Dec. 31, 1935. W. R. BARCLAY ET AL 2,025,704

HEEL AND HEEL SEAT FITTING

Filed Nov. 24, 1933

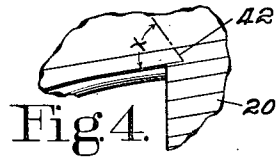


Fig.4.

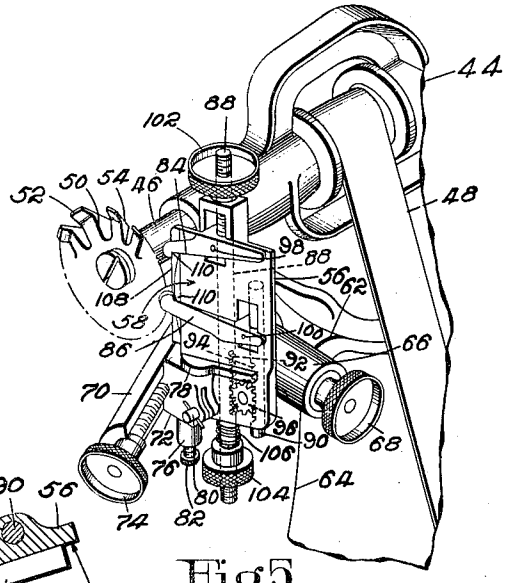


Fig.5.

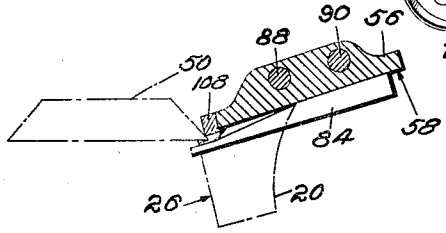


Fig.6.

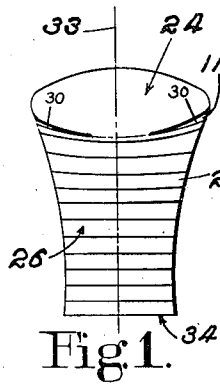


Fig.1.

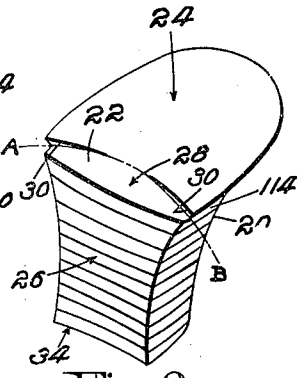


Fig.2.

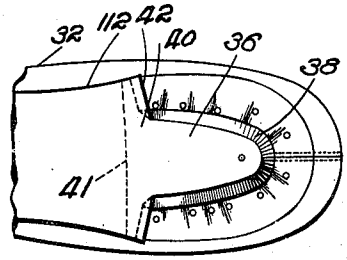


Fig.3.

INVENTORS.
William R. Barclay
Cyril H. James
William D. Bacon
By their Attorney
Harlow M. Davis

Patented Dec. 31, 1935 2,025,704

UNITED STATES PATENT OFFICE

2,025,704

HEEL AND HEEL-SEAT FITTING

William Roderick Barclay, Cyril Harry James, and William Isaac Bacon, Leicester, England, assignors to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application November 24, 1933, Serial No. 699,576
In Great Britain December 16, 1932

9 Claims. (Cl. 12—142)

This invention relates to the manufacture of shoes and is illustrated with reference to a shoe having a novel heel and heel-seat construction and to improvements in methods of fitting heels to shoes.

In United States Letters Patent No. 1,984,453, granted December 18, 1934 on an application filed in the names of Bates, Barclay and Hazelton, there is described a method of shoemaking in which heels built up from lifts are trimmed to shape and are preferably scoured before attachment to shoes. It is an object of this invention to provide an improved heel and heel-seat construction which may be advantageously used in the manufacture of shoes such, for example, as those described in the above-mentioned United States Letters Patent.

With the above object in view and in accordance with a feature of this invention the heel illustrated herein is rabbeted at its upper forward portion to provide a sole-supporting face or ledge which extends from one side of the heel to the other for a substantial distance rearwardly of the breast of the heel, and to provide shoulders which extend generally heightwise of the heel from the lateral portions of the rear end of the sole-supporting ledge and which are concave forwardly of the heel. The sole-supporting ledge of the illustrated rabbet is concave in accordance with the transverse curvature of the shank portion of the shoe to which the heel is to be attached, and the shoulders are undercut and engage respectively transversely extending abutments formed on the sole of the shoe. By providing a rabbet having shoulders which are laterally concave the heel may be readily oriented to its correct position relatively to the heel-seat portion of the shoe preparatory to attaching the heel to the shoe.

