No. 882,274. PATENTED MAR. 17, 1908.

J. J. SMITH.

PROCESS OF MAKING LASTS.

APPLICATION FILED DEC. 8, 1906. RENEWED SEPT. 9, 1907.

3 SHEETS—SHEET 1.

Fig. 1

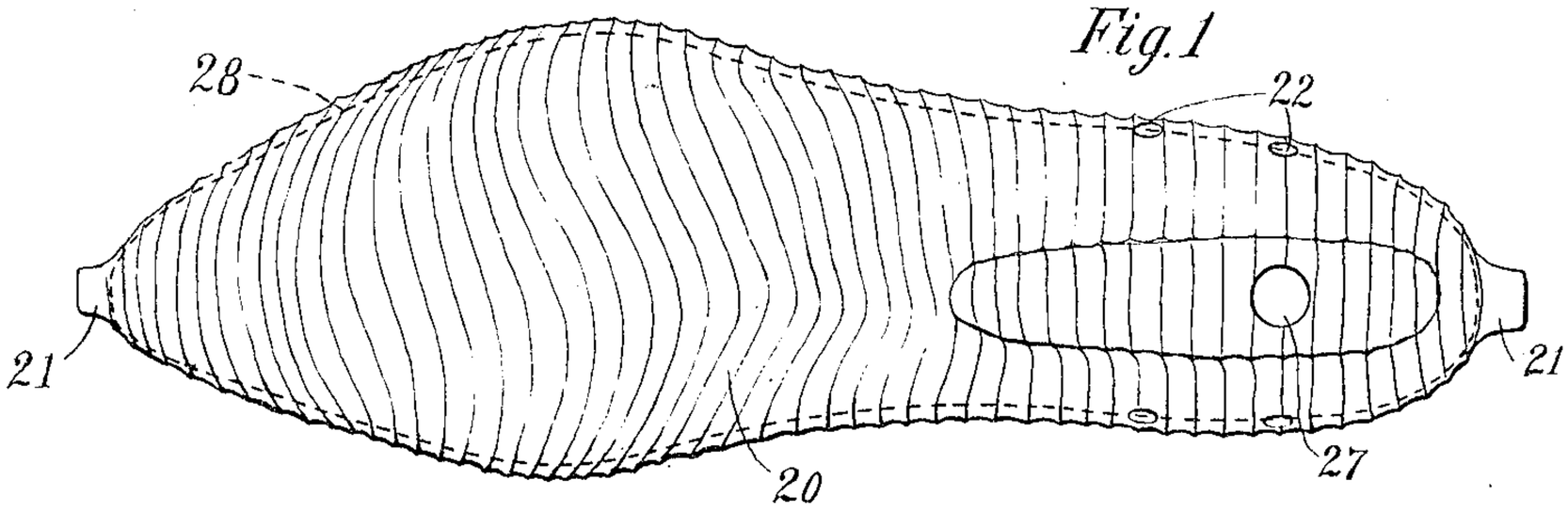


Fig. 2

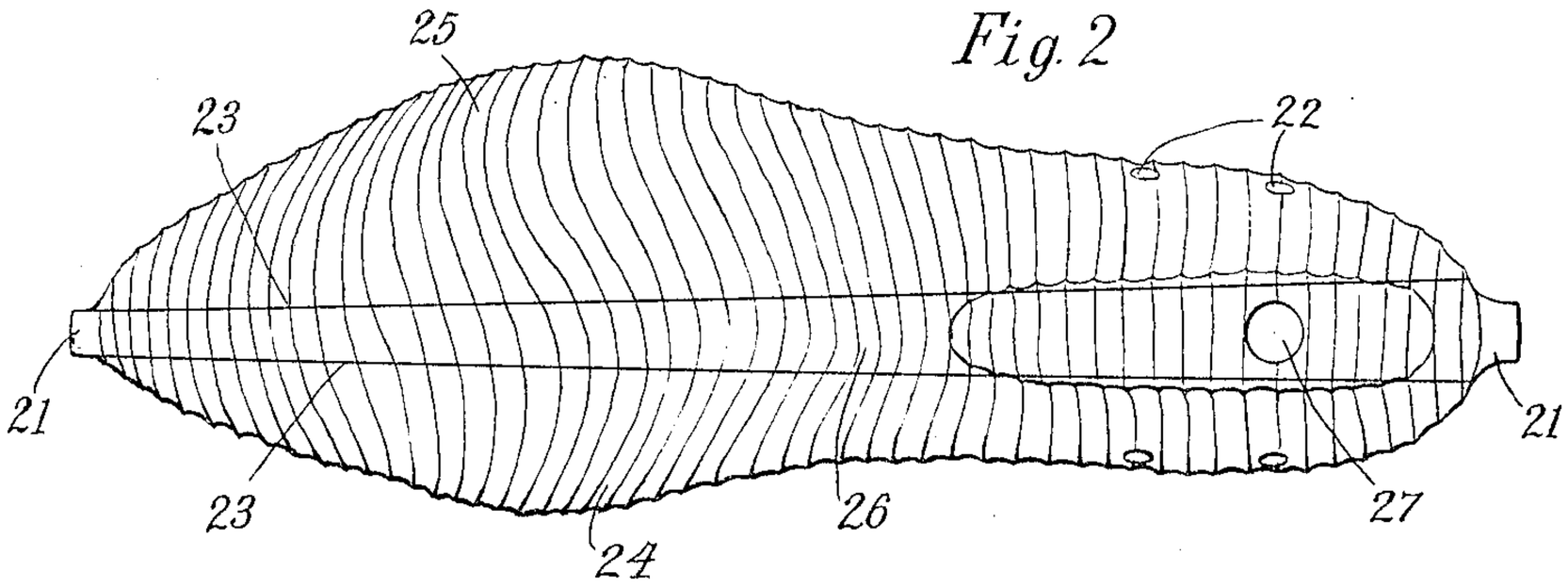


Fig. 3

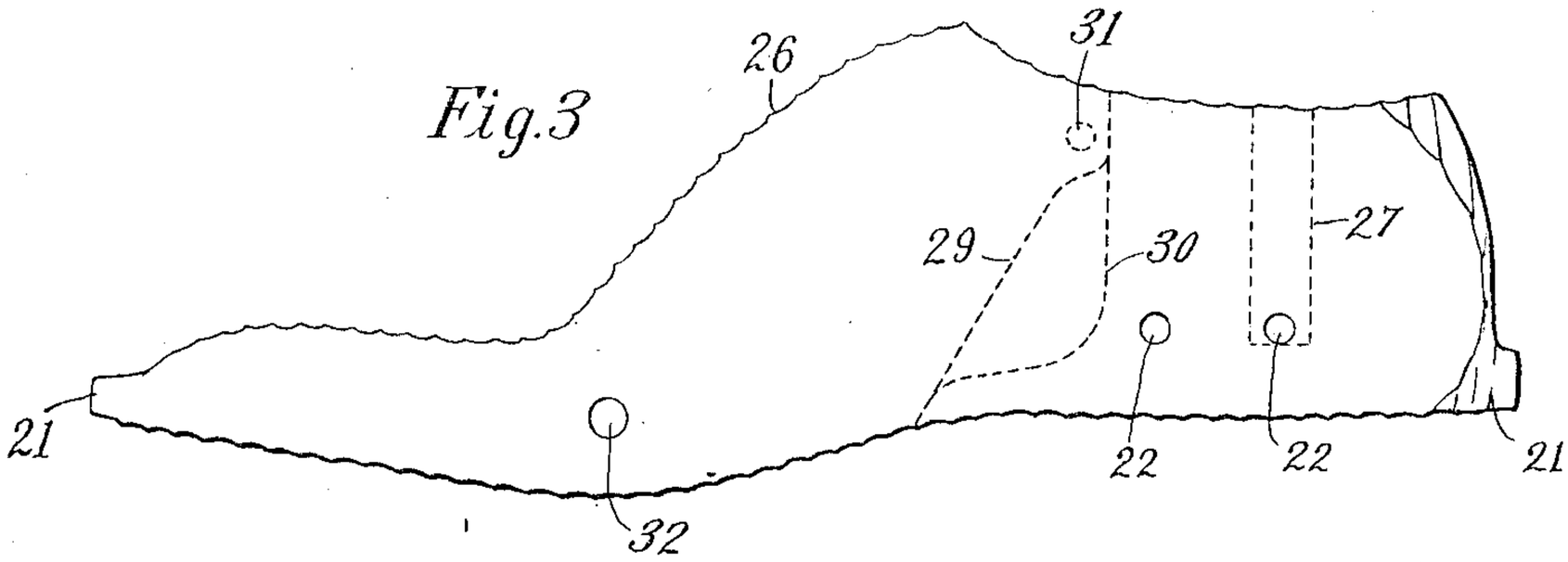
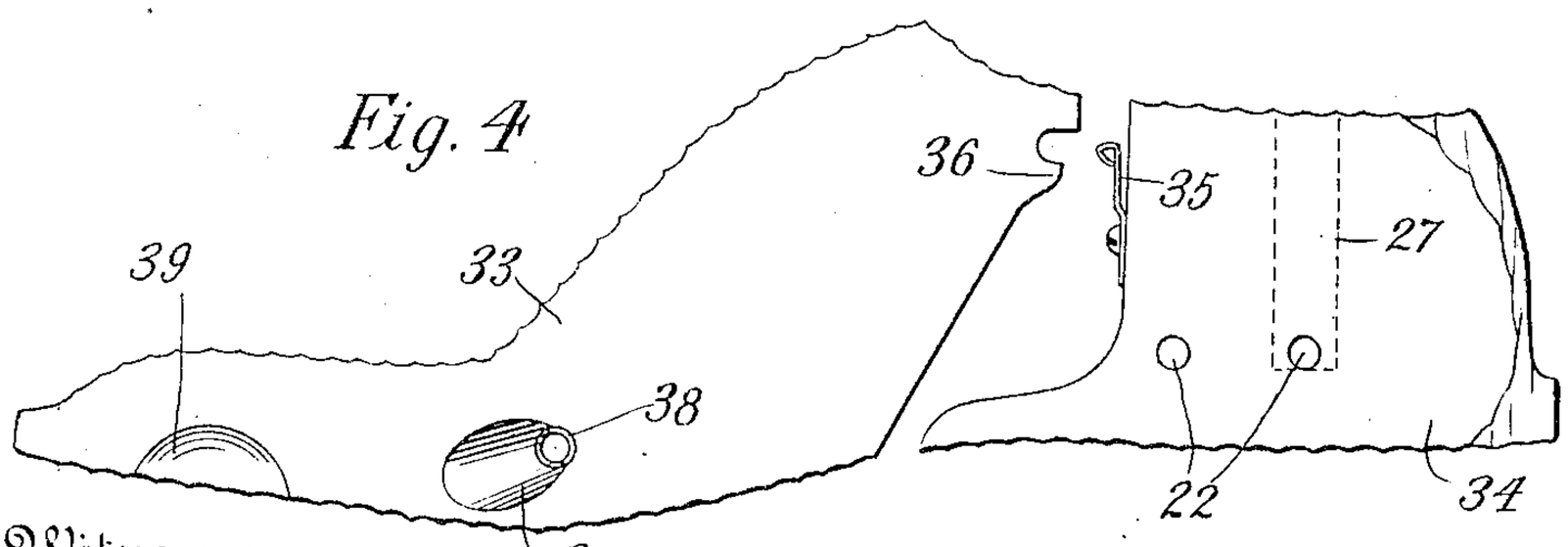


