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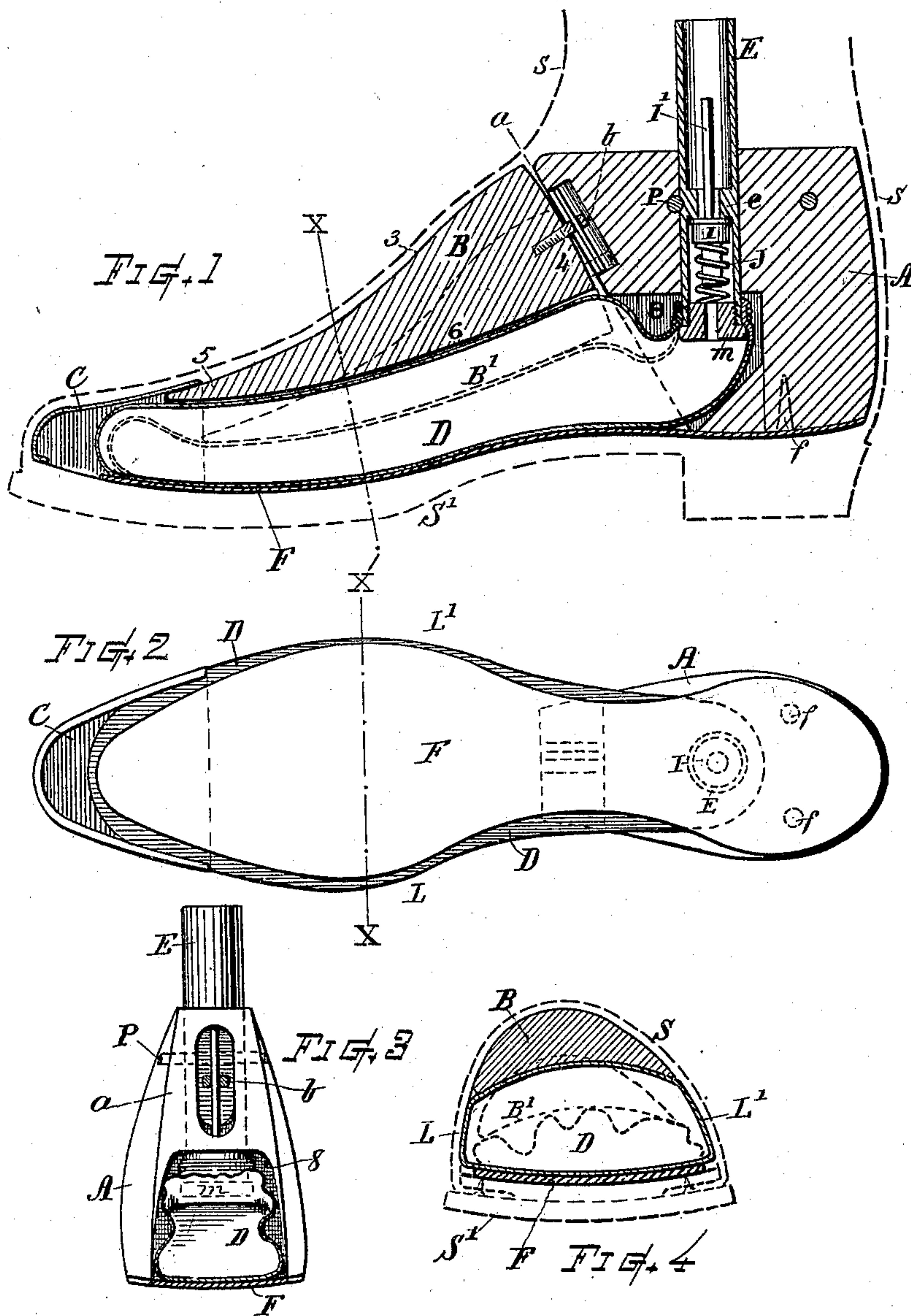
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G. C. BEMIS.

ADJUSTABLE LAST FOR BOOTS OR SHOES.

(Application filed Jan. 30, 1899.)

(No Model.)



Witnesses.

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ADJUSTABLE LAST FOR BOOTS OR SHOES.

SPECIFICATION forming part of Letters Patent No. 635,033, dated October 17, 1899.

Application filed January 30, 1899. Serial No. 703,801. (No model.)

To all whom it may concern:

Be it known that I, GILBERT C. BEMIS, a citizen of the United States, residing at Laconia, in the county of Belknap and State of New Hampshire, have invented a new and useful Adjustable Last for Boots or Shoes, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

My present invention relates to relast appliances or novel construction and combinations in adjustable lasts designed to be employed as second or insertible lasts for introduction into boots or shoes after the original or first last has been removed (which is commonly done at an early stage in the manufacture) and adapted for keeping the uppers of the boots or shoes in proper shape and condition during the subsequent processes and operations of their manufacture or for purposes of support and display of boots or shoes.

