

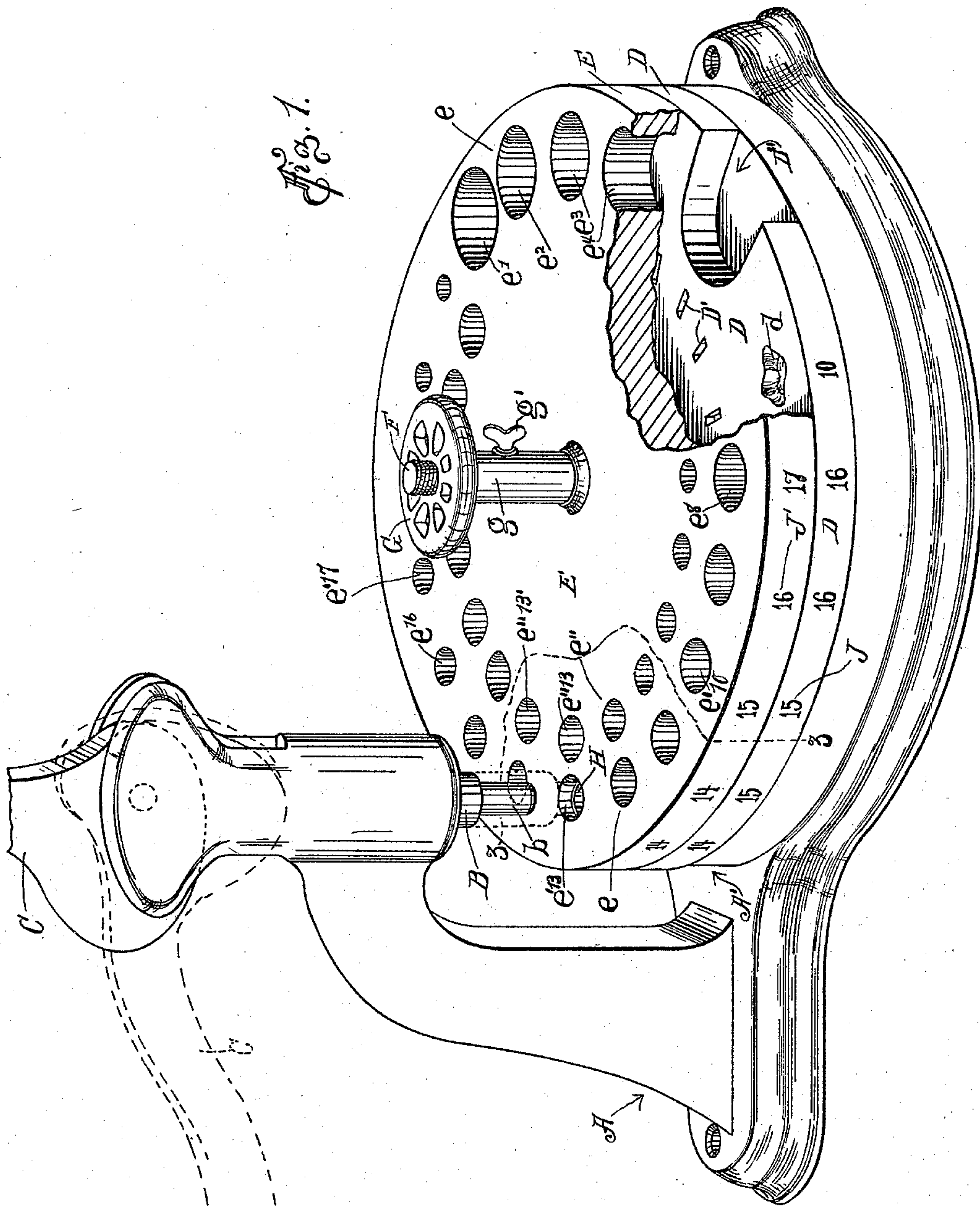
(No Model.)

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A. P. HAYS.  
DENTIST'S CROWN SWAGING APPARATUS.

No. 533,195.

Patented Jan. 29, 1895.



Witnesses.

M. Harbison.

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His Attys.

