

F. M. Shields.

Impt^d in the Manu^{facture} of
Dental Plates.

[27.]

No. 119,245.

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Fig. 1.

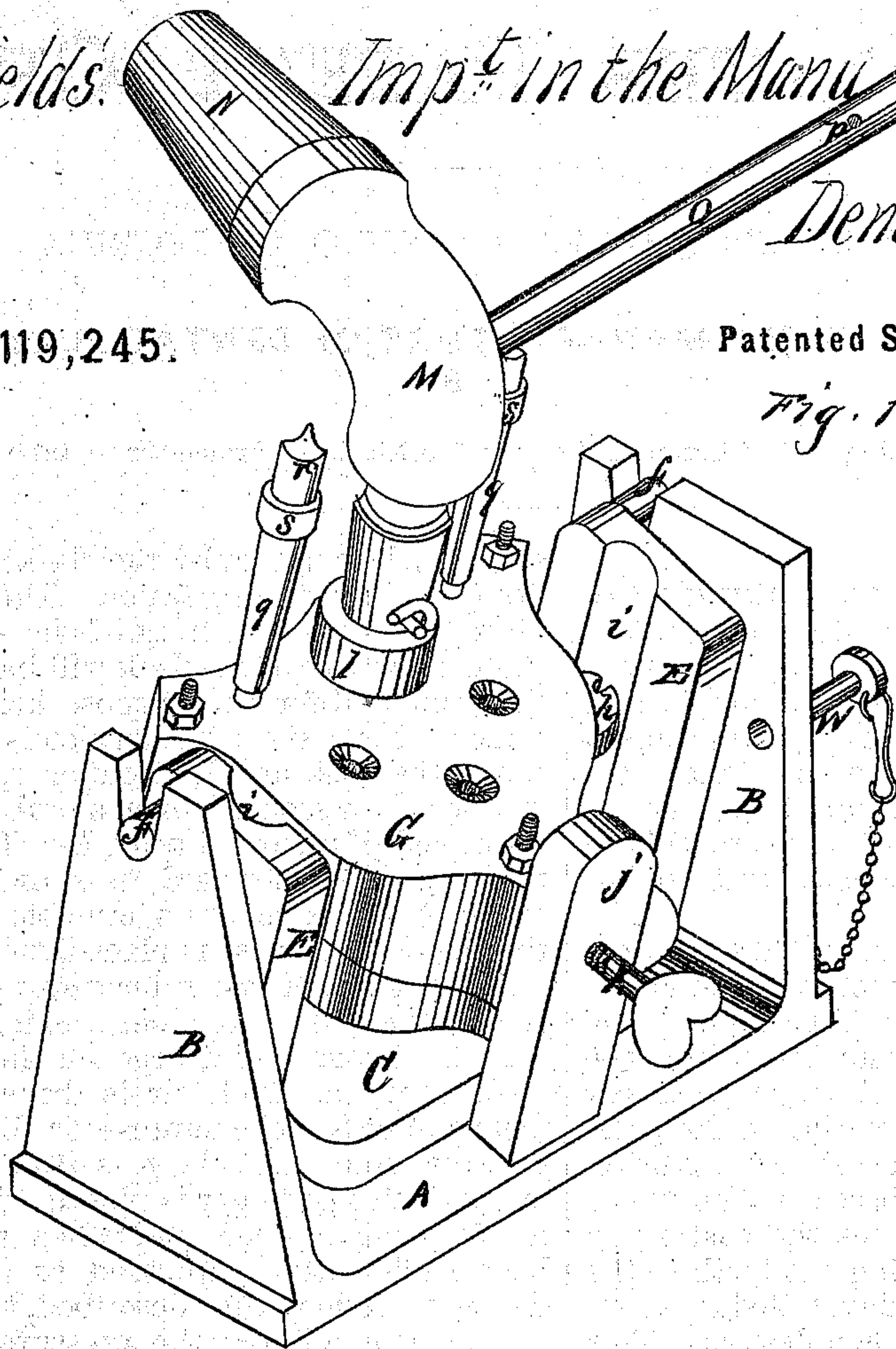
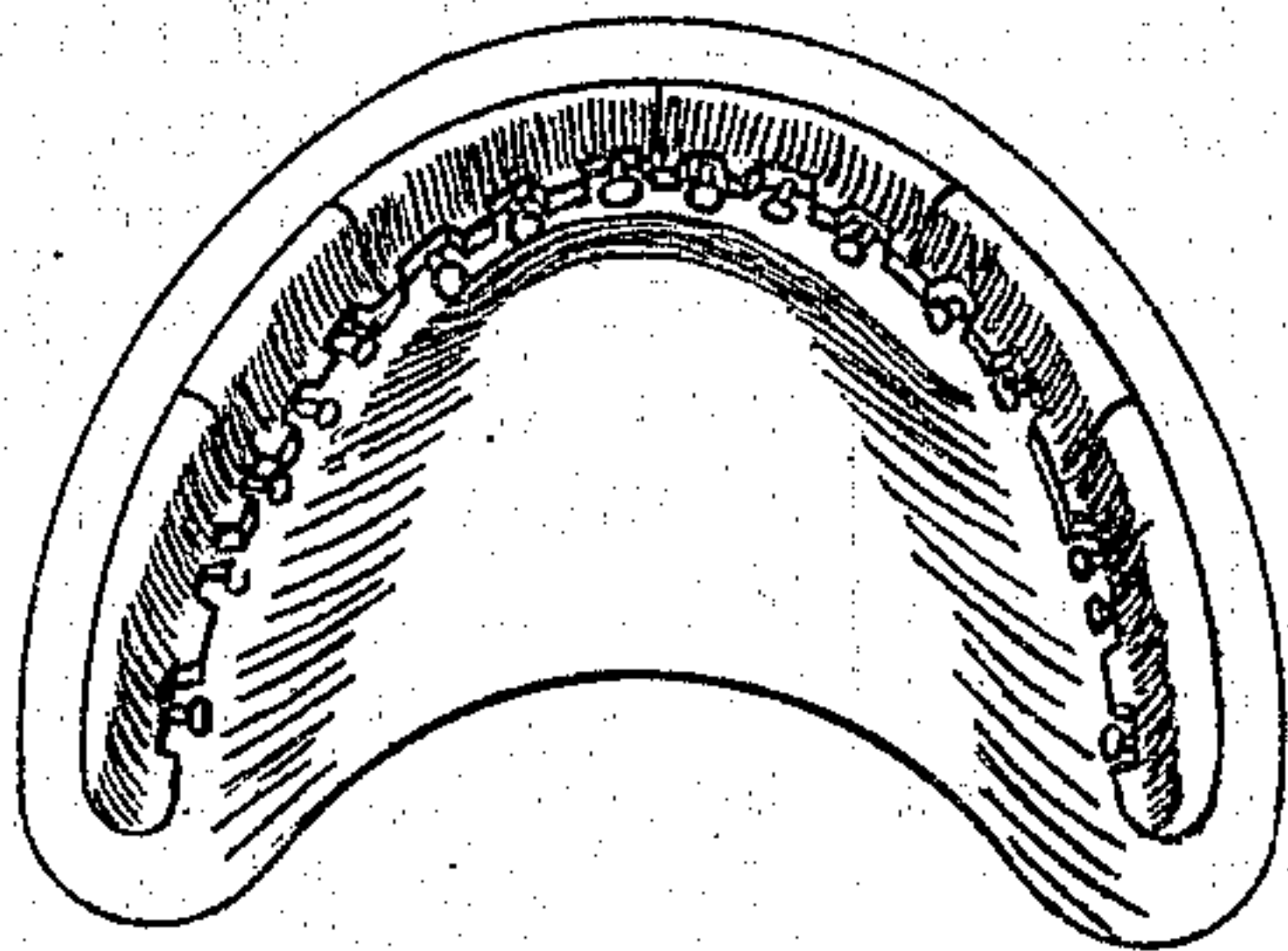


