THE JOINT EXAMINATION BOARD

PAPER P4

AMENDMENT OF SPECIFICATIONS FOR UNITED KINGDOM PATENT APPLICATIONS IN PROSECUTION, REVOCATION PROCEEDINGS OR OTHERWISE

16th NOVEMBER, 2000

10.00 A.M. - 1.00 P.M.

Please read the following instructions carefully. ***Time Allowed – THREE hours***

1. Where a question permits, reasons should be given for the conclusions reached.

2. Start each question **(but not necessarily each part of each question)** on a fresh sheet of paper. In the appropriate boxes at the top of each sheet please enter the designation of the paper, the question number, and your Examination number. Write on **ONE** side of the paper only using **BLACK** ink. You must **NOT** staple pages together. You must **NOT** state your name anywhere in the answers.

3. **Unless specifically requested answers are NOT required in letter form.**

4. **NO** printed matter or other written material may be taken into the examination room.

5. Answers **MUST** be legible. If the examiners cannot read a candidate's answer no marks will be awarded.

6. **NO** writing whatsoever, including numbering of pages, is allowed prior to the commencement of the examination or after it has finished.

7. **At the end of the examination please double check that you have fully complied with instruction 2 and assemble your answers in question number order to hand in.**

This paper consists of **twenty eight** pages including this page

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16th NOVEMBER, 2000

INSTRUCTIONS TO CANDIDATES

In this paper you should assume that a United Kingdom patent application comprising the attached specification (identified as GB 9712345.6) has been filed and that the UK Patent Office has issued the attached Official Letter. You have reported the Official Letter to your client and have received instructions for response in the form of the attached letter from your client's Managing Director.

Your task is to prepare the following:

1. A letter to the UK Patent Office in response to the Official Letter, accompanied by a set of amended claims. Please note that for the purposes of this examination you are **not** required to propose any amendments to the description of the patent application. Similarly, should you believe the filing of a divisional application to be called for, you should not draft the description or dependent claims for such divisional(s).

2. A memorandum consisting of notes to provide the basis for advice and comment to your client explaining the actions you have taken and the reasons for those actions. These notes should be restricted to patent matters; you are not required to consider any other matters such as copyright, design or confidential information.

You should accept the facts given in the paper and base your answer on those facts. In particular, you should **not** make use of any special knowledge that you may have of the subject matter concerned, and you must assume that the prior art referred to is in fact exhaustive. Where only extracts of documents are presented, you should assume that those extracts contain all relevant information.

LETTER FROM CLIENT

Thank you for your reminder about the imminent deadline on this case. I appreciate that time is now short but am sure that you will be able to deal with the matter in good time before the deadline.

I have finally been able to run the Patent Office's objections past my technical people and they are confident that our invention is quite different to the device shown in the more recent of the two documents that have been referred to. A major drawback of that device is that it necessarily involves the use of a specially designed tool. With our main design (the one shown in Figure 2 of our application), however, no special tools are required. All that is needed is a few hexagonal Allen keys of differing dimension. Every fitter carries such tools in his bag and we see the compatibility of our product with these as a major plus. In fact, our technical people are now working on improvements to the design which will be even simpler to use, as they will not even require the user to change tools in order to shear off the successive segments of the bolt. The details of these designs have yet to be worked out, but they will share the same concept as the main design, ie the idea of a range of shear planes, the torque necessary to bring about shearing increasing from the shear plane nearest the head of the bolt to that nearest the tip.

Unfortunately, my senior staff and I will all be away at a trade fair in Australia for the next three weeks, and so we will not be able to provide you with any further assistance. However, I am sure that you will be able to deal with the Patent Office's objections. Please do whatever is necessary to protect our position. Take whatever action you feel to be appropriate, though obviously we would not wish to spend money unnecessarily.

Incidentally, we are now quite interested in the reverse arrangement of shear torques (as described in relation to Figures 6 and 7 of our application). When we prepared the application this was really just an afterthought, but my Marketing Manager now feels that there is a real demand for fasteners of this type in precisely the application that we described (fixing security grilles over windows). We will therefore be promoting this version of the product quite heavily in the coming months.

OFFICIAL LETTER

Application No : GB 9712345.6 **Examiner :** Ivor Screwloose

Applicant : Boltfast Ltd **Date of Report :** 22 May 2000

Latest date for reply:

22 November 2000

Patents Act 1977
Examination Report under Section 18(3)

Basis of the examination

This examination report is based on the application as filed.

Novelty

It appears, as a result of the search under Section 17, that your application does not meet the requirements of Sections 1(1)(a) and 1(1)(b) in that the invention as claimed is not new and/or does not involve an inventive step having regard to the matter contained in the patent specifications or other documents cited below:

GB 1222222
GB 2123123A

United Kingdom Patent Application No 9712345.6

Date of filing 23 June 1997

Shearable Fastener

This invention relates to a shearable fastener, and in particular to a shearable bolt for fastening cables in electrical connectors and the like.

When connecting electrical cables it is commonplace to use connectors with sockets in which the cable ends are received. The walls of the sockets have threaded bores into which clamping bolts are introduced and used to clamp the cable against the opposite internal wall of the socket, thereby creating a mechanical and electrical connection between the cable and the connector. Such clamping bolts commonly have a threaded shank with a head formed for engagement with a suitable drive tool, eg a hexagonal head that can be gripped by a spanner or socket wrench.

It is undesirable for such clamping bolts to project from the connector. It is also desirable to limit the clamping force exerted by the bolt so as to prevent excessive clamping force that might damage the cable. Thus it is standard practice to use clamping bolts with shearable heads which shear off when a predetermined torque is applied to them. This reduces the length of the bolt that protrudes from the assembled connector, and also prevents excessive clamping forces.

Because the diameters of cables to be fastened can vary considerably, when conventional shear-head bolts are employed there can be a correspondingly large variation in the length of bolt that protrudes from the connector. Also, the optimum clamping force to be applied to the cable may vary considerably depending on the physical size of the connector. This means that a fitter may need to carry a selection of clamping bolts of different lengths, and must select the appropriate bolt for any particular application. This leads to a potential for error in that the wrong bolt may be used, particularly since the error may not become evident until after the wrong bolt has been inserted and sheared, by when it is too late to correct the error.

This invention addresses the problem referred to above and seeks to provide a shearable fastener which is versatile and can be used to clamp electrical cables with a range of diameters.

