June 21, 1966 H. BRUDNEY 3,256,597

METHOD OF MAKING LASHED DOLL EYES

Filed April 23, 1962

Fig. 1.

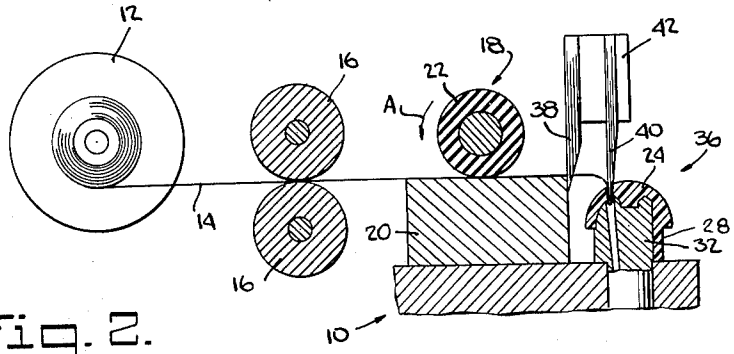


Fig. 2.

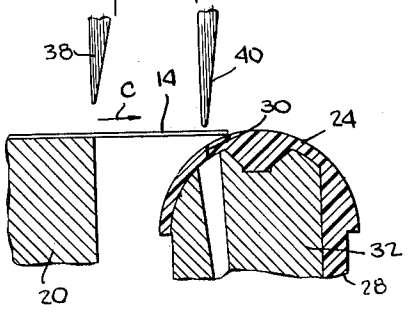


Fig. 3.

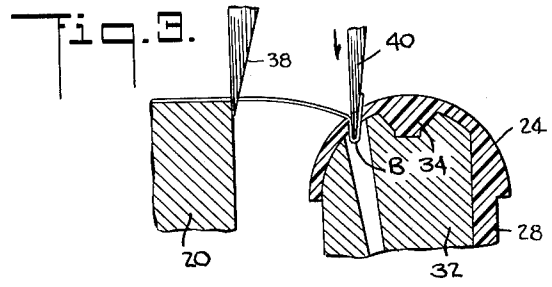


Fig. 5.

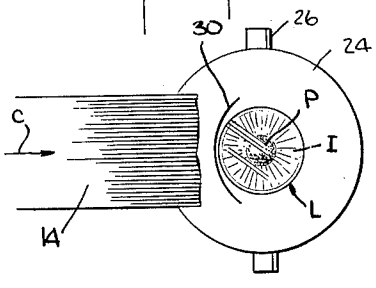


Fig. 4.

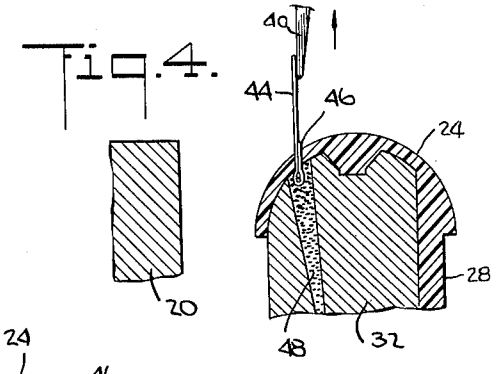
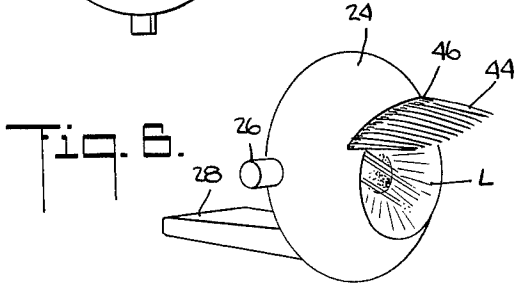


Fig. 6.



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3,256,597

METHOD OF MAKING LASHED DOLL EYES

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Filed Apr. 23, 1962, Ser. No. 189,338
4 Claims. (Cl. 29—450)

This invention relates to a method of making a lashed doll's eye.

By a "lashed" doll's eye I refer to a doll's eyeball having an artificial lash which is fabricated from a great number of preformed lash strands that are anchored to the eyeball.

More particularly my present invention relates to an improvement in a lashed doll's eye of the type which is illustrated and described in Grubman Patent No. 1,569,480 dated Jan. 12, 1926 and Grubman Patent No. 1,782,818 dated Nov. 25, 1930. In general such a lashed doll's eye constitutes a hollow eyeball which preferably is made of an inherently resilient material, e.g., a synthetic plastic, and which is provided with a preformed slit into which a great many doubled eyelash strands are forced so that the doubled strands are held within the slit, preferably by virtue of the constrictive action of the slit and optionally by the further addition of cement or the like, e.g., an adhesive.