Fig. 4



Witnesses
Raphael Netter
C. B. A.

Inventor
J. J. Smith
By his Attorney
Robert M. Pierson

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3 SHEETS—SHEET 2.

Fig. 5

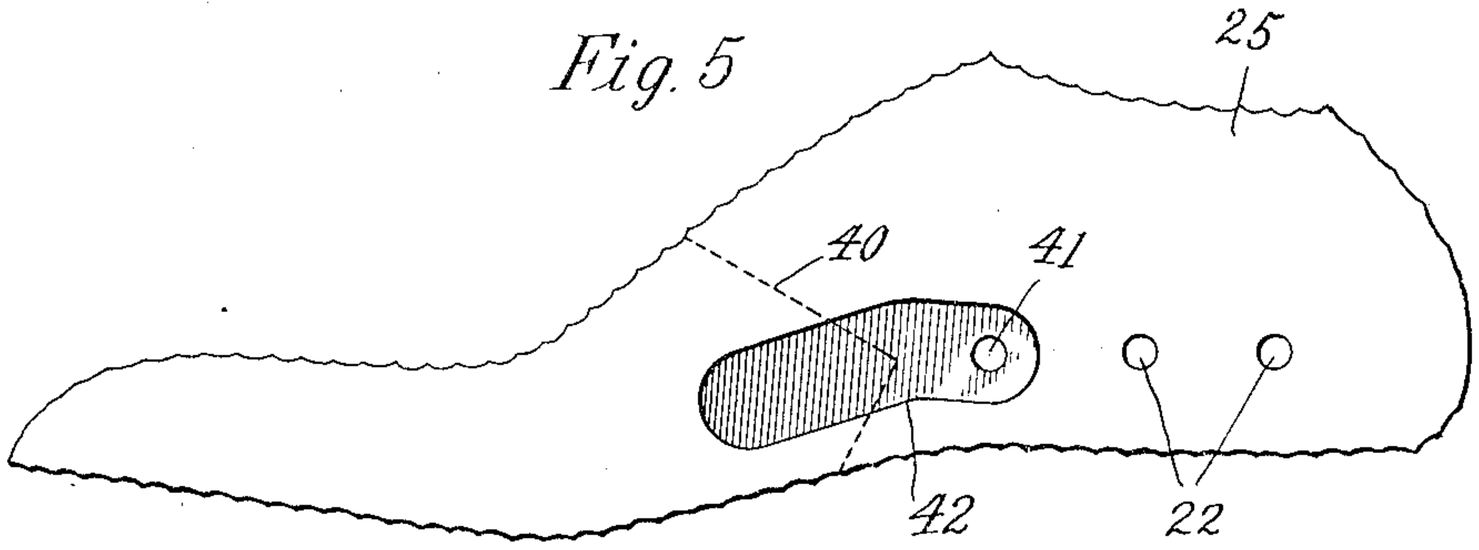


Fig. 6

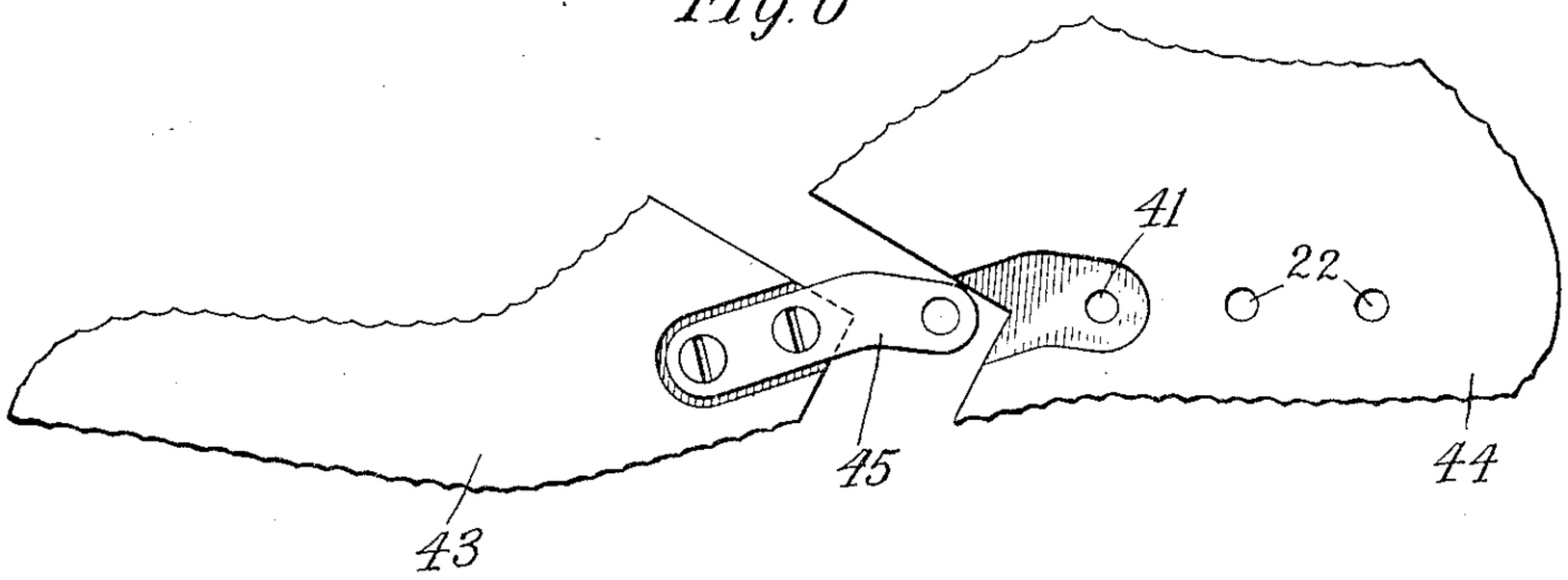
