

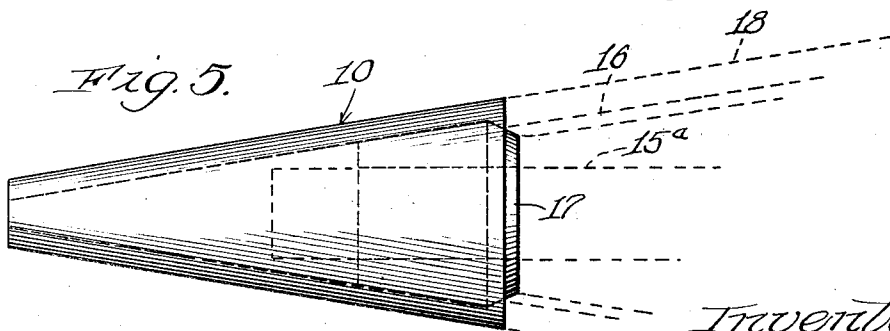
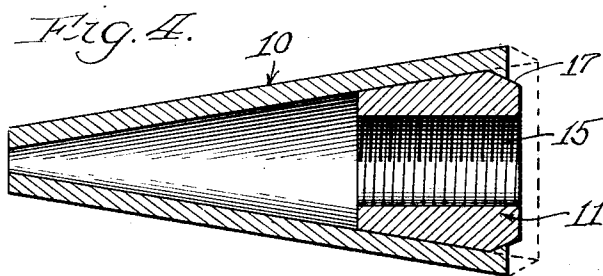
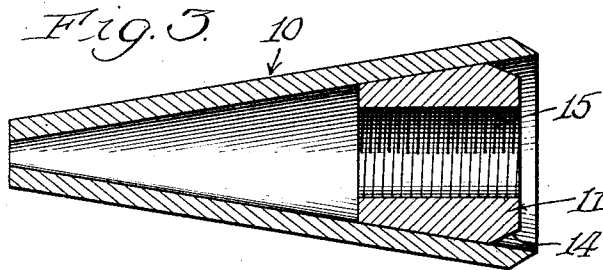
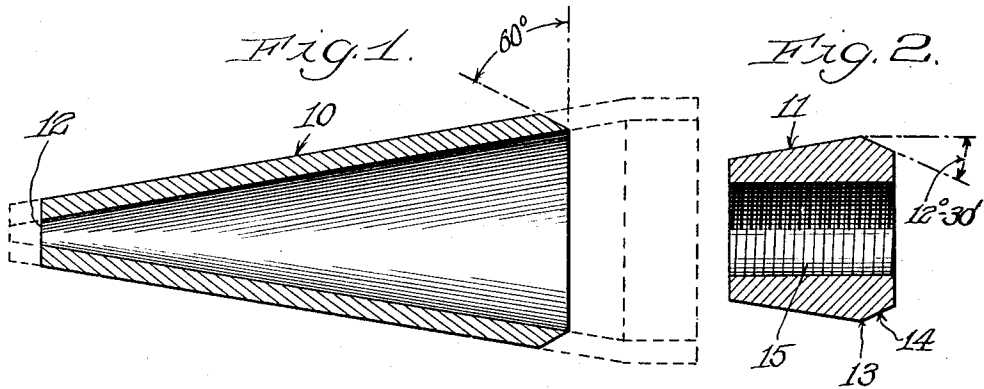
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TIP FOR MECHANICAL PENCILS

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TIP FOR MECHANICAL PENCILS

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The invention relates to a metallic tip for mechanical pencils and to the method for making the same, and has special reference to a tip for the writing point end of a mechanical pencil, said tip having an axial opening therethrough of a diameter to permit the passage of a pencil lead.

More particularly, this invention has reference to a tip for a mechanical pencil comprising a conical metallic shell and a substantially frusto-conical bushing, the latter being held in a fixed relation within the enlarged end of the shell by means of a thickened portion at the base thereof formed preferably by upsetting the peripheral tapered edge of the shell over a bevelled edge at the base of the frusto-conical bushing.

