Sept. 11, 1928. 1,683,828

G. B. IRELAND

RECORDING PEN

Original Filed July 22, 1926

Fig. 1

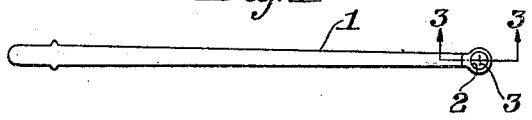


Fig. 2

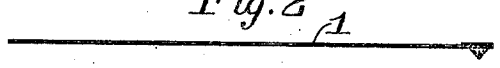


Fig. 3

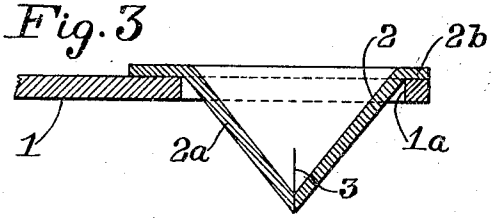


Fig. 4

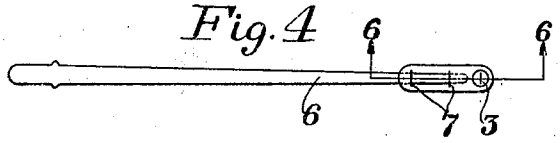


Fig. 5

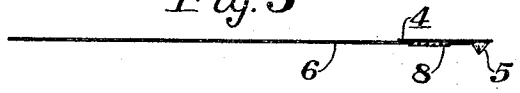
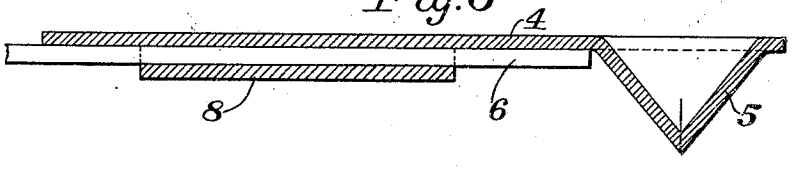


Fig. 6



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UNITED STATES PATENT OFFICE.

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RECORDING PEN.

Original application filed July 22, 1926, Serial No. 124,220. Divided and this application filed March 16, 1927. Serial No. 175,842.

This application relates generally to pen mechanism adapted for making graphic records or for like purposes and more in particular to pen mechanism for co-operation with highly sensitive and delicate elements having a relatively weak operating force.

It is the general object of the invention to provide a pen and a pen arm which operates with an exceedingly light pressure and requires a very small force for operation.

For a full understanding of the invention, reference is made to the accompanying drawings wherein

Fig. 1 is a plan view of one form of the invention;

Fig. 2 is a side view thereof;

Fig. 3 is a cross section on a larger scale, taken on line 3—3, Fig. 1;

Fig. 4 is a plan view of another form;

Fig. 5 is a side view thereof; and

Fig. 6 is a cross section on a larger scale, taken on line 6—6, Fig. 4.

In the drawings 1 represents a pen arm stamped out from thin sheet material such as celluloid or material having generally the physical characteristics of celluloid. At the outer end the arm 1 is formed with a conical depression 2 or indentation defining a corresponding protuberance which is provided with a fine incision 3 extending inwardly from the point of the cone.

The wall of the protuberance preferably has a smaller thickness than the arm. While there is, of course, a good deal of latitude in regard to the thickness of the arm and of the protuberance defined by the indentation 2, I found a thickness of about .01″ for the former and a thickness of about .005″ for the latter very satisfactory.

The depression 2 may be formed in the arm 1 by bringing a correspondingly shaped die element heated to a suitable temperature, in contact with the sheet material and allowing it to sink into the latter to the desired extent.

In order to form a protuberance of smaller thickness than the arm 1, I preferably form the protuberance of the desired sheet material and then unite it with the arm 1 by means of a suitable solvent and preferably under pressure.

The incision 3 is made by means of a razor or other similarly thin-edged cutting blade. The incision is made so fine that ink or other like liquid does not, under the action of gravity alone, flow through it. In fact, the incision can be made so fine that it is almost impossible to detect it, because the inherent resiliency of the material severed by the knife, returns severed parts into their original position before the slit was made and thus practically closes the slit 3.

While it is not material how the pen arm and pen point are formed, I have found that a good deal of care is necessary and the following is a description of a process employed:

The arms 1 are blanked cold from transparent sheet celluloid of .010″ thickness. At the same time a hole is punched in the outer end of the arm for the reception of the pen. The pen points which are made from .005 transparent sheet celluloid, are formed in a hot mold or die, which contains any desired plurality of punches and die elements the co-operating members of which may be held in correct relation by means of dowel pins or the like.

The sheet material from which the pens are made, are cut up into small disks about 3/8″ in diameter and these disks are laid over the dies and the punches are carefully brought down upon them.

Heat from a Bunsen burner or from an electric furnace is then applied. As the dies warm up, the material softens and the weight of the punch block gradually allows the latter to sink into the dies carrying the material with it except for a small margin which is left to seat on the portion of the arm immediately around the hole punched for the reception of the pen.

