

[54] **PLIER-TYPE BAND PRY AND CUTTING TOOL FOR ORTHODONTISTS**

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[51] Int. Cl. **A61c 7/00**
[58] Field of Search **32/66, 60**

[56] **References Cited**

UNITED STATES PATENTS

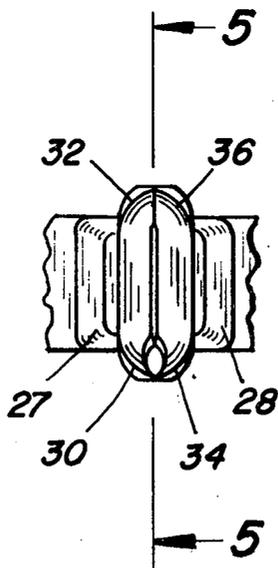
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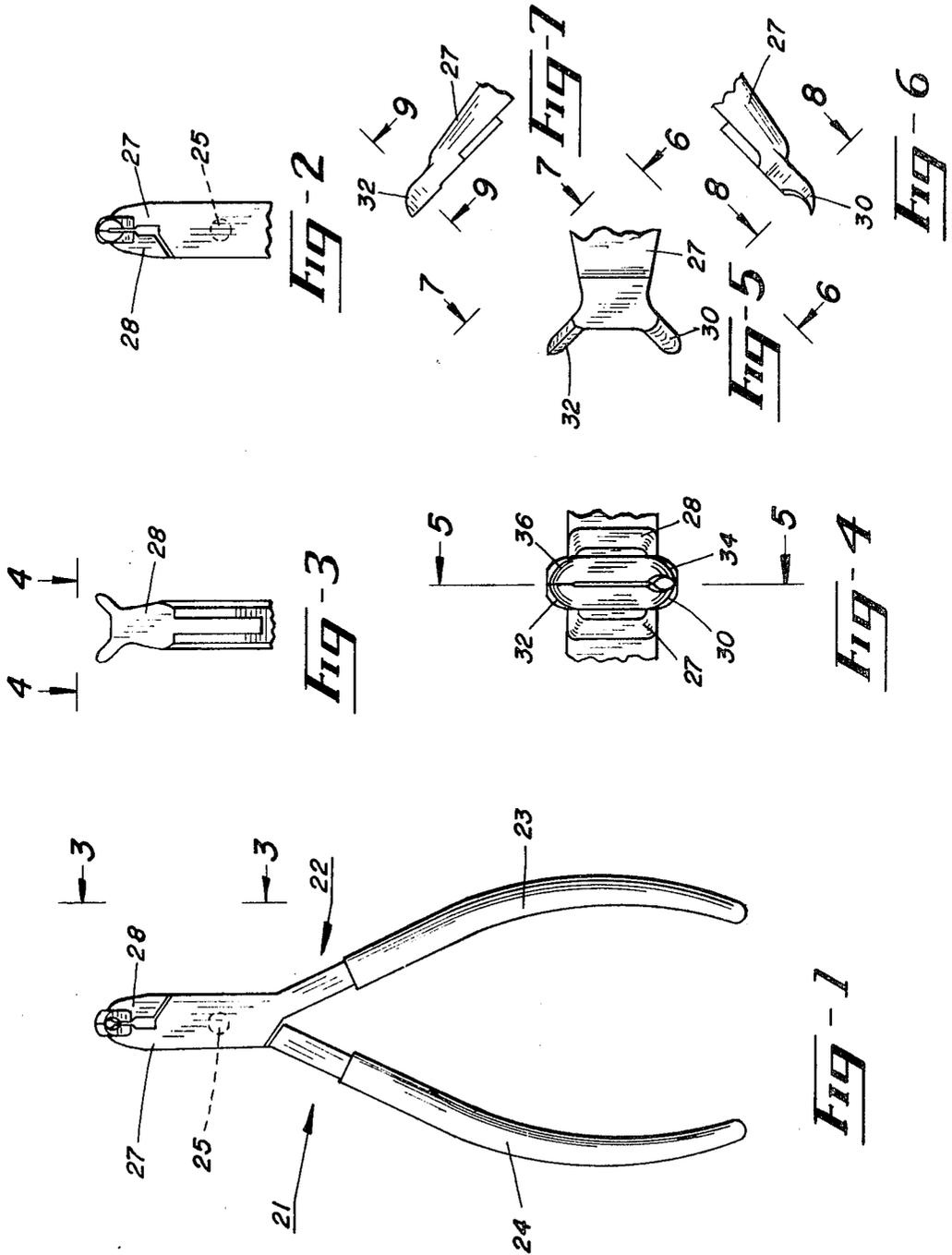
Primary Examiner—Robert Peshock
Attorney—Ralph R. Roberts

