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3,046,987

DISPOSABLE LANCET

Filed June 5, 1957

Fig. 1

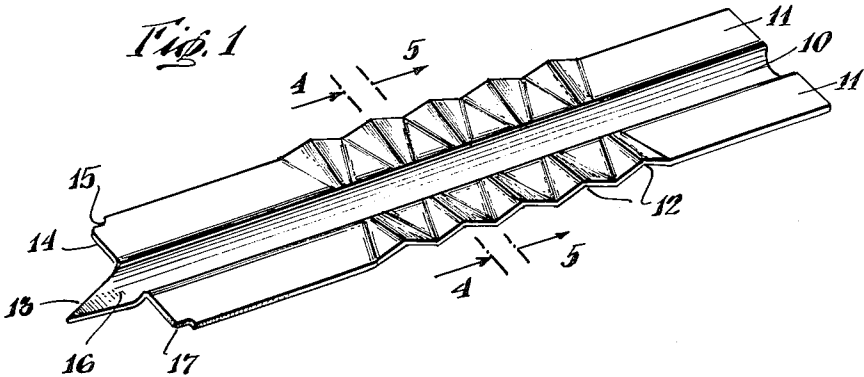


Fig. 2

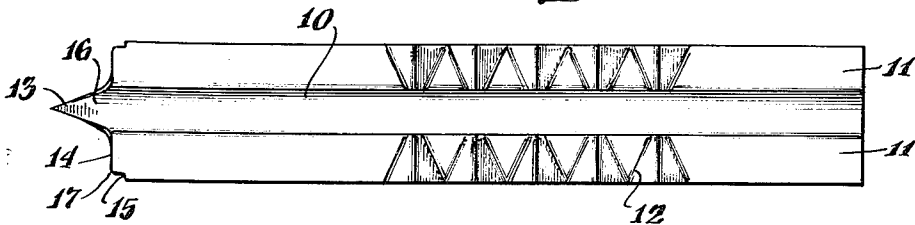


Fig. 3



Fig. 4

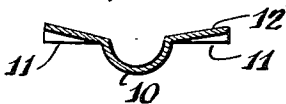


Fig. 5



Fig. 6

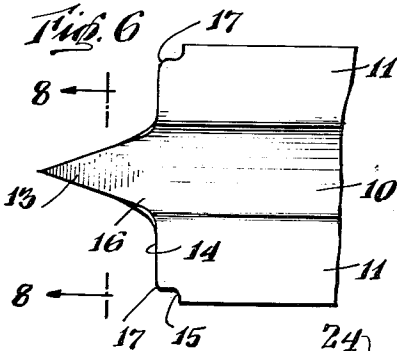


Fig. 7

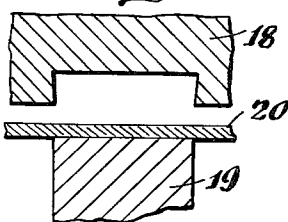


Fig. 8

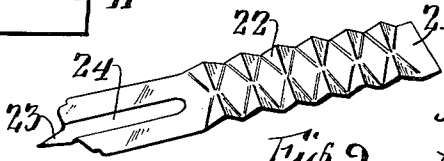
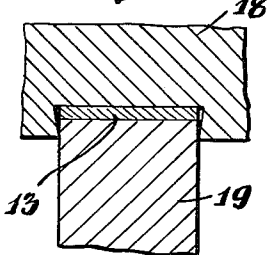


Fig. 9

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1

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DISPOSABLE LANCETJoseph C. Ehrlich, 31 W. 10th St., New York, N.Y.
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This invention relates to a structurally and functionally improved lancet as well as a method of manufacturing the same.

This application is a continuation-in-part of my earlier application for patent Serial No. 410,954 on Lancets, filed February 17, 1954, now United States Patent 2,801,633, dated August 6, 1957.

