

(No Model.)

2 Sheets—Sheet 1.

C. A. WENTWORTH.
SOLE MACHINE.

No. 447,389.

Patented Mar. 3, 1891.

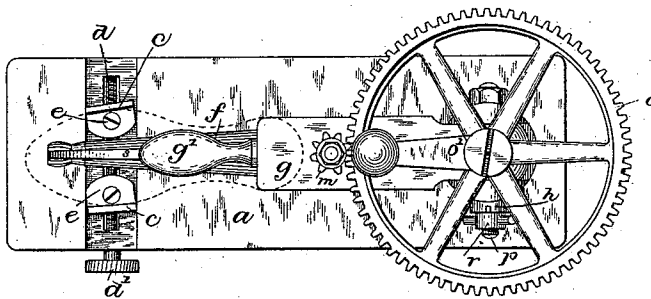
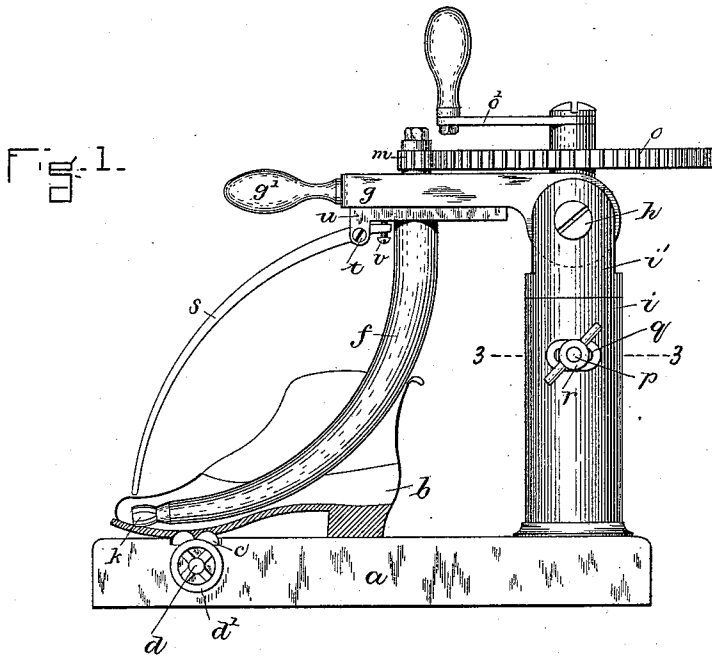


Fig. 2.

WITNESSES.

J. T. Ball
C. E. Bartlett.

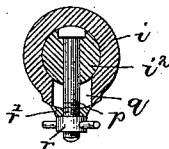


Fig. 3.

INVENTOR.

C. A. Wentworth
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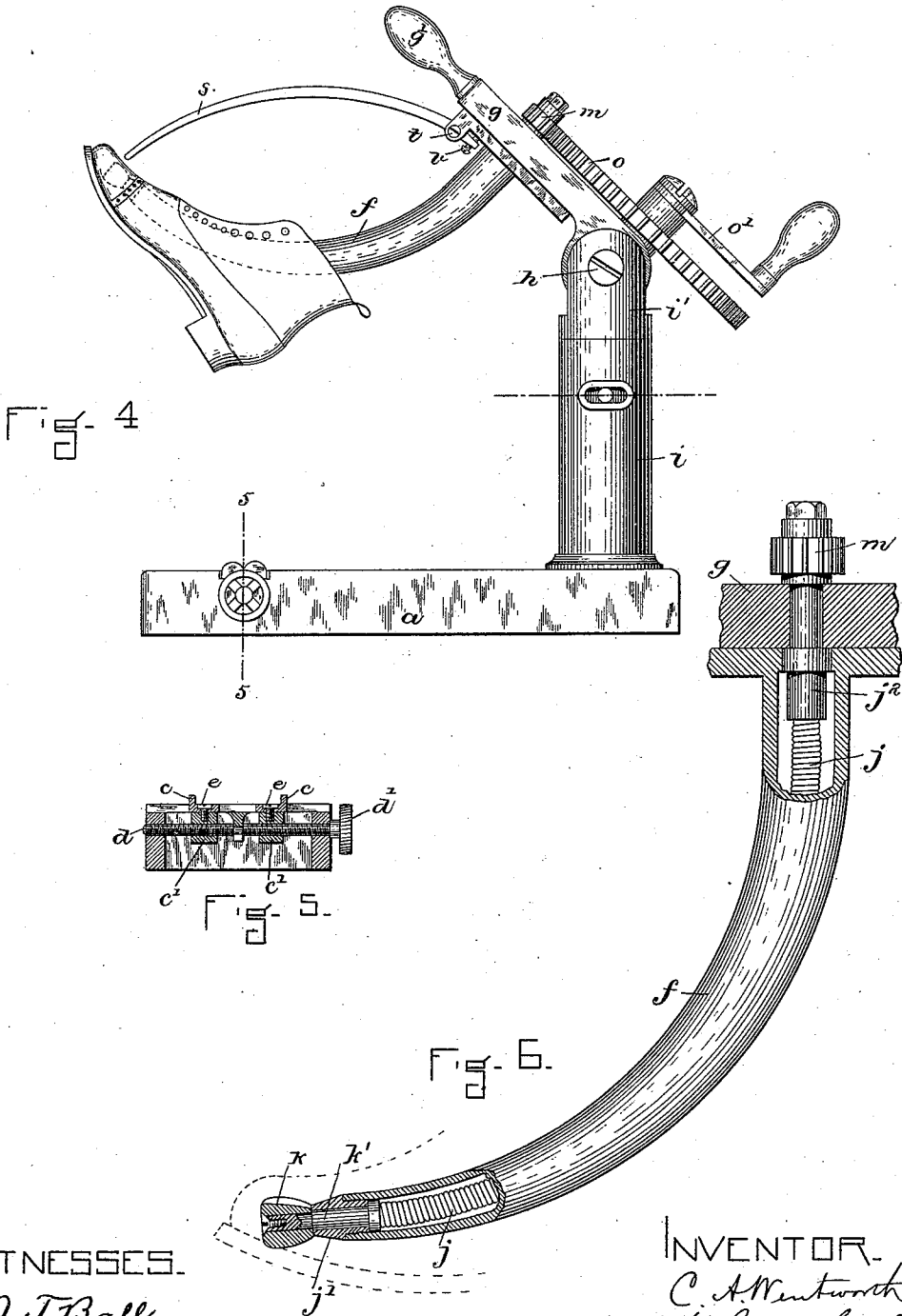
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C. E. Bartlett.

