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F. H. J. FIGGE
UNIT FOR AND METHOD OF INHIBITING AND
CONTROLLING BLEEDING TENDENCIES
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2,814,294

Fig. 1

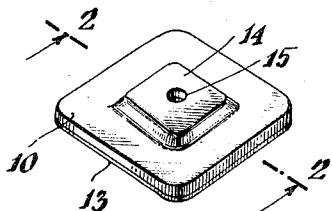


Fig. 2

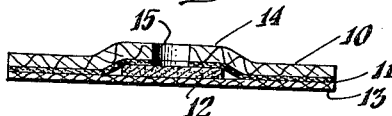


Fig. 6

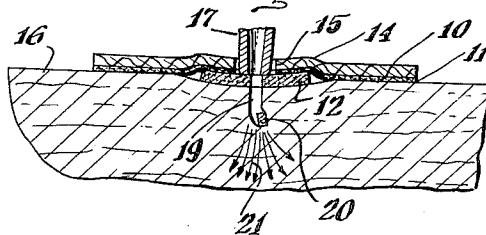


Fig. 3

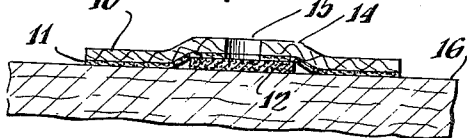


Fig. 4

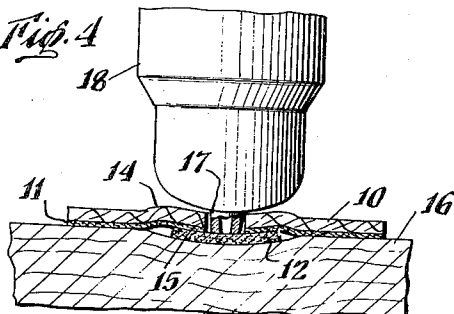


Fig. 7

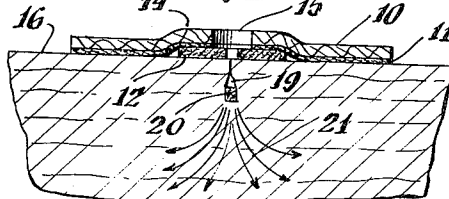


Fig. 5

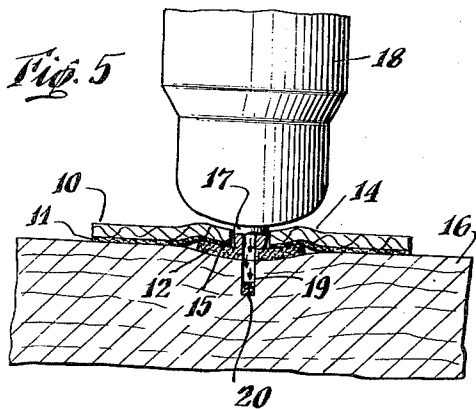


Fig. 8

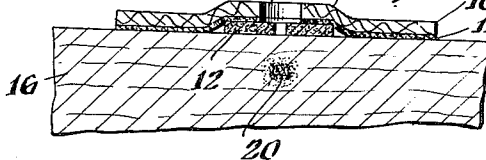
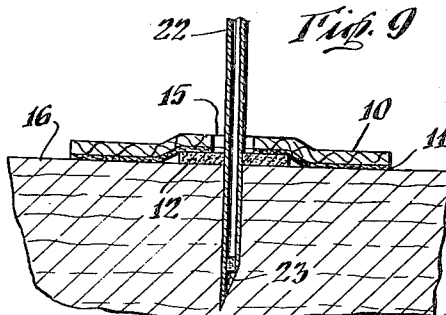


Fig. 9



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UNIT FOR AND METHOD OF INHIBITING AND CONTROLLING BLEEDING TENDENCIES

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8 Claims. (Cl. 128—215)

This invention relates to a structurally and functionally improved plaque or unit for use in connection with hypodermic injections and also teaches a technique to be followed in the use of the plaque and the achievement of the injection in a manner such that bleeding tendencies will be inhibited and controlled aside from the fact that damaging effects will also be controlled.

