

[54] **APPARATUS FOR MOUNTING HAIR**

[76] Inventor: **Garth E. Widdifield**, 532 Turtle Creek, North Dr., Indianapolis, Ind. 46227

[22] Filed: **Sept. 13, 1973**

[21] Appl. No.: **396,851**

Related U.S. Application Data

[60] Division of Ser. No. 276,328, July 31, 1972, Pat. No. 3,811,425, Continuation-in-part of Ser. No. 60,382, Aug. 3, 1970, abandoned.

[52] **U.S. Cl.**..... 3/1, 128/330

[51] **Int. Cl.**..... **A61f 1/00**

[58] **Field of Search**..... 3/1; 128/92 B

[56] **References Cited**

UNITED STATES PATENTS

1,378,147	5/1921	Tapscott	132/53
1,490,479	4/1924	Noel	132/53
3,553,737	1/1971	Bauman	3/1
3,621,837	11/1971	Gindes	3/1
3,694,819	10/1972	Meyer	3/1

FOREIGN PATENTS OR APPLICATIONS

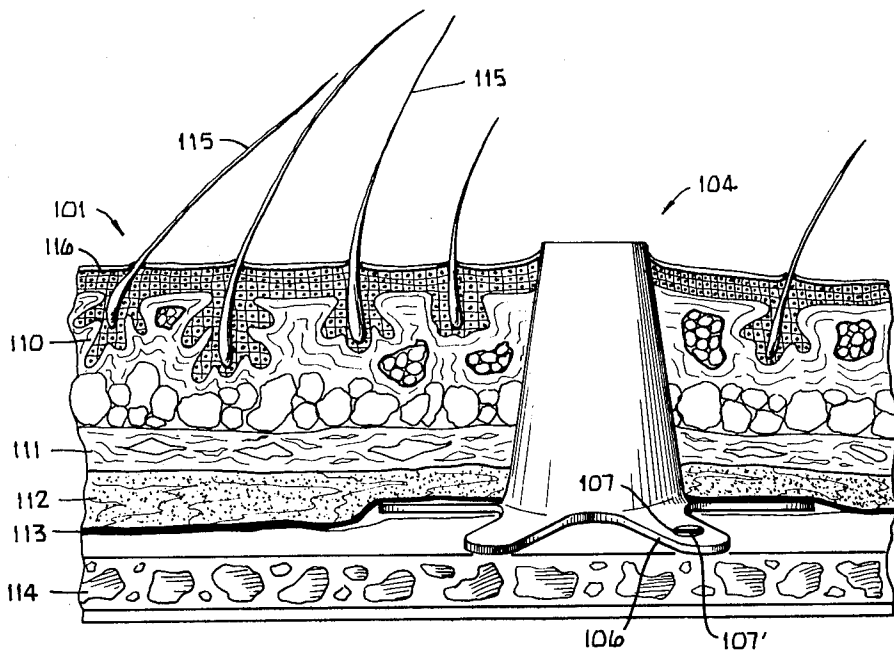
1,094,558 12/1954 France..... 3/1

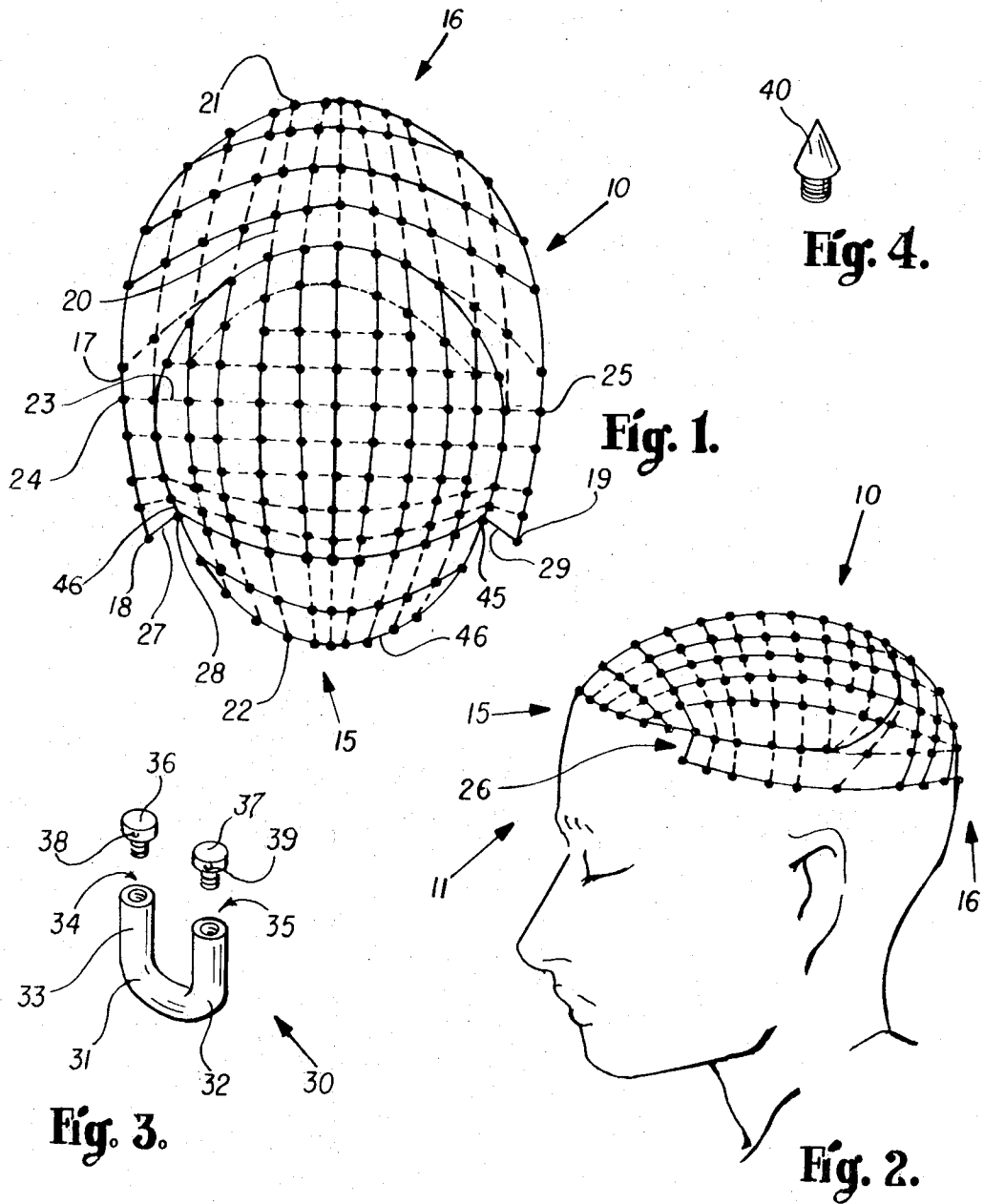
Primary Examiner—Channing L. Pace
Attorney, Agent, or Firm—Woodard, Weikart, Emhardt & Naughton