According to the invention, there is provided a shearable fastener of generally elongate form, the fastener being adapted for engagement with a threaded bore and having at least two points of weakness at axially spaced positions along its length such that the fastener can be caused to shear at a selected one of said points of weakness.

The fastener may have at least two points of weakness.

Although described herein principally in relation to the fastening of electrical cables within connectors, the use of the multiply shearable fasteners according to the invention is not limited to such applications. They can also be used, for example, for the fastening of security devices such as window grilles. In such applications it is important that after shearing the fastener may not be removed. Thus, it is important that there should not be any means of positive engagement of the residue of the fastener with a drive tool. For this reason, there should not be an internal bore which could be engaged to enable removal of the fastener. The shear must take place at the last point of weakness projecting beyond the security grille and so in this case the predetermined shear torques at which the fastener shears need to decrease from the head of the fastener to the tip. The fastener will then shear preferentially at the line of weakness closest to the external surface of the grille. The sheared fastener will project by at most the distance between two successive points of weakness, and so the length of the protrusion can be minimised by choosing small intervals between the points of weakness.

Preferred embodiments of the invention will now be described in greater detail, by way of example only, with reference to the accompanying drawings, in which

Figure 1 is a side view of a shearable fastener according to the invention;

Figure 2 is a view similar to Figure 1 of a second embodiment of a shearable fastener according to the invention;

Figure 3 is a cross-sectional view through a cable connector in which a cable of relatively small dimension has been clamped using the fastener of Figure 1;

Figure 4 is a view similar to Figure 3 but showing a cable of relatively large dimension;

Figure 5 shows the stages in engagement of the fastener of Figure 2 with a cable connector containing a cable as shown in Figure 3;

Figure 6 is a side view of a third embodiment of a fastener according to the invention; and

Figure 7 shows the manner in which the fastener of Figure 6 is used to fix a security device such as a window grille.

Referring first to Figure 1, a shearable fastener according to the invention is generally designated 1 and comprises a head portion 2, a first threaded portion 3, which adjoins the head portion 2, and a second threaded portion 4 which adjoins the first threaded portion 3. The transition from the head portion 2 to the first threaded portion 3, and the transition from the first threaded portion 3 to the second threaded portion 4, are formed by a first connecting section 5 and a second connecting section 6 respectively.The second threaded portion 4 terminates in a contact region 9 at the tip of the fastener

An internal bore 8 is provided along a central screw axis 7 The threads 3′ and 4′ of the first and second threaded portions respectively are sections of a single thread, so that both the first threaded portion 3 and the second threaded portion 4 of the fastener 1 can be screwed into a bore having an internal thread.

The transition region between the first connecting portion 5 and the first threaded portion 3 constitutes a first predetermined breaking point 10.and the transition region between the second connecting portion 6 and the second threaded portion 4 a second predetermined breaking

point 11. These breaking points 10,11 are produced by the outer peripheries of the respective connecting portions 5,6 tapering towards the predetermined breaking points. The diameter of the internal bore 8 decreases stepwise from the head portion 2 to the contact region 9 (ie the diameter of the bore 8 within the head portion 2 is somewhat greater than the diameter of the bore 8 within the first threaded portion 3, which is in turn somewhat greater than the diameter of the bore 8 within the second threaded portion 4). This, together with the fact that the outer peripheries of the respective connecting portions 5,6 are substantially identical, means that the annular thickness at the first predetermined breaking point 10 is less than the thickness at the second predetermined breaking point and so the applied torque at which the fastener 1 shears at the first predetermined breaking point 10 is less than the applied torque necessary to cause the fastener 1 to shear at the second predetermined breaking point.

The internal bore 8 has a hexagonal cross-section adapted to receive tool heads of corresponding shape. In the head portion 2, the internal bore 8 is of constant dimension. In the first threaded portion 3, the bore 8 is somewhat smaller, and in the second threaded portion 4 second threaded portion 4) it is smaller again. The portions are thus adapted to receive tool heads of progressively smaller dimensions.

Figure 2 shows a second embodiment 21 of a fastener according to the invention, in this instance comprising, four further threaded portions 24a-d. Between each pair of adjacent portions 23,24a-d a predetermined breaking point is provided so that the fastener 21 can be sheared at any of five different points. The fastener 21 again has an internal bore (not shown) that extends from the head portion 22 to the last threaded portion 24d, and again decreases stepwise in diameter from one part of the fastener 21 to the next.

Figures 3 and 4 show the fastener 21 of Figure 2 in use to clamp multi-strand electric cables 31,32 within a socket 17 of an electrical connector 15. The cable 31 shown in Figure 3 is of relatively small dimension so that a greater length of fastener is needed to clamp the cable 31 against the internal wall of the socket 17. The head portion 22 and the first three threaded portions 23,24a-b can therefore be sheared off to leave only the last two threaded portions 24c-d in place,

there being effectively no part of the fastener 21 protruding from the connector assembly.

As shown in Figure 4, where the cable 31 is of greater dimension (eg where it comprises a greater number of strands), a shorter length of fastener is required to clamp the cable 31 effectively within the socket 17. In the example illustrated, only the last threaded portion 24d remains in place, all the other parts of the fastener 21 being progressively sheared off.

Thus a fastener of a single form can be used to clamp cables of widely differing dimensions within the same type of connector. In both cases, the risk of excessive clamping force being exerted on the cable is averted, yet in neither case does the fastener protrude from the assembled connector.

The manner in which the fastener of Figure 2 is used to clamp the smaller dimension cable (as shown in Figure 3) is illustrated in Figure 5. First, a large diameter hexagonal tool head 41 is inserted in the head portion 22 (Figure 5a) and the fastener rotated until the tip of the fastener 21 engages the cable 16. Further application of torque to the fastener 21 then exceeds the torque at which the head portion 22 shears off. A second, smaller dimension tool head 42 is then inserted in the first threaded portion 23 (Figure 5b) and sufficient torque exerted to shear off that portion. This process is repeated using further tool heads 43,44 until only the last two threaded portions 24c-d remain (as shown in Figure 3).

Turning now to Figure 6, a third embodiment of a fastener according to the invention is shown 50 and comprises a threaded shank 51 with a hexagonal head 52. A series of annular grooves 53 are formed at axially separated positions along the length of the shank 51. The grooves 53 constitute points of weakness at which the shank 51 shears. By appropriate variation in the depth of the grooves 53, the torque necessary to shear the shank 51 is controlled so that it decreases from the head 52 to the tip of the shank 51.

