

A. B. DODGE.  
KNITTING MACHINE NEEDLE.

(Application filed Dec. 13, 1899.)

(No Model.)

Fig. 1.

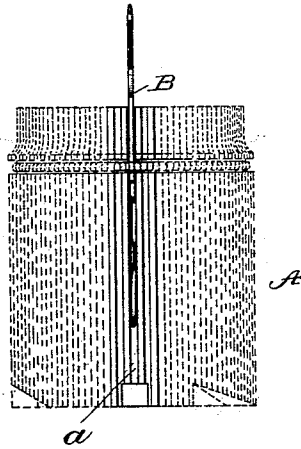


Fig. 2.

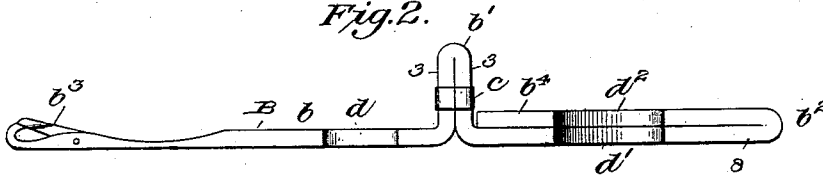


Fig. 3.

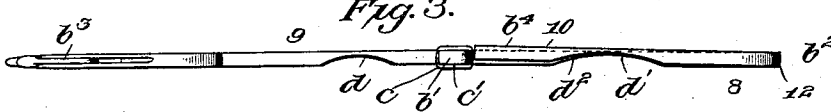


Fig. 4.

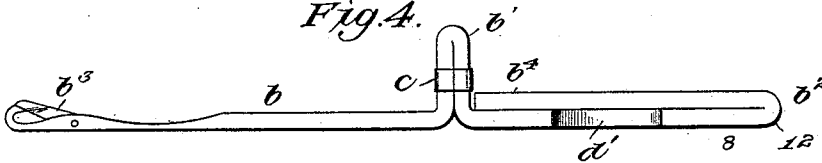


Fig. 5.

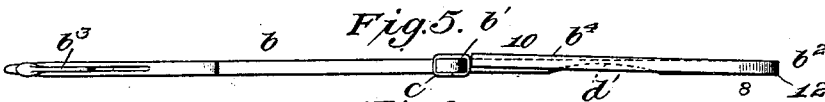


Fig. 6.

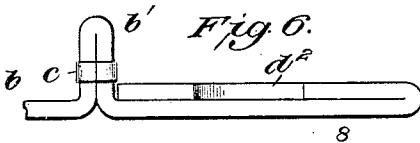


Fig. 7.

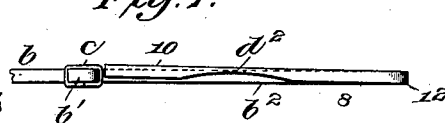


Fig. 8.

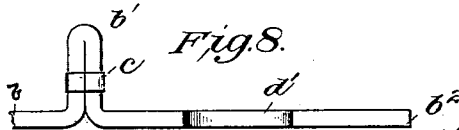


Fig. 9.



Fig. 10.



Witnesses

*J. C. Shaw*  
*Thomas J. Hammond*

Inventor

*Alery B. Dodge*  
by *Leahy & Gregory*  
attys.

# UNITED STATES PATENT OFFICE.

AVERY B. DODGE, OF MANCHESTER, NEW HAMPSHIRE, ASSIGNOR TO THE  
DODGE NEEDLE COMPANY, OF SAME PLACE.

## KNITTING-MACHINE NEEDLE.

SPECIFICATION forming part of Letters Patent No. 664,808, dated December 25, 1900.

Application filed December 13, 1899. Serial No. 740,147. (No model.)

