

2003 PAPER P3 SAMPLE SCRIPT A

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Note to the Examiner

I believe that an arguable claim could be made to a clamping device using, essentially, the mechanism of the sealant gun. The drive and locking mechanisms shown in Fig. C could be adapted, with the tube guide replaced by a U-shaped anvil member and the plunger rod replaced by a rod carrying a mobile jaw member, to produce a clamping device similar in appearance to the traditional G-clamp, but having the advantageous indexing and locking action of my client's device.

This is the second embodiment ("not shown in the drawings") that I have begun to describe in my specific description. In real life I would, of course, describe it in conjunction with appropriate drawings.

An advantage of this arrangement is that the rod can be moved along a substantial distance by repeated operation of the handle, and locked in place each time.

A Clamping Device

The present relates generally to clamping devices, and more particularly to those clamping devices used in carpentry or DIY to hold a workpiece to a bench or to hold two or more workpieces together.

A known type of clamping device is the traditional G-clamp. A generally U-shaped anvil member has a fixed jaw at one end. A mobile jaw member is mounted on one end of a threaded rod, which passes through a threaded hole in the other end of the anvil member.

By turning handle means provided on the other end of the threaded rod, the mobile jaw member may be moved towards or away from the fixed jaw, and by this means workpieces can be clamped to one another or to a workbench. A disadvantage of the traditional G-clamp is that two hands are needed to operate it – one to steady the anvil member and the other to turn the handle means. A further disadvantage is that unclamping is only possible by reversing the clamping action and manually unscrewing the clamp, and this likewise requires two hands.

It is therefore an objective of the present invention to provide an improved design of clamping device, operable with one hand, and in which the clamping jaws can be quickly moved apart to release the workpieces.

According to the present invention, *<the text of claim 1>*. Preferably, the handle means are arranged so as to be operable by one hand. The user is thereby left with one hand free to hold the workpiece, manipulate a tool, etc.

The frame members may be arranged in relatively pivotable relationship, or alternatively in relatively slidable relationship. The latter may be particularly advantageous if it is desired to avoid any turning or side forces on the workpieces as they are clamped.

In a preferred embodiment of the invention, spring means are provided to move the clamping forces apart when the locking means are released.

In an alternative preferred embodiment, the clamping action may be indexed. This permits the clamping faces to be moved over a greater distance than could be achieved in a single operation of the handle means, or alternatively permits the use of mechanical advantage to increase the clamping force.

The invention will now be described, by way of example only, with reference to the accompanying drawings in which

Figure 1 shows a general view of a clamping device according to one embodiment of the invention;

Figure 2 shows a perspective view of the clamping device of Figure 1;

Figure 3 shows a further perspective view of the clamping device of Figure 1, in a clamped condition.

Referring first to Figure 1, a clamping device shown generally at 10 comprises two frame members 12, 14. Each hand member has at one end a handle (respectively 16 and 18) and at the opposite end a clamping face (respectively 20 and 22). The clamping faces are pivotally mounted on the frame members by pivots 24, 26. The frame members are pivotally joined at a clamp pivot 28, so that movement of the handles 16, 18 towards or away from each other will effect a corresponding movement of the clamping faces 20,22 towards or away from each other. In this embodiment the frame members 12, 14 are formed from rigid plastic material.

Attached to the handle 18 of the frame member 14 is an arcuate anchor plate 30. This has serrations 32 along its top edge (more clearly seen in Figure 2). The anchor plate 30 passes through a hole in a toggle plate 34 which is pivoted about a fulcrum 36 on the handle 16 of the frame member 12. A toggle spring 38 biases the toggle plate 34 away from the handle 16. As the handles 16, 18 are drawn together in use, the toggle plate 34 rocks about the fulcrum 36 and against the toggle spring 38 to index past successive ratchet serrations 32. When a work piece has been adequately gripped between the clamping faces 20, 22, the handles 16, 18 can be released and the edge of the hole in the toggle plate 34 catches on an appropriate serration 32 of the anchor plate 30 to hold the jaws in that configuration. Figure 3 shows the clamping device 10 in such a position. Although there is no workpiece, it will be seen that the clamping faces 20, 22 are held together.

When it is desired to release the workpiece, the operator presses the toggle plate 34 towards the handle 16, against the toggle spring 38. This releases the edge of the hole in the toggle plate 34 from the serrations 32 and frees the clamping faces 20, 22 to part again. In this embodiment, a spring (not visible in the Figures) acts between the frame members 12, 14 to force the clamping faces 20, 22 apart.

It can be seen from Figure 2 that the clamping faces 20, 22 are provided with grooves 40, 42. These are helpful when clamping small, especially circular workpieces such as pipes or dowels, as they locate the workpiece more securely between the clamping faces 20, 22.

In this embodiment, the clamping faces 20, 22 are formed of hard rubber material. This has sufficient rigidity to clamp a workpiece securely, but its resilience helps to avoid undesirable marking of the workpiece, as might occur with hard metal clamping faces.

A further embodiment of the invention, not shown in the drawings, will now be described. This embodiment uses the same principles of operation as that previously described, but in a clamp more akin in shape to a traditional G-clamp.

In this embodiment, a generally U-shaped first frame member has a clamping face at one end. An opposing clamping face is mounted on one end of a rod-shaped second frame member, which fits slidingly through a hole at the other end of the U-shaped member. As the rod member is moved to and fro, then, the two clamping faces are caused to move towards or away from each other.

The clamping and locking mechanisms used in this embodiment are similar to those used in known sealant guns.

A drive toggle plate

Claims

1. A clamping device comprising two frame members, each frame member having an associated clamping face, the frame members being arranged in relatively movable relationship so that the clamping faces are in opposed spaced apart relationship, the device having handle means such that in use hand pressure on the handle means will effect relative movement of the frame members so as to move the clamping faces towards each other, there being releasable locking means associated with the frame members which in use act to maintain the relative position of the clamping faces when the hand pressure is released.
2. A clamping device as claimed in claim 1, and operable using one hand.
3. A clamping device as claimed in claim 1 or claim 2, in which the frame members are in relatively pivotable relationship

4. A clamping device as claimed in claim 1 or claim 2, in which the frame members are in relatively slidable relationship.
5. A clamping device as claimed in any preceding claim, in which spring means move the clamping faces apart when the locking means are released.
6. A clamping device as claimed in any preceding claim, in which the clamping action is indexed.
7. A clamping device as claimed in any preceding claim, in which the locking of the locking means is achieved by means of serrations thereon.
8. A clamping device as claimed in any of claims 1 to 6, in which the locking of the locking means is achieved by frictional engagement.
9. A clamping device as claimed in any preceding claim, in which each frame member has handle means formed integrally with it.
10. A clamping device as claimed in any preceding claim, in which the frame members are formed of rigid plastic material.
11. A clamping device as claimed in any preceding claim, in which each clamping face is pivotally mounted with respect to its associated frame member.
12. A clamping device as claimed in any preceding claim, in which the clamping faces are made of hard rubber material.
13. A clamping device as claimed in any preceding claim, in which the clamping faces are grooved.

Abstract (relates to Figure 2)

A clamping device 10 has two frame members 12, 14 in relatively movable relationship, each frame member 12, 14 having a clamping face 20, 22 associated with it. Handle means 16, 18 are associated with the frame members 12, 14 so that, in use, hand pressure on the handle means 16, 18 will move the clamping faces 20, 22 towards each other. Releasable locking means 34 maintain the relative position of the clamping faces 20, 22 when the hand pressure is removed.

