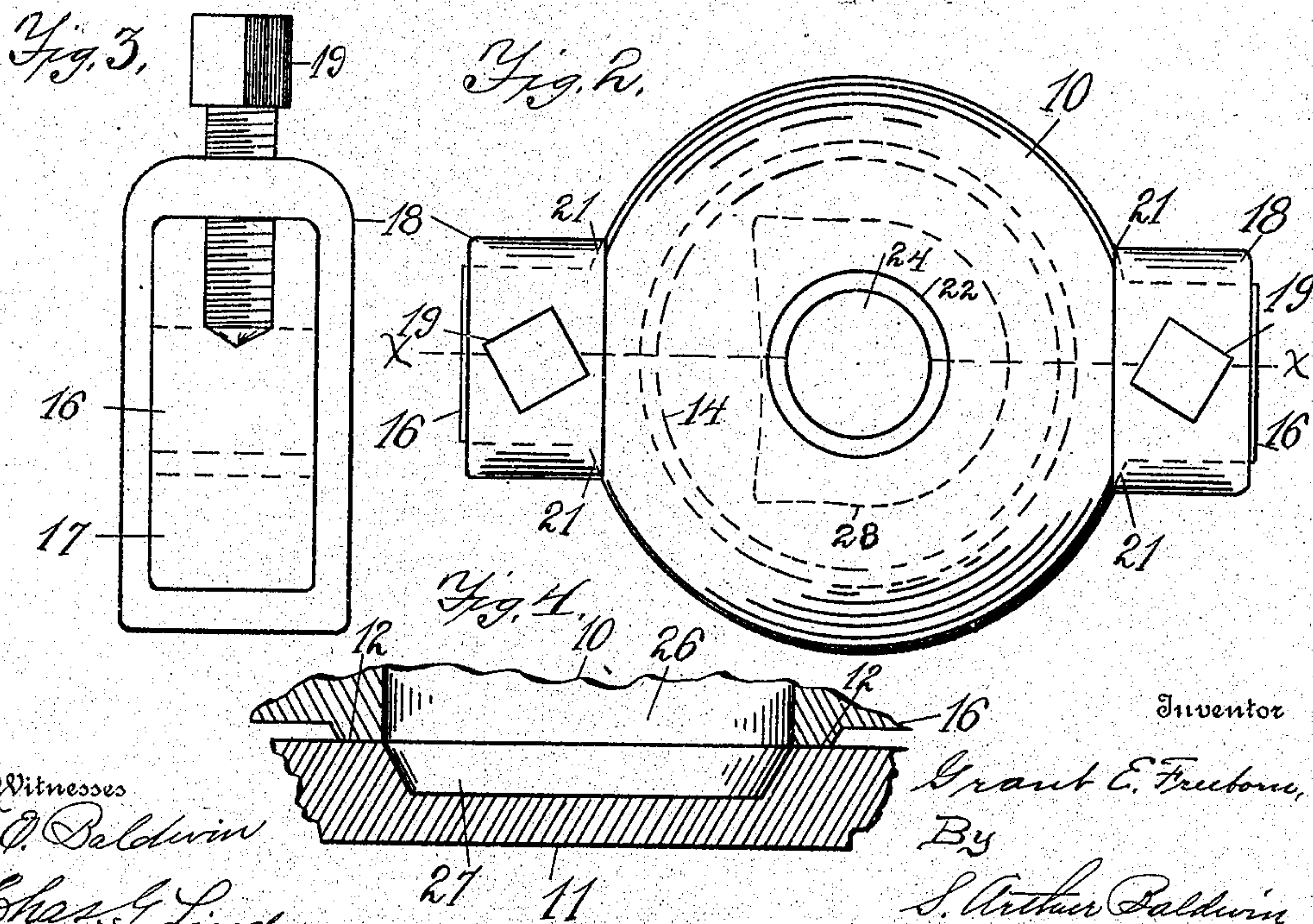
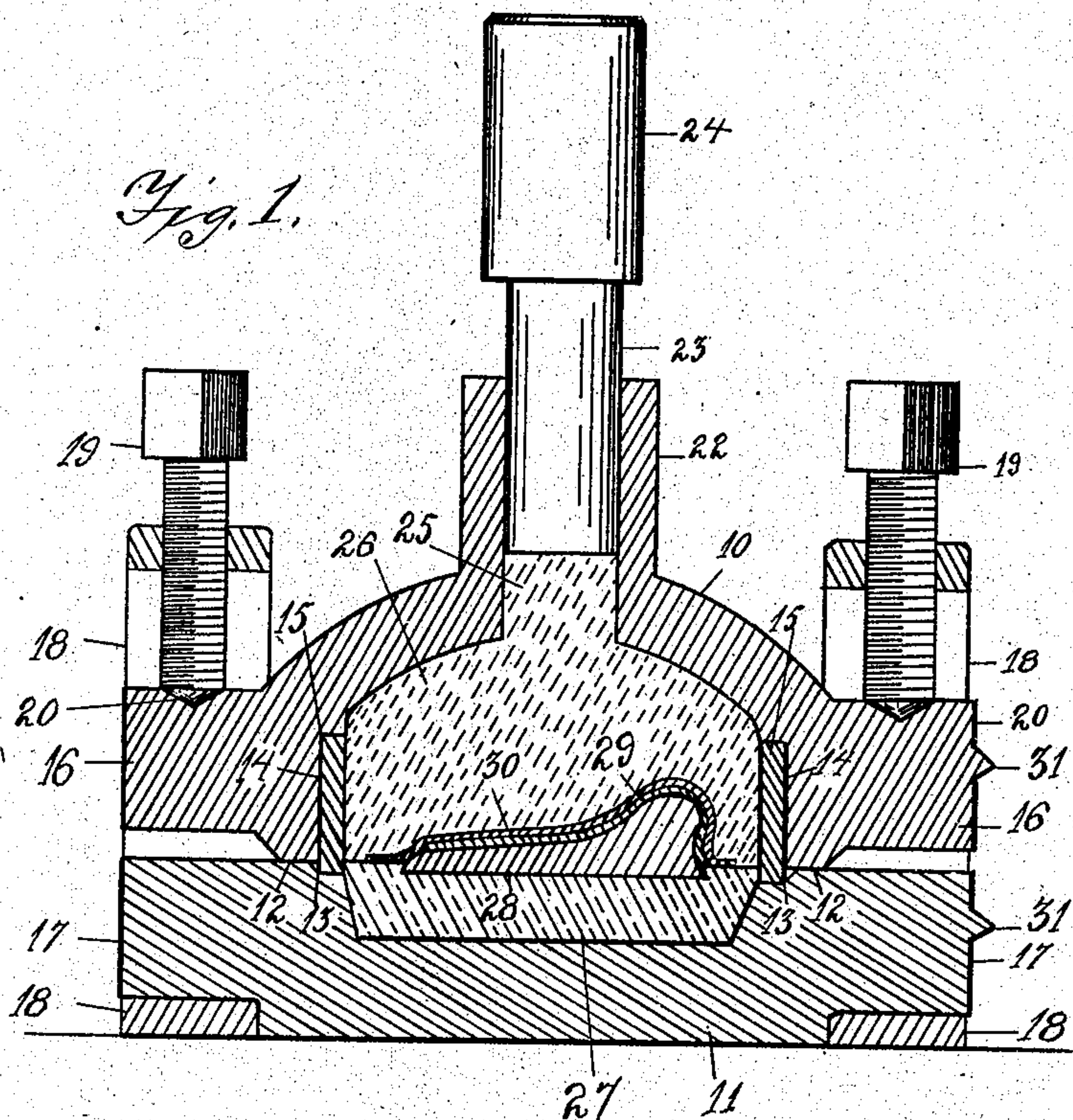