By means of the present teachings a lancet is inexpensively produced. Thereafter, that unit may be conveniently cleaned and sterilized. It will preferably come to the doctor or other user suitably packaged so that it will not be contaminated or subject to contamination. With the opening of the package the lancet is rendered accessible for use. After it has once been used, it should be thrown away. Accordingly, there will be no problem of cleaning and resterilizing nor will there be any danger of a subsequent patient or donor becoming infected as a consequence of a reusing of the lancet without it having been properly cleaned or sterilized after its initial use.

A further object is that of producing a unit of this character which may be readily employed by the physician or technician and which lancet will not require as a step to its manufacture the grinding or other sharpening of any edge zone. With the elimination of this step of manufacture it is apparent that costs in the production of the lancet will be materially reduced.

A further object is that of designing a lancet which may be used with minimum pain to the patient, will assure an adequate blood specimen and will not distort and may be firmly gripped.

With these and other objects in mind reference is had to the attached sheet of drawings illustrating practical embodiments of the invention and in which:

FIG. 1 is a perspective view of a lancet;

FIG. 2 is a face view thereof;

FIG. 3 is a side elevation of such lancet;

FIGS. 4 and 5 are transverse sectional views taken along the lines 4—4 and 5—5 and in the direction of the arrows as in FIG. 1;

FIG. 6 is a fragmentary enlarged sectional view of the point end of the lancet;

FIG. 7 shows schematically a strip of material in process of being punched or sheared to provide the unit;

FIG. 8 is a view similar to FIG. 7 showing the completion of the forming operation and taken along the line 8—8 in the direction of the arrows as indicated in FIG. 6; and

FIG. 9 is a perspective view of an alternative form of lancet.

Referring primarily to FIGS. 1 to 6 the numeral 10 indicates a rib furnishing a central trough portion preferably extending throughout the entire length of the metal strip from which the lancet is formed. This trough is sectionally in the form of an arch which as shown in FIGS. 4 and 5 may be substantially semi-circular within the body of the instrument. To each side of this bent or arched portion marginal zones 11 are included within the strip. While as illustrated and considering the strip in its dimension of width, the central portion 10 may only comprise approximately one-third of the total. This proportioning of the parts might be varied. In no event, however, should this central portion materially exceed one-half of the overall width of the strip.

It is preferred that as shown the base end of the unit be defined by an edge which may extend substantially

2

perpendicular to its axis. The opposite end of the strip includes an outwardly tapered tissue-piercing point as at 13. This point portion will be transversely arched or curved so that its inner face (i.e., the face extending towards the viewer as in FIGS. 1 and 2) will present a recessed configuration. Areas of the marginal zones 11 are indented or corrugated, as at 12.

Edges 14 extend outwardly from the base of the point 13 and conveniently in directions perpendicular to the axis of the lancet. These edges are unflanged. In other words, they do not have portions extending outwardly at right angles to the faces of the marginal zones or parts 11. Preferably, the outer zones of edges 14 are continued in the form of recesses 15 which have their corner edges adjacent the point rounded and which merge into the side edges of the marginal portions 11.

The zone throughout which the corrugated areas 12 extend should ordinarily be limited to the central portion of the lancet. Certainly it is preferred that the zone of corrugation be definitely spaced from point 13. In this manner there will be no danger of a stress or distorting strain being set up in the assembly adjacent the piercing point. While the corrugations might take one of several different forms, they will preferably be of a generally triangular configuration as shown in FIG. 2 and will define recesses extending upwardly in each marginal area 11 beyond the plane in which the uncorrugated parts of these sides extend. This has been shown in a somewhat exaggerated manner in FIGS. 3, 4 and 5.

