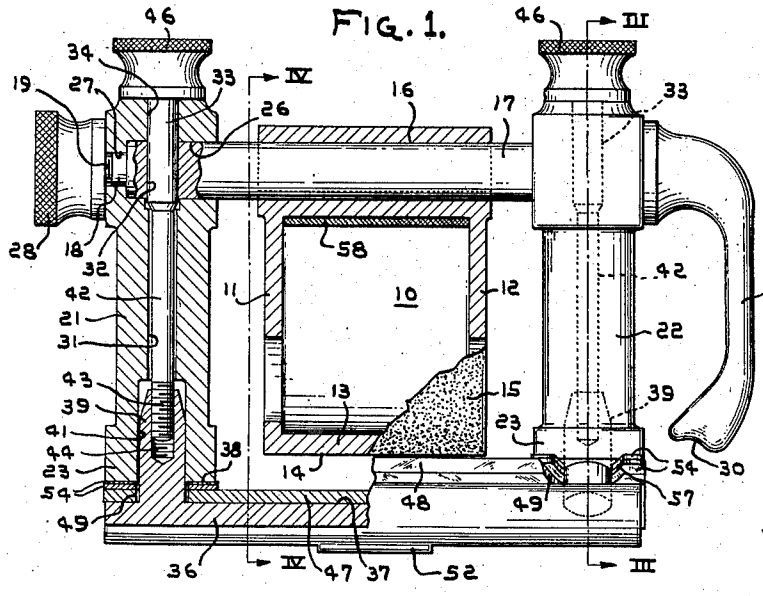
Dec. 26, 1944. J. D. REESE 2,366,054

DERMATOME

Filed Aug. 2, 1944

FIG. 1.



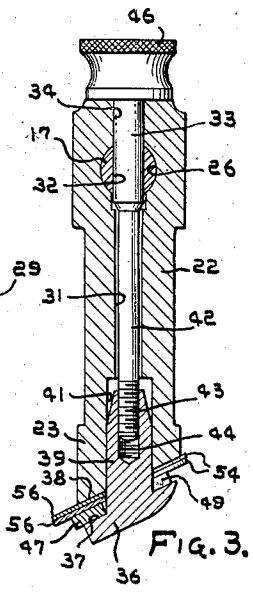


FIG. 3.

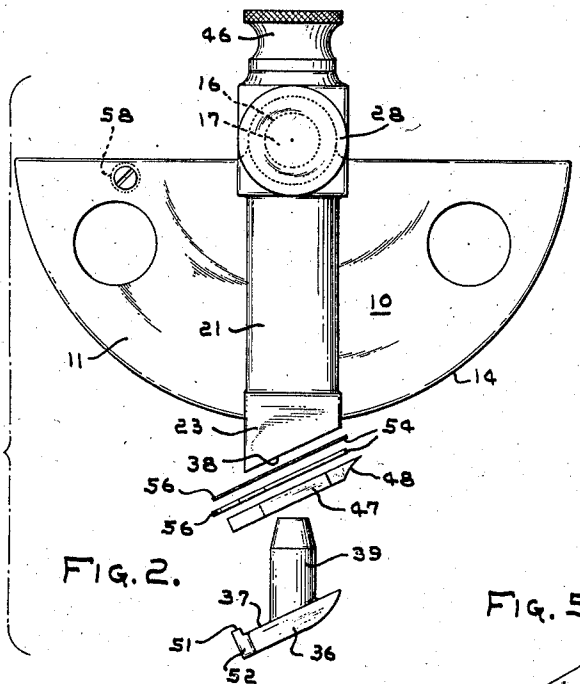


FIG. 2.

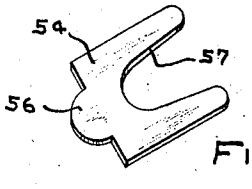


FIG. 6.

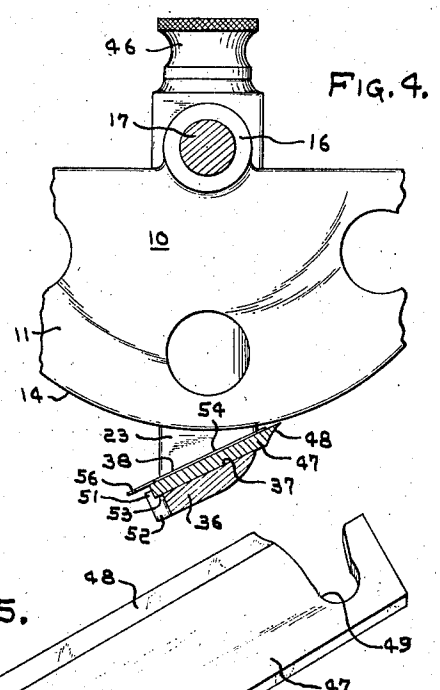


FIG. 4.

