March 24, 1942. H. R. JOCHIM 2,277,109

MECHANICAL PENCIL AND A METHOD FOR MAKING THE SAME

Filed July 10, 1941

Fig. 1

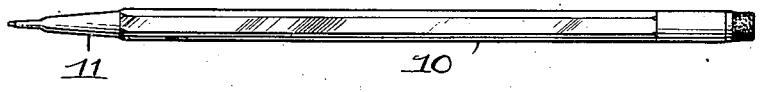



Fig. 2

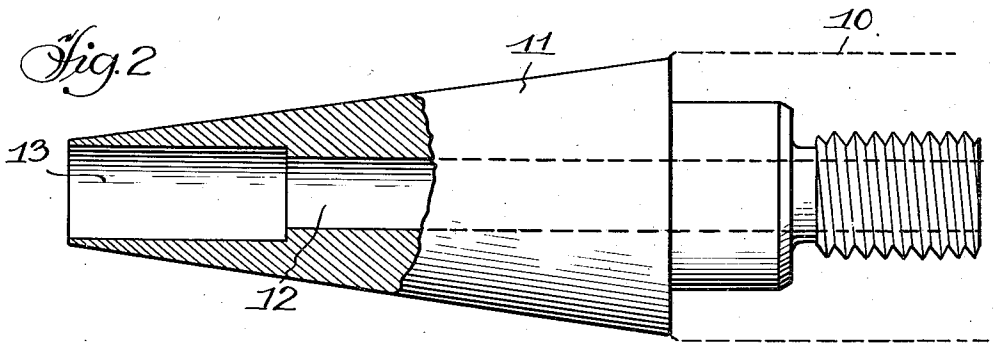



Fig. 4

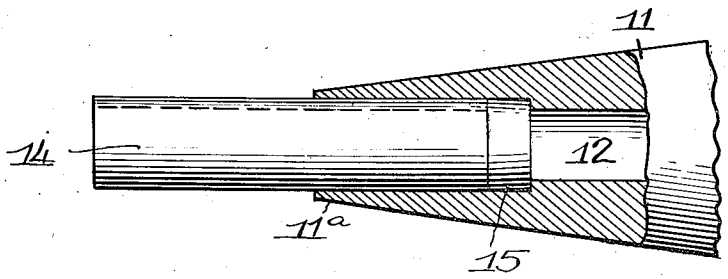
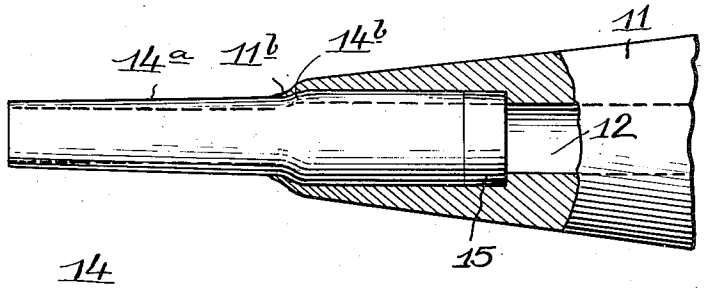



Fig. 5



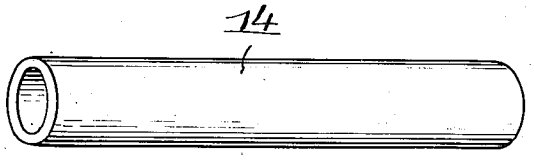




Fig. 3

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# UNITED STATES PATENT OFFICE

2,277,109

## MECHANICAL PENCIL AND METHOD FOR MAKING THE SAME

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2 Claims. (Cl. 120—9)

This invention relates to an improvement in mechanical pencils and to a method for making the same, and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The improvement is designed especially for a mechanical pencil adapted for use by draftsmen who employ the pencils in drawing along the edges of T-squares, triangles, curves and the like. Such a pencil is shown in a patent to H. F. Smenner, No. 2,170,734, granted August 22, 1939. Said pencil is capable of using leads of a very small diameter, as for example, l ss than $\frac{1}{100}$ of an inch, and has a tip terminating in a long, slender, almost cylindrical section whose free end has an external diameter but little greater than that of the lead. It may be used to draw a line along the edge of a T-square, triangle, curve or other edge without varying the uniformity of the distance of the pencil point from said edge.