According to a preferred concept of the invention the material providing the lancet should be quite thin. For example, .002 to .0025" is found to be satisfactory. With such thickness the material in sheet form has the characteristics of relatively stiff foil. Where so manufactured it is preferred to employ a 302-type stainless steel having a Brinnell hardness of from 250 to 300. Visualizing the overall length of the lancet body to be 1¼" and its width to be ⅜", satisfactory proportions will involve a width of approximately ⅛" for channel portion 10 and a length of ⅜" for point 13. The rounded corners or recesses 15 may be developed along a radius of .005". The outer corners or entrance edges 17 to the recesses 15 may be developed along a radius of, for example, .010 to .015". With the width of the channel or groove 10 being approximately ⅛", the aggregate width of the two side portions 11 will be approximately ⅜". The zone of each complete corrugation 12 is, for example, ⅜" and the depth of each corrugation may be on the order of ⅛". The depth of the channel or groove 10 may be ⅜". Conveniently the arching of the point as a continuation of the rib providing the channel or groove 10 continues through a zone 16 which may comprise one-third or one-half the length of the point. Beyond this zone that point is preferably flat, although of course it may be arched through to its outer end.

It is found, if the parts are dimensioned at least generally to have relative proportions and lengths as aforestated, that a lancet unit is furnished which is eminently desirable and will properly perform its functions even if the material of the sheet have a thickness of only .0025". In this connection it will be understood that the rib or groove portion 10 serves as a reinforcement extending axially of the unit and which is braced by the adjacent side portions 11. The corrugations or serrations 12 being preferably limited to the central zone of the unit a user will instinctively grip that zone between his thumb and forefinger. So gripped the point will be in properly spaced relationship to the gripping zone. Also, any distortion of the metal incident to forming the serrations or corrugations will be at a point relatively remote from the piercing element of the lancet. By having the width of the channel

not in excess of one-half of the overall width of the strip the stability of the instrument will be assured, free from objectionable distorting tendencies.

Additionally, the extreme outer zone of the point being preferably flat, a pure puncturing or cutting action occurs as the point pierces the epidermis and its side edges cut through areas beyond the initial point of piercing. This action will continue until the arched or curved zone 16 of the point passes through the skin. Due to the configuration of this portion, the wound which has been created by the extreme outer end and the side edges of the cutting point will be gaped. In other words, the severed tissue will be spread apart thus inducing a flow of blood. The gripping of the unit in line with the serrations and the consequent force exerted may cause a slight bending of the side strips or zones 11. Whether these zones have extended in a straight line as shown especially in FIGS. 4 and 5, or have terminated short of or beyond such a straight line, any such flexing will cause the channel portion 10 to tend to arch to a more acute degree. If this result is evident even in the zone 16 of the point, the acuteness of the arch will merely result in a greater gaping of the wound. This obviously will have a desirable end result.

With the outer end of the point 13 preferably substantially flat, a minimum of pain will be experienced by the patient as that point penetrates the skin. Edges 14 in contact with the surface of the skin will serve as stops arresting further penetration of the point. By having the channel and the base of the point not in excess of one-half of the overall width of the unit, it is unnecessary to incorporate stop flanges in edges 14 despite their preferably very small thickness. Incident to the rounded edge portions 17 it is apparent that even with the lancet body manufactured of very thin material, no secondary cutting edges or points will exist.

While it is apparent that many of the teachings of the present application will be of value in a lancet which may be formed of a material having a thickness substantially greater than the range afore indicated, it is preferred that the sheet material from which the lancet body be formed shall be around .0025" in thickness. It has been found that using such a gauge of material it is feasible to produce the lancet with adequately sharp cutting edges without having to resort to any grinding or honing operations for those edges. More particularly and as shown in FIGS. 7 and 8, the tool elements involved in a punching or shearing operation have been indicated by the numerals 18 and 19. The sheet to be operated on by these tools has been indicated at 20 in FIG. 7. As the tools cooperate in the manner shown in FIG. 8, the point zone 13 of the instrument is produced by removing excess material to either side of this penetrating element. In such removal edges will be left which will be entirely free of burrs, fins or other undesirable projecting or adhering portions. In other words and as shown in FIG. 8 the edges will extend substantially perpendicular with respect to the faces of the point and these edges will be clean. The thickness of the material used being of the nature indicated, it is found that these edges serve adequately to cut the tissue in a lateral direction and also at tangents to that direction as the point has its zone 16 embedded in the epidermis. Therefore, a minimum of pain is experienced by the patient.