An application of the embodiment 50 is illustrated in Figure 7. To fix the peripheral flange of a window security grille 41 to a sub-frame 42,

threaded bores (43,44 respectively) in the two components are brought into registration (Figure 7a) and the fastener 50 introduced into them. Rotation of the fastener 50 (eg by means of a socket wrench fitted to the hexagonal head 52) eventually brings the tip of the fastener 50 into engagement with the underlying masonry (Figure 7b). Continued application of torque to the fastener 50 causes it to shear. Because of the configuration of the grooves 53, shearing takes place preferentially at the point of weakness (groove 53) closest to the surface of the flange (Figure 7c). The length of the shank 51 that projects from the flange is at most the separation of two successive grooves 53. Once the fastener 50 is in place and the shank 51 has sheared, it is difficult or impossible for the fastener 50 (and hence the security grille 41) to be removed.

Claims

1. A shearable fastener of generally elongate form, the fastener being adapted for engagement with a threaded bore and having at least two points of weakness at axially spaced positions along its length such that the fastener can be caused to shear at a selected one of said points of weakness.

2. A fastener as claimed in Claim 1, wherein there are provided two to six points of weakness.

3. A fastener as claimed in Claim 1 or Claim 2, wherein the fastener comprises a head portion and a threaded shank extending from said head portion, the points of weakness being formed at axially spaced positions along the length of the shank.

4. A fastener as claimed in Claim 3, wherein the applied torque necessary to cause the fastener to shear at one of the points of weakness increases from the head portion to the tip of the shank.

5. A fastener as claimed in Claim 3 or Claim 4, wherein an internal bore is formed in the head portion and extends into at least a first threaded portion of the threaded shank.

