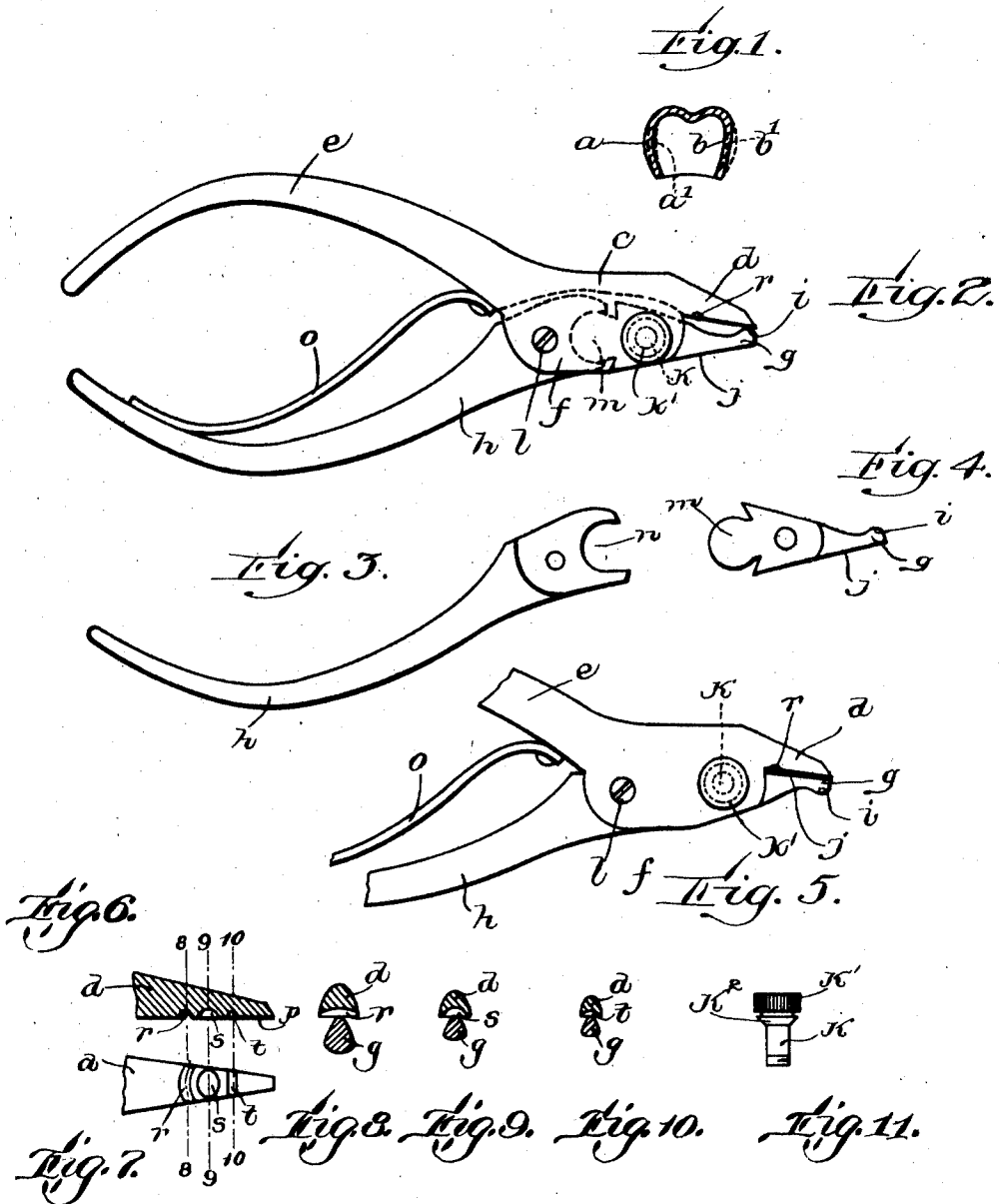


W. G. BRIDGE.
UNIVERSAL DENTAL PLIERS.
APPLICATION FILED JULY 16, 1918.

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UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WALTER G. BRIDGE, a citizen of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Universal Dental Pliers, of which the following is a specification.

This invention relates to pliers of the sort used by dental surgeons and artificers for shaping, bending and fitting tooth crowns and the wires used in constructing dental bridge work, and performing other services for which pliers are adapted. It is the object of the invention to provide a universal tool of this nature equipped with means and provisions adapting it to be used for a wide variety of purposes, including particular purposes for which special tools have heretofore been provided. A part of my object is to enable a greater leverage to be applied to the jaws of pliers adapted to peen and stretch highly tempered gold alloys, thereby adapting them to perform certain classes of work, such as swaging the walls, and bending, enlarging, and otherwise fitting the edges, of tooth crowns, in a better manner than heretofore. A further object is to make one of the jaws of the pliers reversible as a part of the means for adapting it to perform work of the wide variety in contemplation.

