

(No Model.)

J. M. ESTABROOK.
METAL SOLE FASTENING.

No. 280,022.

Patented June 26, 1883.

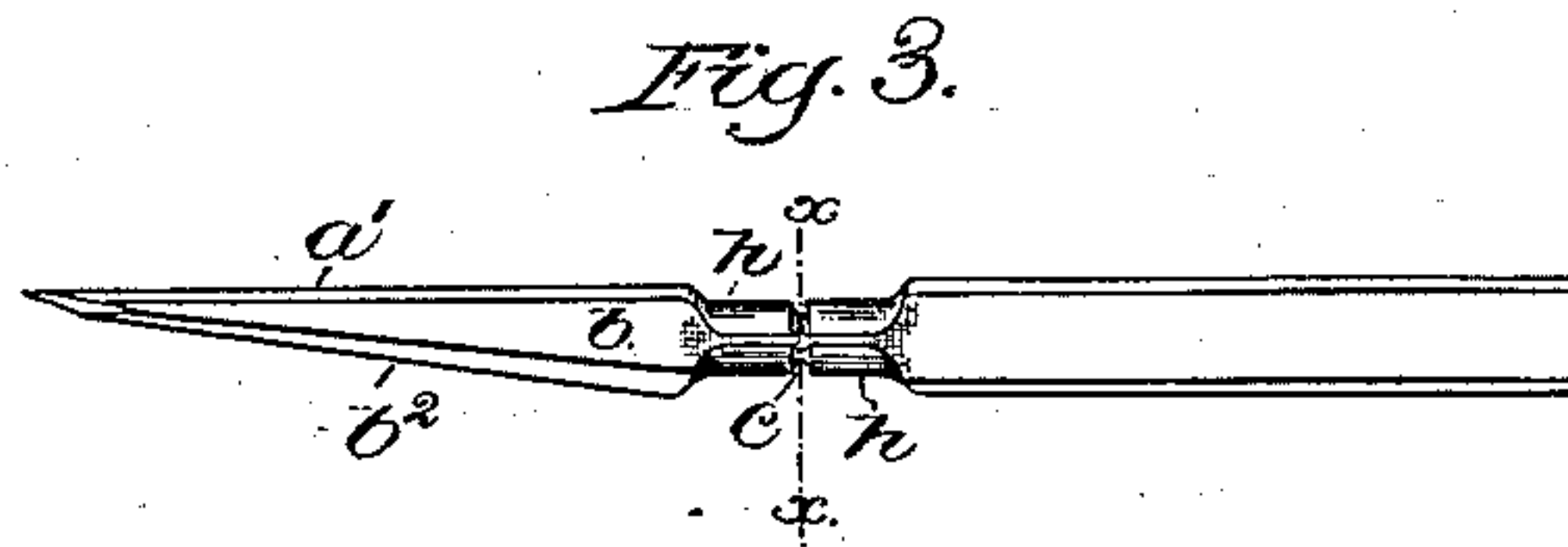
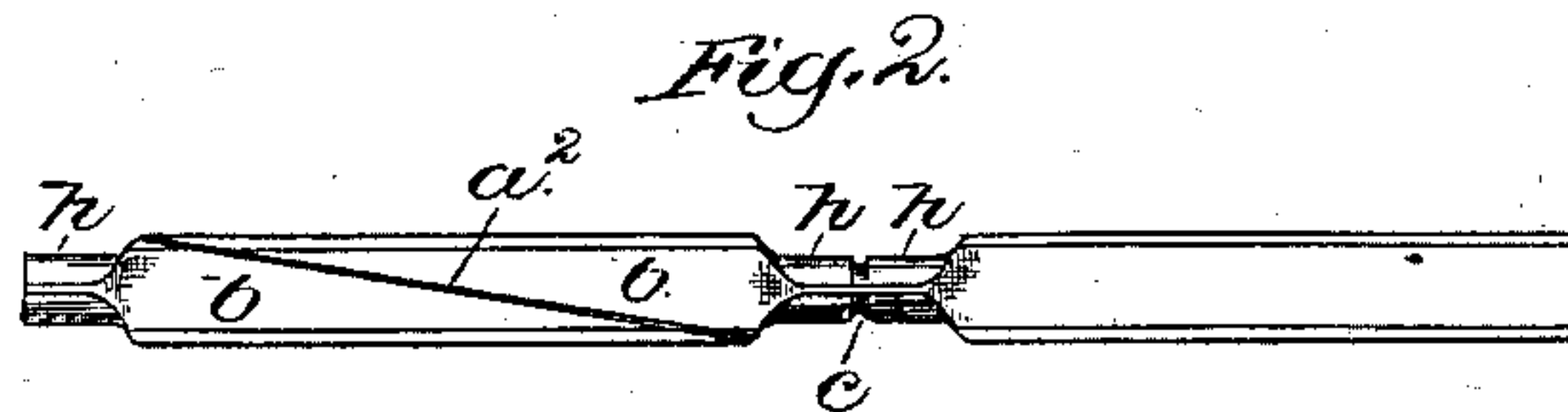
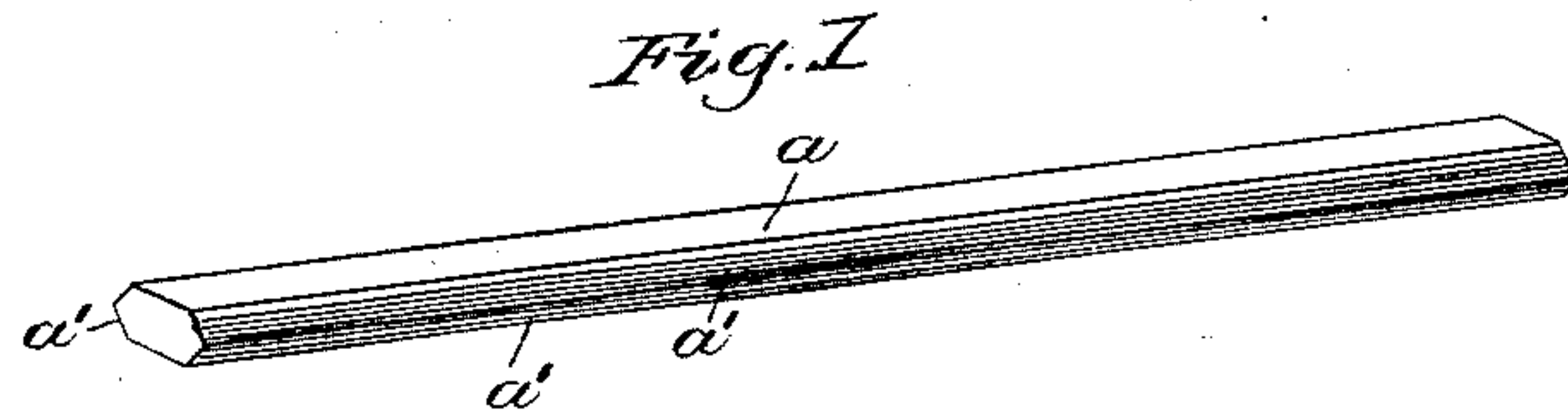