The illustrated transversely extending abutments formed upon the sole, in accordance with another feature of this invention, are of planar form and are constructed and arranged for engagement with corresponding shoulders of the rabbet adjacent to the sides of the heel before they yield slightly under pressure of the heel to engage portions of the shoulders which are spaced from the sides of the heel. In such a construction a closed joint between the respective abutments and shoulders is insured adjacent to the sides of the heel. During the heel-attaching operation the portion of the sole supported by the ledge of the rabbet is compressed between the heel and the shoe upper and is forced toward the shoulders of the rabbet, thereby further insuring the formation of a closed joint between the heel and the sole.

The present invention in its method aspect comprises fitting an uncovered or built-up heel to a shoe characterized by forming a rabbet at the upper forward portion of a heel, reducing the heel-seat portion of the sole to form a tongue shaped for engagement within the attaching face of the heel and to form between the shank portion of the sole and the tongue a filler portion which is constructed and arranged for engagement within the rabbet and projects beyond the sides of the heel positioned upon the shoe, attaching the heel to the shoe, and trimming the projecting lateral margins of the filler portion flush with the respective sides of the heel and jointing the heel and the shank portion of the sole.

With the above and other objects and features in view the invention will now be described in connection with the accompanying drawing and pointed out in the claims.

In the drawing,

Fig. 1 is a front view of a built-up heel, the upper forward portion of which has been rabbeted to provide a sole-supporting ledge and a pair of sole-engaging shoulders extending above the rear lateral portions of the ledge;

Fig. 2 is a perspective view of the heel illustrated in Fig. 1;

Fig. 3 is a plan view of the heel-seat portion of a shoe, the outsole of which has been trimmed to provide a heel seat which has been fitted to receive the heel shown in Figs. 1 and 2;

Fig. 4 is a fragmentary side view of a finished shoe illustrating the joint formed between the heel and the shoe;

Fig. 5 is a perspective view of apparatus which may be advantageously used to form the rabbet in the heel shown in Figs. 1 and 2; and

Fig. 6 is a diagrammatic view illustrating the heel being rabbeted by the machine illustrated in Fig. 5.

The invention is described with reference to a built-up heel **20** provided with a rabbet **22** (Fig. 2) which is positioned between the attaching face **24** and the breast **26** of the heel and comprises a sole-supporting surface or ledge **28** extending from one side of the heel to the other for a considerable distance rearwardly of the breast face **26** of the heel, and a pair of shoulders **30** which extend generally heightwise of the heel from the rear end of the ledge **28**. The shoulders **30** which serve to locate the heel **20** on a shoe **32** are of decreasing height as they approach the median

plane 33 (Fig. 1) of the heel and are spaced somewhat from each other by reason of the merging of the sole-supporting ledge with the attaching face 24 of the heel.

The rear and side surfaces of the illustrated heel have already been shaped and scoured by the use of machines such as those described in the above-mentioned United States Letters Patent No. 1,984,453. The shoulders 30, which are undercut, as indicated by the angle X (Fig. 4), do not extend at right angles to the median plane of the heel but each extends transversely of the heel in a curve and may be said to be concave forwardly of the heel as viewed from above, the base edges of such shoulders lying in a circular arc, as indicated by dotted lines A—B, Fig. 2. The sole-supporting ledge 28 of the rabbet 22 is curved throughout the width of the heel, this being due to the fact that the arc A—B, which extends along the base edges of the shoulders 30 lies in a plane which is disposed at an angle to the plane of the tread face 34 of the heel. Accordingly, the lateral portions of the base edges of the shoulders 30 are slightly higher than the inner portions of such base edges. The sole-supporting ledge 28 may be defined as cylindrical, and the shoulders 30 may be defined as being conical.

The heel-seat portion of the sole of the shoe to which the heel 20 is to be attached is trimmed to provide the fitted shoe illustrated in Fig. 3. The rear end of the sole is reduced to form a tongue 36, the margin of which is skived to provide a beveled margin 38. A filler portion 40 is formed between the heel breast line 41 of the sole and the tongue 36, and terminates in planar surfaces or abutments 42 constructed and arranged for engagement with shoulders 30 respectively when the heel is attached to the shoe, the abutments 42 being so positioned on the sole that the heel 20 may be readily located lengthwise of the shoe by placing it on the fitted heel seat of the shoe with the shoulders 30 in engagement with the abutments 42.

