May 27, 1958 J. B. HARRISON 2,836,134

LOOP GUARD FOR TUFTING MACHINE

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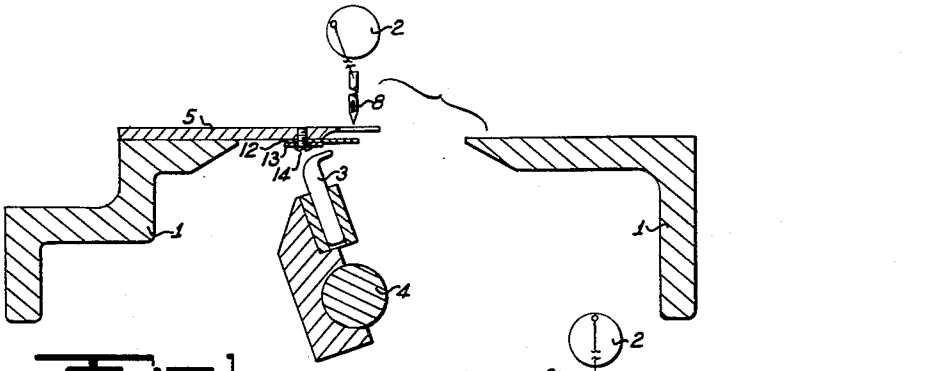


Fig. 1

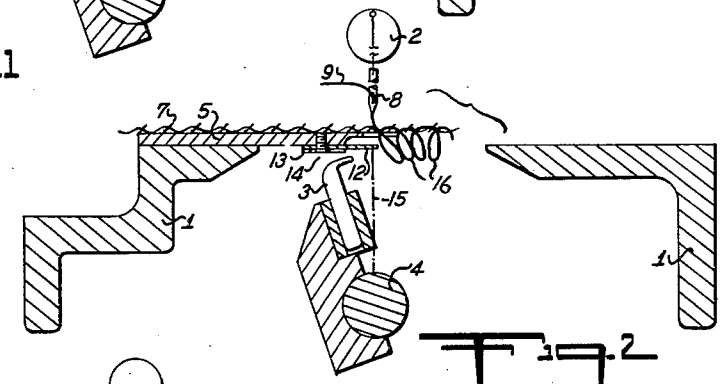


Fig. 2

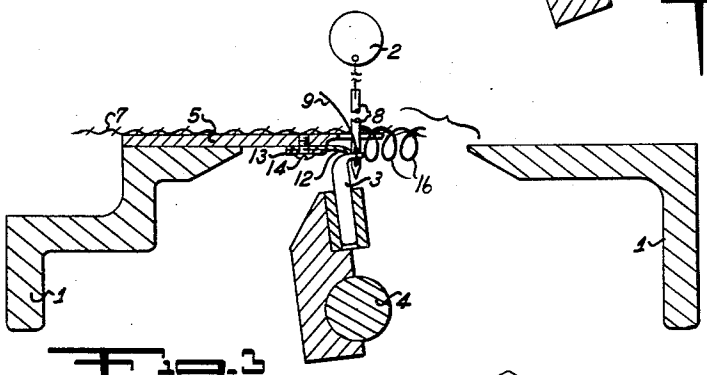


Fig. 3

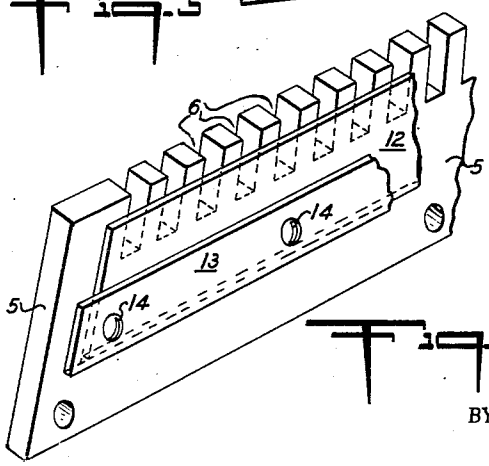


Fig. 4

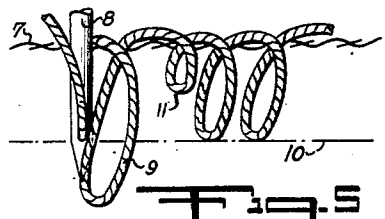


Fig. 5

INVENTOR

JOHN B. HARRISON

BY Smith, Marshall and Gardiner

ATTORNEY

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LOOP GUARD FOR TUFTING MACHINE

John B. Harrison, Rising Fawn, Ga.

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7 Claims. (Cl. 112—79)

This invention is a loop guard for tufting machines designed to prevent interference between formed loops and the needles.

