

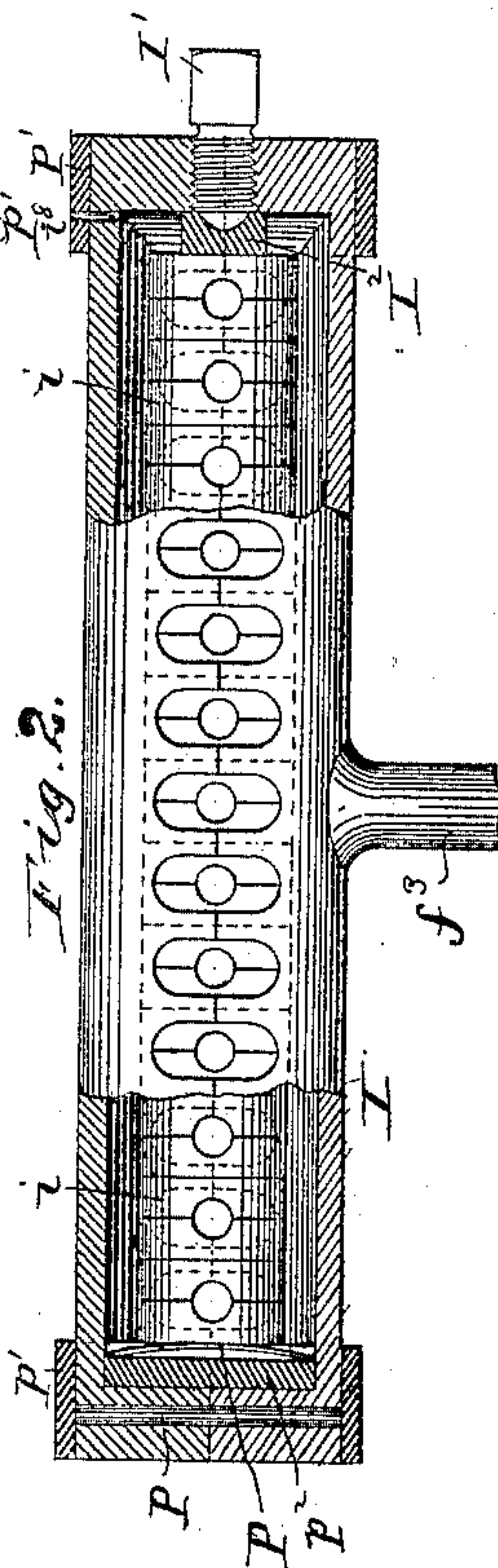
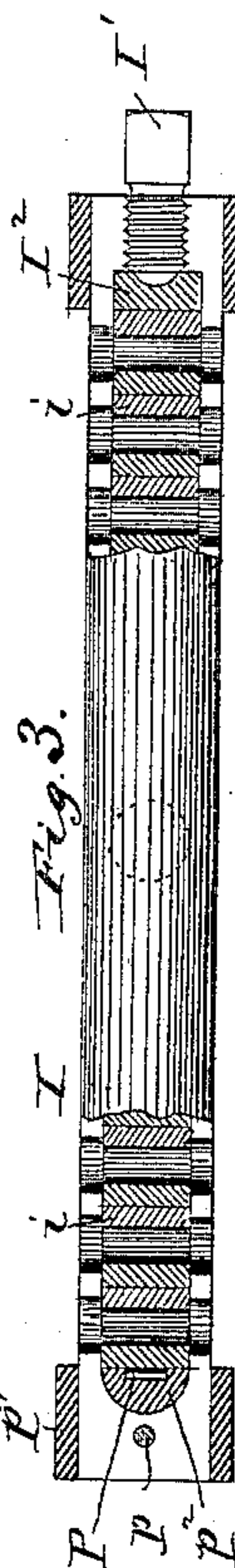
