

- [54] **ENDOTRACHEAL TUBE CLAMP**
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- [22] Filed: **Jan. 20, 1971**
- [21] Appl. No.: **108,158**
- Related U.S. Application Data**
- [63] Continuation-in-part of Ser. No. 843,020, July 18, 1969, Pat. No. 3,602,227.
- [30] **Foreign Application Priority Data**
Jan. 20, 1970 Canada 072534
- [52] **U.S. Cl.**..... **128/351**, 24/263 R, 128/346
- [51] **Int. Cl.** **A61m 25/02**, A61m 16/00, A44b 21/00
- [58] **Field of Search** 24/263 P, 263 PR, 24/263 R; 128/346, 351

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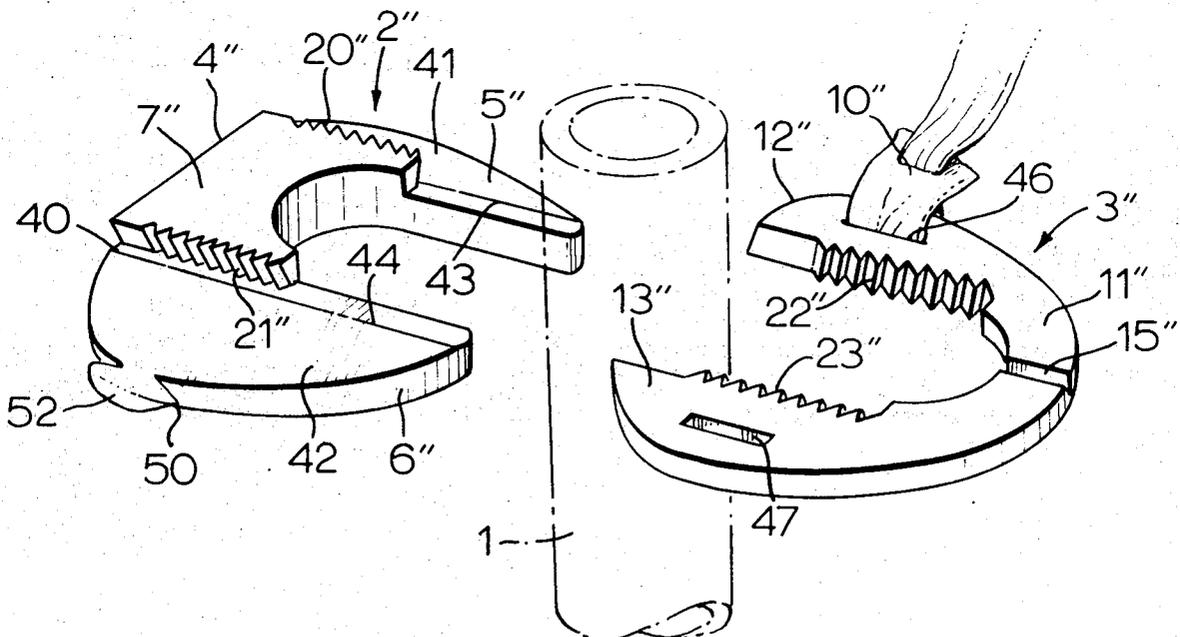
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[57] **ABSTRACT**
A disposable clamp for holding an endotracheal tube or the like during use comprises a pair of superimposed wafer-like clamping members formed with complementary cut-away portions to define an aperture for receiving the tube. The members provide respective pairs of parallel upstanding walls of sawtooth profile which engage one another to prevent separation of the clamping members. The members are retained in superimposed relation by means of interfitting dovetail or equivalent formations. When assembled, the clamping members can be separated only by breaking one of the clamping members, for which purpose a line of easy fracture is provided.