INVENTOR.

C. A. Wentworth
by *Myght Brown & Cooley*
Atty

UNITED STATES PATENT OFFICE.

CHARLES A. WENTWORTH, OF HYDE PARK, MASSACHUSETTS.

SOLE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 447,389, dated March 3, 1891.

Application filed May 14, 1890. Serial No. 351,725. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. WENTWORTH, of Hyde Park, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Cutting Out the Inner Surfaces of Boot or Shoe Bottoms, of which the following is a specification.

This invention has for its object to provide improved means for routing or cutting out portions of the inner or foot bearing-surface of the inner sole of a boot or shoe to adapt said surface to protuberances or tender places on the bottom of the wearer's foot, so that if the boot or shoe occasions discomfort to the wearer by reason of any peculiarity in the form or shape of the bottom of his foot—such as a corn or other protuberance thereon—a portion of the foot bearing-surface corresponding to such protuberance can be cut away to form a corresponding recess or depression without injury to or cutting of any other portion or portions of the boot or shoe.

To this end the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a machine embodying my invention, the mechanism being shown in the position it occupies when in operation on the foot-bearing surface of the bottom of a boot or shoe. Fig. 2 represents a top view of the same. Fig. 3 represents a section on line 3 3 of Fig. 1. Fig. 4 represents a side elevation of the machine, showing the cutting mechanism raised to the position it occupies when the shoe is being applied and removed. Fig. 5 represents a section on line 5 5 of Fig. 4. Fig. 6 represents a side elevation and a partial section of the horn that supports the rotary cutter and portions of the flexible shaft in said horn, the cutter at the outer end of the horn being shown in section.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents a suitable bed or table adapted to support a boot or shoe *b*, as shown in Fig. 1, said table being provided with suitable means for grasping the edges of the boot or shoe sole, and thereby holding the boot or shoe firmly in the position shown.

The holding means here shown are two clamps *c c*, pivoted to the slides *c' c'*, Fig. 5, which are fitted to slide in a slot in the table *a* and moved simultaneously by a screw *d*, having at one end right-hand and at the other end left-hand threads engaged with the slides *c' c'*. By rotating the screw *d* by means of a handle *d'* at its outer end the slides *c'* and clamps *c* can be moved simultaneously toward and from each other, and thus caused to grasp or release the sole interposed between them. The clamps are connected to the slides *c'* by means of pivots *e e*, so that the clamps can turn and conform to the curvature of the particular portions of the sole-edge with which they come in contact.