[57] **ABSTRACT**

This invention pertains to a plier-type handtool for orthodontists in which is provided jaws having either two separate mating pairs or a dual purpose single pair of specially contoured jaws. In the preferred embodiment in which the jaws have separate mating pairs one of the pairs is beak-shaped to provide a pincer or pry means disposed to enter the crack between a thin stainless steel band mounted on the tooth of a patient and by urging the jaws toward each other to bend or displace the band locally outwardly from the tooth. The other pair of specially contoured jaw members are cutting members disposed to compression cut the band at the locally displaced area previously formed by the beak-shaped pair of jaw portions. In another embodiment the beak-shaped jaw pry portions are combined with compression-type cutting segments or portions to provide means for simultaneously prying from and cutting a thin metal band mounted on a tooth of a patient.

10 Claims, 21 Drawing Figures





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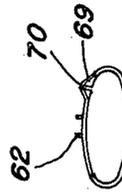
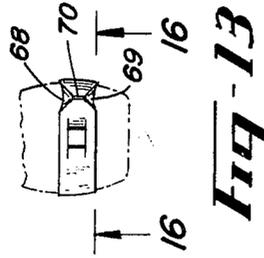
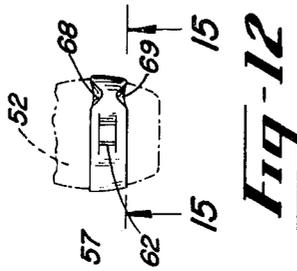
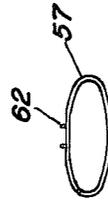
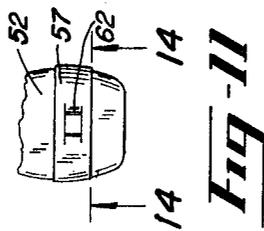
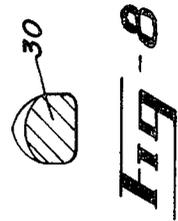
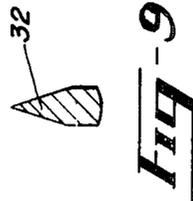
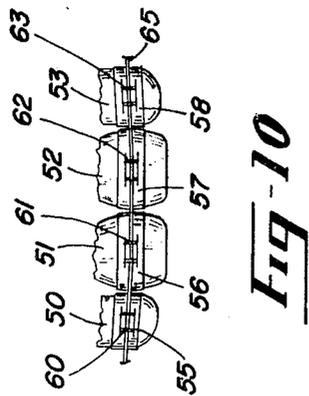


Fig. 14

Fig. 15

Fig. 16

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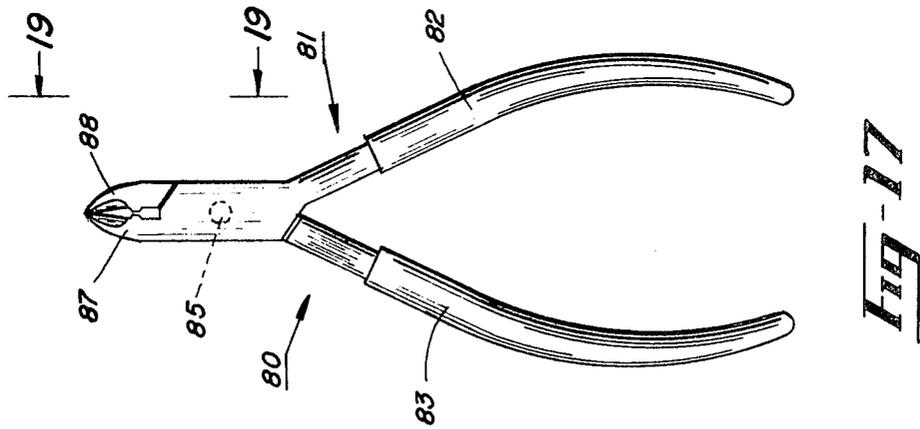