6. A fastener as claimed in Claim 5, wherein the size of the internal bore decreases stepwise at each point of weakness.

7. A shearable fastener substantially as hereinbefore described and as illustrated in Figure 1 or Figure 2.

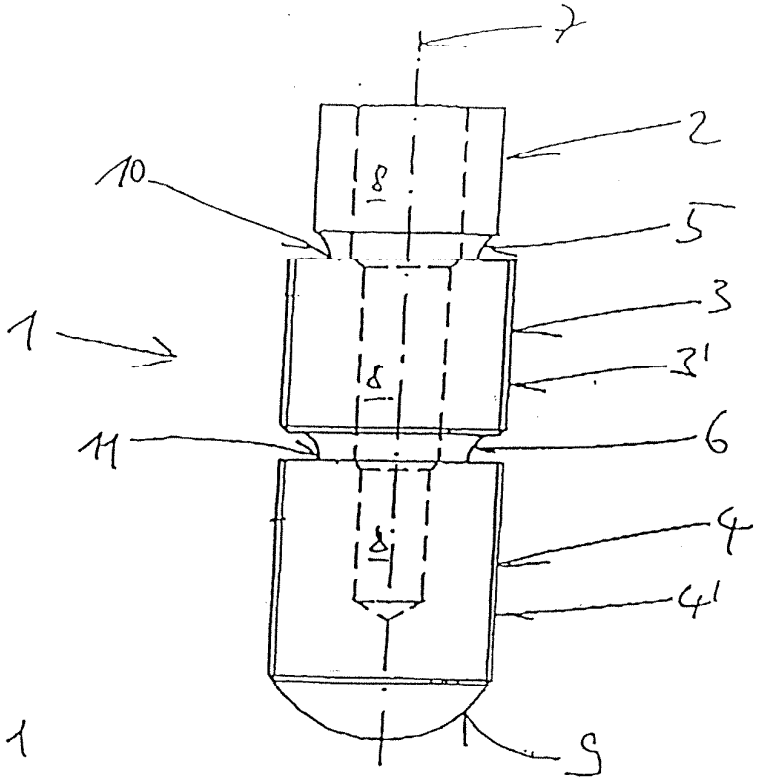


Fig. 1

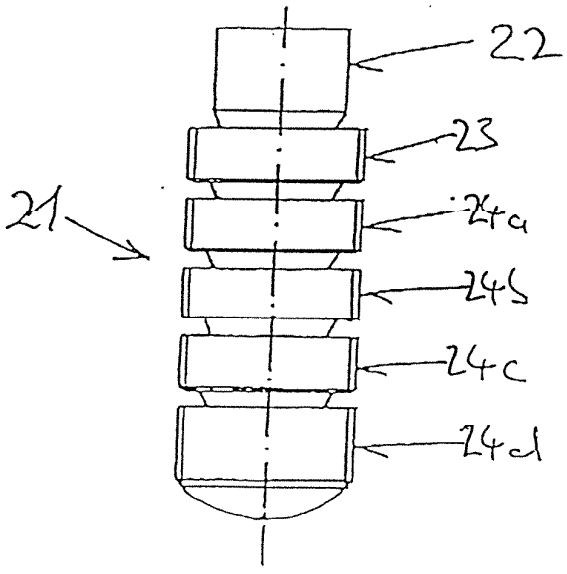


Fig. 2

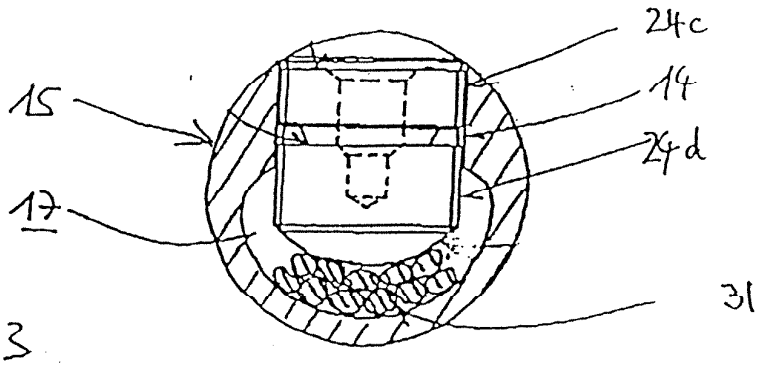


Fig. 3

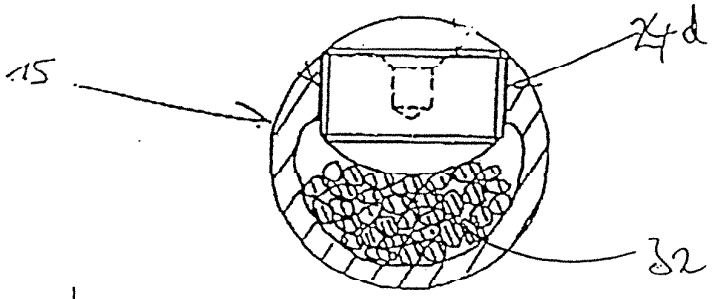


Fig. 4

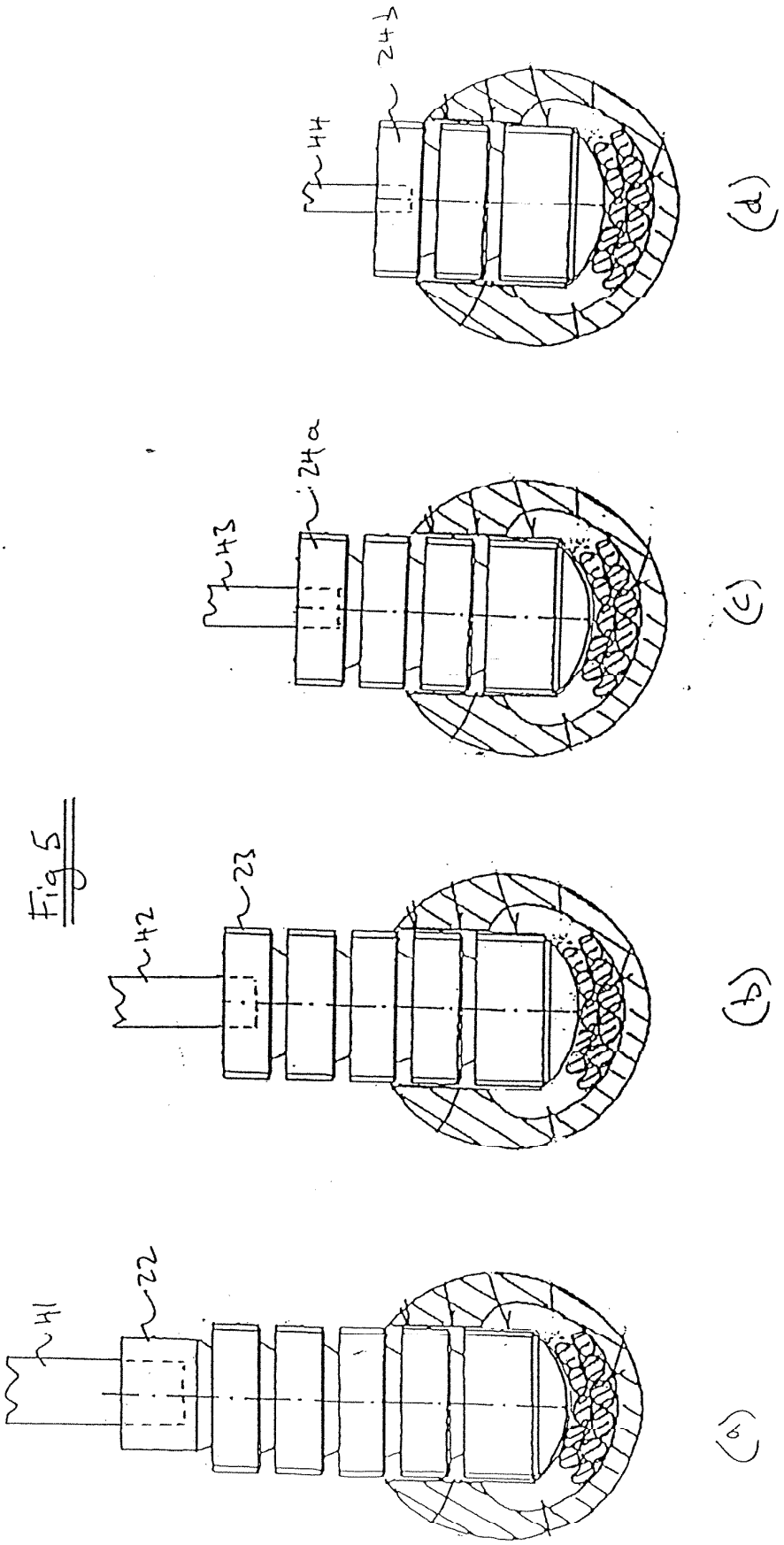


Fig 5

Fig 6

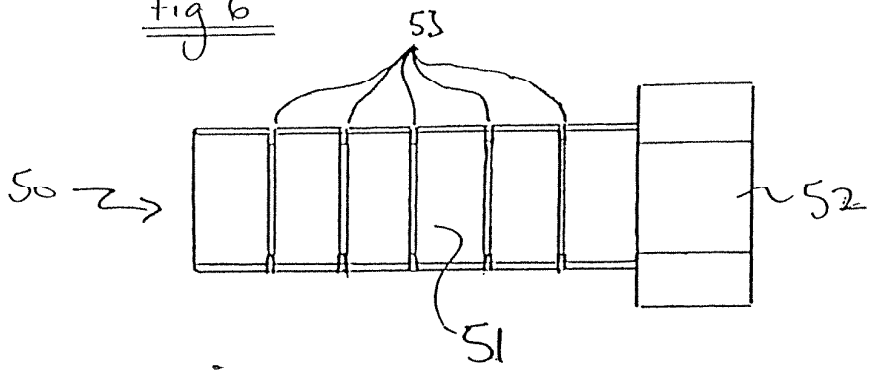
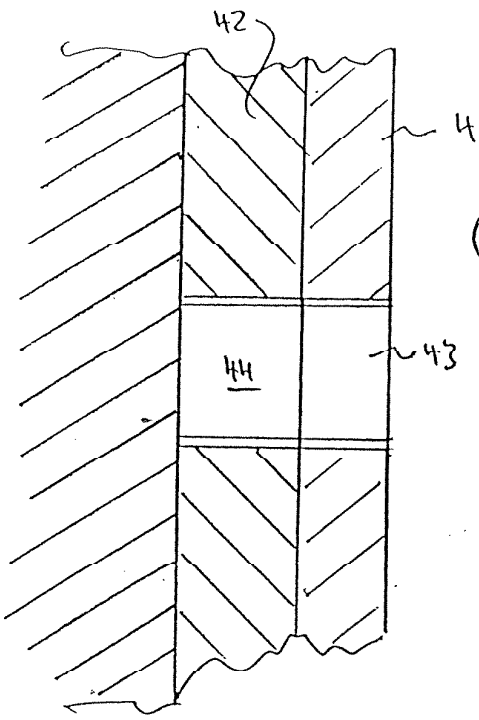
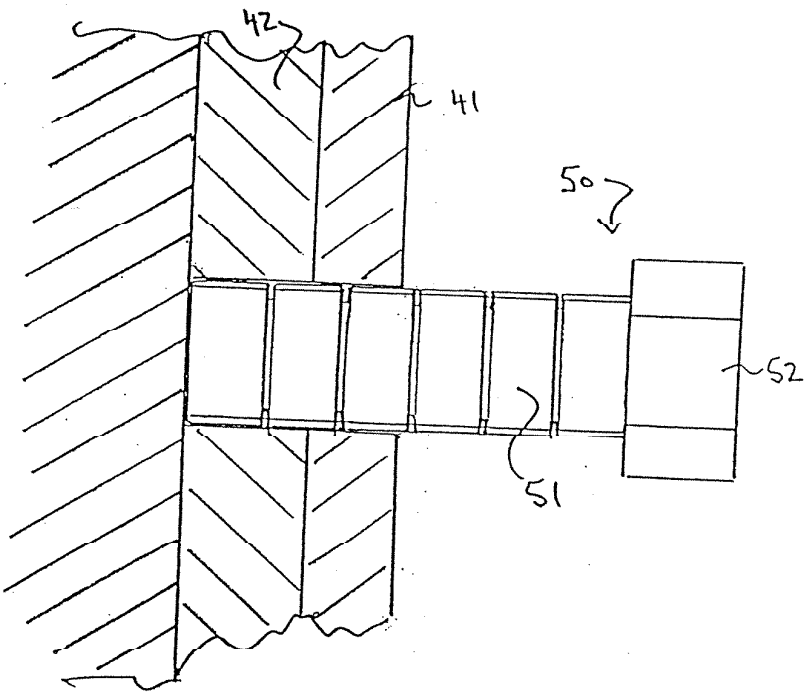


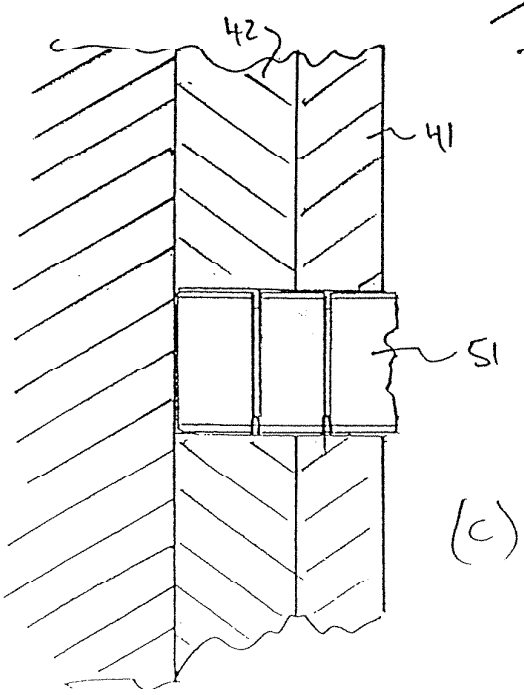
Fig 7



(a)



(b)



(c)

United Kingdom Patent Application No 2123123A

Filing date 1 March 1994
Application published 7 September 1995

Improvements Relating to Clamping Screws

The present invention relates to improvements in clamping screws or shear bolts used to exert a clamping force on an object or objects by the screwing and tightening of the bolt thereon.

As a conventional bolt is tightened to exert a clamping force on an object the torque required to further tighten the bolt increases. When the torque reaches a required level to provide the clamping force conventional shear bolts are provided with reduced necks and shear at this point such that the head portion is removed. The shearing action of the bolt is commonly successful but the position of the shear is entirely dependant upon the positioning of the neck.

This causes problems in many uses and when the article upon which the bolts are used is an electrical cable connector and the objects to be clamped are cable cores, the shank of the bolt which remains can protrude above the surface of the connector. When a connector is used, portions of the two cable cores to be connected are placed in the connector and covered and shear bolts are applied to the connector to be screwed into threaded bores therein to provide a clamping force onto the cores and hold the same in place. When a certain clamping torque is reached the bolt shears at the neck and can leave part of the bolt shank protruding above the surface of the connector. The existence of these protrusions cause particular concern when used with high voltage cable connectors as each of the protrusions can cause what is known as a "corona" effect to occur. The corona effect leads to the insulation material around and adjacent the protrusions being eroded and destroyed by the high voltage stresses.