4 Claims, 7 Drawing Figures



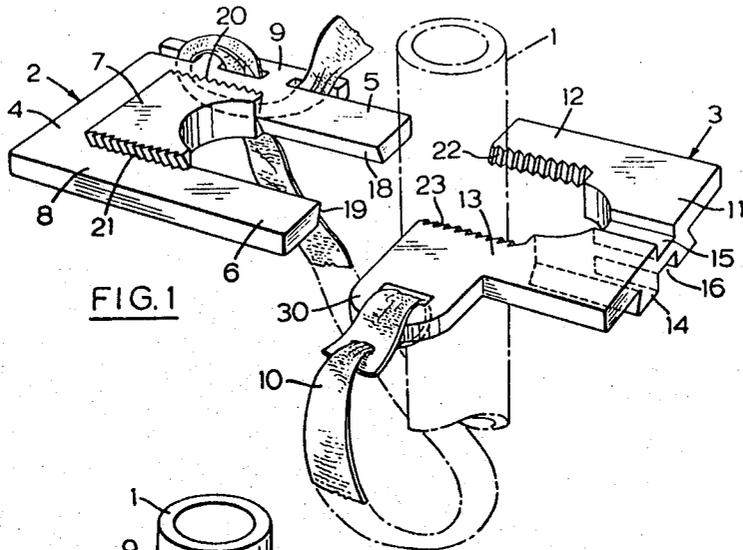


FIG. 1

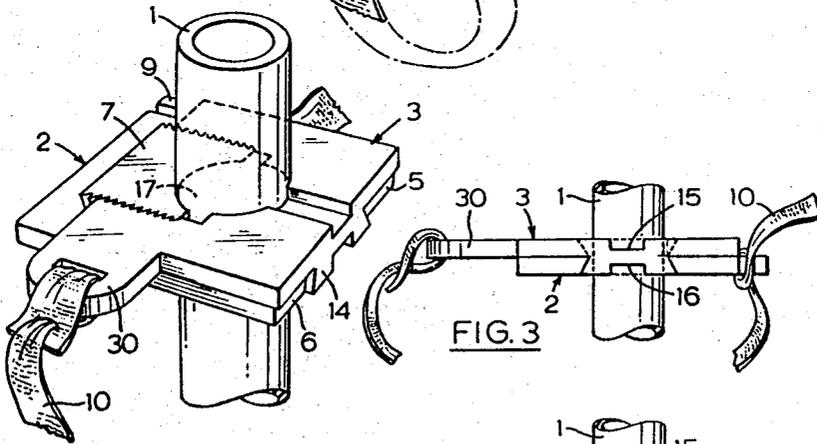


FIG. 2

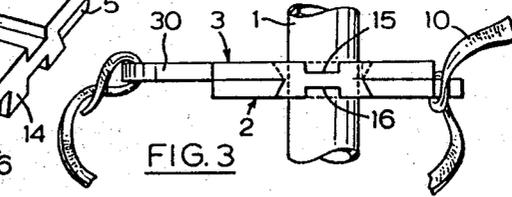


FIG. 3

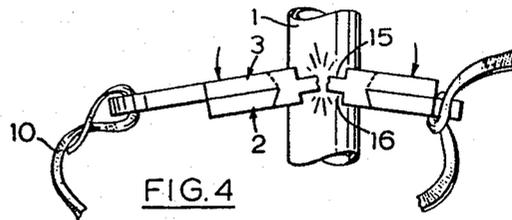


FIG. 4

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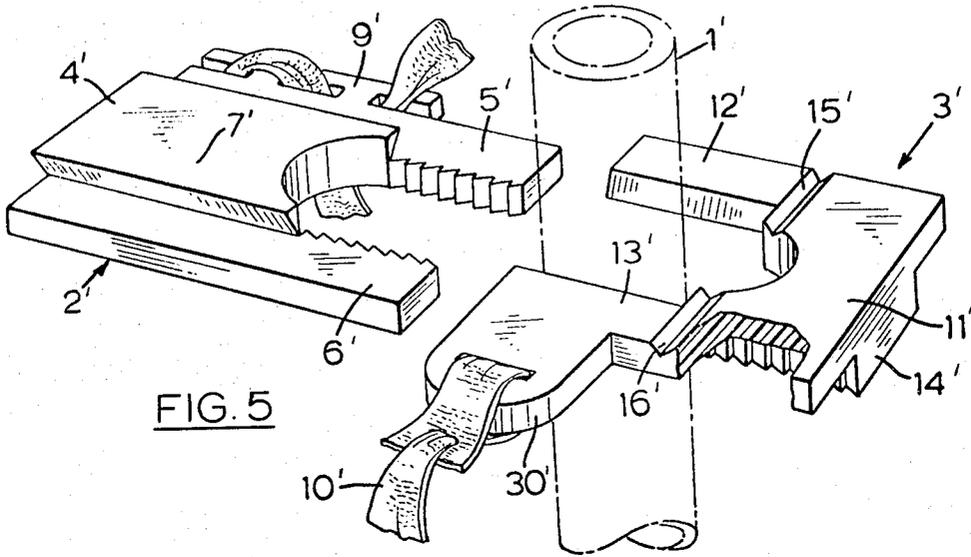