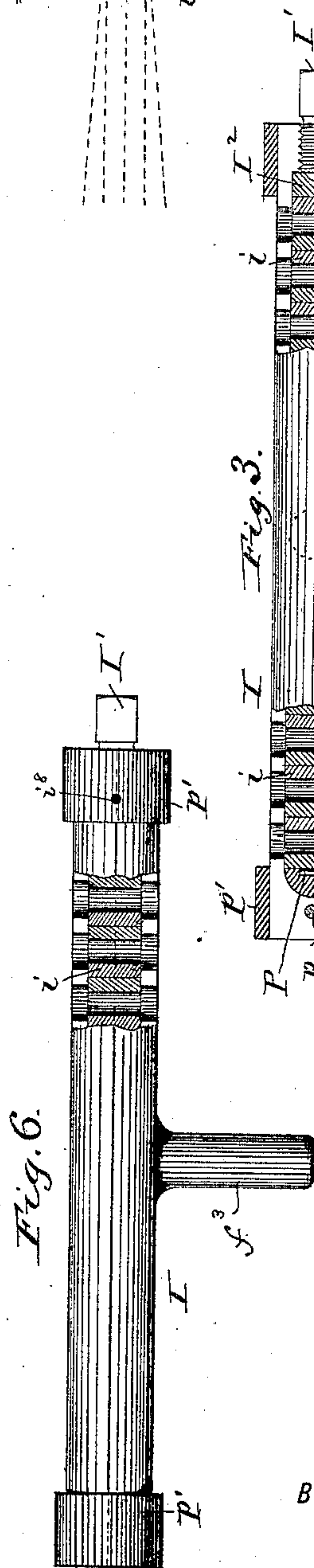
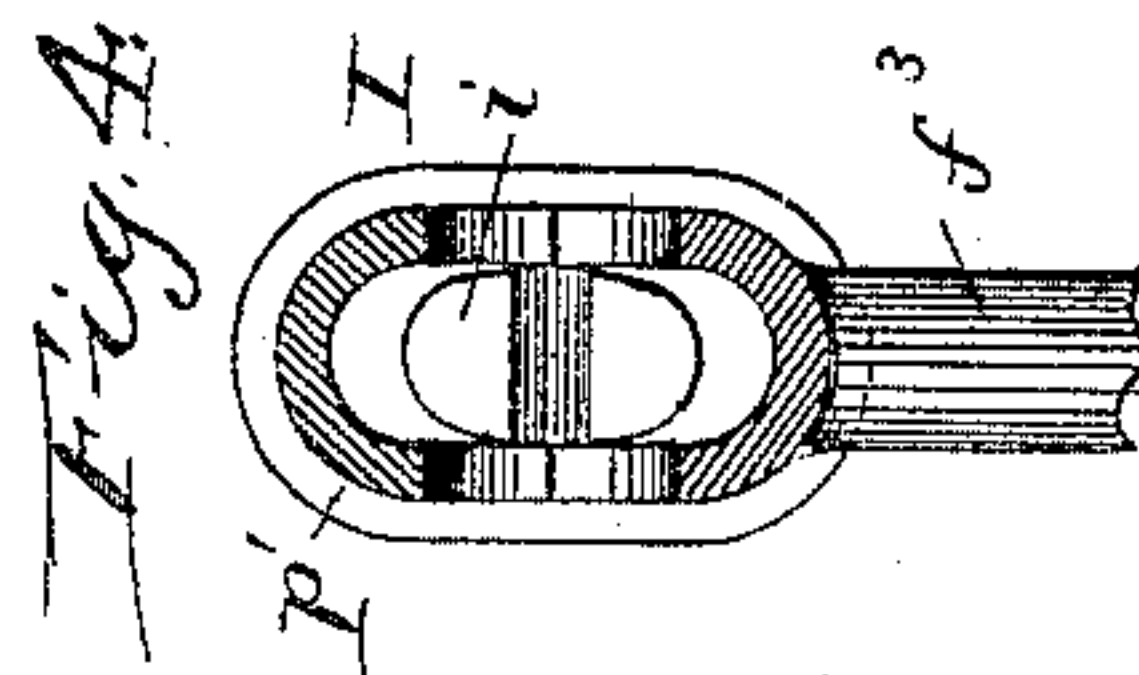