As a consequence of the preferred contour of the point a substantially half-round incision results. That incision tends to gape. Accordingly, this avoids premature closing of the wound and clotting is also delayed. It is obvious that despite the fact the point is relatively short and easier and immediate yield of blood flow in adequately supply results. With an incision of this type a "milking" of the finger tip is unnecessary and therefore a true specimen of the patient's blood is obtained with a minimal dilution of that blood by tissue fluid. The angle and length of the piercing point insure that the incision is

achieved with minimum effort and pain and fewer tactile corpuscles traumatized. The edges 14 automatically control depth of penetration by the point and due to the rounded corners 15 and 17 these edges may contact the epidermis without there being any danger of a secondary and undesired incision occurring.

As in FIG. 9 it will be understood that various forms of unit might be produced involving structures different from those shown in FIGS. 1 to 6 inclusive. Thus, in FIG. 9, 21 indicates the body of a strip formed of thin metal. This is corrugated as at 22 so that its body will be reinforced against collapse. The forward end of this body terminates in a piercing point 23. This is curved or angularly bent in a manner, for example, identical with zone 16 of the previously described point. The curvature or bending is continued as at 24 into the body of the lancet to a zone adjacent that occupied by corrugations 22. It is thus apparent that the forward portion of the lancet is reinforced but that the curved or channel portion 24 need not necessarily extend throughout the entire length of the lancet body.

Thus, among others, the several objects of the invention as specifically aforementioned are achieved. Obviously numerous changes in construction and rearrangements of the parts might be resorted to and the steps of the method might be varied without departing from the spirit of the invention as defined by the claims.

I claim:

1. A lancet for piercing tissue and letting blood samples therefrom comprising: an elongated strip of material including a finger gripping body portion and an integral tissue piercing projection extending axially from one end of said body portion; said piercing projection having a base portion integral with said body portion and tapering to a piercing point at its outer end; the body portion of said strip adjacent said projection being wider than the base portion of said projection thereby presenting shoulders adjacent said projection at each side thereof to limit the extent to which the piercing projection may penetrate tissue; the strip of material being composed of thin normally flexible sheet metal and formed with a longitudinal stiffening rib extending from the base portion of said projection into the body portion; and the pointed outer end of the projection being relatively flat to facilitate penetration into the tissue with the projection at its base portion in the area of said rib being substantially arcuate to provide a gape tissue incision.

2. A lancet for piercing tissue and letting blood samples therefrom comprising: an elongated strip of material including a finger gripping body portion and an integral tissue piercing projection extending axially from one end of said body portion; said piercing projection having a base portion integral with said body portion and tapering to a piercing point at its outer end; the body portion of said strip being wider throughout its length than the base portion of said projection thereby presenting shoulders adjacent said projection at each side thereof to limit the extent to which the piercing projection may penetrate tissue; the strip of material composed of thin normally flexible sheet metal and formed with a longitudinal arcuate stiffening rib extending from the base portion of said projection into the body portion; and the pointed outer end of the projection being relatively flat to facilitate penetration into the tissue with the projection at its arcuate base portion serving to provide a gape incision adjacent the outer surface of the tissue.

3. A lancet for piercing tissue and letting blood samples therefrom comprising: an elongated strip of material including a finger gripping body portion and an integral tissue piercing projection extending axially from one end of said body portion; said piercing projection having a base portion integral with said body portion and tapering to a piercing point at its outer end; the body portion of said strip adjacent said projection being wider than the base portion of said projection thereby present-

ing a shoulder provided by the width of said strip adjacent said projection to limit the extent to which the piercing projection may penetrate tissue; the strip of material being composed of thin normally flexible sheet metal and formed with a longitudinal stiffening rib extending from the base portion of said projection into the body portion; and the pointed outer end of the projection being relatively flat to facilitate penetration into the tissue with the projection at its base portion in the area of said rib being substantially arcuate to provide a gape tissue incision.

5

10

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