FIG. 5

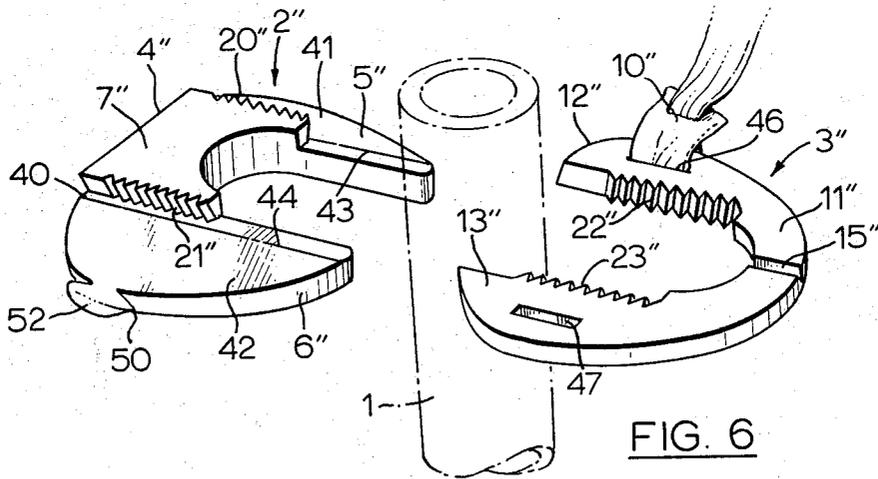


FIG. 6

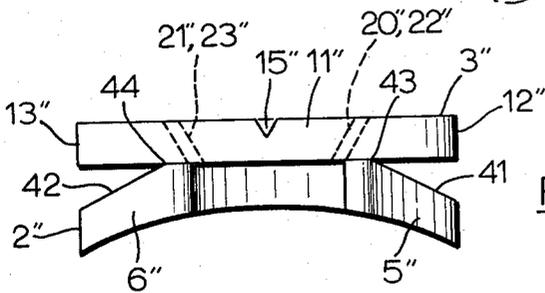


FIG. 7

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ENDOTRACHEAL TUBE CLAMP

This is a continuation-in-part application of application Ser. No. 843,020 filed July 18, 1969, now U.S. Pat. 3,602,227 dated Aug. 31, 1971.

This invention relates to a disposable clamp for holding an endotracheal tube in a set position during use. When an endotracheal tube is applied to a patient, it is most important that the tube be positioned accurately and maintained in the set position for the duration of use. In general it is necessary to clamp the tube in position by means which engage the tube and encircle the patient's neck.

It is an object of the present invention to provide such a clamping device which is simple to apply and safe during use.

An endotracheal tube clamp according to the present invention comprises a pair of cooperating clamping members which securely clamp the tube between them, the clamping members being constructed so as to engage one another in a manner which prevents their release. One of the clamping member is formed with a line of weakness to permit the member to be broken when it becomes necessary to release the clamp. In this way accidental separation of the members is prevented.

Essentially, the clamp comprises a pair of U-shaped clamping members each having a yoke portion and a pair of longitudinally extending parallel limb portions, and means for securing an attachment band to the clamping members, the clamping members being superimposed to define between the yoke portions and limb portions thereof an aperture for receiving the endotracheal tube, each clamping member defining a pair of longitudinally extending wall portions positioned to engage the pair of longitudinally extending wall portions of the other clamping member, for retaining the members in superimposed relationship, each clamping member defining at least one longitudinally extending wall portion of sawtooth profile positioned to engage the corresponding wall portion of the other clamping member for preventing release of the clamping members, and one of the clamping members being formed with a line of weakness to permit said one member to be broken readily in order to separate the clamping members.

Three embodiments of the invention are illustrated by way of example in the accompanying drawings. In the drawings:

FIG. 1 is a general perspective view of the first clamping device, the clamping members being separated and positioned ready to engage an endotracheal tube;

FIG. 2 illustrates the clamping device firmly engaging the endotracheal tube;

FIG. 3 is an end elevational view of the assembly shown in FIG. 2;

FIG. 4 illustrates the method of separating the clamping members;

FIG. 5 is a general perspective view of a second embodiment of my clamping device, partly broken away;

FIG. 6 is a general perspective view of a third embodiment of my clamping device; and

FIG. 7 is an end elevational view of the assembly shown in FIG. 6.

