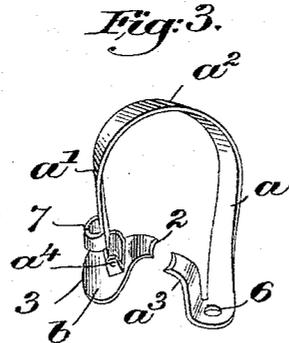
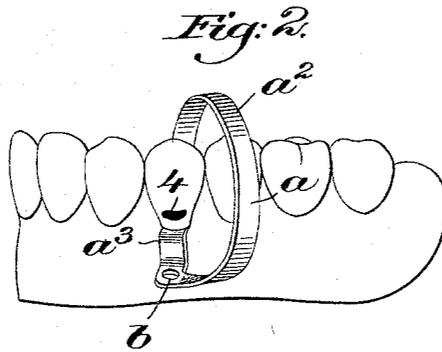
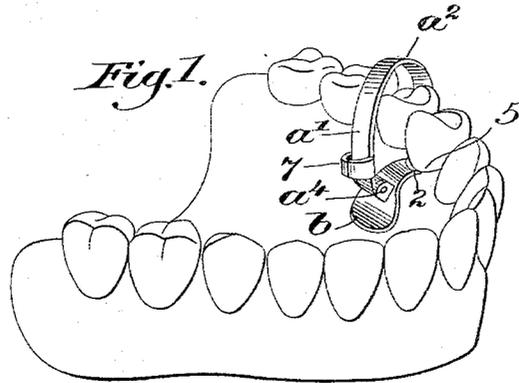


(No Model.)

H. F. LIBBY.
RUBBER DAM CLAMP.

No. 531,802.

Patented Jan. 1, 1895.



Witnesses.
A. C. Harmon
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Inventor:
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UNITED STATES PATENT OFFICE.

HENRY F. LIBBY, OF BOSTON, MASSACHUSETTS.

RUBBER-DAM CLAMP.

SPECIFICATION forming part of Letters Patent No. 531,802, dated January 1, 1895.

Application filed September 24, 1894. Serial No. 523,891. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. LIBBY, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Rubber-Dam Clamps, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to rubber-dam clamps used extensively in dentistry. Clamps of this class, as usually constructed, are provided with two or more arms adapted to be clasped upon opposite sides of a tooth and to hold down a piece of rubber placed about the adjoining teeth and covering a portion of the gum, to prevent dampness reaching the cavity being operated upon. The arms of the clamp, as usually constructed, are turned inwardly and preferably shaped and sharpened to grasp at opposite sides, the neck of a tooth, the neck being that portion of the tooth at or immediately below the termination of the enamel. A clamp constructed to engage a tooth in this manner, must, of necessity, have its two arms or members of substantially the same length, for if one arm is longer than the other the two arms will not act opposite each other upon the tooth, and the clamp will not therefore be firmly held upon the tooth. The inner arm of the clamp, *i. e.*, the arm which acts upon the inside of the tooth, cannot engage the tooth below the neck without being buried in the gum, while it is frequently necessary, in operating upon what are commonly known as labial or cervical cavities, that the outer arm engage the outer face of the tooth at a considerable distance below the neck of the tooth, or at or near the point at which the outer face of the tooth enters the gum, which is usually at a much lower level than the point at which the inner face enters the gum.

The object of this invention is to provide a rubber-dam clamp which can be applied to a tooth with its outer arm engaging the tooth at a point considerably below the neck, *i. e.*, below any labial or cervical cavity, and which may be firmly retained in position clasping the tooth without necessitating the burying of the inner arm in the gum. To accomplish this object, I provide the inner arm of the clamp with a clasping shoe, jointed to the end of said arm and adapted at its upper end

to clasp or engage the neck of the tooth. When the clamp is placed in position with the upper end of the shoe clasping the neck of the tooth, the end of the arm, to which said shoe is pivoted, is by the said shoe carried down to a level considerably below the said neck, or to such a level as will bring it substantially opposite the end of the arm engaging the outer face of the tooth, low down below a labial or cervical cavity. By the use of a shoe, engaging or clasping the neck of the tooth as described, the gum, while acting as a support against which a part of the shoe rests, is nevertheless relieved of much and the most painful pressure, which is that due to the tendency of the clamp to spring up and off the tooth, such pressure being received wholly by the clasping of the shoe on the neck of the tooth.