The invention consists in the universal dental pliers hereinafter described, and in the principles embodied therein as set forth in the following specification and particularly pointed out in the claims.

In the drawings, Figure 1 is a sectional view of a tooth crown showing the character of certain corrections which may be applied by my pliers thereto in order to fit the crown to the position it is required to occupy on the human jaw. Fig. 2 is a side elevation of the pliers embodying my invention. Fig. 3 is an elevation of one of the operating handles removed from the implement. Fig. 4 is a similar view of the reversible jaw removed. Fig. 5 is an elevation of the pliers showing the reversible jaw in the reverse position to that shown in Fig. 2. Fig. 6 is a longitudinal section of one of the jaws. Fig. 7 is a plan view of the same jaw. Figs. 8, 9, and 10 are cross sectional views through both jaws taken on planes represented by the lines 8—8, 9—9,

and 10—10, respectively of Figs. 6 and 7. Fig. 11 is a detail elevation of the pivot or fulcrum for the reversible jaw.

The same reference characters indicate the same parts in all the figures.

I will first describe the details of construction of the particular pliers here shown, and then mention some of the uses which they may serve, and explain the mode of their use in that connection.

The particular tool illustrated comprises a body *c* having a fixed jaw *d* and fixed handle *e*, the body being provided with wings *f* between which is a space; a reversible jaw *g*, a handle *h*, and pivots *k* and *l* for said jaw and handle, such pivots being confined in the wings *f* and passing through those parts of the reversible jaw and of the handle *h* which lie in the space between said wings. On one side of the jaw *g* at the end thereof is a projecting rounded knob or hump *i*, while the opposite side of said jaw is formed with a straight edge. This jaw is removable and reversible and may therefore be placed with either side adjacent to the fixed or complementary jaw *d*. The two relatively reversed positions of jaw *g* are shown in Figs. 2 and 5, respectively. In one of these positions the hump *i* is the only part of this jaw which co-acts with the complementary jaw, while in the other position all parts of the edge *j* are adapted to co-act with said complementary jaw.

Such removal and reversal is permitted first by making the pivot *k* readily removable, and second by providing a form of connection between the reversible jaw and its operating handle which is effective equally when the reversible jaw is mounted in either position. This connection comprises a tooth or tongue *m* on that end of the jaw which enters the body of the pliers, and a notch *n* in the adjacent end of the handle *h*, such tongue and notch being preferably of substantially equal width whereby to avoid backlash between the jaw and the handle. Of course the mouth of the notch *n* is wide enough to permit withdrawal and insertion of the tongue by movement of the jaw longitudinally.

Thus the jaw and operating handle are both two-armed levers, which are coupled together by the means described. Preferably also the bearing point between the jaw and operating handle is located nearer

to the pivot *l* than to the pivot *k*, and in such a position that a mechanical advantage is secured, giving ability to apply greater force through the jaw *g* than is possible with pliers of the sort where the jaw and its operating handle are integral. This feature may be briefly described as a means for applying increased leverage to the jaw *g*.

10 A spring *o* is provided and arranged to normally separate the handle and thereby the jaws from one another. Any type of spring other than the particular one shown may be provided for this purpose.

15 Referring to Fig. 11 a preferred form of the pivot *k* is shown as a stud adapted to be slipped through one of the wings *f* and the hole in the reversible jaw, and being threaded at its end to screw into the further wing. It is provided with a knurled head *k'* to enable it to be readily applied and removed by the fingers, and between the head and the shank or cylindrical portion, with a beveled surface *k''* which fits a complemental recess in the adjacent wing *f*, and is provided to take up side play.

In the operative face of the jaw *d* are provided a plane surface *p* which cooperates with the knob *i* of the reversible jaw, and recesses *r*, *s*, *t* having different forms and outlines; the first named being a curved groove, the second a substantially circular or elliptical shallow depression, the entire circumference of which is between the bounding edges of the jaw, and the third being a straight groove of substantially uniform width but of greater depth at the middle part than at the ends. The straight edge *j* of the reversible jaw is the part of the latter which cooperates with these recesses when said jaw is in the position shown in Fig. 5.