Fig. 5.

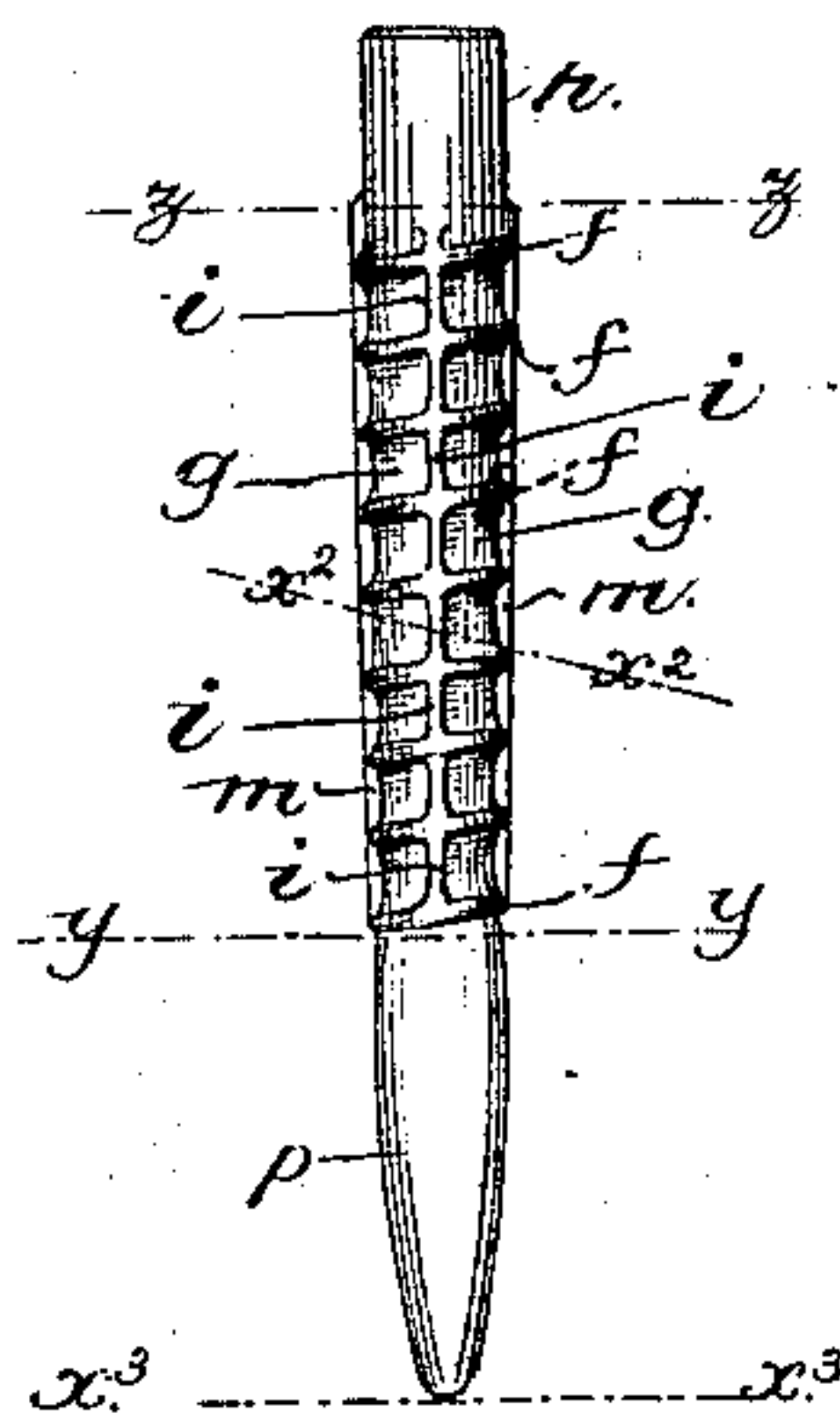


Fig. 4.

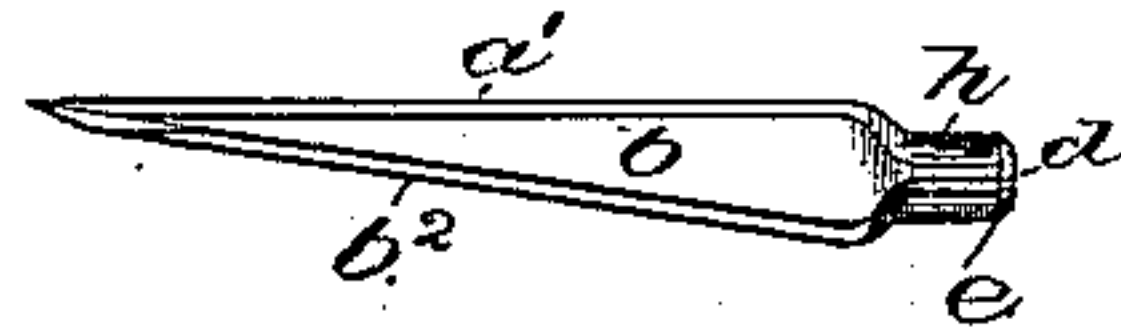


Fig. 7.

