May 6, 1947. J. FITZPATRICK 2,420,235

LAST

Filed Jan. 11, 1946 3 Sheets-Sheet 1

Fig. 1.

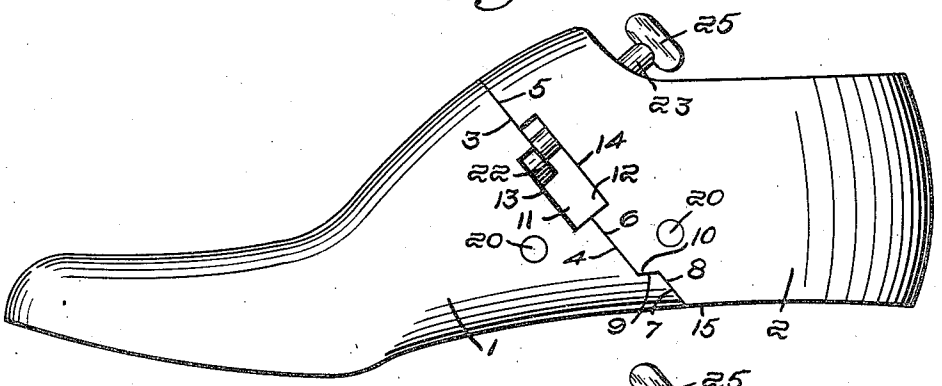


Fig. 2.

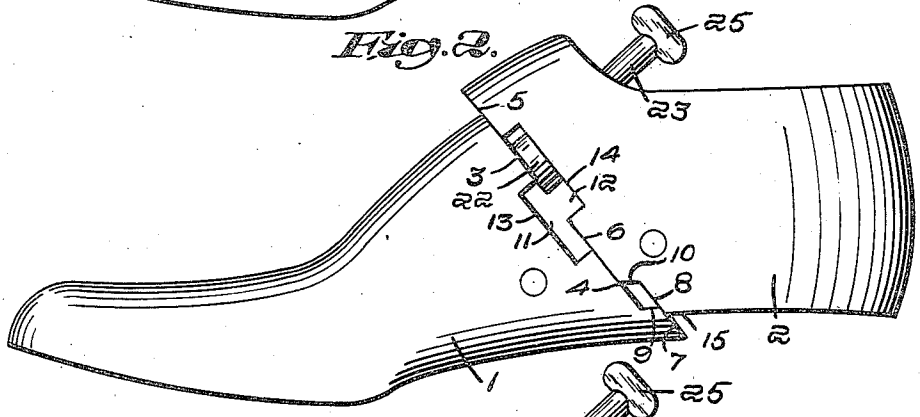
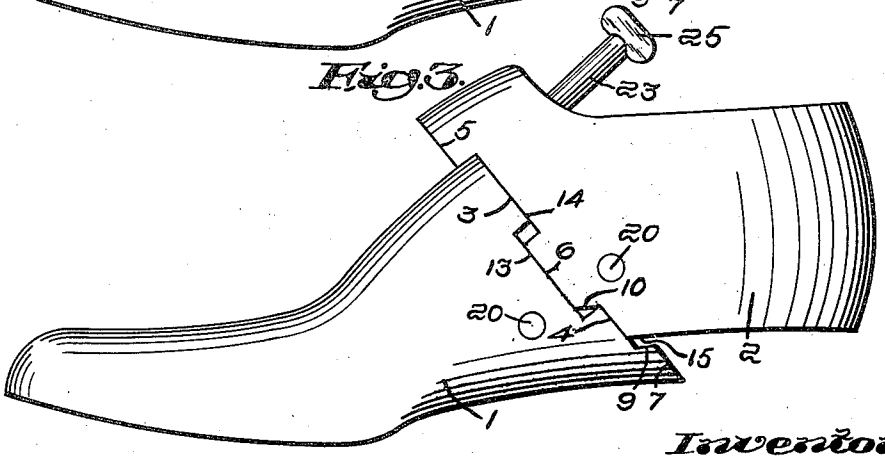


Fig. 3.