A lashed doll's eye of the foregoing type is characterized by an unusually bushy appearance or, phrased differently, an unusually thick appearance, which is quite unnatural. The reason for such appearance arises from the method of insertion and holding of the lashes. The lashes are highly flexible and unmanageable due to their small diameter. Therefore when they are doubled and pushed into the preformed slit there is a tendency for them to become disarranged. To avoid this tendency and to maintain order in the arrangement of the lashes a great many lash strands, e.g. hundreds, typically from about one hundred and fifty to about five hundred are used. The lash strands then lie adjacent to one another and thereby maintain a nice parallel relationship. However a necessary concomitant of such large numbers of strands at the slit is the presence of a large number of distal lash strand ends. It will be obvious that the number of lash strand ends is not equal to the number of lash strands but is twice this number since each of the lash strands is doubled before being thrust into the slit. Accordingly a lashed doll's eye of the above described Grubman type is inherently thick and bushy and therefore has a highly artificial appearance. Indeed due to the separation of the doubled ends of each folded lash strand the lash as a whole is abnormally thick so that it does not resemble a human eyelash.

It would be highly desirable to substantially reduce the number of lash strand ends so as to more closely approximate the appearance of a natural eyelash and for this purpose various alternate arangements and methods of manufacture have been proposed.

Some manufacturers, particularly in Europe, have secured one eyelash strand at a time to an eyeball and in this manner could, of course, use as few strands as were desired, accurately determine the mounting of each strand and accordingly obtain a nice ordering of the relative arrangement between the strands. However this method and the resulting lashed doll's eye was not susceptible to nor compatible with American mass production processes entailing as it did an unrealistically large amount of hand labor which was suitable for localities where manual labor was plentiful and inexpensive but was entirely inappropriate for countries like the United States where labor is skilled and costly. Therefore to change from

the rapid, cheap and more or less satisfactory Grubman method to individual hand setting of lash strands would increase the cost of a doll's eye out of all proportion to the cost of other components and moreover would so greatly slow down production that normal demands could not be met.

Another proposed method and what might seem to be obviously the best, simplest and easiest one was merely to reduce the number of eyelash strands applied by the Grubman method. Even a slight reduction of the number of strands would be of obvious assistance and a substantial reduction, e.g. halving, would permit the strands to be arranged in a single file relationship rather than the separated double file relationship characteristic of the Grubman lashes. However it was observed that as the number of strands was reduced below the number required to completely fill, i.e., cram or pack, the slit the desired parallel relationship of the strands quickly was lost and the strands exhibited a marked tendency to assume random angles, to group in random bunches and to cross one another. Of course any of these defects made the lash extremely unsightly and therefore commercially unacceptable so that this modification could not be used.

Still another proposed method was to band the lashes before they were inserted by the Grubman method. Pursuant to the banding process fewer lashes were doubled and inserted into a slit but these lashes were held in orderly arrangement by transverse bands to which the lashes were secured as by adhesive. The banding arrangement tended to prevent disorderly bunching, crossing and aparallelism of the lash strands, although not completely; however it introduced additional handling, caused more wastage of strand material and substantially complicated the machinery that had to be employed. As a result this last modification has never come into extensive use.

It is an object of my invention to provide a method of making a lashed doll's eye which retains the many advantages of the Grubman method, to wit, simple manufacturing machinery, high rate of production and inexpensive end product, but which is not subject to any of the disadvantages thereof and specifically which does not provide a bushy lash.

It is another object of my invention to provide a method of making a lashed doll's eye wherein although folded strands are attached to an eye by the Grubman method the completed lash is far sparser than a conventional Grubman lash but still constitutes individual strands which are parallel to one another and are not bunched, i.e., are uniformly spaced.

It is another object of my invention to provide a method which produces a comparatively sparsely lashed eye of the character described which is attractive in appearance and can be made inexpensively and rapidly by mass production methods.

It is another object of my invention to provide a method which produces a comparatively sparsely lashed eye of the character described which can be made by machine with a high degree of uniformity.

It is another object of the present invention to provide a method of the character described which can be carried out at a low cost.

Other objects of my invention in part will be obvious and in part will be pointed out hereinafter.