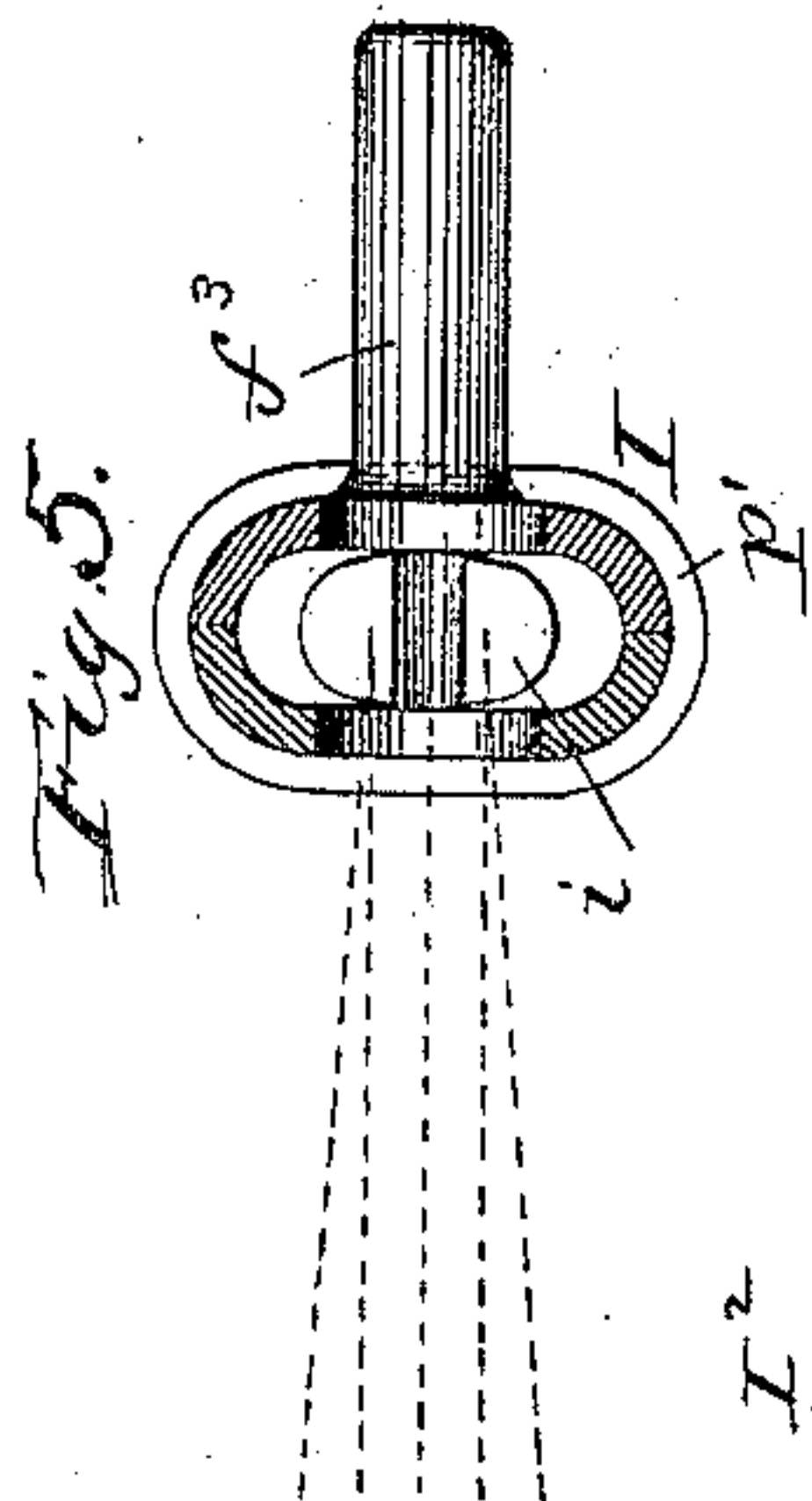
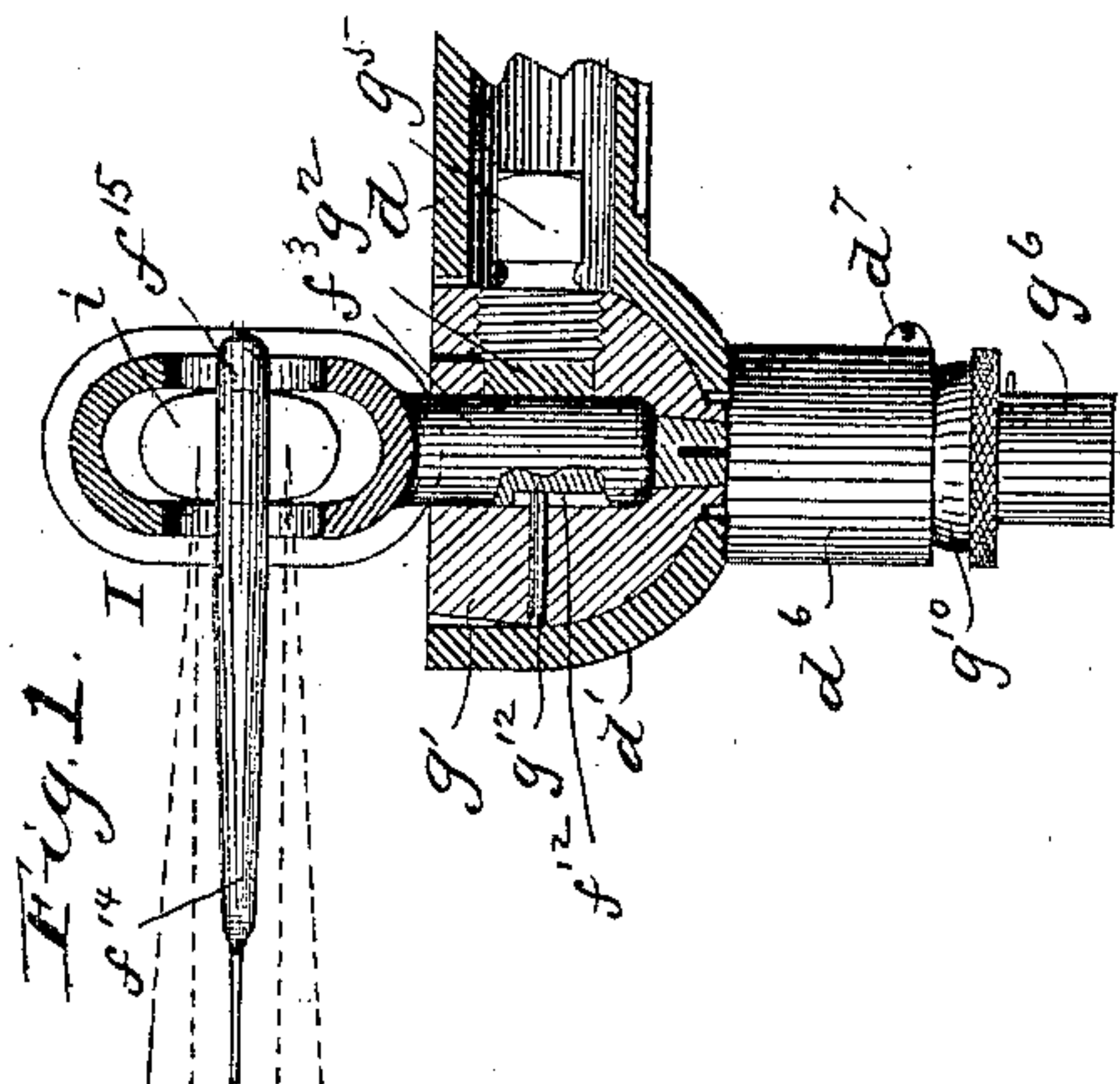
(No Model.)