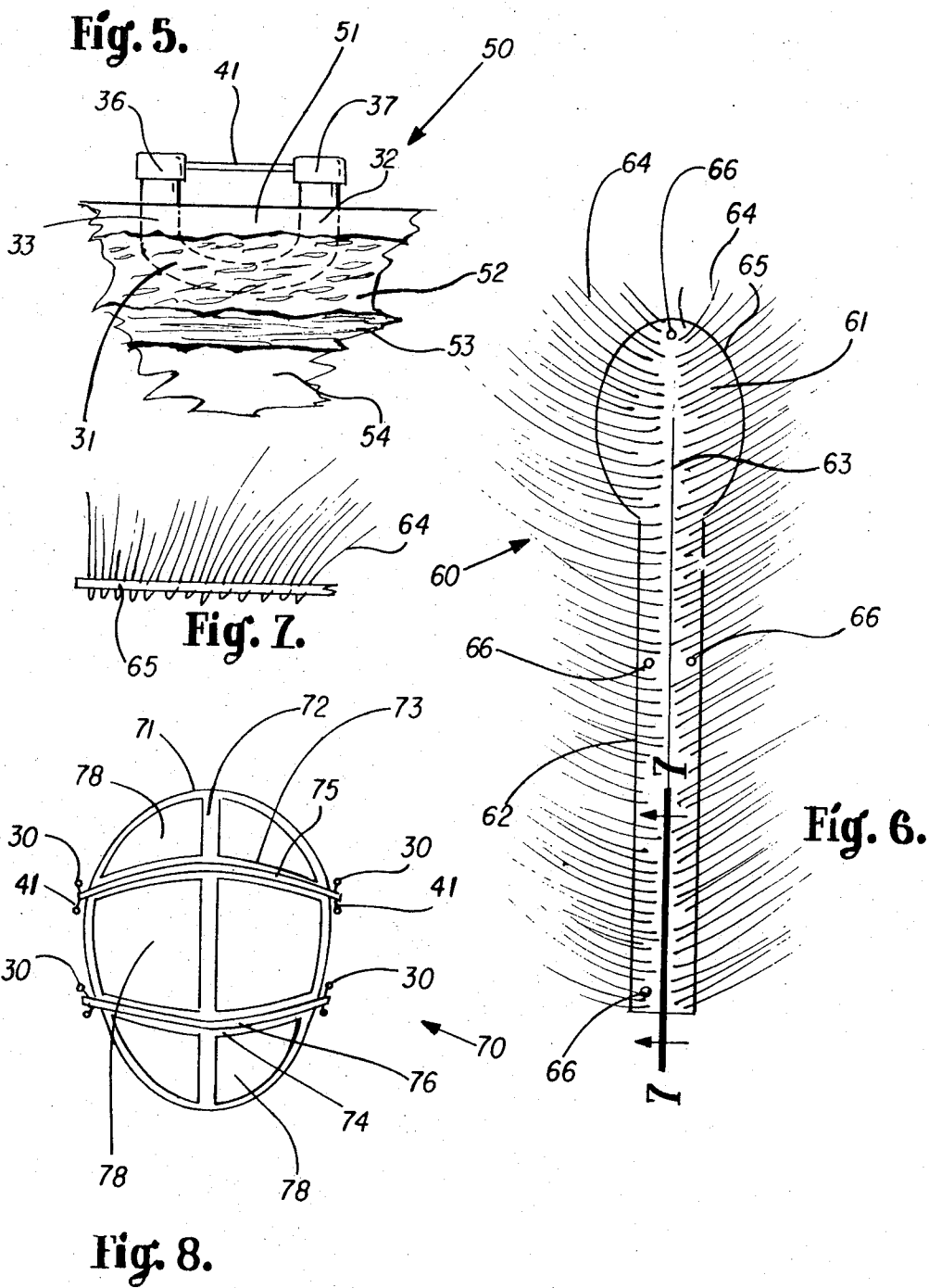
[57] **ABSTRACT**

A method and apparatus for mounting hair to a human head. In one embodiment, holes are formed in the scalp and U-shaped anchors are surgically embedded into the scalp with the ends of each anchor protruding out of the scalp. A mesh screen having hair mounted thereto is then attached to the anchors. In another embodiment, an incision is made through the skin and subcutaneous tissues of the scalp down to and through the periosteum. The periosteum is then separated from the skull and the base of an implant is positioned between the periosteum and skull. The body of the implant tapers from the base to the top — which protrudes from the scalp to which connection with a hair piece may be made.

6 Claims, 14 Drawing Figures







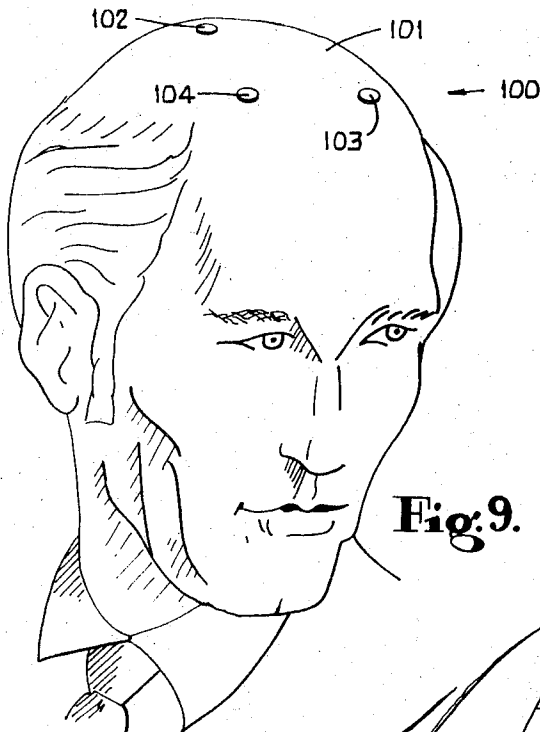


Fig. 9.

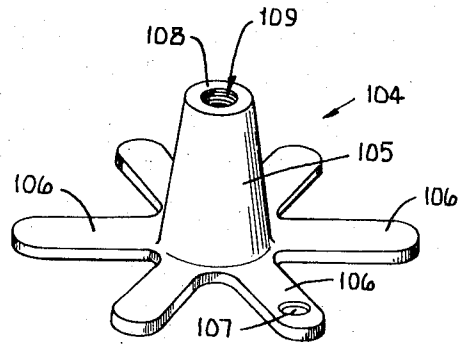


Fig. 10.

