

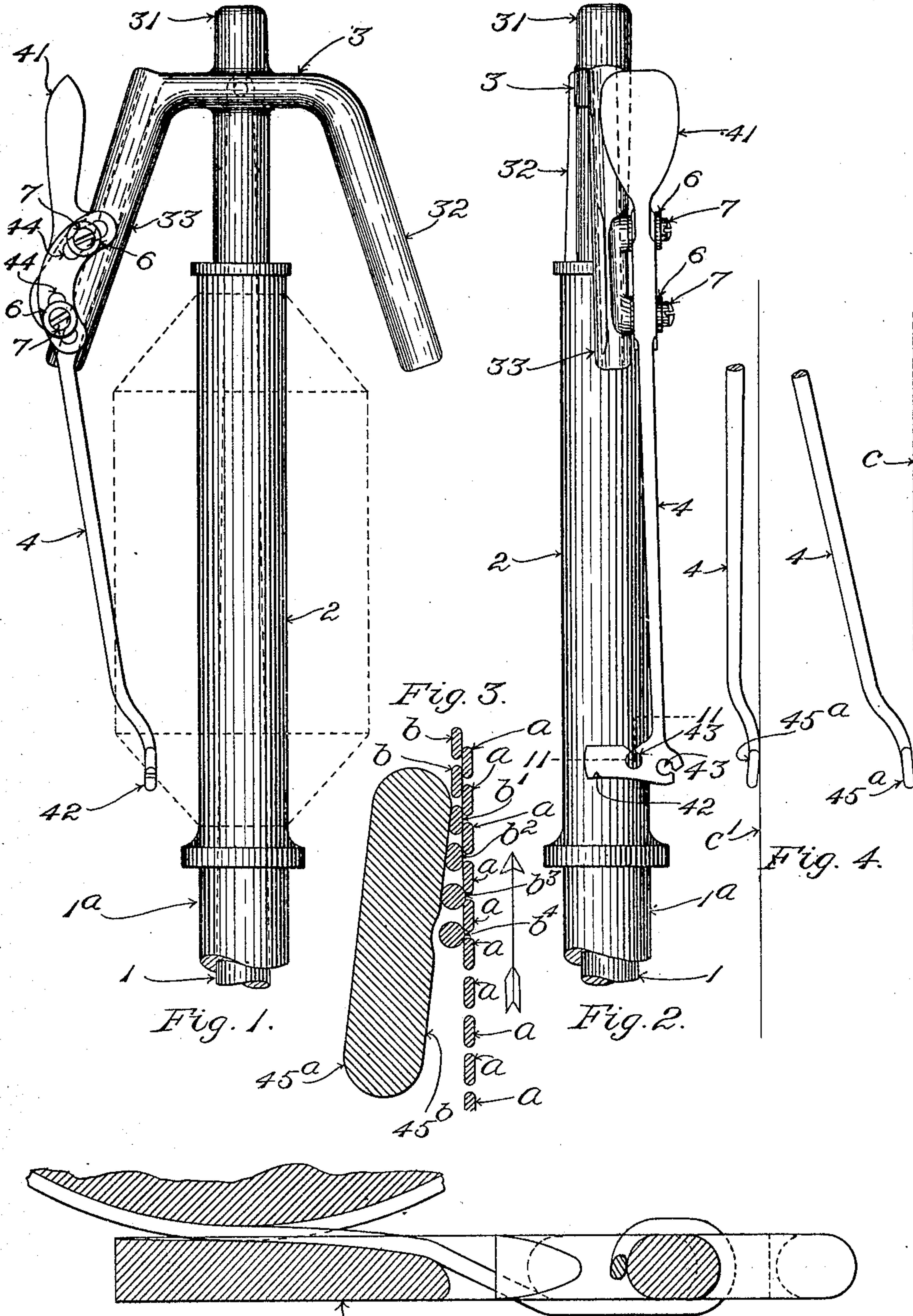
F. H. MARTIN.  
FLIER.

APPLICATION FILED AUG. 21, 1907. RENEWED JULY 13, 1908.

913,646.

Patented Feb. 23, 1909.

2 SHEETS—SHEET 1.



Witnesses:  
Oscar F. Hill  
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Fig. 11.

by

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F. H. MARTIN.