3 Sheets—Sheet 1.

I. N. FORBES.  
LASTING MACHINE.

No. 436,851.

Patented Sept. 23, 1890.



WITNESSES:

E. H. Stutevant.  
C. C. Burdine

INVENTOR

BY Isaac N. Forbes.  
by H. N. Low  
ATTORNEY.





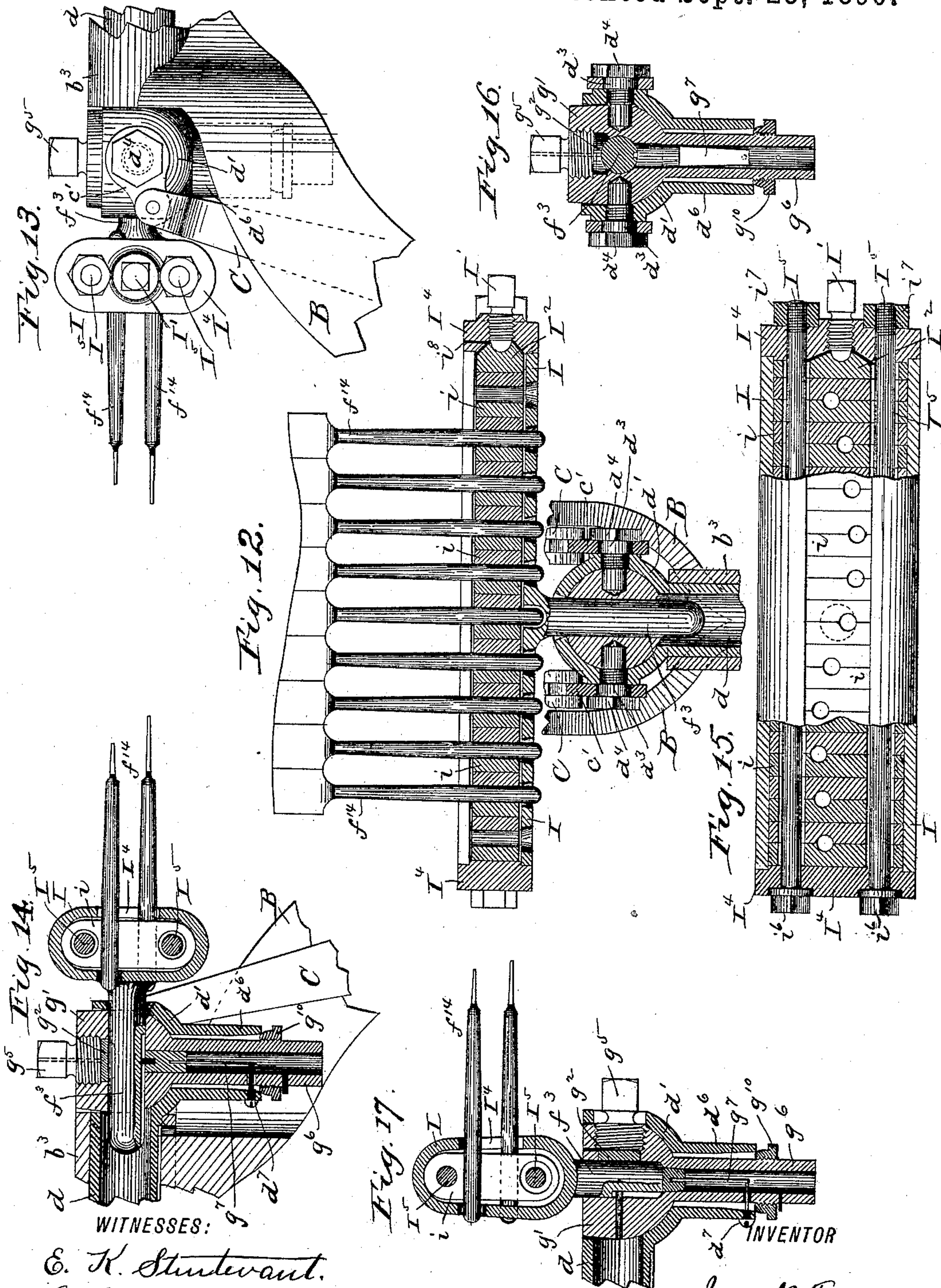
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3 Sheets—Sheet 3.

