IMPROVED LASER COMB DESIGN/FUNCTION

Low-power laser is in widespread use in skin care, scar reduction, wound healing and the like, and has also been found to assist the hair's natural ongoing replacement and improve its condition. However, when there is existing hair growth on the skin being treated (for whatever purpose), laser beams by themselves do not satisfactorily penetrate the hair and it is necessary to find means to enable the laser beam or beams to be better brought into contact with the hair-growing skin. Therefore it is desired to overcome this problem.

The invention relates to a hand-held, comb-like device emitting laser beams from laser diodes set in a row centered between two parallel rows of teeth for parting hair, enabling more economical product manufacturing as well as a more effective way of irradiating hair-growing skin with laser energy than that afforded by conventional hand-held laser devices where the laser energy is conveyed via a system of fiber optics into and through tubes which must also act as teeth for parting hair.

In an embodiment of the invention, laser energy reaches the hair-growing skin by way of a row of laser beams, being preceded by a row of teeth that part the hair to expose the skin in advance of said row of laser beams. Said laser irradiation is thus direct in its action. This has advantages over unnecessarily complex conventional systems which use tubes, where each tube contains a fiber optic to both carry the laser light and part the hair, requiring said tubes to be broader than the teeth of this invention, which are solid and can be finer and more sharply pointed and 'plow-like' in shape and function, affording more effective hair parting than that of aforesaid conventional system.

This invention will now be described with reference to the accompanying drawings which show internal details which are encased in the device. (See Figs.1, 1a, 1b, 1c).

In this device solid state diode lasers are used. The diodes usually come from the manufacturer within complete modules which are small cylindrical units each approximately 20mm long by 6mm in diameter in which is encased the lasing medium which creates the laser beam and the electronics that control and process the electric current that passes through the lasing medium.

The lasing medium chosen for use in the preferred form of this invention produces a visible red beam of between 632 to 670 nanometers and has a typical divergence of 33 degrees in the perpendicular plane and 7 degrees in the parallel plane, said angles varying slightly according to different manufacturers' diode module construction. A lens is positioned in front of each diode at or near the point of exit of the laser beam to columnate said laser beam so as to control its divergence from its point of exit.

Another preferred feature of this invention is its two rows of teeth which are provided in this device so that the aforesaid function of parting the hair is conveniently effected whether the device is moved in either a forward or backward direction across the skin.

This invention has been described by way of example only and it should be appreciated that modifications and improvements may be made without departing from the scope and spirit thereof. For example, the above description of the invention refers to a preferred laser diode frequency but other frequencies such as the infrared wavelength may be used. Also, a single laser diode may be used and divided into separate beam parts deflected in a configuration similar to that emitted from a row of separate diodes as described in the foregoing.

Also, in addition to the comb-like configuration described in the foregoing (where the row of lasers and combs are parallel to the body of the device) other configurations such as a rake-like one (where the row of lasers and teeth are at right-angles to the body of the device) or a brush-like one are possible. Modification of the device from mains power to battery power usage is also possible.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A laser comb of improved design/function for irradiating hair-growing skin, comprising:

a radiation source, and a power source for said radiation source;

a hand-held case enclosing a row of lasers emitting a row of laser beams or a single laser the beam of which is divided into a number of emitted beams;

said row of laser beams being preceded by teeth that part the hair in advance of said row of laser beams;

two rows of teeth – one on each side of the row of said laser beams enabling parting of the hair with said laser comb whether it is moved in either a forward or backward direction across the skin.

2. A hand-held laser skin treatment device, including:

a laser assembly, said assembly including a laser beam generator, a power supply for supplying power to the laser beam generator and means for directing at least one laser beam outward from the laser assembly; and

a hair-parting means to expose the scalp of an individual when the laser treatment device is moved over the individual's scalp such that the laser beam is not obstructed from reaching the scalp by the individual's hair, wherein said hair-parting means is a tooth which is associated with the laser beam and is disposed relative to the laser beam such that when the device is moved across an individual's scalp, the tooth creates a furrow in the hair in front of the laser beam so that the laser beam has a relatively unimpeded path to the individual's scalp.

3. The device of claim 1 or 2, wherein there is provided a row of laser beams directed outward from the laser assembly, and wherein the hair-parting means comprises a row of teeth, each tooth being associated with an individual laser beam.

4. The device of claim 3, wherein the hair-parting means includes two rows of teeth, and wherein individual teeth are disposed on opposite sides of an equal number of said individual associated laser beams relative to the direction of movement of the laser comb across the individual's scalp.

5. The device of any preceding claim, wherein the laser beams are visible red beams of wavelength in the range 632nm to 670nm.

6. The device of any preceding claim, wherein the laser beam has a perpendicular divergence of about 33° and parallel divergence of about 7°.