[3 pages of drawings follow]

* * * * *

Fig. 1.

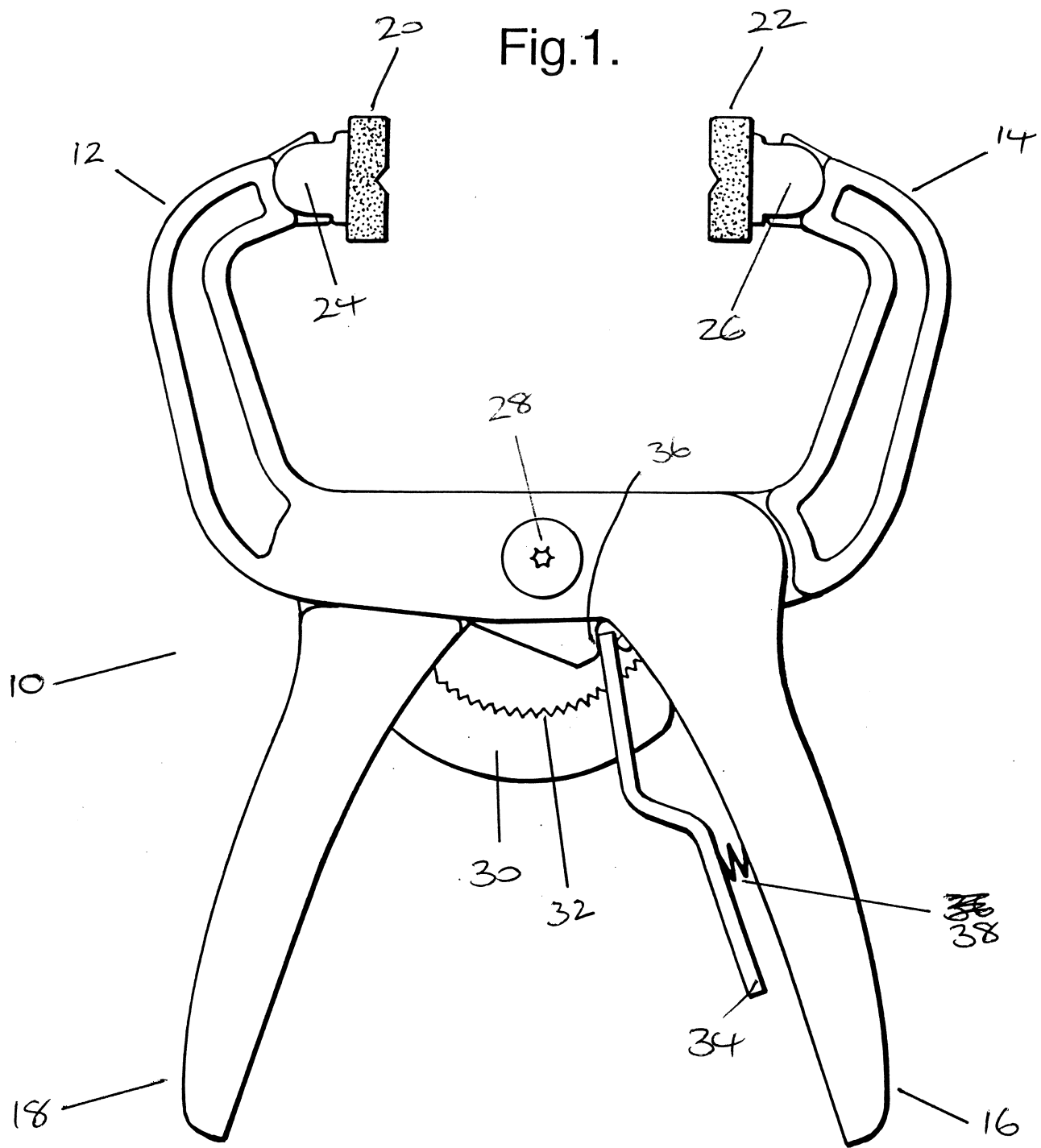
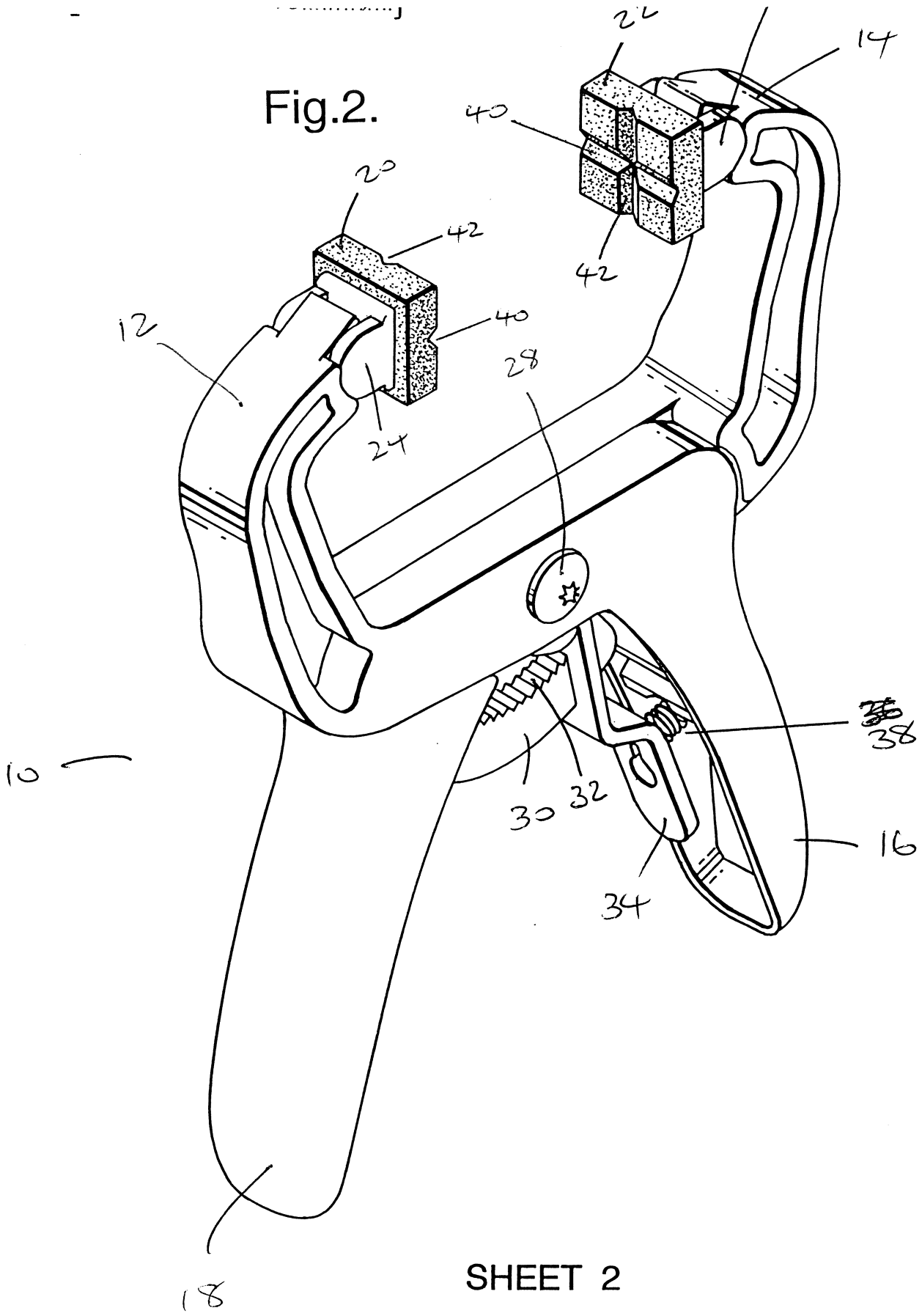


Fig.2.