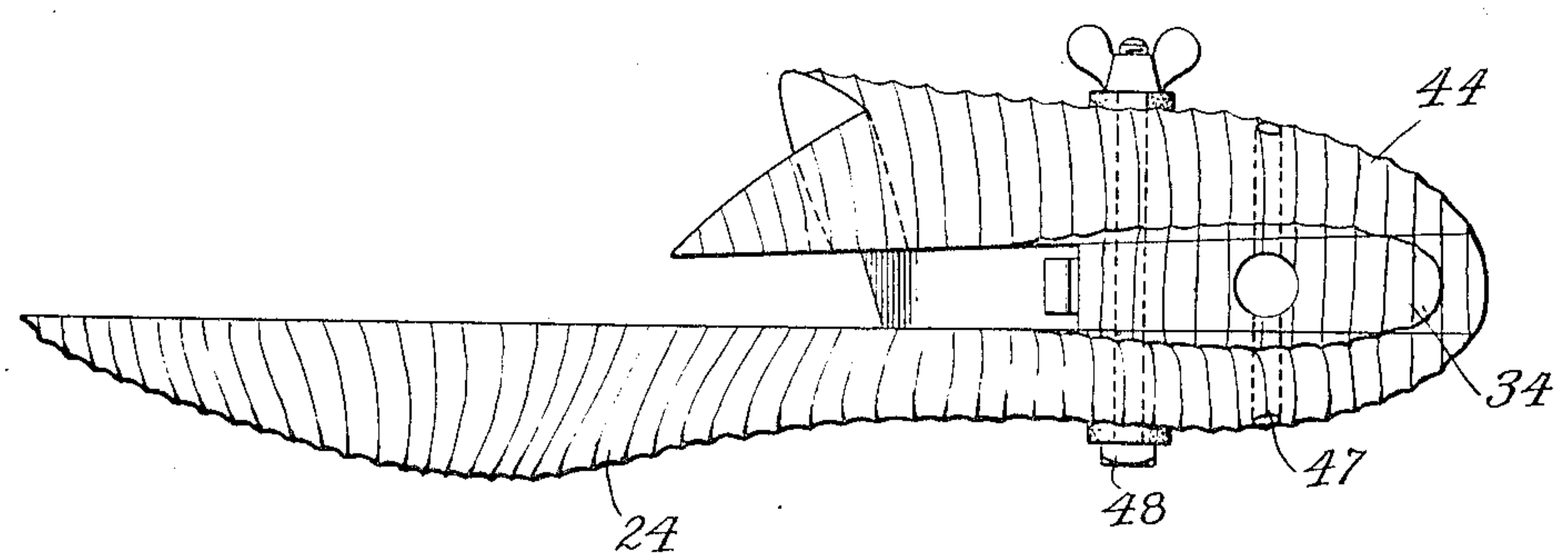


Fig. 7



Witnesses
Raphaël Netter
F. Blake

Inventor
J. J. Smith
By his Attorney
Robert M. Erwin

No. 882,274. PATENTED MAR. 17, 1908.

J. J. SMITH.

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APPLICATION FILED DEC. 8, 1906. RENEWED SEPT. 9, 1907.

