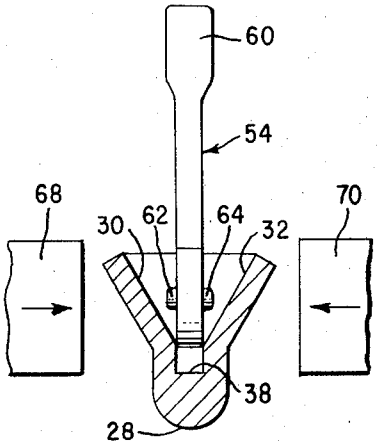


Fig. 6

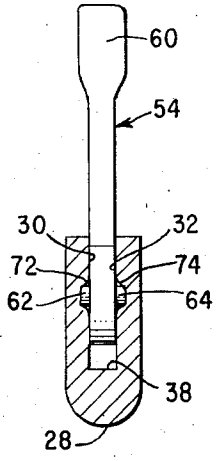


Fig. 7

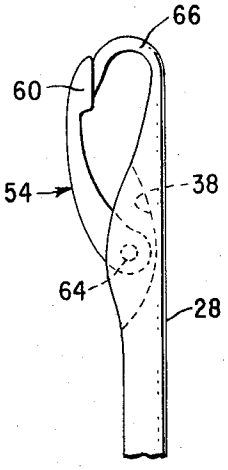


Fig. 8

METHOD FOR MAKING LATCH NEEDLES

This is a division of application Ser. No. 257,261, filed May 26, 1972, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to latch needles and more particularly to a method of manufacturing the same, and to a novel latch needle.

Because the pivot portion of latch needles is subjected to a large amount of wear, a high degree of precision is required in the manufacturing of such needles. Conventional methods of manufacture utilize milling and grinding steps to precisely form the recess within which the latch is pivoted. Owing to the required precision the manufacture of needles of small gauge is extremely difficult because of the narrow recesses of such needles. This is particularly true where the recesses are less than 0.2 millimeters. The milling and grinding feed speeds for those narrow grooves is extremely low, and the manufacture of these precision milling cutters requires special know-how and therefore results in very high cost. Furthermore, because material is removed by these methods, the needles are weakened at the most critical section. Moreover, conventional techniques of pivotally securing the latch in the recess have been accomplished by boring a hole within the latch and pivotably mounting it on a rivet within the recess, or by inserting the latch within the recess and upsetting the side walls of the recess into the hole of the latch, as for example, the methods disclosed in U.S. Pat. Nos. 1,961,429 and 1,991,140. Inasmuch as these conventional methods of assembling the latch within the recess require special tools and manufacturing techniques the manufacturing cost are correspondingly higher.

SUMMARY OF THE INVENTION

In order to reduce these difficulties and to reduce the cost of manufacturing latch needles, the present invention provides a method which eliminate the milling and grinding operations to thereby increase the production rate greatly. The method includes the step of dieforming the recess portion of the needle by means of a tool and die to form a recess having oblique side walls. A latch member which is stamped and punched to include a pair of pins or dimples may be inserted into the recess and the oblique walls can then be forced into engagement with a respective pin so as to form bearing surfaces therefore. The invention also provides a needle having the latch trunnions integral with the latch and the bearing surfaces integral with the recess walls.

One object of this invention, therefore, is the provision of a method for manufacturing latch needles which is more economical, precise and rapid than the methods currently utilized.

Another object is the provision of a latch needle in which the latch trunnions are integral with the latch and the pivot bearing surfaces are integral with the recess walls.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and objects of the invention will appear more fully from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. **1** is a perspective view of a portion of a needle blank upon which the method is to be carried out;

FIG. **2** is a cross sectional view illustrating the blank of FIG. **1** positioned in a forming die;

FIG. **3** illustrates the step of dieforming the blank to form the exterior surface of the needle and to form the latch recess;

FIG. **3***a* illustrates a modification of the step of FIG. **3** wherein the bottom of the needle blank recess is slotted simultaneously with the dieforming step;

FIG. **4** is a perspective view of a portion of a needle formed during the step of FIG. **3**;

FIG. **5** is a perspective view of a portion of a preformed strip of latch members prior to separation therefrom;

FIG. **6** illustrates the preferred step of fastening a latch member within the recess;

FIG. **7** is a cross sectional view taken through the recess of the new needle showing the mounting of the latch therein; and