My invention accordingly consists in the series of steps which will be exemplified in the method hereinafter described and of which the scope of application will be indicated in the appended claims.

In the accompanying drawings in which I have shown the steps involved in one of the various possible embodiments of my invention,

FIG. 1 is a vertical sectional view through a lashing machine for carrying out the method of the present invention;

FIG. 2 is an enlarged view of the lash cutting and lash folding and inserting station of said machine, the same being illustrated at the end of a lash feeding movement;

FIG. 3 is a view similar to FIG. 2, but illustrating the station as it appears during a lash folding and inserting operation;

FIG. 4 is a view similar to FIG. 2, but showing the station as it appears during a cementing operation;

FIG. 5 is a top plan view of said station; and

FIG. 6 is a perspective view of a doll's eye having a finished trimmed lash and made by the method of my invention.

In general the method of my invention is achieved by what may now seem to be an extremely simple modification of the aforesaid Grubman method but which has escaped the attention of workers in the doll's eye art since the 1920's. In the Grubman patents a great many transversely spread lash strands are transversely fed above and beyond (over) their elongated site (a preformed slit) of doubling and inserting, the overfeed being by an amount which is in excess of the length of a reach of a trimmed doubled lash strand from its bight (fold) to its tip. Moreover the strands are cut off from their source of supply at a distance from the site of the doubling and inserting which distance likewise is in excess of the length of a reach of a trimmed doubled lash strand from its bight to its tip. Then after doubling and insertion the lash strands are trimmed to some certain length as may be desired. In their trimmed condition the doubled lash strands have a predetermined length from their bights to their tips (distal ends). Hence the total longitudinal feeding movement of a transversely spread group of lash strands is in excess of twice the predetermined length of the trimmed lash strands from their bights to their tip.

The modification which I have made of the Grubman method simply consists in shortening the feed of a group of lash strands past (over or beyond) the site of doubling and inserting. Pursuant to my invention the amount of overfeed is less than the predetermined trimmed length of the lash strands from their bights to their tips. I still retain a degree of overfeed but this is in the order of the length along the lash from the bight to just shortly beyond the external surface of the eyeball, such distance typically being in the order of about three thirty-seconds of an inch and being approximately enough for, and very little, if any more than, the overfeed required to permit the lash strands to be folded and the folded portions to be inserted in the preformed slit in the doll's eyeball. Thereby it will be appreciated that the inserted lash strands will effectively have only a single reach of each strand projecting for any appreciable distance beyond the doll's eyeball. Thus where in the previous construction because of the large amount of overfeed each strand had two reaches appreciably projecting beyond the exterior surface of the doll's eyeball, by following the method of my present invention the two reaches of the folded strand will be of unequal length so that one will terminate close to the doll's eyeball and the other will terminate remote from the doll's eyeball.

From the foregoing the article produced by my invention will be amply clear and will seem to consist of a doll's eye having a great many folded lash strands clamped adjacent their bights in a preformed slit in the eye with the bights giving unequal reaches so that one reach terminates in proximity to the eyeball whereas the other reach terminates at a normal trimmed length away from the eyeball. With such an arrangement I secure the large number of lash strands within the slit that is proper to obtain an orderly arrangement of the strands, i.e., uniform spacing and parallel relationship, but I have, in effect, cut in half the number of substantially protruding reaches of the lash strands which are the only portions that the public notices. Such an eyelash is of course far sparser than a Grubman doubled lash and considerably more realistic in appearance and this highly improved result is obtained without sacrificing in any respect whatsoever efficiency in speed or operation or cost of end product; indeed the product cost is somewhat reduced because the length of lash feed is shortened.

Referring now in detail to the drawings, the reference numeral **10** denotes in schematic form a machine adapted to carry out the method of my present invention.

Said machine includes a reel **12** which is rotatably supported in any suitable fashion and has wound about it a large number of long lengths of lash strands **14** of any suitable material. Because a glossy appearance is desirable and because lash strands can be inexpensively procured where they are made from modern-day synthetic plastics, the lash strands **14** desirably are so constituted, that is to say they are manufactured of a synthetic plastic. One such plastic the appearance of which is rather pleasant is nylon (a polyamide resin). As indicated previously a great number of lash strands is used, these all, for example, being wound up on a single reel **12**. The number of lash strands employed will depend upon the size of the eyeball, the length of the preformed slit and the fineness (denier) of the lash strands; and in general enough lash strands will be used so that when they are folded and inserted in a manner which hereinafter will be described in detail the lash strands will be crammed in the slot to such a degree that they will be parallel to one another at their points of securement to the doll's eyeball. In FIG. 5 it will be apparent that enough strands are used so that they are densely packed, that is to say touching upon one another, thus assuring the presence of sufficient strands to completely fill the slit in the doll's eye into which they will be inserted. The number of lash strands required to pack the slit may range from about one hundred and fifty to five hundred and many more. The strands obviously may be made in any desired color, for example, blonde, red, brunette and black, to match, if desired, the color of the hair on the head of the doll.