By means of the present teachings, a unit is produced which will be capable of achieving the desired results and which unit will be quite inexpensive aside from the fact that it may be employed with facility by persons having no special technical skills.

With these and other objects in mind, reference is had to the attached sheet of drawings illustrating a practical embodiment of the invention and the procedure to be followed in using the same and in which:

Fig. 1 is a perspective view of one form of plaque assembly;

Fig. 2 is a sectional side view taken along the line 2—2 and in the direction of the arrows as indicated in Fig. 1;

Fig. 3 shows the unit in section and applied to the site to be injected;

Figs. 4 to 8 inclusive are views similar to Fig. 3 but showing the successive steps involved under velocity injection technique; and

Fig. 9 is a view similar to Fig. 3 but showing the procedure embraced under hypodermic injections achieved by the use of needles.

In connection with hypodermic injections and including especially those achieved by velocity injection, it has been noted that bleeding from the site of injection is a common occurrence. Also, after needle-type injections, a slight amount of bleeding is frequently observed. By means of the present teachings, bleeding will be completely or partially inhibited. If, however, some bleeding does occur, the relatively small quantity of blood will be absorbed immediately, thus protecting clothing from blood stains. Additionally, the patient will not be aware that bleeding has occurred.

Referring primarily to Figs. 1 and 2 of the annexed drawings, a unit has been shown which includes, for example, a plastic or cloth strip 10 of any desired contour and which has applied to its inner face a layer 11 of adhesive to which is attached disk of plaque layer 12 covered by a protecting strip 13 which has its edge zones preferably in engagement with the adhesive layer.

The outer face of strip 10 may present a convex or domed portion 14 provided with a centrally located aperture 15. The outer face of the strip may be protected by a covering layer (not shown). Under certain conditions, it would be feasible merely to employ the plaque 12 in order to achieve at least certain of the advantages inherent to the present teachings. However, for the purpose of providing a unitary and readily handled unit, it is preferred that the parts embrace a grouping such as afore described.

The material of which the plaque is formed should

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be absorbable so that when particles are dislodged and carried into the body of the patient, these particles will be absorbed in a natural way leaving no residue and without exciting much, if any, foreign body reaction or scar tissue formation. Also, the plaque should be constructed of non-sensitizing, non-allergenic material or of material proven to be essentially non-antigenic. This material should additionally be sterile and capable of treatment with an appropriate anti-biotic, antiseptic or local anesthetic or any other desired agents. This will, for example, minimize contamination with bacteria or other organisms and/or pain during or after the injection. Finally, the material, in addition to being severable, should also be hemostatic or promote the clotting of blood especially if particles of such material are carried into and lodge in the intra-tissue opening or channel made by the needle, jet or other penetrating device.

One material embodying the desired characteristics is a heat-sterilized foam sponge made of animal gelatin. This has the characteristics of flexibility and is capable of being left in situ. A material of similar type is an absorbable fibrin foam made from human plasma. Materials of this type do not induce inflammation and are completely absorbed within a reasonable period of time. The material may be used alone, with thrombin, with saline solution or with antibiotics when indicated. According to one method of procedure, resulting in a material of the desired characteristics, gelatin is first de-natured to decrease its solubility and then worked into a foam. This is poured into molds and hardened into blocks disposed in suitable drying enclosures. These blocks may be cut by slicing machines or otherwise and sterilized. The slices may be subdivided to include areas of desired shape and size. The surface areas of the material act in a manner such that they apparently release thromboplastin which hastens clotting. The dry material effectively serves as a hemostatic matrix.

In proceeding, the surface of the site to be injected is swabbed with alcohol, ether, or acetone. The several parts of the plaque unit, having all been sterilized, the protecting strip 13 of the latter is removed (if the unit embraces a structure such as is generally shown in Fig. 2). Thereupon, plaque 12 is brought in direct contact with the surface of tissue 16 as indicated in Fig. 3 and the parts are maintained in position for example, by the adhesive lever 11. The nozzle 17 of a velocity injection mechanism 18 is introduced through the opening 15 in the manner shown in Fig. 4. That apparatus or gun is now "fired."