Fig. 2.



Witnesses.
Geo. W. Strong.
Wm. H. Rummel.

Inventor.
Francis M. Shields
By his Atty's
Dewey & Co.

UNITED STATES PATENT OFFICE.

FRANCIS M. SHIELDS, OF SACRAMENTO, CALIFORNIA.

IMPROVEMENT IN THE MANUFACTURE OF DENTAL PLATES.

Specification forming part of Letters Patent No. 119,245, dated September 26, 1871.

To all whom it may concern:

Be it known that I, FRANCIS M. SHIELDS, of the city and county of Sacramento, State of California, have invented Improvements in the Manufacture of Dental Plates from Aluminium; and I do hereby declare the following description and accompanying drawing are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvements without further invention or experiment.

My invention relates to an improved apparatus to be employed in the manufacture of artificial dental plates from the metal aluminium. The process which I employ consists in casting the plate in two operations. The first operation consists in casting the body or covering of the palatine arch and alveolar processes leaving dovetailed recesses between the bases of the teeth. The second operation completes the casting by covering the rivets and uniting the teeth to the first casting by means of the dovetailed recesses, and also forming the rims, when desired. This latter operation remedies any defects in the first casting. My invention consists in the devices hereinafter claimed for carrying out those processes.

The apparatus and process which I employ are more fully described and illustrated in the accompanying description and drawing, in which—

A represents a base-plate having side standards B. C is a strong metal plate having side arms E, which are provided with trunnions *f* at each side. These trunnions bear in the upper ends of the standards B so as to suspend the plate C inside of the frame, composed of the plate A and standard B. The flask G is here shown as composed of two parts, but it can also be made in three or even more pieces, and secured together by bolts and nuts in the usual manner. The flask is made in the form of a shield, and is so formed internally as to give the upper section a forward and upward direction, which conforms to the under cuts of the models and avoids fracture. On each side of this flask is formed a lug or projection, *h*, which fits into vertical grooves *i*, which are made on the inside of the arms E, so as to slide down the grooves and allow the flask to be placed on the swinging plate C. A standard, *j*, projects upward from the plate C at the rear of the flask, and a set-screw, *k*, passes through it

and may be set against the flask so as to fix it firmly in the swinging frame. The trunnions are placed somewhat in front of the center, so that the narrow end of the flask will hang lower than the front end for the purpose hereinafter mentioned. *l* is a short tube, which is secured to the top of the flask near its front or upper edge, and into which is secured in a suitable manner the lower end of a curved tube, M. This tube is intended to curve forward, as shown, and has secured to its extremity a crucible N, into which the metal to be cast is placed, to be brought to a proper state of fusion for turning into the matrix in the flask. A pipe, *o*, enters the curved tube M at some point between the crucible and flask, through which air is driven by suitable means in order to compress or force the metal into the mold. A hole, *p*, is drilled in this pipe, over which the finger is placed while the pressure is being applied, and when the metal has been sufficiently compressed, as indicated by a device to be hereafter described, the uncovering of the hole relieves the pressure. Upon each side of the tube M is a small hollow tapering standard, *q*, which is made in two parts, each standard being divided longitudinally through its center. Each of these parts or halves is grooved along its meeting side so as to form a passage through the standard when the two are united together. Small side holes, *r*, lead out from this central passage near the top of the standard. The two parts are held together by a sliding ferrule, *s*, so that they can be readily separated in order to remove the metal which cools in the passage. The height of these standards will be regulated according to the amount of pressure which is required to properly force the metal into the mold, as when the metal is turned into the matrix and the pressure of air is applied the metal will be forced up the hollow standards *q*, its appearance through the side holes *r* indicating the moment when the pressure should be discontinued by removing the finger from the vent-hole *p* in the compressing-pipe *o*.

The casting of the plate is made in two operations, the object being to avoid breaking, twisting, or fracturing the teeth by the shrinkage of the plate after being cast. The matrix is first prepared in the usual manner, with the exception that I bury the teeth in the plaster of Paris in the position which they are to occupy when at-

tached to the plate. I then remove the plaster of Paris between the pins or root of each tooth so as form dovetail recesses *v* between each two teeth or pairs of teeth, as shown at Fig. 2, leaving the teeth entirely concealed. I then place the metal aluminium in the crucible and turn the frame which supports the flask forward until the crucible stands nearly vertical, in which position the frame is held by a pin, *W*, which passes through a hole in the side plate *E*. Heat is then applied to the crucible until the metal is in a proper state of fusion, when, by removing the pin *W*, the flask will swing to its former position and cause the metal to flow through the tube *M* into the matrix in the flask, the pressure of air being applied at the same time. This forms that portion of the plate which covers the arch of the mouth and alveolar processes. The plaster of Paris surrounding the base of the teeth and their pins is then removed and a second casting made in a similar manner to that above described, which unites the teeth to the plate by the metal filling in the dovetail recesses above mentioned, and also embracing the teeth. By this means I entirely avoid breaking, twisting, or fracturing the teeth by the shrinkage of the metal, as the shrinkage of the small amount of metal employed in the second casting will not be sufficient to disturb them; besides, the dovetailed recesses will prevent any tendency there may be to injure them from this cause.

My apparatus is especially applicable for this class of work, and when properly employed will be readily managed and give satisfactory results.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The frame composed of the base plate *A* and standards *B* in combination with the swinging frame composed of the plate *C*, side arms *E*, and standard *j*, substantially and for the purpose above described.

2. The shield-shaped flask *G*, divided into two or more parts and having the lugs *h*, in combination with the plate *C* and side arms *E*, all constructed and arranged substantially as and for the purpose set forth.

3. The curved tube *M* with its compression-pipe *o*, in combination with the crucible *N* and flask *G*, substantially as and for the purpose set forth.

4. The curved tube *M*, crucible *N*, and flask *G*, in combination with the indicating-standards *g* and compression-pipe *o*, when constructed and arranged substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand and seal.

FRANCIS M. SHIELDS. [L. S.]

Witnesses:

ED. CADWALADER,
L. C. CARPENTER.