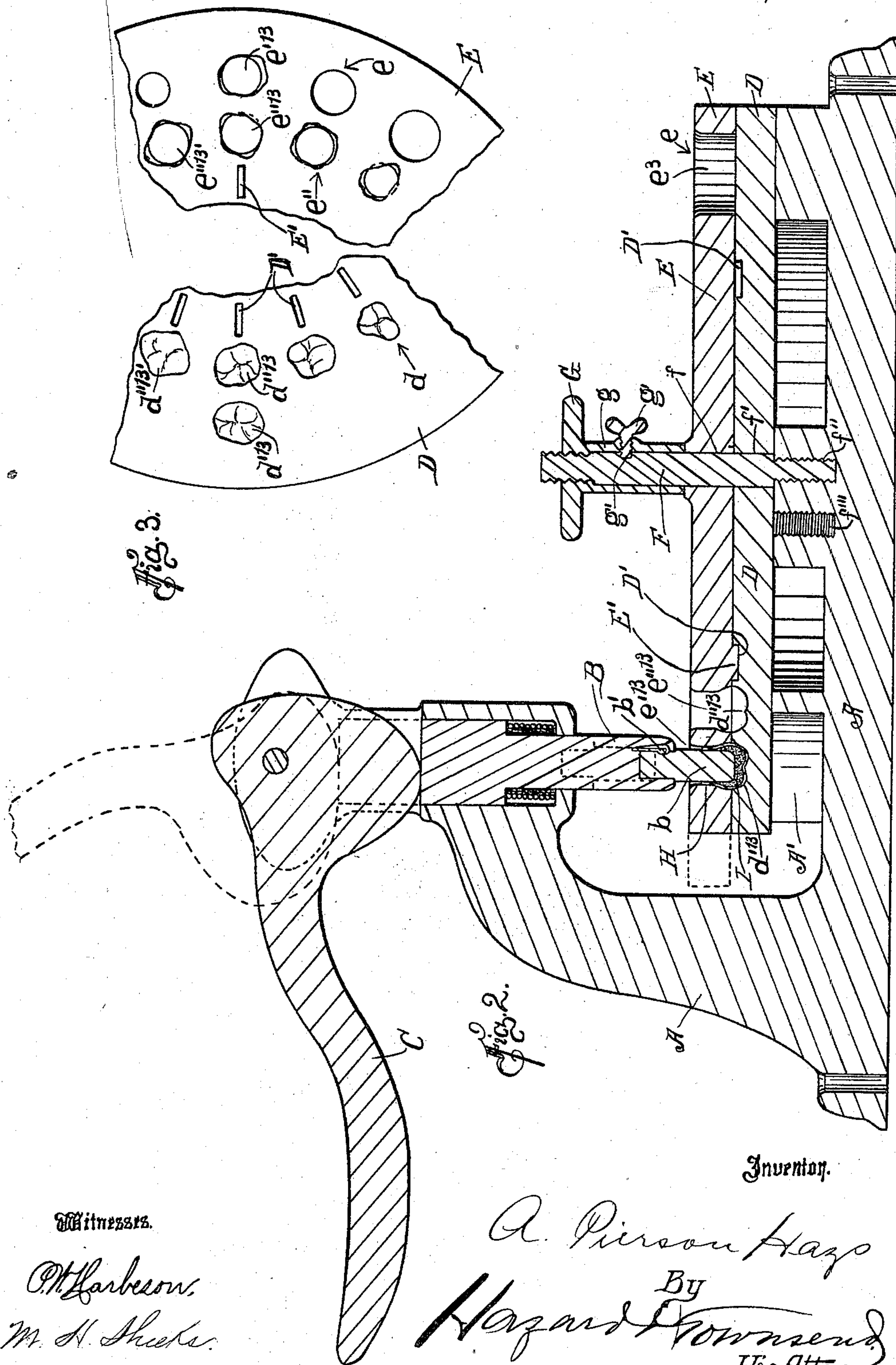
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Witnesses.

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# UNITED STATES PATENT OFFICE.

ADAM PIERSON HAYS, OF LOS ANGELES, CALIFORNIA.

## DENTIST'S CROWN-SWAGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 533,195, dated January 29, 1895.

Application filed October 1, 1894. Serial No. 524,549. (No model.)

*To all whom it may concern:*

Be it known that I, ADAM PIERSON HAYS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Dentists' Crown-Swaging Apparatus, of which the following is a specification.