After the pen cups have been formed, they are set into the holes in the ends of the pen arms and cemented with liquid celluloid or any other suitable solvent, to the latter. After the connection is made, each pen point is placed over a cone conforming to the shape of the punch and provided with a fine slot extending from its point half way toward the base. In this position the pen cups are slitted with a very thin and sharp knife mounted in a suitable holder for motion in line with the slot in the cone.

Care must be taken not to drop the knife directly down upon the point of the pen cap, but to approach it with a sliding motion similar to that of a saw. This precaution must be observed to avoid crushing of the point.

By the process described, it is possible to provide a pen arm and a pen which separately and together are extremely light, extremely simple and cheap.

Having now special reference to Figure 3, which shows the preferred form of construction, 1^a indicates a hole at the end of the arm 1. The pen cup 2^a is formed of a separate piece of sheet material of smaller thickness than the arm 1. The pen cup 2^a has a flange 2^b by which it is supported on the arm, the pen cup extending through the hole 1^a.

The ink is placed into the cup serving as a reservoir. As soon as the pen is placed upon a chart and moved relatively thereto, the ink is drawn through the slit by capillary attraction and traces the record as intended.

The principal advantage of the mechanism described is an exceedingly small resistance to movement over the record chart. The point of the pen cup while sharp enough to define a thin record line, is sufficiently rounded to offer a smooth surface to the paper. It has no sharp edges or corners tending to scratch on or dig into the surface of the paper.

A second advantage of almost equal importance is the light weight combined with a suitable degree of resilience for maintaining the pen on the paper in an almost ideal operating condition. The pen arm can be so positioned that the pen bears only very lightly upon the paper while the arm is sufficiently stiff to avoid vibrations. In other words the pen can be maintained in contact relation to the paper with a minimum of pressure.

The two advantages mentioned are instrumental in providing a pen which offers a minimum of resistance to movement.

The form shown in Figs. 4–6 is generally similar to the form shown in Figs 1–3. However, the pen point 5 is provided separately from the arm 6 and may be detached therefrom and replaced by a new pen point. It comprises a small strip 4 of sheet celluloid having at one end the protuberance 5 slitted as previously described. Toward the other end, the strip 4 has two transverse slits 7 and the portion intermediate the slits is pressed out of the plane of the strip to provide a socket portion 8 for receiving the arm 6.

The pen mechanism described has been especially adapted for use as a part of a recording sphygmomanometer, but it is understood that it is of general application.

While, in the form described, it is principally adapted for movement over a horizontally disposed chart, the principle of the invention may be embodied in other forms, as for instance for movement of the arm in a vertical plane.

Although I have specifically mentioned only celluloid, all composition materials having the physical characteristics of celluloid, are available for the purposes of invention.

The subject matter of the application is disclosed in my application Serial No. 124,220 for "apparatus for measuring pulsating currents" filed July 22, 1926.

I claim:

1. A pen consisting of a thin piece of composition material having substantially the physical characteristics of celluloid, said piece having on one side an indentation defining a pointed protuberance on the other side, the protuberance being provided with a fine incision extending inwardly from the point.

2. Pen mechanism of the character described, comprising an arm of a composition material having substantially the physical characteristics of celluloid, said arm having on one side an indentation defining a pointed protuberance on the other side, the protuberance being provided with a fine incision extending inwardly from the point.

3. A pen consisting of a thin strip of composition material having substantially the physical characteristics of celluloid, said strip having on one side an indentation defining a pointed protuberance on the other side, the protuberance being provided with a fine incision extending inwardly from the point substantially at right angles to the strip.

4. A pen consisting of a piece having a thickness of about .01″ of a composition material having substantially the physical characteristics of celluloid, said piece having on one side an indentation defining a pointed protuberance on the other side, the protuberance being provided with a fine incision extending inwardly from the point.

5. Pen mechanism of the character described, comprising an arm of a composition material having substantially the physical properties of celluloid, of a thickness of about .01″, a piece of composition material having substantially the properties of celluloid, said piece having on one side an indentation defining a pointed protuberance on the other side, of a thickness less than the thickness of the arm, the protuberance being provided with a fine incision extending inwardly from the point.

6. Pen mechanism of the character described comprising an arm of a composition material having substantially the physical properties of celluloid, said strip having on one side an indentation defining a pointed protuberance on the other side, the arm having a thickness of about .01″ and the protuberance having a thickness of about .005″ and being provided with a fine incision extending inwardly from the point.

7. Pen mechanism of the character de-

scribed, comprising an arm of a composition material having substantially the physical properties of celluloid, a funnel-like substantially cone-shaped element of like material, provided with a fine incision extending inwardly from the point, the said element having a smaller thickness than the arm and being united to the latter.

8. In pen mechanism of the character described, for combination with a pen arm, a nib of a composition material having substantially the composition of celluloid, said nib consisting of a thin piece of the material formed to define an indentation on one side and a pointed protuberance on the other side, the protuberance being provided with a fine incision extending inwardly from the point.

In testimony whereof I affix my signature.

GEORGE B. IRELAND.