Fig-17



Fig-20

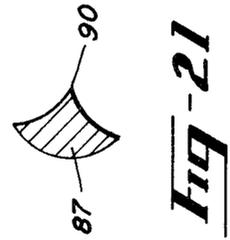


Fig-21

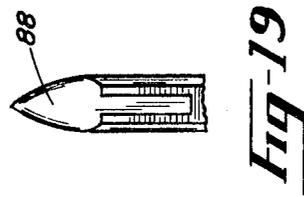


Fig-19

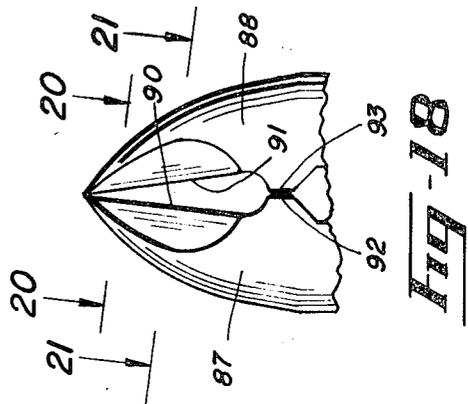


Fig-18

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PLIER-TYPE BAND PRY AND CUTTING TOOL FOR ORTHODONTISTS

BACKGROUND OF THE INVENTION

Field of the Invention

With reference to the classification of art as established in the U.S. Pat. Office the tool of this invention is a plier-type tool specifically useful in the field of Orthodontics. In the general class of "Dentistry," the particular subclass of "instruments" and the further subclass of "orthodontic" are pertinent to the invention. Further art is found in the general class of "Compound Tools" and the subclass of "plier-type" and more particularly in the further subclasses of "with cutter" and "nipper."

As this tool is a plier-type instrument whose jaws are for a special purpose further pertinent art may be found in the general class of "Tools" whose jaws are positioned by relatively movable plural handles and the subclass of "jaw features" and other subclasses thereunder of "jaws extend laterally beyond side edge plane of handle" and also "nonplanar jaw faces." Another general class of note is "Metal Deforming" and the subclass of "with means to actuate both elements of tool-couple" and the particular subclass thereunder of "handle-actuated tools."

Description of the Prior Art

In the straightening of children's teeth an established technique includes the cementing of a metal band to the teeth of the patient. Each band is provided with a clip disposed to hold a tempered wire. By manipulating the movement of the wire the orthodontist is able to adjust the tension by which the teeth are urged toward or away from each other to cause the teeth to be straightened. Usually these bands are of thin stainless steel which permit sanitary cleaning as well as resist staining and deterioration of the metal. It is customary that these bands be retained upon the teeth for a period of several months and on some occasions for as many as 2 or 3 years. As it is impractical to attempt to clean behind these bands during this installation period they are thoroughly cemented in place to insure that bacteria and unwanted tooth decaying particules such as sweets do not get behind the bands. The adhesive for cementing the bands in addition to being a filler and barrier insures that the bands are sealed to the tooth and also are retained in place by this cement.

When it becomes time to remove the bands from the teeth the orthodontist cuts and removes the wire or wires attached to the various clips before the bands are removed from the teeth. With the bands cemented to the teeth by means of the adhesive it is quite a job to remove the band from the teeth. Among the usual procedures for removal is the use of an abrasive cutter usually carried in a drilling handpiece. Carefully and laboriously the orthodontist grinds a groove to nearly cut through the band after which by means of a pry tool the band is forced from the tooth and at the ground groove or sawed area is broken. The orthodontist may also attack this partly severed portion of the band with a diagonal cutting plier to partly cut the band and worry the band until he has the band completely pulled away from the tooth. This procedure for removing the band is often quite long and sometimes because of the heat of grinding or sawing is a little painful to the patient. Another procedure uses a special band-removing tool which uses the end of the tooth as a support to force the band along and from the tooth. Because of the high pressure this is often quite painful. To shorten and ease the procedure of band removal it is desirable that a particular purpose tool provide means for ready grasping of the band and to pry it from the surface of the tooth without damage to the tooth or discomfort to the patient, after which the band is rapidly and easily cut by a cutting pair of jaws provided by the tool.