In the drawings, Figure 1 represents in perspective, one form of clamp embodying my invention, as it will appear when applied to a tooth; Fig. 2, a view looking at the face of the tooth upon which the clamp is clasped, the clasping end of the outer arm being low down to clear a labial cavity, the rubber-dam being omitted for the sake of clearness; and Fig. 3, a perspective view of the clamp by itself.

Referring to the drawings, my improved clamp comprises the two arms or members *a, a'*, preferably united by a resilient or spring crown portion *a²*, and shown as formed from a single piece or strip of resilient metal, though said arms so far as concerns my present invention may be otherwise formed or connected, if desired. The lower or clasping end *a³* of the outer arm *a* is shown as turned inwardly, and concaved and sharpened to embrace the outer face of a tooth. The lower or clasping end of the inner arm *a'*, is connected by a hinge joint or pivot *a⁴*, to a clasping shoe *b*, shown as a substantially flat piece of metal concaved and preferably sharpened at its inner end 2, to engage or clasp the inner face of a tooth at its neck, and at its opposite end 3 made rounding to better conform to the contour of the gum.

Referring now particularly to Fig. 2, 4 represents a labial cavity located below the level of the neck 5 of a tooth, and in operating upon this cavity, it is desirable that the rub-

ber-dam and clasping end of the outer arm of the clamp be considerably below the cavity to permit free manipulation of the instruments. To apply my improved clamp to a
 5 tooth having such a labial cavity, the ends of a pair of spring pliers such as are commonly employed for this purpose, are inserted in the hole 6 in the end a^3 and in the eye 7 formed at the end of the arm a' , and the two arms
 10 spread to enable the clamp to be placed upon the tooth, the inturned clasping end a^3 of the outer arm a being placed against the face of the tooth below the cavity, and the shoe b placed with its clasping end under the neck
 15 of the tooth at the inner face thereof, and permitted to rest upon the gum below the neck, as shown.

By reference to Fig. 1, it will be seen that while the concave knife edge 2 of the shoe b
 20 engages the neck of the tooth above the gum, yet the point of attachment a^4 of the arm a' is carried below the said neck to a position substantially opposite the clasping end 1 of the arm a low down at the outer side or face
 25 of the tooth, and that the ends of the two arms being pressed toward and substantially opposite each other by the spring crown a^2 , thereby retain the clamp firmly in position upon the tooth.

30 The shoe b may be made longer or shorter as desired to carry the end of the inner arm a' to a greater or less distance below the neck of the tooth to bring it at such a level or position as shall cause it to act substantially opposite the end of the outer arm, yet the engagement of said shoe with the neck of the tooth holds the clamp firmly in position and takes the larger part of the pressure from and thereby relieves the gum.

40 The neck of the tooth at the inner side is always higher or nearer the top of the tooth than the neck at the outer side of the tooth, and it is evident that a clamp, in which the two arms are of equal or of substantially equal
 45 length, even when applied with its clasping ends at the neck of the tooth at each side,

must stand in an inclined position, and the inclination would be much more were it attempted to carry the clasping end of the outer arm down below the neck for a labial or cervical cavity without carrying the clasping
 50 end of the inner arm also below the neck. When this is attempted the inclination is found to be so great as to cause the end of the outer arm to slip upwardly upon the tooth
 55 toward the neck thereof, making it impossible to hold the dam down below the cavity. With my improved device, however, the shoe upon the end of the inner arm while clasping the neck of a tooth, enables the end of said arm
 60 to be carried to a considerable distance below the said neck to thereby bring it in proper operative position with relation to the clasping end of the outer arm, when the latter engages the tooth low down upon the outer face
 65 thereof.

It will be noticed that the outer arm is offset from and dropped below the inturned clasping end a^3 in such a manner as to clear the instruments when in use. 70

I claim—

A rubber dam clamp, having two arms, one adapted at its end to engage and clasp a tooth at the outer side thereof and a clasping shoe pivoted to the end of the other arm and provided above its pivot with a clasping edge to engage and clasp said tooth at its neck and at the inner side thereof, to carry the end of said other arm below said neck and hold the same in position by engagement of its clasping edge with the neck of said tooth, whereby the tooth receives much of the pressure necessary to retain the clamp in position, substantially as described. 75 80

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

HENRY F. LIBBY.

Witnesses:

FREDERICK L. EMERY,
 KATHERINE F. SCOTT.