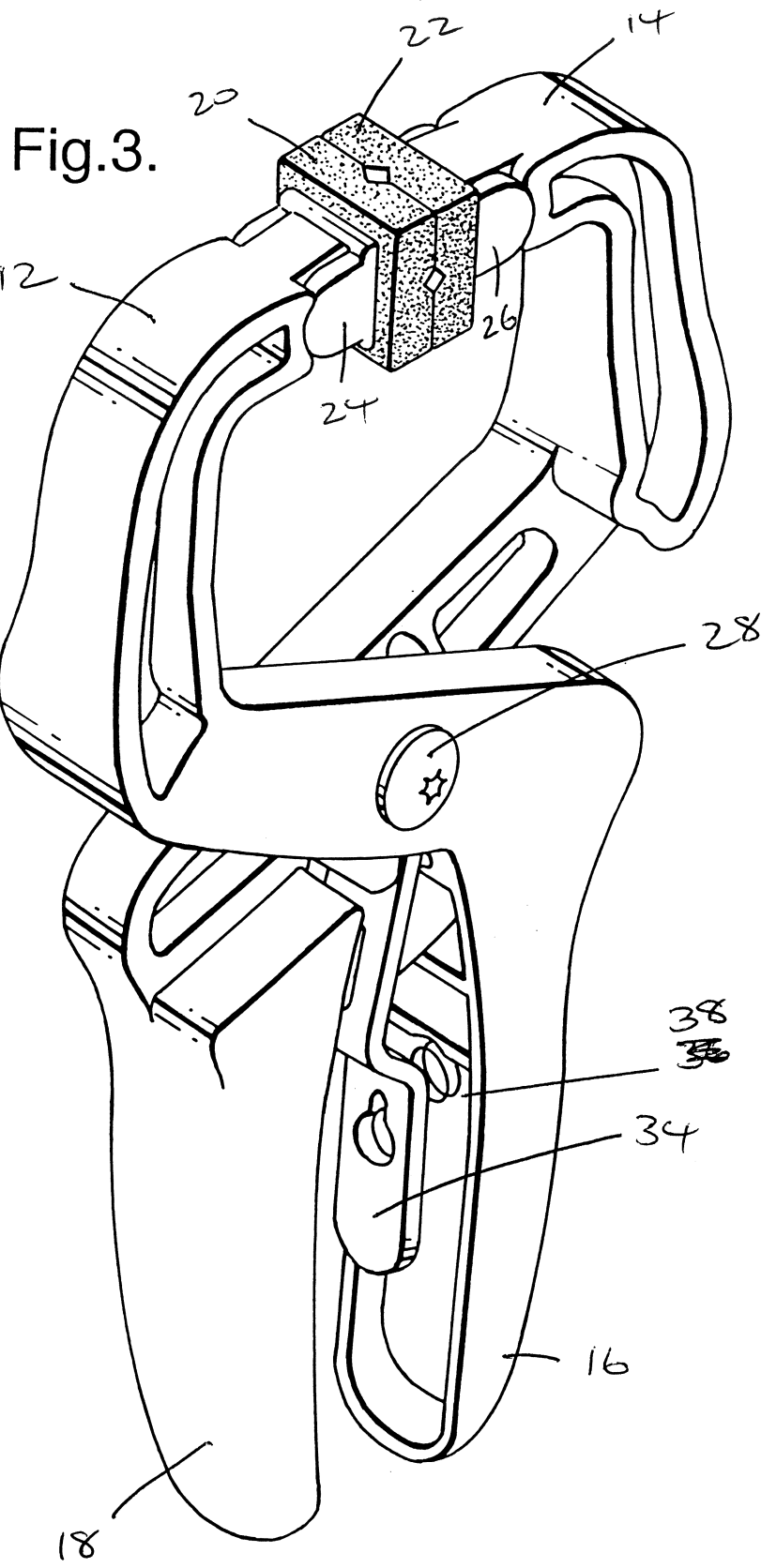


Fig. 3.

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SAMPLE SCRIPT B

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NOTE TO EXAMINER

At the last minute I decided that the sealant gum was not in fact relevant prior art as it is not in the same field & not a clamp, and broadened my claim to cover the idea behind it. I did not have time to add further dependent claims to this locking means.

Clamp

The present invention relates to a clamp, and in particular a clamp for clamping a work piece to a bench or two or more workpieces together.

Traditionally, a "G"-clamp has been used for this process. A G-clamp consists of a C-shaped anvil member, one end of which forms a fixed jaw member. The other end of the anvil member has a hole for receiving a screw thread. One end of the screw thread has a mobile jaw member which can be screwed towards the fixed jaw in order to clamp work pieces therebetween. The other end of the screw thread has a handle to assist with the screwing process. This device requires the use of two hands, one to hold the anvil member, and one to turn the handle. In addition, the process of bringing together and separating the two jaws is slow due to the nature of the system. It is not straightforward to clamp work pieces together. In addition, the clamp can easily slip by rotating to release the workpieces from tight hold.

Accordingly, in a first aspect of the present invention, there is provided (*Claim 1*). In a preferred embodiment, the clamp additionally comprises return means for returning the jaws to the non-clamping position when the locking means are released. This provides the benefit of locking the jaws of the clamp in position until such time as they should be released.

This clamp has the additional benefit of allowing the clamp to return quickly and easily to the non-clamping position, without any of the problems associated with the prior art. In particular, it can allow the clamp to be released using only one hand, so that the other hand can grip the work piece.

It is preferred that the clamp is of shape and size so that the jaws can be moved to a clamping position using only one hand, thereby allowing the entire clamping and unclamping operation to be undertaken with one handed.

In a preferred embodiment of the present invention, the clamping jaws are each connected to an arm, and the two arms are pivotally connected together. The use of two pivotally connected arms beneficially allows the jaws to be closed by applying a compression force to the arms, rather than a turning force as in the “G”-clamp. A compression force is easier to apply, particularly in a one-handed clamp. It is further preferred in this embodiment that the clamping jaws are pivotally connected to the arms as this permits the jaws to be maintained in parallel relationship to each other so that when the work piece is flat, it always receives the flat clamping surface of the jaw, reducing risk of damage to the work piece.

The return means can be anything which permits the jaws to be returned to the non-clamping position once the locking means is released. However, a suitable return means is a spring, typically a compression spring or a hair spring. Other return means, such as elastic bands could be used and would be apparent to a person skilled in the art.

The person skilled in the art would also understand that the locking means can be anything which is suitable for holding the jaws in at least one clamping position. It is preferred that the locking means can hold the jaws in a series of clamping positions, so that the clamp can be used for clamping work pieces of a variety of thickness.