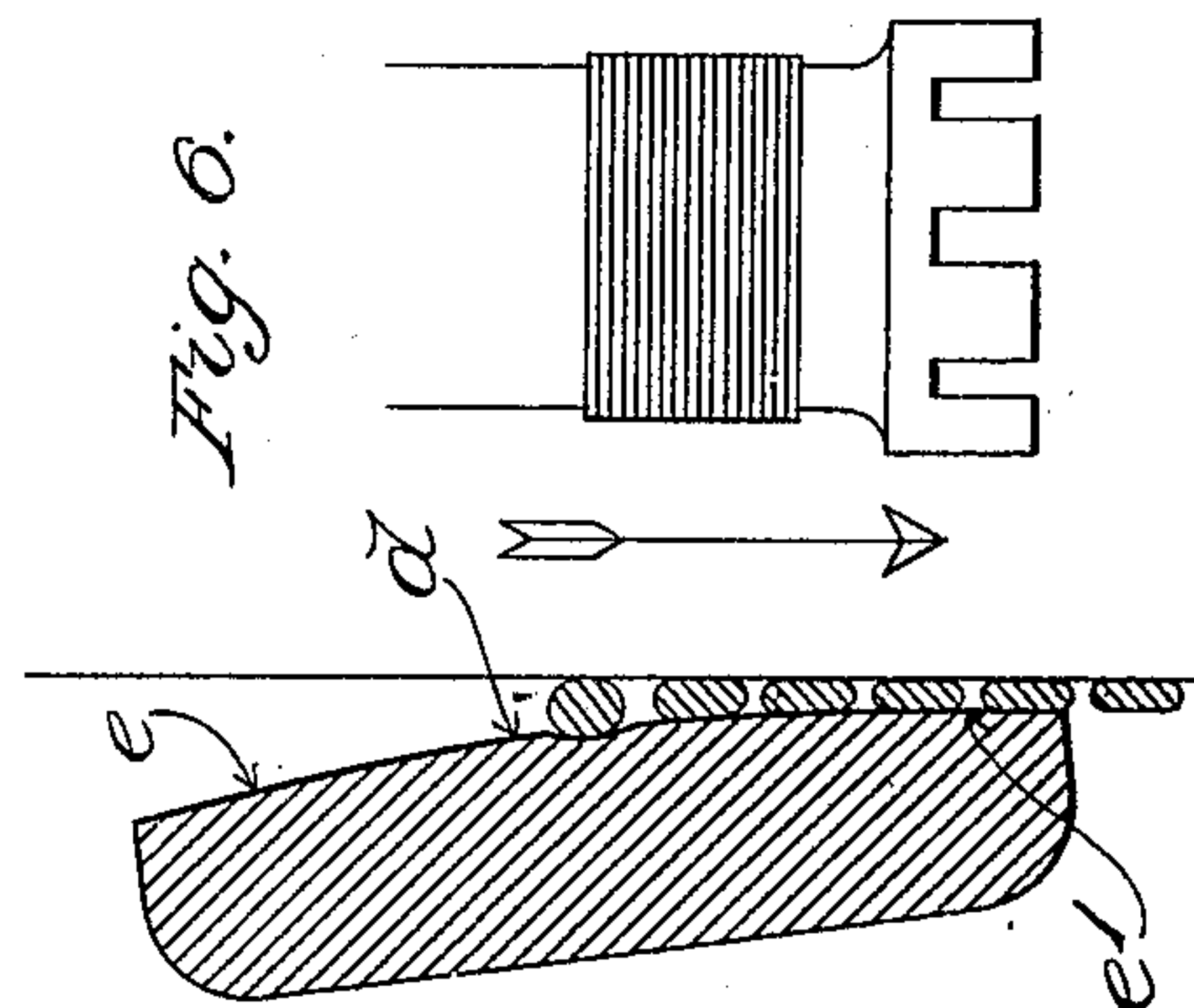
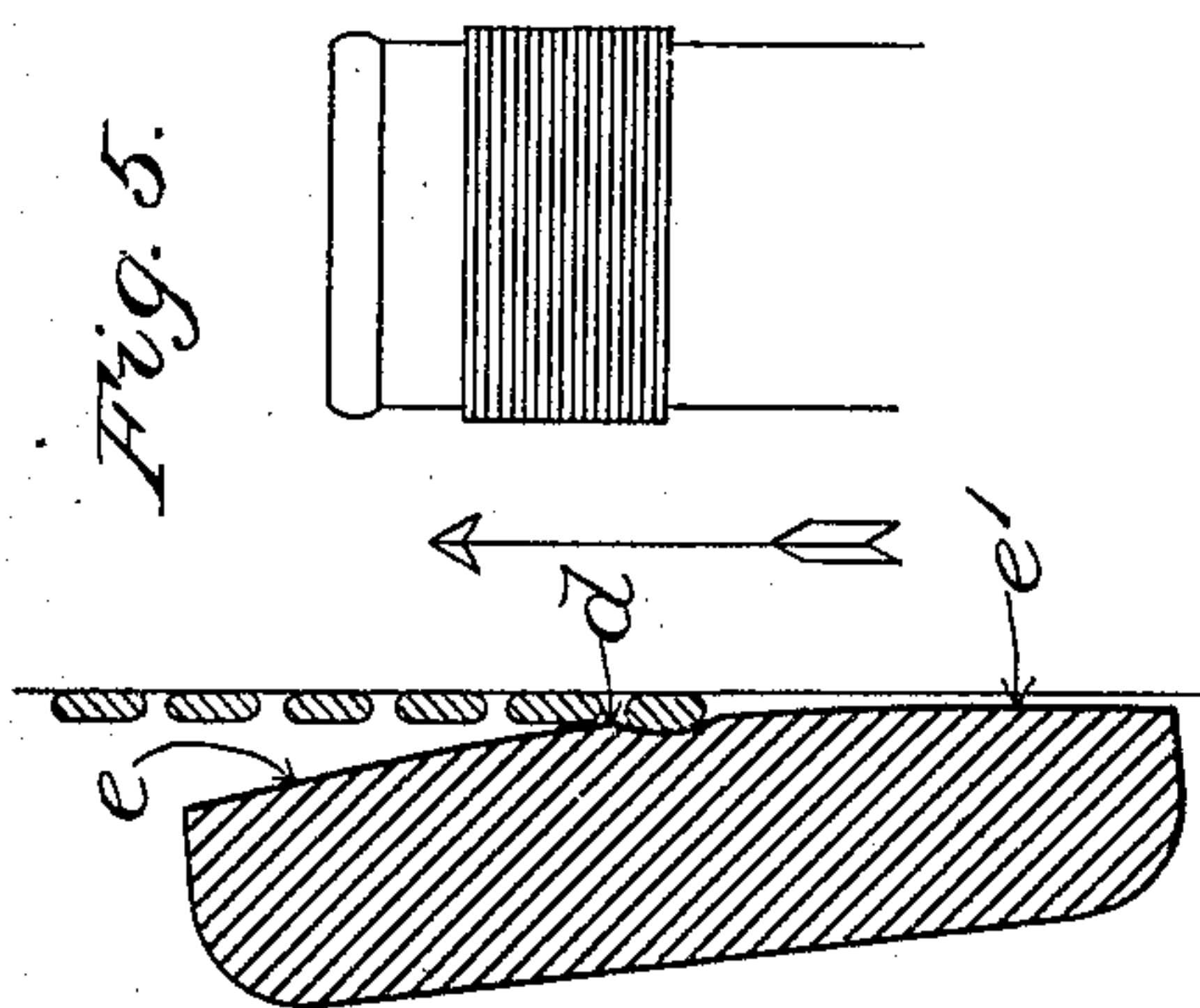