In the practice of dentistry, great difficulty is often experienced in forming artificial gold crowns;—the present process of forming the same being laborious and requiring considerable skill upon the part of the operator. This makes crown work very expensive.

Various methods of forming artificial crowns of gold or other ductile metals have been employed. For instance, one method is to form a band or open ended thimble of the desired size and to solder upon one end of this thimble a cusp stamped from another piece of the metal and to fill in the bottom of the thimble with solder to strengthen the cusp. This manner of making the crown is very laborious and requires great skill upon the part of the operator to produce an accurate fit, and in such case the body of the crown is straight and does not conform to the natural shape of the tooth. Another method is to swage a straight thimble and a cusp integral with each other to form the crown, but in this method of doing the work as heretofore employed the body of the crown does not conform to the shape of the tooth.

My improvement consists in means for producing an integral crown having its body shaped to correspond with the shape of the tooth to be fitted.

The object of my invention is to produce a crown swaging apparatus which, at slight expense of time and labor, will form the crown integral and of proper shape corresponding to the shape of the tooth for which it is designed; and by means of which a workman of only ordinary mechanical skill will be enabled to accurately and quickly fit a crown to any tooth desired; and that without liability of mistake.

My invention comprises the various features of construction and combinations and arrangements of parts whereby I attain these ends.

The accompanying drawings illustrate my invention.

Figure 1 is a fragmental perspective view of a swaging machine embodying my invention. Fig. 2 is a vertical mid-section of the same. Fig. 3 is a fragmental view of the engaging faces of the upper and lower plates. The line of fracture is indicated by dotted line 3—3 in Fig. 1.

My newly invented machine comprises the combination of a lower half-crown swaging plate having a plain upper face and provided in such face with a socket, cup or mold conformed to half of the crown of the tooth to be fitted, an upper, combined draw-and-half-crown swaging plate having a plain under face fitted upon the upper face of the half crown swaging plate and having a die hole flaring at the lower end and conformed to and registering with the margin of the socket in the half-crown swaging plate and arranged to form therewith a mold for the crown, suitable means for detachably securing the plates together and suitable means for drawing and swaging a ductile thimble to fit the mold.

I will now describe my invention; reference being had to the specific form of machine shown in the accompanying drawings.

A indicates the press frame of the machine and B indicates an ordinary power-operated plunger carrying a punch *b* and operated through the medium of the lever C.

D indicates the half-crown swaging plate seated upon the base of the press A and provided with a circularly arranged series of half-crown-swaging sockets which in the drawings are marked with the reference letter *d*, together with suitable indices, and in practice are distinguished by suitable numerals as indicated in the drawings. The half-crown swaging plate D is also provided with locking catchers marked D'.

E indicates the combined half-crown-draw-and-swaging plate provided with the circularly arranged series of crown forming holes which comprise the series *e* of draw-holes *e'*, &c., and the draw-and-half-crown-swaging holes, *e''* &c., and the series *e'''* of half-crown-swaging holes. The several holes which correspond in size, are, in practice, distinguished by suitable numerals as indicated in the draw-



ings. The draw-and-half-crown-swaging holes  $e'^{10}$ , &c., and the half-crown-swaging holes of the inner series  $e''$ , respectively flare at their lower ends as indicated in Fig. 2 and their rims at the lower face of the plate conform respectively to the contour of the mid-section of the bellies of the teeth to be fitted, and to the rims respectively of the half-crown sockets  $d$ . The sockets and swaging holes of corresponding size are marked with the same numerals indicative of their size. It will be understood that there will be several differently shaped holes of the same size to respectively fit the several teeth of the same size which have different shapes. For example, holes  $e'^{13}$ ,  $e''^{13}$ , and  $e'''^{13}$  and sockets  $d'^{13}$ ,  $d''^{13}$  and  $d'''^{13}$ . The plate E is also provided upon its underside with the catch E'. The catches E' and D' are arranged with such relation to each other and to the draw-and-half-crown swaging holes and the half-crown swaging sockets that when the catch of the upper plate catches with the catch of the lower plate, the two plates will be held against rotation with relation to each other, and the swaging holes and swaging sockets will register with each other.

The two plates are removably pivoted to the press frame A by the pivot post F which is screw threaded at each end and is fastened by being screwed into the base of the frame.