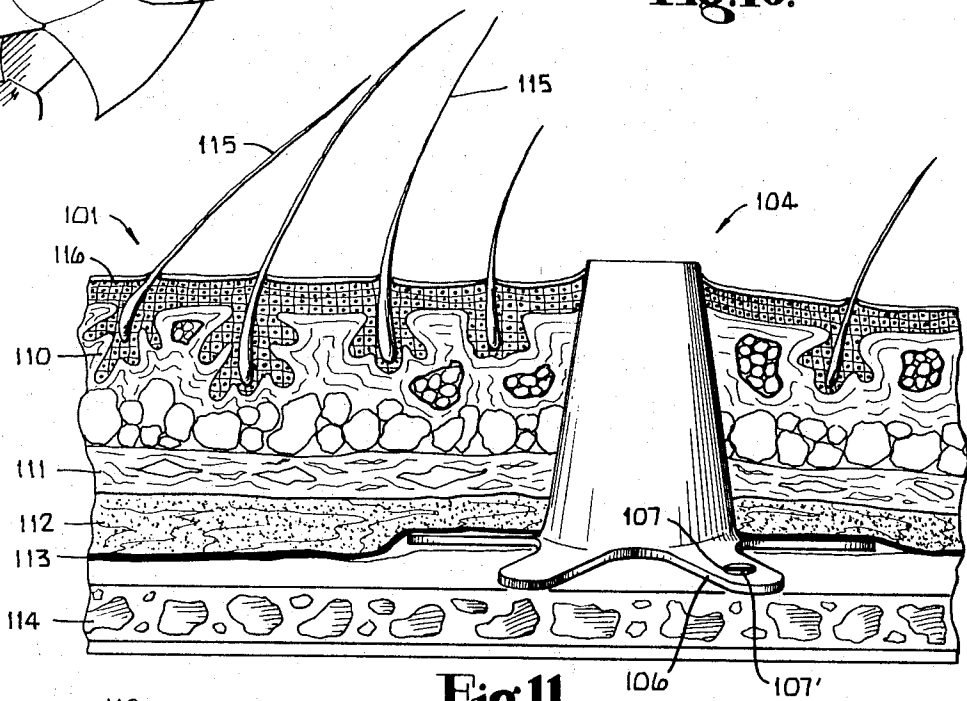


Fig. 11.

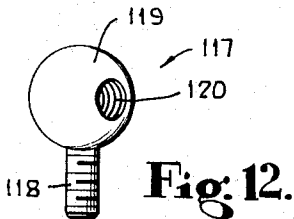


Fig. 12.

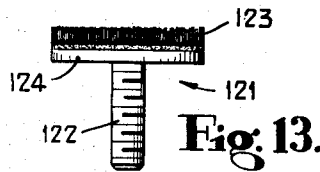


Fig. 13.

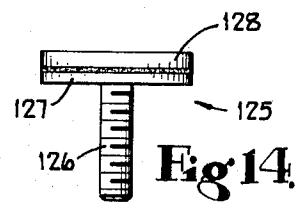


Fig. 14.

APPARATUS FOR MOUNTING HAIR

CROSS-REFERENCE TO RELATED APPLICATION

This is a division, of application Ser. No. 276,328, filed July 31, 1972, now U.S. Pat. No. 3,811,425, dated May 21, 1974.

This application which is a continuation-in-part application of my earlier U.S. Pat. application, Ser. No. 60,382, filed Aug. 3, 1970, now abandoned, and entitled "Method and Apparatus for Mounting Hair."

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is the apparatus, and the method of securing the apparatus as a means for the attachment of hair to a human head.

2. Description of the Prior Art

Few ways have been devised to attach hair to the human head. Jenkins in U.S. Pat. No. 3,280,826 showed an apparatus for attaching wefts of hair directly to hair growing from the scalp but this was mostly confined to the long flowing hair of women. Mielzynski in U.S. Pat. No. 3,003,155 described the insertion of metal darts (containing tufts of hair) directly into the scalp. Here, the body extruded the darts and the technique was turned to doll heads. More recently the process of 'hair-weaving' has appeared. Here, a nylon net is stretched over the bald area and strands of the wearer's hair are used for tying the net in place. To the nylon net is attached wefts of hair that can be combed into the wearer's remaining hair thus concealing the bald area. The major problem here is that a certain amount of fringe and frontal hair are necessary for the attachment. The overwhelming disadvantage, though, lies in the fact that the hair, to which the prosthesis is attached, is continually growing, loosening the prosthesis day by day — thus requiring frequent, time consuming, expensive "tightenings."

Then there are adhesives of one type or another. The pitfalls of adhesives are numerous. They can promote irritation and eczema. They leave gummy, sticky residues when removed. They are loosened by water, wind, sweat, natural body oils, and lateral pressures occurring while sleeping. Adhesives are probably the most widely used method of attachment and yet the wearer cannot be confident that his hairpiece will remain in place while exercising, while in bed, while in wind, hot humid weather, etc.

Then Bauman disclosed an interesting method in U.S. Pat. No. 3,553,737. Here, stainless steel sutures are sewed into the soft tissues of the scalp — either as a continuous suture around the periphery of the bald area or as a series of closed loops around the same periphery. A nylon net was placed over the bald area and tied to the sutures protruding above the scalp. Wefted hair was then sewed onto the net to be combed into the wearers own hair, and styled. This process simulated hair weaving except for the fact that the hair prosthesis was tied to embedded sutures rather than growing hair, eliminating the problem of periodic adjustments. But, many problems developed. The sutures around the periphery together with the net, acted as a dam to the natural drainage of sweat, oil, dandruff, soaps, etc., creating a caking in these areas — impossible to clean. The many openings into the scalp by the in and out penetrations of the sutures created many portals of infection. The major problem, though, was the fact that when in

bed, with the head on a pillow, the hair prosthesis was subject to strong pressures, both forward and laterally, causing considerable tension on the sutures over prolonged periods of time during the night. These tensions give the embedded suture a knife-like action — gradually causing each and every suture to cut its way to the surface with loss of the prosthesis and subsequent scarring, and disfigurement.