No. 815,807.

PATENTED MAR. 20, 1906.

G. E. FREEBORN.  
DENTAL PLATE SWAGE.  
APPLICATION FILED MAY 1, 1905.



Witnesses  
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# UNITED STATES PATENT OFFICE.

GRANT E. FREEBORN, OF BELFAST, NEW YORK.

## DENTAL-PLATE SWAGE.

No. 815,807.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed May 1, 1905. Serial No. 258,177.

*To all whom it may concern:*

Be it known that I, GRANT E. FREEBORN, a citizen of the United States, and a resident of Belfast, in the county of Allegany and State of New York, have invented new and useful Improvements in Dental-Plate Swages, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

10 The invention relates to appliances for shaping sheet-metal dental plates; and the objects of my improvement are, first, to provide a simple form of swage which is divided on a line with the die and can be opened for inspection at any stage of the operation without detriment to the plate and in which the plate and particularly the under-cuts of the plate are accessible for malleting, and, second, to provide means for preventing leakage under the heavy pressure necessitated in swaging sheet metal over a die.

In the drawings, Figure 1 is a sectional view of the swage at line X X in Fig. 2 and showing a plate in the process of swaging. 25 Fig. 2 is a plan view of the swage, showing the retaining-ring and die in dotted line. Fig. 3 is a side elevation of one of the end clamps. Fig. 4 is a sectional view of a modification of the swage without the inner ring.

30 Similar numerals refer to corresponding parts in the several views.

The base of the swage is divided on a line with the plate-die. The two parts of the base are indicated by the numerals 10 and 11. The upper part 10 sets on the lower part 11 with a ground joint 12. For light plates the ground joint 12 is sufficient to prevent leakage, and the simple divided base, as shown in the modification in Fig. 4, would be sufficient for such work; but for heavy plates I prefer the insertion of an inner ring 14. Ring 14 is made to fit lightly within top part 10, so that in opening the swage it remains in place. A seat 13 is made in lower part 11 for the lower edge of ring 14, said seat having a slight vent extending up to the joint 12 in order that the ring 14 may be easily removed in opening the mold and so that the ring will also instantly seek its place in putting the two together. 45 The upper edge 15 also has a close joint. It is apparent that the ring 14 will provide joints 13 and 15 in addition to the ground joint 12 and in front of said joint and between the die and the joint, thus absolutely preventing all liability to leakage, yet allowing of the easy opening of the swage.