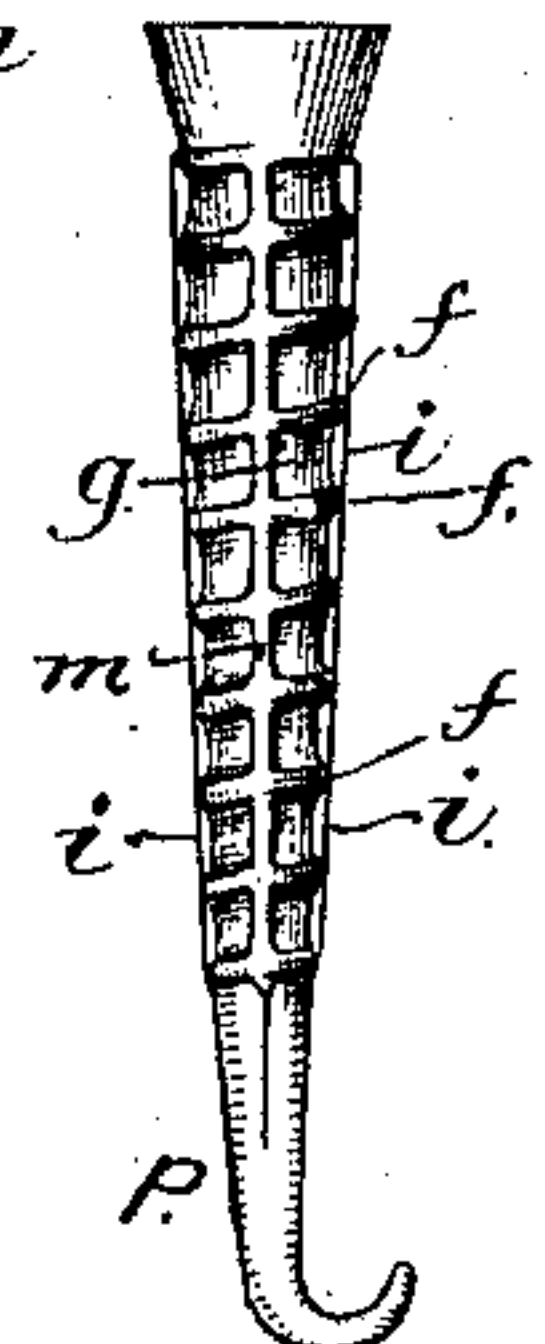


Fig. 6.



Fig. 8.