Inventor:
Jeremiah Fitzpatrick
by John E. R. Hayes
Attorney

May 6, 1947. J. FITZPATRICK 2,420,235

LAST

Filed Jan. 11, 1946 3 Sheets-Sheet 2

Fig. 4.

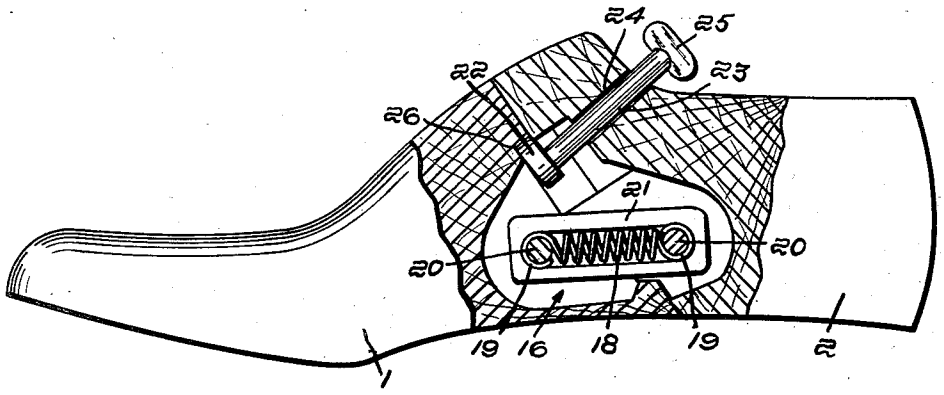


Fig. 5.

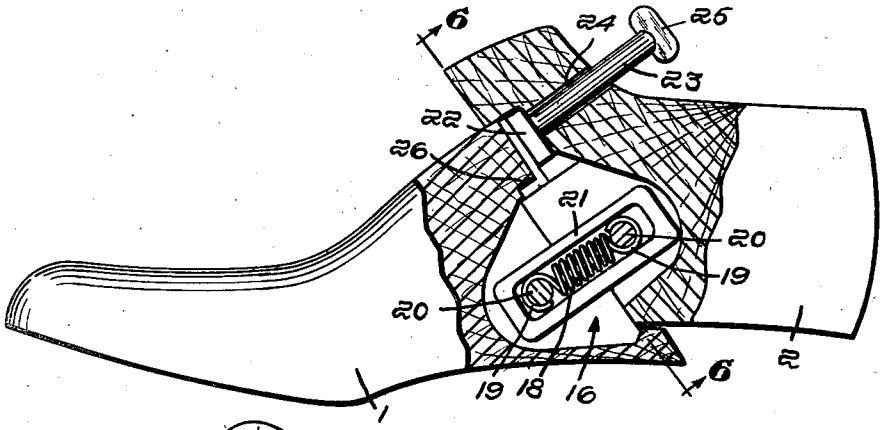
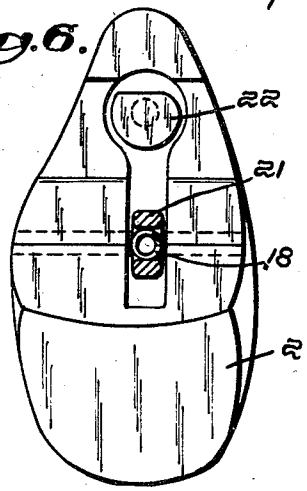


Fig. 6.



Inventor:
Jeremiah Fitzpatrick
By John E. R. Hayes
Attorney

May 6, 1947. J. FITZPATRICK 2,420,235

LAST

Filed Jan. 11, 1946 3 Sheets-Sheet 3

Fig. 7.

