July 9, 1929. F. E. DOUGLAS 1,720,412

METHOD OF MAKING COP SKEWERS

Filed May 18, 1928

Fig. 1

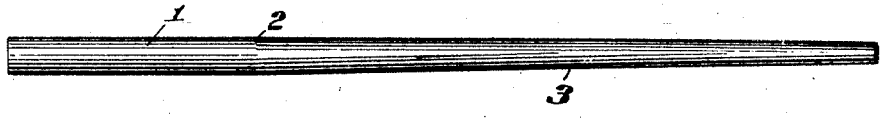


Fig. 2

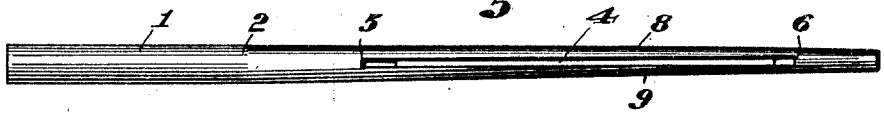


Fig. 3

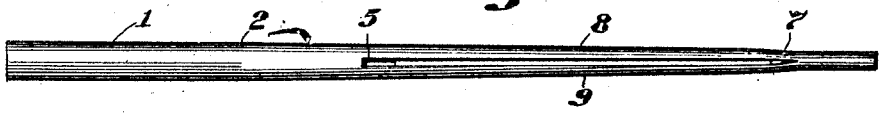
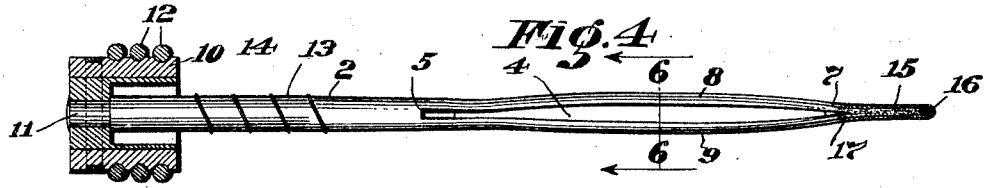


Fig. 4



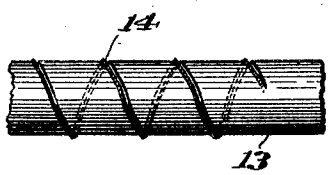


Fig. 5

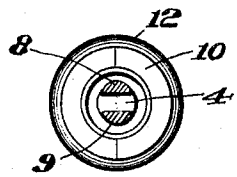


Fig. 6

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING COP SKEWERS.

Application filed May 18, 1923. Serial No. 278,724.

This invention relates to the method of making cop skewers, whereby the defects and objections heretofore existing in the finished product may be eliminated and a cop skewer be provided of such character and strength to effectively withstand the rough treatment to which it is subjected in use.

Cop skewers, as now ordinarily made, consist of a head portion, a barrel for the support of the cop tube and cop, and a tapering tip portion; and when such skewers are employed in filling replenishing looms of the bobbin changing type, such skewers with wound filling thereon are usually held in the hopper by head and tip engaging means. During weaving the shuttle is subjected to sudden endwise shocks due to the picking operation and the arrest of the shuttle in the shuttle-box which are calculated to displace the cop tube and cop longitudinally of the skewer, and it has heretofore been customary to provide the barrel portion of the cop skewer with resilient members formed by a longitudinal slot in the skewer barrel.

In the manufacture of such cop skewers of the resilient side member type, however, it is now the ordinary practice to make the skewer of two pieces welded together at the butt end and brazed together at the pointed or tip end, but since the skewer is made of high carbon steel, this method has been costly, difficulty has been encountered in producing a satisfactory skewer, and the finishing operation has been found frequently to present air holes which have rendered the skewer unfit for use. The brazed pointed end rendered it practically impossible to temper and harden the skewer at this portion which is the weakest part of the skewer, because the brazing material would fuse or melt during the hardening operation and result either in the separation of the parts entirely or in leaving a crack at the end of the skewer to cause trouble in use by catching the yarn or filling and wearing the tip holding means in the hopper.