The tool of this invention provides easy band removal whereby the orthodontist or assistant uses one pair of pry jaws of the tool to grasp opposite edges of the band and pries the band outwardly from the surface of the tooth. The outwardly displaced band portions are readily cut by the other pair of

jaws carried by the same tool. The pair of jaws for cutting are short compressive cutters adapted to graze the tooth surface while cutting the band portion previously pried from the tooth.

5 In an alternate embodiment of this preferred tool construction the pry jaw portion is combined with compressive cutter edges to give a combined pry and cutting action. This tool may require more pressure to be applied to the handle members of the tool to effect the displacing and severing of the band.

10 Insofar as is known, the tool of this invention is new and novel in that it provides not only a beak-shaped pair of jaws contoured and shaped for prying the band from the tooth while at the same time the jaws are provided with compression-type cutting jaws. In the known prior art attention is directed to U.S. Pat. No. 1,813,038 which issued to Erne on July 7th, 1931. In this patent a plier-type tool is provided with fingers adapted to grip a round head machine bolt. At the same time the pliers are provided with shear-type wirecutting means. This tool although the fingers might be modified to pry a band from a tooth could not use the shear-type cutters to cut the band from the tooth. A fish-skinning tool as shown in U.S. Pat. No. 2,654,120 although disclosing pincer jaws and a cutting knife as a combination tool cannot pry bands from teeth, let alone cut the bands. A plier-type cutting and gripping tool is shown in U.S. Pat. No. 3,287,751 which issued to Hoffman on Nov. 29th, 1966. This tool has no pry means nor does the cutter lend itself to cutting the band. These and other known tools insofar as is known do not provide a means for easy and positive prying of the band to enable band cutting and removal as is provided by the tool of this invention.

SUMMARY OF THE INVENTION

35 This invention may be summarized at least in part by reference to its objects.

40 It is an object of this invention to provide a plier-type hand tool for orthodontists in which both pry jaw members and compression cutter members are carried upon the same plier-type jaw members; the pry members adapted to enter behind and pry an outwardly localized portion of a thin metal band mounted on the tooth of the patient and with the pair of cutting members disposed to sever this pried out portion to permit ready removal of the band from the tooth of the patient.

45 It is a further object of this invention to provide a plier-type handtool for the use of orthodontists to remove a thin metal band mounted on the tooth of a patient, said tool having a pair of opposed jaws contoured to provide a beak-type pair of pincers adapted to enter behind and pry outwardly localized portions of the metal band. The pincer jaws are also provided with mating underportions sharpened to provide cutting means adapted to cut the metal band as it is pried outwardly and to sever the band as it is deformed outwardly.

50 The tool of this invention is primarily a plier-type tool with two members pivotally retained so that by grasping and manipulating the handle portions the jaw portions may be urged toward or away from each other. In the preferred embodiment each of the jaws of this tool has two extending portions disposed at approximately 90° to each other. In the embodiment shown these jaw portions lie at an angle of about 45° from the centerline of the plane of the handles of the pliers and also about 45° from the axis of the pivot pin which pivotally retains the pliers.

55 Both pairs of jaws are symmetrically configured and are mirror images of each other so that in the prying operation and the cutting operation the applied forces are substantially equal distributed. One pair of jaws is pry or pincer jaws in which the members are curved into a shape of a beak with the opposed distal ends just touching or nearly touching each other when the plier tool has been brought to a completely closed condition. The outer approaching edges or ends of these jaws are more or less sharp and are tapered to a very thin end disposed to easily slide behind the edge of the thin metal

band mounted on the teeth. The other pair of jaws is mirror image compression cutters disposed to provide a compression cut. The sharp edges of the compression cutting jaws as they approach each other are used to cut the thin sheet metal band. These jaws are contoured and sharpened similar to the cutting edges of the jaws of a diagonal wire cutter except that the jaws of the tool of this invention are symmetrical to permit right- or left-hand cutting. As reduced to practice the tool is of a box-joint-type construction to insure that the pivot action of the tool is precise and overcomes distortion tendencies caused by the application of pressure to cause bending or cutting of the band.

