No. 800,387. PATENTED SEPT. 26, 1905.

J. MILLS.

MATRIX RETAINER.

APPLICATION FILED JUNE 11, 1904.

Fig. 1.

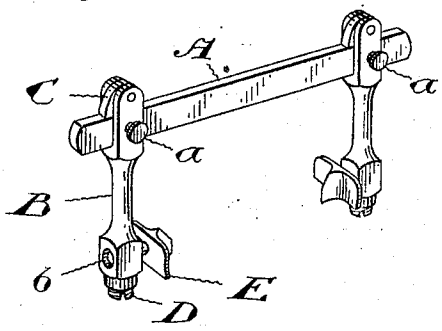
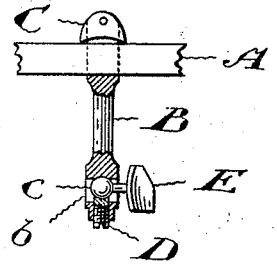


Fig. 2.



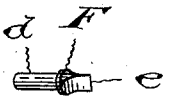


Fig. 3.

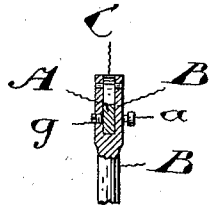


Fig. 6.

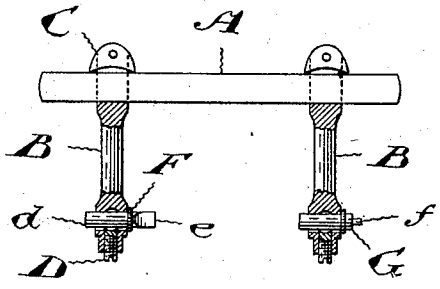


Fig. 4.

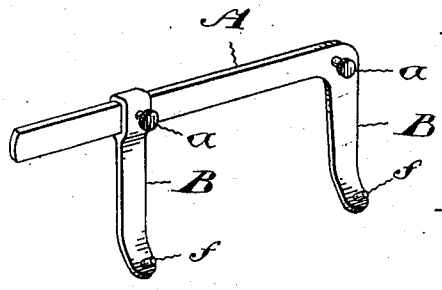


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN MILLS, OF BRANTFORD, CANADA.

MATRIX-RETAINER.

No. 800,387. Specification of Letters Patent. Patented Sept. 26, 1905.

Application filed June 11, 1904. Serial No. 212,214.

To all whom it may concern:

Be it known that I, JOHN MILLS, of the city of Brantford, in the county of Brant, Province of Ontario, Canada, have invented certain new and useful Improvements in Matrix-Retainers, of which the following is a specification.

The object of my invention is to devise a simple and effective matrix-retainer adapted for use in a variety of situations and of neat and convenient form; and it consists, essentially, of a bar having arms slidable thereon, the arms being adapted at their free ends to carry both ball-and-socket and rigid jaws, substantially as hereinafter more specifically described and then definitely claimed.

Figure 1 is a perspective view of my improved retainer. Fig. 2 is a sectional elevation of one of the arms of the same. Fig. 3 is a perspective detail of a form of jaw used in clamping a matrix about a tooth. Fig. 4 is an elevation of the apparatus, showing at the left hand a rigid jaw, such as used in clamping a matrix round a tooth, and at the right hand the rigid jaw employed when spreading apart the ends of a retainer, as called for in placing a matrix behind and between the front teeth. Fig. 5 is a perspective detail of a modification of my invention. Fig. 6 is a sectional detail showing one of the arms provided with a set-screw by means of which it may be clamped to the bar.

In the drawings like letters of reference indicate corresponding parts in the different figures.

Referring particularly to Fig. 1, A is a bar, and B B arms, each provided at one end with jaws embracing the bar A. On each arm between the jaws I pivot a block C, preferably slightly concave on its under side, so as to present two transverse edges engaging the upper side of the bar. I find this arrangement preferable to having the bar pass through a slot cut through a solid end of the arm, as shown in Fig. 5.

From the construction described it follows that each arm may be readily slid along the bar by pressure applied in line with the bar. The pressure applied at the end of the arm rocks the arm on the bar so that one of the edges of the lower side of the opening between the jaws and the opposite edges of the block C engage the lower and upper surfaces of the bar, and by their frictional contact grip the bar so firmly that no matter how great the pressure applied to the end of the arm it will not slip on the bar. Indeed, the greater the pressure the firmer the grip taken of the bar.

For the purpose of enabling the arms to be moved I provide studs *a* on the arms in line with the bar. These may be engaged by suitable forceps to draw the arms together or spread them apart. The outer end of each arm has a hole *b* bored therein substantially parallel to the bar A. Through the lower end of the bar is threaded a screw D. The upper end of this screw is cupped, and a similar cup is formed opposite to it at the upper side of the hole *b*.