*To all whom it may concern:*

Be it known that I, AVERY B. DODGE, a citizen of the United States, residing at Manchester, in the county of Hillsborough and State of New Hampshire, have invented an Improvement in Knitting-Machine Needles, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

In the use of knitting-machine needles it is essential for the best results that the needles fit the grooves of the needle-bed, so that they will be retained in said grooves in the position in which they are left by the knitting-cams as the latter retire from contact with the butts of the needles. The needles are sometimes too narrow when applied in the grooves of the cylinder, due sometimes to the fact that the grooves have been widened by the friction of the needles against their walls in the use of the machine. Usually when a needle is too narrow, so that it will not be retained frictionally in the place in which it was left by the cam, it is customary to bend or crook the needle somewhat, so that it will contact with both walls of the groove. Several patents have been issued wherein the tail of the needle beyond its butt is crooked or shaped to make of it a spring; but in all such cases known to me the spring part so produced is so shaped and is so stiff that the end of the spring by rubbing against the walls of the needle-groove wears the walls, and the wear of the spring upon the wall is a very serious trouble, and frequently it becomes necessary to replace a needle-cylinder. To obviate the wearing of the groove by the needle, and yet produce a needle which may contact at its opposite sides near its extremities with the opposite walls of the grooves of the needle-cylinder, I have produced a needle having a thinned or weakened portion between its extremities to afford a point at which the needle may be crooked or bent, more or less, to enable the opposite side walls of the needle near its opposite ends to bear against or slide smoothly over the side walls of the grooves of the needle-cylinder. In the production of my improved needle I thin or reduce in thickness the metal to provide the weakened por-

tion, leaving only such thickness of metal to be bent as will possess sufficient resiliency to cause the opposite side walls of the needles in contact with the side walls of the groove in a cylinder to exert only a pressure sufficient to maintain the needle in the position in which the cam shall leave it. In a flat plate the friction of the needle against the side walls of the groove need be only sufficient to resist the movement of the needle under centrifugal action or momentum. In my invention there is no end presented by the needle to contact with the walls of the groove; but, on the contrary, a flat side of the needle bears against the side walls of the groove.

In the use of knitting-machine needles they frequently break in the sharp bend made in the formation of the butt, and to provide for this the butts have been provided with a metal band and the bands have been soldered in place on the butts. I have herein shown a needle banded across its butt, and my invention in this part of the needle lies in notching the butt of the needle and forcing the band over the butt, the band entering a notch of the butt and being thereby retained in place, thus avoiding soldering the band to the butt.

Figure 1 shows a sufficient portion of a needle-cylinder of usual construction with one of my improved needles in a groove of said cylinder, the sides of the needle contacting with the side walls of the groove. Fig. 2 is an enlarged side elevation of a needle embodying my invention. Fig. 3 is a top or plan view thereof. Fig. 4 shows a modified form of needle. Fig. 5 is a top or plan view thereof. Figs. 6 and 7 show, respectively, a partial side elevation and plan view of another form of needle embodying my invention. Fig. 8 shows yet another modification. Fig. 9 shows the butt of a needle with the band removed, and Fig. 10 shows a modified form of band.

In the drawings, A represents, chiefly by dotted lines, a needle-cylinder, it presenting a series of grooves *a*, presenting side walls with which contacts the needle B.

I have chosen to illustrate my invention in a needle B, composed of a shank *b*, a butt *b'*,

a tail  $b^2$ , and a latch  $b^3$ ; but it will be understood that my invention as to weakening the needle to form a yielding bending point and also in banding the butt of the needle may be applied to any known form of needle as may be required. The butt  $b'$  of the needle B (see Fig. 9) is notched, as therein represented, at two places, as at 2 2, said notches receiving in them and holding in position a band  $c$ , which may be pushed upon the butt of the needle. If in the formation of the butt of the needle the two runs 3 3 of wire in the butt are made to contact substantially throughout, as in Figs. 2, 4, 6, and 8, then I may make the band  $c$  open at one edge, as at  $c'$ , the band being of spring metal, so that when it is being pushed down over the unnotched part of the butt it may spring open a little, it closing itself into the notch 2 on its arrival opposite said notch. In case, however, in the formation of the butt the runs or portions 3 3 of the wire were not brought closely in contact, but were left slightly spread, as at 4 in Fig. 9, then in such case I would use a solid or unbroken band, as  $c^2$ , as represented in Fig. 10, it when being slid upon the butt to enter the notch or notches 2 somewhat closing the space 4 and preventing the breaking of the butt.

I may make the width of the needle slightly less than the width of the groove  $a$ , and to insure the proper amount of friction of the opposite side walls of the needle with the opposed walls of the groove  $a$  I preferably bend or crook the needle slightly, and to obviate undue or excessive friction of the sides of the needle against the side walls of the groove I thin or reduce the thickness of the metal of the needle to thereby form a bending point presenting metal of less thickness than the thickness of the needle. This reduced or weakened part may be made at any desired portion of the needle.