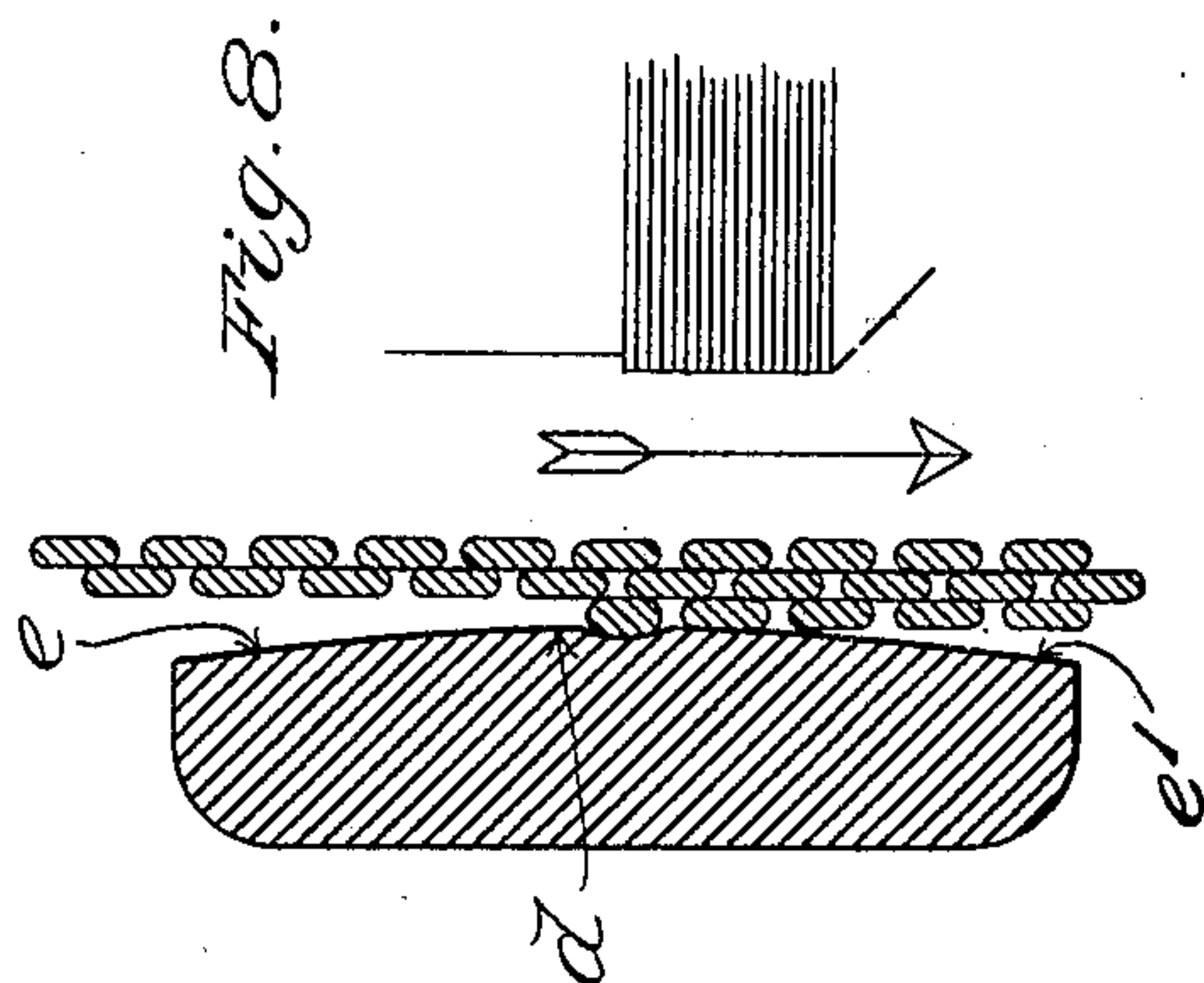
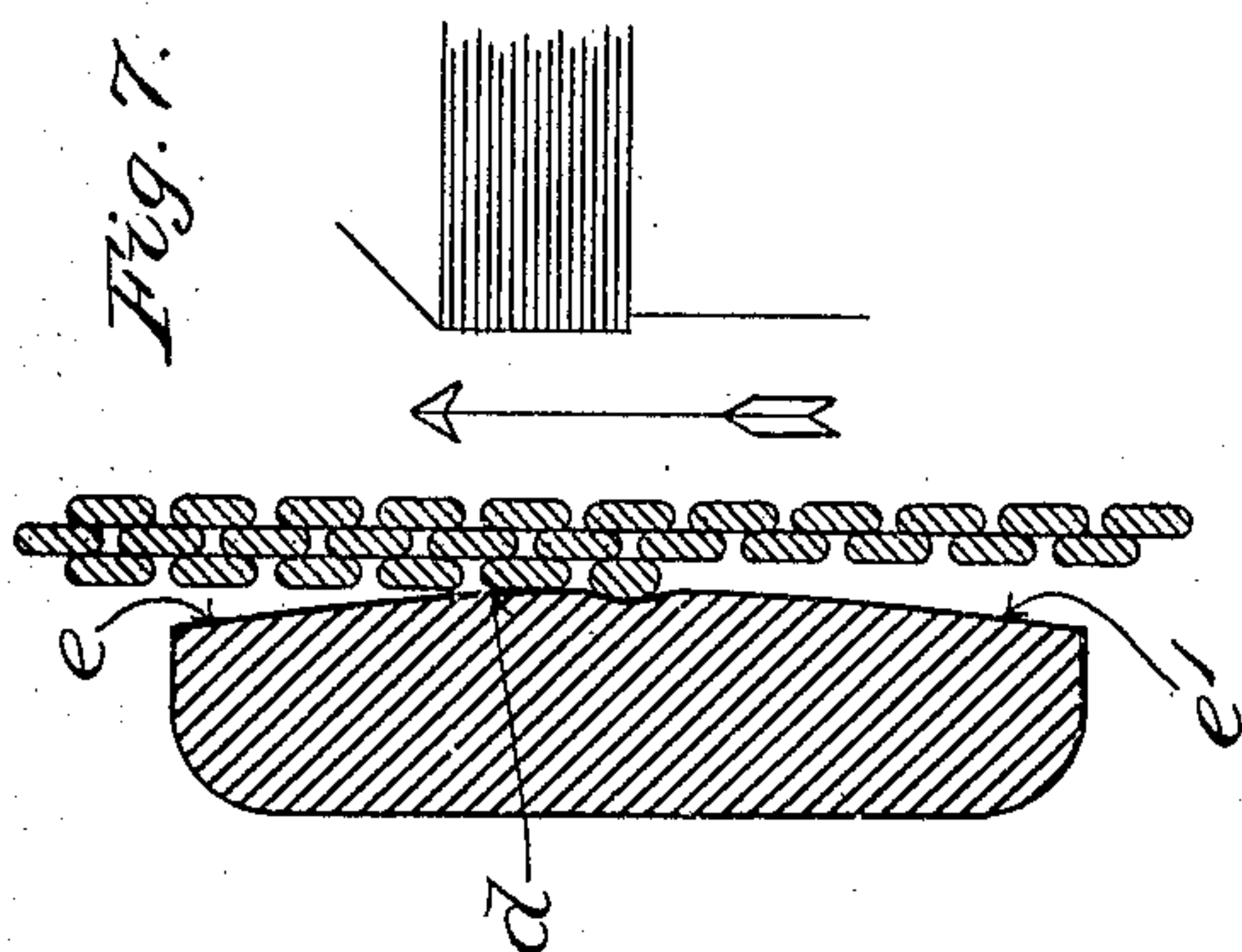