3 SHEETS—SHEET 3.

Fig. 8

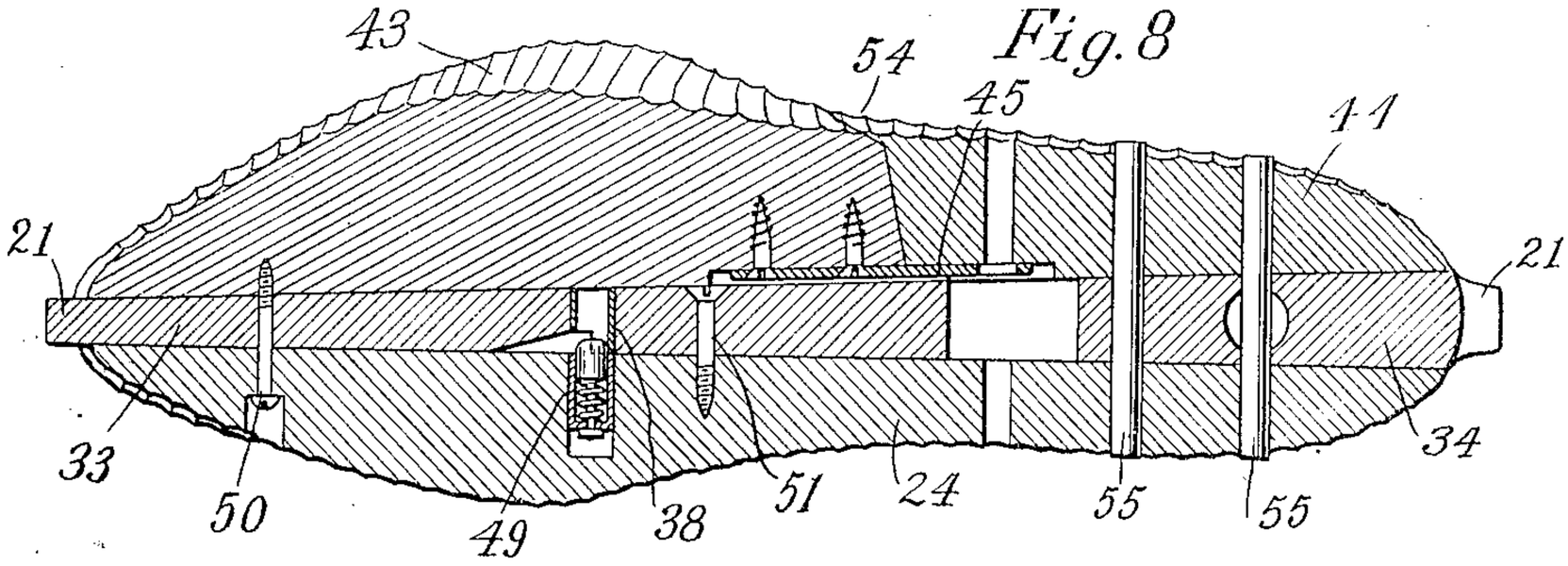


Fig. 9

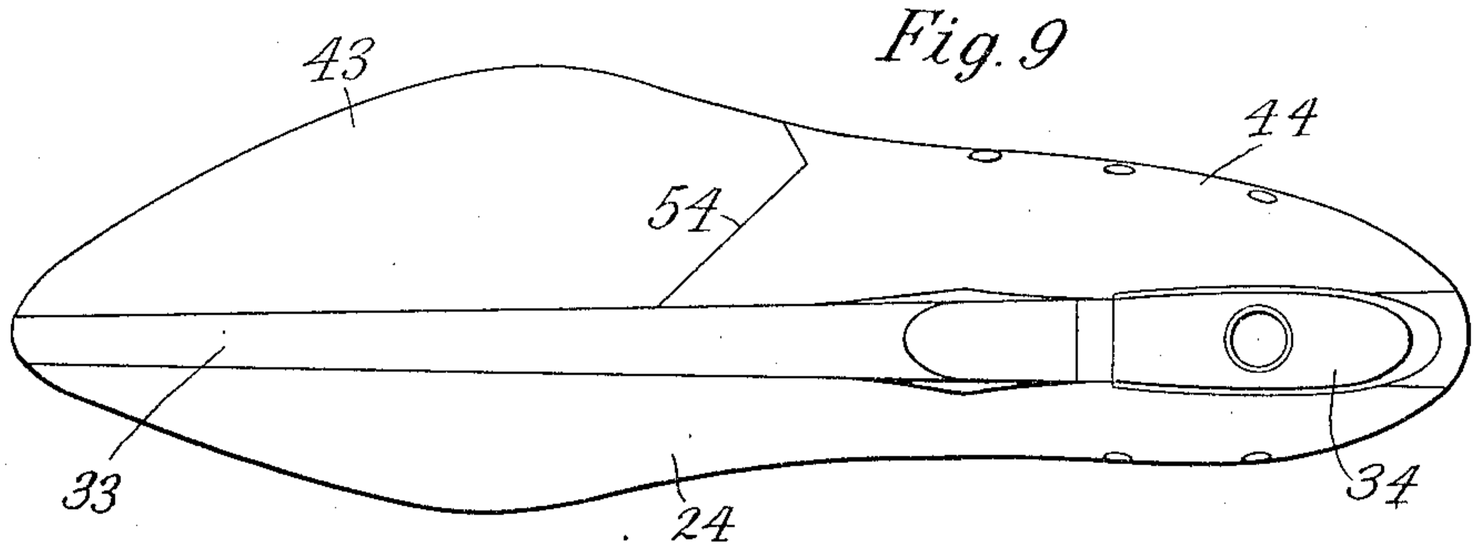


Fig. 10

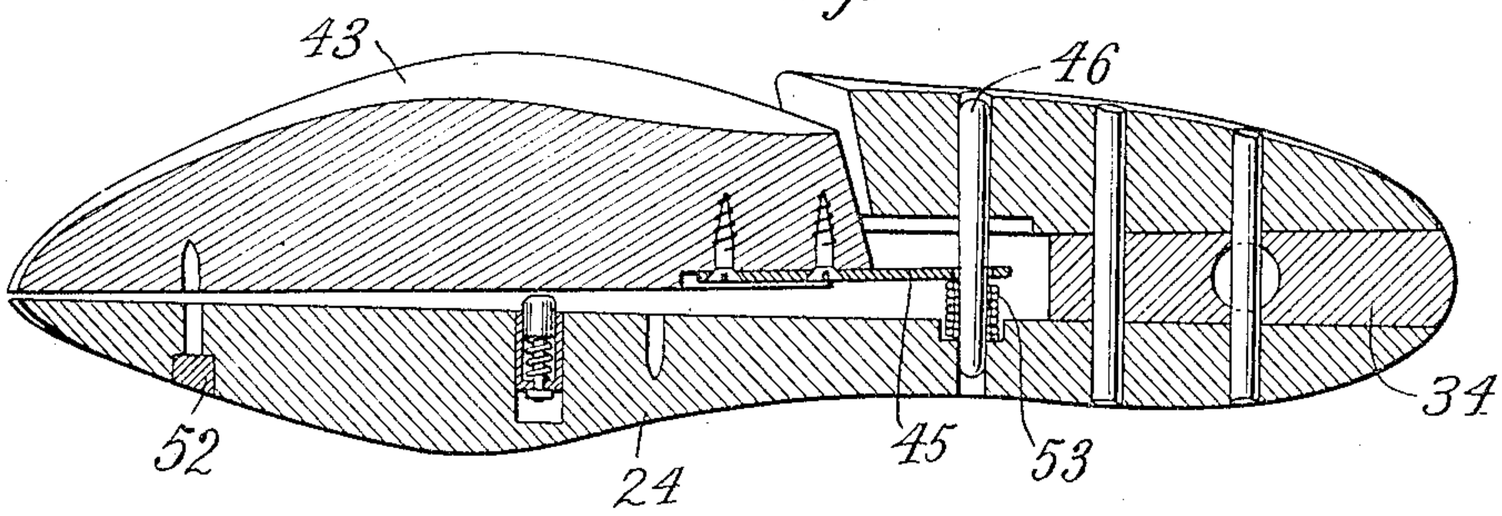
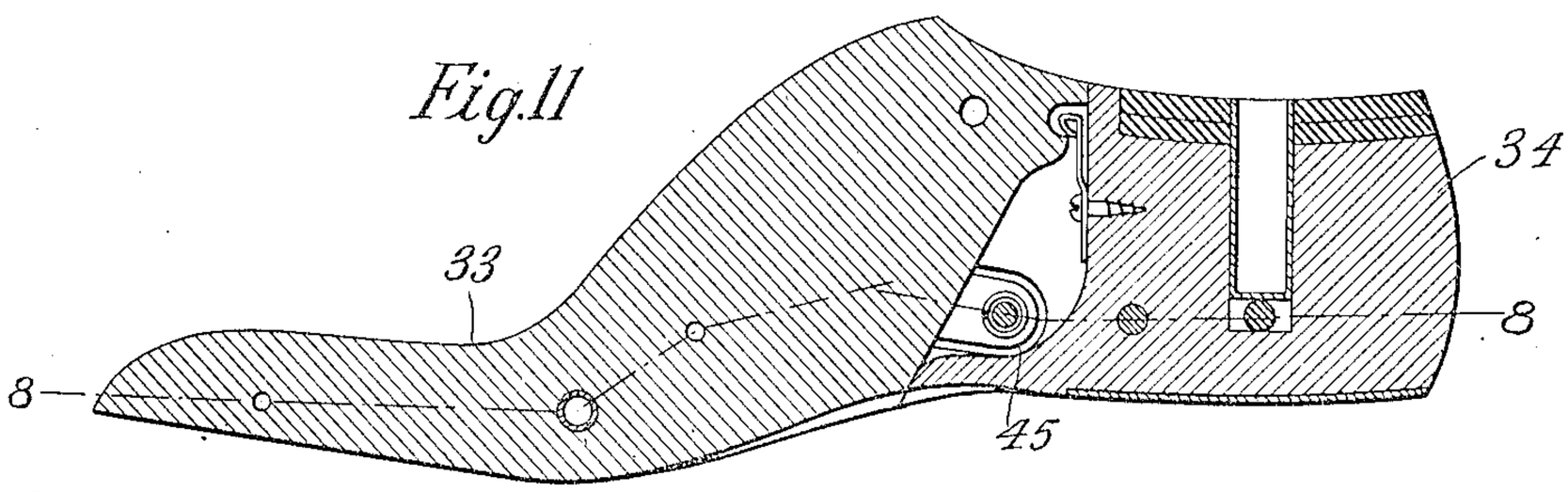


Fig. 11



Witnesses
Raphael Netter
J. Blake

Inventor
J. J. Smith
By his Attorneys
Peters & Pierson

UNITED STATES PATENT OFFICE.

JOSEPH J. SMITH, OF NEW YORK, N. Y.

PROCESS OF MAKING LASTS.

No. 882,274. Specification of Letters Patent. Patented March 17, 1908.

Application filed December 8, 1906, Serial No. 346,852. Renewed September 9, 1907. Serial No. 392,045.

To all whom it may concern:

Be it known that I, JOSEPH J. SMITH, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Processes of Making Lasts, of which the following is a specification.

This invention relates to a process of making sectional lasts for boots and shoes, and especially lasts such as described in my application, Serial No. 301,580, which have a contracting fore-part together with a removable filler-piece which, when in place, expands and completes the contour of the last in its normal condition for forming the shoe thereon, and when removed, permits the collapse of the fore-part to enable it to be more readily removed from the shoe or reinserted therein.

