H. KELLERMAN.

COP TUBE.

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1,029,065.

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Fig. 1.

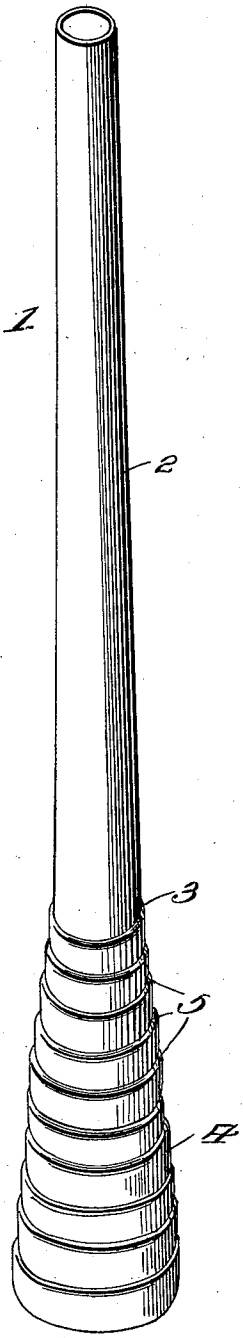
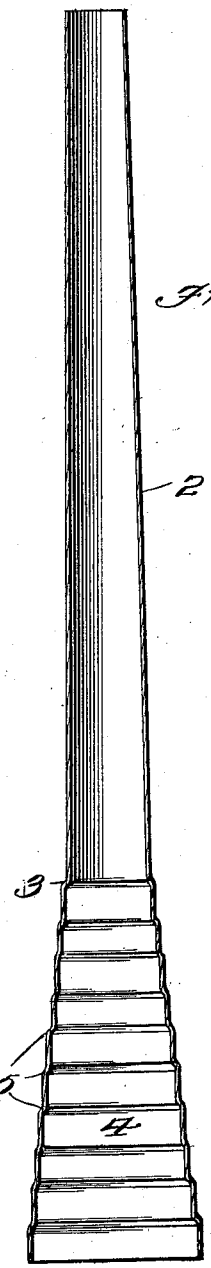



Fig. 2.




Witnesses

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# UNITED STATES PATENT OFFICE.

HENRY KELLERMAN, OF MAYFIELD, PENNSYLVANIA.

## COP-TUBE.

1,029,065. Specification of Letters Patent. Patented June 11, 1912.

Application filed January 22, 1910. Serial No. 539,589.

*To all whom it may concern:*

Be it known that I, HENRY KELLERMAN, a citizen of the United States, residing at Mayfield, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Cop-Tubes, of which the following is a specification.

My invention relates to quills whereon silk is wound when shipped, and the objects of my invention are to provide a quill of paper or like material which shall be extremely light and so cheaply manufactured that it may be thrown away after the silk has been unwound therefrom, the quill being of such form that the yarn may be pulled freely from the tapered surface which forms the base of the quill.

The quill ordinarily used today consists of a hollow spindle of wood having a solid base. These quills are of considerable relative weight, and cost so much to manufacture that they cannot economically be thrown away after the silk has been unwound therefrom, but are returned after being emptied, to the manufacturer, at considerable cost for expressage. Further than this, these wooden quills are so relatively thick that a large proportion of the cop consists in the wooden quill itself. Paper tubes have also been slightly used, but in these, the taper is very slight and uniform from the top of the tube to the base thereof, making the tube practically straight. This is a very serious fault, as it makes it difficult to use up all the silk on the quill, because of the fact the silk on the base of the tube must be pulled over the silk lying under it, instead of pulling freely from a tapered surface. These paper tubes have also had to be provided with solid bases. The cost of these bases and the weight of the material therein has prevented the paper tubes from being satisfactory, and prevented their coming extensively into use, particularly where silk and other valuable yarns are to be wound thereon.

In order to avoid the disadvantages heretofore referred to and incident to the use of both wood quills and paper quills, as heretofore manufactured, I have devised the quill shown in the drawings and now to be described.

For a full understanding of the invention and the merits thereof, and to acquire a knowledge of the details of construction, reference is to be had to the following description and accompanying drawing, in which the tube is shown about twice its ordinary size.

