April 19, 1949. J. J. DEBROT, JR 2,467,969

MATRIX PLIERS

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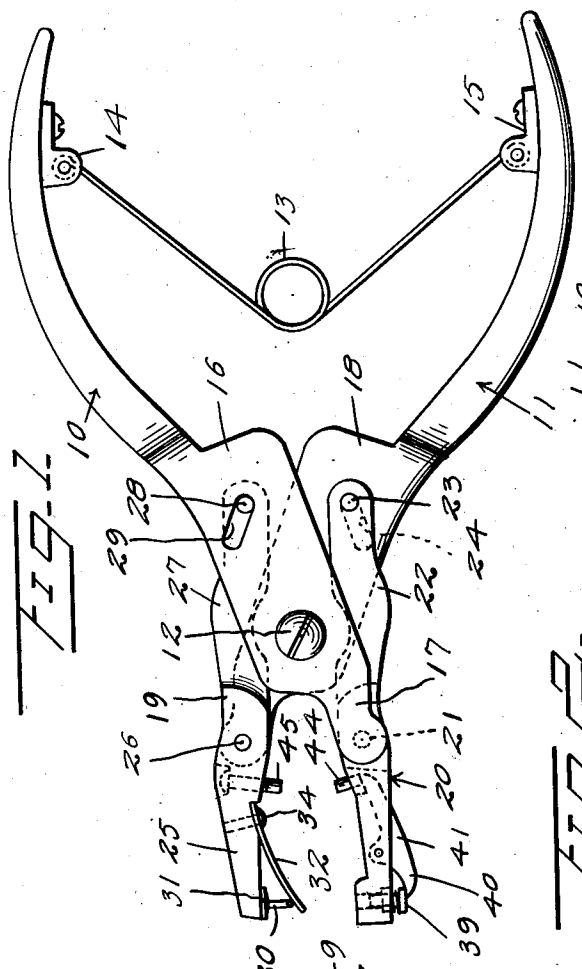


FIG. 1.

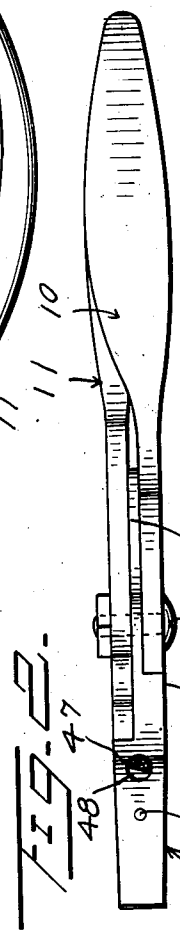


FIG. 2.

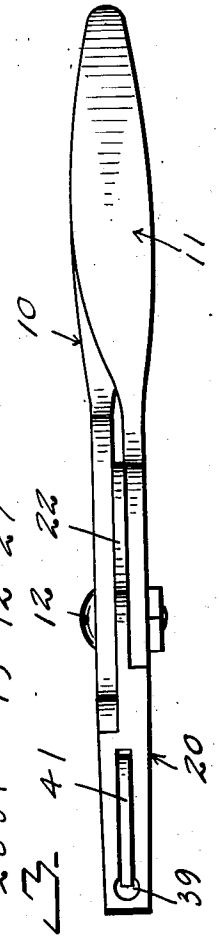


FIG. 3.

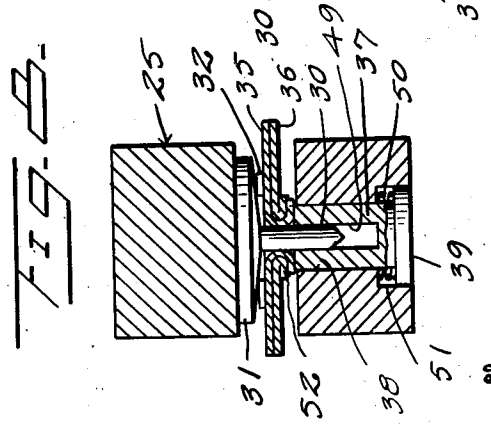


FIG. 4.

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Fig. 4.

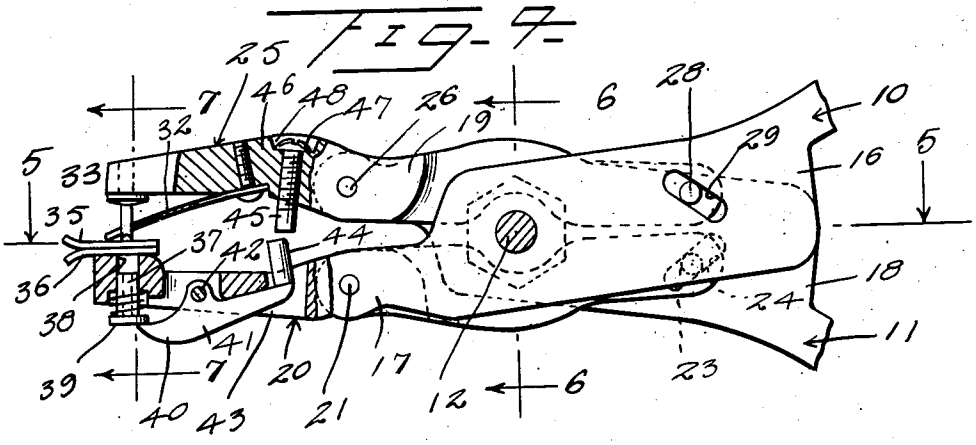


Fig. 5.