The jaws E have ball-ended stems *c* secured to their rear sides. These balls are inserted into the holes *b* until they come in line with the cups already described. The said screws are then tightened up to engage the ball. A simply-constructed and effective ball-joint is thus formed for the jaws E, which any time may be made rigid by further tightening up the screws D.

I claim nothing on the configuration of the jaws E, as they are substantially the same as those shown in my prior United States patent, No. 719,834.

For certain purposes it is necessary to provide jaws for clamping a band round a tooth. For such purposes I employ a jaw F, which is provided with a stem *d* and a chisel end *e*.

In working on front teeth it is sometimes necessary to have jaws which may be engaged with the ends of a matrix-band to spread them outwardly. For this purpose I employ a jaw G, such as shown at the right hand in Fig. 4. This is also provided with a stem *d* and at its outer end a pin *f*, which may be engaged with holes punched in a matrix-band.

The jaws F and G are held in position by inserting their stems in the holes *b* and tightening up the screws D.

It will thus be seen that the construction I have devised enables me to connect either rigid or ball-and-socket jaws to the ends of the arms B, thus enabling the one tool to be adapted for a variety of purposes.

I do not claim as new the methods of using matrix-bands, but only my special apparatus for that purpose. Hence I have not entered into any detailed explanation of the method of use, which is substantially that ordinarily employed.

I find my device very convenient in use, as it is very simple and neat and quickly and instantly employed without requiring the use of screws or other slow-moving mechanisms.

It is of course not absolutely necessary that both arms B be made movable on the bar A, and in Fig. 5 I have shown only one arm so movable. In this figure, further, I show one set of jaws similar to jaws G, permanently secured to the ends of the arms B. A tool as thus constructed is of course limited in its use, being particularly intended for applying bands to the front teeth.

In Fig. 6 I show a set-screw by means of which one of the arms may be clamped to the bar at any time, so that when the forceps are applied to clamp the jaws on a band only one of the arms will slide. This is an important matter when working in some positions.

What I claim as my invention is—

1. In a matrix-retainer a bar in combination with arms slidable on the bar means whereby the arms are adapted to grip it when rocked in line therewith; and matrix-engaging jaws connected to the ends of the arms, substantially as described.

2. In a matrix-retainer a bar in combination with arms slidable on the bar means whereby the arms are adapted to grip it when rocked in line therewith; matrix-engaging jaws connected to the ends of the arms; and studs on sides of the arms adjacent to the bar for engagement by forceps, substantially as described.

3. In a matrix-retainer a bar in combination with an arm suitably connected with the bar; an arm slidable on the bar means whereby the arms are adapted to grip it when rocked in line therewith; and matrix-engaging jaws connected to the ends of the arms, substantially as described.

4. In a matrix-retainer a bar in combination with an arm suitably connected with the bar; an arm slidable on the bar means whereby the arms are adapted to grip it when rocked in line therewith; matrix-engaging jaws connected to the ends of the arms; and studs on sides of the arms adjacent to the bar for engagement by forceps, substantially as described.

5. In a matrix-retainer a bar in combination with an arm suitably connected with the bar, the arms having holes bored through their ends in the plane of the bar; a cup formed at one side of each hole; a cupped screw threaded through each arm to coöperate with the cups in the holes to form ball-sockets; and jaws provided with balls adapted to be engaged by the said ball-sockets, substantially as described.

6. In a matrix-retainer a bar in combination with an arm suitably connected with the bar, the arms having holes at right angles thereto bored through their ends in the plane of the bar; screws threaded through the arms into the holes; and jaws having stems adapted to enter the said holes, substantially as described.

7. In a matrix-retainer an arm having a hole bored transversely through its end; and having a cup formed at one side of the hole in combination with a cup-ended screw threaded through the arm into the hole opposite the aforesaid cup to coact with said cup in engaging a ball, substantially as described.

8. In a matrix-retainer a bar in combination with an arm suitably connected with the bar; an arm forked to embrace the bar; a block pivoted between the jaws and shaped to engage the bar; and matrix-retaining jaws at the ends of the arms, substantially as described.

9. In a matrix-retainer a bar in combination with an arm suitably connected with the bar; an arm forked to embrace the bar; a block pivoted between the jaws and shaped to engage the bar, with a plurality of knife-edges; and matrix-retaining jaws at the ends of the arms, substantially as described.

10. In a matrix-retainer a bar in combination with arms slidable on the bar means whereby the arms are adapted to grip it when rocked in line therewith; matrix-engaging jaws connected to the ends of the arms; and a set-screw whereby one of the arms may be clamped to the bar, substantially as described.

11. In a matrix-retainer a bar in combination with an arm suitably connected with the bar; an arm slidable on the bar and provided with a set-screw whereby it may be clamped to the bar; and matrix-engaging jaws connected to the ends of the arms, substantially as described.

Brantford, Ontario, May 17, 1904.

JOHN MILLS.

In presence of—

D. B. Moore,

Irene Baxter.