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# UNITED STATES PATENT OFFICE.

ISAAC N. FORBES, OF NEW YORK, N. Y.

## LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 436,851, dated September 23, 1890.

Application filed July 13, 1889. Serial No. 317,443. (No model.)

*To all whom it may concern:*

Be it known that I, ISAAC N. FORBES, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Lasting-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to certain improvements upon the lasting devices shown in my applications Serial Nos. 303,927, 312,484, and 313,616; and it consists in a carrier having a series of side-lasting fingers individually adjustable therein and readily removable as a whole from the lasting-machine to be replaced by a carrier and lasting-clamp adjusted to a different last.

It further consists in a removable lasting-clamp carrier tube or frame adapted to receive individually-adjustable lasting-fingers and provided with a vertical shank adapted to be clamped in a suitable movable holder, whereby, together with great compactness, sufficient length of the fingers may be obtained for the desired elasticity or range of adjustment.

It further consists of a lasting-clamp holder of improved construction.

It further consists in certain parts and combinations thereof hereinafter more particularly set forth and claimed.

In order to make my invention more clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect.

In said drawings, Figure 1 is a vertical cross-sectional view, part full, of a holder having applied thereto a finger-carrier and series of individually-adjustable fingers. In this construction said carrier is shown as provided with a vertical stem or shank. Fig. 2 is a vertical sectional view, part full, of the carrier shown in Fig. 1, the fingers being removed. Fig. 3 is a horizontal sectional view, part full, of the same. Fig. 4 is a vertical transverse sectional view of the same. Fig. 5 is a view similar to Fig. 4, showing the two main portions of the carrier as separable upon a vertical plane and the shank or stem arranged horizontally and formed with or attached to the outermost of said main parts.

Fig. 6 is a top view, partly in section, of the same. Fig. 7 is a top view of a holder and a portion of its actuating mechanism and of the individually-adjustable lasting-fingers, showing also in horizontal section the carrier as applied thereto, the main portion of said carrier being formed of a single tubular piece with a horizontal stem or shank. Fig. 8 is an elevation of the same. Fig. 9 is a vertical sectional view, part full, of the same. Fig. 10 is a vertical longitudinal section of the carrier detached. Fig. 11 is a vertical sectional view, part full, of the holder, carrier, and fingers, the carrier being provided with a vertical stem or shank. Fig. 12 is a horizontal sectional view of the holder and carrier, the latter being of modified form, as hereinafter more particularly described. Fig. 13 is a side elevation of the same. Fig. 14 is a vertical transverse section, part full, of the same. Fig. 15 is a vertical longitudinal section, part full, of the carrier detached. Fig. 16 is a vertical central section, at right angles to Fig. 14, of a holder adapted for a finger-carrier, the stem of which is horizontal. Fig. 17 is a vertical transverse sectional view of a carrier and holder, part full, the carrier being of a modified form.