In particular, it is beneficial that the locking means can hold the jaws in several discrete locking positions as this results in each position being more rigidly defined than a system with infinite locking positions, where slipping of the locking means is likely to occur.

A preferred locking means which provides a plurality of discrete locking positions is where the locking means comprises a plurality of teeth connected to one jaw, and a locking member connected to the other jaw, wherein the locking member can interact with the teeth to prevent the jaws moving relative to one another. The interaction between the locking member and each tooth represents a discrete locking position. The locking member can be moved to a position where it does not interact with the teeth, thereby allowing the return means to operate so that the jaws move to the non-clamping position. In an alternative embodiment, the locking member can lock to a bar simply by means of friction. In this embodiment, these are not discrete locking positions. Preferably the locking member is spring-loaded such that it is moved against the spring to move to the non-locking position, and when released, it returns to the locking position to allow the jaws to be moved into a clamping position.

A preferred embodiment of the invention will be further described with reference to the drawings in which:-

Figure 1 shows the clamp in the non-clamped position from above;

Figure 2 shows a perspective view of the clamp in the non-clamped position; and

Figure 3 shows a perspective view of the clamp in a clamped position.

A clamp 1 consists of a first arm (5) and a second arm (10). The arms (5, 10) each consist of a handle portion, (15, 20), a pivot section (25, 30) roughly perpendicular to the handle portion (15,

20) and an anvil portion (35, 40) attached to the pivot portion (25, 30), and parallel to and extending away from the handle portion (15, 20). The two arms (5, 10) are pivoted together at a pivot point (45) in the pivot portion (25, 30) using a nut and bolt arrangement (50). At the end of each anvil portion (35, 40) furthest from the handle portions (15, 20), a hard rubber jaw (55, 60) having a substantially flat clamping surface (65, 70) is pivotally attached at a pivot point (72, 74). The clamping surface with V-shaped channel (75) running horizontally and vertically through the middle of the clamping surface.

Attached to the handle portion (15) of the first arm (5) is an arcuate anchor plate (80), which is positioned between the two handle portions. On the upper edge of the anchor plate (80) is a serrated edge (85) consisting of a number of teeth.

Connected to the pivot section (30) of the second arm (10) is a toggle plate (90). The toggle plate (90) is moveable about a fulcrum (95) in the pivot section (30). The toggle has a hole (100), through which passes the anchor plate (80). The toggle plate is connected to the handle portion (20) of the second arm (10) via a spring (105).

A spring (not shown) connects the two arms (5, 10), such that it is relaxed when the arms (5, 10) are shown in Figure 1, but it under tension when the arms (5, 10) are as shown in Figure 3.

In use, the two handle portions 15, 20 are moved together, thereby bringing the jaws (55, 60) together. The edge of the hole (100) touched the teeth of the serrated edge (85), but the plate (90) rocks about the fulcrum (95) and against the spring (105) to index past the teeth. When the jaws (55, 60) are positioned so as to grip the required work piece(s) (not shown), the handle portions (15, 20) can be released, and the edge of the hole (100) catches on an adjacent tooth, holding the jaws in position. When release is required, the plate (90) is pulled towards the handle portion (20) which moves the edge of the hole (100) from the tooth, allowing free pivoting of the arms (5, 10). The spring (not shown) acts to separate the jaws (55, 60) and return them to the clamping position. The plate (90) can then be released, and the spring (105) returns it to a position where it catches the teeth.

The jaws (55, 60) pivot so that the flat surfaces (65, 70) can always lie flat against the flat surface of a work piece. Alternatively the 'V'-shaped grooves can grip the edges of workpieces.

It would be clearly understood that other shaped jaws could be used for gripping different shaped surfaces, such as curves.

1. A clamp comprising:

a first jaw member;

a second member, wherein the jaw members are moveable relative to each other between a non-clamping position and at least one clamping position; and

releasable locking means for holding the jaws in the clamping position.

wherein when the locking means is released, the jaws can be returned to the non-clamping position.

2. A clamp as claimed in Claim 1, additionally comprising return means for returning the jaws to the non-clamping position when the locking means are released.
3. A clamp as claimed in Claim 1 or Claim 2, wherein the first jaw member is connected to a first arm, and the second jaw member is connected to a second arm, wherein the arms are pivotally connected.
4. A clamp as claimed in Claim 3, wherein the jaw members are pivotally connected to the arms for allowing the clamping face of the jaw members to allow parallel to one another.
5. A clamp as claimed in any one of the preceding claims, wherein the return means is a spring.
6. A clamp as claimed in any one of the preceding claims, wherein the locking means comprises: a plurality of teeth connected to the first jaw member and a moveable locking member connected the second jaw member, wherein the locking member can interact with the teeth to prevent the jaw members moving relative to one another, such that the jaw members have a set number of clamping positions associated with each tooth, and the locking member is moveable to a non-locking position wherein the locking member does not interact with the teeth.
7. A clamp as claimed in Claim 6, wherein the locking member is connected to a spring such that it can be moved to the non-locking position, to permit the jaws to move to the non-clamping position but when release, it returns to the locking position.
8. A clamp as claimed in any one of the preceding claims, wherein the clamp is suitable for operation with one hand.
9. A clamp substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings.

