No. 695,630. Patented Mar. 18, 1902.

C. G. BELMER.

ROTARY CUTTER HOLDER.

(Application filed July 10, 1899.)

(No Model.)

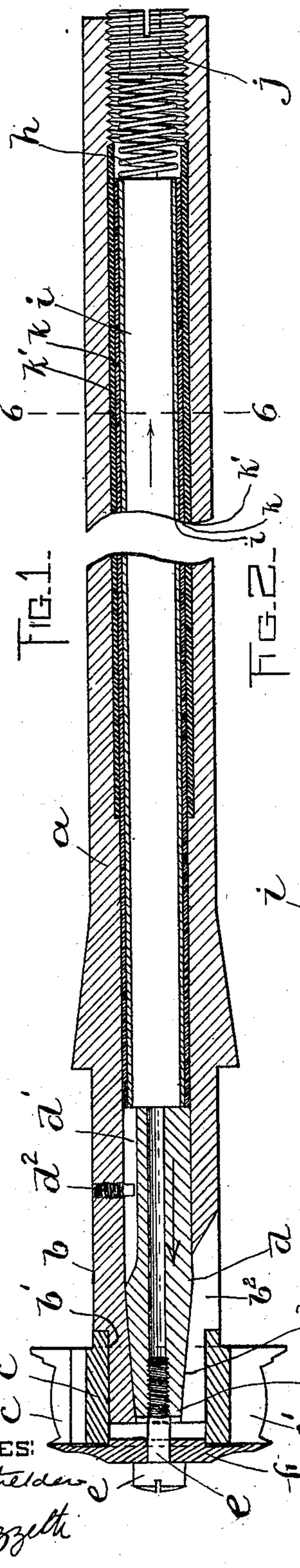

FIG. 1.

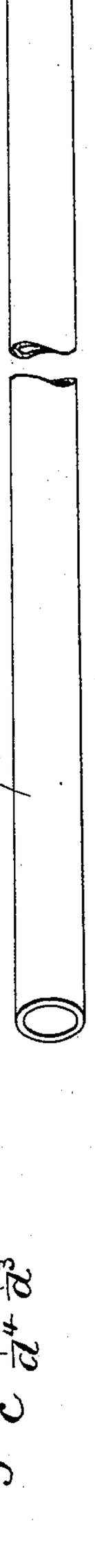

FIG. 2.

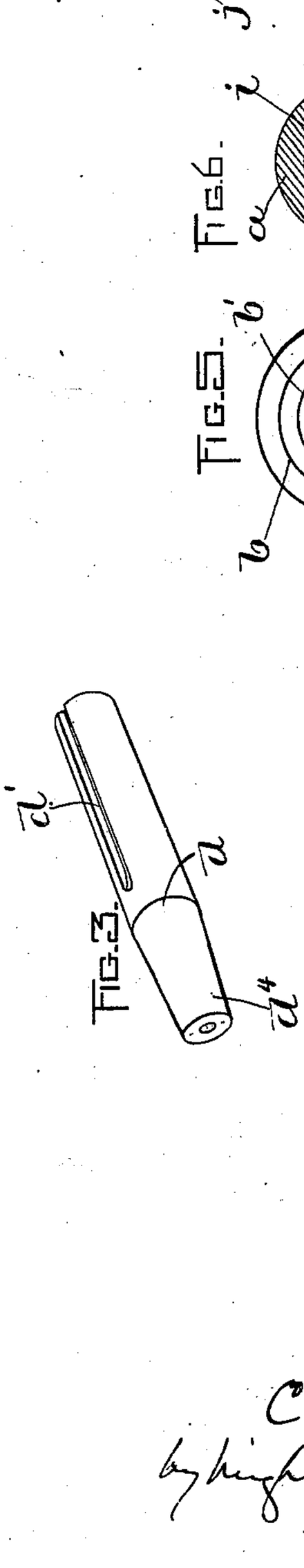

FIG. 3.

FIG. 4.

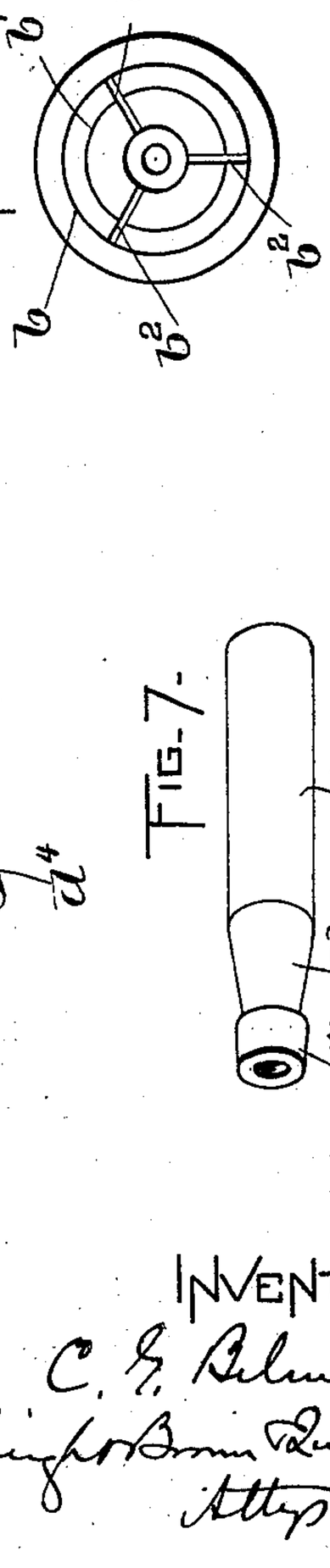

FIG. 5.

