

**FORM 2**  
**THE PATENTS ACT, 1970**  
**(39 of 1970)**  
**& The Patent Rules, 2003**  
**COMPLETE SPECIFICATION**

**1. TITLE OF THE INVENTION:**

A SLIT DILATING DEVICE AND A METHOD OF DILATING A SLIT

**2. APPLICANT:**

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**3. PREAMBLE TO THE DESCRIPTION:**

The following specification particularly describes the invention and the manner in which it is to be performed:

## **Field of Invention**

The present invention relates to a slit dilating device and a method for dilating the slit. More particularly, the present invention relates to a slit dilating device for dilating a slit for various purposes including insertion of graft, extraction of graft, surgery, food container, beverage can or the like.

## **Background**

Since past many years, devices like forceps have been continuously used in medical procedures like hair implantation, surgery etc. Forceps usually include two arms fused together at an end or joined with a spring mechanism. The fused joint or spring mechanism causes inhibited motion of the arms of the forceps. In such instances, movement of the arms with respect to each other is resisted until a force is applied to the forceps to overcome the resistive force of the spring mechanism or fused joint. Thus, a user must constantly apply pressure or force to the arms to retain the altered position of the arms with respect to each other. Further, a user must maintain pressure on the forceps to control the forceps while applying pressure to the forceps to retain an object. Accordingly continuous use of forceps in such medical treatment causes fatigue to the human finger and hand muscles especially during hair implantation procedure, which lasts for several hours as per the cases.

Further, the skin of the scalp is a pliable structure and therefore requires traction and counter traction create or make a cut or slit on the scalp. The manual traction using palm or fingers not only causes fatigue where the process requires hours together but also produces inadequate stretch to the skin resulting in problem to assistant and operators both during the process of either extraction of graft or implantation of graft as per the case.

This problem has been tried to be resolved in US Patent publication No. US 2010/0049243, which discloses a hinged forceps with at least two arms, a finger grip and a hinge. The hinge couples two or more arms that allow separation of 30 degree, 60 degree, 90 degree etc. between the coupled arms. The finger grip facilitates movement and/or control of an arm of a forceps by a user. During use, a user may

only need to apply pressure to the forceps to grip an object and not to retain the forceps in the user's hand since the finger grips would inhibit the forceps from being dropped by the user. The forceps though creates ease in use as compared to the conventional forceps, however, still results in fatigue to the human muscles due to continuous application of pressure or force by the fingers to grip the object during the medical procedures.

It would therefore be advantageous to have a slit dilating device to overcome the above-mentioned drawbacks and/or to have various other benefits and advantages.

### **Summary**

One embodiment of the present invention discloses a slit dilating device comprising of a shaft including a hook configured to dilate a slit. At least a finger grip positioned on said shaft and configured to grip a finger of a user. The finger of the user gripped in the finger grip moves the shaft radially to the slit thereby dilating the slit by the hook. The use of only one finger for the device results in avoiding the over crowding of multiple hands over recipient area, thereby increasing the maximum visualization of slit, and further allowing the user to work efficiently. This device uses two finger grips, which are positioned on the surface of the shaft to grip the finger of the user in the finger grip, thereby increasing the gripping of the finger in the finger grip. The surface of the shaft faces the finger grip thereby providing support to a lower surface of said finger for efficient working of the device and avoiding fatigue to the human muscles especially during longer medical procedures.

The finger grip includes an adjusting structure, which is configured to adjust the finger grip thereby gripping the finger of said user properly.

Another embodiment of the present invention discloses a method of dilating a slit comprising the steps of gripping a finger of a user in at least a finger grip positioned on a shaft by a hook and dilating the slit by the hook connected to the shaft by moving the shaft by the finger of the user gripped in the finger grip

radially to the slit thereby resulting in efficiently inserting the graft in the slit without causing damage to the graft and avoiding excessive bleeding during implantation.

The method includes gripping the finger in two finger grips and supporting a lower surface of the finger by a surface of the shaft facing the finger grip, thereby achieving the speed during implantation or other medical procedure and avoiding the excessive bleeding during such procedures. The method also includes adjusting the finger grip by an adjusting structure thereby gripping said finger in said finger grip for increasing gripping and avoiding unnecessary movement of the device during procedures. Further, the application of the device efficiently allows the user to control the pulling force or grasping force during the extraction of the graft without causing fatigue to the user's skin. The device also provides an adequate or efficient stretch to the scalp and the skin by traction and counter traction of the surface of the skin or scalp for making cut or slit for implantation or extraction of the graft.

**Brief Description of Drawings**

Figure 1 discloses an embodiment of the present invention depicting isometric view of the slit dilating device with finger grip.

Figure 2 discloses an embodiment of the present invention depicting isometric view of the slit dilating device with the finger of the user.

Figure 3 discloses an embodiment of the present invention depicting the method of hair implantation with slit dilating device.

**Description of Elements**

**Reference Numeral**

A slit dilating device	10
Shaft	12
Surface	14

Terminal	16
Hook	18
Finger	20
Finger grip	22
Adjusting structure	24
Slit	26
Graft	28
Implantation device	30

### **Detailed Description of the Embodiments**

The embodiments of the present invention can be understood by reading following detailed description of some of the embodiments with reference to the accompanying drawings.