CLAMP

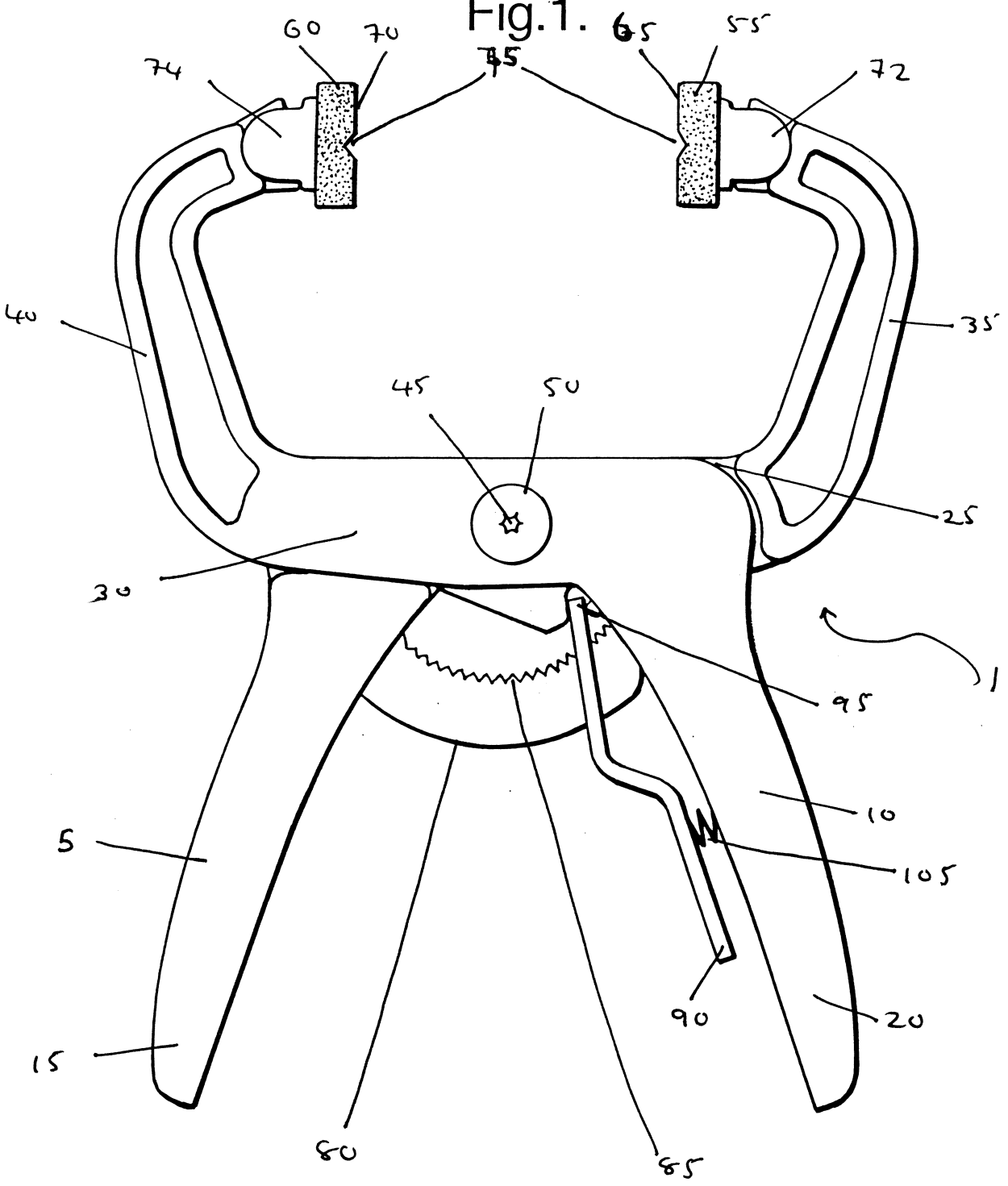
ABSTRACT

A clamp (1) having a first jaw member (55) and a second jaw member (60) which are moveable relative to each other. Releasable locking means (85, 90) can hold the jaw members in at least one clamping position. Return means may be provided to return the jaws to the non-clamping position.

[3 pages of drawings follow]

* * * * *

Fig. 1.



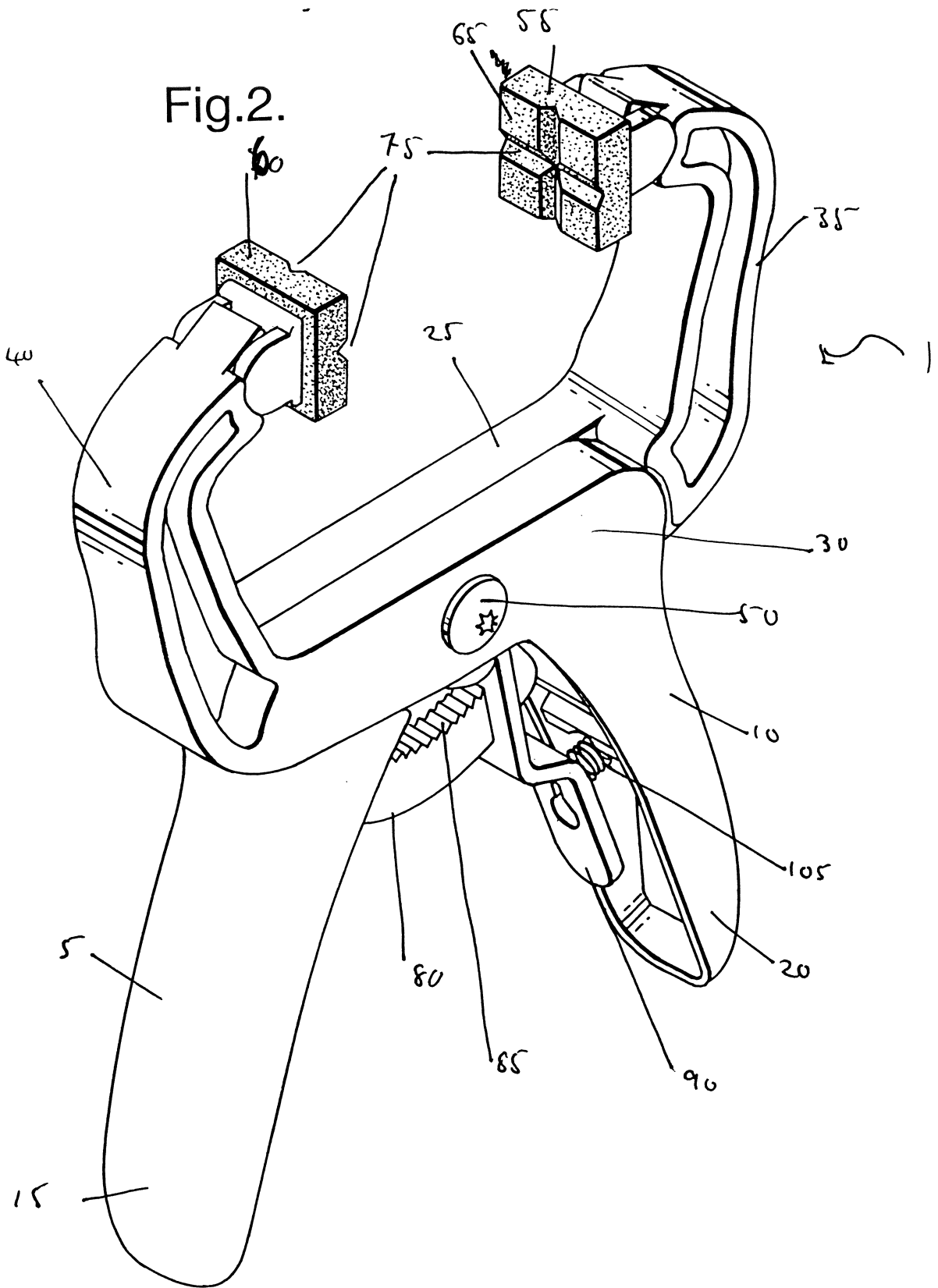
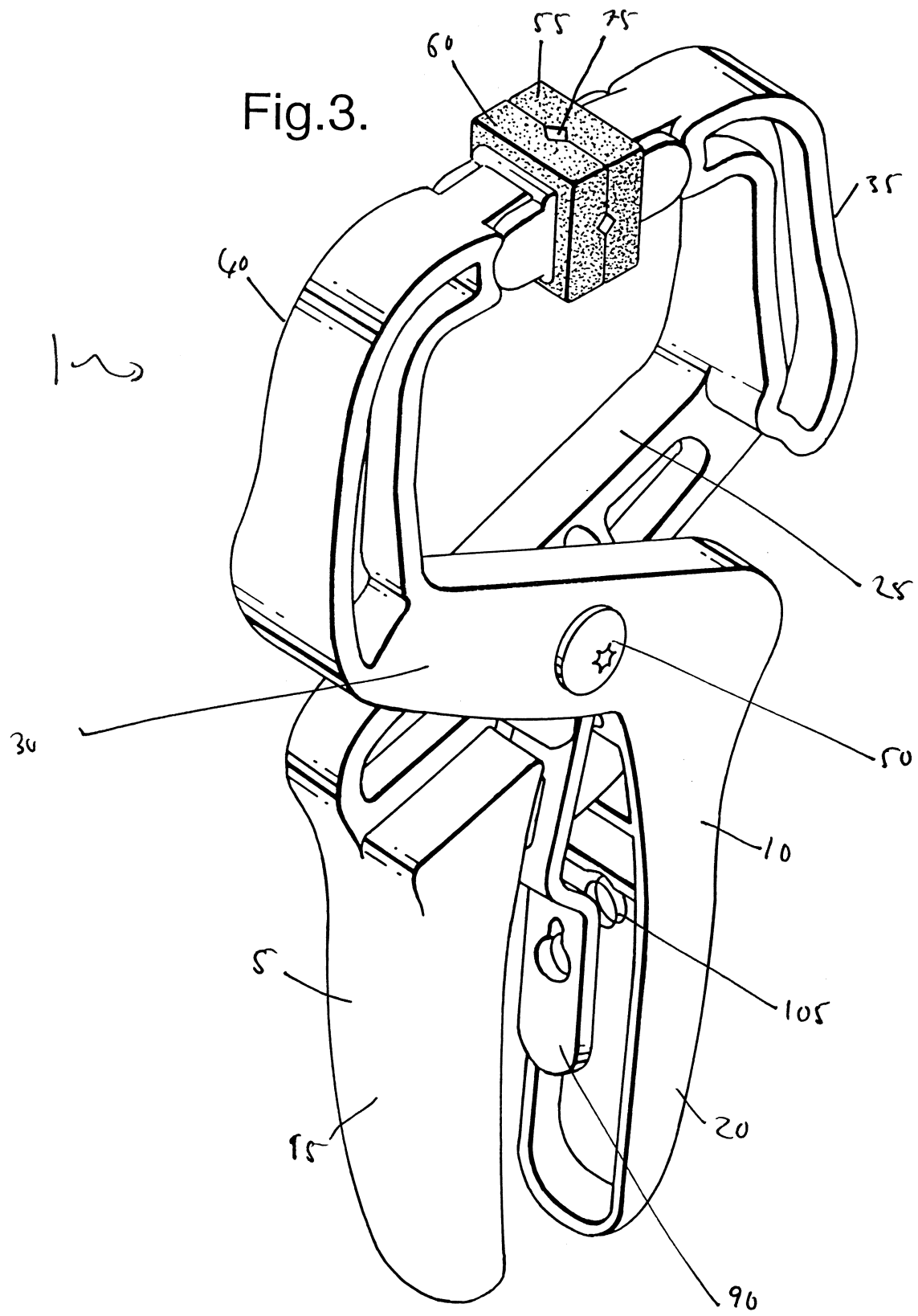