In carrying out my process in the preferred form in which it is hereinafter described I first turn the last from the block on the usual last-turning lathe or by other suitable method reduce it to the form of a last which is larger in both length and breadth than the ultimate intended size. This may be done from a model having the proper form of the last by making adjustments on the turning-lathe such as are familiar to those acquainted with the art. I then saw the last vertically in two places from end to end so as to divide it into a middle-piece and two side-pieces, and then, after sawing one of the side-pieces transversely at about the instep to separate the movable fore-part section from the heel-part, and also dividing the middle-piece into two parts to make a removable fore-part filler-member and a heel-part member, I secure the heel part of the middle-piece by glue and dowels between one of the side-pieces and the heel part of the other side-piece, after having previously attached a guiding device for connecting the movable fore-part section to the heel section and having inserted certain automatic fasteners and performed suitable boring operations for the reception of screws, etc. I then assemble practically the whole last with its parts rigidly secured in place and subject it to a second turning operation which reduces the last practically to its ultimate size, after which it is surface-finished in the usual fashion and the temporary interior fastenings removed to release the removable filler and permit the expansible last to be operated in its intended manner.

Of the accompanying drawings, Figure 1 represents a top plan view showing the last after performing the first-turning step of my process. Fig. 2 represents the same, after being sawed longitudinally. Fig. 3 represents a side elevation of the middle-piece after being marked and bored. Fig. 4 represents a side elevation showing the fore and heel parts of the middle-piece after having been separated and the automatic fasteners or catch-members applied. Fig. 5 represents an inner side elevation of the outer side-piece after being marked, bored, and recessed. Fig. 6 represents a similar view of this piece with its fore and heel parts separated and the slide-plate applied to the fore-part. Fig. 7 represents a top plan view showing the heel parts re-assembled. Fig. 8 represents a horizontal section showing the whole last assembled for second turning. Fig. 9 represents a top plan view of the finished last. Fig. 10 represents a horizontal section thereof. Fig. 11 represents a median vertical section thereof.

The same reference characters indicate the same parts in all the views.

In the drawings, Fig. 1 indicates the last 20 in a first-turned condition to which it is reduced on the turning-lathe by using the ordinary model for a last of the ultimate size and shape, and so arranging the machine as to turn it too large throughout. It may be turned about one-half size too long and three sizes too full, and the projections 21 at the two ends for the lathe-centers are left on during the early steps of manufacture, so as to allow the last to be mounted in jigs for the rapid and accurate performance of subsequent operations. The purpose of turning the last too large is mainly to allow for the kerf or thickness of the saw clefts made by the next operation. The ultimate dimensions are illustrated, for example, by the dotted line 28. This first turning is preferably not a "rough" turning, as last-makers understand the term, which means the original turning from the log on an ordinary lathe, resulting in the last "block," somewhat resembling a last but not turned from a model and having no very definite relation to the ultimate last except that these blocks are roughly graded in different sizes for large and small lasts. My first turning as I prefer to

perform it, is a turning of this rough "block" from a model on a last-turning lathe, and is the same turning which would precede the finishing of a last for a larger size than the one which I start out to make in any particular instance. After the first turning I drill two lateral holes 22, 22 through the heel portion for the subsequent reception of dowels, and the vertical hole 27 for the jack-spindle.

Fig. 2 shows the last after being sawed through on two vertical planes 23 to divide it into inner and outer side-pieces 24, 25 and a middle-piece 26. The latter is preferably made slightly tapered or wedge-shaped, with its smaller end at the toe of the last to allow for the easy insertion and withdrawal of the filler piece hereinafter mentioned, constituted by the front half of the middle-piece.

With the last separated into three pieces throughout its length I am enabled to perform certain otherwise difficult or impracticable sawing and other operations upon the several pieces. One class of these is illustrated in Figs. 3 and 4 and consists in marking out with templets the sawing lines 29, 30 (Fig. 3) on the middle-piece 26 for dividing and recessing this piece, and boring a hole 31 near the crown for making a catch abutment and a second hole 32 in the ball portion for receiving a catch-socket member. Fig. 4 shows the middle-piece sawed across from top to bottom, to separate it into a fore-part section 33 constituting the removable filler-piece of the last, and a heel-part section 34 which is subsequently incorporated permanently in the heel part of the last. One of these parts is re-sawed to make a cavity or recess between the two middle parts with top and bottom walls integral with one or the other of said parts, which cavity contains the spring-catch 35 on the heel-part section 34 adapted to engage the abutment 36 on the filler - piece 33, and also contains certain transverse members indicated in Fig. 10. At any convenient time the side of the filler-piece 33 is recessed or beveled at 37 from the socket-hole 32 toward the toe and the socket-piece 38 for the lower spring-catch is inserted. The same face is also recessed or beveled at 39 to facilitate insertion of the toe of the filler-piece past the catch which engages socket 38.