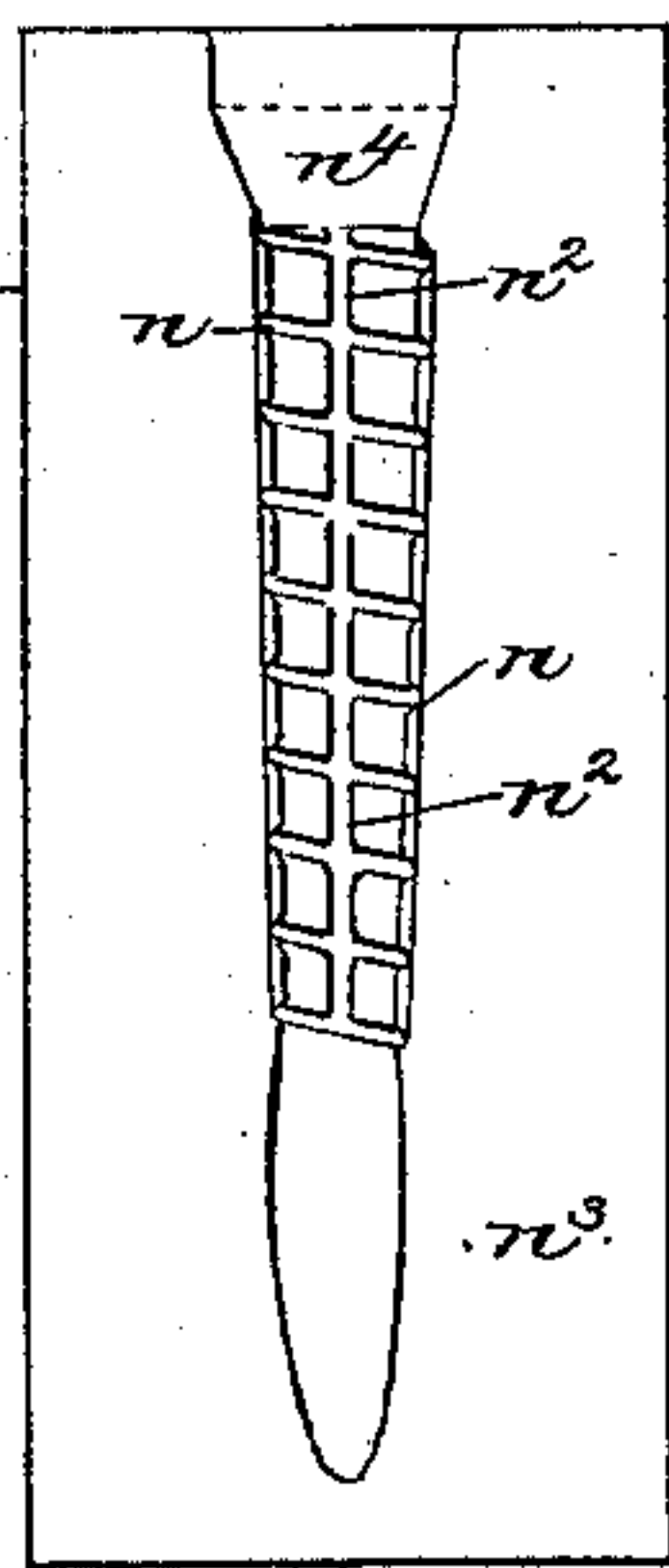
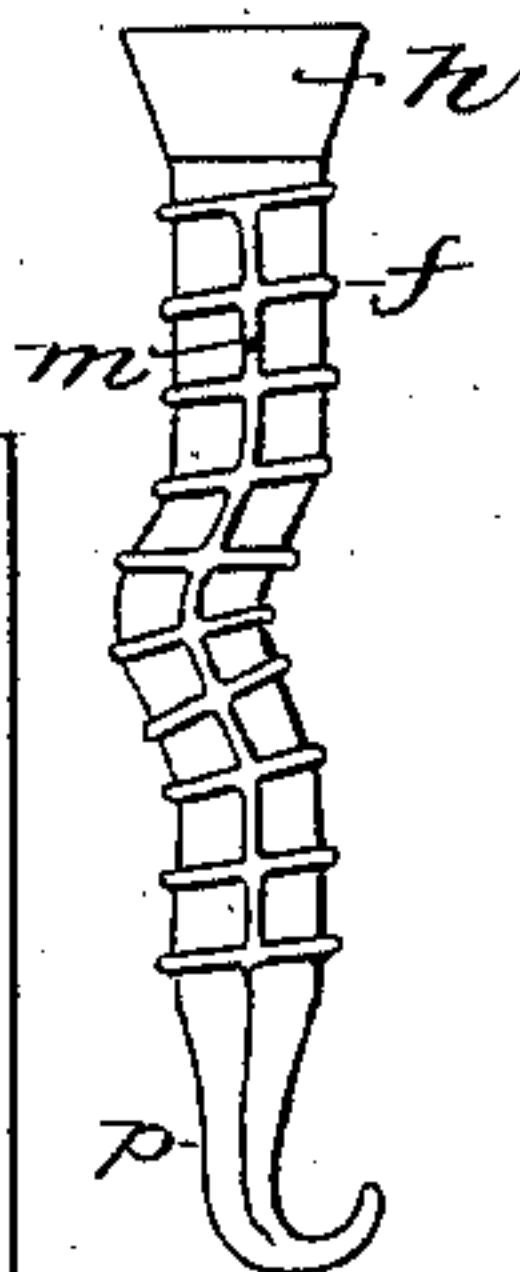


Fig. 9.

Witnesses.

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JOSEPH M. ESTABROOK, OF MILFORD, MASSACHUSETTS.

METAL SOLE-FASTENING.

SPECIFICATION forming part of Letters Patent No. 280,022, dated June 26, 1883.

Application filed December 8, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. ESTABROOK, of Milford, county of Worcester, and State of Massachusetts, have invented an Improvement in Metal Sole-Fastenings, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The bodies of metallic sole-fastenings as now commonly made, which have clinching-points adapted to turn in one of two directions, frequently bend or cripple when the fastening is being driven into, and so as to take up the settle of the stock, which is a serious evil for many reasons.

In the manufacture of boots and shoes for the best and most perfect work the body of the nail or fastening should always remain straight, and the point of the fastening, or that part of it below the body, should be enough weaker than the body to bend and clinch gradually, and to fully clinch before the strain on the body is sufficient to cripple it. The body of a sole-fastening or nail which is corrugated or threaded by pressure between dies is thereby hardened and stiffened; but the depressions left therein between and of smaller diameter than the ridges of the corrugations constitute portions which are less stiff than the ridges of larger diameter, and the body thus has a series of what may be called "weak portions," so that the body will at times cripple in driving. In my experiments to remedy this evil I have devised a method of making the fastening whereby its body, in line with the central portion of the widest part of the clinching-point, is provided with a brace which is extended from the upper end of the clinching part of the fastening to the under side of the head of the fastening.