Vertically-opposite lugs 16 and 17 are provided on parts 10 and 11 to receive the clamps 18, which clamps are preferably operated by a screw 19. Upper lugs 16 have slight depressions 20 to receive the lower end of screw 19, so that the clamp will always come to the correct position in compressing the parts. Clamps 18 are also set close to the main body of parts 10 and 11, as shown at 21 in Fig. 2, so as to hold the parts firmly in place and prevent their springing under heavy blows.

The central portion of part 10 is extended upward in a cylindrical tube 22. A plunger 23 is provided to fit the opening 25 in tubular portion 22 and has an elongated head 24 suitable for striking with a heavy sledge or hammer.

The interior of the divided swage has its upper portion 26 made in conical form to allow equal pressure to all surfaces. Lower part 11 has a cup-shaped opening 27 therein. Opening 27 is filled with a stiff resinous compound which melts at low temperature, the modeling compound used by all dentists supplying this purpose perfectly. The conical opening 26 is filled with a wax compound, preferably formed of sixteen parts paraffin to one part venice-of-turpentine or eight parts of spermaceti and paraffin-wax and one part of venice-of-turpentine. Either of these gives a tough wax which forms the sheet metal to the die without breaking the wax under the heavy pressure in the swage. Ring 14 is held in upper part 10 by the wax and its close fit. Die 28 is made of metal which melts at low temperature, preferably at about 150° Fahrenheit.

The operation of making a dental plate is as follows: The cup-shaped openings 26 and 27 of the parts 10 and 11 are filled with the modeling compound and wax, as above stated. The same wax and compound are used over and over in swaging plates. The opening in the wax formed by the die and plate remains about the same, so as to quickly conform to the change in shape of the different plates. The impression of the mouth is taken with plaster-of-paris or modeling compound, and this cast may be immediately filled with the melted low-temperature metal for the die without waiting for the cast to dry, since the metal melts at a temperature below the boiling-point and will not create air-bubbles from moisture. Accordingly the metal may be run into the wet plaster-of-paris cast at once, or it may be used



in the same manner in the model compound cast without melting the cast. It is then placed in cold water, instantly setting the metal hard. The die 28 is now ready to be  
 5 placed in the modeling compound in opening 27, the compound having first been softened by setting in hot water or over a flame for a few moments. This allows the die 28 to sink  
 10 into the compound to the desired point, at which point the compound may be instantly set hard by running cold water over it. This holds the die 28 firmly in place. Die 28 is placed with its front part toward the projec-  
 15 tions 31, so that the operator knows the exact position of his die and can open the parts of the swage from the rear side of the die, and thus not break or bend the under-cut of the plate. It is apparent that the die 28 being  
 20 slightly above the level of the lower part 11 the under-cut of the die is accessible for mal-  
 leting. The thin sheet metal 29 for the plate is placed over the die and a piece of sheet-  
 rubber 30, such as is used by dentists for rub-  
 25 ber-dam work, is placed over plate 29. The upper portion 10 is now forced down upon the die and plate by means of clamps 18, which give great leverage power in holding the parts together and preventing leakage. They also form an easy means of putting the  
 30 parts together and taking apart. Plunger 24 is then struck a number of blows with the sledge, three blows being sufficient to com-  
 plete the plate, thereby forcing the wax in the upper part about all parts of the die and  
 35 forcing the sheet metal of the plate to conform to the least depressions in the die. It is apparent that great pressure will be given by such blows to the confined die and plate, estimated at about three thousand five hun-  
 40 dred to four thousand pounds to the square inch, sufficiently powerful to cause a plate of eighteen-gage aluminium-bronze to copy the

die. Under such pressure any liability to leakage is a great detriment. A metal plate on being removed from the swage is as bright  
 45 and smooth as when put in, thereby preventing the polishing away of at least two gages in thickness of the gold or other material used.

I claim as new—

1. In a dental-plate swage, a hollow base  
 50 formed in two parts, a cup-shaped lower portion having a resinous compound adapted to support the die, a cup-shaped upper portion having a yielding wax compound therein and  
 55 provided with a tubular opening, a plunger operable in said opening, lugs on said portions and screw-clamps to engage said lugs and unite said portions, and a ring within  
 60 said base to protect the joint between said portions.

2. A dental-plate swage consisting of, a lower portion 11 having the cup-shaped open-  
 65 ing 27 on its upper side and the lugs 17 thereon, the upper portion 10 having the conical opening 26 on its under side and lugs 16 thereon, a tubular extension 22 in said upper  
 70 portion, a plunger 23 operable in said tubular portion, screw-clamps 18 engaging said lugs to hold the parts together, ring 14 having seats within said parts adjacent the joint  
 75 between said portions to prevent leakage, a die 28 supported upon a resinous compound in opening 27, a rubber covering 29 for the plate and a yieldable wax compound in open-  
 ing 26, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GRANT E. FREEBORN.

Witnesses:

L. J. SIZER,

PERCY L. HANKS.