In the formation of loop pile fabric on a tufting machine, it frequently happens that a previously formed loop will become aligned with the path of the needle which formed it and on the succeeding down stroke of the needle, said loop will be struck by the needle with the result that the loop so struck is pulled down or is "knocked down" by the needle and thus carried to a considerable length beyond the normal pile length while simultaneously robbing thread from a previously formed loop, to correspondingly shorten the same. This is generally referred to by those skilled in the art as "tagging" and results in a ragged, unsightly appearance in the finished fabric due to the fact that the long loops so "knocked down" stand up a considerable height above the pile field which is of normal or correct height.

One object of the present invention is to provide guard means which will engage the pile loops as formed and urge them to a position clear of the path of the needles.

Another object of the invention is to provide a guard of the character described which will underlie the needle plate and normally tend to at least partially close or obstruct the needle holes or slot therein but which may be moved clear of the needle aperture as the needle descends through the plate.

Another object of the invention is to provide a guard of the character described which is in the form of a resilient or yieldable strip or plate positioned normally to underlie a needle aperture in the needle plate and which will be automatically deflected into a position out of line with the needle movement by the needle during its down stroke.

These and other objects of the invention will become apaprent from a reading of the following specification when considered in the light of the accompanying drawings wherein

Fig. 1 is a fragmental transverse cross-sectional view of a tufting machine equipped with my loop guard.

Fig. 2 is a fragmental transverse cross-sectional view of a tufting machine equipped with my loop guard and with the needle in elevated position.

Fig. 3 is a view similar to Fig. 1 showing the parts in position when the needle is in its lowermost position.

Fig. 4 is a perspective view of a needle plate having my loop guard attached thereto.

Fig. 5 is a diagrammatic view showing a loop being "tagged" by a needle.

In the accompanying drawings wherein I have shown a preferred embodiment of my invention and wherein like reference numerals are used to designate like parts throughout, I have shown only those parts of a conventional tufting machine as are essential to the understanding of my invention. Thus, I have shown at **1** the usual bed frame of the machine in cross-section and the conventional needle driving mechanism has been indicated diagrammatically at **2**. Beneath the bed plate of the machine I have indicated the conventional looping mechanism including the looper hook **3** and the looper rock shaft **4**. On the bed plate **1** of the machine is mounted a conventional needle plate **5**, the latter being provided with one or more conventional needle apertures **6** at the free edge thereof which projects from the bed frame **1** in the direction of work feed, and supports the base fabric **7** which is fed across the needle plate and bed plate of the machine in the usual manner by conventional feed mechanism (not shown). It will be understood that in the normal operation of a tufting machine, the base fabric **7** is fed across the bed plate of the machine and the needle mechanism **2** will operate to reciprocate needle **8** carrying thread or yarn **9** to project a succession of loops through the base fabric, the needle **8** passing through the needle opening in the free edge of the needle plate. The looper hook is operated in timed relation to reciprocation of the needle to catch the loop on the needle to hold the same against withdrawal on the up stroke of the needle.

As has previously been stated, it frequently happens in the course of manufacture of loop pile fabric that a previously formed loop is "tagged" or "knocked down" by a subsequent stroke of the needle which formed it with the result that the loop so struck is pulled down to a considerably greater length than the normal loops, and this increase in length is accompanied by a shortening of a previously formed loop due to the fact that thread is pulled from said loop into a loop which has been "tagged." This operation is diagrammatically shown in Fig. 5 wherein the needle **8** is shown tagging a loop **9** which has been pulled down below the normal height of the loops as indicated at **10** with the result that a previously formed loop **11** has been materially shortened by the robbing or back-drawing action previously described.

The present invention seeks to preclude the occurrence of "tagging" by providing on the underface of the needle plate **5** a loop guard **12**. The loop guard is preferably formed of a strip of resilient, yieldable material such as rubber or plastic having sufficient stiffness to render it self-supporting, or to maintain a substantially horizontal position when supported in cantilever fashion as shown in the drawing. The strip **12** may be secured to the underface of the needle plate **5** in any convenient manner such as by utilizing a clamping strip **13** overlying the loop guard **12** and secured to the underface of the needle plate by means of screws **14**. As thus mounted, the free edge of the guard strip projects generally horizontally beneath the needle slot or aperture **6** in the needle plate and to an extent such that the forward free edge thereof lies beyond the center line **15** of the path of movement of the needle. The normal position of the loop guard in respect to the needle plate is shown in Fig. 1. During the normal operation of the machine, with the loop guard mounted as shown, the needle **8** will form a succession of loops **16** and each loop as formed will be engaged by the forward free end of the loop guard and urged into a position out of alignment with the path of movement of the needle as clearly shown in Fig. 2. On each down stroke of the needle, that portion of the loop guard lying within the path of needle movement is engaged by the needle as shown in Fig. 3 and deflected into a position to allow the needle to pass between the forward end of the guard and the last previously formed loop. This position of the parts is clearly shown in Fig. 3. Thus, with the needle in elevated position, the loops are urged into a position out of the path of movement of the needle but the guard member, being yieldable, will upon contact by the needle in its down stroke, be deflected laterally of the needle to allow the needle to pass between the guard and the last formed

loop. This operation precludes "tagging" and results in the production of a fabric having pile loops of uniform height.