One part of my invention consists of a nail or fastening provided with a brace such as described, whereby it will not bend in its body until after the point below the brace thereon has been fully clinched. The method herein employed of producing a braced nail is of my invention.

Figure 1 represents a strip or piece of stock or metal from which to produce my improved braced fastening or nail. Fig. 2 shows the stock as having been acted upon by suitable dies to reduce it in diameter at certain proper distances apart to produce head-forming por-

tions for two nails. Fig. 3 shows the stock, shaped as in Fig. 2, as divided diagonally in its broader portion to form a blank for the body and point end of a nail. Fig. 4 shows the completed blank cut from the stock on the dotted line $x x$, Fig. 3. Fig. 5 shows the blank after having been squeezed between the dies, which, by their action upon its edges, groove or corrugate the blank and shape it to form the body and clinching-point for the nail or fastening and provide it with a brace. Fig. 6 is a section of Fig. 5 on the dotted line x^2 . Fig. 7 shows the nail, Fig. 5, headed and with its point clinched. Fig. 8 represents a common or unbraced nail, its body crippled; and Fig. 9 shows one of the dies for shaping the nail.

In the manufacture of my improved braced nail I take preferably a piece of stock, a , cut from rolled sheet metal and having V-shaped edges a' , and place it between dies, which will compress and round the stock, as shown at h , for a length suitable for the production, when upset, of heads for two nails, and as the head-forming portions are being produced the projections of the dies will form a beveled-edge depression or channel, c , which will almost, or more or less, sever but not separate the head-forming portions. The stock is next cut diagonally through its flat side from end to end between adjacent head-forming portions h , to thus form the body parts of blanks b . Each body part has its straight edge V-shaped, such edge being formed when cutting the strip of stock a from the metal plate, as described, and the inclined edge of the body part b is also left V-shaped, as at b^2 , by reason of the shape of the cutters employed to sever the stock diagonally on the line a^2 , Fig. 2.

Fig. 4 shows a blank produced in the manner described, it being such a blank as I employ for the production of my braced nail. In Fig. 4 it will be seen that the edges of the blank from the rounded head-forming portion h are V-shaped, and that the diameter of the part marked d is left by cutting the head-forming part through the bottom of the beveled groove or depression c in the line $x x$, Fig. 3, smaller in diameter than the head-forming portion h , between it and the body of the blank. The blank, Fig. 4, will next be placed between two like dies, r , Fig. 9, having a longitudinal groove, n^2 , to produce the brace in

accordance with my invention, and also a recess, n^3 , to produce a clinching-point broader than it is thick, and thin at its edges, the said dies also having the usual cross-grooves or depressions, n , and preferably a heading-recess, n^4 .

The grooves n^2 of the die form upon the blank the brace i , and, as herein shown, the grooves n and n^2 act to shape the body of the blank, as represented in Fig. 2, leaving ridges f extended about the same in more or less inclined direction to the axis of the body, and depressions g or portions of less diameter between the ridges. The braces i appear, as shown, between the adjacent ridges f and cross the intervening depressions g and extend longitudinally of the body of the nail from the upper to the lower ridge, f , in line with the center of the clinching-point p , as shown, thus stiffening the body of the nail, or that part of it contained between the lines $y y$ and $z z$, so that it will not bend in either of the two directions in which the point p is made to turn when being clinched in regular manner.

The metal in the brace i is the same as that forming the V-shaped edges at $a' b^2$, referred to. As two dies like the die r are closed upon the blank to compress it from edge to edge, as described in my Patent No. 261,213, dated July 18, 1882, in a direction opposite the pressure exerted on the stock when rolling it into the form represented in Fig. 1, the blank has formed on it fins m , which in a measure stiffen the body of the nail at points ninety degrees distant from the braces i . The dies r , acting on the blank, also shape its point between the lines $x^3 x^3$ and $y y$, to form a clinching-point, p , preferably oval or awl shaped in cross-section, and tapered toward its end, as in Figs. 5 and 7.