Another class of operations permitted by separating the last longitudinally into pieces is illustrated in Figs. 5 and 6, showing the outer side-piece 25. With a suitable templet the inner face of this piece is marked at 40 with a V-shaped line for the cut which separates the movable fore-part section from the heel-part of the side-piece. A hole 41 is bored near the waist of this piece for the reception of a transverse guide-pin, and a recess 42 is bored or routed on the inner face for the reception of the slide-plate to engage this pin. Fig. 6 shows the side-piece sawed across with a V-cut to separate the fore and heel parts 43, 44, and also indicates the side-plate 45 above-mentioned, screwed to the fore-part section 43. The V-cleft between the two parts is made along planes with horizontal elements at a slight angle to the transverse axis of the last in order to readily clear the fore-part 43 from the heel-part 44 when the ball portion of the last is collapsed by pressing the fore-part or movable section 43 inwardly. The V-shaped cleft constitutes a joint with complemental salient and re-entrant portions giving a firm seat for the movable fore-part section 43 to resist vertical strains in both directions, to which the last is subjected during the manufacture of a shoe thereon, and the slide-plate 45 and its pin 46 (Fig. 10) serve to tie the section 43 to the section 44 and guide it thereon during the expanding and collapsing movements.

The next step consists in assembling and re-uniting permanently the inner side-piece 24 and the heel part 44 of the outer side-piece with the heel part 34 of the middle-piece between them, as indicated in Fig. 7. These pieces are glued together on their contacting faces and held alined under pressure until the glue is dry, by a temporary pin 47 and bolt 48 placed in the two dowel-holes 22 hereinbefore mentioned. After the glue is dry permanent wooden dowels 55 (Fig. 8) are forced and glued into these holes in place of said pin and bolt. At any convenient time previous to this operation a spring bolt 49 (Fig. 8) is mounted in a hole drilled for it in the inner face of the side-piece 24 to engage the socket-piece 38, hereinbefore mentioned, in the removable filler-piece 33, and suitable holes are drilled for the temporary wood-screws 50, 51 next to be mentioned.

The last is now ready to be assembled for the second turning and to this end the wood-screw 51 is inserted from the inside, binding the rear portion of the filler-piece 33 to the inner side-piece 24. Then the movable fore-part section 43 is located in place and all three fore-part sections are bound together by the wood-screw 50 inserted from the outside near the toe of the last and having its head in a counter-sunk hole so as to be free of the turning tool.

The parts of the last being thus bound firmly together in their proper alinement the last is a second time placed in the turning lathe which will now be adjusted so as to turn the last down to its ultimate size, and after that operation is completed the last is taken out of the lathe, the centering projections 21, 21 at heel and toe ends are cut off and the last is subjected to the usual abrading and polishing operations to finish off its surface. After that, the temporary screws 50 and 51 are removed, and a wooden plug 52 forced into the counter-sunk hole for the head of screw 50 and smoothed off, then the

guide-pin 46 is forced into place, while a spring 53 is preferably inserted between the inner side-piece 24 and the slide-plate 45 for forcing the movable fore-part section 43 outwardly to normally expand the ball portion of the last. Pin 46 is preferably tapered toward the inner side of the last where it enters the hole in slide-plate 45 so that when forced into place this pin will tend to draw the movable fore-part section 43 rearwardly to a firm seat along the faces of the V-shaped cleft 54, the said taper also facilitating the clearing of movable section 43 as it is moved inwardly in collapsing the last.

The last is now complete and ready for use, its fore-part being adapted to collapse in width when the filler-piece 33 is removed, to permit its ready withdrawal from the lasted or finished shoe and its reinsertion within the shoe if desired, the last being held in its normal condition within the shoe by the insertion of the filler-piece 33 which completes the contour of the last and holds the fore-part in a solid expanded condition.

Certain details of manufacture such as the application of a jack-spindle socket and heel-plate, and minor operations auxiliary to the main operations herein described, which would occur to those versed in the art of last making, have not been specifically set forth. It will be understood moreover, that the main operations may be more or less varied in their order or specific character and will also apply in greater or less degree to the making of lasts differing in construction from the precise construction illustrated.

I claim:—

1. The process of making a sectional last which consists in first forming it in the shape of a last of larger than the ultimate size, sawing it into a plurality of pieces, re-assembling said pieces, and reducing the last to its ultimate size.

2. The process of making a sectional last which consists in first turning said last from the rough block to a size exceeding its ultimate size, then saw-cutting the last into a plurality of pieces, then re-assembling said pieces, and finally re-turning the last to its ultimate size and surface-finishing the returned last.

3. The process of making a sectional last which consists in dividing the last vertically lengthwise into two side-pieces and a middle-piece, dividing the middle-piece transversely into fore and heel parts, and re-assembling the heel-part of the middle-piece permanently with the heel parts of the side-pieces.

4. The process of making a sectional last which consists in dividing the last vertically lengthwise to leave a side-piece separate from the remainder of the forward body of the last, then separating the forward side-portion from the heel-portion by a transverse saw-cleft so shaped as to make a joint between fore and heel parts with complemental horizontal salient and reëntrant portions, and attaching the forward side-section thus removed to the heel part.

5. The process of making a sectional last which consists in dividing the last longitudinally to remove a filler-piece from the fore-part before the last is reduced to its ultimate size, separating one of the fore-part side-sections from the heel part, re-assembling said last-parts in rigid relation and turning the last down to its ultimate size.

6. The process of making a sectional last which consists in sawing the last, before reducing it to its ultimate size, into two side-pieces and a middle-piece, by clefts extending from end to end, dividing the middle-piece and one of the side-pieces each into fore-part and rear-part sections, re-uniting permanently the sections of the heel-part of the last, re-uniting temporarily the sections of the fore-part, turning the last to its ultimate size and finishing its surface, and finally separating the fore-part sections.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses, the 8th day of November, 1906.

JOSEPH J. SMITH.

Witnesses:
G. W. HOPKINS,
G. BLAKE.