Ordinarily, in the present day manufacture of mechanical tips for mechanical pencils, the bushing of the tip for connection with the pencil mechanism has been soldered into the enlarged end of the conical shell and since solder deteriorates with age, the bushing often becomes loosened within the shell and falls off thereby requiring repair. Most of the larger and well established manufacturers are forced to maintain elaborate servicing stations at the place of manufacture and also in the larger cities for repair work and it has been found that a substantial percentage of repairs have been in the tip of the pencil because the pencil is frequently dropped and the tip assembly loosened, or by reason of the deterioration of the solder.

The above recited present day construction is substantially great in cost of assembly owing to the handling thereof in preparation for receiving the solder and the cost of the apparatus and maintenance thereof. In the present invention, the dipping and electroplating apparatus may be dispensed with since only mechanical operations are necessary. It is further pointed out that an application of heat is necessary to join the parts in the soldered construction thereby prohibiting the handling thereof with bare hands and requiring elaborate apparatus.

It is herein contemplated to eliminate the necessity for soldering in upsetting the extending portion of the shell over the bevelled

portion of the bushing to urge a forced engagement between the inner and outer tapered side walls of the shell and bushing respectively. This construction practically eliminates subsequent servicing of the tip since there are no materials subject to substantial deterioration. Further there will be no so-called "production rejects" since the elements are held in a predetermined relation to each other by mechanical means; whereas, in the soldered construction the elements are assembled manually without predetermined positioning. The term "production rejects" is given to those tips which have been found to be faulty or inferior after being given an inspection by men trained in that work.

The method for making the tip comprises facing the enlarged end of a conical shell to provide an edge converging inwardly toward the axis thereof, disposing a substantially frusto-conical bushing in the enlarged end of said shell to a depth such that a portion of the shell projects beyond the base of the bushing, upsetting the extending end of said shell to engage a bevelled edge at the base of said bushing by a force exerted substantially axially of said shell so that the shell is thickened at the base portion thereof, and in trimming the end of the shell, if desired.

One of the objects of this invention is to provide a tip for a mechanical pencil of the type hereinbefore described, wherein the service repairs and production rejects are substantially eliminated.

Another object of this invention is to provide a tip for a mechanical pencil of the character noted above wherein the manner of assembly is substantially economical and the structure is comparatively inexpensive and is durable.

A further object of this invention is to provide a new and novel method of making a tip for a mechanical pencil of the type recited above.

Other objects and advantages will hereinafter be more fully pointed out and for a more complete understanding of the characteristic features of this invention reference may now be had to the following description

when taken together with the accompanying drawing, in which latter:

Figure 1 is a central sectional view of the shell of the tip embodying the features of this invention after the first operation on the shell thereof, the initial form of the shell being shown in dotted lines;

Fig. 2 is a central sectional view of the bushing for the tip of the present invention;

Fig. 3 is a central sectional view of the bushing assembled in the shell;

Fig. 4 is a view similar to Fig. 3 after the end of the shell has been upset to secure the bushing therewithin; and

Fig. 5 is an elevational view of Fig. 4 after the end trimming operation showing its relation with the writing point end of a mechanical pencil, which latter is shown fragmentarily in dotted lines.

Referring now more particularly to the drawing, the structure of the present invention comprises a conical-shaped metal shell 10 and a substantially frusto-conical bushing 11.

The shell 10 is preferably formed from a piece of tubular stock which is ordinarily of a base material such as brass having a nickel or precious metal plating thereon. Tips of this character have been provided since the advent of mechanical pencils, the barrels of which latter ordinarily are formed of plastic or composition materials. These tips, having a precious metal plating, give a finish to the pencils and also afford a very efficient construction since the wearing character of the pencil would be such as not to stand up under continued use for a substantial length of time if the end of the composition barrel were exposed.