FIG. **8** is an elevational view of the working portion of a completed knitting machine latch needle.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, wherein like numerals designate similar parts, there is shown in FIG. **1** a portion of a metallic needle blank **10** upon which the operations hereinafter described are performed. The blank **10** is located within a forming die **12** having obliquely tapered interior walls **14** and **16** and a width and contour at the bottom cavity **18** thereof equal to the thickness and of the shape desired for the needle to be manufactured. A forming punch **20,** having obliquely tapered exterior walls **22** and **24** and a substantially rectangular leading end **26,** is pressed into the blank with a force sufficient to cause the metal of the blank to flow between the die and the punch and to fill the bottom cavity **18.** The punch is also appropriately contoured at its longitudinal ends (not shown) so that this dieforming metal deforming operation results in the needle blank having a recess including latch seats conforming to the shape of the complemental die and punch. As shown in FIG. **4** the needle blank now includes a bottom surface **28** contoured to the shape of the bottom **18** of the die **12** and includes a recess having obliquely tapered walls **30** and **32** and latch seats **34** and **36.** The bottom **38** of the recess is contoured by the leading end **26** of the punch and is of course of equal width thereto. Alternatively, a die **40** and punch **42** may be utilized for the process. The die **40** differs from the die **12** in that it includes a clearance **44** defined by the walls **46** and **48** at the lower portion of the die. The punch **42** differs from the punch **20** in that it includes an extended leading end portion **50** which registers with the clearance **44** beyond the bottom of the needle blank so that a slot **52** may be punched clear through the bottom of the needle recess. The purpose of this slot **52** is to prevent lint accumulation in the recess during for example the knitting operations of the latch needle, thereby to prevent jamming of the latch. Conventionally, slotting the recess of the needle is accomplished with very fine size milling cutters with the disadvantages discussed above. Of course, the slot **52,** rather than being punched simultaneously with the dieforming step, may be punched separately after the dieforming operation is performed with the apparatus of FIG. **3.**

Latch members **54** may be preformed by stamping a continuous strip **55** of sheet or wire material. The

latches may be separated along score lines **56** and **58** prior to or after forming the cup portion **60** of the latch, and may be preformed with pins **62** and **64** adjacent one end thereof. The pins can be cylindrical, spherical or conical, and are shown in the drawings to be cylindrical with slightly rounded free end surfaces.

The latches and pins are thereafter hardened and the pin end of the latch is inserted within the recess of the needle. The needle includes a hook portion **66** which may be formed prior to or a subsequent to fastening the latch within the recess. The walls of a recess **30** and **32** are then transversely acted upon by a pair of oppositely directed pressing members **68** and **70** with a force sufficient to compress the harden pins of the latch against the relatively soft walls of the needle recess to form indentations **72** and **74** in the walls. These indentations act as bearing seats on which the latch pins **62** and **64** pivot. Alternatively, of course, the latch may be fastened within the recess by the prior art methods of upsetting the recess wall into a hole formed in the latch, or by use of a rivet.

The finished needle, as shown in FIG. **8,** is similar in appearance and operation to needles manufactured by conventional methods. The only apparent visible difference would occur when the fastening of the latch in the recess is accomplished by the method of FIG. **6.** A needle so made would have structural advantages over conventional needles since there is no removal of material from the components thereof.

Numerous alternations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of the invention which is for purposes of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

Having thus described the nature of the invention, what I claim herein is:

1. The method of manufacturing a latch needle comprising the steps of:

a. locating an elongated metallic needle blank in a die;

b. pressing a forming punch into said blank with a force sufficient to cause the metal to flow between the punch and the die to form the exterior surface of said needle and to form a longitudinal recess in the blank;

c. inserting a latch preformed with a pair of oppositely extending protuberances into the recess with each protuberance facing a longitudinal wall of said recess; and

d. fastening the latch in the recess by transversely pressing each of said walls inwardly against the respective protuberance to form a bearing surface in the walls for said latch.

2. In the method recited in claim **1** wherein said die and said punch each include portions having complementary oblique walls so that said recess includes oblique longitudinal walls, said fastening comprising pressing said oblique walls of said recess.

3. The method recited in claim **1** including the step of punching a slot through the bottom of said recess.

4. The method recited in claim **3** wherein said slot is punched simultaneously with the forming of said recess.

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