The braces i extend along the body of the nail from a line substantially central with the flat or broadest side of the point p , as in Fig. 5, to the under side of the head-forming portion or head of the nail, thus preventing the body of the nail crippling or bending in the line strengthened by the brace. In my patent referred to the body of the nail was straight or of uniform diameter in cross-section; but herein the two dies will preferably be so shaped as to taper the body of the nail and leave it oval in cross-section, for a nail oval in cross-section, except where the fins and braces appear, is preferable to any other kind known to me, because it will drive more readily into the stock, and gives the greatest amount of holding-surface in proportion to the amount of metal used in the nail, and also results in the production of a nail of gradually-increasing strength from its point to its head. Owing to the oval shape of the body of the fastening in cross-section, and also to the shape of the clinching part or point, it being shaped and adapted to turn in but one of two directions, the body of the nail, as the latter is driven, has a tendency to bend or cripple only in the direction of clinching; but should the

thin edge of the point strike a hard substance as the nail is being driven, and before the point commences to clinch in regular manner, then the fins m would tend to prevent the crippling of the body from such a strain.

Fig. 8 shows a nail such as commonly made prior to this my invention, it being supposed to have been driven into a piece of leather and crippled; but it could not have been crippled in actual use if the body between the ridges f had been provided with a brace such as shown at i , Fig. 5. The body and point p having been shaped, a suitable header (not shown) will be thrown forward against the head-forming part h of the blank while yet held between the dies referred to, and will upset the said portion h into the head-shaping spaces n^4 of the said dies r , producing a head such as shown in Fig. 7. This head, it will be noticed, presents a well-defined corner free from a fin or sharp edge of any sort, such as is commonly found upon the heads of nails of this class. The formation of the annular groove C before referred to leaves a smooth edge, e , (see Fig. 4,) on the head-forming end of the blank, which, as the head-forming part h is upset by the header, enlarges or spreads out and forms the boundary of the head, while the fin left on the metal of the smaller part d of the head-forming portion, (see Fig. 4,) is by the header carried backward into the central main portion of the head, leaving a head absolutely free from any fin or sharp edge, and consequently enabling the production of a truly circular head with a flat face.

I do not desire to limit my invention to the exact shape of point as to what would be its cross-section, or to the exact shape of the body, as the essential feature of my invention in nails is the brace which strengthens the body of the nail in line with the point at each side of it in the two directions in which the point is made to bend and clinch when it meets a metal last or horn. Fig. 7 shows one of my brace-nails with its point partially clinched.

The brace i , by partially filling the depressions of the corrugated body, enables the nail to be driven more easily.

If desired, the head of the nail may be omitted.

The beveled edge left at the end of the head-forming portion of the blank is of great importance, as it obviates the formation of fins at the outer edges of the head when the latter is completed in the dies. The longer the beveled edge of the head-forming portion the greater may be the expansion or enlargement of the head under the action of the usual heading-die. By reason of the taper form of the nail and the braces, the point of the nail will first clinch or turn over up to its braced portion, and further driving of the nail, owing to the taper of its body, will cause the body to gradually follow the point in its clinching action. The length of the head-forming portion and of the head-forming recess in the dies will be such that the junction of the beveled

end of the head-forming portion and main part of the head will fall within the head-forming recess, which will be of such taper outward as to permit the head of the nail to be expanded or enlarged to the necessary diameter.

I claim—

1. A metallic sole-fastening or nail provided with a clinching-point, and having a corrugated tapered body oval in cross-section, and provided with a brace extended from at or near the upper end of the clinching-point to the under side of the head-forming portion, to prevent the body of the fastening or nail from bending or crippling in the direction in which the clinching-point is made to bend and insure that the body bend gradually, substantially as described.

2. The metallic sole-fastening or nail, including in its construction the head, the corrugated body *fg*, the braces *i*, located as shown and described, to strengthen the body, and the clinching-point *p*, the brace *i* being extended longitudinally of the body of the nail between the under side of its head and the upper portion of the clinching-point on the two sides of the body of the nail in the direction in which the point may turn in clinching, substantially as shown and described.

3. That improvement in the art or method of making a smooth-edged head for a sole-fastening or nail which consists in grooving or beveling the head-forming portion of the stock of the blank, then severing the said stock and head-forming portion transversely through the bottom of the said groove, and then upsetting the said head-forming portion while held in a suitable die-space, substantially as described.

4. A fastening or nail having a tapered body cut oval in cross-section, and terminated by a clinching-point to operate substantially as and for the purpose set forth.

5. A blank for a metallic sole-fastening or nail, it consisting of a piece of metal having flat sides, V-shaped edges, and a head-forming portion beveled at its end, all as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH M. ESTABROOK.

Witnesses:

G. W. GREGORY,
W. H. SIGSTON.