FIG. 6.

FIG. 7.

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UNITED STATES PATENT OFFICE.

CHARLES G. BELMER, OF CHELSEA, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ARTHUR A. BRIGGS, OF HAVERHILL, MASSACHUSETTS.

ROTARY-CUTTER HOLDER.

SPECIFICATION forming part of Letters Patent No. 695,630, dated March 18, 1902.

Application filed July 10, 1899. Serial No. 723,284. (No model.)

To all whom it may concern:

Be it known that I, CHARLES G. BELMER, of Chelsea, in the county of Suffolk and State of Massachusetts, (and whose post-office address is 50 Phoenix Row, Haverhill, Massachusetts,) have invented certain new and useful Improvements in Rotary-Cutter Holders, of which the following is a specification.

This invention relates to rotary tools such as are used in trimming sole edges and other parts of boots and shoes, the tool being mounted detachably upon the end of a shaft which is rotated at a high rate of speed when the machine is in operation.

The invention has for its object to provide simple and effective means for simultaneously securing the tool upon the shaft against removal therefrom and giving it a firm bearing upon the shaft, so that there will be no lateral play of the tool upon the shaft.

The invention also has for its object to provide an improved means for preventing the heating of the shaft when it is in operation.

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 longitudinal section of a cutter-shaft and cutter holding and releasing devices embodying my invention. Figs. 2 and 3 represent perspective views of parts shown in Fig. 1. Fig. 4 represents an end view of the plug in the rear end of the shaft. Fig. 5 represents a view of the front end of the shaft. Fig. 6 represents a section on line 6 6 of Fig. 1. Fig. 7 represents a perspective view of the preferred form of wedge hereinafter described.

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

In the drawings, *a* represents a rotary shaft, which may be a part of a sole-edge-trimming machine and mounted in bearings in a suitable supporting-frame. (Not shown.)

b represents an extension of the shaft *a*, which extension constitutes the tool-holder. The extension *b* is preferably integral with the shaft, although it may be made in a separate piece, secured in any suitable way to the shaft. The outer end of the extension or shaft *b* has a seat *b'* for the hub *c* of the cutter. The shaft *b* is tubular and the portion of its inner surface which is surrounded by the seat *b'* is of tapering form, its diameter decreasing from the inner portion of the shaft toward its outer portion.

d represents a sliding piece which is movable lengthwise in the tubular shaft *b* and has its outer portion tapered to fit the taper of the outer portion of the inner surface of said shaft, so that when the piece *d*, which I hereinafter term a "wedge," is moved in the direction indicated by the arrow in Fig. 1 it will expand the seat *b'*, the latter being made expansible by means of longitudinal slots b^2, formed in the seat, said slots extending into the body of the shaft *b*.

e represents a screw which is engaged with a tapped socket formed in the outer portion of the wedge *d*, the head *e'* of the screw projecting beyond the outer end of the shaft *b* and being formed to bear upon the shield *f*, which covers the outer ends of the blades *c'* of the cutter.

It will be seen that when the hub of the cutter is placed upon the seat *b'* and the screw *e* is turned to advance it inwardly the head of the screw bearing against the shield *f* exerts inward pressure against said shield and against the cutter, confining the latter closely against outward displacement on its seat and at the same time the shank of the screw draws the wedge *d* outwardly, causing it to expand the seat *b'* until said seat has a firm bearing upon the interior of the hub of the cutter and effectually prevents any motion of the cutter upon its seat. The screw *e* therefore not only serves its usual function of securing the shield and cutter against removal from the shaft, but also actuates the seat-expanding device, and thus insures a tight fit of the cutter upon the shaft.

To prevent rotation of the wedge while it is being adjusted, as above described, I provide the wedge with a longitudinal groove d', which receives the inner end of a stud d^2, engaged with the shaft *b*.