Theoretically, the abutments 42 should be complemental to the shoulders 30 respectively, so that when the heel 20 has been placed on the shoe but before it is permanently attached thereto a slight widthwise movement of the heel upon the heel-seat portion of the shoe may be effected to cause the heel to be oriented into proper angular position upon the heel seat, the shoulders 30 and the abutments 42 being kept in contact with each other along their entire extent during such movement. However, it has been found that when the abutments 42 are substantially planar they may be made in practice to engage quite satisfactorily with the shoulders 30, the arrangement being such that the heel may be angularly adjusted into correct position should it in fact not be initially placed on the shoe in such position.

The angle at which the planar abutments 42 of the shoulder portions 40 are disposed to the median plane of the sole is such that when the heel is moved forwardly of the shoe into position the margins of the shoulders 30 first engage the abutments 42. Continued movement of the heel forwardly of the shoe causes the lateral abutments 42 of the filler portion 40 to yield slightly, thereby to permit the shoulders 30 of the heel to engage the respective abutments 42 along substantially their entire extent. Such an arrangement further insures the formation of a closed joint between the shoulders 30 and the abutments 42 adjacent to the side of the heel. With the above construction the heel may be moved for a short distance lengthwise of the shoe against the yielding pressure of the abutments 42 in order correctly to position the heel should the shoulders 30 or the abutments 42 he slightly misplaced, while maintaing a close fit between the shoulders 30 and respective abutments 42 at points located adjacent to the sides of the heel.

The pressure under which the heel is attached to the shoe causes the leather of the filler portion 40 to flow and thus to be forced with considerable pressure against the shoulders 30 and this further insures the forming of a closed joint between the heel and the sole.

Although the illustrated heel is provided with a pair of shoulders 30 it will be clear that the two shoulders may, if desirable, extend to the median plane of the heel and form in effect a single shoulder which extends from one side of the heel to the other.

An apparatus which may be effectively used to rabbet the heel 20 is shown in Figs. 5 and 6 and will now be described. In a head 44 of the machine a shaft 46 is journaled in suitable bearings and is arranged to be driven at a high rate of speed by a belt 48, a rotary cutter 50 being secured to the forward end of the shaft. The cutter 50 comprises a plurality of teeth 52 provided with cutting edges 54 which lie in a conical surface of a frustum of a cone, each of the cutting edges 54 of the teeth 52 extending to the base of the cone and being skewed in order to facilitate cutting. A work support is positioned adjacent to the cutter 50 and comprises a plate 56 which may be adjusted to various positions, it being desirable when forming the rabbet 22 to arrange the plate 56 so that the plane of its heel-supporting surface 58 (Fig. 6) forms an angle of about 16° with the plane of rotation of the cutter 50.

The plate 56 is mounted in the following manner. A bracket 62 projects forwardly from a column 64 of the machine, the forward end of the bracket serving as a guide on which a casting 66 is mounted. The casting 66 is normally held in fixed position with respect to the bracket 62 and may be adjusted with respect to the bracket in a direction perpendicular to the axis of rotation of the cutter 50 by turning an adjusting screw 68. Projecting forwardly from the casting 66 is a sleeve member 70 within which is supported a carrier 72 which normally occupies a fixed position with respect to the sleeve member 70 but which is constructed and arranged for adjustment relatively to the sleeve member in the direction of the axis of the same upon turning an adjusting screw 74.

The carrier 72 is bored to receive a substantially vertical stem 76 which projects downwardly from a lug 78 secured to the plate 56. The carrier 72 is split and a clamping screw 80 is provided for clamping the carrier 72 to the stem 76 so that the plate 56 may be placed in desired angular position with respect to the carrier 72. In order to adjust the plate 56 heightwise with respect to the cutter 50, the machine is provided with an adjusting screw 82 which may be turned after releasing the clamping screw 80.

To guide a heel over the work supporting face 58 of the plate 56, two work positioning fingers 84, 86 are adjustably secured to the plate 56, portions at the rear side of which are bored to receive a pair of substantially vertically disposed rods 88, 90. The rods 88, 90 are provided at their

lower portions with opposed racks 92, 94 respectively and a pinion 96 carried by the plate 56 is constructed and arranged for engagement with the racks. The upper finger 84 is rigidly secured to the rod 88, the finger having a rearwardly extending lug through a hole in which the rod 88 passes, a pin 98 being provided to lock the parts together. The lower finger 86 is secured to the rod 90 by a pin 100. The rod 88 is screw-threaded at its upper and lower portions and nuts 102 and 104 are provided in threaded relation with such portions respectively. A compression spring 106 surrounds the rod 88 between the nut 104 and the bottom of the plate 56, the arrangement being such that by turning the nut 102 the fingers 84 and 86 are separated. It will be clear from the foregoing construction that the two fingers 84, 86 will yieldingly move equal distances in opposite directions. A small fibre block 108 is secured to the edge of the plate 56 nearest the cutter 50.