On the upper end of the post is screwed a thumb-nut G provided with the sleeve  $g$  which is arranged to engage the combined-draw-and-swaging plate to clamp the plates in position. This sleeve is detachably attached to the post by means of the thumb-nut in order to allow the plates to be removed while the post is fixed in the base. Means are provided for fixing the plate engaging and clamping sleeve  $g$  to the post. They comprise a set screw  $g'$  which screws through the sleeve into a seat  $g''$  in the post so that the thumb-nut can be fixed on the pivot post to serve to turn it to screw it into or out of its socket in the base of the press frame.

The two plates are circular and are pivoted at their centers to the base of the press A. The pivot post F passes through the pivot holes  $ff'$  in the plates and screws into the post socket  $f''$  or  $f'''$  and is thus fastened to the base of the press. The holes in the upper plate are circularly arranged in two circles, the outer circle containing the draw holes  $e$  and the combined draw-and-half-crown swaging holes  $e'^{13}$ , &c., and the inner circle containing the half-crown swaging holes  $e''$ . The half-crown swaging sockets  $d$ , &c., in the lower plate are located to register with the appropriate holes in the upper plate when the two plates are pivoted together at the center as shown, and the punch is arranged with its extended axis intersecting the path of such holes and sockets.

The half-crown swaging plate D is provided with a peripheral recess or notch D'' and the base of the press is provided with a corre-

sponding recess A' to allow the partially formed blanks to be driven downward through and out of the large swaging holes  $e'$ ,  $e^2$ ,  $e^3$ , &c., so that when the pivot post is seated in the outer post hole  $f''$ , punches can be used through the several draw holes to draw the thimble to the proper reduced size, and then the plates can be shifted and the pivot post F screwed into the inner post hole  $f'''$  so as to allow a punch to be used to swage the thimble in those molds which are formed by the half-crown swaging holes and the half-crown swaging sockets in the inner circle. I have shown in Fig. 2 of the drawings one of the draw holes in the outer circle arranged to form both a draw hole and a swaging hole. It is possible to combine in one hole the drawing hole and swaging hole in those molds which fit teeth which do not have any contracted portion below the neck of the tooth. In such swaging holes the upper portion thereof may be made circular, and of the size of the neck of the tooth and can therefore serve as a suitable draw hole and therefore can be arranged (as shown at  $e'^{13}$  in Fig. 2) in the outer circle with the other draw holes. The lower plate D is provided with a half-crown swaging socket  $d'^{13}$  arranged in the outer circle to register with such combined draw-and-half-crown swaging hole,  $e'^{13}$ .

In practice, in beginning the operation, the half crown swaging plate is adjusted with the recess D'' registering with the recess A' and the combined draw-and-half crown swaging plate E is arranged with its largest hole  $e'$  above the recess D''. The two plates are pivoted together with the pivot post seated in the outer screw socket  $f''$ , to hold the plates in position during the process of drawing. The blank is then drawn through the draw hole  $e'$  by a punch or plunger of suitable size for the purpose. After the plunger is withdrawn, the draw plate is rotated to bring the next draw hole to register with the plunger. The process of drawing is then repeated with the several holes of successively diminishing size until a cylindrical trimble of the size required for the tooth to be fitted is formed, with one end closed. In the drawings the size of the tooth being fitted corresponds with the draw hole  $e'^{13}$  and when the thimble has been drawn through the hole  $e'^{13}$  the plates are then adjusted so that the lower end or swaging portion of the hole  $e'^{13}$  will register with the swaging socket  $d'^{13}$  and the plates are then firmly clamped to the base A by means of the post F and the thumb-nut G and sleeve  $g$ . When thoroughly fixed and secured the thimble H is inserted the second time into the draw hole  $e'^{13}$  and is partly filled with molding-sand I or with some other suitable material which will give pressure in all directions under the action of the punch. The punch  $b$ , which is rounded at the end for this purpose, is then forced into place. When sufficient force has been applied to force the sand to cause the gold to perfectly conform to



the mold, the punch is withdrawn and the thumb-nut and sleeve G g are removed from the post and the draw-and-half-crown swaging plate is lifted from the lower plate, thus releasing the crown, which is complete.

The numbers J, J' which indicate the sizes of the inner series of swaging holes and sockets are applied to the edges of the plates D and E so that the operator can readily adjust the plates with proper relation to each other.