I prefer to reduce a portion of the tapered periphery of the wedge *d*, as shown at d^3, Fig. 7, so that only a limited portion or collar d^4 of the tapered periphery will bear upon

the tapered inner surface of the sleeve *b*. The object of this formation of a taper collar and the reduced portion behind it is to give the wedge a secure frictional hold on the internal surface of the tube, so that the two parts are locked together by friction when the wedge *d* is adjusted outwardly. Furthermore, the recess or reduced portion behind the collar serves to receive any foreign matter or grit that may get inside the sleeve and that would have a tendency to result in an uneven operation of the wedge. A spring *h* is provided to press the wedge *d* outwardly, and thus hold its tapered portion d^4 in contact with the tapered inner surface of the shaft *b*. The spring is located at the rear end of the shaft *a*, the latter being tubular throughout its entire length. Between the spring and the wedge I have interposed a movable filling-piece, which is preferably a thin light tube *i*, of sheet metal, which is movable endwise in the shaft and imparts to the wedge the thrust or pressure of the spring.

j represents a plug which is screwed into the outer end of the tubular shaft as an abutment for the spring. The plug has an air duct or orifice j', which connects the interior of the shaft *a* with the external air. The plug is of larger diameter than the wedge and tube, so that when the plug is removed from the shaft the wedge may also be removed, provision being thus made for conveniently replacing the wedge by a new one when its screw-thread, which engages the screw *e*, becomes worn. The screw d^2 must be withdrawn before the withdrawal of the wedge.

It will be seen that provision is made by the tubular form of the shaft and the air-duct j' for keeping the shaft from becoming excessively heated, the heat developed in the shaft by friction between it and its bearing being radiated into the interior of the shaft and escaping through the duct j'. Whenever the wedge *d* is pushed inwardly to release the cutter, it acts to a certain extent as a piston to displace a portion of the air from the interior of the shaft and eject it through the duct j'.

To prevent the tube *i* from jarring and rattling in the shaft *a*, I interpose between the tube and the interior of the shaft a sleeve or layer *k* of yielding material, which is preferably asbestos paper formed into a tube. This material, besides being sufficiently yielding to prevent rattling of the tube, is also adapted to slide freely in contact with a metal surface, the asbestos being to some extent a lubricant. The sleeve *k* may be affixed to the tube *i*, although it is preferably affixed as a lining to the shaft, in which case the tube will slide in contact with the sleeve. In Fig. 1 I show a fixed sleeve *k'*, which may be of the same material as the sleeve *k* and is attached to the interior of the shaft *a*, a recess or enlargement being formed in the bore of the shaft for its reception.

It is obvious that the described provisions for permitting the withdrawal of the wedge through the rear end of the shaft may be used independently of the spring or of the spring and tube. The shaft may be used to carry any desired rotary tool, such as a brush or a buffing-roll. The screw-plug *j* is adjustable, so that the pressure of the spring on the wedge may be adjusted by means of said plug.

I claim—

1. A rotary-tool holder comprising a shaft having a tubular outer end which is formed externally as a tool-seat and is longitudinally slotted to make said seat expansible, the interior surface of the tool-seat portion of the shaft being tapered, a wedge movable within the shaft and comprising a conical collar having a reduced portion behind it, said collar being formed to coöperate with the tapered inner surface of said shaft, and a screw engaged with said wedge and having a tool-securing head projecting from the tool-seat end of the shaft.

2. A rotary-tool holder comprising a shaft having a tubular expansible tool-seat at one end, a seat-expanding wedge movable in said shaft, an adjusting-screw engaged with said wedge and having a tool-engaging head projecting from the end of the shaft, and a spring adapted to force the wedge outwardly toward the screw.

3. A rotary-tool holder comprising a tubular shaft having an expansible tool-seat at one end, a seat-expanding wedge movable longitudinally in said shaft, and adapted to be withdrawn from the rear end thereof, an adjusting-screw engaged with said wedge and having a tool-engaging head projecting from the end of the shaft, a spring adapted to force the wedge outwardly toward the screw, and a stop or abutment detachably secured to the shaft to support the spring, the spring and wedge being removable from the shaft when said stop is displaced.

4. A rotary-tool holder comprising a shaft having an expansible tool-seat at one end, a seat-expanding wedge movable longitudinally in said shaft, an adjusting-screw engaged with the wedge and bearing a tool-engaging head projecting from the end of the shaft, a spring adapted to force the wedge outwardly toward the screw, and means for varying or adjusting the pressure of said spring.

5. A rotary-tool holder comprising a tubular shaft one end of which is formed as an expansible tool-seat, the bore of the shaft extending through the entire length thereof and having a tapered portion within the expansible part of the shaft, a detachable stop near the opposite end, and a movable filling-piece interposed between the stop and wedge.

6. A rotary-tool holder comprising a tubular shaft one end of which is formed as an expansible tool-seat, the bore of the shaft extending through the entire length thereof and having a tapered portion within the expansible part of the shaft, and a detachable spring seat or stop near the opposite end, a spring

bearing on said seat within the shaft, and a sliding tube interposed between the spring and wedge.

7. A rotary-tool holder comprising a tubular shaft one end of which is formed as an expansible tool-seat, the bore of the shaft extending through the entire length thereof and having a tapered portion within the expansible part of the shaft, and a spring-seat near the opposite end of the shaft, a spring bearing on said seat within the shaft, a sliding tube interposed between the spring and wedge, and a sleeve of yielding material between said tube and the internal surface of the shaft.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES G. BELMER.

Witnesses:
C. F. BROWN,
E. BATCHELDER.