With reference to FIG. 1, the first embodiment of my disposable clamping device for securely holding an endotracheal tube 1 comprises a first U-shaped clamping member 2 and a second U-shaped clamping member 3,

each clamping member being a one-piece moulding of plastics material. The member 2 consists of a yoke portion 4, a pair of longitudinally extending parallel limb portions 5,6 a projection 7 integral with the upper surface 8 of the yoke portion 4, and a projecting tab 9 at one edge for securing one end of an attachment band 10. The attachment band 10 is a tape or the like adapted to be passed around the back of the patient's head in the manner known in the art.

The second clamping member 3 consists of a yoke portion 11, a pair of longitudinally extending parallel limb portions 12,13 and a projection 14 of dovetail cross section integral with the lower surface of the yoke portion 11. A projection tab 30 is provided for securing the attachment band 10. A pair of longitudinally extending channels 15,16 on the upper and lower surfaces of the yoke portion 11 define a line of weakness which permits the clamping member to be readily broken.

The two clamping members are adapted to be superimposed, as shown most clearly in FIG. 2, so as to define between the yoke portions and limb portions thereof an aperture 17 for receiving the endotracheal tube 1, the members being longitudinally slidable one over the other so as to shorten the aperture and firmly grip the tube 1. Separation of the clamping members is prevented by means of an interfitting dovetail formation provided by the dove-tail projection 14 and a pair of longitudinally extending walls 18,19 of complementary dovetail form at the inner edges of the limb portions 5 and 6.

The projection 7 defines a pair of longitudinally extending walls 20,21 of sawtooth profile, which are positioned to engage a correspondingly profile pair of walls 22,23 defined by the inner edges of the limb portions 12,13 of the second clamping member. To assemble the clamping members the walls 18,19 are engaged with the dovetail projection 14, the latter defining a pair of retaining edges or walls for retaining the limb portions 5,6 and the walls 20,21 are engaged with the walls 22,23. The sawtooth profiles of the latter are arranged so that the teeth can slide over one another, by virtue of the resilience of the limb portions 12,13 as the clamping members are closed together, but so that the clamping members cannot be moved apart.

It will therefore be seen that the clamp illustrated in FIGS. 2 and 3 cannot be unfastened except by breaking the clamping member 3 along its line of weakness as illustrated in FIG. 4.

It is apparent that numerous modifications may be made to the illustrated embodiment without departing from the spirit of the invention.

In one such modification, the two clamping members are substantially similar, the projections 7 and 14 both being of dovetail cross section and defining side walls of sawtooth profile, these walls being engageable with walls of corresponding dovetail formation and sawtooth profile defined by the inner edges of the limb portions.

In another modification, the projection 14 instead of being of dovetail cross section is formed with a flange lying parallel to the lower surface of clamping member 3 and adapted to engage the lower surface of clamping member 2.

In yet another modification, the projection 14 on clamping member 3 is omitted, and the mutually engageable pairs of walls 20,21 and 22,23 are shaped to

provide the necessary dovetail formation or equivalent.

Referring again to FIG 1, it will be apparent that there is no necessity for both walls of each pair 20,21 and 22,23 to be of sawtooth profile; it is sufficient that the walls of at least one mutually engageable pair be of sawtooth profile for the purpose described.

Referring now to FIG. 5, the second clamping device is basically similar to the first clamping device described above, and corresponding parts thereof are denoted by the same reference numerals as are used in FIG. 1, but are primed.

The clamping device comprises a first U-shaped clamping member 2' and a second U-shaped clamping member 3', each clamping member being a one-piece moulding of plastics material. The member 2' consists of a yoke portion 4', a pair of longitudinally extending parallel limb portions 5',6' a projection 7' integral with the upper surface 8' of the yoke portion 4', and a projecting tab 9' for securing one end of an attachment band 10'.

The second clamping member 3' consists of a yoke portion 11', a pair of longitudinally extending parallel limb portions 12',13' a projection 14' integral with the lower surface of the yoke portion 11', and a projecting tab 30' for securing the other end of the attachment band 10'. The two clamping members fit together to provide a circular aperture wherein the endotracheal tube 1' is received and gripped.