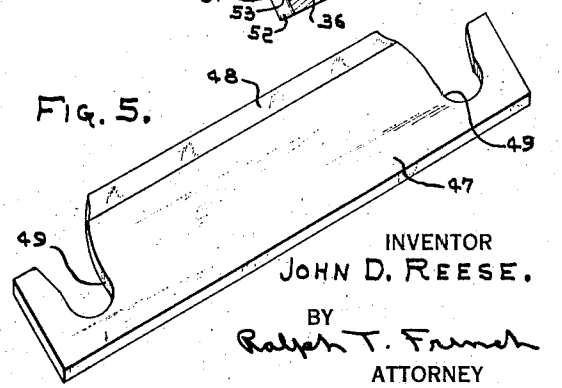


FIG. 5.

INVENTOR
JOHN D. REESE.

BY
Ralph T. French
ATTORNEY

Patented Dec. 26, 1944

2,366,054

UNITED STATES PATENT OFFICE

2,366,054

DERMATOME

John D. Reese, Philadelphia, Pa.

Application August 2, 1944, Serial No. 547,718

9 Claims. (Cl. 128—305)

This invention relates to surgical instruments, more particularly to instruments known as dermatomes, and has for an object to provide improved devices of this character.

Today most dermatomes in use in this country are of the type disclosed in United States Letters Patent No. 2,288,709, granted July 7, 1942, to G. J. Hood, and comprise a body member having a convex outer surface adapted to be coated with an adhesive for temporary retention of a skin graft thereon, together with a skin-cutting blade mounted for rotation and reciprocation relative to the convex surface for separating the skin graft from the body of the patient while the adhesive-coated convex surface is rolled or rocked on the latter.

The dermatomes of this type available commercially during the past half-dozen years, while constituting a very considerable improvement over prior dermatomes, are not entirely satisfactory for several reasons, principal of which are; (1) inaccuracies in the adjustment of the skin-cutting blade with respect to the convex surface of the body member, (2) flexing or twisting of the body member, and (3) flexing of the blade; each of these resulting in the cutting of skin grafts of non-uniform thickness or with holes completely therethrough.

Therefore, another object of the invention is to provide a dermatome which will cut a skin graft of uniform thickness throughout.

Yet another object of the invention is to provide a dermatome incorporating novel means for supporting a skin-cutting blade with respect to a convex surface of a body member.

A further object of the invention is to provide, in a dermatome of the type wherein a skin-cutting blade is supported for rotary and reciprocatory movement relative to the convex surface of a skin-holding body member, novel means for accurately varying the spacing of the blade relative to the convex surface of the body member.

Another object of the invention is to provide, in a dermatome, a blade holder with which a blade may readily be assembled and from which it may readily be removed.

Yet another object of the invention is to provide a dermatome having an improved skin-holding surface.

These and other objects are effected by the invention as will be apparent from the following description and claims taken in accordance with the accompanying drawing, forming a part of this application, in which:

Fig. 1 is a front elevational view, partially in section, of apparatus embodying the principles of the present invention;

Fig. 2 is an elevational view of the left side of the apparatus, as viewed in Fig. 1, with certain elements thereof shown in exploded relation;

Fig. 3 is a vertical sectional view, taken along the line III—III of Fig. 1, looking in the direction indicated by the arrows;

Fig. 4 is a vertical sectional view, taken along the line IV—IV of Fig. 1, looking in the direction indicated by the arrows;

Fig. 5 is a perspective view of a skin-cutting blade member; and

Fig. 6 is a similar view, greatly enlarged as to thickness, of one of the shims appearing in Figs. 1 to 4.

Referring now to the drawing more in detail, the reference numeral 10 indicates, in its entirety, a body member comprising a pair of spaced, parallel, semi-circular side walls 11 and 12, joined along their curved edges by a bottom wall 13, presenting a convex outer surface 14. The side walls 11 and 12 support a bearing 16, whose longitudinal axis coincides with the axis of generation of the convex outer surface 14. Preferably, the entire body member 10 is made as a single casting, for greater rigidity and accuracy, although it will be obvious that it may be made of separate elements secured together in assembled relation by suitable means, for example, welding or riveting.