In explanation of one of the uses of the pliers thus described, reference is directed to Fig. 1, which shows in section a metal tooth crown. Such crowns require to be accurately fitted, and in the course of fitting, one or another side may be either bulged or flattened, or the edge may be stretched and enlarged at given points, or bent in or out. Fig. 1 shows the wall *a* of the crown as being too much bulged and the wall *b* as too flat. By using the knob *i* of the reversible jaw when in the position of Fig. 2, in cooperation with the jaw *d*, and properly manipulating the tool, the flat wall may be bulged into the position shown by dotted lines *b'*; and by using the opposite side of the reversible jaw, the wall *a* may be flattened as indicated by dotted lines *a'*. The knob *i* is also used for stretching and bending the rim of the crown, this effect being aided by the great leverage capable of being exerted upon the

jaw as already described. By powerfully compressing in this manner the rim of the crown between knob *i* and jaw *d*, the metal may be spread, whereby the circuit of the rim is actually enlarged. If at the same time the pliers are properly manipulated, the rim may be curled in or out, with or without stretching, at any points desired.

The straight edge *j* of the reversible jaw is used in connection with the recess *r*, *s* or *t* for bending wires used in bridge work. Preferably this edge of the jaw is a blunt or somewhat rounded knife edge as indicated in Figs. 8, 9, and 10, instead of a flat surface. Thereby it more readily bends the wires operated upon into the recesses, which are of greater depth in the central part of the jaw *d* than at the sides of such jaw. Curved wires which enter the recess or channel *r* may thereby be bent transversely to the plane of their original curvature; straight wires may be bent when laid in the groove *t*, and those which will not enter either groove may be placed over the depression *s*, and bent into the latter.

In addition to these special uses, this tool may be applied to all other uses for which pliers are adapted.

Many modifications may be made in the specific details of the tool, and therefore I do not limit the protection which I seek to these details of form and arrangement otherwise than as appears from the express terms of the appended claims.

What I claim and desire to secure by Letters Patent is:

1. Pliers comprising a body having a jaw, and a second jaw pivoted to said body having diverse characteristics in its opposite faces, and being reversible whereby to bring either face into place for coaction with the first jaw.

2. Dental pliers comprising a body having a jaw, and a second jaw detachably pivoted to said body in a manner permitting it to be placed with either one of two faces adjacent to the first jaw; one of said faces having a projecting knob, and the other of said faces being straight.

3. Dental pliers comprising a body having a jaw, and having separated wings, a complemental jaw fitting movably between said wings and adapted to be there placed with either of its opposite faces next to the first named jaw, and a removable pivot passing through said wings and the interposed part of said complemental jaw.

4. Dental pliers comprising a body having a jaw, and having separated wings, a complemental jaw fitting movably between said wings and adapted to be there placed with either of its opposite faces next to the first named jaw, and a removable pivot passing through said wings and the interposed part of said complemental jaw, said pivot

having a beveled surface cooperating with the hole in one of said wings to take up side play.

5 5. Dental pliers comprising a body having a jaw, and having separated wings, a complementary jaw fitting movably between said wings and adapted to be there placed with either of its opposite faces next to the first named jaw, an operating lever or handle 10 pivoted to said body and engaged detachably with said complementary jaw for operating the latter.

6. Dental pliers comprising a body having a jaw, and having separated wings, a 15 complementary jaw fitting movably between said wings and adapted to be there placed with either of its opposite faces next to the first named jaw, an operating lever or handle pivoted to said body and engaged detachably 20 with said complementary jaw for operating the latter, the engagement between said lever and jaw being positioned to secure an increased leverage in the transmission of force from the handle to the jaw.

25 7. Pliers comprising a body having a jaw, a complementary jaw mounted movably on said body and adapted to be there placed with either of its opposite faces next to the first named jaw, an operating lever or handle 30 pivoted to said body and engaged detachably with said complementary jaw for operating the latter, said lever or handle and

complementary jaw having a tongue and notch connection constructed to permit ready disconnection of the jaw and its reinsertion in reversed position. 35

8. Pliers comprising a body having a jaw, a complementary reversible jaw detachably pivoted to said body and adapted to be reversed in place whereby either of two different faces may be put in operative relation 40 with the first jaw, and an operating handle pivoted independently to the body and having disengageable power-transmitting engagement with said reversible jaw. 45

9. Pliers comprising complementary jaws and operating handles, one of said jaws having recesses in its operative face of varying depth, and the opposed jaw having a longitudinal edge crossing said recesses 50 without entering them arranged to bend wires interposed between said jaws and overlying said recesses.

10. In universal dental pliers, a jaw having a recess of which the greatest depth is 55 between the sides of the jaw, and a complementary jaw having an elongated edge arranged substantially in the longitudinal median line of the first jaw and extending across such recess and the opposite edges 60 thereof.

In testimony whereof I have affixed my signature.

WALTER G. BRIDGE.