A transversely spread group of lash strands **14** is led longitudinally of their lengths between a pair of guide rollers **16** from which they are directed to a feed station **18**.

Any suitable feeding arrangement can be employed which intermittently feeds the flat group of lash strands a predetermined distance. One such feeding arrangement is shown herein, the same constituting a stationary feed block **20** and a feed roller **22**, the latter optionally being made from a yieldable rubber so that it is able to frictionally engage the lash strands of the group and when the roller is turned in the direction indicated by the arrow A to advance said lash strands forwardly away from the reel **12**.

The lash strands **14** are adapted to be mounted on a doll's eyeball **24**. This eyeball is of any conventional construction except for the lash, the finished arrangement of which subsequently will be described in detail. More particularly the eyeball is desirably fabricated from a synthetic plastic. The eyeball like all modern eyeballs is preferably made by molding, e.g., injection molding. Typical materials employed for the eyeball are cellulose acetate, cellulose acetate butyrate or an acrylic resin. The eyeball principally constitutes a hollow hemispherical shell and, for convenience in mounting providing that the eyeball is of a rotatable type, the same may include outwardly extending opposed diametrically registered trunnions **26**. Likewise if the eyeball is rotatable, it may include a rearwardly extending lower tail **28** about which a suitable weight (not here shown), such for instance as a strip of lead, may be wrapped to cause the eye to assume a certain angular idle position.

Prior to the lash folding and inserting operation which

is performed by the machine **10**, the doll's eyeball **24** has had formed therein a slit **30** in the upper half of the eyeball (above the lens). This slit either may be straight across the eyeball as shown in the Grubman patents or, for a more pleasing appearance, it may be curved with its concave side facing the lens as is customary in a more modern eyeball. The slit is formed by forcing a sharp thin cutting blade of the proper configuration into and through the eyeball and then withdrawing the same. Since the formation of the slit is no part of my invention I have not shown the apparatus or the method step of carrying the same out this being illustrated and described in the earlier of the two Grubman patents above mentioned. It is merely necessary to observe that the preformed slit already is present when the eyeball is ready to receive a folded lash.

To hold the eyeball in proper position for securing the lash strands the machine **10** includes a supporting member, i.e. a post **32**, the upper surface of which is shaped to receive the rear surface, that is to say the back surface, of the hemispherical doll's eyeball **24**. The post holds the eyeball with the slit **30** facing upwardly. It may be noted in passing that the back surface of the doll's eyeball has, in a present day eyeball, a protuberant formation **34**. Said formation is approximately in the shape of a frustum of a cone and may be formed with reflecting ribs. The flat apex of the frustum will in the finished eye constitute the pupil P of the doll's eye and the sloping side walls of the formation will constitute the iris I. The pupil and iris jointly make up a lens L. The post **32** is shaped to match the aforesaid configuration including the protuberance and also including a surface to match the tail **28**. The position of the slit **30** at this time is indicated in FIG. 2.

The machine **10** has a lash cutting and a lash folding and inserting station **36** one member of which is the post **32** that is located directly forward of the front face of the feed block **20**. The feed block **20** is so oriented with respect to the post **32** that it will direct the flat (transversely spread) group of lash strands **14** in a generally flat plane across the top of the eyeball, the direction of feed being such that the previously cut forward ends of the lash strands first cross the upper edge of the eyeball, then they are fed transversely across the slit and finally they move over the lens L. In other words the direction of movement is from above to below the slit with the overfeed being below the slit. Furthermore the strands are centered with respect to the slit and are disposed close to the eyeball, being so directed by the feed roller and feed block that they will brush the eyeball (see FIG. 2) and barely clear the slit.

Also included at the lash cutting and lash folding and inserting station of the machine **10** are two blades. One of these is a sharp cutting blade **38**. The other is a thin dull folding and inserting blade **40**. Both of these blades are carried by a vertically reciprocatable support **42**. The blades are so positioned on the support that the cutting blade **38** has its rear face in vertical alignment with the front face of the feed block **20** and the blade **40** is in vertical alignment with the slit **30**.