SUMMARY OF THE INVENTION

One embodiment of this invention is a method and apparatus for mounting a hair piece to a human head. Stainless steel anchors are embedded into the fatty portion and through the dermis of the human scalp with ends protruding from the scalp for attachment to the hair mounting base. The method of inserting the anchors into the scalp requires the scalp to be scrubbed, marked, and anesthetized. Holes are surgically punched into the scalp dermis for receiving the anchors and an antibiotic ointment is placed around the anchor sites after the surgery. A mesh screen or a toupee base is then attached to the anchors.

Another embodiment of the present invention is the apparatus and method for securing said apparatus for the purpose of affixing a hair piece to the scalp. Wherein, a small incision is made through the skin and subcutaneous tissue of the scalp down to and through the periosteum which is then separated from the skull. A physiologically inert implant having an outwardly extending base and a body which tapers from the base to the top is inserted into the incision. The base of the implant is positioned between the periosteum and the skull with the tip of the implant protruding from the scalp. To this a hair piece may be connected.

It is one object to provide apparatus that does not depend upon the presence of remaining hair around the area to be covered.

It is another object to provide apparatus which eliminates the need for expensive periodic tightening and adjusting as in "hair-weaving."

It is another object to provide apparatus which eliminates the need for "anchors" sutured into the scalp.

Another object is to provide by the rigid fixed implanted apparatus the elimination of sutures embedded into the scalp with their knife-like action resulting in pain, infection, extrusion, and scarring.

It is another object to provide apparatus for the attachment of hair which eliminates the need for adhesives.

It is another object to provide apparatus to which a hair piece can be attached and remain, with absolute security from detachment, under any and all conditions.

Another object is to provide apparatus from which a hair piece can be removed by the wearer, at will, in privacy, and without expense for the purpose of cleaning, repairing, replacement, etc. — and, yet, when reattached be absolutely secure.

Another object is to provide apparatus to which the wearers present hair piece or a new hair piece (either factory or custom made), with slight modification, can be permanently attached.

Another object of this invention is to provide a fixed, rigid implant which is locked in place by the natural growth of fibrous tissue over and around the implant, providing maximum strength, stability, and permanence — which is in contrast to suture "anchors"

(which are embedded into soft, mobile tissues of the scalp and are eventually extruded).

It is another object to provide a physiologically dynamic implant which promotes tissue closure around the exterior portion of the implant — thus preventing and eliminating open portals of infection as seen in "anchor" sutures.

It is another object to provide an implant that by the nature of its rigid attachment eliminate the pain occurring with the to and fro pulling tension of the suture "anchors."

It is another object to provide a means of attaching hair to the scalp with a minimum of portals into the scalp thus eliminating multiple scar deformities to the scalp and further reducing portals of infection.

Another object is to provide apparatus for hair application that is comfortable and attractive.

Another object is to provide for hair application that is relatively inexpensive and eliminating the need for follow up care and its expense.

Related objects and advantages of the invention will be apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of a mesh screen for attachment to a person's scalp.

FIG. 2 is a side view of the mesh screen shown in FIG. 1.

FIG. 3 is a perspective view of an anchor with associated parts for fastening the device of FIG. 1 or FIG. 8 to a person's scalp.

FIG. 4 is a side perspective view of a cutting tool used to embed the anchor of FIG. 3 in a person's scalp.

FIG. 5 is an enlarged fragmentary section of a scalp with the anchor of FIG. 3 embedded.

FIG. 6 is a top view of a hair piece forming the hair part.

FIG. 7 is a fragmentary section taken along the line 7-7 of FIG. 6 and viewed in the direction of the arrows.

FIG. 8 is a top view of a toupee base anchored to a scalp by the anchor of FIG. 3.

FIG. 9 is a top view of a person's head with the preferred embodiment of an anchor attached thereto incorporating the present invention.

FIG. 10 is an enlarged perspective view of one of the anchors shown in FIG. 9.

FIG. 11 is an enlarged cross section of a portion of the scalp of FIG. 9 with the anchor of FIG. 10 positioned therein.

FIGS. 12 through 14 are side views of various threaded members which are received by the anchor of FIG. 10.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now more particularly to FIG. 1, there is illustrated a mesh screen 10 made from stainless steel wires, such as surgical suture size "0" (26 gauge), welded together in such a manner so as to conform to the top of a person's head. To achieve the desired configuration of mesh screen 10, a plaster mold of the top of the head is made using plaster impregnated gauze. The cavity formed by the plaster impregnated gauze is then sprayed subsequent to drying with a suitable release agent such as polytetrafluoroethylene. A silicone foam is then poured into the cavity formed by the configured plaster gauze and allowed to dry. The plaster gauze may then be separated from the solidified silicone foam resulting in a foam shaped object duplicating the contour of the scalp. The stainless steel wires used to construct mesh screen 10 may then be placed over the form shaped object and the wires may be welded together.