One difficulty encountered in the use of prior dermatomes of the semi-cylindrical type has been failure of the adhesive coating (applied to the convex surface to hold the skin thereagainst), to adhere to said surface during the graft-cutting operation, particularly where the skin of the donor area is inflexible due to fauna, disease, malnutrition or other abnormality. To eliminate this difficulty the present invention provides a roughened convex surface 14, preferably obtained by making the body member 10, or at least the curved wall 13 thereof, of a relatively soft material, such as brass, and subjecting the outer surface 14 thereof to a sand blasting treatment which pits the surface, as at 15, with subsequent porosity enhancing the adhesive properties thereof.

A shaft 17 is mounted in the bearing 16 for both rotary and reciprocatory movement, and is provided with terminal portions 18 having their ends threaded, as at 19.

A pair of posts 21 and 22 are mounted on, and extend radially of, the shaft 17, at opposite sides of the body member 10, in parallel re-

lation and with their outer ends 23 projecting beyond the outer convex surface 14 of the body member 10.

Each of the posts 21 and 22 is provided with an opening extending laterally therethrough which has a portion 26 of enlarged diameter to closely receive the main portion of the shaft 17, and a portion 27 of reduced diameter to closely receive the reduced terminal portion 18 of the shaft, with the threaded portion 19 thereof extending beyond the post for reception thereon of a nut 28. Preferably, the post 22 has, substituted for the nut 28 of post 21, a handle member 29 threaded onto its shaft terminal portion 19, by means of which the shaft and its associated structure may readily be reciprocated and rotated relative to the convex outer surface of the body member, in a manner familiar to those skilled in the art. It will be apparent that tightening of the nut 28 and the handle 29 will securely clamp the posts 21 and 22 against movement axially of the shaft 17. Preferably, the free end of the handle 29 is provided with a notch 30 against which the little finger of the operator may rest, with his thumb abutting the finger piece 46 and the remaining fingers surrounding the handle.

In order to prevent rotation of the posts with respect to the shaft, and to insure parallel alignment of said posts, the latter are provided with central bores 31 extending axially thereof from end to end, aligned openings 32 also being provided in the shaft 17, where it intersects the bores. Dowel pins 33 are closely received in the upper portions 34 of the bores and in the aligned openings 32 of the shaft, with the result that rotation of the posts with respect to the shaft, and hence relative to each other, is positively prevented.

A blade-supporting bar 36 is positioned at the outer ends 23 of the posts, and has a flat upper blade-supporting surface 37, lying in a plane parallel to the axis of the shaft 17 and inclined with respect to the longitudinal axes of the posts, the outer ends of said posts likewise being beveled, as at 38, to the same angle as the blade-supporting surface 37.

A pair of lugs 39 extend upwardly from the supporting surface 37 of the bar 36 and are adapted to be telescopically received in enlarged portions 41 of the post bores 31. The bar 36 and posts 21 and 22 are retained in assembled relation by extensions 42, integral with the dowels 33 and having their terminal portions 43 threadedly received in threaded bores 44, formed in the ends of the lugs 39. The upper ends of the dowels 33 are provided with knurled finger pieces 46, by which the dowels and their extensions 42 may be rotated to move the supporting bar 36 towards or away from the posts.

A skin-cutting blade 47, preferably of relatively thick and rigid tool steel, and having a hollow-ground cutting edge 48, is adapted to be supported on the surface 37 of the bar 36, with the lugs 39 of the latter extending through notches 49 formed in the cutting edge of the blade. When positioned on the supporting bar 36, forward movement of the blade is prevented by engagement of the bottoms of the notches 49 with the lugs 39, and rearward movement is prevented by contact of the rear edge of the blade with an upstanding rib 51, provided on the rearwardly-projecting heel 52 of the supporting bar 36 (Figs. 1, 2 and 4). The blade may be proportioned so as to fit snugly on the bar between the lugs 39 and the rib 51, due to the blade-engaging surfaces of these parts diverging upwardly with respect to each other from the bar, as best shown in Fig. 2.

Even though the blade may fit closely between the lugs and the rib, it may be easily removed since the blade-engaging face of the rib 51 is spaced rearwardly of the rear edge of the bar 36 a material distance (Fig. 4), with the result that the blade likewise projects rearwardly of the bar, as at 53, thereby providing a surface easily engaged by the fingers of the operator to raise the blade from the bar without the necessity of touching the cutting edge 48.