The tubular member is swaged into a conical shape, such as that shown in dotted lines in Figure 1, the apex of the cone being provided with an aperture 12 of a size to snugly engage the pencil lead, although permitting an easy longitudinal movement thereof. The cone, shown in dotted lines in Figure 1, is inserted in a lathe and the enlarged end thereof is faced and the opening 12 drilled to a desired overall length which, in this instance, is approximately .517 of an inch, the enlarged end converging toward the axis at an angle of about sixty degrees from the plane of the base.

The frusto-conical shaped bushing 11 is inserted into the enlarged open end of the shell 10, as shown more particularly in Fig. 3, to a depth such that a portion of the shell projects beyond the base of the bushing. By the term "base of the bushing" is meant the largest diameter thereof as indicated by the numeral 13 in Fig. 2. It is preferable that the taper of the exterior wall of the conical shaped bushing be the same as the taper of the inner wall of the conical metallic shell

so as to have a comparatively great engaging surface. The bushing is provided with a bevelled extension 14 from the base thereof and has a double function of providing a pilot for the tip and also an engaging member for providing an interlocking relation between the bushing and the shell.

The bushing 11, in the present instance, is internally threaded as at 15 to threadedly engage an extension on the guide tube 15a of the internal operating mechanism of the mechanical pencil, although, it is to be understood that this invention is not to be limited by this particular securing arrangement for it may be readily apparent to those skilled in the art that there are various other manners of securing these members together. The bushing is preferably cast of a material hard enough to hold a thread and, in the present instance, is formed of brass.

After the bushing 11 is inserted into the enlarged end opening of the conical shell 10, the converging enlarged end of the shell which extends beyond the base of the frusto-conical bushing 11 is upset by means of a force inserted substantially axially of the shell against the end thereof. The assembly of the bushing in the shell is placed into a die which supports the exterior wall of the shell and a combination punch and pilot is then forced axially into engagement therewith, the pilot centering the bushing by means of passing through the threaded aperture thereof and the punch exerting a pressure on the bevelled end of the shell to force the material thereover to flow against the bevelled extension on the base of the bushing, the tapered wall of the die preventing outward displacement of the material of the shell. The completion of this operation is shown in Fig. 4, wherein the end of the shell is shown as being upset or thickened. If desired, this end may be trimmed to present a perfect abutting surface for the end of the radite shell of the barrel of the mechanical pencil. It will be noted that a portion of the bevelled edge of the bushing extends beyond the base of the shell 10 after the final operation thereof to act as a pilot for engaging the inner brass sleeve 16 of the barrel for aligning the tip with respect to the axis of the pencil.

Inasmuch as mechanical pencils are ordinarily formed of a substantially heavy radiate material on a thin metallic shell, it has been found desirable to countersink the light wall of the brass tube 16 to snugly fit the pilot 17 extending from the tip. It will be understood that under no circumstances is it desirable to countersink or remove any of the radite of the barrel 18 of the pencil owing to a possibility of the radite swelling or bulging. By means of providing a flat base to the shell of substantial width and also one which is true to a thousandth of an

inch, the matching of the tip in the barrel will be substantially perfect since the end of the radite barrel 18 is also true as it is usually faced on a lathe.

5 In summary, a tip has been provided of two elements without the necessity of soldering the same together and with a minimum of expense by which is obtained a durable construction free from production rejects and subsequent repair. The operation consists in facing the enlarged end of the shell to provide an edge converging axially of the shell which is upset by means of a punch and die to engage a bevelled edge of a pilot extending from the frusto-conical bushing, the bushing being wedged into the shell to prevent rotation therebetween and being held by the surplus of material obtained from the shell extending initially beyond the base of the frusto-conical bushing. The edge of the base presents a perfect flat surface devoid of any radius which will permit of the tapered surface thereof being coextensive with the outer surface of the barrel of the mechanical pencil.