Referring to the drawings, B indicates the standard, secured to a suitable table (not shown) and carrying at its upper end a horizontal tubular bearing  $b^3$ , in which is mounted a sliding sleeve  $d$ , which carries at its inner end a hemispherical socket  $d'$ , provided with a downward extension  $d''$ . In said socket is mounted an inner bearing-piece  $g'$ , having clamping devices adapted to receive and hold the shank  $f^3$  of the lasting-clamp, the lasting-fingers or edges of which are adapted to operate upon the sides of the upper. Side-actuating levers C are connected by links  $c'$  with the sides of the slide-bearings  $d$   $d'$  and are adapted to draw said slides inward to cause the side-lasting clamps to perform their work. The hinge-bearings for connecting said links with the socket or bearing  $d'$  are formed by enlarged portions  $d^3$  of the diametrically-opposite bolts  $d^4$ , Figs. 13 and 16. The side levers C may be actuated by any suitable mechanism—such, for instance, as that fully described and illustrated in my application No. 303,927, a description of which is not here necessary to an understanding of my invention.



The parts thus far referred to are preferably of the character described in my application No. 313,616, the bearing-piece  $g'$  having a limited oscillation in its socket  $d'$ , which is controlled by extension  $g^6$ , pin or screw  $d^7$ , spring  $g^7$ , and conical nut  $g^{10}$ , and which is caused by the contact of the lower end of extension  $g^6$  as the side-lasting clamps move inward with a stop, (not shown,) with the result of automatically depressing the lasting-edges of said clamps, all as fully described and illustrated in my last-mentioned application, Serial No. 313,616. The inner socket-piece  $g'$  has, however, according to my present invention, certain features of modification and improvement. One of said features consists in its adaptation to receive a vertical stem or shank supporting the carrier of the lasting-clamp. (See Figs. 1, 11, and 17.) This position of the stem gives the necessary distance between the side of the last and the center of adjustment of the lasting devices, and at the same time enables the machine to be more compactly and economically constructed.

The carrier consists of a rod, frame, or tube I, formed in one or more parts and adapted to receive clamping-pieces  $i$  and hold them loosely, one next to the other. The pieces  $i$  have formed between them bearings adapted to receive and fit the shanks of the separate and independently-adjustable fingers  $f^{14}$ . The inner ends of the latter are shaped to fit the last and to operate properly in forcing the upper over it, and their shanks  $f^{15}$  are round, as shown, whereby they are adapted to be twisted into any desired position upon said shank as an axis between the bearing-pieces  $i$  and to be moved in or out. The bearing-pieces being also adapted to oscillate to a certain extent within the tube I, the inner or operative ends of the fingers may be adjusted at different heights to fit the instep or ball or other portion of the bottom edge of the last, and when thus in place the inward movement of a clamping-screw  $I'$  forces a bearing-piece  $I^2$  against the first clamping-piece  $i$  and presses the whole series, together with the intermediate finger-shanks, against the opposite end of said tube, thus firmly securing the whole series in their adjusted position. The fingers thus form what I term a "side clamp" adapted for a certain contour of last.

Such a carrier and its clamping-pieces may be constructed in various ways. In Figs. 1, 2, 3, and 4 the main portion of the tube or frame I, together with its inclosing ends, is formed by two trough-like pieces, which meet upon a horizontal plane and are pinned together, as shown at  $p p$ , and inclosed by bands  $p' p'$ . The interior of this tube is substantially oval in cross-section, the greater dimension of which is the vertical one, and the clamping-pieces  $i$  are of substantially similar shape, but are smaller, so that they may be slightly moved vertically and rocked in the carrier to give a greater range of vertical adjustment to the lasting-fingers.

P is a spring interposed between one of the end-clamping pieces  $i$  and the end wall of the carrier I. This spring is preferably held in place and protected from too much pressure by being mounted in a slot formed in a bearing-piece  $p^2$ . When the clamping-screw  $I'$  is moved inward to secure the clamping-pieces, the piece next to the spring P compresses said spring flush with the inner face of bearing-piece  $p^2$ . Said clamping-piece then comes in contact with said bearing-piece and all of the pieces  $i$  are rigidly held between the part  $p^2$  and the bearing-piece  $I^2$  at the opposite end of the carrier. When the clamping-screw  $I'$  is relaxed, the spring P serves to exert sufficient pressure upon the clamping-pieces to keep them from dropping or being displaced from their proper position at or near the center of the tube, and also to maintain them in contact with the finger-shanks when the latter are inserted with a comparatively light pressure, which does not prevent the fingers and the clamping-pieces from being readily raised, lowered, or rocked for the purposes of adjustment.