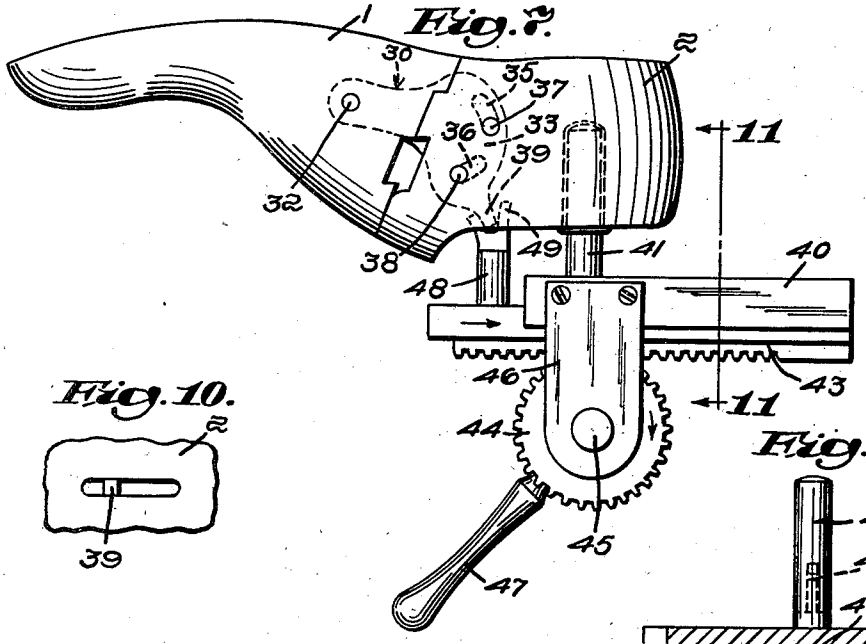


Fig. 10.

Fig. 11.

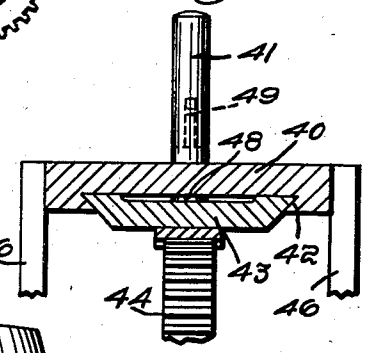


Fig. 8.

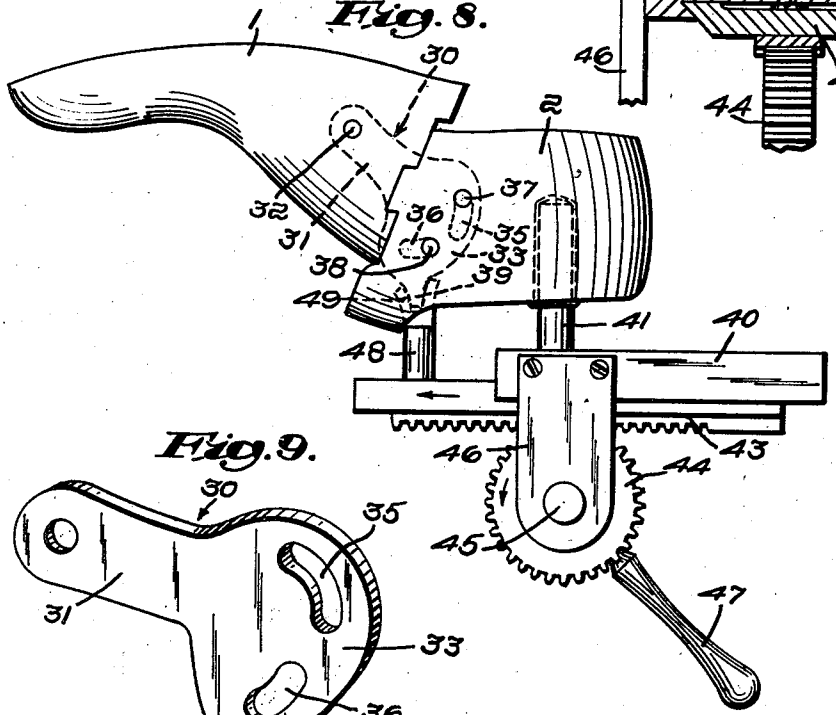


Fig. 9.