While but a single embodiment of this invention is herein shown and described, it is to be understood that various modifications thereof may be apparent to those skilled in the art without departing from the spirit and scope of this invention and, therefore, the same is only to be limited by the scope of the prior art and the appended claims.

I claim:

35 1. A tip for a mechanical pencil comprising a metallic shell, a bushing in one end opening of said shell for connection with an end of said pencil, said shell having a conical-shaped outer wall and a thickened portion at the base thereof for retaining said bushing against the inner wall of said shell to form a fixed relation therebetween.

40 2. A tip for a mechanical pencil comprising a metallic shell, a bushing in one end opening of said shell for connection with an end of said pencil, said shell having a conical-shaped outer wall and a thickened portion at the base thereof for retaining said bushing against the inner wall of said shell to form a fixed relation therebetween, a portion of said bushing extending beyond the end of said shell to form a pilot for positioning said tip relatively to said pencil.

55 3. A tip for a mechanical pencil comprising a metallic shell, a bushing having a bevelled edge at the base thereof, said bushing being disposed in one end opening of said shell for connection with an end of said pencil, said shell having a conical-shaped outer wall and a thickened portion at the base thereof for engagement with said bevelled edge for retaining said bushing against the inner wall of said shell to form a fixed relation therebetween.

65 4. A tip for a mechanical pencil comprising

a metallic shell, a bushing having a bevelled edge at the base thereof, said bushing being disposed in one end opening of said shell for connection with an end of said pencil, said shell having a conical-shaped outer wall and a thickened portion at the base thereof for engagement with said bevelled edge for retaining said bushing against the inner wall of said shell to form a fixed relation therebetween, a portion of said bevelled edge extending beyond the end of said shell to form a pilot for positioning said tip relatively to said pencil.

5. A tip for a mechanical pencil comprising a conical metallic shell, a bushing having its outer wall converging in opposite directions, said bushing being disposed in one end opening of said shell for connection with an end of said pencil, one of said converging outer walls of said bushing engaging over its length a portion of the inner wall of said shell, said shell having a thickened end wall for engaging the other of said converging walls of said bushing for retaining a fixed relation between said shell and said bushing.

6. A tip for a mechanical pencil comprising a conical metallic shell, a bushing having its outer wall converging in opposite directions, said bushing being disposed in one end opening of said shell for connection with an end of said pencil, one of said converging outer walls of said bushing engaging over its length a portion of the inner wall of said shell, said shell having a thickened end wall for engaging a portion of the other of said converging walls of said bushing for retaining a fixed relation between said shell and said bushing.

7. The method of forming a tip for a mechanical pencil consisting in forming a conical-shaped shell, inserting a bushing into the enlarged end opening of said conical shell and in upsetting said shell at its enlarged end to form a thickened securing wall at the base of said bushing by a force exerted substantially axially of said shell.

8. The method of forming a tip for a mechanical pencil consisting in forming a conical-shaped shell having a bevelled end at the base thereof, inserting a bushing into the enlarged end opening of said shell, and in upsetting the bevelled end of said shell to form a thickened securing wall at the base of said bushing by a force exerted substantially axially of said shell.

9. The method of forming a tip for a mechanical pencil consisting in forming a conical-shaped shell having a bevelled end at the base thereof, inserting a bushing having oppositely converging side walls into the enlarged end opening of said shell, and in upsetting the bevelled end of said shell over one of said converging side walls of said bushing to form a fixed relation between the other of said converging side walls of said bushing

and said shell by a force exerted substantially axially of said shell.

10. The method of forming a tip for a mechanical pencil consisting in forming a conical-shaped shell having a bevelled end at the
5 base thereof, inserting a bushing having oppositely converging side walls into the enlarged end opening of said shell, and in up-
10 setting the bevelled end of said shell over a portion of one of said converging side walls of said bushing to form a fixed relation be-
15 tween the other of said converging side walls of said bushing and said shell by a force exerted substantially axially of said shell.

In witness whereof, I have hereunto subscribed my name.

WILLIAM H. LINDEMON.

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