In the present example, a transverse line of weakness 15' is formed across the second clamping member, the line of weakness to intersect the aperture 17' for receiving the tube 1'. The projection 7' is of dovetail cross-section and engages a pair of longitudinally extending walls of complementary dovetail form at the inner edges of the limb portions of the second clamping member. The projection 14', however, is not dovetailed, and defines a pair of longitudinally extending walls of sawtooth profile, which are positioned to engage a correspondingly profiled pair of walls defined by the inner edges of the limb portions of the first clamping member.

Turning now to FIGS. 6 and 7, the third embodiment of my clamping device will now be described, parts thereof corresponding to the embodiments shown in FIGS. 1-5 being denoted by the same reference numerals, but are double-primed.

The first U-shaped clamping member 2'' has a yoke portion 4'' with a projection 7'' formed integral therewith on the flat central upper surface 40, flat surface 40 preferably extending along the inner extremities of the upper surfaces of longitudinally extending limb portions 5'',6''. The upper surfaces of the outer extremities of limb portions 5'',6'' are beveled as designated at numerals 41,42 to define longitudinally extending juncture lines 43,44 where the surface 40 intersects surfaces 41,42.

Projection 7'' integral with the upper surface 40 of yoke portion 4'' has sawtooth profiles formed on walls 20'',21'' said walls having a dovetail configuration.

The second U-shaped clamping member 3'' has a yoke portion 11'' and a pair of longitudinally extending parallel limb portions 12'',13'' with sawtooth profiles formed on inner walls 22'',23''. Walls 22'',23'' also are of dovetail configuration for abutting engagement with walls 20'',21'' of clamping member 2'' whereby the two clamping members fit together in locked superim-

posed relationship to provide a circular aperture for receiving endotracheal tube 1''.

Attachment band 10'' is secured to clamping member 3'' by use of opening 46 formed in limb portion 12'', as shown, or is secured by fusing or cementing the band to the clamping member. An opening 47 formed in limb portion 13'' is adapted to receive the opposite end of attachment band 10'', after passing about the back of the patient's neck, and the free end of band 10'' impaled on the sharp projection 50 of cleat 52 or cleated thereon.

A longitudinal line of weakness 15'' is formed in the upper surface of yoke 11'' and, with reference to FIG. 7, permits facile breakage of clamping member 3'' at line of weakness 15'' by the use of juncture lines 43,44 which function as fulcrums about which limb portions 12'',13'' can be pivoted. Attachment band 10'' effectively secures the fractured portions of clamping member 3'' to member 2'' such that the clamp can be completely and readily removed when desired.

Although the embodiment of my invention as described with reference to FIGS. 6 and 7 shows beveled upper surfaces 41,42 of limb portions 5'',6'', it will be understood that the under surfaces of the limb portions 12'',13'' of clamping member 3'' can be beveled in like manner, either in the alternative to or in addition to the beveled upper surfaces of limb portions 5'',6'', in order to provide facile breakage of clamping member 3''.

I claim:

1. A disposable clamp for holding an endotracheal tube, comprising:

a. a first U-shaped clamping member having a yoke portion and a pair of longitudinally extending limb portions, a projection from said flat upper surface, the projection defining a first pair of longitudinally extending walls of sawtooth profile and dovetail configuration;

b. a second U-shaped clamping member having a yoke portion and a pair of longitudinally extending limb portions, the limb portions defining a second pair of longitudinally extending walls of sawtooth profile and dovetail configuration engageable with said first pair of walls; and

c. said yoke portion and said limb portions of at least one clamping member having a flat central surface and laterally beveled limb surfaces, the flat surface and beveled limb surfaces intersecting to define a pair of longitudinally extending juncture lines, and said second U-shaped clamping member having a flat central surface whereby upon the clamping members being assembled to define between the yoke portions and limb portions an aperture for receiving the endotracheal tube, said clamping members being retained in assembled relation by the mutual engagement of said pairs of longitudinally extending wall portions having said sawtooth profiles and dovetail configurations;

d. one of the clamping members has a line of weakness to permit said one member to be broken readily in order to separate the clamping members by pivotal movement of said second clamping member limbs about the longitudinally extending juncture lines.

2. A disposable clamp as claimed in claim 1, wherein each clamping member has means for securing an attachment band thereto.

3. A disposable clamp according to claim 1, wherein each clamping member is formed with an integral tab for tying one end of an attachment band thereto.

4. A disposable clamp according to claim 1, wherein the clamping members are of moulded plastics material.

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