Inventor:
Jeremiah Fitzpatrick
By John E. R. Hayes
Attorney

Patented May 6, 1947

2,420,235

UNITED STATES PATENT OFFICE

2,420,235

LAST

Jeremiah Fitzpatrick, Weymouth, Mass., assignor to Arnold Bros. Company, Weymouth, Mass., a corporation of Massachusetts

Application January 11, 1946, Serial No. 640,574

11 Claims. (Cl. 12—136)

1

The invention relates to an improvement in divided lasts of the extensible and contractible type, and especially of a type in which the contraction is effected without turning the heel part of the last.

The essential object of the invention is to provide a new and simplified way of obtaining the extension and contraction of the last; the invention pertaining essentially to the way this result is obtained.

The invention embodies also certain other new features, all of which can best be seen and understood by reference to the drawings in which—

Fig. 1 is a side elevation of the last when in full extension.

Fig. 2 is a side elevation of the position occupied by the respective parts of the last during the initial stages of the contracting operation.

Fig. 3 is a side elevation showing the relative position of the two parts of the last when the last is in full contraction.

Fig. 4 is a view partly in side elevation and partly in vertical section of the last when in full extension as shown in Fig. 1.

Fig. 5 is a view partly in side elevation and partly in vertical section of the last when in full contracted position as shown in Fig. 3.

Fig. 6 is a section substantially along the line 6—6 of Fig. 5.

Fig. 7 is a plan view of the extended last mounted upon a lasting bed and with which last and bed are associated parts later to be referred to, by which the last may be extended or contracted when mounted upon the bed.

Fig. 8 is the same as Fig. 7 excepting that the last is shown in a contracted position with change in the position of various of the operating parts by which such contraction is effected.

Fig. 9 is a side elevation of the plate later to be referred to, which connects the heel and toe portions of the last and by the turning of which the last is extended or contracted.

Fig. 10 is a fragmentary view of the top of the last; and

Fig. 11 is a section on the line 11—11 of Fig. 7.

1 represents the fore part of the last, 2 the heel part. The fore and heel parts of the last are separated, as when the last is in full extension as shown in Fig. 1, by two sets of cross cuts both forwardly inclined with relation to the longitudinal axis of the last when in full extension as shown in Fig. 1, and one cut spaced from the other.

The cuts provide the respective parts of the last with various surfaces. By the first cut of

2

those previously referred to the fore part of the last is provided with spaced surfaces 3 and 4; the heel part of the last with spaced surfaces 5 and 6. By the second one of the cuts of those previously referred to the fore part of the last is provided with a surface 7; the heel part with a surface 8. By another cut the fore part of the last is provided with a surface 9 which extends substantially in the direction of, or parallel to, the longitudinal line of the last; the heel part with a corresponding surface 10.

The two parts of the last are also provided with sockets inset from the line of the first of the cuts previously referred to; the fore part of the last being provided with a socket 11 lying between the surfaces 3 and 4 and the heel part with a socket 12 lying between the surfaces 5 and 6. Each of these sockets is of a depth substantially equal to the distance which separates the planes of the two cuts previously referred to, or substantially equal to the longitudinal extent of the surfaces 9 and 10; the socket 11 being provided with a bottom surface 13 and the socket 12 with a bottom surface 14. Both the surfaces 13 and 14 are inclined surfaces substantially parallel with those formed by the cut first referred to on the respective two parts of the last.

When the last is fully extended as shown in Fig. 1, or partially extended as shown in Fig. 2, the surfaces on the respective parts of the last and the respective sockets will bear a changed relationship to each other.