As in Fig. 5, the jet of liquid 19 will, under these circumstances, be discharged through the body of the plaque into the underlying tissue 16. So discharged, it will sever a plug 20 from the plaque and carry it into the tissue 16 to a certain depth. This penetration of the tissues by the plug may occur for only a relatively shallow depth. As shown in Fig. 6, the liquid medicament comprising jet 19 will penetrate these tissues to a far greater depth and in a desired pattern according to the characteristics of the injection apparatus. So flowing the medicament, generally indicated by the arrows at 21, will in effect by-pass plug 20.

Therefore, as shown in Fig. 7, the plug will remain adjacent the surface of the tissue at the end of the firing or injection stroke. It will plug the opening or bore formed by jet 19. It may remain in the position diagrammatically shown in Figs. 7 and 8 or may be closer to or further away from the surface of the tissue. Bleeding or the escape of other body liquids onto the surface of the tissues will be either completely or partially prevented. If some small quantity of body fluid does escape, it will be absorbed immediately by the main portion of plaque 12 remaining on the surface of the tissues thus

protecting clothing from stains. Also, the patient will not be aware of the escape of such fluids to the surface. The plaque may remain in position after the injection or, if desired, may be substantially immediately removed. The plug 20, after it has served the desired functions will be absorbed.

If an injection is to be made by a hypodermic needle, such as 22 in Fig. 9, then the plaque is again applied to the surface of the tissues as heretofore described. The needle is plunged through the opening 15 if a protecting strip 10 is employed. In so projecting the needle, a plug 23 will be cut from the plaque either due to the shearing action of the needle edges or else due to the tearing action upon the plaque by projecting the needle through the same. In Fig. 9, the plug 23 has been shown as actually within the bore of the cannula in which case it will be carried down substantially to the full depth of penetration of the needle. If not so positioned, the plug, in being torn loose from the plaque, would be carried down into the tissues to a lesser depth by frictionally adhering to the outer face of the needle. In either event, as the needle is withdrawn, the plug would move to some extent with it towards the tissue surface. More particularly, if the plug were lodged within the bore of the cannula as in Fig. 9, it would be initially discharged as the medicament was injected and would remain adjacent the point of the needle during the injection stroke. As the needle was withdrawn and incident to the natural elasticity of the tissues, the liquid medicament would be under some pressure and tend to escape through the channel or bore created by the needle. In so flowing, the plug would be forced towards the tissue surface.

Obviously, if the plug or portion 23 were outside of the bore of the cannula and between it and the adjacent tissue surface, it would remain in position during the injection stroke. However, as the needle was withdrawn, the frictional engagement between the same and the plug would tend to move the latter outwardly. Also, the pressure of the medicament attempting to escape, would similarly shift the plug. Therefore, the latter would again assume a position adjacent the surface and perform the desired functions.

Throughout the specification, the designation "plug" has been employed. This also appears in the appended claims. The term is a convenient one and is to be interpreted generically so as not to be limited to a definite unitary body of material. It is intended to cover also any number of particles which result from the operations afore described. As will be understood, if only a few isolated particles or molecules of the plaque are introduced, they will also cause an obstruction to form in the perforation made by either the jet or needle. Even if the particles be microscopic in size and individually far smaller than the opening, the desired result will follow. The absorption of blood at the surface and the stimulation of clotting in the opening of the skin is of primary importance and in certain respects more important than deeper plugging. Concealment of the slight bleeding that may occur is also important both psychologically and for the protection of clothing.

Thus, among others, the several objects of the invention as specifically aforementioned are achieved. It is apparent that the structure of the unit may be varied in numerous respects and the steps of the method might be similarly varied without departing from the spirit of the invention as defined by the claims.