It will be understood that the loop guard of the present invention may be applied to needle plates of various types but all of which are characterized by the presence of apertures, slots, or openings through which the needles of the machine pass in normal loop-forming operation. I have shown in Fig. 4 a perspective view of one form of needle plate having my loop guard attached thereto but it will be understood that the needle plate as illustrated is but for the purpose of example only and not for the purpose of limiting the application of the present invention, which may be applied to both single and multiple needle machines.

It will also be understood that while I have referred to the loop guard as being made of rubber or plastic material, these materials are mentioned by way of example only, and that the loop guard may be made of any similar material having the resiliency or yieldability which will enable it to maintain a position such as generally shown in the drawings, and yet will yield or deflect when engaged by the needle and will return to its normal position as the needle withdraws from the base fabric. In line with this, it may be quite possible to employ stiff paper, fiber-board, thin metal or the like.

While I have described the free end of the loop guard as terminating at a point beyond the center line of needle movement, it will be understood that it is necessary to maintain the formed loops in a position such that they will not be struck by the needle point on the down stroke of the needle so that, theoretically, the guard could be terminated at the center line of needle movement. However, the guard operates more effectively if extended slightly beyond the center line of needle movement.

Having thus described my invention, it will be apparent to those skilled in the art that various changes may be made in the size and proportion of parts without departing from the spirit of the invention, the limits of which are set forth more particularly in the appended claims.

Having thus described my invention, what I claim as new is:

1. In combination a needle plate having needle passages therethrough and a loop guard secured to the under side thereof, said loop guard comprising a strip of resilient material secured to the needle plate in cantilever fashion with a free edge portion thereof facing in the direction of movement of work across the plate and normally tending to obstruct normal loop forming movement of the needles through the passages in said needle plate, said loop guard yielding downwardly to clear said needle passages when contacted by a needle moving through the plate.

2. In combination a needle plate having needle passages therethrough, a loop guard secured to the under side of the needle plate and having a yieldable portion underlying said needle passages and extending across the path of needle movement through the plate, said yieldable portion including a loop engaging portion terminating at a point beyond the center of the path of needle movement through the plate in the direction of movement of work across the plate.

3. In a tufting machine including a reciprocable needle for forming loops, an apertured needle plate through which the needle operates, a loop guard member mounted to underlie the needle plate and having a yieldable portion normally disposed in a position tending to obstruct the movement of a needle through the aperture in said plate, said yieldable portion extending forwardly in the direction of work movement through the machine from a point in front of the needle to a point within the path of movement of the needle, the yieldable portion of said loop-guard having a loop-engaging terminal portion facing forwardly in the direction of movement of work through the machine and disposed, upon withdrawal of the needle, to engage successive loops formed by the needle to hold the loops clear of the path of the needle and to urge said loops in the direction of work movement, the yieldable portion of said loop guard yielding when the loop guard member is contacted by a needle passing through the plate in a loop forming stroke to permit the needle to pass between the terminal portion of the guard and the last formed loop.

4. In combination, a needle plate having needle apertures along one edge thereof and a loop guard member secured thereto on the underside thereof, said loop guard member having a yieldable portion substantially coextensive with that portion of the plate having the needle apertures therethrough and normally lying in the path of movement of needles moving through the plate, the yieldable portion of the loop guard member including loop engaging portions projecting from the underside of the needle plate in the direction of movement of work across the plate when in use, said loop engaging portions being juxtaposed respectively to the paths of movement of needles through the plate and movable to clear said apertures when contacted by the needle.

5. In a tufting machine including needle mechanism for forming loops and a needle plate having a needle passage through which the needle moves in loop-forming operation, loop-guard means mounted to underlie the needle plate, said loop-guard means including a movable portion normally disposed in the path of needle movement through the plate and normally tending to obstruct such movement but movable out of the path of the needle when struck by a needle moving through the plate in a loop-forming operation, said loop-guard means including means for returning said movable portion to normal position when the needle is withdrawn from the needle plate.

6. In a tufting machine, a needle plate having needle passages therethrough, a loop-guard member mounted in cantilever fashion to underlie the needle plate with the free end of the loop-guard member facing forwardly in the direction of movement of work through the machine and normally disposed in the path of movement of needles through the plate, said loop-guard member being formed of resilient material whereby it is deflected out of the path of needle movement when struck by a needle moving through the plate and will return to normal position when the needle is withdrawn.

7. In combination a needle plate having a needle passage therethrough and a resilient loop-guard member secured in cantilever fashion to said plate on the under side thereof, the free end of said loop-guard member normally underlying the needle passage through the plate and tending to obstruct needle movement through said passage, said loop-guard member yielding when struck by a needle and moving to a position out of the path of needle movement and returning to normal position when the needle is withdrawn from the plate.

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