When the last is in full extension as shown in Fig. 1, the surfaces 3 and 5, 4 and 6, will lie in meeting engagement in the plane of the first one of the cuts previously referred to; the sockets 11 and 12 will lie oppositely disposed. The surfaces 7 and 8 will lie in meeting engagement in the plane of the second one of the cuts previously referred to. The surfaces 9 and 10 will lie in meeting engagement in the plane of the third one of the cuts previously referred to.

When the last is in full contraction as shown in Fig. 3, the surface 5 of the heel part will extend over and lie above the rear end of the fore part. That portion of the fore part having the surface 3 will extend into the socket 12 of the heel part and the surface 3 will lie in meeting engagement with the bottom 14 of this socket. That portion of the heel part having the surface 6 will extend to the socket 11 of the fore part, and the surface 6 will lie in engagement with the bottom 13 of this socket. The surface 8 of the heel part will then lie in meeting engagement with the surface 4 of the fore part. The surface

10 of the heel part will then lie within the socket 11 of the fore part, while the surface 9 of the fore part will extend beneath the bottom side 15 of the heel part.

The contraction of the last from its state of full extension as shown in Fig. 1 to that of full contraction as shown in Fig. 3 is accomplished first by sliding the inclined surfaces of the heel part over their meeting surfaces on the fore part. The surface 5 will slide over the surface 3, the surface 6 over the surface 4, and the surface 8 over the surface 7. This sliding will occasion some contraction of the last owing to the diagonal inclination of these sliding surfaces. A point is reached, however, when further rapid and material contraction takes place, this when the surface 5 slides off the end of the surface 3, the surface 6 off the end of the surface 4, and the surface 8 off the end of the surface 7. The ensuing rapid contraction of the last is in the direction or plane of its longitudinal axis, or parallel thereto. At the end of such contracting movement that portion of the heel part bearing the surface 5 will extend over and lie above the rear end of the fore part; the portion of the fore part bearing the surface 3 will have entered the socket 13; the portion of the heel part bearing the surface 6 will have entered the socket 11, and the surface 8 of the heel part will lie in engagement with the surface 4 of the fore part. During this whole contracting operation there is no tipping or turning of the heel part which maintains at all times its longitudinally aligned position, the only change during the contraction being that in parallelism.

The two parts of the last are maintained at all times in drawing engagement with each other. A socket 16 is formed within the respective parts of the last and within this socket is located a coil spring 18. This spring is provided at both ends with loops 19 through which extend pins 20 located, respectively, in the heel and fore parts of the last, the arrangement being such that the spring will lie at all times tensioned between these points whatever the contraction of the last may be. The spring is contained within a metal cage 21 and when the last is in its full state of expansion the loops on the spring will be brought into engagement with the ends of the cage substantially as shown in Fig. 4, which prevents further extension of the last. The spring becomes highly tensioned when the last is in its full state of expansion and at such time the line between the pins 20 will lie substantially within, or parallel to, the longitudinal line of the last, thus giving full potency to the action of the spring in exerting draft upon the two parts of the last. When the last is moved into its contracted state as shown in Fig. 3, then the spring becomes contracted and the line between the pins is lessened, the spring preferably, however, being still under some degree of tension.

When the last has reached the limit of its full extension it is locked in such position by means of a cam 22. This cam is borne by a cam shaft 23 which turns and is slidable within a way 24 formed in the heel part. The shaft is moved by a thumb piece 25 upon its end. During the operation of contracting the last the cam is withdrawn to lie within a recess 26 formed in the heel part of the last. When thus recessed the cam will not interfere with the contracting operation. When the last has been expanded to a point approaching the full extent of its expansion the cam may be moved to lie within the upper part

of its socket 11, and when turned will engage a cam edge 28 formed in that portion of the fore part lying above the socket 11. As the cam is turned its engagement with the cam surface will tend to further depress the heel part and move it into its final extended position and maintain it in such position until the cam is released.