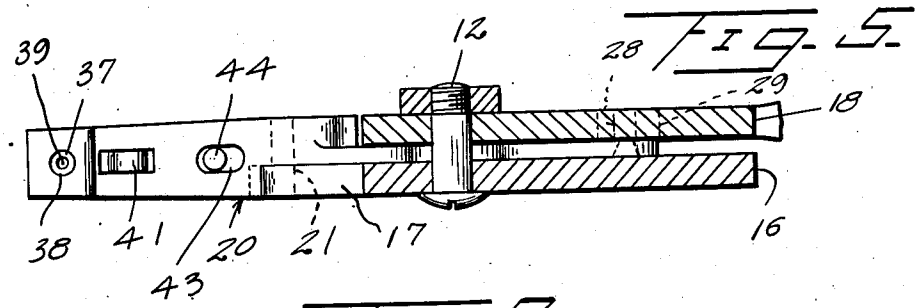


Fig. 7.

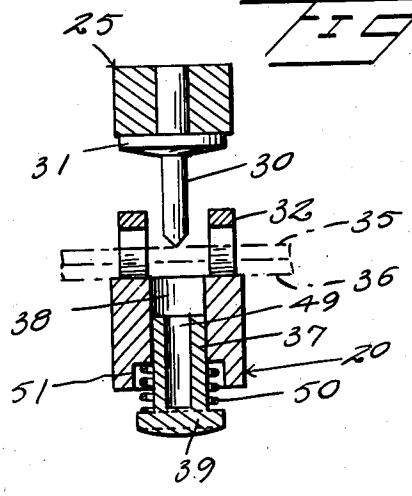
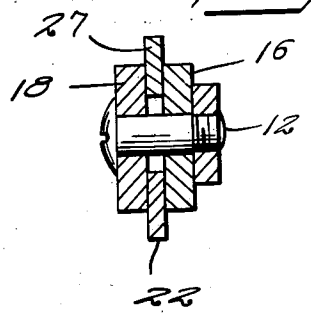


Fig. 6.



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MATRIX PLIERS

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Application December 22, 1945, Serial No. 636,833

2 Claims. (Cl. 32—63)

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This invention relates to dentists' tools.

An object of this invention is to provide a crimping tool in the form of pliers which will crimp the open ends together of a band which is applied about a tooth for making fillings or impressions.

Another object of this invention is to provide a tool of this kind which will speed up the application of the metal band about the tooth and provide for the quick release of the open ends of the band when such procedure is desired.

A further object of this invention is to provide a tool of this kind which will form a substantial grommet through a thin metal band which is looped upon itself with the free ends in abutting relation, so as to hold the free ends of the band together and at the same time will permit the quick separation of the ends of the band after the band has served its purpose.

A further object of this invention is to provide a tool of this kind which will tightly hold the open or free ends of a metal strip in looped position about the tooth prior to the piercing of the band and the formation of a grommet for holding the ends together.

To the foregoing objects, and others which may hereinafter more fully appear, the invention consists of the novel construction, combination and arrangement of parts, as will be more specifically referred to and illustrated in the accompanying drawings, but it is to be understood that changes, variations, and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a detail side elevation of a tool constructed according to an embodiment of this invention,

Figure 2 is a top plan view of the device,

Figure 3 is a bottom plan view of the device,

Figure 4 is an enlarged fragmentary side elevation partly broken away and in section of the device,

Figure 5 is a fragmentary sectional view taken substantially on the line 5—5 of Figure 4,

Figure 6 is a sectional view taken on the line 6—6 of Figure 4,

Figure 7 is a sectional view taken on the line 7—7 of Figure 4, and

Figure 8 is a view similar to Figure 7 on an enlarged scale and showing the jaws of the device in closed crimping position.

Referring to the drawings, the numerals 10 and 11 designate generally a pair of pivotally connected together handles which are constantly urged away from each other at their rear ends

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by means of a spring 13, which is anchored at the opposite ends thereof, as at 14 and 15, to the inner sides of the handles 10 and 11 adjacent the rear thereof. The handle 10 is formed with a relatively wide body 16 terminating in an extension 17 projecting forwardly from the pivot member 12.