It will be observed that the vertically moving blade **40** makes a smaller angle with the surface of the eyeball below the slit **30** than with the surface of the eyeball above the slit.

The front face of the feed block **20** matches the plan shape of the rear face of the cutting blade **38** so that this front face can act as a shear member to cooperate with the blade **38** to cut off the strands **14** which project over the front edge of the feed block at any time that the cutting blade **38** is lowered into cooperative engagement with the feed block.

The thin dull folding blade **40** has a plan configuration and length which match the shape and length of the slit **30**. Thereby since the blade **40** is registered with the slit, as noted above, when the support **42** is lowered the blade **40** will enter into the slit. The blade **40** has upwardly diverging front and back edges so that as the thin blade enters the slit it will spread the walls of the same apart.

It will be appreciated, of course, that when the blade **40** is withdrawn from the slit the walls of the slit will tend to spring back towards one another because the eyeball **24** is made of a synthetic plastic and a synthetic plastic is inherently resilient so that it will tend to regain its original shape when slightly deformed and the deforming stress is released. Hence if anything is introduced into the preformed slit in its spread state it will be clamped by the walls of the slit when the spreading means is withdrawn. This characteristic of the eyeball machine and method are detailed in the earlier of the aforesaid Grubman patents and it is understood that the same does not constitute any feature of novelty in the present invention. Indeed it will be understood that the machine **10** is the same as the machine of said Grubman patent except for the alteration in the shape of the post to accommodate a modern eyeball and except for the curvature of the dull folding blade **40** to match a curved shape of the slit **30** if such a curved slit is provided.

The novelty of the present invention consists in the novel manner of using the aforesaid patented machine. In the conventional use of the machine after the support **42** is elevated the forward previously cut end of the group of lash strands **14** is at the forward face of the feed block **20**. Thereupon the feeding station is actuated as by turning the feed roller **22** to feed the group of lash strands forward over and past (below) the slit **30** by a distance which is in excess of double the distance from the bight to the tip of a trimmed lash. The distance from the forward edge of the feed block **20** to the slit **30** is in excess of the distance from the bight of a trimmed lash strand to the tip thereof. Thus the total feed of the lash strands heretofore has been such that the strands before folding and insertion into the slit extended transversely two (both) ways from the slit (above and below) for a distance that was in excess of the distance from the bight to the tip of a trimmed lash. Subsequently by the previous method the lash after insertion was trimmed to any desired length.

It will be appreciated that the insertion took place upon lowering of the support **42**. As this occurred the tip of the thin dull blade **40** would press a transverse segment of the group of lash strands into the slit **30** folding each of the individual strands as it did so whereby to form a bight B in each strand at the point of folding. These folded bights would be pushed by the blade **40** into the preformed slit and at the same time the blade **40** would spread apart the walls of the slit **30**. The folded portions (bights B) of the lash strands would be pushed far enough into the slit, preferably at least until the bights cleared the rear surface of the eyeball, for the walls of the slit to be able to hold the lash strands firmly in place after the folding blade was withdrawn.

In accordance with the present method the foregoing operation of the machine is modified to shorten the feed of the transversely spread group of lash strands **14** so that the overfeed, i.e., the feed of the free ends of the lash strands beyond (below) the slit and over the lens L in the direction C is considerably less than the length from the bight to the tip of a reach of a trimmed lash strand. Preferably the overfeed is slightly in excess of the distance from the bight of an inserted lash strand to the external surface of the eyeball. This arangement is shown quite clearly in FIG. 2, the overfeed being indicated by the portion of the strands **14** to the right of (below) the slit **30** and of the folding and inserting blade **40**. It will be seen that the overfeed thereby is sufficiently long to permit the group of lash strands to be folded and inserted into the slit when the dull blade **40** is brought down as indicated in FIG. 3. Thereby when the dull blade is retracted from the slit it will leave caught between the walls of the slit all of the group of lash strands **14** with each of the lash

strands having a folded portion (bight) compressed between the walls of the slit and with the bight of the folded portion preferably located at the interior of the eye, i.e., rearwardly of the rear surface of the eye.