FIG. 1 shows a top view of the mesh screen 10 as it is positioned onto a person's head or scalp. The dashed lines as well as the solid lines represent stainless steel wires. The dashed lines are wires used to hold the wire mesh screen together and are not used for attachment of hair. The solid lines are wires used to hold the screen together and to also attach hair to the mesh screen. For example, wire 17 extends around the major portion of screen 10 from point 18 via point 21 to point 19 where it is welded to wire 29. Wire 17 is also welded to wire 27 at point 18 and to other wires between points 18 and 19. Wire 27 in turn is welded to wire 46 at point 28. Wire 46 is also welded to wire 29 at point 45. Both wires 17 and 46 are utilized to attach hair thereto and are illustrated as solid lines. Wire 17 is welded to many other wires as it extends around the back 16 of the mesh screen. Likewise, wire 46 is welded to many other wires as it extends around the front 15 of the mesh screen. An example of a support wire which is not utilized to attach hair thereto is wire 23 which extends across the mesh screen being welded to wire 17 at points 24 and 25. Wire 23 is welded to many other wires, such as wire 20 which extends from the back 16 of mesh screen 10 to the front 15 of mesh screen 10. As shown in FIG. 1, wire 20 is welded to wire 17 at point 21 and is also welded to wire 46 at point 22. Wire 20 is shown as a solid line and as a dashed line in FIG. 1. Thus, wire 20 would be used to attach hair thereto when the wire is only shown as solid.

FIG. 2 is a side view of the mesh screen shown in FIG. 1 and more particularly shows the mesh screen as it is positioned on head 11. A cutout 26 is provided at the lower edge of mesh screen 10 toward the front 15 so as to realistically simulate the normal hair line. Of course, cutout 26 is positioned on either side of head 11 at the front 15 of the mesh screen. Prior to installing the mesh screen on a scalp, and subsequent to welding, the mesh screen is grit blasted with aluminum oxide grits. The grit blasting produces surface roughness on the individual wires with a profile in excess of 100 micro inches suitable for bonding with polytetrafluoroethylene. The roughened mesh work is then sprayed with polytetrafluoroethylene using a pressure gun at a distance of 4 to 6 inches with an atomizing pressure of 25 to 30 pounds. The sprayed polytetrafluoroethylene is then baked and sintered on the mesh screen improving the corrosion resistance of the screen. Of course, the sprayed coating is applied only to the wires and does not cover the space between the wires. As a result, the

open mesh work allows for ventilation of the scalp and also allows any growing hair to emerge through the mesh work to be incorporated into the attaching hair. The coating on the wires also provides for easy cleaning due to the superior anti-stick qualities of polytetrafluoroethylene. The completed mesh screen is then attached to the scalp. The attachment method is to embed anchors into the scalp. FIG. 3 shows a perspective view of one embodiment of the anchor. Anchor 30 is U-shaped and has a middle portion 31 integrally connected to upstanding tubes 32 and 33 which have threaded holes 34 and 35 for threadedly receiving caps 36 and 37.

FIG. 5 is a fragmentary cross section of a portion of a scalp 50 showing anchor 30 embedded therein. Portion 31 of anchor 30 extends into the fatty portion 52 of the scalp whereas members 32 and 33 extend up through dermis 51. Anchor 30 does not extend into the muscle 53 or skull 54. Of course, anchor 30 would be inserted or embedded in the scalp under strict surgical procedures. The person to receive the anchors is requested to shampoo his hair with surgical soap on the night before surgery. A hexachlorophene soap is used to scrub the scalp and the patient is draped to insure a clean field. Sites for the anchors are marked with a sterile indelible pen on the scalp at the perimeter of the bald area and the sites are then anesthetized, applying the anesthetic with a 30 G needle or compressed air jet stream. The anesthetic controls both the pain and the bleeding. A dermal punch or burr, smaller in diameter than the anchor tube, is then used to form entrance and exit holes through the dermis.

The end of anchor 30 (FIG. 3) having tool 40 (FIG. 4) threaded thereon is inserted into the opening in the dermis and down into fatty portion 52 (FIG. 5) and back up through dermis 51 to the position as shown in FIG. 5. Tool 40 is unthreaded from anchor 30 and caps 36 and 37 are threaded into both ends of the anchor. Antibiotic ointment is then used to cover the surgical sites after insertion of all of the anchors.