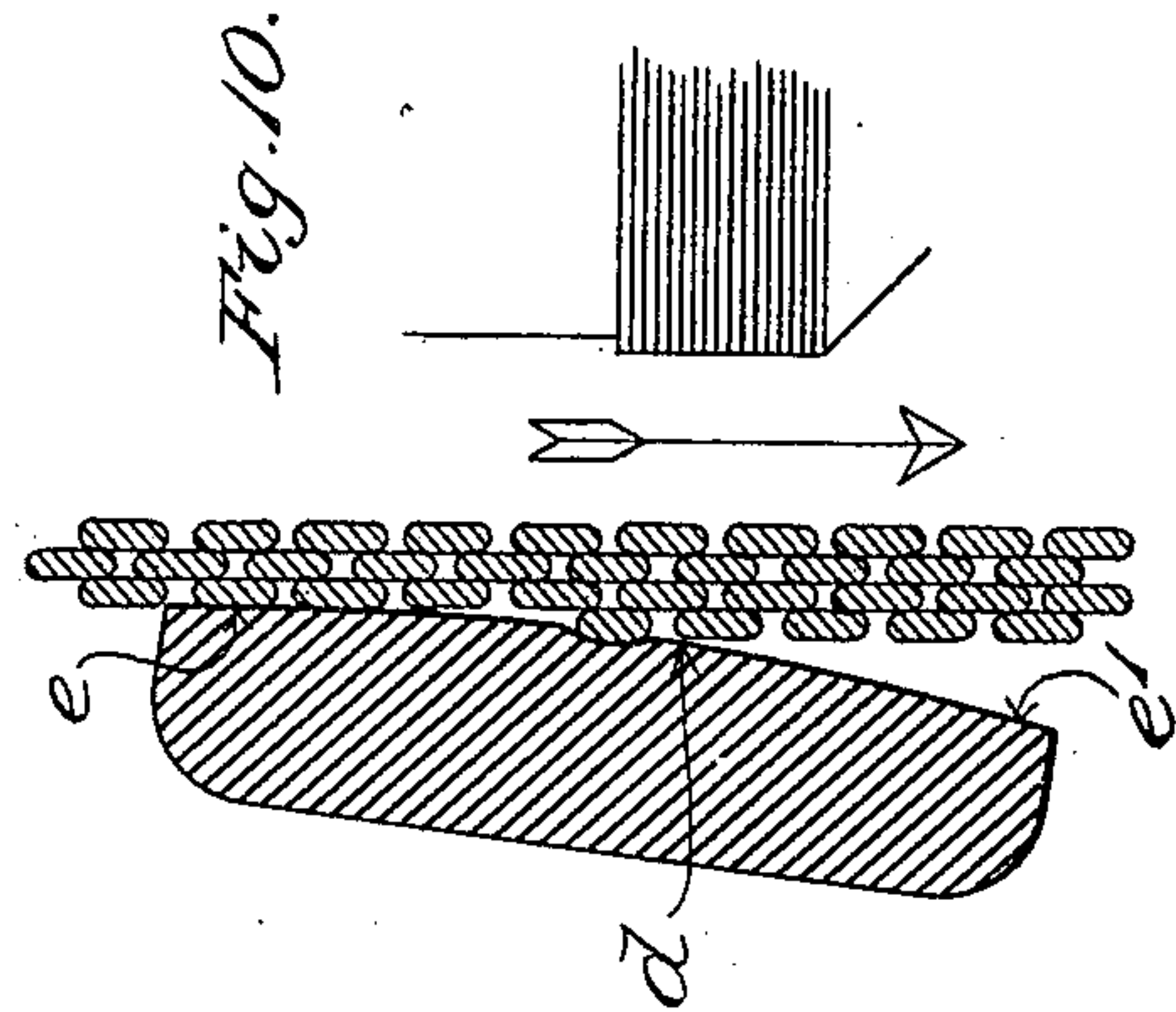
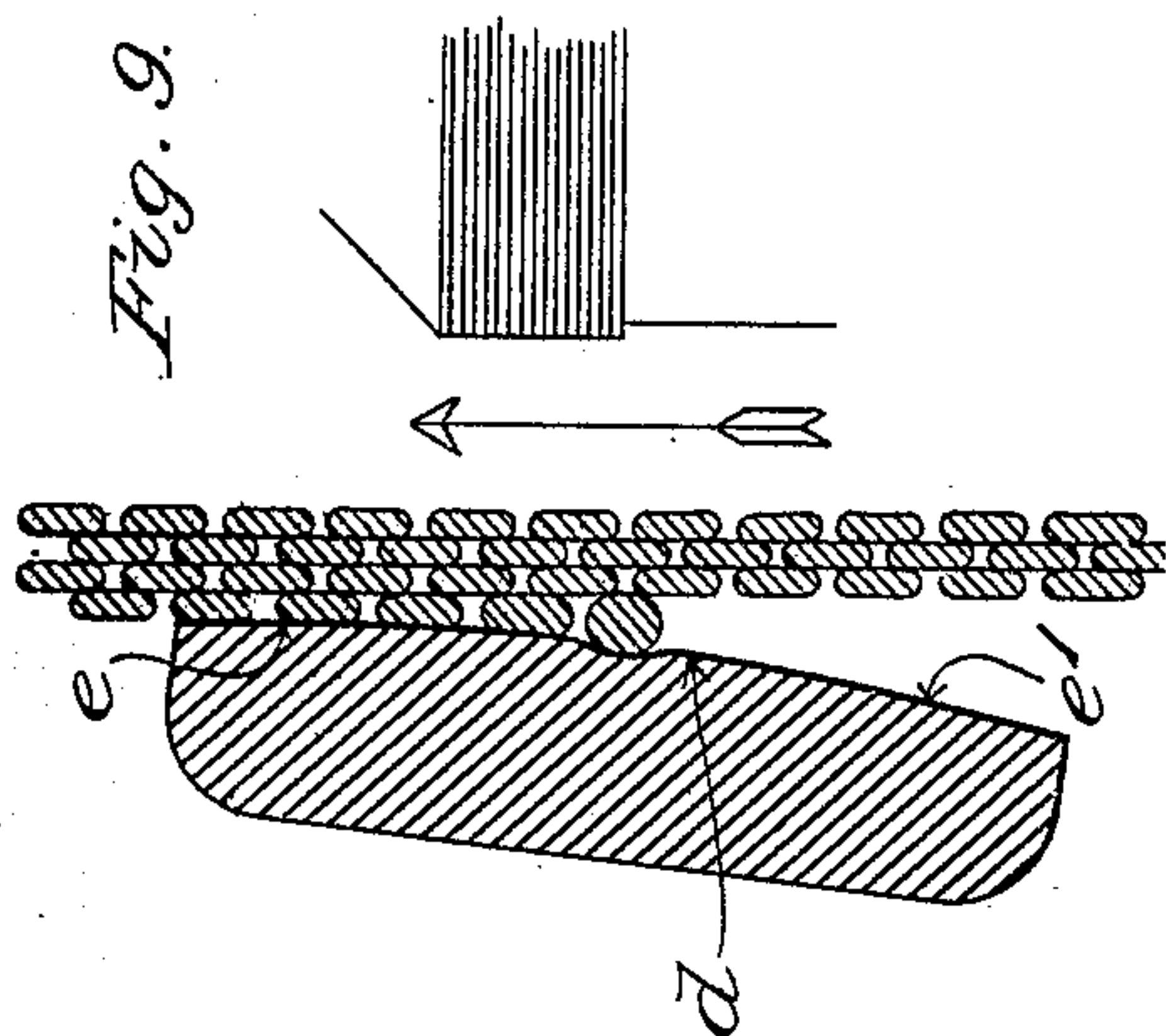
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2 SHEETS—SHEET 2.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## FLIER.