f represents a curved horn, which is formed to enter the interior of the boot or shoe, and is attached to one end of an arm *g*, which is pivoted at *h* to a standard *i*, attached to the bed or table *a*, the arm *g* being adapted to be raised and lowered, so as to either elevate the horn, as shown in Fig. 4, or to depress the same, as shown in Fig. 1. Said arm *g* is preferably provided with a handle *g'* for the convenience of the operator. Within the horn and extending through the same is a flexible shaft *j*, Fig. 6, of the kind ordinarily used in dental drills and like mechanism to transmit power.

k represents a rotary cutter, which may be of any suitable form, and is here shown as having longitudinal teeth somewhat resembling those of a burr-cutter or milling-tool. Said cutter is attached to a shaft or stud *k'*, which is journaled to rotate in a bearing *j'*, affixed to the outer end of the horn *f*. One end of the flexible shaft *j* is attached to the shaft *k'*, and its other end is attached to a solid shaft-section *j²*, which is journaled in a bearing in the arm *g* and is provided at its outer end with a pinion *m*.

o represents a gear-wheel, which is mounted on a stud or bearing affixed to the arm *g*, and is adapted to be rotated by a crank *o'*, affixed to its hub. Said gear meshes with the pinion *m*, and when rotated imparts rapid rotary motion to said pinion, which motion is imparted through the curved horn *f* by the flexible shaft *j* to the cutter *k*.

It will be seen from the foregoing that when the horn is introduced into the interior of the

boot or shoe and the latter is supported by the table *a* the rotation of the gear *o* will rotate the cutter *k* within the boot or shoe and cause the cutter to form a depression in the foot bearing-surface of the boot or shoe bottom.

5 The boot or shoe may be adjusted endwise upon the table *a* to enable the cutter to act at any desired point between the toe and heel. To enable the cutter to be adjusted

10 crosswise of the shoe, so as to reach any point within the upper within the side edges of the sole, I provide the standard *i* with a pivoted upper section *i'*, which has a stud *i²*, Fig. 3, adapted to rotate in the fixed lower

15 portion of said standard, so that the arm *g*, which is pivoted to ears on the upper section *i'*, can be moved horizontally to give the cutter any desired adjustment crosswise of the boot or shoe bottom. The upper section *i'*

20 may be secured at any position to which it may be turned by means of a stud or bolt *p*, attached to it within the fixed portion of the standard *i*, and projecting outwardly through a slot *q* in said fixed portion, and a clamping-

25 nut *r*, engaged with the threaded outer end of said stud and adapted to force a washer *r'* against the side of the fixed portion of the standard *i*. The slot *q* is of sufficient length to permit a sufficient range of adjustment of

30 the upper section *i* and the horn and cutter supported thereby, as will be readily seen.

To enable the location of the cutter within a boot or shoe to be accurately determined, I provide an arm or indicator *s*, which is attached to the arm *g*, and is extended therefrom so that its outer end is directly over and in close proximity to the outer end of the cutter *k*. Said indicator is so arranged that it is outside of the upper of the boot or

40 shoe, as shown in Figs. 1 and 4, and therefore enables the operator to know the location of the cutter within the boot or shoe, so that a depression may be formed in the foot bearing-surface at any point desired. The

45 indicator *s* is preferably vertically adjustable, so that its outer end may be set nearer to or farther from the cutter, and to this end the cutter is pivoted at *t* to an ear *u* on the arm *g*, and is provided with a bearing-screw *v*,

50 which bears on the under side of said arm *g* or upon the under side of a piece thereto attached, on which the ear *u* is formed, as shown in Fig. 1. By turning said screw up or down the outer end of the indicator will

55 be lowered or raised, as the case may be.

Although I have shown the horn *f* as curved, in order the better to adapt it to enter the boot or shoe, it is obvious that for some kinds of work the horn may be straight, and if made

60 straight the shaft *j* within it may be of rigid construction instead of being flexible.

The arm *g* may be considered a part of the horn, and, if desired, the said arm and horn may be made as one piece with or without

65 the projecting handle *g'*, in which case the horn may be said to be pivoted directly to the support *i'*.

The nut *r* may be left loose, so that the section *i'* will be left free to oscillate horizontally while the machine is in operation in case it is desired to permit the rotary cutter to travel laterally across the bottom of the boot or shoe while it is cutting into the same.

The horizontal pivot *h* and the vertical stud or pivot *i²* therefore constitute the members of a universal joint, whereby the cutter is permitted to move either vertically or horizontally. In case it is desired to confine the action of the cutter to a given spot, so that it can only sink into the foot bearing-surface

80 without moving crosswise of the same, the nut *r* is tightened, so that the arm *g* and the horn thereon cannot swing laterally.

It is obvious that the indicator *s* may be attached directly to the horn instead of being indirectly connected thereto, as here shown.