In an embodiment of the present invention, a slit dilating device (10) comprising of a shaft (12) including a hook (18) and a finger ring (22). The shaft (12) also includes a surface (14) and a terminal (16) on which the finger grip (22) and a hook (18) are positioned respectively. The hook (18) is configured to dilate the slit (26) in order to implant the graft (28).

As shown in Fig. 1, the shaft (12) is a lengthwise structure with a surface (14) on which the finger (20) of the user rests on during the use of the device. The surface (14) facing the finger grip (22) supports the lower surface of the finger (20) of the user. The surface (14) has two finger grips (22) positioned in a way to grip the finger completely. One of the finger grips (22) is positioned close to the terminal (16) and the other is positioned away from the terminal (16) in way to keep sufficient distance between the finger grips (22) to have sufficient gripping on the device. These finger grips (22) include an adjusting structure (24), which is configured to adjust the finger grip (22) as per the size of the finger (20) of the user.

As shown in Fig. 2, the index finger of the left hand of the user is inserted into the finger grips, which is configured to grip the finger and then the adjusting structure

(24) is adjusted accordingly so that the finger (20) is properly placed in the finger grip (22) and the user can comfortably use the device without losing the grip on the device. The adjusting structure (24) can be a screw, which can be loosen and tighten by the screwdriver.

As shown in Fig. 3, the recipient is prepared prior to the process of the hair implantation by forming the premade skin slit on the head. The grafts (28) are prepared separately for the implantation on the recipient, which is performed by the implantation device (30). The implantation device (30) can be a medical forcep to hold and implant the graft (28) in the respective slit (26).

Once the slit (26) on the premade skin is prepared for the implantation of the graft (28) as per the need of the recipient, the slit dilating device (10) dilates the slit (26) in order to insert the graft (28). The user wears the device on the index finger of the left hand by inserting the finger (20) i.e. the index finger into the finger grips (22) followed by adjusting the adjusting structure (24) to have sufficient grip on the device. The hook (18) at the terminal (16) of the shaft (12) is placed either inside the slit (26) or on the top layer of the slit (26) in a way to connect the side surface of the superficial skin layer. The finger (20) gripped into the finger grips (22) is then moved relative to the slit (26) or radially to the slit (26) i.e. the shaft (12) is moved in a way to pull the sides of the slit (26) gently by the hook (18) of the shaft (12), thereby dilating the opening of the slit (26). Subsequently, the user implants the graft (28) into the slit (26) by the implantation device (30). Once the graft (28) is implanted, the user moves the finger (20) gripped into the finger grip (22) again i.e. the shaft (12) is moved radially towards the slit (26), thereby gently releasing the sides of the slit (26) from the hook (18) and contracting the slit (26).

In an alternate embodiment, the adjusting structure (24) can be ring or circular structure made of flexible materials to hold the finger (20) and provide sufficient grip to use the device.

In an alternate embodiment, the surface (14) of the shaft (12) facing the finger grip (22) is flat there by providing further support to the finger (20) of the user.

In an alternate embodiment, the device (10) dilates the slit of the scalp during extraction of the graft or separation of already cut hair follicles or during collection of follicles.

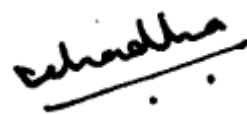
**I Claim:**

1. A slit dilating device (10) comprising:  
a shaft (12) including a hook (18) configured to dilate a slit (26); and  
at least a finger grip (22) positioned on said shaft (12) and configured to grip a finger (20) of a user,  
wherein said finger (20) of said user gripped in said finger grip (22) moves said shaft (12) radially to said slit (26) thereby dilating said slit (26) by said hook (18).
2. The device (10) as claimed in claim 1, wherein two said finger grips (22) are positioned on said shaft (12).
3. The device (10) as claimed in any of the preceding claims, wherein said shaft (12) includes a surface (14) facing said finger grips (22) to support to a lower surface of said finger (20).
4. The device (10) as claimed in claim any of preceding claims, wherein said finger grips (22) includes an adjusting structure (24) configured to adjust said finger grips (22) to grip said finger (20) of said user in said finger grips (22).
5. A method of dilating a slit (12) comprising the steps of:  
gripping a finger (20) of a user in at least a finger grip (22) positioned on a shaft (12) including a hook (18); and  
dilating said slit (12) by said hook (18) by moving said shaft (12) by said finger (20) of said user gripped in said finger grip (22) radial to said slit (26).
6. The method of dilating said slit (12) as claimed in claim 5, including gripping said finger (20) in two said finger grips (22).



7. The method of dilating said slit (26) as claimed in any of the preceding claims, including supporting a lower surface of said finger (20) by a surface (14) facing said finger grips (22).
  
8. The method of dilating said slit (26) as claimed in any of the preceding claims, including adjusting said finger grips (22) by an adjusting structure (24) thereby gripping said finger (20) in said finger grip (22).

Dated this 28<sup>th</sup> day of August, 2015.



(CHETAN CHADHA)  
PATENT AGENT

## ABSTRACT

### A SLIT DILATING DEVICE AND A METHOD OF DILATING A SLIT

A slit dilating device (10) and a method of dilating a slit (26) comprising a shaft (12) including a hook (18) configured to dilate a slit (26). At least a finger grip (22) positioned on the shaft (12) and configured to grip a finger (20) of a user. The finger (20) of the user being gripped in the finger grip (22) moves the shaft radial to the slit (26) thereby dilating the slit (26) by the hook (18). **Figure 1** is the representative figure.