In Figs. 7 and 8 there is shown a means for connecting the fore and heel parts of the last by which it may be extended or contracted and which is especially adaptable for attaining these ends when the last is mounted on the lasting bed. The means comprises a plate 30 extending between the fore and heel parts of the last and socketed to turn therein. The general form of the plate is shown in Fig. 9 where the portion 31 of the plate has socketed extension into the fore part of the last where it is mounted to turn upon a crosspin 32 passed through the body of the fore part.

The portion 33 of the plate socketed to turn within the heel part of the last is provided with cam forming slots 35 and 36, through which extend, respectively, crosspins 37, 38 passed through the body of the heel part. The relation of these slots to one another, and to the point of pivotal turning of the plate about the pin 32 in the fore part, is such that when the last is in full extension as shown in Fig. 7, then upon turning the plate forward in the direction of the fore part of the last the heel part will be lifted and moved forward in an inclined direction and afterwards in a forward direction substantially within or parallel to the longitudinal axis of the last, thus effecting its contraction first gradually and then abruptly. During these operations the heel part of the last will not turn but be lifted with translatory movement attended with forward projection.

These ends are secured by the bearing of the cam edges of the respective slots against the pins extending through them, the engagement of the pins with the ends of these slots, as shown in Fig. 8, being determinate with the contracted state of the last. Reversely, when the plate is moved back in the general direction of the heel part of the last its fore and heel parts will first be abruptly extended and then gradually further extended until brought into a position of full extension, as shown in Fig. 7, when the pins extending through the slots will have reached the ends of the slots determinate with the full extended position of the last, and in which position it will be maintained.

The plate is turned by a projecting arm 38 movable in reverse directions, the slot in the last which received the plate being extended to provide in the head of the last a path or way along which this arm is movable. (See Fig. 10.)

The arm may be moved by hand but the construction is such as especially lends itself to movement of the arm for extending or contracting the last, when the last is mounted upon the lasting bed, as shown in Figs. 7 and 8, where 40 represents the lasting bed and 41 the post of which the last is mounted in the usual manner.

Formed on the under side of the bed is a way 41 in which slides a rack 43. This rack is moved in a forward and reverse horizontal direction by a pinion 44 mounted on the shaft 45 turning in hangers 46 depending from the sides of the bed. The pinion is turned by a handle 47 affixed to it.

Borne by the body of the rack and upstanding therefrom, substantially parallel with the post 41 on which the last is mounted, is a finger 48 having a split end 49 which engages the arm 39

and by which the arm may be moved in reverse directions for turning the plate 30 as previously explained for extending or contracting the last, depending upon the direction the rack is moved by the hand controlled pinion.

A further advantage is that the last will be fixedly maintained when extended or contracted.

I claim:

1. A divided last having a fore part and a heel part provided with intermediate forwardly inclined surfaces and between certain of which surfaces sockets are formed, those of said inclined surfaces between which the sockets are formed meeting in a plane forwardly inclined to the longitudinal axis of the last when the last is in extension, and certain other of said surfaces then meeting in a plane substantially parallel with said first mentioned plane but rearwardly spaced therefrom, said surfaces being so related that said heel part of the last may slide in said planes and upon change in the relative position of said surfaces be movable longitudinally with entry by certain of said surfaces into and out of said sockets whereby the longitudinal extension or contraction of the last will be accomplished by movement of the heel part along lines substantially parallel to the longitudinal axis of the last, and means connecting said parts whereby the relative positions thereof may be changed as aforesaid and the last be extended or contracted.