Anchors 30 are made from stainless steel 316L which is inert in the human body and resistant to corrosion. Other inert substances which may be substituted for the stainless steel are gold alloys, titanium, polytetrafluoroethylene coated metal or certain plastic. As in ear piercing, the channel formed by the anchor epithelializes, creating a permanent sinus track thereby allowing the anchor to be removed or replaced. The size of the track tends to prevent the formation of keratin granulomate.

Caps 36 and 37 have holes 38 and 39 (FIG. 3) extending through their tops. After anchor 30 is embedded into the scalp and caps 36 and 37 are threaded into the anchor body, holes 38 and 37 are aligned for receiving wire 41. Wire 41 is inserted through the holes and is welded at either end to caps 36 and 37 on the patient. The anchor is then completely ready for receiving mesh screen 10 (FIG. 1) or base 70 (FIG. 8). A piece of nylon or similar thread is used to tie wire 41 to mesh screen or base. For example, a piece of nylon thread may be wrapped around wire 41 and wire 17 of mesh screen 10 (FIG. 1). Approximately 8 to 12 anchors are embedded in the scalp around the perimeter of the mesh screen for attachment of the permanent mesh screen arrangement. Only four anchors are embedded in the scalp for attachment of the base shown in FIG. 8.

In addition to attaching hair to the mesh screen 10, a hair piece simulating the part is attached to the mesh screen. For example, hair piece 60 (FIGS. 6 and 7) is tied to the mesh screen. Hair piece 60 has a crown 61 integrally attached to portion 62 which simulates the part 63 of the hair. The base 65 of hair piece 60 is made from sheet polytetrafluoroethylene having a thickness of 0.010 to 0.015 inches. Base 65 has holes for looping hairs 64 through and also has holes 66 located around its periphery for receiving nylon thread to tie to the wires of mesh screen 10. The bottom surface of base 65 is roughened or etched prior to looping the hairs through the base. A neoprene phenolic applied to the bottom etched surface after the hairs are looped through the base, thereby enmeshing the hair. A second piece of sheet polytetrafluoroethylene, not shown, identical in configuration to base 65 and having a roughened top surface is placed in contact with the phenolic bond securely locking the hair into position.

FIG. 8 shows an alternate base for attachment of hair. A toupee base 70 is contoured to fit the scalp and is made from polypropylene having a thickness of 0.020 inches. A plaster mold is first made of the person's scalp using conventional techniques. The mold is then dried and sprayed with a release agent such as polytetrafluoroethylene and plaster of paris is poured into the mold and allowed to harden and dry. The hardened plaster mold is placed in a standard vacuum forming apparatus where a sheet of hot pliable polypropylene is set over the plaster cast. The vacuum forming apparatus forces the hot sheet over the plaster cast thereby contouring the sheet to the scalp. Openings are cut into the contoured polypropylene base such as illustrated in FIG. 8. Openings 78 allow ventilation to the scalp with ring 71 being integrally joined to cross struts 72, 73 and 74. The polypropylene dome is then sent to a toupee maker for incorporation into a conventionally made toupee. Toupee base 70 when attached to a toupee is then fastened to the scalp by means of flat springs 75 and 76 extending over and resting on struts 73 and 74. Of course, the hair would cover the springs. As may be seen from FIG. 8, only four anchors 30 are utilized for securing base 70 to the scalp. Anchors 30 are identical to those described previously. The ends of springs 74 and 75 are looped around wires 41 of anchors 30 securing base 70 to the scalp.

Many variations of the above disclosed items are included and contemplated by the present invention. For example, anchor 30 is shown in FIG. 3 threadedly receiving the male portion of caps 36 and 37. Of course, it would be possible to thread the external surfaces of tubes 32 and 33 for receiving a complementary threaded female portion on the end of caps 36 and 37. Likewise, it is possible to glue the caps to the anchor in lieu of engagement by threads. It is also possible to machine one end of anchor 30 thereby integrally forming a cap. In this latter case only one end of anchor 30 would receive a separate cap. In lieu of providing holes through the heads of 36 and 37, the heads of caps 36 and 37 could be configured as rings. Anchors 30 may be made from round wire, rectangular wire or hollow tubing. Of course, it is also possible to delete caps 36 and 37 and to instead have the ends of anchor 30 solid with holes for receiving the nylon thread for securing the anchor to the mesh screen. Another variation of anchor 30 is to hingedly mount a bar to one end of the an-

chor and to connect the free end of the bar to the opposite anchor end by means of a pin.

The preferred embodiment of the present invention is disclosed in FIGS. 9 through 14 wherein a person's head 100 having scalp 101 is provided with three identical implants 102, 103 and 104 in a triangular pattern. Of course, a number other than three implants may be utilized in various patterns for practicing the invention.

Implant 104 will now be described it being understood that a similar description applies to implants 102 and 103. Implant 104 has a main body 105 configured as a truncated cone which tapers from an enlarged end mounted atop base 106 to a reduced end 108. Base 106 is flat and thin and has a plurality of radially extending spaced apart arms with one or more arms having apertures 107 for receiving bone screws 107' for securing the anchor to the skull. The anchor 104 has a threaded hole 109 extending through the top end 108 for receiving the threaded shank 118, 122 or 125 of screws 117, 121 or 124.