An object of the present invention consists in so making the cop skewer that the defects hereinbefore noted may be avoided and other advantages be secured incident to the construction of the cop skewer itself and its method of manufacture.

The invention and new features thereof will best be made clear from the following description and the accompanying drawings which disclose a new method of manufacture and the cop skewer resulting therefrom possessing advantages not heretofore present.

In the drawings:

Fig. 1 represents in elevation a metal rod or cop skewer blank from which the cop skewer is made;

Fig. 2 represents the metal rod or cop skewer blank as provided with a longitudinally extending opening;

Fig. 3 is a similar view showing the tip portion of the rod or skewer as having been compressed at the tip terminal portion of the longitudinal opening;

Fig. 4 is a side elevation, with the head of the skewer in section, showing the completed skewer;

Fig. 5 is a side elevation of a portion of the barrel of the cop skewer for supporting the paper cop tube throughout its length; and

Fig. 6 is a cross-section on the line 6—6 of Fig. 4.

In carrying out the method of the present invention, a metal rod of suitable dimensions is formed with a taper towards the tip end thereof, and, as illustrated by Fig. 1, the non-tapered portion of the rod at 1 is formed cylindrical, for the purpose of properly supporting the paper cop tube in cylindrical form when the completed cop tube is employed in the shuttle. From the tip terminal portion of the cylindrical part 1, as at 2, the rod is tapered, as at 3. The formation of the cylindrical portion and the tapering portion 3 of the rod may be variously contrived, but, preferably, this is done by turning the rod into the desired shape.

The rod having been tapered, as explained, and as illustrated by Fig. 1, it is provided with a rectangular opening 4 which extends longitudinally of the tip portion of the rod from a point tipward of the cylindrical portion 1. Since the opening 4 is rectangular, it follows that each end of the rectangular opening 4 will form the shoulders 5 and 6. The rectangular opening 4 extending longitudinally of the skewer may be made in various ways but preferably it is produced by a saw-cut or milled.

As hereinbefore stated, one of the weak points of a slotted cop skewer is at the tip end portion of the longitudinally extending opening in the skewer barrel, which becomes particularly observable subsequent to the shape grinding operation, and one of the important features of the present invention con-

sists in overcoming this objectionable defect. In accordance with the present invention, the slotted cop skewer, Fig. 2, is subjected to compression at the tip end portion adjacent the tip terminal of the longitudinal opening 4, with the result, as indicated in Fig. 3, that the end of the slot 4 is closed, as shown at 7, Fig. 3, and the diameter of the skewer at this portion is decreased, thus preserving more metal and consequent strength at this point after the shape grinding operation than would be the case if the shape grinding took place without such compression. The shape grinding operation, which imparts the surface finish to the skewer, is performed subsequent to the compression operation above described, and consequently more metal is retained at the terminal end of the closed-in slot 4, than would otherwise exist.

The side members 8 and 9 of the opening 4 are then separated or sprung apart, as indicated in Fig. 4, thereby forming the two resilient members 8 and 9 which by their expansive action serve to hold the wound cop properly on the skewer when in use.

As indicated in Fig. 4, the head 10 of the skewer is secured to the end portion 11, as indicated, and such head portion, where the skewer is to be used in filling replenishing looms, is provided with rings 12.

In filling replenishing looms of the feeler type, economy of waste of filling depends upon the sensitive action of the feeler in determining when a substantial exhaustion of filling occurs, and in order that the cop skewer may afford a proper support for the paper tube for sensitive action of the feeler, the paper tube supporting portion of the skewer, as indicated at 13, Fig. 4, is formed cylindrical, and of a length longitudinally of the skewer to support the paper tube throughout, without the latter overlapping the resilient side members 8 and 9 of the skewer. In other words, the cylindrical portion 13 affords a support for the paper tube to maintain it in cylindrical form during the use of the cop, to thereby afford proper contacting surface for the feeler.