The prime objects of my invention are to provide a light-weight adjustable last convenient for manipulation and efficient for the purposes stated, to make a relasting appliance that is readily adjustable to different sizes and forms of shoes, also to provide an adjustable last that will collapse sufficiently to be removed from the work without unbuttoning or unlacing the shoe. These objects I attain by a last or mechanism the nature and operation of which is substantially as illustrated and described, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 represents a vertical longitudinal section of a last mechanism embracing my invention. Fig. 2 represents a bottom view of the same. Fig. 3 is a front view of the heel-section, and Fig. 4 a transverse section through the fore part at line X X.

Referring to the parts of my adjustable last as shown on the drawings, A denotes the heel-section, made as a rigid block, of wood or suitable material, externally shaped to the proper contour of a last-heel and preferably having its front end formed with a transverse forwardly and upwardly inclined face, as at *a*. The incline may extend from the heel-seat to

a point at the top a short distance rearward from the instep.

B indicates an instep-form, its top surface 3 shaped to the contour of an instep, its rear end 4 adapted to abut against the inclined face of the heel-section, and its fore end 5 formed on a thin paper to slip beneath the toe-supporting shell C. The under surface 6 of the form B may be flat, curved, or under-chambered in shape to give a suitable seating thereof upon the spreader-sack. The rear end 4 is loosely linked to the heel-section A by a running loop *b* or shiftable connecting-joint, so that the instep form is movable up and down or can rise and fall in relation to the heel-section. The rear end 4 of the instep-form is preferably made slightly rounded where it seats against the heel-block face, so as to avoid rigidity in the joint and to permit limited rise or fall of the fore end 5, while affording free sliding action of the rear end up and down the inclined surface *a*.

C indicates a toe-supporting form employed in combination with the variable toe portion of the adjustable last for maintaining a fixed shape over the same and preserving the shape of the shoe-upper at its toe, said supporting-form providing within its interior a hollow or space of sufficient capacity for allowing the expansive and contractile adjustment of the last-body, and thus permitting the variations in relative position of adjustment, which will enable a single expansible last-body to be used in different styles, sizes, and widths of shoes without regard to the particular form of the toe portion of the adjustable body of the last itself. The toe-supporting form C is best formed of thin comparatively stiff sheet-steel and is shaped in any instance to correspond with the particular style or dimension of shoe in which it is to be used. Said shell is unattached to the other parts of the mechanism, thereby permitting interchanges for the various sizes and shapes of shoe-toes being manufactured.

D indicates a distensible body member or pneumatic spreader consisting of a suitably-shaped sack or receptacle formed of an airtight flexible fabric or pliable elastic material capable of inflation and collapsing action, as required, arranged in connection with

the heel-section A and extending forward beneath the instep-form B for supporting and adjusting the same. The spreader-sack or distensible body member has its mouth or rear end connected with an air-pipe or tubular spindle E, that projects through the top of the heel-section and through which pipe air can be injected into and discharged from the interior of the spreader. A suitable check-valve is provided for controlling the air-passage, said valve automatically closing outward, so as to retain the air within the spreader when inflated.

F indicates a sole-frame supported in connection with the heel-section and extending forward under the spreader or distensible body member D. Said sole-frame preferably consists of a comparatively stiff metal plate conforming to the inner-sole shape in general curvature and of such area dimension as will readily enter the shoe. It serves as a support for the flexible body or sack, sustains the pressure of the inflation, and obviates any tendency thereof to change the conformation of the sole when the last is inflated and distended, and protects the sack fabric from puncture by any lasting tacks or points that might be found projecting from the insole. Said sole-frame can be permanently attached to the heel-section A, if in any instance so desired, but is preferably made readily detachable therefrom by interlocking devices or insertion of stay-studs *f*, so that the sole-frame may be interchanged with others of different shape and curvature to accommodate various styles of shoes. Said frame may, if in any instance so desired, be formed of a wire rim open or covered with a suitable fabric to support and protect from puncture the pneumatic spreader-sack.

The air-tube E and spreader-sack D may be secured to the heel-section in any suitable manner for effecting their operation substantially as set forth. In the present instance I have shown the tube as fitting within a hole bored vertically through the heel-block, a cavity or chamber 8 being formed in the block for the reception of the end of the sack. A valve-seat *e* is formed in the tube, an upwardly-closing valve or puppet I is arranged below the seat, having a stem I', that projects upward within the tube, and an expanding coil-spring J is disposed beneath the valve for normally closing it. The foot of the spring rests upon a perforated nipple *m*, screwed into the end of the tube, and the mouth of the sack is slipped over or wired around the tube end above the head of the nipple, thus making a convenient and non-leaking connection. The tube can be secured in the heel-block by a transversely-disposed pin P, inserted in the block and engaging a groove or nick in the side of the tube, as indicated, or in other convenient manner. The tube E may be of any convenient or desired length and its upper end fitted for juncture with the nozzle of any suitable air-compress-

ing apparatus for pneumatically distending the spreader D, as required. The air can be readily discharged by inserting a rod into the tube against the end of the valve-stem I', thereby opening the valve I.

The dotted lines S S' indicate the outline of the shoe and illustrate the relation of the various parts as fitting therein when in distended condition.

The dotted lines at B' indicate the position assumed by the instep-form when the spreader is collapsed.