Fig.3.



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SAMPLE SCRIPT C

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CLAMP

Field of the Invention

This invention relates to clamps and, in particular, clamps which are used in the home market.

Summary of the Invention

Clamps are indispensable when working in a number of industries and are used to maintain the relative positions of the object, or two more objects, temporarily while work is carried out on that object or objects. Common uses include gluing two objects together or clamping an object to a surface so that it may be sawed, filed, glued etc.

Figure A of the attached drawings illustrates the clamp used. The clamp 10 includes a handle 12 to which a screw thread 14 is attached. A mobile jaw member 16 is attached to the screw thread 14. An anvil member 18 is horse-shoe shaped and a lower threaded portion 20 engages with the screw thread 14. An upper fixed jaw 22 extends around and faces the mobile jaw member 16. In use, the handle 12 is rotated relative to the anvil member 18 which increases or decreases the space between the mobile jaw member 16 and the fixed jaw 22 (depending on the direction of rotation).

To clamp an object the space between the mobile jaw member 16 and the fixed jaw 22 is adjusted to accommodate the object to be clamped. The space is then reduced by the appropriate rotation until both the fixed jaw 22 and the mobile jaw member 16 engage the object in a manner secure enough to maintain its relative position (either to another object or a work surface).

The screw thread 14 adjusts the distance between the fixed jaw 22 and the mobile jaw member 16 and it is therefore the friction between the screw thread 14 and the lower threaded portion 20 of the anvil member 18 which prevents relative movement of the mobile jaw member 16 with respect to the fixed jaw 22.

In the illustrated clamp, the user has to rotate the anvil member relative to the handle to adjust the space between the jaws. This can be a tedious and time consuming process.

It would therefore be advantageous if the jaws could be quickly moved into the clamping position and once there, the position would be maintained until released.

It would further be an advantage if, once in the clamping position, the jaws could be quickly moved to a release position where the object being clamped is released.

It is also known, in the field of glue guns, to have a plunger for delivering glue from a tube. The plunger is releasably attached to a lever and the movement of the lever is biased against movement which forces the plunger into the tube (to deliver glue). Means are provided so that the lever only engages the plunger when encouraging movement of the plunger into the tube. Further means are provided to prevent movement of the plunger out of the tube. In this way the plunger may be incrementally moved into the tube by the action of the lever and the glue may be delivered in a metered manner.

According to a first aspect of the invention, a clamp is provided which includes vice means which are slideably mounted with respect to one another. This allows rapid movement between a clamped position and a release position. However, to ensure that the closed position is maintained, means are also provided to selectively anchor the relative position of the vice means.

According to a second aspect of the invention, a clamp is provided which includes vice means which is moveable between a clamping and a release position, biasing means to bias the clamping means to the release position and means for selectively anchoring the movement of the vice means.

Further aspects of the invention are provided in the accompanying claims.

Brief Description of the Drawings

Preferred embodiments of the invention are described with reference to the accompanying drawings, in which:

Figure A illustrates a clamp according to the prior art;

Figure 1 is a side view of a clamp according to a preferred embodiment of the invention;

Figure 2 is an isometric view of the clamp of Figure 1 in a first position; and

Figure 3 is an isometric view of the clamp of Figure 1 in a second position.

Description of preferred Embodiment

With reference to Figures 1 and 2, a clamp 20 includes a first vice member 22 and a second vice member 24 pivotally attached to the first vice member by rivet 26.

Each of the first and second vice members is formed with respective first 26 and second 28 handle portions. Each of the vice members also includes respective first 30 and second 32 jaw members.

An anchoring means 34 is supplied which consists of a ratchet 36 attached to the first vice member 22 and a plate 38 attached to the second vice member 24. The plate 38 and ratchet 36 engage so that the ratchet may only move relative to the plate when the plate is moved in the direction of arrow 40 (i.e. in a direction towards the handle portion 28 of the first vice member 22).

Biasing means 42 acts to bias movement of the plate 38 away from the handle portion 28 of the first vice member 22 (i.e. towards the position which prevents movement of the first vice member relative to the second vice member).

In use, the plate 38 is moved in the direction of arrow 40 which disengages it from the ratchet 34 and allows relative movement of the two vice members. The handle portions 26 and 28 of the vice members are then moved towards one another in the direction of arrows 44 or away from one another in the directions of arrows 46.

When clamping an object, the object is placed between the first 30 and second 32 jaw members. The handle portions are moved in the directions of arrows 44 which causes the jaw members to be brought closer together. Once the optimum distance between the jaw members 30 and 32 is reached, the user releases the plate 38. The action of the biasing means 42 encourages the plate 38 to engage with the ratchet 34 which prevents movement of the first vice member relative to the second vice member, thereby ensuring that the object is clamped.