In addition to the above summary the following disclosure is detailed to insure adequacy and aid in understanding of the invention. This disclosure, however, is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how it may later be disguised by variations in form or additions of further improvements. For this reason there has been chosen a specific embodiment of the band pry and cutter as adopted for use by orthodontists in the removing and cutting of thin sheet metal bands from the teeth of their patients. In this embodiment there is shown a preferred arrangement of the jaws of this plier-type tool.

This specific embodiment and an alternate embodiment thereof have been chosen for the purpose of illustration and description as shown in the accompanying drawings wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 represents a side view of the preferred embodiment of a plier-type tool of this invention, the view being substantially a full scale representation of the tool as reduced to practice;

FIG. 2 represents a fragmentary view of the opposite side of the jaw portion of the tool of FIG. 1;

FIG. 3 represents a fragmentary plan view of the jaw end of the tool and showing a preferred arrangement of the extending jaw portions of this foreportion of the tool, the view taken on the line 3—3 of FIG. 1 and looking in the direction of the arrows;

FIG. 4 represents a fragmentary front view in an enlarged scale of the jaw end of the tool, the view taken on the line 4—4 of FIG. 3;

FIG. 5 represents a fragmentary plan view of the lower jaw of the tool, the view being taken on the line 5—5 of FIG. 4 and looking in the direction of the arrows;

FIG. 6 represents a fragmentary side view of the beak-shaped pry jaw portion of the tool, the view taken on the line 6—6 of FIG. 5 and looking in the direction of the arrows;

FIG. 6 represents a fragmentary side view of the beak-shaped pry jaw portion of the tool, the view taken on the line 6—6 of FIG. 5 and looking in the direction of the arrows;

FIG. 7 represents a fragmentary side view of the other jaw member portion of the tool, the view taken on the line 7—7 of FIG. 5 looking in the direction of the arrows and showing in particular the configuration of the cutting jaw member of the tool;

FIG. 8 represents in an enlarged scale a sectional view of the beak-shaped jaw portion, the view taken on the line 8—8 of FIG. 6 and looking in the direction of the arrows;

FIG. 9 represents in an enlarged scale a sectional view taken on the line 9—9 of FIG. 7 and looking in the direction of the arrows and showing in particular the preferred construction and configuration of the cutting jaw of the tool;

FIG. 10 represents a fragmentary front view of a portion of the tooth array of a patient and the mounting arrangement of the straightening bands on these teeth, the bands having clips attached thereon and with a length of wire extending through the various clips;

FIG. 11 represents a front view in an enlarged scale of one of the teeth of FIG. 10 but with the length of wire removed and showing in particular a mounted band and its attached clip prior to the band being removed by means of the tool of this invention;

FIG. 12 represents a front view of the tooth and band of FIG. 11 after the band has been gripped so that the edge portions of the band are bent outwardly by the prying action of the beak-shaped jaw portions of the tool and to thus prepare the band for cutting by the tool;

FIG. 13 represents a front view of the tooth and band of FIG. 12 after the outwardly bent portion of the band has been severed by the cutting jaw members of the tool;

FIG. 14 represents a plan view of only the band as seen in FIG. 11, the view taken on the line 14—14 of FIG. 11 and looking in the direction of the arrows;

FIG. 15 represents only the band after it has been partially bent by the prying action of the beak-shaped jaws, the view taken on the line 15—15 of FIG. 12 and looking in the direction of the arrows;

FIG. 16 represents the band of FIG. 15 after the bent sections have been severed by the compression cutting jaws of the tool of FIG. 1;

FIG. 17 represents a side view of an alternate embodiment of a plier-type tool, the view showing in substantially full scale the tool as provided with a combination action pair of jaws;

FIG. 18 represents a fragmentary side view in an enlarged scale and showing the configuration of the jaws of the tool of FIG. 17;

FIG. 19 represents a fragmentary plan view of the jaw end of the alternate embodiment and showing in particular the configuration of the jaws, the view taken on the line 19—19 of FIG. 17 and looking in the direction of the arrows;

FIG. 20 represents a sectional view of the lower jaw and showing in particular the jaw configuration and construction, the view taken on the line 20—20 of FIG. 18 and looking in the direction of the arrows, and

FIG. 21 represents a sectional view of the same lower jaw and showing the jaw construction at a point a little closer to the pivot joint, the view taken on the line 21—21 of FIG. 18 and looking in the direction of the arrows.