In an attempt to overcome these problems it is possible to use packing pieces in conjunction with the bolt when the cable core to be clamped

is a relatively small diameter cable compared to the bore of the connector and/or to use differing lengths of bolts for each diameter of cable core to be clamped.

The aim of the present invention is to provide a bolt or screw clamping means for use in clamping an object in position, said bolt being provided with means to allow at least a portion to shear off once a predesignated clamping torque is reached and to provide drive means for the same, the said apparatus being of a form to allow the position and plane of the shear to be controlled and predicted thereby eliminating the production of protrusions on the surface of the article when the bolt shears.

The present invention provides a screw clamping apparatus comprising a screw shank and a drive means connectable to the shank for transmission of torque from the drive means to the shank to screw it into a bore in an article to apply a clamping effect, and when the shank applies a predetermined turning torque to produce a clamping force the shank shears in a transverse shear plane with continued turning of the drive means, wherein the axial position of the shank is movable relative to the drive means and the drive means can seat on the article adjacent the bore, whereby said shear plane is created substantially in the plane of the surface of the article around said bore regardless of the extent to which the shank, within a predetermined range, enters the bore.

According to a first embodiment, the drive means comprises a drive rod of non-circular section slidable in a recess axially of the shank whereby the shank is driven by rotation of the drive rod, and a support rotatably supports the drive rod and is adapted to seat the article surface adjacent the bore.

Typically the length of the drive rod relative to the article determines the plane of shear upon a predesignated clamping torque level being reached. In all cases the shank will shear in a plane substantially parallel with the end of the drive rod.