In the illustration of FIG. 9, there is shown in perspective, the head of an individual whose central portion of scalp is without hair. It makes little difference to this method whether the individual supplies his present hair piece, or a custom made hair piece is made for him, inasmuch as any hair piece can be modified for use with this invention. In either event, the bald area of his scalp is carefully surveyed and examined, and the sites of implantation are ascertained. These sites are determined by their strategic location in resisting the constant lateral 'shearing' pressure which is associated with reclining or sleeping positions, as well as the antero-posterior pressures of wind, combing, etc.

After the sites of implantation have been determined, the services of a medical doctor are required. The doctor prepares the skin 116 by thoroughly cleansing the area, followed by skin antisepsis. The subject's head is draped with sterile draping, and under aseptic techniques, the areas to be incised are anesthetized with a local anesthetic. An incision approximately 1½ inches in length is then made through the skin 116, subcutaneous dense connective tissue 110, aponeurosis 111, loose connective tissue 112 and finally through the periosteum 113. The periosteum 113 is then separated from its attachment to the skull bone 114 by means of a periosteal elevator.

The base 106 of the implant is thereafter positioned between the periosteum 113 and the skull bone 114. This being accomplished, the incision is closed by suturing. The above steps are repeated in the placing of the other implants and the hair piece is then connected to the protruding top implant ends.

The implants are composed of pure titanium, or other physiologically inert material which is compatible with human tissue. The main body 105 is in the shape of a smooth truncated cone. If in the opinion of the doctor additional support is advisable, than a bone screw 107' can be screwed through hole 107 in the base 106 of the implant directly into the skull bone 114. This additional support is generally not needed since the base of the implant is 'locked' into place with the passage of time due to the reattachment of the periosteum over and around the implant base thus creating a fixed and rigid attachment to the head — an actual extension of the skull itself.

The conical shape of the body of the implant insures the epidermis of the scalp will not invaginate (turn in-

ward toward the base of the implant) but will cause the epidermis to act as a sphincter — gripping the implant as the gums grip a tooth.

The hair piece may be readily attached to the protruding top ends of the implants by several means. Member 117 is threadedly received by hole 109. By inserting a ligature through hole 120 of head 119 and tying the hair piece to this provides for a permanent installation.

Alternatively, interlocking cloth fasteners 123 sold under the trademark "VELCO" (produced by American Velco, Inc. of 406 Brown Avenue, Manchester, N.H. 03103) may be attached to the inner surface of the hair piece. A fastener 123 has been laminated to the disc-like head 124. Member 121 is then threadedly received by hole 109. The hair piece can then be readily attached by pressing the cloth fasteners atop the implants and on the hair piece together.

Another alternative includes the attachment of thin metal discs to the inner surface of the hair piece (at position relating to the position of the implants when the hairpiece is in place). Member 125 with a round permanent magnet 128 laminated to the disc-like head 127 is then threadedly received by hole 109. The hairpiece can then be readily attached by merely setting in place. Each magnet withstands a pull of 8 pounds — creating a hair piece able to withstand a total pull of 24 pounds. The magnetic field may be broken with another magnet with reversed polarity.

In all cases, the top ends of the implants always protrude from the scalp to receive the threaded members. The implants must therefore be inserted into the opening so the top ends protrude from the scalp. The openings are formed in the scalp by slitting and are then closed subsequent to the positioning of the implant bases between the periosteum and the skull. The openings are closed by suturing so as to position the skin around and in contact with the anchors.

While the invention has been disclosed and described in some detail in the drawings and foregoing description, they are to be considered as illustrative and not restrictive in character, as other modifications may readily suggest themselves to persons skilled in this art.

The invention claimed is:

1. An implant for implanting within a scalp to attach a hair piece thereto comprising:
 - a smoothly tapered main body with a reduced top end for protruding out of said scalp and an enlarged bottom end, said main body having a truncated cone configuration;
 - a thin base connected to said bottom end and extending outwardly from said bottom end for placement between the skull and periosteum; and,
 - means mounted to said top end operable to connect to said hair piece.
2. The implant of claim 1 wherein:
 - said thin base is flat and has a plurality of spaced apart arms extending radially outward from said bottom end.
3. The implant of claim 2 wherein:
 - said means is a removable headed member with a shank threadedly received by said main body; and,
 - said main body is metal.
4. The implant of claim 3 wherein:
 - said headed member has a ball shaped top end with a hole extending through said ball shaped top end.
5. The implant of claim 3 wherein:
 - said headed member has a magnet top end.
6. The implant of claim 3 wherein:
 - said headed member has a cloth fastening top end.

* * * * *