In order to use the above described apparatus to rabbet the upper forward portion of a heel, the heel is placed by the operator with its attaching face 24 against the heel supporting surface 58 of the plate 56 and its breast surface 26 facing the cutter 50, the heel lying between the fingers 84 and 86. The operator next moves the heel toward the cutter 50, keeping the rim of the attaching face of the heel pressed against the plate 56. The fingers 84, 86 will have been initially adjusted so that the separation at their ends which are nearest the cutter 50 is somewhat less than the width of the heel. As the heel is moved toward the cutter 50, the fingers 84, 86 yield but serve properly to position the heel widthwise, the heel being so positioned that its median plane passes through the axis of rotation of the cutter 50. The fibre block 108 projects slightly forwardly of the front surface 58 but is so curved that as the heel is moved toward the cutter 50 the concavity of the attaching face 24 allows it to pass over the fibre block 108, the block during such movement supporting the heel. The heel is moved toward the cutter 50 by the operator until its progress is stopped by contact of the breast 26 of the heel with inwardly turned hook portions 110 of the fingers 84, 86. Before the heel is stopped, however, the forward upper corner of the heel will have moved past the lower base portion of the cutter 50 to rabbet the heel (Fig. 6).

It will be clear that the screws 68, 74 and 82 above mentioned are adjusted before operating upon the heel, in order to bring the plate 56 into correct relation with respect to the cutter 50. Thus, the screw 68 may be utilized to bring the plate 56 toward the cutter so that the fibre block 108 is as close as permissible to the cutter, the screw 74 having been utilized to adjust the plate 56 so that shoulders 30 of a desired height will be formed. The screw 82 adjusts the plate 56 lengthwise so that when the heel is presented to the cutter the heightwise median plane of the heel lies substantially in the plane of the axis of rotation of the cutter 50. The position of the hooked portions 110 of the fingers 84, 86 controls the extent of the sole supporting surface 28 from the breast of the heel.

The forward parts of the opposing surfaces of the fingers 84, 86 are undercut so that, when the heel has been moved into position to be operated upon, the fingers prevent the heel from being lifted from the supporting face 56. By undercutting opposed surfaces of the fingers 84, 86 as above described, it is necessary for the operator to move the heel away from the cutter 50 before lifting the heel from the supporting face 28.

The sole of the shoe (Fig. 3) may conveniently be prepared to receive the heel illustrated in Figs. 1 and 2 by the following operations. A tongue, which does not extend as far forwardly of the sole as the abutment surfaces 42, is formed upon the sole before the sole is applied to the shoe, by the use of a heel-seat fitting machine such as disclosed in British Letters Patent No. 305,276. After the sole has been secured to the shoe, the shoe is transferred to a heel-seat fitting machine such, for instance, as that described in United States Letters Patent No. 1,850,149, granted March 22, 1932, on an application filed in the name of George Hazelton. In the machine disclosed in United States Letters Patent No. 1,850,149 the abutments 42 may be automatically formed at correct positions by measuring the length of the heel in a heel gauge of the machine, which gauge automatically controls the path of movement of abutment forming cutters. The short tongue may also be elongated in the above machine. After the heel has been positioned upon the shoe, it is permanently attached to the same by the use of a suitable heel attaching machine.

In order to insure a smooth joint between the heel 20 and the shank portion 112 of the sole, it has been found desirable to form abutments 42 which are slightly wider than the heel. The projecting margins of the abutments 42 are thereafter trimmed down to the sides of the heel and are jointed with the shank portion 112 of the shoe so that the sole of the finished shoe will blend smoothly with the heel.

While the present invention may be utilized in connection with uncovered heels of various constructions, it is particularly advantageous, as already indicated, when employed in relation to built-up heels which have been trimmed and scoured as described in the above-mentioned United States Letters Patent No. 1,984,453. Satisfactory results have been obtained when practicing the present invention in relation to heels of which only a top piece 114 and one or two adjacent lifts are formed of leather, the remaining lifts being constructed of ordinary forms of fibre board used in heel making. Heels so constructed are advantageous since they are light and cheap to manufacture. In some cases it may be desirable to employ a heel in which, although the majority of the lifts are of board, the lift which actually contacts with the shoe bottom is of leather. It has been found, however, that satisfactory results may be obtained when the lift which is in contact with the shoe bottom is constructed of board.