In Fig. 5 the carrier is divided upon a vertical plane, such being the more convenient arrangement when, as in this figure, the supporting-stem  $f^3$  is horizontal. Such stem is in this figure shown as integral with the outermost of the parts of the tube I.

In Figs. 7, 8, 9, 10, and 11 the carrier-tube I is formed of a single piece, circular in cross-section, in which corresponding circular bearing-pieces  $i$  fit neatly. In this case the carrier-tube is provided at each end with a clamping screw or plug  $I'$ , between which the clamping-pieces are secured. With this form of tube the supporting-stem  $f^3$  may be either horizontal, as shown in Figs. 7, 8, 9, and 10, or it may be vertical, as shown in Fig. 11.

In Figs. 12, 13, 14, 15, and 17 there is shown a carrier, the main or tubular portion of which is formed in a single piece open from end to end upon its inner face. Each end of the tube is closed by a head-piece  $I^4$ , held together and upon the tube by longitudinal rods  $I^5$ , which pass through the latter. Preferably these rods are in the form of elongated bolts, the heads and nuts  $i^6 i^7$  of which engage the outer faces of the heads  $I^4$ . Through the open front of the carrier-tube the finger-shanks are inserted at different heights, Fig. 15, corresponding with the average last-bottom contour, into the bearings formed for them between the clamping-pieces  $i$ . In this construction the clamping-pieces  $i$  are perforated at each end, as shown, so as to loosely inclose the rods or bolts  $I^5$ , Fig. 14. Sufficient play is thus given to enable the clamping-pieces to be slightly rocked in the tube for purposes of adjustment, while at the same time any improper displacement of them is prevented. The bearing-screw  $I'$  engages a screw-threaded aperture in one of the heads  $I^4$  and is adapted to force the clamping-pieces against the opposite head.



In Fig. 17 the main portion or tube of the lasting-finger carrier is made of somewhat greater diameter at its lower side than it is at its upper side, and the bearing-pieces, hinging neatly upon the upper of the bolts  $I^5$ , are permitted at their bottom a slight inward and outward play for purposes of adjustment, their lower ends being provided with a perforation or recess sufficiently large that the bearing-pieces are not interfered with in their movement by the lower bolt  $I^5$ . In this latter construction the supporting-stem  $f^3$  is vertical, while in Figs. 12 to 16 it is horizontal. The stem  $f^3$  may be mounted in a universally-adjustable clamp or holder. Such a device adapted for a horizontal stem is fully described in my application Serial No. 313,616.

In Fig. 1 is shown a holder adapted to securely hold the carrier and permit it to be readily changed for one adjusted to a different contour of last. In this construction the inner socket-piece  $g'$  of the holder is provided with a recess adapted to receive the stem  $f^3$ , with a pin  $g^{12}$ , adapted to engage a longitudinal slot  $f^{12}$  in said stem to aid in guiding the latter and to insure its insertion in the proper position, with a bearing-piece  $g^2$ , with a clamping-screw  $g^5$ , adapted to force the latter piece against the stem  $f^3$  and secure it rigidly in place, and with diametrically-opposite hinge-bolts  $g^4$ , by which it is connected with the outer socket-piece. This inner socket-piece is adapted to be automatically rocked in its outer socket  $d'$  as the lasting-clamps are advanced, as already described.

In Figs. 7, 8, 9, 12, 13, 14, and 16 there is shown a substantially similar holder, with the exception that it is adapted for a horizontal carrier-stem, the aperture for the latter in piece  $g'$  being horizontal and the clamping-screw  $g^5$  operating vertically.

In Fig. 17 the holder is adapted for a vertical stem, as already described; but the clamping-screw  $g^5$  is applied from the inner side of the holder through a suitable aperture in the outer socket  $d'$ .

Perfect lubrication for the clamping-screw  $g^5$  is insured by means of an oil-hole adapted to conduct the lubricant to the outer face of the bearing-piece  $g^2$ . When said screw is vertical the oil-hole passes vertically through it, Figs. 7, 8, 9, 13, 14, and 16. When the screw is horizontal said oil-hole leads through the part  $g'$  to the plane of meeting of said screw and bearing-piece  $g^2$ , Figs. 1, 11, and 17. Similar provision is made for lubricating the screws  $I'$  and bearing-pieces  $I^2$  by means of oil-hole  $i^8$ .