Great difficulty has been encountered in providing the tip of such pencil with the integral, comparatively long, thin walled, substantially cylindrical tube or sleeve in which the tip terminates, as shown in said Smenner patent. The object of the present invention is to provide a tip made in two parts and equipped with such a thin sleeve at its end and a method for making it by means at once simple and ready of assembly, and at the same time with the required rigidity in the connection between the main body of the tip and the small diametered sleeve which encloses the lead in the neighborhood of its exposed point.

In the drawing—

Figure 1 is a view representing a side elevation of a mechanical pencil containing the invention.

Figure 2 is a view partly in section and partly in elevation showing a blank for the main part of the tip.

Figure 3 is a perspective view of an elongated tube or sleeve of stainless steel.

Figure 4 is a view similar to Figure 2, with said stainless steel tube which is to constitute the elongated tip of very small diameter inserted into the main part of the tip.

Figure 5 is a view partly in section and partly in elevation showing the finished tip.

Referring now to the drawing, 10 indicates a pencil body to which is secured in any familiar manner a tapered tip 11 preferably made of brass. Said tip is provided with the usual bore 12 to receive the lead. It is also counter-bored from its end as indicated at 13, the counter-bore being slightly greater in diameter than the bore 12.

14 indicates a tube preferably made of stainless steel. Said tube is of such diameter that it may be driven into the counter-bore 13 (as shown in Figure 4), and is of such thickness that its inner cylindrical surface will be in substantial alignment with and constitute a continuation of the bore 12 of the tip. Its inner diameter is greater than it is designed to be in the finished structure.

A mandrel of approximately the diameter of the lead to be used in the pencil is then inserted into the tube 14, and the end 11a which appears as an abrupt shoulder in Figure 4 is swaged down upon the tube 14 which itself is swaged and polished upon the mandrel to reduce it to the required diameter as shown in Figure 5 at 14a, the swaging action resulting in the formation of an annular shoulder 14b on the stainless steel tube 14 and of a gradually thinning out and overlapping of the brass shoulder 11a upon the annular shoulder 14b as at 11b. This produces a one-piece effect and at the same time an efficient lock between the brass tip 11 and the stainless steel tube or sleeve 14.

When inserting the tube 14 into the counter-bore 13, it may be preferred to file the end to be inserted to produce a slight taper, as shown at 15 in Figure 4.

I claim as my invention:

1. In a mechanical pencil, a tapered metal tip provided with a bore and with a counter-bore of greater diameter at its end, a steel sleeve of the diameter of said counter-bore fixed therein with a substantial part of its length projecting beyond said tip, said tube and the end of said tip being swaged down the one upon the other to form a shoulder on said tube overlapped by the metal of said tip to interlock the tube and tip together and to reduce the tube projecting beyond the tip to a predetermined small interior diameter.

2. A method of making a tapered metal tip with a thin steel sleeve of comparatively small diameter projecting beyond said tip, which consists in providing a comparatively heavy tapered brass tip with a central bore; in forming adjacent the end of said tapered tip a counter-bore of greater diameter than said first named bore and concentric therewith; in driving a thin metal sleeve of the outer diameter of said counter-bore into said counter-bore; and in then swaging the end of said brass tip and said steel tube down upon a mandrel to thin out said tube and reduce it to a predetermined small diameter in manner to form an annular rounded shoulder in said steel tube, and to draw down the end of said tip to overlap said shoulder and disappear in the outer surface of said sleeve whereby said tip and sleeve are made to simulate an integral structure of tip and sleeve.

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