In some cases it may be desirable to form the cylindrical portion 13 with a spiral rib, and in such case the cylindrical portion may be provided with the spiral rib 14 which extends from the head portion of the skewer towards, but does not reach, the terminal end portion 5 of the longitudinal opening 4 which separates the resilient members 8 and 9.

When the cop skewer is used in a filling replenishing loom, it is usual to support the cop skewer with its load of yarn, in a hopper, having means for engaging the head of the skewer, and other means for engaging the tip end portion of the skewer, and during the transfer of the loaded cop skewer from the hopper to the shuttle it is subjected to a sudden impulse which is liable to bend or permanently deflect the tapered tip portion of the skewer and cause the formation of burrs or roughness at the end portion of the tip where it is engaged with the tip holding means in the hopper. A further important feature of the invention, therefore, consists in providing the skewer with a hardened tip portion to withstand the stress of transfer without bending and at the same time avoid the formation of burrs or roughness at the end of the tip.

In accordance with this feature of the invention, the tip end portion of the skewer is subjected to a heat treatment and then hardened, either by immersion in water or oil or by other cooling agent, and such treatment may be extended from the extreme end 16 of the tip to a point including the thin sides of the terminal end of the longitudinal slot, as at 17, the effect being that the skewer may withstand the strains of transfer without bending or the formation of burrs or roughness at the terminal portion of the tip.

What is claimed is:

1. A method of making cop skewers for shuttles, which consists in forming a skewer blank from a solid cylindrical rod by tapering the rod towards one end, then slotting the blank longitudinally from a point adjacent the tapered end of the blank, subjecting the tapered end of the blank at the terminal portion of the longitudinal slot to compression, widening the longitudinal opening between its ends, and then heat treating the tapered end of the skewer and hardening it.

2. The method of making cop skewers for shuttles, which consists in forming a skewer blank from a cylindrical rod having the same diameter as the paper tube receiving portion of the finished skewer by tapering the rod towards one end, forming a rectangular slot between the ends of the tapered blank, compressing the tapered end of the blank at the terminal portion of the longitudinal slot, and thereafter shape grinding the blank.

3. The method of making cop skewers for shuttles, which consists in tapering a solid, cylindrical rod toward one end to form a skewer blank, then forming a longitudinally extending rectangular slot between the ends of the tapered blank, compressing the tapered end of the blank at the terminal portion of the longitudinal slot, and heat treating the tapered end of the blank and hardening it.

4. The method of making cop skewers for shuttles, which consists in forming a skewer blank of a solid cylindrical rod by tapering the rod towards one end, forming a rectangular slot between the ends of the tapered blank, compressing the tapered end of the blank at the terminal portion of the longitudinal slot, and thereafter shape grinding the blank and heat treating the tapered end of the blank and hardening it.

5. The method of forming cop skewers for

shuttles, which consists in forming a metal skewer blank of a cylindrical rod having the same diameter as the tube supporting portion of the finished skewer and tapering the rod from an intermediate portion thereof to one end of the blank, forming a longitudinal opening in the blank from the cylindrical portion to a point adjacent the tapered end of the blank, compressing the tapered end of the blank at the terminal portion of the opening to reduce the diameter of the blank and partially close the end of the opening, and heat treating and hardening the tapered end of the blank.

6. The method of making cop skewers for shuttles, which consists in forming a metal skewer blank from a cylindrical rod having a tapered portion extending from an intermediate portion of the rod to an end thereof, forming a longitudinal opening in the blank from the cylindrical portion to a point adjacent the tapered end of the blank, compressing the tapered end of the blank at the terminal portion of the opening to reduce the diameter of the blank and partially close the end of the opening, then shape grinding the blank, and heat treating and hardening the tapered end of the blank.

In testimony whereof, I have signed my name to this specification.

FREDRIC E. DOUGLAS.