2. A divided last having a fore part and a heel part provided with intermediate forwardly inclined surfaces and between certain of which surfaces sockets are formed, those of said inclined surfaces between which the sockets are formed meeting in a plane forwardly inclined to the longitudinal axis of the last when the last is in extension, and certain other of said surfaces then meeting in a plane substantially parallel with said first mentioned plane but rearwardly spaced therefrom, said surfaces being so related that said heel part of the last may slide in said planes and upon change in the relative position of said surfaces be movable longitudinally with entry by certain of said surfaces into and out of said sockets whereby the longitudinal extension or contraction of the last will be accomplished by movement of the heel part along lines substantially parallel to the longitudinal axis of the last, and means connecting said parts whereby the relative positions thereof may be changed as aforesaid and the last be extended or contracted and any longitudinal extension thereof be limited.

3. A divided last having a fore part and a heel part provided with intermediate forwardly inclined surfaces and between certain of which surfaces sockets are formed, those of said inclined surfaces between which the sockets are formed meeting in a plane forwardly inclined to the longitudinal axis of the last when the last is in extension, and certain other of said surfaces then meeting in a plane substantially parallel with said first mentioned plane but rearwardly spaced therefrom, said surfaces being so related that said heel part of the last may slide in said planes and upon change in the relative position of said surfaces be movable longitudinally with entry by certain of said surfaces into and out of said sockets whereby the longitudinal extension or contraction of the last will be accomplished by movement of the heel part along lines substantially parallel to the longitudinal axis of the last, means connecting said parts whereby the relative positions thereof may be changed as

aforesaid and the last be extended or contracted, and means for fixedly maintaining said parts of the last when the last is in extension.

4. A divided last having a fore part and a heel part provided with intermediate forwardly inclined surfaces and between certain of which surfaces sockets are formed, those of said inclined surfaces between which the sockets are formed meeting in a plane forwardly inclined to the longitudinal axis of the last when the last is in extension, and certain other of said surfaces then meeting in a plane substantially parallel with said first mentioned plane but rearwardly spaced therefrom, said surfaces being so related that said heel part of the last may slide in said planes and upon change in the relative position of said surfaces be movable longitudinally with entry by certain of said surfaces into and out of said sockets whereby the longitudinal extension or contraction of the last will be accomplished by movement of the heel part along lines substantially parallel to the longitudinal axis of the last, means connecting said parts whereby the relative positions thereof may be changed as aforesaid and the last be extended or contracted, and means for fixedly maintaining said parts of the last when the last is in extension or contraction.

5. A divided last having a fore part and a heel part provided with intermediate forwardly inclined surfaces and between certain of which surfaces sockets are formed, those of said inclined surfaces between which the sockets are formed meeting in a plane forwardly inclined to the longitudinal axis of the last when the last is in extension, and certain other of said surfaces then meeting in a plane substantially parallel with said first mentioned plane but rearwardly spaced therefrom, said surfaces being so related that said heel part of the last may slide in said planes and upon change in the relative position of said surfaces be movable longitudinally with entry by certain of said surfaces into and out of said sockets whereby the longitudinal extension or contraction of the last will be accomplished by movement of the heel part along lines substantially parallel to the longitudinal axis of the last, means connecting said parts whereby the relative positions thereof may be changed as aforesaid and the last be extended or contracted, a cam normally recessed when in non-operative position in said heel part and movable into an operative position in said fore part to engage a surface therein as the cam is turned when the last is approaching its limit of extension whereby the extension of the last will be completed by the turning of said cam, and means whereby said cam may be moved into and out of its operative and inoperative positions and turned when in its operative position.

6. A divided last having a fore part and a heel part provided with intermediate forwardly inclined surfaces and between certain of which surfaces sockets are formed, those of said inclined surfaces between which the sockets are formed meeting in a plane forwardly inclined to the longitudinal axis of the last when the last is in extension, and certain other of said surfaces then meeting in a plane substantially parallel with said first mentioned plane but rearwardly spaced therefrom, said surfaces being so related that said heel part of the last may slide in said planes and upon change in the relative position of said surfaces be movable longitudinally with entry by certain of said surfaces into and out of said sockets whereby the longitudinal extension or

contraction of the last will be accomplished by movement of the heel part along lines substantially parallel to the longitudinal axis of the last, a cam forming plate interposed between said parts of the last and socketed to turn therein, means for pivotally securing said plate to the fore part of the last, means securing said plate to the heel part of the last whereby said parts of the last will be connected and the relative positions thereof be changed as aforesaid for extending or contracting the last as said plate is turned, and means whereby said plate may be turned.