While I have hereinafter claimed certain parts and combinations thereof as constituting my invention, it will be understood that I do not confine myself to the exact shapes or arrangements described, but that such claims extend as well to any parts or combinations thereof which are substantially the same, though differing somewhat in shape, appear-

ance, or operation from those herein illustrated and described.

I do not in this application claim, broadly, a carrier having a series of clamping-pieces and a series of independently-adjustable lasting fingers or clamps, the broader claims for such subject-matter being made in my application, Serial No. 312,484, filed May 29, 1889; nor do I in this application claim, broadly, a cylindrical carrier or tube with or without a shank and provided with a series of clamping-pieces oscillatory therein, such cylindrical carrier or tube and clamping-pieces being the subject in part of my application, Serial No. 303,927, filed March 19, 1889.

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

1. In a lasting-machine, a detachable lasting-finger carrier provided with a series of independently-adjustable clamping devices adapted to receive and secure a series of lasting-fingers, and with a projecting shank whereby all of said fingers may be applied to a lasting-machine and connected with its actuating mechanism at once, substantially as set forth.

2. In a lasting-machine, the combination, with a holder having a vertical clamp-bearing, of a lasting-finger carrier having a series of independently-adjustable clamping devices adapted to receive and secure a series of lasting-fingers, and with a projecting shank at an angle to the normal position of the fingers and adapted to fit said bearing of the holder, substantially as set forth.

3. In a lasting-machine, a removable and changeable side-lasting-finger carrier consisting of a tube or frame having a series of clamping-pieces adapted to receive between them and permit the adjustment of the lasting-fingers, whereby said fingers and carrier may be readily removed as a whole and a carrier with differently-adjusted fingers substituted for changing the machine from a right to left last, or vice versa, or from one size to another, if desired, in combination with a holder adapted to receive and permit the adjustment of the carrier and a clamp for securing the latter, substantially as set forth.

4. In a lasting-machine, the combination of a holder, mechanism for moving the same toward the last, a removable carrier supported by said holder, means for detachably securing said carrier in the holder, and a series of lasting-fingers individually adjustable in the carrier, substantially as set forth.

5. In a lasting-machine having side clamps changeable for a right or left last, the combination, with the side clamp, of a holder having a cylindrical vertical socket or bearing for the stem of the side clamp and a part or socket movable toward and from the last, in which part said holder is hinged and adapted to be automatically oscillated, substantially as set forth.



6. In a lasting-machine, the combination of a finger-carrier provided with a stem or shank, a series of clamping-pieces situated and oscillatory therein, having between them bearings for the shanks of the fingers, and means for clamping said pieces and finger-shanks together, substantially as set forth.

7. In a lasting-machine, the combination of a removable finger-carrier having a stem or shank, a holder therefor, a series of independently-adjustable clamping-pieces therein having between them concave bearings for the finger-shanks, and means for clamping said pieces and shanks together, substantially as set forth.

8. In a lasting-machine, the combination of a finger-carrier, a series of clamping-pieces therein having bearings between them for the finger-shanks, and means for clamping said pieces and shanks together, the carrier being of greater internal dimension than said pieces, and the latter being movable therein transversely to its axis, substantially as set forth.

9. In a lasting-machine, the combination of a finger-carrier provided with a stem or shank, a series of longitudinally-movable clamping-pieces therein, a series of fingers having cylindrical shanks which are situated directly between said clamping-pieces, and means for clamping said pieces and finger-shanks together, substantially as set forth.

10. In a lasting-machine, a finger-carrier

provided with longitudinal rods  $I^5$  and a series of clamping-pieces  $i$  therein perforated for the passage of and held in place by said rods, substantially as set forth.

11. In a lasting-machine, a carrier-tube of larger internal dimension at one side than the other, a rod  $I^5$ , passing through the same, and a series of bearing-pieces  $i$ , hinged upon said rod and adapted to oscillate in the tube, substantially as set forth.

12. In a lasting-machine, a holder  $g'$ , having a cylindrical socket or bearing formed directly therein, an outer socket or support upon which said holder is journaled upon a transverse axis, mechanism for moving the holder toward the last, and a detachable lasting-finger having a cylindrical shank adapted to fit said socket, substantially as set forth.

13. In a lasting-machine, a slide or movable part and means for causing the same to approach the last, combined with a holder hinged in or upon said movable part by means of bolts  $d^4$ , having enlarged bearings  $d^3$ , and links mounted upon said bearings and connected with said actuating means, substantially as set forth.

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

ISAAC N. FORBES.

Witnesses:

H. N. LOW,

J. S. BARKER.