In any embodiment the shank is preferably provided with at least one weakened point along the length thereof to encourage the shank to shear at those points. Typically the weakened points are notches cut into either or both of the outer surface of the shank or along the wall of the axial recess in the shank.

When used on an electrical cable core connector, the cable cores are clamped in position and the notches are preferably positioned to ensure the shank shears at known positions and these positions can be calculated when used in a connector of known size and for cable cores of known characteristics such that the notches are spaced to ensure that the shank shears in a predicted position in relation to the surface of the article and above the threaded section of the bore. For example, as cables are manufactured in a limited number of defined sizes notches are provided on the shank to match with the length of shank required to provide the necessary clamping force on a particular cable core cross-sectional area in a particular connector, and the notches are spaced such that there is always one notch between the end of the drive rod and the start of the threaded section on the bore and it is this notch which shears at a position adjacent the surface of the connector and substantially in the plane of the end of the drive rod to give a smooth and uniform connector surface.

A further aspect of the invention is that if the shank is provided with an axial recess, the recess, which is exposed once the shank has sheared, can be re-engaged subsequently by the drive means and rotation of the drive means causes the removal of the shank from the connector. This is of particular advantage where a temporary electrical connection is required to be made and then subsequently changed.

Specific embodiments of the invention are now described with reference to the accompanying drawings, wherein:

Figure 1 is a cross-sectional view of screw clamping means of the invention in a first position;

Figure 2 is a cross-sectional view of the apparatus of Figure 1 in a second position;

Figure 3 is a cross-sectional view of the apparatus of Figure 1 in a third position;

Figure 4 is a cross-sectional view of the apparatus of Figure 1 at the point of shear; and

Figure 5 is a cross-sectional view of the apparatus of Figure 1 in a final position;

Referring firstly to Figure 1 there is shown a first embodiment of the screw clamping means 2 of the invention. The screw clamping means comprises a shank 4 and drive means 6 for the said shank. In this embodiment the shank 4 is to be inserted into an electric cable core connector 8 to exert a clamping force on the cable core 10. The shank 4 includes an axial recess 14 which has a hexagonal cross section and is threaded to be screwed into the threaded bore 12 in the connector 8.

The drive means 6 comprises a drive rod 16 with a head 19 and a support means 18. The drive rod has a hexagonal cross section similar to that of the recess 14 in the shank so that the rod 16 fits into, and is axially movable in relation to, the axial recess 14. Rotation of the drive rod screws the shank 4 into the bore 12. The support means 18 comprises a downwardly extending skirt 20 or legs (not shown). In use, the bottom edges 22 of the skirt rest on the surface 24 of the connector. The support means 18 can be rotatable with the drive rod 16 or may be held stationary with the drive rod 16 rotatable relative thereto.

Figure 1 illustrates the shank 4 and drive means 6 in a first position wherein the drive rod 16 is fitted into the axial recess 14 of the shank 4. Preferably the shank is introduced into the bore 12 to

provide a secure starting location. The drive means 6 is then rotated in a clockwise direction to screwing the shank 4 into the bore 12.

The rotation of the drive means causes the shank 4 to move into the connector as shown in Figure 2. At this stage the support means 18 has moved down such that the bottom edges 22 now rest on the connector surface 24 adjacent the bore 12. At this point the drive rod 16 is prevented, from moving any further downwardly with the shank 4 and further turning of the drive means causes continued downward screwing of the shank 4 and produces relative axial movement between the rod 16 and shank recess 14 as shown.

Continued turning of the drive means 6 moves the clamping end 25 of the shank 4 into contact with the cable core 10, causing the same to deform, and then exert a clamping force thereon as shown in Figure 3.

Every size of cable core 10 is required to be clamped to a predesignated torque level to produce the required clamping force and at that torque the shank is required to shear thereby holding the core in this clamped position. In this invention the torque level at which the shank 4 will shear is determined by the difference between the width of the recess 14 and the outer diameter of the shank 4 and also the material from which the shank is made. The next step is to control the position at which the shear occurs.

Figure 4 illustrates the embodiment of Figures 1-3 at a position where the predesignated clamping torque on the core 10 has been reached and shear as indicated by line 26 is about to occur upon continued turning of the drive rod 16. The plane of shear is determined by the position of the end 28 of the rod 16 which is in the axial recess 14 of the shank 4 and the position of which is known and fixed due to the support means 18. The support means 18 is provided to rest on the connector surface 24 so the position of the end 28 of the drive rod 16 is determined relative to the connector and hence the plane of shear 26 in this embodiment is substantially level with the surface 24 as required.

The shank 4 when sheared is shown in Figure 5 and the plane of shear 26 is substantially level with the surface 24 as desired. To further encourage the plane of shear to be located at a predictable location on the shank, the shank is provided with sets of notches 30. The selection of the location of these notches is described in more detail later. However in Figure 5 the notch 30A is positioned for use when clamping the biggest cable core cross section namely 150mm, the notch 30B is for the intermediate cross section 120mm and the notch 30C, which in this case is at the shear plane 26 is for inducing shear with a 90mm cross-sectional cable core.