Due to the shortness of the overfeed, typically about three thirty-seconds of an inch, each lash strand will have extending forwardly from the bight two reaches **44**, **46** (FIG. 4) of unequal length. The length of the reach **44** equals the distance from the slit to the forward edge of the feed block and the length of the reach **46** equals the amount of overfeed beyond (below) the slit **30**. The reach **46** thus is considerably shorter than the reach **44**. The reach **44** preferably is in excess of and at least equal to a length required to provide a sufficiently long protruding section after the lash strands have been inserted and the excess length, if any, has been trimmed away. Since the trimming step already has been outlined in the earlier of the Grubman patents no further mention will be made of it here. However it is only the long reach **44** which is trimmed. The reach **46** is much shorter than the trimmed length of the reach **44** so that it is not trimmed to form the finished lash.

In the finished lash as shown in FIG. 6 the reaches **44** of the several lash strands **14** will be seen to protrude only a short distance beyond the external surface of the eye and they will not be noticeable unless attention is directed to them. The predominant portion of the lash will constitute the trimmed long reaches **44** which in number will only be one-half the number of visible lash strands that are obtained pursuant to the previously described Grubman method, and by thus halving the number of reaches an appearance of sparseness is secured.

After the lashes have thus been clamped in place their securement may be made additionally firm by application of an adhesive. This may be applied through a slot **48** in the post **32**. The upper end of the slot is necessary for reception of the tip of the dull folding blade **40** whereby the slot simply has to be extended downwardly to enable cement intermittently to be forced upwardly so as to be applied to the bights of the folded lash strands.

Attention is directed to the relative locations of the long and short reaches **44**, **46**. The long reaches are on top and the short reaches are on the underside of the finished lash whereby the short reaches are substantially concealed by the long reaches. This mutual positioning is the result of the direction of feed for the lash strands as mentioned above. It is because the feed is over the lash toward the lens that the short overfeed is on the bottom side of the slit whereby after folding and insertion the short reaches will be lowermost and on the bottom side of the finished lash. Still further the short reaches tend to be less noticeable because they are located within the smaller angle between the lash and eyeball which angle is at the underside of the lash.

It also will be observed that the tips of the short reaches are substantially aligned across the finished lash (see FIG. 6) due to the fact that the tips of these reaches originally were cut off in a straight line at the block **20** and severing blade **38**, that the lash strands are fed uniformly and that the folding and inserting operation does not materially disturb such arrangement although it may curve the line.

It thus will be seen that I have provided a method of making a lash which achieves the several objects of my invention, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth it is to be understood that all matter herein described or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A method of lashing a doll's eye that includes a hollow eyeball having a slit preformed therein between the center of the eyeball and a peripheral portion of the eyeball, said method comprising

(a) feeding a great many lash strands from a source in a direction transversely across the slit with the leading ends of the strands first crossing over said peripheral portion and then over the slit and finally advancing toward the center of the eyeball and with the lash strands spread lengthwise of the slit,

(b) halting the feed of the lash strands according to step (a) when the leading ends of the strands have advanced beyond the slit a distance considerably less than the distance from the bight to the distal end of a trimmed reach,

(c) then performing the step of pressing the lash strands intermediate their ends into the slit over the length of the slit

(1) so as to fold the lash strands and thereby form bights at the folds, from which bights reaches extend,

(2) so as to insert the folded bights of the lash strands into the slit, and

(3) so as to clamp the reaches of each lash strand adjacent their bights between the walls of the slit with at least one reach of each lash strand protruding from the eyeball,

(d) cutting the lash strands from the source at a distance from the slit at least equal to the distance from the bight to the distal end of a trimmed reach, and

(e) trimming to a predetermined length the distal ends of the reaches which protrude from the eyeball in excess of such length,

(f) whereby each lash strand has a long trimmed reach on the upper side of the inserted lash and a short reach on the under side of the inserted lash.

2. A method as set forth in claim **1** wherein the distance the lash strands are fed past the slit is approximately equal to the distance from the bight of the inserted lash to the external surface of the eyeball.

3. A method as set forth in claim **1** wherein the distance the lash strands are fed past the slit is slightly more than the distance from the bight of the inserted lash to the external surface of the eyeball.

4. A method as set forth in claim **1** wherein enough lash strands are included to pack the slit and arrange the reaches within the slit in parallel relationship.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,256,597 Dated June 21, 1966

Inventor(s) Harry Brudney

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 7, line 23, "44" should read -- 46 --.
Column 8, line 20, "bight" should read -- slit --;
line 21, "trimmed reach" should read -- finished lash --;
line 39, before "length" and after the comma insert -- to finish the lash --.

Signed and sealed this 8th day of December 1970.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents

RM PO-1050 (10-69)

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* U.S. GOVERNMENT PRINTING OFFICE 1969 O-366-334