The handle 11 is also formed with a relatively wide member or body 18 terminating at its forward end in a narrow extension 19 projecting forwardly from the pivot member 12. A jaw member 20 is pivotally secured to the extension 17 on a pivot 21 and the jaw member 20 includes a rearwardly extending lever 22 having a pin 23 projecting laterally and outwardly therefrom. The pin 23 loosely engages in an inclined slot 24 which is formed in the body 18 so that the jaw 20 will be maintained in substantially parallel relation with a second jaw 25 during the opening and closing of the jaws. The jaw 25 is pivotally mounted, as at 26, on the extension 19 and includes a lever 27 projecting rearwardly from the pivot 26 and having a pin 28 secured to the rear portion thereof which is slidable in a slot 29 formed in the body 16. The jaw 25 has mounted at the forward end thereof a piercing pin or plunger 30 formed with a flange 31 bearing against the inner side of the jaw 25. A flat bowed spring 32 which is formed with a slot 33 in its forward free end is normally disposed with the forward end of the spring 32 at substantially the inner end of the pin 30.

The rear end of the spring 32 is secured by fastening means 34 to the inner side of the jaw 25. The spring 32 constitutes a resilient clamping means for initially holding the one end 35 of a metal strip in contacting relation with the other end 36 of the strip, as shown in Figure 4. A crimping pin 37 is slidably mounted in an opening 38 formed in the forward end of the jaw 20 and is provided at its outer end with a head 39 against which the forward end 40 of a rock lever 41 is adapted to engage. The work lever 41 is pivotally mounted on a pivot 42 and the lever 40 is loosely mounted in a slot 43 formed lengthwise of the jaw 20.

The lever 41 is provided at its rear end with an inwardly projecting pin 44 which confronts a stationary pin 45 carried by the jaw 25. The pin 45 is formed at the inner end of a screw 46 which is threaded through the jaw 25 and has the head 47 thereof countersunk in a recess 48 formed in the outer side of the jaw 25. The crimping pin 37 as shown in Figure 8 is formed with a bore 49 extending outwardly from the

inner end thereof within which the pin **30** is adapted to loosely engage. The crimping pin **37** is constantly urged outwardly by means of a spring **50** which bears against the head **39** and engages in a counterbore **51**, which is formed in the outer side of the jaw **20**. When the pin **37** is in crimping position the inner end of the pin **37**, as shown in Figure 8, will be substantially flush with the inner side of the jaw **20**.

In the use and operation of this tool the band is wrapped or looped about the tooth which is to be treated for a filling, impression or the like and the free ends of the band are then extended outwardly. The free ends of the band are then inserted between the jaws **20** and **25**, which are extended to a position closely adjacent the tooth whereupon the handles **10** and **11** are squeezed toward each other moving the jaws **20** and **25** toward each other and in substantially parallel relation. The spring clamping member **32** will initially bear against the adjacent end **35** of the metal band, so as to hold this end **35** in contacting relation with the other end **36**. Further pressure on the handles **10** and **11** will cause the punching pin **30** to project through the two plies of the metal thereby forming a hole through the metal and also causing portions of the ply **35** to be extended through the opening formed in the ply **36** and when the jaws **20** and **25** are in their innermost positions the projecting portions **52** of the metal from the ply **35** will be pressed against the outer side of the ply **36**. The inner end of the pin **37** constitutes an anvil for crimping the jagged portions of the plies against the outer side of the ply **36**. This crimping of the jagged ends of the metal strips or plies together will form a substantial grommet to firmly hold the ends of the strip together and permit the necessary operations on the tooth. After the necessary operations have been performed on the tooth the band may be opened by pull on the outer ends of the plies **35** and **36** which procedure will cause the release of the clamped portions of the bands and the ready release of the crimped ends. With a tool as hereinbefore described there will be a very considerable time saving in forming the desired operations on the

tooth and these operations can be performed at the least inconvenience to the patient.

The exact configuration illustrated is regarded as the optimum, but some of the desirable results inherent in this disclosure may be obtained by various slight modifications including some departure from the exact configuration shown, and it is therefore requested that the scope of the invention should be regarded as limited only by the terms of the claims.

What I claim is:

1. A crimping tool comprising a pair of jaws, means for moving said jaws toward each other, an article piercing pin fixedly carried by one jaw, a second pin slidably carried by the other jaw and formed with an axial opening within which said first pin is adapted to extend, a lever pivotally carried by said other jaw and bearing at one end against said second pin, and means carried by said one jaw engageable with the other end of said lever for rocking the latter to effect inward movement of said second pin.

2. A crimping tool comprising a pair of movable jaws, an article piercing pin carried by one of said jaws, a crimping pin slidably carried by the other jaw in a bore of said jaw and formed with an axial opening for receiving said piercing pin, and correlated means carried by said jaws for moving said crimping pin inwardly of said bore after said piercing pin has pierced the article.

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