In these drawings: Figure 1 is an elevation of my improved quill or cop; and Fig. 2 is a longitudinal section thereof.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawing by the same reference characters.

Referring to these figures, 2 designates a quill made of paper, tubular in formation and slightly tapering. The lower end of the tube from the point 3 is expanded gradually outward to form the base 4, the face of this base being preferably slightly corrugated, as at 5. It will be seen that the taper of the body portion of the quill is very slight and that the angle of the outer face of the base to the axis of the tube is much greater than the angle of the face of the body portion of the tube to the axis.

It is to be noted that the quill is hollow from one extremity to the other and that it is composed of practically one thickness of material, from end to end, the base portion of the quill being no thicker than the body portion thereof. The quill may be formed of paper or like composition, and may be either made in one piece, pressed or rolled into shape, or two or more pieces fastened together, or it may be made of a narrow strip of paper wound spirally into the shape shown. I do not wish to limit myself to any special means of making the cop tube, nor do I wish to limit myself to the exact form of corrugations 5 upon the tapering base 4.

It will be seen that the quill formed as above described is extremely light and extremely cheap. Millions of these quills are used every month, and hence it will be seen that a saving in weight and an economy in the construction of these tubes is of very great moment. The form of quill devised by me may be so cheaply made that the quill need not be returned to the manufacturer after the yarn or silk has been unwound therefrom, and on account of its extremely light weight, the quill may be shipped very much less expensively than quills made of wood and which have a relatively solid and weighty base. It will also

be seen that my improved quill will hold more silk than wooden quills of the same character, the wooden quill having a thick wall, whereas the paper quill has a very thin wall, thus making the finished cop nearly solid silk instead of its being about half wood. Thus the loom will run much longer without requiring the shuttle to be replenished. Furthermore, the peculiar shape of my quill is such that the yarn is pulled freely from a tapered surface down to the last course.

It will be obvious that by making the quill of paper having a uniform thickness from end to end that the cost is reduced very materially, both in the manufacture of the quill and in the transportation charges, and indeed making it so cheap that after it has reached the manufacturer it may be destroyed. Further than this another advantage secured by the quill being of paper and having a uniform thickness throughout is that the paper being slightly yielding the tube can be forced more or less on to the spindle as may be desired. This is important in actual practice as a wooden quill or cop tube cannot be so forced on to the wooden spindle. There are constant slight variations due to wear and particles of waste which will not permit a quill having an unyielding base to be forced on to the spindle so as to accurately space it where the traverse is set to commence winding. My paper tube may be adjusted accurately and this is of the utmost importance in fine work where a hundredth part of an inch makes a great difference. Another great advantage residing in my tube over the wooden tube or quill is that a wooden quill will surely warp, and the very slightest curvature in the quill makes it impossible to fit it upon the tapered spindle, making reboring necessary and making it of course imperative that the silk upon it shall be removed. If, however, my improved tube should warp slightly it can be still forced upon the spindle and will hold as well as ever.

I am aware that paper quills have been put upon the market and used to some extent. These quills have a uniform and very slight taper from top to bottom. They do not have an enlarged base and are therefore open to many objections. One of these objections is that when nearly empty the yarn or silk must pull off over a part of the silk already upon the tube. Thus at the end of the traverse, near the large end of the uniformly tapering tube of paper, the strand of silk must pull over the wound silk above it, and in weaving especially when using silk of a fuzzy nature or containing flecks the strand will almost surely catch and break. In weaving silk the looms are run at a rate of speed which draws the silk from the quill at about two hundred yards per minute with a shock at each reversal of about 200 times per minute. These shocks nearly always loosen the silk at the large end of a uniformly tapering tube so that the silk collapses and becomes entangled, making it impossible to use all of the silk from a plain tapered tube.

The faults above mentioned have always prevented uniformly tapering paper tubes from being satisfactorily used.

Having thus described the invention, what I claim is:—

A quill of the character described, constructed of paper having continuous walls of uniform thickness throughout, the major portion of said quill being slightly tapered and the remainder of the quill comprising a plurality of annular portions increasing in diameter away from the larger terminal of the tapered portion of the same.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY KELLERMAN. [L. S.]

Witnesses:

G. FRANK COUCH,

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