To release the object the user again moves plate 38 in direction of arrow 40 but then moves the handle portions 26 and 28 in the directions of arrow 46 which will encourage the jaws 30 and 35 to move away from each other to release the object.

A spring (not shown) provides a further biasing means and is connected to the first vice member 22 and to the second vice member 24. The spring acts to move the handle portions 22 and 28 in the direction of arrows 46. Therefore to release the clamp, a user need merely move plate 38 in the direction of arrow 40 and the spring will act to release the clamp.

It is to be realised that the teeth of the ratchet 34 provide a number of predetermined positions for the first vice member 22 relation to the second vice member 24.

In an alternative embodiment, the plate 38 is orientated relative to the spokes of the ratchet 34 so that the plate moves freely when the clamp is being tightened (handle portions moved in

direction of arrows 44) and that the only time of which the plate 38 is to be depressed is when the clamp is to be released.

Figure 3 illustrates the clamp of Figures 1 and 2 in a closed position. This is the preferable storage position as the spring (also not shown) is under the least amount of tension in this position. Only movement in the direction of arrows 46 is possible.

It is to be realised that a clamp of the current invention has the advantage that it may be operated with one hand. It is also quickly engageable and releaseable and is easier to use due to the leverage provided by the vice members.

Other embodiments are possible e.g. ratchet and plate may be replaced by any member which allows increased movement.

Abstract

A clamp which includes two vice members which move between at least one clamping position and a release position and which includes an anchor to maintain the vice members in the clamping position and which may further include biasing means to encourage movement to the release position.

Claims

1. A clamp which includes first and second vice members slideably moveable relative to one another between a clamping position in which an object is clamped and a release position in which the object is released and means for anchoring the relative movement of the first and second vice members when in the clamping position.
2. A clamp according to claim 1 which includes biasing means to bias movement of the first and second vice members towards the release position.
3. A clamp which includes first and second vice moveable relative to one another between a clamping position in which the object is clamped and a release position in which an object is released, biasing means to bias movement of the first and second vice members towards the release position and means for anchoring the relative movement of the first and second vice members when in the clamping position.
4. A clamp according to any preceding claim wherein the anchoring means anchors the relative movement of the first and second vice members at any one of a plurality of predetermined clamping positions.

5. A clamp according to claim 4 wherein the anchoring means includes a plate and ratchet arrangement so that the plurality of predetermined positions is defined relative to a position on the ratchet where the plate is engaged.
6. A clamp according to claim 5 wherein the plate is biased relative to the ratchet to the ratchet to encourage its engagement therewith.
7. A clamp according to any preceding claim in which the first vice member is pivotally mounted relative to the second vice member.
8. A clamp according to any preceding claim which includes a jaw connected to each of the vice members.
9. A clamp which includes a first vice member pivotally mounted to a second vice member so that at least the first vice member is moveable between a clamping position and a release position.
10. A clamp substantially as herein before described with reference to Figures 1, 2 and 3 of the accompanying drawings.

[4 pages of drawings follow]

* * * * *

Fig.A.

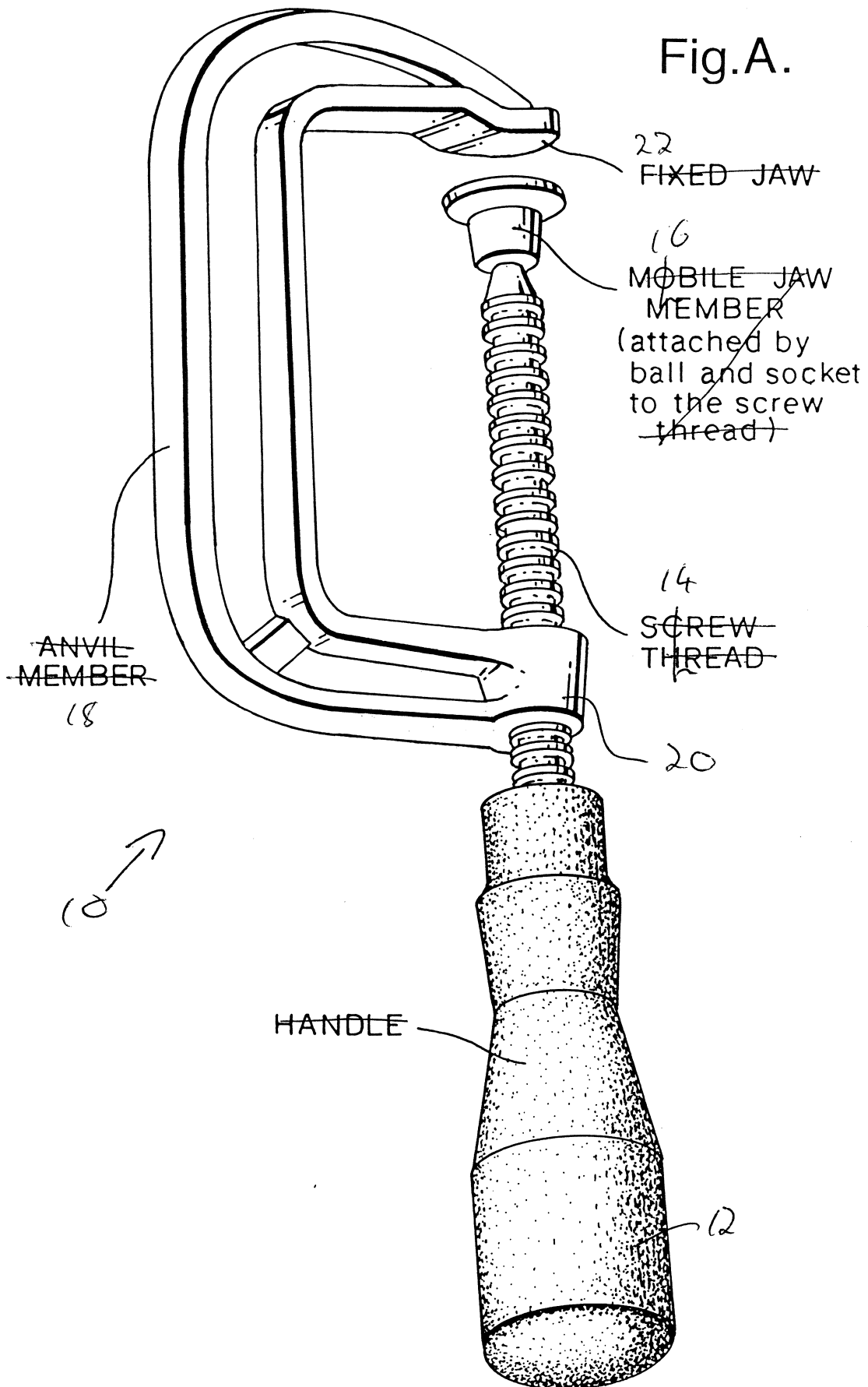


Fig. 1.