For reasons not necessary to discuss here, it is desirable that the spacing of the cutting edge 48 of the blade from the convex surface 14 of the body member be variable at the option of the operator, so that skin grafts of varying thicknesses may be cut, these thicknesses generally being between 6 and 16 thousandths of an inch. In the present construction, such adjustment of the spacing is easily and accurately obtained simply by the insertion of shims 54, of the desired thickness, between the blade and the outer end surfaces 38 of the posts. Preferably, these shims 54 are of the shape shown in Fig. 6, varying only in thickness, and are provided with finger tabs or handles 56, which project rearwardly when inserted between the blade and the posts. The shims are provided with notches 57, corresponding to the notches 49 of the blade 47, and receive the lugs 39 when assembled.

To facilitate the use of this dermatome, there is provided a finger grip in the form of a knurled rod 58, extending between the body portion side walls 11 and 12, adjacent the straight edges thereof near one end. In using the device, the operator will grip the body portion 10 with one or more fingers against the finger grip 58 and the thumb against the opposite side of the bearing 16, the surface 14 of the body member having previously been coated with a suitable adhesive. That end of the convex surface 14 which is adjacent the finger grip 58 is pressed against the body of the patient, and the body member slowly rocked on the convex surface. The adhesive will cause the skin to be raised sufficiently to be readily cut by the blade as the latter is reciprocated thereagainst by means of the handle 29, moved by the operator's other hand.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various modifications and changes, as well as other applications, without departing from the spirit thereof.

What is claimed is:

1. A dermatome comprising a body member having a convex outer surface and adapted to have a cutting blade associated with said surface at a predetermined distance therefrom for rotary movement about the axis of generation of the surface and for reciprocatory movement parallel to said axis; a bearing carried by and located axially of the body member; a shaft rotatable and slidably supported in said bearing, said shaft having terminal portions of reduced diameter providing outwardly-facing annular shoulders at the junctures of said reduced terminal portions with the body of the shaft; a pair of posts having transverse openings therethrough near one end thereof to closely receive the ends of the shaft with the shaft terminal portions at least partially projecting therebeyond, said posts extending radially of the shaft

at opposite sides of, and spaced from, the body member in parallel relation; nuts threaded on the portions of the shaft which extend beyond the posts and bearing against said posts to clamp the latter against the outwardly-facing annular shoulders of the shaft; means for preventing rotation of the posts with respect to the shaft and with respect to each other, including said posts being provided with central bores extending from their inner ends through and beyond the shaft, and dowel pins disposed in said bores and passing through the shaft; and a blade-supporting bar secured to the outer ends of the posts and adapted to retain a blade with its cutting edge a predetermined distance from the convex surface of the body member.

2. A dermatome comprising a body member having a semi-cylindrical outer surface; a cutting blade associated with said surface at a predetermined distance therefrom for swinging movement about the axis thereof and for reciprocatory movement parallel to said axis; a bearing carried by and disposed axially of the body member; a shaft rotatably and slidably supported in said bearing; a pair of posts carried by the terminal portions of said shaft and extending radially therefrom in parallel spaced-apart relation with the spacing of said posts being materially greater than the width of the body member, said posts having openings extending transversely therethrough for reception of the shaft terminal portions and said terminal portions having threaded extremities extending beyond the outer ends of the post openings; nuts threaded on the projecting extremities of the shaft and bearing against the post to prevent axial movement of said posts with respect to the shaft; a blade-supporting bar disposed in close proximity to the outer semi-cylindrical surface of the body member in parallel relation to the shaft; a pair of parallel lugs extending outwardly from one surface of the blade-supporting bar near opposite ends thereof for connecting said bar to the outer ends of the radially-extending posts, said posts having bores extending axially thereof from end to end and adapted to receive the supporting bar lugs, the shaft terminal portions received in the transverse openings of the posts intersecting the bores and being bored in alignment with the post bores; and headed pins extending into said bores from the ends thereof adjacent the shaft and closely fitting the bores in the vicinity of the shaft to prevent relative rotation of the posts with respect to the shaft and with respect to each other, said pins having threaded inner ends received in mating threaded sockets in the ends of the supporting-bar lugs, whereby said bar may be drawn towards the outer ends of the posts to clamp the cutting blade between said bar and said post outer ends.