No. 913,646.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed August 21, 1907, Serial No. 389,458. Renewed July 13, 1908. Serial No. 443,349.

*To all whom it may concern:*

Be it known that I, FAY H. MARTIN, a citizen of the United States, residing at Boston, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Fliers, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention has relation to fliers of roving frames and the like machines, and more particularly to the pressers of such fliers.

In a flier of ordinary type, the presser swings in a horizontal plane about a vertical axis in connection with one of the arms of the flier. In other fliers the presser swings upon a horizontal axis. Fliers of this class are shown and described in United States Letters Patent to Thomas F. Dunn, No. 595,996, granted December 21, 1897; to myself, No. 760,227, granted May 17, 1904; and to myself and Philip R. Hovey, No. 796,138, granted August 1, 1905. In these patents the presser is mounted upon a flier-arm in such manner as to swing upon a horizontal axis in a radial vertical plane, and at the same time move bodily in the direction of its length. The invention has reference to fliers of the class in which the pressers are arranged to swing about a horizontal axis, and more especially to fliers on the order of those illustrated in the patents to which reference has been made, although it is not necessarily restricted in all cases to employment in this precise connection.

In the operation of a roving frame equipped with fliers of the type illustrated by the patents aforesaid trouble has been experienced, after the bobbins have become filled to or approximately three-fourths of the full extent, from breakages of rovings in restarting the frame after a stoppage of the latter. This source of trouble persisted in practice, notwithstanding various endeavors to obviate the same, and the reason therefor proved difficult of ascertainment. After prolonged study and experiments I discovered that the breakages in question are in large part the outgrowth of defective construction and action of the presser-foot or presser-shoe, as it variously is termed, of the flier. The said presser-foot, as heretofore made, has been shaped to bear fully and squarely upon the exterior of the wound mass of roving on the bobbin only when the bobbin is half-full or thereabout, while when winding upon a

practically empty bobbin only the lower marginal portion of its face is pressed against the said exterior, and after the bobbin has approximated three-quarters of its full diameter only the upper marginal portion of the said face makes contact with such exterior. The result is that the roving is not subjected to uniform pressure and friction in being laid and wound upon the bobbin. The manner in which this tends to the breakages aforesaid, or becomes permissive thereof, is explained hereinafter.

The invention consists in a flier having a presser movable in a radial vertical plane about a horizontal axis, and provided with a presser-foot of novel and improved construction, by which better results are secured in operation, and breakages of roving in restarting a frame after stoppage are very much reduced in number.

The invention will first be described with reference to the drawings, and then more particularly defined in the claim.

In the drawings,—Figure 1 shows in elevation portions of a spindle and its bearing, a bobbin, and a flier of the type to which my invention relates, the exterior of a mass of roving wound upon the bobbin being indicated by dotted lines. Fig. 2 is a view looking from the left-hand side in Fig. 1. Fig. 3 is a sectional view on an enlarged scale, illustrating the mode of operation of a presser-foot of the form heretofore employed. Fig. 4 is a diagram illustrating the action of the said form of presser-foot. Figs. 5 to 10, Sheet 2, are sectional views, hereinafter referred to, illustrating the invention, and its mode of operation. Fig. 11, Sheet 1, is a detail view on an enlarged scale, in section in a horizontal plane passing through the presser-foot.

Having reference to the drawings,—1, Figs. 1 and 2, designates the spindle of a roving-frame, the upper portion thereof being indicated by dotted lines in Fig. 1. At 1<sup>a</sup>, Figs. 1 and 2, is a portion of the spindle-bearing. 2 is a bobbin surrounding the said spindle. A load of roving upon the said bobbin is indicated by dotted lines in Fig. 1.

3 is a flier which is applied to the upper end of the spindle. The boss or nose of the flier is designated 31 in Figs. 1 and 2. The balancing arm of the flier is designated 32, and the arm to which the presser-finger, or presser, is connected is designated 33. The guide-passage for roving extending length-



wise within the said arm 33 is indicated by dotted lines in Fig. 1.

4 is the presser-finger, or presser, 41 being its weight-arm, 42 being the presser-foot or presser-shoe, and 43, 43, being the eyes of the said presser-foot through which the roving is led on its way to the bobbin. At 44, 44, are two curved or arc-shaped slots which are formed through the body-portion of the presser, and which receive studs, bushings, or the like projecting from the arm of the flier. At 7, 7, are screws passing through the said studs or bushings into the flier-arm, and 6, 6, are washers upon the stems of the said screws, intervening between the heads of the screws and the outer side of the body of the presser.

As thus far described, the parts are or may be constructed as heretofore, or may be constructed and arranged in practice as preferred.

The construction of the presser-foot 42 I have improved in the respects which I will now proceed to explain.

Reference will be made, first, to Fig. 3, which latter is a diagram showing on a considerably enlarged scale, in vertical cross-section, a presser-foot of the character heretofore employed, and in conjunction therewith portions of two layers of roving supposed to form part of the wound mass upon a bobbin in process of being filled. In this figure, the presser-foot is designated 45<sup>a</sup>. Its working face, 45<sup>b</sup>, is flat transversely, *i. e.* vertically. The turns or coils of a previously wound layer of roving are designated *a, a, a*, etc., and at *b, b, b', b'', b''', b''''*, are shown the last-wound turns or coils of a layer in process of being wound outside the layer *a, a, a*, etc. The presser-foot is shown occupying a position in which its working face inclines downwardly and outwardly away from the axis of the spindle and bobbin, and consequently from the two layers of roving. This inclination and its direction correspond with the position of the presser-foot, after the bobbins have become half-filled, the degree of inclination increasing in proportion as the diameter of the wound mass of roving upon a bobbin increases. Only the upper portion of the working face of the presser-foot presses against the wound roving, while at the "line of passage" of the roving, *i. e.*, the line of the roving in issuing through the delivery-eye of the presser-foot and going on to the bobbin, (see Fig. 11, Sheet 1), the working face does not press against the turn or coil *b''*. Fig. 4 shows the position of the presser and presser-foot when beginning to wind upon an empty bobbin, and also the position thereof when the bobbin is full. It will be seen that in the case of the empty bobbin, the working face of the presser-foot has an inclination the opposite