The cutter 50 operates to cut clean, well-defined shoulders 30 on the heel when the lift is constructed of board as well as when such lift is constructed of leather. In some cases, where the lift in contact with the shoe upper is constructed of board, it has been found that with some varieties of board it is desirable, after the heel has been attached to the shoe, to subject the edge of the surface of such lift to a consolidating operation which consists in pressing the edge surface of the lift around its periphery (except at the breast of the heel) against a rotating tool such, for example, as a smooth surface roller. This operation hardens the surface of the lift somewhat and tends to prevent any splitting or

gapping of the surface during the life of the shoe.

Having described the invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A heel the forward portion of the attaching face of which is provided with a sole-supporting ledge extending for a substantial distance rearwardly of the breast of the heel throughout the width of the same, the ledge being bounded at its rear end by a shoulder which extends generally heightwise of the heel and the marginal portions of which are concave forwardly.

2. A heel provided with a rabbet at its upper forward portion, said rabbet comprising a sole-supporting ledge extending from one side of the heel to the other for a substantial distance rearwardly of the breast of the heel, and a pair of shoulders which extend generally heightwise of the heel from the lateral portions of the rear end of the ledge and which are concave forwardly of the heel.

3. A heel the forward portion of the attaching face of which is provided with a sole-supporting ledge which extends for a substantial distance rearwardly of the breast of the heel throughout the width of the same, the ledge being bounded at its rear end by a pair of shoulders which extend generally heightwise of the heel and which are concave forwardly throughout their lateral extent and decrease in height as they approach the median plane of the heel.

4. A heel having a laterally curved sole-supporting ledge at the forward part of its attaching face, said ledge being positioned below the general plane of the rim of the attaching face, marginal portions of the rear end of the ledge being bounded by a pair of concave conical shoulders which extend generally heightwise of the heel and decrease in height as they approach the median plane of the heel and which also terminate at the opposite sides of the heel respectively at points spaced from the breast of the heel.

5. A heel the forward portion of the attaching face of which is provided with a rabbet which extends for a substantial distance rearwardly of the breast of the heel and from one side of the heel to the other, said rabbet being defined by a concave cylindrical sole supporting surface and a concave conical shoulder which extends heightwise of the heel and decreases in height as it approaches the median plane of the heel.

6. A heel having a rabbet formed at its upper forward portion, said rabbet including a sole-supporting surface which extends for a substantial distance rearwardly of the breast of the heel throughout the width of the heel and including a pair of shoulders located at the rear end of the sole-supporting surface and extending generally heightwise of the heel, the shoulders being concave forwardly throughout their lateral extent as viewed from above.

7. A heel having a rabbet formed at its upper forward portion, said rabbet including a sole-supporting surface which extends for a substantial distance rearwardly of the breast of the heel throughout the width of the same and including a pair of spaced undercut shoulders which extend generally heightwise of the heel from the rear end of the sole-supporting surface and which are concave forwardly throughout their extent.

8. That improvement in methods of shoemaking which consists in forming at the upper forward portion of a heel a rabbet extending from one side of the heel to the other for a considerable distance rearwardly of the breast of the heel, reducing the heel-seat portion of the sole of a shoe to form a tongue shaped and arranged for engagement within the attaching face of the heel and to form upon the sole a filler portion which is constructed and arranged to fit within the rabbet and extends beyond the sides of the heel positioned upon the shoe, attaching the heel to the shoe, removing from the sole the lateral parts of the filler portion of the sole which project beyond the sides of the heel, and jointing the heel with the shank portion of the sole of the shoe.

9. A shoe including a heel having a rabbet formed at its upper forward corner, said rabbet comprising a sole-supporting surface which extends from one side of the heel to the other for a substantial distance rearwardly of the breast of the heel and comprising a pair of spaced undercut shoulders which extend generally heightwise of the heel from the rear end of the sole-supporting surface and are concave forwardly throughout substantially their lateral extent, said shoe including a sole provided with a tongue overlying the attaching face of the heel and a filler portion positioned between the sole-supporting surface of the rabbet and the shoe upper, the filler portion being provided with planar abutments which extend heightwise and laterally of the sole and engage the shoulders respectively of the rabbet with greater pressure adjacent to the sides of the heel than at other portions spaced from said sides.

WILLIAM RODERICK BARCLAY.
CYRIL HARRY JAMES.
WILLIAM ISAAC BACON.