I do not confine myself to the exact details of construction here shown, but may variously modify the same within the limits of mechanical skill and judgment without departing from the spirit of my invention.

Instead of the curved horn and the flexible shaft therein as the means for supporting and rotating the cutter *k*, I may use an arm or support of any form suitable to enter the interior of a boot or shoe, the cutter being journaled in a bearing at one end of said arm, and any suitable means for imparting motion from the outside of the boot or shoe along said arm or support to the cutter.

I claim—

1. The combination of an arm or support formed to enter a boot or shoe or other like article, a rotary cutter at one end of said arm, formed to bear on and cut away the foot bearing-surface of a sole, means for transmitting power to said cutter, and thereby causing it to act on the foot bearing-surface of the sole of a boot or shoe, and an external indicator occupying a definite relation to the cutter, whereby the location of the cutter within the boot or shoe is shown, as set forth.
2. In a machine for cutting out or forming the inner surfaces of boot or shoe bottoms and other like articles, the combination, substantially as hereinbefore set forth, of a curved horn formed to enter the article, a rotary cutter at one end of said horn, a flexible shaft extending through the curved horn and connected at one end with the cutter, and means for applying power to the opposite end of the shaft.
3. In a machine for cutting out or forming the inner surfaces of boot or shoe bottoms and other like articles, the combination of a holder or clamp adapted to grasp the sole of a boot or shoe, a horn formed to enter the boot or shoe, a flexible shaft extending through the horn, a rotary cutter supported by one end of the horn and attached at one end to the cutter, and means for applying power to the opposite end of said shaft, as set forth.
4. In a machine for cutting out or forming

the inner surfaces of boot or shoe bottoms and other like articles, the combination of a holder or clamp adapted to grasp the sole of a boot or shoe, a horn formed to enter the
 5 boot or shoe, a pivoted support for the horn, whereby the latter is adapted to rise and fall, a rotary cutter supported by one end of the horn, a shaft extending through the horn and attached at one end to the cutter, and means
 10 for applying power to the opposite end of the shaft, as set forth.

5. In a machine for cutting out or forming the inner surfaces of boot or shoe bottoms and other like articles, the combination of a holder
 15 or clamp adapted to grasp the sole of a boot or shoe, a horn formed to enter the boot or shoe, an arm supporting the horn, a universal joint connecting said arm with a fixed support, whereby the outer end of the horn is
 20 adapted to move both vertically and laterally, a rotary cutter supported by the outer end of the horn, a shaft extending through the horn and attached at one end to the cutter, and means for applying power to the opposite end
 25 of the shaft, as set forth.

6. In a machine for cutting out or forming the inner surfaces of boot or shoe bottoms and other like articles, the combination of the supporting bed or table, sole-clamping devices
 30 thereon, a horn formed to enter a boot or shoe on said table and pivotally connected to a fixed support, whereby the outer end of the horn is adapted to rise and fall, a rotary cutter supported by the outer end of the horn,
 35 means for rotating said cutter, and an indicator connected with the horn and adapted to rise and fall therewith, said indicator being arranged with one end in close proximity to the cutter.

40 7. The combination, with the horn having the rotary cutter, of the indicator pivotally connected with its support and adapted to swing away from its normal position to per-

mit the application of the boot or shoe to the horn, as set forth.

8. The combination of the boot or shoe supporting table having sole-clamping devices, a standard on said table, having an upper section mounted to turn horizontally, an arm pivoted to said upper section and adapted to
 50 swing vertically, a horn attached at one end to said arm, a rotary cutter supported by the outer end of said horn, a shaft extending through the horn and attached at one end to the cutter, and means for applying power to
 55 the opposite end of the shaft, as set forth.

9. The combination of the boot or shoe supporting table having sole-clamping devices, a standard on said table, having an upper section mounted to turn horizontally, means for lock-
 60 ing said upper section to the lower section, an arm pivoted to said upper section and adapted to swing vertically, a horn attached at one end to said arm, a rotary cutter supported by the outer end of said horn, a shaft extending
 65 through the horn and attached at one end to the cutter, and means for applying power to the opposite end of the shaft, as set forth.

10. The combination, with the bed or table and with the rotary cutter and its supporting
 70 and operating devices, of the slides *c' c'*, movable in a guide in said table, means for moving said slides simultaneously in opposite directions, and the clamps *c c*, pivoted to said
 75 slides and adapted by their pivotal connection to conform to the shape of different portions of the edges of a sole interposed between them, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of
 80 two subscribing witnesses, this 12th day of May, A. D. 1890.

CHARLES A. WENTWORTH.

Witnesses:

EWING W. HAMLEN,
 C. F. BROWN.