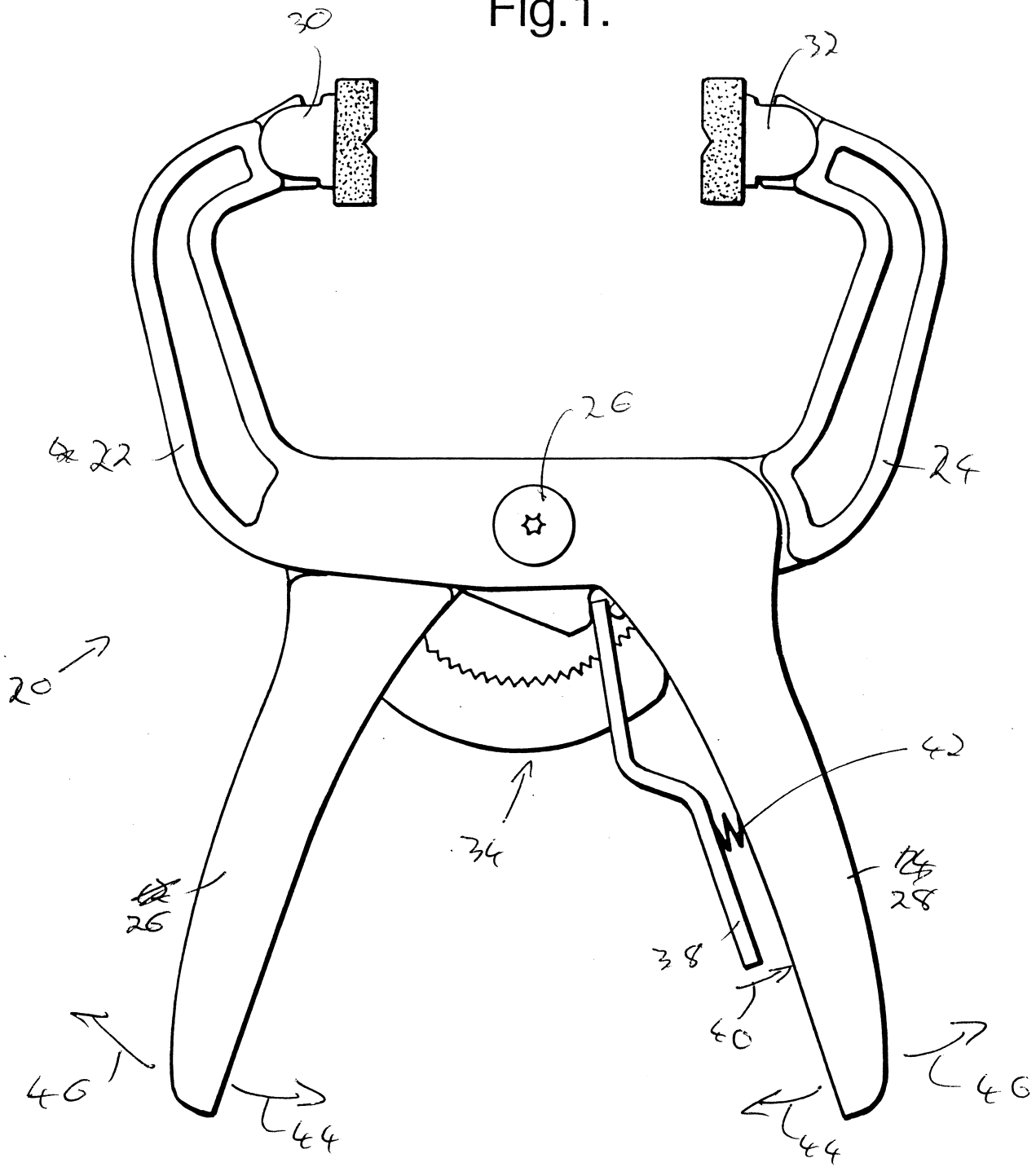


Fig.2.

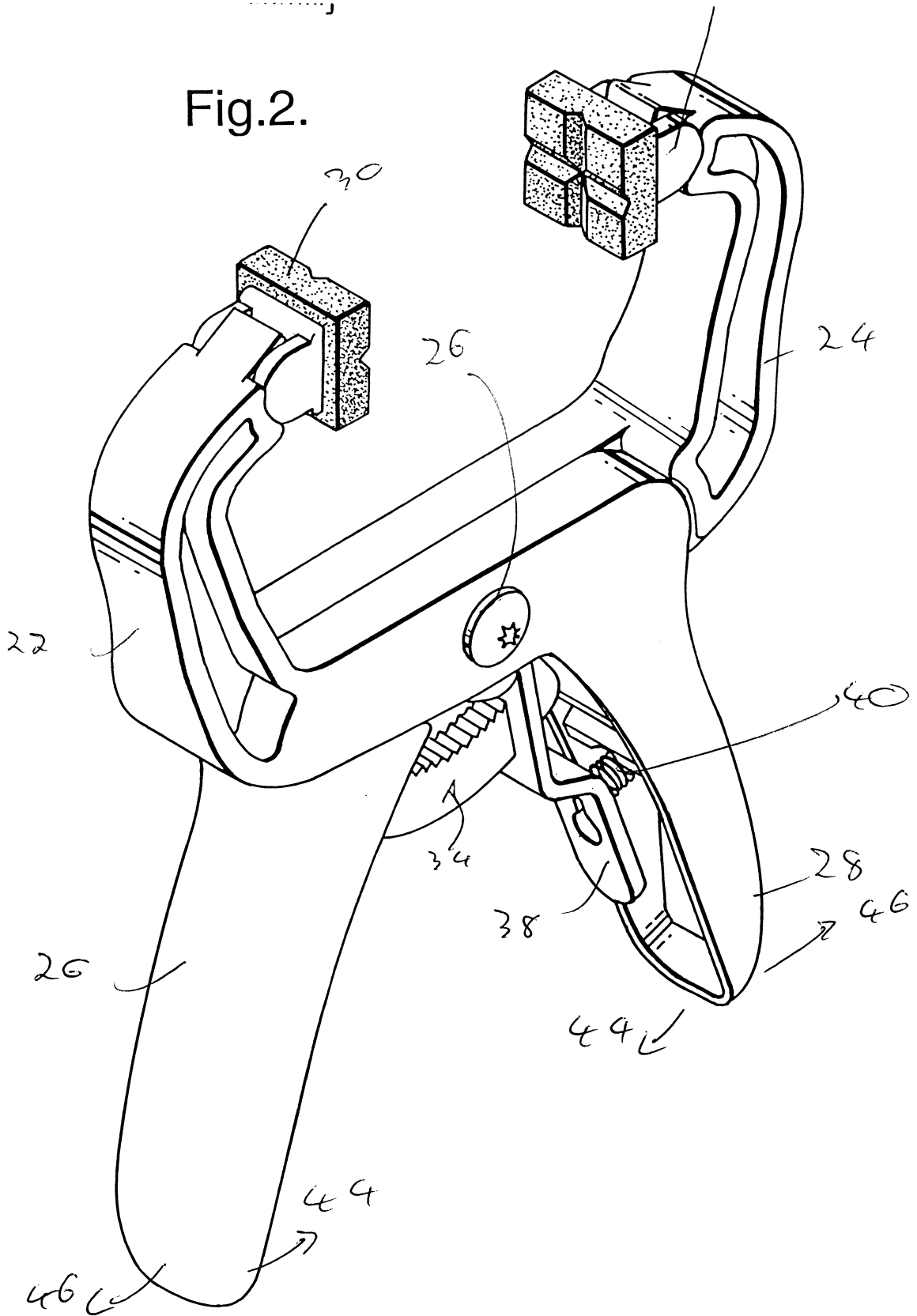


Fig.3.