In Fig. 2 I have shown the needle reduced or thinned at three portions, as at  $d$   $d'$   $d^2$ , the thinned or weakened portion  $d$  being in the shank of the needle, the reduced portion  $d'$  in the tail of the needle, and the portion  $d^2$  in a reinforcing member  $b^4$  of the tail. When inserting this needle in the groove, I slightly bend the same in one of the thinned or weakened portions, so that said needle-shank and tail will not stand throughout in exactly the same straight line, and as a result thereof the face 8 at one side of the tail will bear upon one wall of the groove, while the opposite side of the needle, as at 9, will bear against the other wall of the groove, and also the flat face 10 of the reinforcing part of the tail will bear against the wall of the groove opposite that against which the part 8 of the tail contacts.

If desired, the weakened portion  $d$  of the needle (represented in Figs. 2 and 3) may be omitted and the needle-shank be made of full width at that point, as represented in Figs. 4 and 5.

Very good results may be obtained by the employment of but one thinned or weakened portion, and this thinned or weakened portion may be either in the main body of the tail or in the reinforcing member of the tail.

In Fig. 4 I have shown the needle as provided with one weakened portion  $d'$ , it being in the main or lower member  $b^2$  of the tail, the upper or reinforcing member  $b^4$  of the tail being of the full width and thickness of the body of the needle.

In the modification Fig. 6 I have shown the thinned or weakened portion made only in the reinforcing portion of the tail, it being represented in Fig. 7 as bent and turned out of alignment with the walls of the main part of the tail, so that the straight wall 10 of the reinforcing portion of the tail contacts for a great portion of its length with the right-hand side wall of the needle-groove, while the portion 8 of the opposite side of the main portion of the tail contacts with the left-hand side wall of the needle-receiving groove.

In Fig. 8, showing yet another modification, I have omitted the reinforcing portion of the tail and have represented the main portion  $b^2$  of the tail as provided with a thinned or reduced portion  $d'$ .

In all these various modifications of my invention it will be noticed that the corner 12 at the extremity of the tail cannot dig into or wear against the side wall of the groove, and there is sufficient length in the reinforcing portion of the tail to enable it to have a free easy movement, so that its side face 10 may contact with the wall of the needle-groove.

Thinning or weakening the needle at a point between its ends affords a point at which the needle may be easily bent, so that the needle at or near its extremity may run freely and smoothly against and not wear or cut into the walls of the needle-groove, or, in other words, the friction exerted to maintain the needle in its groove in the position in which the needle is left by the cam is exerted by the straight sides of the needle working against the straight sides of the walls of the groove, and by the use of these straight faces to contact with the side walls of the grooves a greater extent of rubbing-surface of needle against the walls of the groove is maintained, and this extent of friction-surface results in lessening the wear of the walls of the grooves of the needle-cylinder and also acts to better steady the motion of the needle in its grooves.

The described needle having a weakened portion at which it may be bent readily is especially useful in certain classes of knitting-machines—as, for instance, in United States Patent No. 596,301, dated December 28, 1897, wherein the needles are sprung in the operation of the machine, the weakened portion in the needle enabling the needle to be sprung with the application of but little force, and the wear of the cams operating the needles in the positions where they are sprung

out of the straight line is very materially limited.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A knitting-machine needle having a thinned or weakened portion between its extremities the needle being crooked or bent at said portions that flat portions of the needle at its opposite sides may contact with the smooth inner walls of the grooves of the needle-cylinder.

2. A knitting-machine needle having a butt and a tail reduced in thickness and weakened said tail being bent at the weakened portion to present flat sides of the tail of the needle at opposite sides of its weakened portion to contact with opposite side walls of the grooves of the needle-cylinder.

3. A knitting-machine needle reduced in thickness and having a reinforced tail, one member of said tail being reduced in thick-

ness between the butt and the extremity of the tail to form a bending-point.

4. A knitting-machine needle having a butt, the edges of said butt being notched, and a band embracing said butt and engaging the notched portion whereby it is held in place.

5. A knitting-machine needle having a butt notched at opposite sides, and a band embracing the butt, one of said parts being elastic to enable the band to be forced upon the butt and engage the notches.

6. A knitting-machine needle having a butt provided with notches, and a split band adapted to be forced upon the butt to engage the notches.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AVERY B. DODGE.

Witnesses:

L. D. HEYNE,  
J. H. RICE.