In the operation the adjustable last is inserted into the boot or shoe in a collapsed condition. (See dotted lines, Figs. 1 and 4.) The end of the tube is then placed in connection with an air-compressor and air is forced into the spreader-sack or body member D, pneumatically distending the same and pressing the instep-form B upward until it gives a firm self-adjusted bearing along the eyelet-facings within the shoe, the upward movement of its rear end 4 on the inclined front *a* of the heel-section causing said instep-form to move forward to proper position of self-adjustment, accordingly as the shoe is of larger or smaller size, while the sides of the upper at L L', between the instep-form and sole, are filled out and supported by the sides of the flexible spreader or body member pneumatically pressed directly against the interior of the upper, and the shape of the toe is maintained by the steel supporting-shell C, said shell being substantially fixed in position while the varied adjustments of the last-toe takes place within it. When it is desired to remove the adjustable last, a rod or tool inserted into the tube E depresses and opens the valve I, letting the air escape. The spreader A then immediately collapses, dropping the instep-form, as per dotted lines B', and reducing the last, so that it can be readily taken from the shoe, in some instances without unlacing or unbuttoning the shoe.

It will be noticed that the fore end of the instep-form can extend more or less under the toe-shell, which is an unattached part, and as the sole-frame is somewhat shorter than the shoe-sole S', and the spreader-body being distensible to greater or less extent, a single last of the character described can be used for a variety of sizes and shapes of shoes, a toe-supporting shell C of proper form being used in each shoe, inserted therein at the original lasting and left in the shoe when the primary last is withdrawn and the adjustable last inserted. The non-flexible instep-form firmly maintains the shape of the shoe along the laced instep or eyelet facings, and its end-wise movement affords ready self-adjustment thereof to different shoes, while the flexible body member serves for placing said instep-form with all the advantages of ample distension and ready release.

In some instances my adjustable last can be used without the bottom plate F, the sack or distensible body member acting directly

against the insole of the shoe and upwardly against the under side of the instep-form, the operation of the distending parts being in such case practically the same in character as that above described, but the removable sole-frame or bottom piece F being left off from the heel-section when inserting the last into the shoe. Such use and practice I desire to include as within the scope of my invention.

It may also be noted that the feature of a hollow rigid toe-supporting form in combination with the variable toe portion of an expansible or adjustable last can be successfully applied to adjustable lasts or relast appliances wherein the construction and operation of the adjusting means is varied from that herein shown, and I desire to include the combination when so employed as within the scope of my invention.

I claim as my invention—

1. A pneumatically-distensible last provided with an inflatable flexible body member and a non-flexible instep-form, for the purpose set forth.

2. A pneumatically-distensible last provided with an inflatable body member of flexible or elastic fabric, a non-flexible instep-form seated thereon, and a rigid toe-support affording space therein for the forward extension of said parts, in accommodation of varying adjustment for the size or shape of a shoe, substantially as set forth.

3. An adjustable last comprising a rigid heel-section, a non-flexible movable instep-form, and an underlying expansible and contractile supporter for controlling said instep-form, substantially as set forth.

4. An adjustable last, comprising a heel-section, a stiff bottom part or sole-frame attached thereto, and a movable instep-form; in combination with an inflatable and collapsible body member between said sole-frame and instep-form, and means for inflating and collapsing said body, for the purpose set forth.

5. In a pneumatic adjustable last, the combination with a solid heel block or section, and a pneumatically-inflatable spreader or distensible body member formed of flexible or elastic fabric; of a sole frame or plate constituting a non-puncturable guard beneath

said distensible body member, for the purpose set forth.

6. In an adjustable last, the combination of a rigid heel-section, a sole-frame removably attached thereto, an upwardly-and-downwardly movable instep-form adapted for forward and rearward adjustment in relation to said heel-section, an inflatable spreader disposed between said sole-frame and instep-form, an inlet or tube for injecting air into said spreader, and a stop or valve for retention of the air therein, substantially as set forth.

7. In combination, the heel section or block having a forwardly-inclined front surface, the instep-form having its rear end movably linked to said heel-section and abutting against said inclined surface, a pneumatically-inflatable body member underlying said instep-form, means for conducting air into and from said body member, a check-valve for retaining the inflation, and facilities for the release of the same, substantially as set forth.

8. The movable instep-form adapted to extend at its fore end beneath the toe-supporting shell; in combination with the heel-section block, the unattached toe-supporting shell, and a distensible body member beneath said instep-form, for the purposes set forth.

9. The combination, of the heel-section block, the unattached toe-supporting shell, the instep-form movably connected to said block and having its fore end adapted to slip beneath said shell, a flexible inflatable body-sack extending beneath said instep-form, the air-pipe supported in said heel-section and having said body-sack connected therewith, a check-valve provided with an upwardly-projecting stem within said tube, and a spring pressing said check-valve to its seat, for the purposes set forth.

10. In a last, for the purpose specified, the combination of an expansible and contractible last-body, and a hollow toe-supporting form within which the toe portion of the last-body is movably adjustable.

Witness my hand this 20th day of January, 1899.

GILBERT C. BEMIS.

Witnesses:

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ELLA P. BLENUS.