3. A dermatome comprising a body member having a convex outer surface; a cutting blade associated therewith; and means for supporting said blade at a predetermined distance from said surface for swinging movement about the axis of generation of the convex surface and for reciprocatory movement parallel to said axis, said means comprising a bearing carried by and located axially of the body member; a shaft rotatably and slidably supported in said bearing; a pair of posts carried by the terminal portions of said shaft and extending radially therefrom in parallel relation at opposite sides of and spaced from the body member with their outer ends extending beyond the convex surface of the body member, each of said outer ends having an opening therein; a rigid bar having a flat inner blade-supporting surface; a pair of lugs extending upwardly from said blade-supporting surface and adapted to be received in the openings in the outer ends of the posts; and means for urging said blade-supporting bar towards the outer ends of the posts, whereby a cutting blade supported on the blade-supporting surface of the bar will be clamped against said outer ends of the posts.

4. In a dermatome of the type comprising a body member having a convex outer surface and a cutting blade associated therewith; means for supporting said blade at a predetermined distance from said convex surface for swinging movement about the axis of generation of said surface and for reciprocatory movement parallel to said axis; said means comprising a bearing carried by and positioned axially of the body member; a shaft rotatably and slidably supported in said bearing; a pair of posts carried by the terminal portions of said shaft and extending radially therefrom in parallel relation at opposite sides of and spaced from the body member with their outer ends extending beyond the convex surface of said body member, said outer ends of the posts lying in a plane parallel to the axis of the body member and inclined with respect to the longitudinal axes of said posts; a rigid bar having a flat inner blade-supporting surface; a pair of lugs extending upwardly from said blade-supporting surface at an angle thereto corresponding to the angle of inclination of the post outer ends with respect to the longitudinal axes of the posts, said lugs being adapted to be received in mating axial bores extending through the posts from end to end thereof; and bolts extending into the post bores from the inner ends thereof and having terminal portions threadedly received in openings formed in the ends of the supporting bar lugs, whereby tightening of said bolts will draw the blade-supporting bar towards the post outer ends to clamp a blade carried on said bar against said post outer ends.

5. For use in a dermatome of the type comprising a body member having a convex outer surface, a shaft disposed axially thereof, and a pair of radially-extending arms on the shaft supporting a skin-cutting blade in close proximity to the convex surface; an elongated blade-supporting bar having a flat upper blade-supporting surface; a pair of parallel spaced lugs extending upwardly from said surface near the ends thereof with their longitudinal axes inclined at an angle to the perpendicular of said surface in planes at right angles to the longitudinal axis of the bar, said bar having a straight rear edge; a heel projecting rearwardly from said rear edge for a limited portion of its length with its upper surface continuous with the blade-supporting surface of the bar; and a rib extending upwardly from the rear edge of said heel and providing a backing for a blade when positioned on the bar between said rib and the lugs with its cutting edge projecting forwardly of the front edge of the bar.

6. Structure as specified in claim 5, wherein the blade-engaging surface of the rib is disposed rearwardly of the rear edge of the blade-supporting bar a material distance, so that a blade supported on the bar will have its rear edge overhanging the rear edge of the bar at opposite sides of the rib and heel, whereby said blade may be grasped at its rear edge by the fingers of the user for removal.

7. A dermatome comprising a body member

having a skin-engaging surface; a pair of parallel, spaced-apart posts at opposite sides of the body member; a blade-supporting bar carried by the posts at one end of the latter and bridging the space therebetween; means supporting the posts at their other ends from the body member for movement of the bar parallel to, and at a predetermined distance from, the skin-engaging surface of said body member; and means for urging the blade-supporting bar towards the ends of the posts to clamp a blade between said bar and said post ends, whereby the predetermined spacing of the bar with respect to the skin-engaging surface may be accurately varied by the insertion of shims of the desired thickness between the blade and the post ends.

8. A dermatome comprising a body member having a convex skin-engaging surface; a pair of parallel spaced-apart posts at opposite sides of the body member and extending radially with respect to said convex surface; a blade-supporting bar carried by the posts at one end of the latter and bridging the space therebetween; means pivotally and slidably supporting the posts at their other ends from the body member for movement of the bar parallel to, and at a predetermined distance from, the convex surface; and means for drawing the blade-supporting bar towards the ends of the posts to clamp a blade between said bar and said post ends, whereby the predetermined spacing of the bar, and hence of the blade, with respect to the convex surface may be accurately varied by the insertion of shims of the desired thickness between the blade and the post ends.

9. Structure as specified in claim 8, wherein the skin-engaging convex surface is pitted.

JOHN D. REESE.