The post F serves as a guide for the combined draw-and-half-crown swaging plate E so that in the act of removing it from the half-crown swaging plate D the crown will not be injured by any accidental displacement of the plate; and, in connection with the catch E', it prevents any lateral movement of the plate B. When the crown has been removed, the thumb screw and sleeve are again screwed upon the post F and secured by the set screw g' and the post is then unscrewed from the base A and the plates are again placed together and pivoted in position for drawing another thimble to the size for another tooth; and so the work is continued.

The screw-threaded pivot post F together with the screw-threaded sockets f'' and f''' provided in the base of the press frame constitutes means for adjustably pivoting the two plates to the press frame. The socket f'' is arranged at a distance from the extended axis of the punch equal to the radius of the circle in which the outer series of holes in the upper plate E, is arranged; and the distance from the center of the socket f''' to the extended axis of the punch is equal to the radius of the circle in which the inner series of holes in plate E is arranged, so that when the plates are pivoted by the post screwed into the socket f'', the path of the outer series of holes is brought beneath the punch, and when the plates are pivoted by the pivot post set in the socket f''', the path of the inner series of holes is brought beneath the punch.

It will be understood without illustration that plungers of various sizes will be used for the different sized holes, the same as is customary in drawing and swaging thimbles. b' indicates a spring catch for holding the punch b in place.

Now, having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

55 1. A crown swaging machine comprising a half-crown swaging plate having a plain upper face and provided in such face with a socket arranged to conform to half of the crown of the tooth to be fitted; a combined draw-and-half-crown swaging plate having a plain under face fitted upon the upper face of the half crown swaging plate and having a die hole flaring at the lower end and conformed to the shape of the upper half of the crown of the tooth to be fitted, and registering at its margin the margin of the socket in the half-

crown swaging plate, and arranged to form with such socket a mold for the crown; suitable means for detachably clamping the plates together, and suitable means for drawing and swaging a ductile thimble to fit the mold.

2. A swaging machine comprising the base; the half-crown swaging plate provided with the central post hole, the half-crown sockets arranged around the post hole in a circle, suitable catch devices and the peripheral recess; the combined draw-and-half-crown swaging plate provided with the central post hole and with the circularly arranged draw and swaging holes respectively flaring at their lower ends and conforming to the rims of their respective swaging sockets in the half-crown swaging plate; the center post secured to the base and passing through the half-crown swaging plate and the combined draw-and-half-crown swaging plate; means mounted on the post for clamping the plates to the base, and a power operated punch for drawing and swaging, substantially as set forth.

3. The combination of the base; the half-crown swaging plate provided with the central post hole and the circularly arranged sockets; the draw-and-half-crown swaging plate provided with the central post hole and the circularly arranged holes corresponding with the sockets in the half-crown swaging plate; the pivot-post passing through the post holes in the two plates and secured to the base; the thumb-nut provided with the plate engaging sleeve; and the power operated punch arranged with its extended axis intersecting the path of such holes and sockets.

4. A crown swaging machine having two swaging plates pivoted to a press frame and provided with a circularly arranged series of holes and sockets in the plates for forming the crowns, and having its punch arranged with its extended axis intersecting the path of such holes and sockets.

5. In a swaging machine, the combination of the base; the two swaging plates provided respectively with a pivot-post hole; the pivot-post passing through such holes and fastened to the base; and the plate-engaging-and-clamping sleeve detachably attached to the pivot-post.

6. In a swaging machine the combination of the base; the two swaging plates provided respectively with a pivot-post hole; the pivot-post passing through such holes and fastened to the base; and the thumb nut provided with the plate engaging sleeve and arranged to screw upon the top of the pivot-post.

7. The crown swaging machine set forth comprising the base provided with the two screw-threaded post-hole sockets; the upper plate provided with the pivot post-hole and two circularly arranged series of crown forming holes; the lower plate provided with the pivot-post hole; the pivot-post screw-threaded at its opposite ends; the thumb-nut provided



with the plate-engaging sleeve arranged to screw upon the top of the pivot-post, and means for fixing the thumb-nut to the post.

5 8. In a crown swaging machine the combination with the punch and press frame, of the two swaging plates each having two circularly arranged series of holes for forming

the crown; and means for adjustably pivoting the plates to the press frame.

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