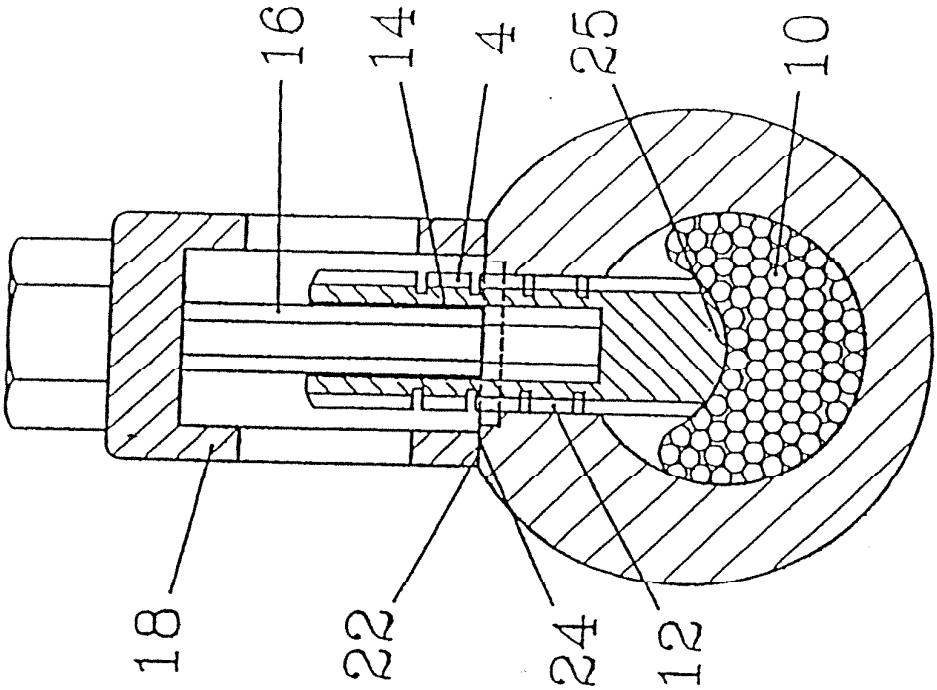


Figure 2

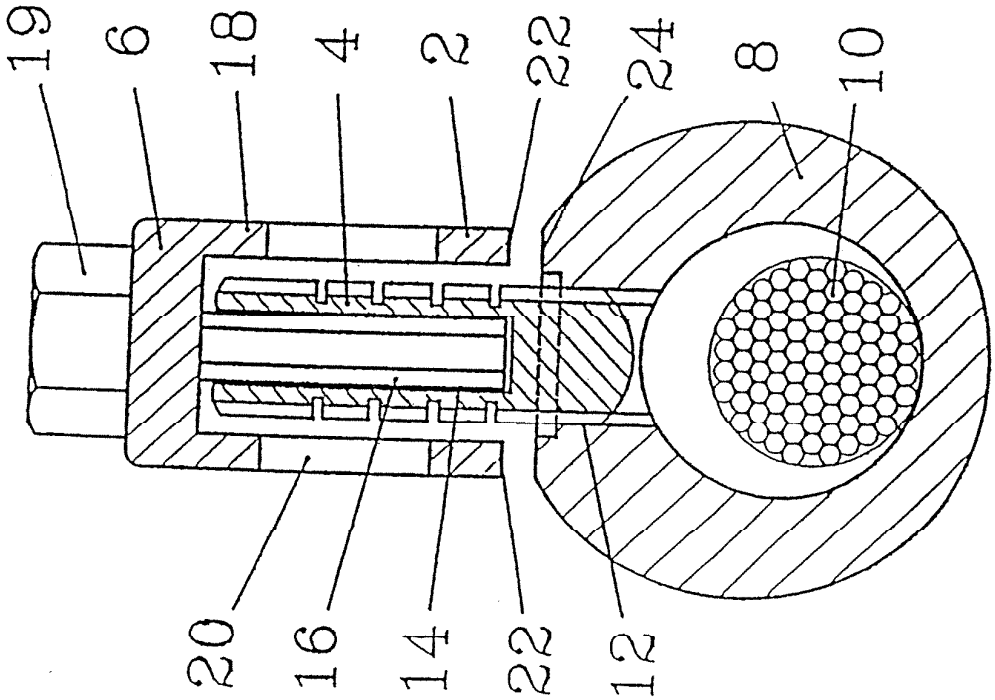


Figure 1

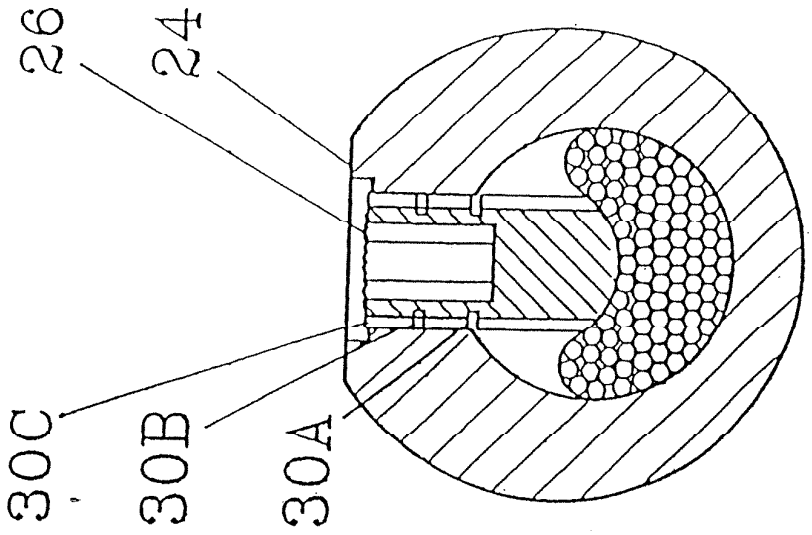


Figure 5

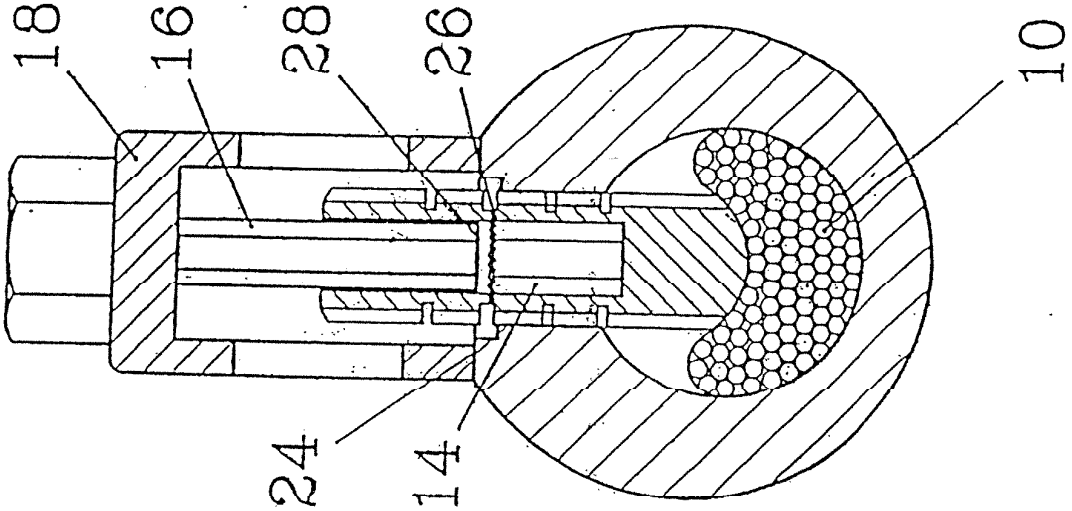


Figure 4

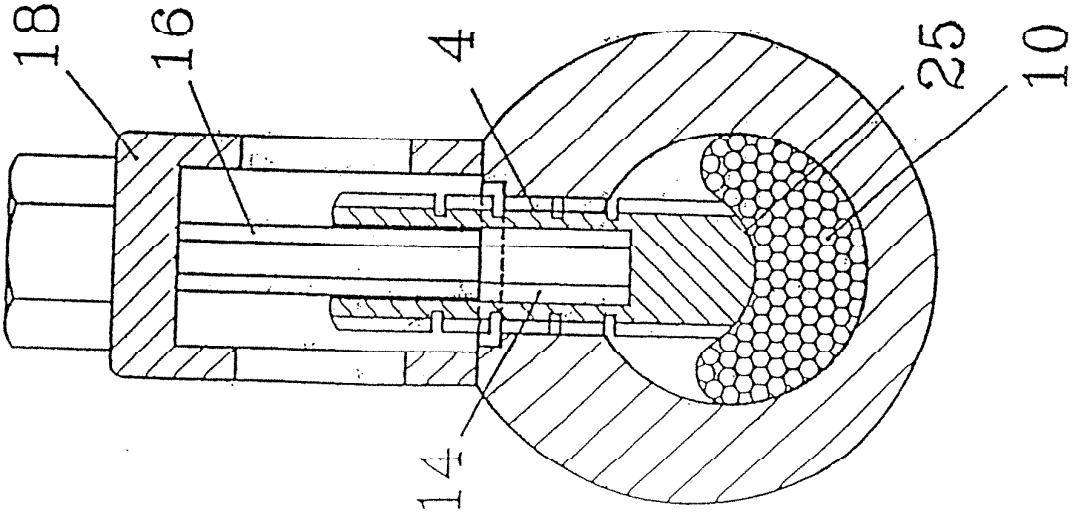


Figure 3

United Kingdom Patent Specification No 1222222

Filed 17 March 1972
Complete specification published 14 January 1976

Tooth Anchoring Means and Method

This invention relates to means and methods for building superstructure on a tooth and in particular to means and methods for anchoring at least one dentistry pin to a tooth.

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According to the invention a method of anchoring a metal pin to a tooth comprises first forming in the tooth a hole having a width approximately equal to that of the pin, applying a thin coating of a liquid cyanoacrylate cement to an end of the pin or to the tooth hole and then before the cyanoacrylate cement hardens, rapidly inserting the pin end into the hole in order to anchor it therein by means of the cyanocrylate cement.

In accordance with a further feature for the method, a cyanoacrylate cement is used in combination with a pin having a profiled exterior, such as for example, a threaded ringed, or knurled pin. The pin may have a non-circular cross section to increase its retention in the hole.

According to another aspect of the invention there is provided the combination, for example as a packaged kit, of at least one dentistry pin and a quantity of cyanoacrylate cement suitable for securing the pin to a tooth by a method in accordance with the invention. In such a combination the pin may have a profiled exterior as previously referred to and at least four dentistry pins may be present in a pin structure comprising an elongated strip of connected pins of the same cross-section separated by regions of smaller cross-section where the pins can be separated by breaking.

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Embodiments of the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawing wherein:

Figure 1 is an enlarged side view of a strip of pins for use in a method in accordance with the invention;

Figure 2 is an enlarged cross-sectional view along the line 2-2 of Fig 1.