In the following description and in the claims various details will be identified by specific names for convenience; these names, however, are intended to be generic in their application. Corresponding reference characters refer to like members throughout the several figures of the drawings.

The drawings accompanying and forming a part of this specification disclose certain details of construction for the purpose of explanation of the broader aspects of the invention, but it should be understood that structural details may be modified in various respects without departure from the concept and principles of the invention and that the invention may be incorporated in other structural forms than those shown.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in particular to the plier-type handtool as shown in FIGS. 1 through 9 it is to be noted that the tool includes a pair of pivoted plier members 21 and 22, each of which are integrally constructed. The upper member 22 has a curved handle portion 23 which is complementarily spaced from a like curved handle portion 24 formed in the lower plier member 21. If desired, plastic sheaths or sleeves may be provided on the curved handle portions to improve grip comfort. These plier members 21 and 22 are pivotally retained by means of a pin 25 which is shown in dashed outline in both FIGS. 1 and 2. This pin is mounted so as to be mostly concealed by being a press fit into a blind hole in one member and with the other outer end of the pin polished. This is a typical construction found in high-class tools formed with a box joint. The leftwardly extending jaw portions of members 21 and 22 carry the outwardly extending working portions of the tool. The lower jaw 27 is the leftwardly extending portion of member 22 and the upper jaw 28 is the leftwardly extending portion of member 21. Outwardly of the ends of these jaw portions 27 and 28 are provided two special purpose extending portions disposed at about 90° included angle to each other.

As particularly seen at the right side of FIG. 5 is an extending jaw portion 30 formed into a beak-shaped member whose outer portion is curved outwardly and upwardly to provide a chisel end adapted to enter the space between an attached thin metal band and the face surface of a tooth. The other jaw member is disposed at an angle about 90° from and to the left of jaw member 30 and is identified as 32. This member provides the lower jaw member of a compression type pair of cutters which is operated in a manner similar to that of a diagonal-type wire cutter. As seen in FIG. 4 the upper jaw portion 28 is provided with mating jaw members in that a beak-shaped portion 34 is a mirror image of the beak-shaped portion 30. The outer end of portion 34 when the jaws 27 and 28 are in closed condition just touches the mating outer end of the jaw 30. In a like manner a cutting jaw 36 is carried by upper jaw portion 28 and is a mirror image of the compression cutting jaw 32. When the jaws 27 and 28 are brought to a closed condition the cutting edge of jaw 36 is preferably contiguous to the cutting edge of the jaw member 32. As the jaw members 32 and 36 are brought together they are adapted to sever a metal strip or wire by compression cutting. With the handle portions 23 and 24 moved outwardly from the position of FIG. 1 the jaws are opened to the desired extent so that a metal band mounted on a tooth can be engaged for the desired prying action and subsequent cutting operation.

USE AND OPERATION OF THE TOOL

Orthodontists conventionally use thin stainless steel bands which are mounted on the teeth of a patient to permit straightening and moving of the teeth of the patient. Reference is now made to FIGS. 10 through 16 wherein it is to be seen that mounted on adjacent teeth 50, 51, 52 and 53 are stainless steel bands 55, 56, 57 and 58. Each of these bands is provided with a clip member which is sequentially identified as 60, 61, 62 and 63. Mounted in these clips is a wire 65 attached in a conventional manner by the orthodontist. After the teeth straightening operation, or after a determined portion of the procedure thereof is completed, the wire 65 is removed from the clips after which the bands are removed from one or more of the teeth.

As seen in FIG. 11, and for the purpose of description, it is suggested that tooth 52 be the tooth from which band 57 is to be removed from its mounted condition. With the beak-shaped jaw portion of the tool opened to a determined extent and with the outer ends positioned so that the beak ends may be brought adjacent to the surface of the tooth 52, the band 57 is grasped by these ends. As shown in FIGS. 12 this point is just to the right of the clip 62. The outer ends of the beak jaws are caused to be entered behind the edge of band 57 and then the plier handles are urged toward each other to cause a substantial portion of the band 57 to be locally bent outwardly as at 68 and 69 as seen in FIG. 12. With the band bent outwardly at these portions the hand tool is rotated or turned 180° and the handles opened. The orthodontist then brings the cutting jaws 32 and 36 into position on the locally and outwardly bent portions 68 and 69. The jaws 32 and 36 are now urged towards each other to cause a cut 70 as seen in FIGS. 13 and 16 to be made into and through the band after which the tool may again be reversed so that the beak-shaped jaw portions 30 and 34 may be used as a pincer grip to grasp the band and pull it from the tooth. This sequence of operation proceeds with each tooth until all bands which are to be removed are removed.