7. A divided last having a fore part and a heel part provided with intermediate forwardly inclined surfaces and between certain of which surfaces sockets are formed, those of said inclined surfaces between which the sockets are formed meeting in a plane forwardly inclined to the longitudinal axis of the last when the last is in extension, and certain other of said surfaces then meeting in a plane substantially parallel with said first mentioned plane but rearwardly spaced therefrom, said surfaces being so related that said heel part of the last may slide in said planes and upon change in the relative position of said surfaces be movable longitudinally with entry by certain of said surfaces into and out of said sockets whereby the longitudinal extension or contraction of the last will be accomplished by movement of the heel part along lines substantially parallel to the longitudinal axis of the last, a plate interposed between said parts of the last and socketed to turn therewith, said plate having cam slots therein presenting cam forming edges, means for pivotally securing said plate to the fore part of the last, pins in the heel part of the last extending, respectively, through the slots in said plate and engageable with the cam forming edges thereof whereby said parts of the last will be connected and the relative positions thereof be changed as aforesaid for extending or contracting the last as said plate is turned, and means whereby said plate may be turned.

8. A divided last having a fore part and a heel part provided with intermediate surfaces on which the heel part of the last is movable along lines substantially parallel to the longitudinal axis of the last for extending or contracting the last, a cam forming plate interposed between said parts of the last and socketed to turn therein, means for pivotally securing said plate to the fore part of the last, means securing said plate to the heel part of the last whereby said parts of the last will be connected and the relative positions thereof be changed as aforesaid for extending or contracting the last as said plate is turned, and means whereby said plate may be turned.

9. A divided last having a fore part and a heel part provided with intermediate surfaces on which the heel part of the last is movable along lines substantially parallel to the longitudinal

axis of the last for extending or contracting the last, a plate interposed between said parts of the last and socketed to turn therewith, said plate having cam slots therein presenting cam forming edges, means for pivotally securing said plate to the fore part of the last, pins in the heel part of the last extending, respectively, through the slots in said plate and engageable with the cam forming edges thereof whereby said parts of the last will be connected and the relative positions thereof be changed as aforesaid for extending or contracting the last as said plate is turned, and means whereby said plate may be turned.

10. A divided last having a fore part and a heel part provided with intermediate surfaces on which the heel part of the last is movable along lines substantially parallel to the longitudinal axis of the last for extending or contracting the last, a cam forming plate interposed between said parts of the last and socketed to turn therein, means for pivotally securing said plate to the fore part of the last, means securing said plate to the heel part of the last whereby said parts of the last will be connected and the relative positions thereof be changed as aforesaid for extending or contracting the last as said plate is turned, means whereby said plate may be turned, and means for turning said plate for extending or contracting the last when the last is mounted on a lasting bed.

11. A divided last having a fore part and a heel part provided with intermediate surfaces on which the heel part of the last is movable along lines substantially parallel to the longitudinal axis of the last for extending or contracting the last, a plate interposed between said parts of the last and socketed to turn therewith, said plate having cam slots therein presenting cam forming edges, means for pivotally securing said plate to the fore part of the last, pins in the heel part of the last extending, respectively, through the slots in said plate and engageable with the cam forming edges thereof whereby said parts of the last will be connected and the relative positions thereof be changed as aforesaid for extending or contracting the last as said plate is turned, means whereby said plate may be turned, and means for turning said plate for extending or contracting the last when the last is mounted on a lasting bed.

JEREMIAH FITZPATRICK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,685,783	Krentler	Oct. 2, 1928

FOREIGN PATENTS

Number	Country	Date
631,837	French	Sept. 20, 1927