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The quick setting property of the cyanoacrylate cement permits the use of a multi-pin structure for extremely fast mounting of the pins. One such pin structure is illustrated in Figure 1, which is an enlarged side view of an elongated pin stock 10 comprising five connected discrete dentistry pin portions 11 separated by regions 12,13,14 15 of smaller cross-section. The pin stock may be of round section and threaded throughout or of square section and threaded throughout as illustrated. The smaller cross-section regions 12-15 may have a diameter of approximately one-half that of the pin portions 11.

In use, the dentist first drills in the tooth the desired number of holes to receive pins. Then holding one end 17 of the long strip 10, he applies a thin layer of cyanoacrylate cement to the free end 18 and quickly inserts the coated pin end in one of the drilled holes. Instantly the cement hardens and the pin end is locked in place. The dentist then breaks off the four remaining pins at the first thinned-down region 12, applies a new coat of cement to the free pin end and inserts the coated end into a second hole. He then breaks off the three remaining pins at the second thinned down region 13, and continues the procedure until all five discrete pin portions 11 have been mounted. In this technique, the pins are initially handled as a long strip, at least having a length of four pins, which makes it much easier for the dentist to handle. Moreover, the pin strip need never leave the dentist's hand, thereby saving the time normally spent in picking up tiny loose pins with pliers and then inserting in a special tool or handled directly by the pliers. It is evident that this technique will shorten considerably the time required to install a large number of tooth pins. To make it easier to break off the

remaining pins, preferably the pin to be mounted is first bent over to weaken the joint at the thinned down region. The cement is applied and the bent-over pin end inserted into the tooth hold. This practice can also be applied to the remaining pins.

Figure 2 illustrates the square cross section pin 10 with corners 19 threaded, thereby forming longitudinally extending crevices 20 along the flat sides for receiving cement to enhance the resistance to pin rotation.

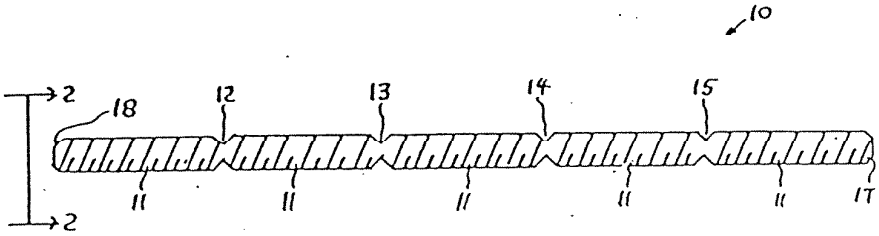

FIG. 1

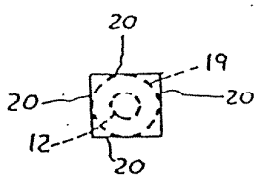

FIG. 2