ALTERNATE EMBODIMENT OF FIGS. 17-21

Referring finally to the plier-type tool of FIGS. 17 through 21 there is disclosed an alternate embodiment of the tool of FIG. 1. In this alternate embodiment the jaws are specially contoured to provide a dual action. As in FIG. 1 this tool has a pair of pivoted plier members which are identified as 80 and 81 and which are integrally formed. The upper member 81 has a curved handle portion 82 which may have a plastic covered

portion if desired. The lower member 80 has a curved handle portion 83 similar to and which is a mirror image of the curved portion 82 and likewise may have a plastic covered portion if desired. A pivot pin 85 retains the box-jointed members in a desired pivoted relationship.

The leftwardly extending jaw portions of plier members 80 and 81 are shaped to provide the working portions of the jaws. Lower jaw 87 is an extension of plier member 81 and the upper jaw 88 is an extension of plier member 80. These jaw members are shaped to provide the specially shaped jaw portions of the plier-type tool. As seen in FIG. 18 the lower and upper jaw portions 87 and 88 are aligned with the handles and are symmetrically tapered from the widest part nearest the pivot pin to a point or nearly sharp point at their outer left ends.

As seen in FIGS. 17 and 18 each of the jaw extensions 87 and 88 has its outer surfaces and portions curved toward each other to form beak-shaped pincers. The outer portions of the jaw extensions provide the beaklike pry members with the outer ends disposed to enter the space between the band and the face or surface of the tooth. Beginning at or very near their outer left ends both the upper and lower jaws have cutting edges 90 and 91 formed thereon. The cross-sectional representations of the preferred configuration of these jaw members are better seen in the enlarged FIGS. 20 and 21 which represent cross sections through jaw 87 as taken on FIG. 18. Stop portions 92 and 93 may be provided to insure that the jaws 87 and 88 are limited in their closing motion.

USE AND OPERATION OF ALTERNATE EMBODIMENT

In the manner of the tool as shown in FIG. 1 the tool of FIG. 17 is also used to remove a mounted band from the tooth of a patient. In use, with the band in the mounted condition of FIGS. 11 and 14, the jaw members 87 and 88 are opened to a width wider than the band 57. The outer ends of jaws 87 and 88 are brought adjacent the surface of the tooth to the extent that the outer sharp ends of the jaws enter the crack or space between the band and surface of the tooth. The handles 82 and 83 are now urged toward each other so that the beak-shaped curved jaw ends cause the band to be displaced outwardly in a manner similar to the bending action depicted in FIGS. 12 and 15. As the bending of the band proceeds the cutting edges 90 and 91 are brought into pressing force against the band and as the band is quite thin these sharp edges cut the band. When the jaws have reached the closed condition of FIG. 18 it sometimes occurs that the band is not completely severed because of the inclination edges 90 and 91 whereupon the orthodontist may complete the severing of the band by using a twisting motion to the tool to snap that small remaining band portion. The severed band is then removed by using the beak ends as gripping or pincer members.

SUMMARY

Whether the preferred or alternate embodiment of the band-removing tool is used, it is quite apparent that the use of the tool permits a simple rapid removal of a band from a tooth to be accomplished by the orthodontist or assistant. The removal of the band does not require any grinding or sawing and eliminates any discomfort to the patient or possible damage to the tooth. Either of the tools shown and described can be used for bands mounted on any of the upper or lower teeth of the patient. Either or both tools are readily manipulated to cut a mounted band on either side of the wire retaining clip. Either of the tools shown provides means for ready grasping of the severed band and removing the band from its cemented position on the tooth. In addition the tool of FIG. 1 may be used with its cutting jaws to sever or cut the wire 65 and remove this wire from the mouth before the bands are removed. Whether the beak-shaped jaw portions and compression-type cutter portions are made as welded-in-place inserts or are molded or forged as part of the plier members, when the tool is ready to use the special jaw portions are preferably a permanent portion of the jaw members.