of that shown in Fig. 3 and above specified, while in the case of the full bobbin the inclination is substantially the same as in Fig. 3. In Fig. 4 the surface of the empty bobbin is indicated by the line *c*, and the exterior of the outermost layer of roving is indicated by the line *c'*. It will be perceived that in the said figure the result of the inclined positions of the presser-foot is that in beginning to wind upon an empty bobbin only the lower edge of the working face of the presser-foot makes contact with the surface of the bobbin, and that in winding the last layer only the upper edge of the said working face makes contact with the exterior of the wound mass of roving. Consequently, in neither of the positions of the presser which are indicated in Fig. 4 does the presser-foot apply the desired pressure to the roving as it passes from the delivery-eye of the presser-foot to the bobbin or periphery of the wound mass thereon, and the roving is not compressed or held by the presser-foot at the winding-point. It is only when the bobbin becomes half-full that the presser assumes a position in which its working face stands parallel with the axis of the spindle and bobbin, and applies the desired pressure and friction to the roving at the winding-point. From the fact that in its inclined positions the presser-foot does not press upon and hold the portion of roving that extends from the delivery-eye of the presser-foot to the surface of the bobbin or the wound mass thereon so as to prevent the fibers thereof from readily pulling apart, it follows that should the roving frame be stopped at a stage when the presser occupies either of such positions, the roving will be liable to pull apart or break in such portion under the strain or tug incident to restarting the frame. Hence breakages of the roving are frequent, both before the bobbin has become half-full and after it has been three-fourths full, and in practice sometimes it has been found necessary on this account to doff the bobbins before they have been filled to the extent usually desired. Inasmuch as the roving is not subjected to proper pressure in being laid upon the bobbin as the first layers are wound, and as the final layers are wound, and is subjected to such pressure only during the intermediate stages in the winding, it follows that the successive layers vary in density, and in practice it has resulted that the exterior layers of the filled bobbins have been too soft. Not only this, but in consequence of the layers not being wound under proper pressure after the bobbin became three-fourths full, or thereabouts, the diameter of the wound mass increases disproportionately fast, necessitating from time to time hand-adjustment of the cone-belt to compensate therefor.



The general object of the present invention is to obviate the disadvantages of the old form of presser-foot.

The invention consists in a flier provided with a presser which is hung so as to move in a radial vertical plane about a horizontal axis, and having a presser-foot with working face that is prominent on the line of passage of the roving, and with the portions of such face above and below the prominence angularly disposed to give clearance permitting the said prominence, in the various positions assumed by the presser in swinging in the said plane, to remain in contact with the roving at the point at which winding takes place.

The invention itself is illustrated in Figs. 5 to 10. These views are diagrams on an enlarged scale showing in vertical transverse section a presser-foot embodying the invention, and illustrating the action of the same at the different stages of the filling of a bobbin, and in both the upward and the downward traverse of the rail.

Figs. 5 and 6 show the position assumed by the improved presser-foot during the winding of the first layer of roving upon an empty bobbin, Fig. 5 indicating the relations, etc., in case the rail is raised during the winding of such layer for the purposes of the traverse, and Fig. 6 indicating the relations, etc., in case the rail is lowered during such winding.

Figs. 7 and 8 show the position assumed by the improved presser-foot when the bobbin is half-full, or approximately so, Fig. 7 illustrating the action during the traverse of the rail in the upward and Fig. 8 illustrating the action during the downward traverse.

Figs. 9 and 10 illustrate the action when the bobbin is full or nearly full, Fig. 9 illustrating the relations, etc., during the upward traverse of the rail, and Fig. 10 illustrating the same during the downward traverse.

The prominence at the line of passage is designated  $d$  in each of Figs. 5 to 10, and the

angularly disposed pressure portions above and below the said line of passage are designated, respectively,  $e$  and  $e'$ . The prominence  $d$  usually will be grooved slightly along the line of passage to accommodate the roving, as indicated in Fig. 11. The pressure-portions  $e$ ,  $e'$ , usually will be rounded in vertical cross-section, as shown, although this rounding is not essential in all cases. It will appear from Figs. 5 to 10 that in all positions of the presser the prominence of the presser-foot bears upon the roving at the winding-point, and applies pressure and friction to the same at such point. The pressure at the line of passage is reduced somewhat in the case of the nearly filled bobbin during the upward traverse of the rail, but not to such an extent as to interfere with the satisfactory attainment of the results aimed at.

My invention obviates the breakages to which reference is made at the outset herein. It also causes the roving to be wound of substantially uniform density throughout the thickness of the bobbin-load. It also enables a greater quantity of roving to be wound in a bobbin-load of a given diameter.

What is claimed as the invention is:—

A flier having a presser which is hung so as to move around a horizontal axis in a radial vertical plane, and having a presser-foot with working face prominent on the line of passage of the roving and with the portions of such face above and below the prominence angularly disposed to give clearance permitting the said prominence, in the various positions assumed by the presser in swinging in the said plane, to remain in contact with the roving at the point at which winding takes place.

In testimony whereof I affix my signature in presence of two witnesses.

FAY H. MARTIN.

Witnesses:

CHAS. F. RANDALL,  
EDITH J. ANDERSON.