I claim:

1. A method of inhibiting and controlling the escape of body fluid from a passage formed in tissues incident to the latter having been hypodermically injected, said method including utilizing a plaque of absorbent hemostatic material the inner face of which is to be arranged adjacent to the tissue surface, disposing the operative parts of a hypodermic apparatus adjacent the outer plaque face, operating said apparatus to sever a plug of material

from said plaque and to cause said plug to be moved inwardly of such inner face and to substantially simultaneously cause liquid medicament to flow through the area of plug severance.

2. A method of inhibiting and controlling the escape of body fluid from a passage formed in tissues incident to the latter having been hypodermically injected, said method including utilizing a plaque of absorbent hemostatic material the inner face of which is arranged adjacent to the tissue surface, disposing the operative parts of a hypodermic apparatus adjacent the outer plaque face, operating said apparatus to sever a plug of material from said plaque and cause said plug to be moved inwardly of such inner face and to substantially simultaneously cause liquid medicament to flow through the area of plug severance and thereafter cause said plug to move towards the surface after completion of the injection.

3. A method of inhibiting and controlling the escape of body fluid from a passage formed in tissues incident to the latter having been hypodermically injected, said method including utilizing a plaque of absorbent hemostatic material the inner face of which is to be arranged adjacent to the tissue surface, disposing the operative parts of a hypodermic apparatus adjacent the outer plaque face, operating said apparatus to sever a plug of material from said plaque and cause said plug to be moved inwardly of such inner face and to substantially simultaneously cause the liquid medicament to flow through the area of plug severance and bypassing the plug with the medicament which is being injected.

4. A method of inhibiting and controlling the escape of body fluid from a passage formed in tissues incident to the latter having been hypodermically injected, said method including utilizing a plaque of absorbent hemostatic material the inner face of which is arranged adjacent to the tissue surface, disposing the operative parts of a hypodermic apparatus adjacent the outer plaque face, operating said apparatus to sever a plug of material from said plaque and cause said plug to be moved inwardly of such inner face and to substantially simultaneously cause the liquid medicament to flow through the area of plug severance, bypassing the plug with the medicament which is being injected and allowing said plug to move towards the surface after completion of the injection.

5. A method of inhibiting and controlling the escape of body fluids from a passage formed in tissues incident to the latter having been hypodermically injected, said method including utilizing a plaque of absorbent hemostatic material the inner face of which is to be arranged adjacent to the tissue surface, disposing the injection nozzle of a velocity injection apparatus adjacent the outer plaque face, operating said apparatus to force a jet of liquid medicament through said plaque and simultaneously shear a plug of material therefrom.

6. A method of inhibiting and controlling the escape of body fluids from a passage formed in tissues incident to the latter having been hypodermically injected, said method including utilizing a plaque of absorbent hemostatic material the inner face of which is to be arranged adjacent to the tissue surface, plunging the point of a hypodermic needle through the outer plaque face and through the plaque body, simultaneously removing a plug of plaque material incident to such plunging action and projection of the needle, forcing liquid medicament through said needle and thereupon retracting the needle with respect to the plaque and plug.

7. A unit of the character described, including in combination a plaque of material transversely shearable to provide a plug section, said material having hemostatic and absorbent characteristics, means in contact with said plaque for securing the latter in direct engagement with the surface of tissue to be hypodermically injected, and said securing means extending to one side of the area of

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plug shearing, whereby a plug of material may be injected into the tissue free from any part of the material constituting said securing means.

8. A unit of the character described, including in combination a plaque of material, said plaque presenting an inner face to be applied to tissues to be injected, said material having hemostatic characteristics and being absorbable into human tissues, means attached to said plaque for supporting the same, whereby said plaque may be disposed in direct face-to-face contact with the surface which it is to overlie and said supporting means being provided with an opening in line with said plaque material through which opening the activating cause of a hypo-

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dermic injection assembly may pass to shear a plug of plaque material and inject it together with medicament into tissues below such surface.

References Cited in the file of this patent

UNITED STATES PATENTS

2,456,357	Correll	Mar. 29, 1949
2,533,004	Ferry	Dec. 5, 1950

FOREIGN PATENTS

316,112	Great Britain	July 23, 1929
818,079	Germany	Oct. 22, 1951