Terms such as "left," "right," "up," "down," "bottom," "top," "front," "back," "in," "out" and the like are applicable to the two embodiments of the band-removing tool shown and described in conjunction with the drawings. These terms have been used merely for the purposes of description and do not necessarily apply to the position in which the band removing tools may be constructed or used.

While a particular embodiment of the band removing tool and an alternate embodiment has been shown and described it is to be understood that the invention is not limited thereto since modifications may be made within the scope of the accompanying claims and protection is sought to the broadest extent the prior art allows.

What is claimed is:

1. A plier-type band pry and cutting tool having two separate mating pairs of jaws and adapted for use by orthodontists and the like for removing thin metal bands from the teeth of patients, said tool including: (a) a pair of plier members each having a handle and a jaw portion, said members retained in a pivotal relationship by a pivot pin, said plier members selectively movable from an open to a closed condition by manipulation of the handle portions of the members; (b) a pair of beak-shaped members of like configuration and arranged in a mirror relationship to each other, one beak-shaped member carried by one jaw portion and the other beak-shaped member carried by the other jaw portion, the ends of the beak-shaped members curved toward each other and with the ends thinned to provide a chisel-type distal end adapted to enter on opposed sides of the band the space between a band and tooth, the jaws contoured and positioned so that with the jaws moved to the closed condition these distal ends at least nearly meet each other and when engage with a thin metal band mounted on a tooth is adapted to locally displace the band outwardly from the tooth; (c) a pair of compression-type cutter members also carried as a part of said jaw portion and arranged in a substantially mirror relationship to each other, the cutter members adapted to mate and provide a cutting means for said bands, and (e) means to limit the movement of the jaws toward each other.

2. A plier-type band pry and cutting tool as in claim 1 in which the beak-shaped members are arranged as one pair of jaw portions and the compression cutter members are arranged as another pair of jaw portions disposed at a determined distance and angle from the beak-shaped members.

3. A plier-type band pry and cutting tool as in claim 2 in which the compression-type cutter jaw members have their cutting edges disposed so as to be contiguous for at least a substantial portion of their length when the jaws are brought to their closed condition.

4. A plier-type pry and cutting tool as in claim 3 in which both the beak-shaped portions and the cutter jaw members are made as an integral portion of the jaw portion of the plier members.

5. A plier-type pry and cutting tool as in claim 3 in which the pair of beak-shaped portions and the pair of compression-type compression cutting jaw portions are disposed at an included angle of about 90° apart.

6. A plier-type pry and cutting tool as in claim 3 in which the plier members are arranged with a box joint pivotal relationship.

7. A plier-type band pry and cutting tool as in claim 1 in which the beak-shaped members are also contoured and shaped to have their inner facing portions provided with compression cutting edges as mirror images of each other, the cutting edges when the jaws are in a closed condition diverging from the outer end of the jaws and to a point a determined distance from the distal end of the jaw, said cutting edges disposed to cut the thin metal band as the band is being displaced outwardly by the beak-shaped members of the tool.

8. A plier-type band pry and cutting tool as in claim 7 in which the beak-shaped members are formed in the same plane as the handle portions.

9. A plier-type band pry and cutting tool as in claim 7 in which the beak-shaped members and cutting edges are made as integral portions of the plier members.

10. A plier-type band pry and cutting tool as in claim 7 in which the plier members are arranged with a box joint pivotal relationship.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,638,316 Dated February 1st, 1972

Inventor(s) Anthony J. Cusato

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

- Abstract - line 1, "handtool" should read -- hand tool --;
line 5, "on" should read -- one --.
- Column 1, line 21, "Defroming" should read -- Deforming --.
- Column 2, line 69, "equal" should read -- equally --.
- Column 3, lines 50, 51 and 52, delete completely the repetition of FIG. 6.
- Column 5, line 49, "FIGS" should read -- FIG. --.
- Column 6, line 19, "beaklike" should read -- beak-like --.

Signed and sealed this 11th day of July 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents