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(54) **An improvement of the C type clamp (11).**

(57) This is an improved C type clamp. Its features are that a C type shaft body is created as a whole body system or a half-sectioned system, or a multiple-sided connected set system, or an angle adjustable type shaft set that consists of two L-shaped shaft which are connected together by a multiple-sided column.

On four sides or multiple-sides and corner places of a shaft body, there are several threaded holes that are intended to connect other half-sectioned system C type shaft body or to connect a middle connector.

this may be used to clamp an object which has multiple angles, multiple non-paralleled surfaces or paralleled surfaces.

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Description

AN IMPROVEMENT ON THE C TYPE CLAMP (II)

Summary Of The Invention:

This is an improved C type clamp. Its features are that a C type shaft body is created as a whole body system or a half-sectioned system, or a multiple-aided connected set system, or an angle adjustable type shaft set that consists of two L-shaped shaft which are connected together by a multiple-sided column.

On four sides or multiple-sides and corner places or a shaft body, there are several threaded holes that are intended to connect other half-sectioned system C type shaft body or to connect a middle connector.

This may be used to clamp an object which has multiple angles, multiple non-paralleled surfaces or paralleled surfaces.

Detailed Description Of The Invention:

A traditional C type clamp consists of a whole C type shaft, its one end is screwed in a threaded piston shaft, posing as a compressive clip structure.

It can be effective when the object to be clamped has two paralleled surfaces. But in other various processing and assembling circumstances if it is needed to clamp several objects at the same time and the objects have non-paralleled surfaces, then it needs several C clamps to fasten the object one by one. As a results, too many clamps are on an object or an equipment. It affects the processing efficiency and is inconvenient for the refinery operation. This invention supplies an independent or an assembled, connected multiple-directioned, multiple-angled, non-paralleled surfaces gripping function. It may be applied to processing or assembling operation, with less clamps and simpler mechanism for fastening simultaneously.

Now, the detailed ewplanations of the implementation examples of this invention are given as follows in the order of the appendixed Figures.

Figure 1. A solid view of a C type clamp with one bodied C type shaft of this invention.

Figure 1-1. A front view of the Figure 1.

Figure 2. A solid view of a C type clamp of this invention that has threaded holes at the corner of an one bodied C type shaft.

Figure 2-1. A front view of the Figure 2.

Figure 3. A solid, disassembled view of an L-type shaft and a half-sectioned type C clamp of this invention.

Figure 3-1. A front view of the Figure 3.

Figure 3-2. A solid view of the other model of a C type clamp with one bodied C type shaft of this invention.

Figure 3-3. A front view of a C type clamp with one bodied C type shaft.

Figure 3-4. One implementation example that shows this newly invented C type clamp is bolted together with a middle connectors.

Figure 3-5. One implementation example that shows this newly invented C type clamp is bolted together with a middle connectors.

Figure 3-6. A solid view of the other model of a C type clamp that has an L-type shaft of this invention.

Figure 3-7. A front view of the other model of a C type clamp that has an L-type shaft of this invention.

Figure 1-2-3. An implementation example of a combination of an one bodied system and a half-sectioned system C type clamps.

Figure 4. A solid view of a C type clamp of this invention by combining a multiple-sided column to form as a C type shaft.

Figure 4-1. A front view of the Figure 4.

Figure 4-1-1. An implementation example of this invention by combining a C type clamp which is formed by multiple-sided columns and a half-sectioned system C type clamp.

Figure 5. A solid view of an L-shaped shaft body which is connected with a connecting column by a threaded shaft.

Figure 5-1. A front view of the Figure 5.

Figure 5-2. An implementation example of a C type clamp of this invention by combining an L-type shaft and a connecting column with a threaded shaft.

Figure 6. A solid view of a C type clamp of this invention that is formed by two L-shaped shafts connected with a connecting column.

Figure 6-1. A top view of the Figure 6.

Figure 6-2. A front view of the Figure 6.

Figure 6-3. An implementation example of a C type clamp of this invention which has two L-shaped shafts.

Figure 7. A solid view of this invention that its C type shaft has a hexagonal sectional view and has threaded holes that are not piercing through.

Figure 7-1. A solid view of this invention that its L-type shaft has an octagonal sectional view and has threaded holes that are not piercing through.

Figure 7-2. A triangle sectional view of a C type shaft of this invention.

Figure 8. One of a middle connector of this invention (1).

Figure 8-1. A front view of the Figure 8.

Figure 9. One of a middle connector of this invention (2).

Figure 9-1. A front view of the Figure 9.

Figure 10. One of a middle connector of this invention (3).

Figure 10-1. A front view of the Figure 10.

Figure 11. One of a middle connector of this invention (4).

Figure 11-1. A front view of the Figure 11.

Figure 11-2. A side view of the Figure 11.

Figure 12. A solid view of a turning wing nut of this invention.

Figure 12-1. A front view of the Figure 12.

Figure 12-2. A solid, disassembled view of a middle connector and threaded nuts of this

invention.

Figure 12-3. Another solid implementation example view of a central direction diversifying connector of this invention.

Figure 8-3. The first implementation example of this invention using middle connectors to expand the gripping distance.

Figure 8-3-1. The second implementation example of this invention using middle connectors to expand the gripping distance.

Figure 8-3-2. The third implementation example of this invention using middle connectors to expand the gripping distance.

Figure 13. A solid view of a C type clamp set of this invention that has a square shaped column connector.

Figure 13-1. An implementation example of a C type clamp of this invention which is formed by two square shape column connectors connected with extension shaft.

Figure 13-2. A solid disassembled view of this invention that shows an extension shaft and a connecting column are fixed by a bolt.

Figure 14. A solid view of this invention that one end of an L-shaped shaft has multiple-sided body.

Figure 14-1. A front view of this invention that one end of an L-shaped shaft has multiple-sided body.

Figure 15. An implementation example of this invention using various C type clamps and middle connectors to grip an object.

Figure 1 and Figure 2 show a C type clamp of this invention.

An one body system C type shaft shaft 1 has a square sectional view and around the 45 degrees turning places, several threaded holes 11 are drilled for connecting other half-sectioned system C type clamp or connecting middle connectors to extend and connect other sect of half-sectioned system C type clamp.

The threaded holes 11 on the various surfaces are made in interplay position, so that it does not affect the structure strength of the C type shaft body 1.

Figure 3 shows a half-sectioned system C type clamp of this invention. It consists of an L-shaped shaft body 3, a threaded piston shaft 2 and a half-sectioned clamp jaw 35. On top of an L-shaped shaft body 3 where cut flat, a threaded hole 31 or a protruding threaded shaft is made. On the L-shaped shaft body 3, several threaded holes 11 facing different directions are drilled.

On a half-sectioned clamp jaw 35 where cut flat, a threaded hole is made to connect a central connector. As shown in the Figure 3-2 and 3-3, the C type clamp of this invention consists of a C type shaft body 10 and a pressing threaded rod 20. There are:

A C type shaft body 10 has a complete square sectional view. The inner side of a C shape has a protruding reinforced muscle 110 which is in the trapezoid shape for its sectional view as shown in the Figure 16-1. The threaded holes 120 or piercing holes 130 are made in interplay position and properly distanced between the adjoining holes on both sides and back surface of a square shape shaft part. The threaded holes 120 are piercing holes if they are made on both sides. If they are made on the back surface, they are blind holes. All piercing holes 130, whether they are on the back surface or on both sides, are piercing holes and their hole diameters are larger than threaded holes 120.

As shown in the Figure 3-4 and 3-6, the middle connectors 60 are connected to non-piercing threaded holes 120 on a C type shaft body 10, and tighten by nuts 61 at their inserting ends. If the middle connectors are connected to a piercing holes 130, for tightening, the nuts are placed on the other side of a C type shaft 10 that middle connectors 60 are inserted, as the straight middle connector 60 in the Figure 3-5.

As shown in the Figure 3-6 and 3-7, the structural design of the half-sectioned system C type clamp of this invention consists of an L-shaped shaft body 30 and a threaded pressing rod 20. The inner side of an L-shaped shaft body 30 that has a square shaft extends in the shape of a trapezoid as the re-inforced muscle 310 for having the better strength. There are piercing threaded holes 320 or piercing holes 330 on both sides and back surface of the square shaped shaft portion. There is a threaded hole 350 on the severance surface of an L-shaped shaft for connecting a middle extension connector 60.

The whole system C type clamp or the half-sectioned system C type clamp stated in the above may be connected together, as shown in the Figure 1-2-3. The L-shaped shaft body 3 of a half-sectioned system C type clamp is directly connected or with a middle connector to the whole system C type clamp to form three clamping points in a triangular shape. The clamping point of a half-sectioned system C type clamp is vertical to a clamping line of the whole body C type clamp.

The design as shown in the Figure 4, the clamping point of a C type clamp of this invention is not on the extended line of a threaded shaft. A threaded piston shaft 2 is piercing one end of a connecting column 4. On the other end of the connecting column 4, there is a multiple-sided (hexagonal or octagonal) column body, which can be inserted to a connecting end of a C type shaft body 1.

On a connecting end of a C type shaft, a multiple-sided column hole is drilled. On the side of this column hole, a side screw hole is made for a bolt 41 to be screwed in. After a connecting column is inserted into the column hole, it can be tighten by turning a bolt 41. By releasing a bolt 41, a connecting column 4 may be pulled out.

Matching the work object, the corner angle between a connecting column 4 and a C type shaft body 1 can be re-adjusted and re-bolted.

On the various surfaces of a C type shaft body 1, there are several threaded holes 11 of different angle directions that are intended to connect other half-sectioned C type clamp.

As shown in the Figure 4-1-1, it is one design of this invention. A half-sectioned C type clamp is combined with the original C type clamp of which connecting column 4 angle is adjusted to fit the specific clamping surfaces. It grips three points on

the three surfaces (such as triangle, irregular square, etc.). This is its specific feature.

One step ahead, this design may have a half-sectioned C type shaft. The L-type shaft 3, on its cut off surface, protrudes a proper length of a threaded extension shaft 32, as shown in the Figure 5 and 5-1.

On a longer connecting column 4, make a lead hole or an adjustable threaded hole which is in parallel with a threaded piston 2.

The threaded piston 32 may be screwed into the adjustable threaded hole. It may be pre-locked by a nut 33 after adjusting to the needed width of an object. The firm grip can be made by tightening a threaded piston 2. This structure may be supplied to grip two points that are not on the same line but are on the paralleled surfaces as shown in the Figure 5-2.

The connecting column 4 may turn around the threaded shaft 32 that is extending from the L-shaped shaft 3. It enables to grip any two points on two paralleled surfaces.

One step ahead, this invention may designed to be a clamp set by connecting two L-shaped shafts with one connecting column as shown in the Figure 6, 6-1, and 6-2.

On the non-clamping ends of the L-shaped shafts 5, make two flanges 51 and one middle flange 52. They are facing each other. Put flanges 51 and 52 in layers, and drill a vertical, multiple-sided opening 53 for inserting a connecting multiple-sided Column 4. Extend a threaded shaft under the end of a connecting multiple-sided column 4. After it is inserted into a multiple-sided hole 53, a nut is screwed to it.

Thus two L-shaped shaft 5 and a connecting column 4 make up one clamp. The two L-shaped shaft 5 may expand widely to match the shape of the work object and after its gripping ends touch the object, place flanges 51 and flange 52 on layers together, insert and bolt the connecting column 4. Tighten the threaded piston 2 to grip work firmly as shown in the Figure 6-3.

All C type shaft body 1 or various L-shaped shaft body 3 that stated above may have a rectangular shaft body. On their shaft surfaces and cornered shaft surfaces, several threaded holes 11 are drilled for screwing other sets of an L-shaped shaft body 3 or a middle connector.

One step ahead, C type shaft body 1 and an L-shaped shaft body 3 may have a multiple-sided shape sectional view as shown in the Figure 7, 7-1, and 7-2. But these threaded holes 11 are not piercing through the shaft body.

Another specific feature of this invention is that on all C type shaft body 1, an L-shaped shaft body 3 or the cut end of an L-shaped shaft body 3, there are threaded holes 31 or protruding threaded shafts. All of them can be fitted to connect middle connectors 6 as shown in the Figure 8, 9 and 10.

A middle connector 6 is used to extend or change directions. A central connector includes a hexagonal column at its central part or its one end is threaded and the other end is drilled to be a threaded hole.

One step ahead, the middle connectors 6 may have other designs as shown in the Figure 11, 11-1 and 11-2.

A middle partition body 61 has a multiple-sided column.

On each of the middle partition body 61, threaded holes are made to screw an L-shaped shaft body 3 or a middle connector 6.

At the combining point of a middle connector 6 and a C type or L-type shaft body, or another middle connector 6, a wing nut 7 may be attached as shown in the Figure 12, 12-1. This wing nut may tighten a central connector 6 or other connecting end to perform the clamping function.

A middle connecting shaft 60 is shown in the Figure 12-1. It is a shaft body with a proper length. Both ends are smaller diameter threaded shaft 510.

These smaller diameter threaded shaft 510 can be screwed into the threaded holes 120, 320 of the above stated C type shaft body 10 or an L-type shaft body 30. They can also pierce through a larger openings 130, 330 and fixed by bolts 61. One end of a threaded shaft 510 can be inserted into a C type shaft body 10 or an L-type shaft body 30 and fixed with a bolt.

Thus a tight pressing clamping can be made by turning the bolts.

The surface of the central portion of a middle connector 6 can have knurls for easy grip.

Its central portion may be cut to be flat surfaces 620. When its both ends are screwed to a C type clamp or other middle connectors, it may turn tight by applying a wrench on the cut flat surface.

A central direction diversifying connector of this invention is shown in the Figure 12-3. It may have a multiple-sided shape body. There are piercing threaded or non-piercing threaded openings 720 on each surfaces. This threaded openings 720 can be connected with the smaller diameter threaded shafts 510 on both ends of the middle connector 60.

By connecting in this way, the C type clamp may be expanded in the multiple direction and may make multiple-angled extension.

The extension function of middle connectors 6 is shown in the Figure 8-3, 8-3-1, 8-3-2. A wing nut 7 can tighten the connection. Thus an L-shaped shaft body 3 can be assembled and connected to clamp an extra large work object. This is its specific feature.

The clamp body design is shown in the Figure 13. A threaded piston shaft 2 is screwed through a connecting column 4. Its lower part is a square solid body 45. On each surface of the square solid body, piercing openings in the shape of an oblong, square, round or multiple-sided is made for connecting an extension shaft 8 which has the corresponding sectional shape.

On the extension shaft 8, several openings or threaded holes are drilled at regular intervals. After it is connected to the square solid body 45 of a connecting column 4, it can be fixed with a bolt or pin as shown in the Figure 13-1, 13-2.

This design, one step ahead, the lower end of a connecting column 4 may have a multiple-sided column body. On each surface of the muliple-sided column body, oblong openings or round openings may be made allowing an extension shaft 8 to be

inserted to connect a connecting column 4 from various angle corresponding to a work object situation.

An L-shaped shaft body 3 of a half-sectioned system C type clamp is shown in the Figure 14, 14-1. On the cut off place, there is a square solid body 45 or a multiple-sided column body 46.

As stated in the above, each surface of the multiple-sided column body 46 can be connected with an extension shaft 8 through a threaded hole. It an be extended in various angle direction to hold a longer clamping distance.

The extension shaft 8 may be made as a regular or irregular steps system shaft body or may have an indented or protruded surface for the convenience of connection.

Various system clamp bodies of this invention clamp an assembled work object or a work object that awaits processing as shown in the Figure 15. Operations can be completed at the same time without clamping one by one.

Claims

1. This is an improved structural design for a C type clamp. Its specific features include:
One C type shaft body has a square or multiple-sided sectional view. On each surface, a pierced or non-pierced threaded hole are made to connect other set of C type shaft body or a middle connector which has a cut off and protruding threaded shaft.
One C type shaft body is cut off to become an L-shaped shaft body. On the cut off surface, a threaded hole or a protruding threaded shaft is made. One half-sectioned clamp jaw can be connected to a middle connector through a threaded hole on the cut off face. The central section of several sets of middle connectors can be made as multiple-sided column body. On both ends or one end, protruding threaded shafts or threaded holes are made. The threaded extension shaft may have a certain bending angle.

2. An improved structure of a C type clamp as stated in the Patent Claim Part 1, the non-clamping end of a C type shaft body may be cut off, then combine it with a connecting column that has a threaded shaft. It creates a clamp of which the gripping point is not on the extension line of a threaded piston shaft. These specific features include:
A multiple-sided connecting column is attached to a multiple-sided opening of a C type shaft body.
On the cut off surface of a c type shaft body, there is a multiple-sided hole. A horizontal fixing screw is used to lock up the multiple-sided column part of a connector.

3. An improved structure of a C type clamp as stated in the Patent Claim Part 1 and 2 has the following specific features:
A threaded extension protrudes on the cut off surface on an L-shaped shaft. It is connected to a threaded hole under the connecting column.
Under the connecting column, a threaded hole or lead hole is drilled that is parallel with a threaded piston shaft. This may mount on the threaded shaft of an L-shaped shaft. It may firmly grip the work object by driving a nut. A threaded piston shaft may change its gripping point by turning an L-shaped shaft.

4. An improved structural design of a C type clamp has specific component features as follows:
On a non-clamp ends of two L-shaped shaft, make two protruding flanges in the same direction in two layers and one middle protruding flange. At their piling place, make a vertical multiple-sided opening to insert a multiple-sided connector.
A connector has a threaded piston shaft. On its other end, there is a multiple-sided column body and a threaded extension shaft on its top. It is inserted into the protruding flanges of two L-shaped shaft and tighten with a nut.
The two L-shaped shafts may radiate to pose a certain angle degree from the center of the piled protruding flanges. By inserting a connecting column into the flange holes, it functions to grip a work object at three points.

5. A specific feature of a structural design of a C type clamp as stated in the Patent Claim Part 1 is that the cut off surface of a whole body system or a half-sectioned system C type shaft body is shaped as a rectangular.
A trapezoid shaped reinforcing muscle is extending in its inner side. On the two flank sides and back side of rectangular shaped shaft, piercing or non-piercing threaded holes are drilled alternately as proper intervals. The holes may be a bigger diameter piercing hole for connecting other set of a half-sectioned system C type shaft body or other middle connector with both ends or one end are threaded. By this way, it may expand the clamping point of a C type clamp.

6. A C type clamp as stated in the Patent Claim Part 1, on both flank sides or back side of a C type shaft body rectangular bar shaft portion of a whole body system or half-sectioned system C type clamp, several threaded holes are drilled alternatively at proper intervals. The holes on the back side are not piercing, but the holes on two flank sides are piercing.

7. A C type clamp as stated in that Patent Claim Part 6, on both flank sides or back side of a C type of an L-shaped shaft body, some or all of the threaded holes may have a bigger diameters.

8. A C type clamp as stated in the Patent Claim Part 1, a middle connector that is used for an extension may be shaped as a column body with both ends threaded. One or both ends are two step threaded shaft. At least the smaller step threaded shaft can pass through the piercing hole on the back side of a C type shaft body.

9. A C type shaft body or an L-type shaft body as stated in the Patent Claim Part 1 and 4 may have a multiple-sided sectional view, and on the surfaces of each shaft, piercing or non-piercing threaded opening are drilled for screwing other set of L-type shaft body or middle connector.

10. A middle connector as stated in the Patent Claim Part 1 and 9 may have multiple-sided columns on its both ends or one end is a threaded shaft and the other is a threaded hole. On its column shape body, there are piercing or non-piercing threaded holes.

11. A middle connector as stated in the Patent Claim Part 1, 9 and 10, when it is used to snap with a C type or an L-type shaft body, or a half-sectioned clamp jaw or to connect other middle connector, on their snapping or connecting portion, a turning bolt is applied for tightening.

12. A combined system C type clamp as stated in the above Patent Claim Part 1 and 4, a connecting column in which a threaded piston shaft is installed, may have a square body on its lower end.

On each surface of this square body, square, round or multiple-sided openings are made to allow the connection of corresponding shape extension shafts. On the extension shaft, piercing openings or threaded holes are made at regular intervals. After an extension shaft is put through or put in the square body, then it is firmly fixed to a connector by using a pin shaft or a threaded bolt.

13. A combined system C type clamp as stated in the Patent Claim Part 1 and 12, one step ahead, its lower end of a connector may have a multiple-sided column body.

On each surface of the multiple-sided column body, piercing square or round holes are made to allow the connections with connectors in various angles corresponding the specific shape of a work object.

14. A combined system C type clamp as stated in the Patent Claim Part 1, 12 and 13, it may have an L-shaped shaft body of a half-section system C type clamp.

The cut off portion may shape as a square body or a multiple-sided column body. There are threaded holes on each surface of the multiple-sided column body which are used to connect extension shafts. It may be extended in any angle and in any length. Its extension shaft may be a regular or irregular interval step system shaft body or may have indented or protruded surface for hooking up with a connector.

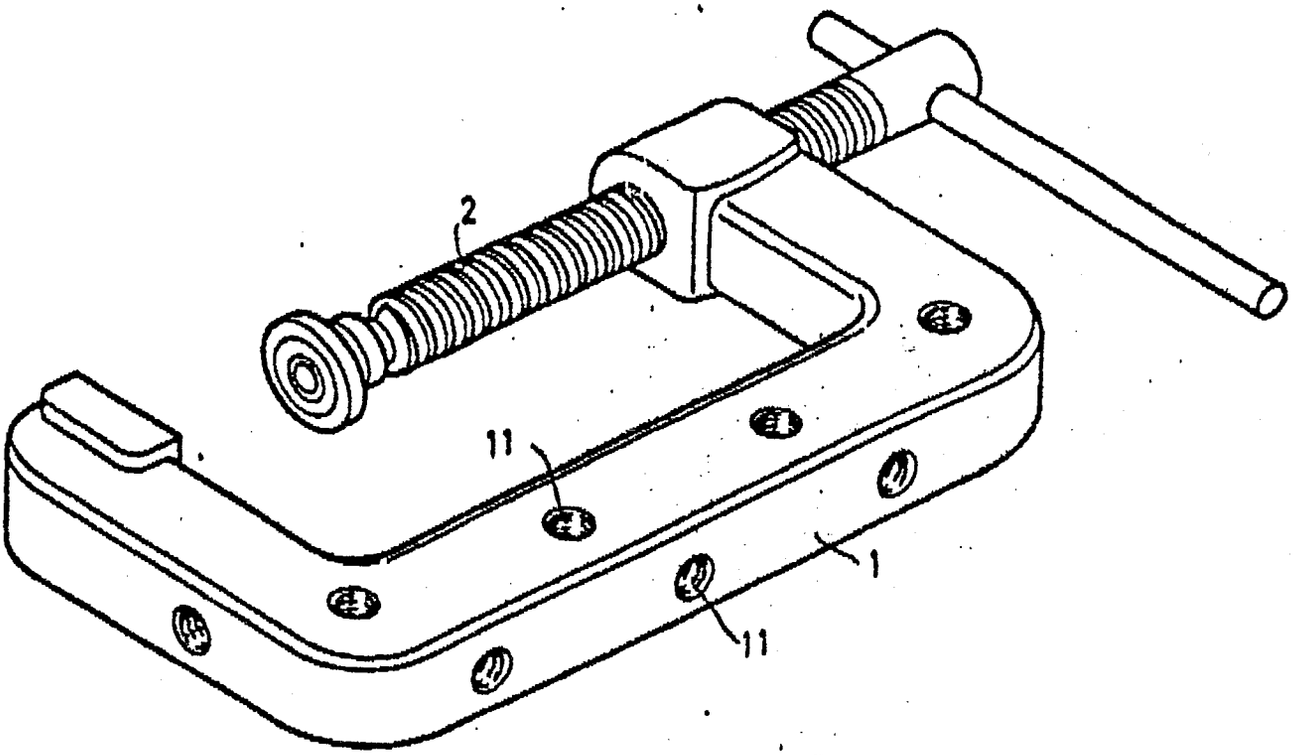

Fig. 1

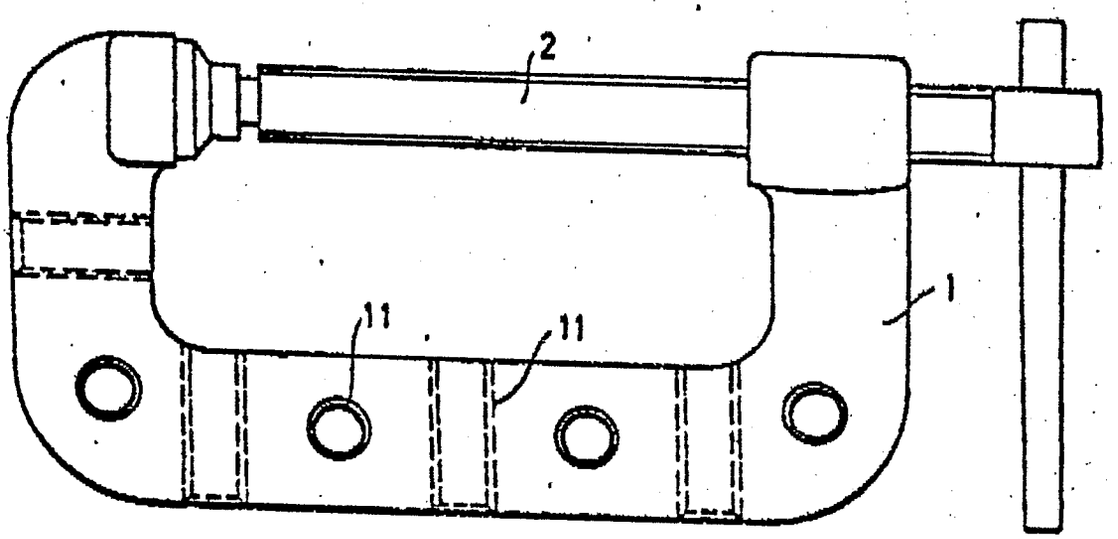

Fig. 1-1

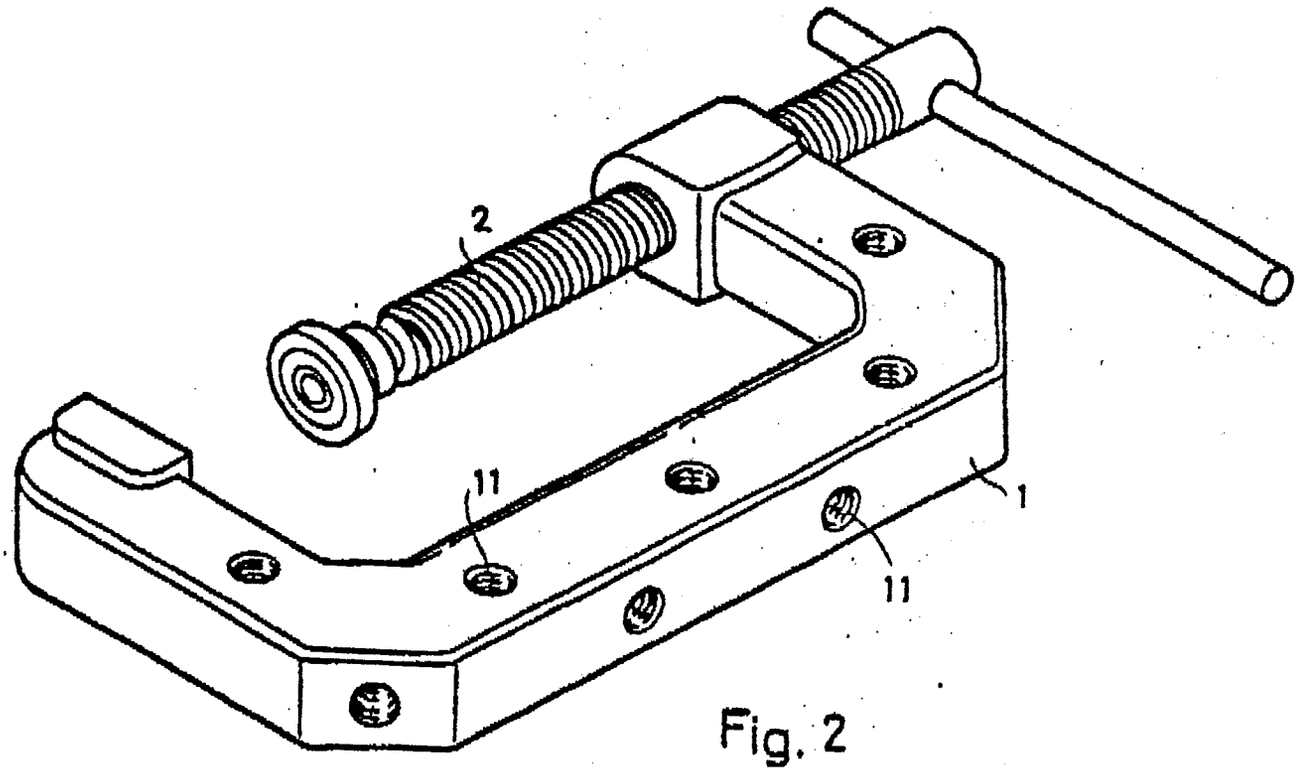

Fig. 2

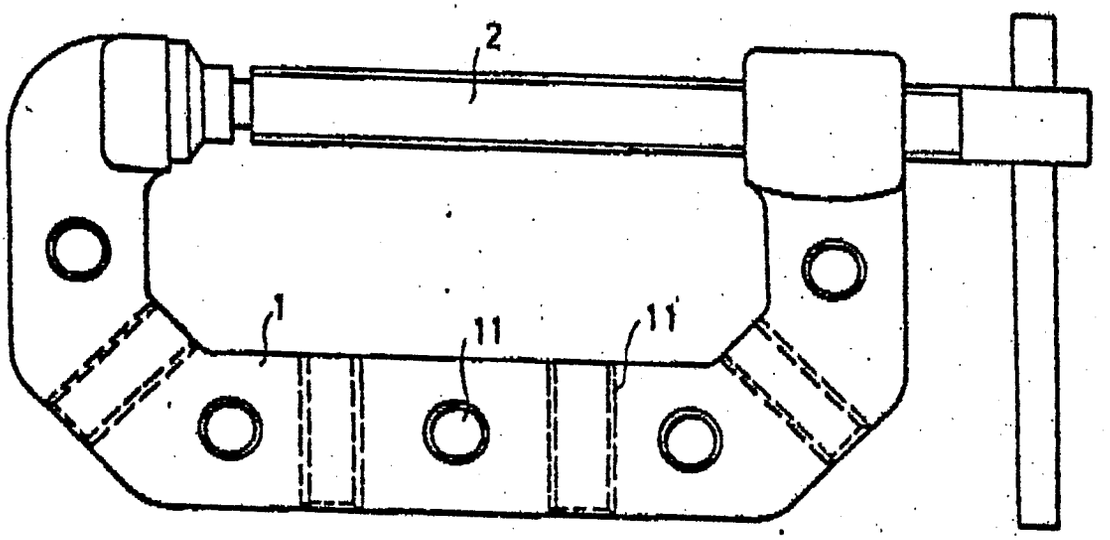

Fig. 2-1

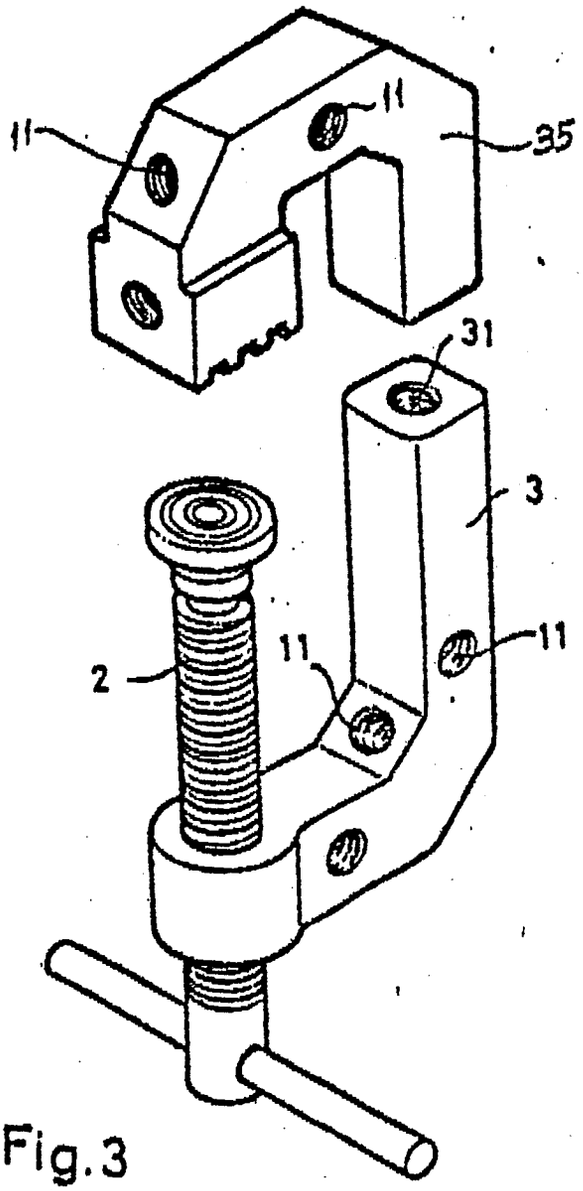

Fig.3

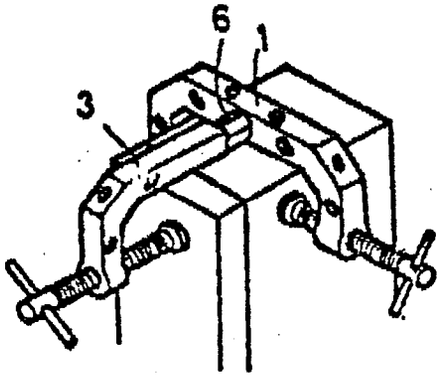

Fig. 1-2-3

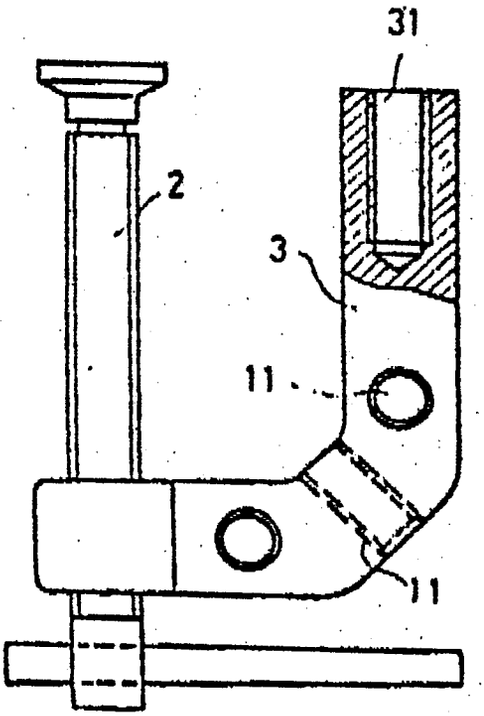

Fig. 3-1

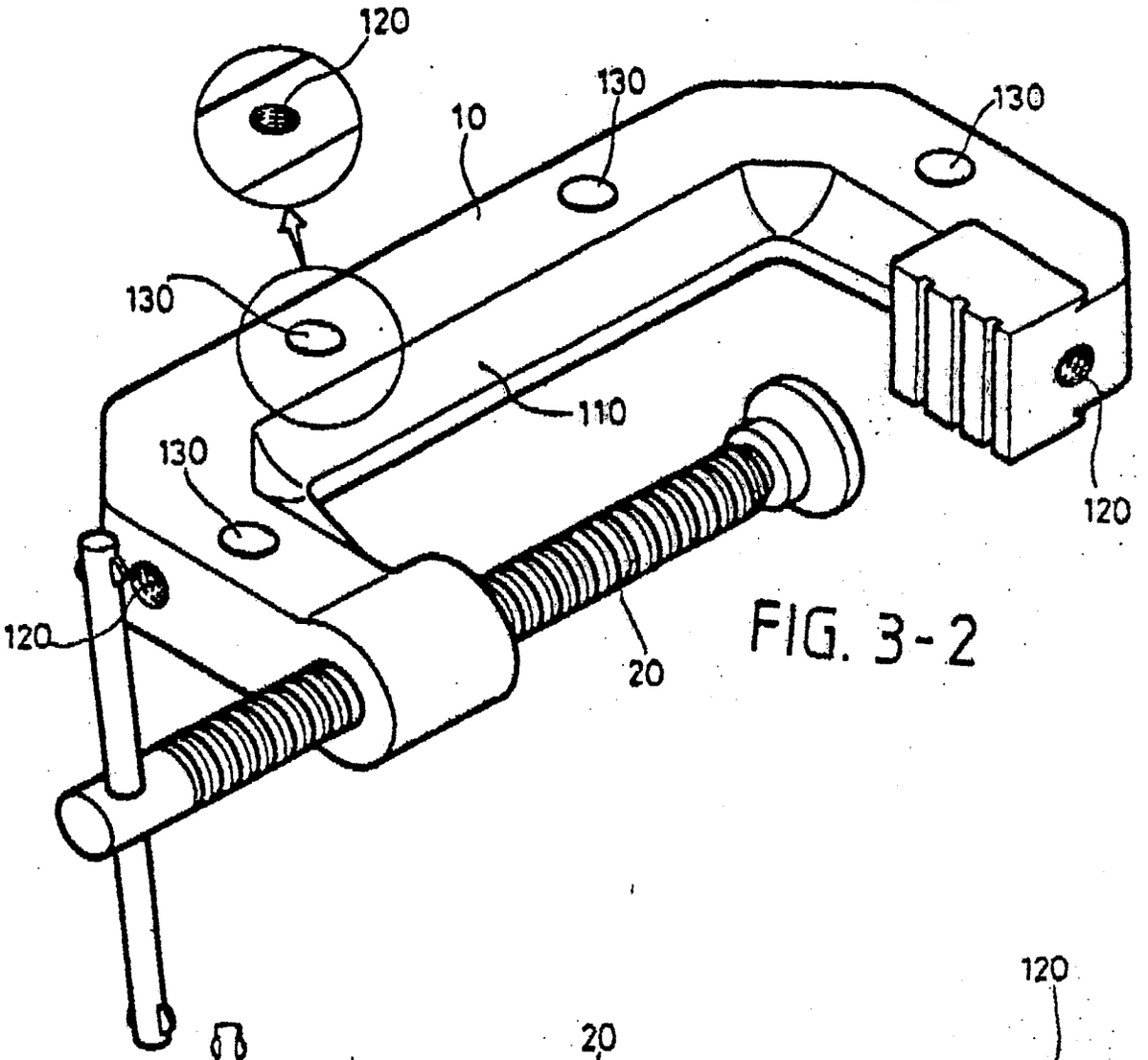
120
10
130
130
130
110
130
120
120
20

FIG. 3-2

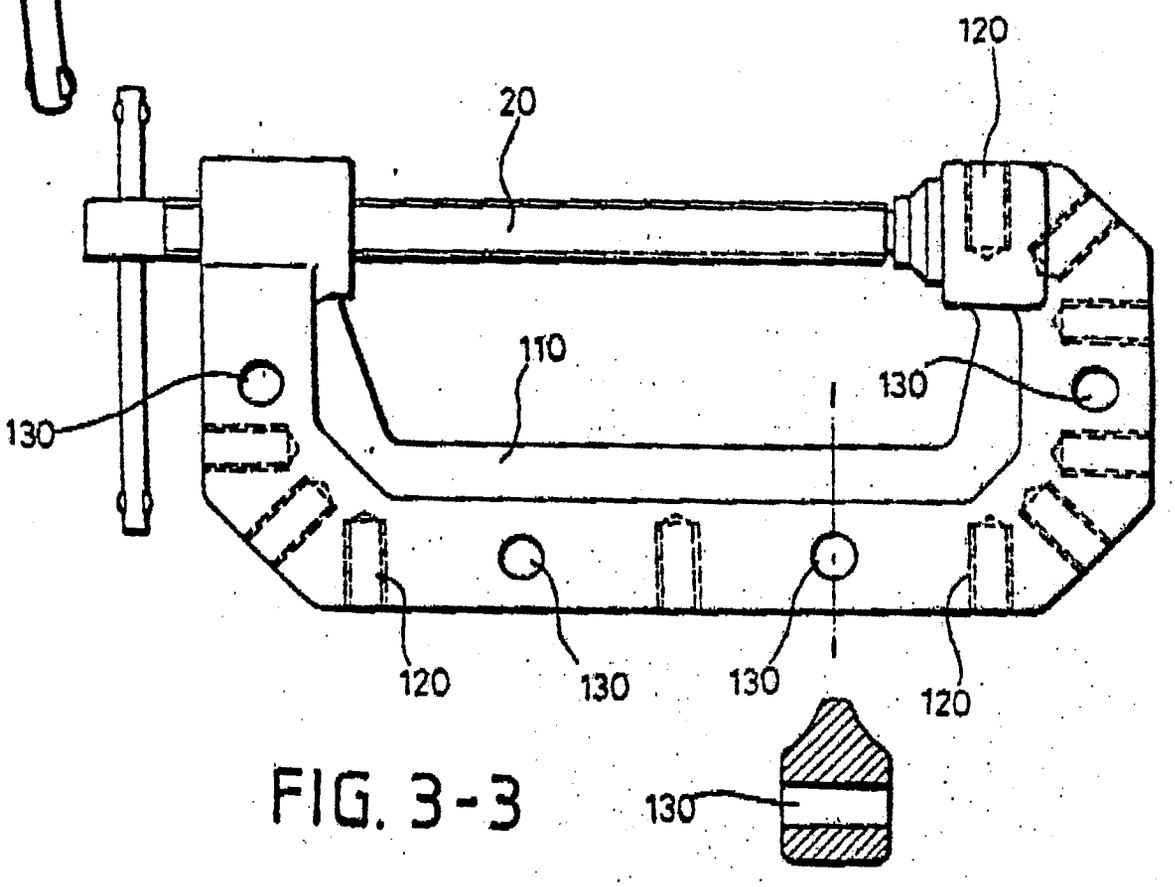
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FIG. 3-3

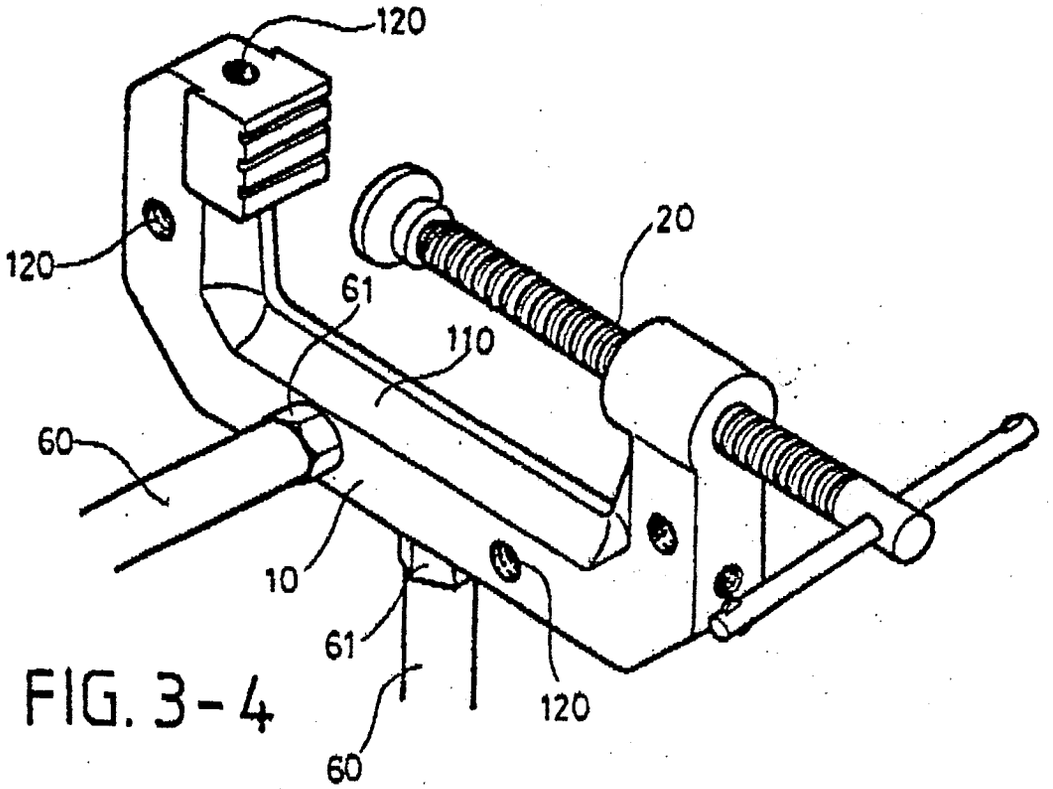

FIG. 3-4

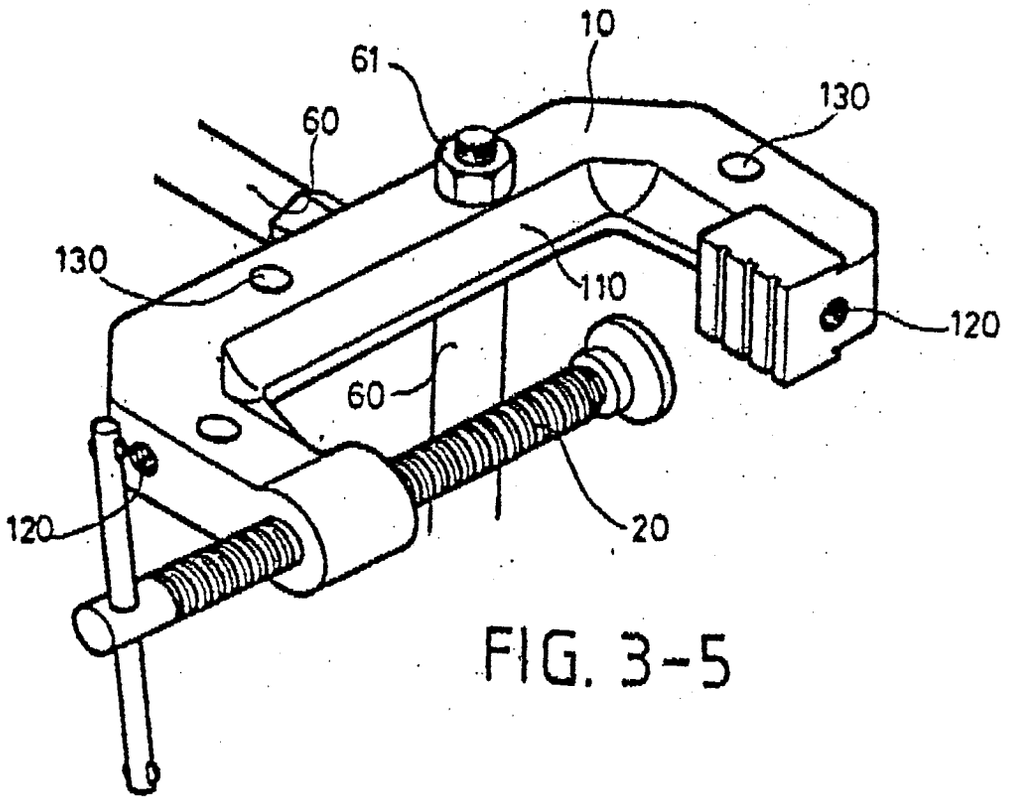

FIG. 3-5

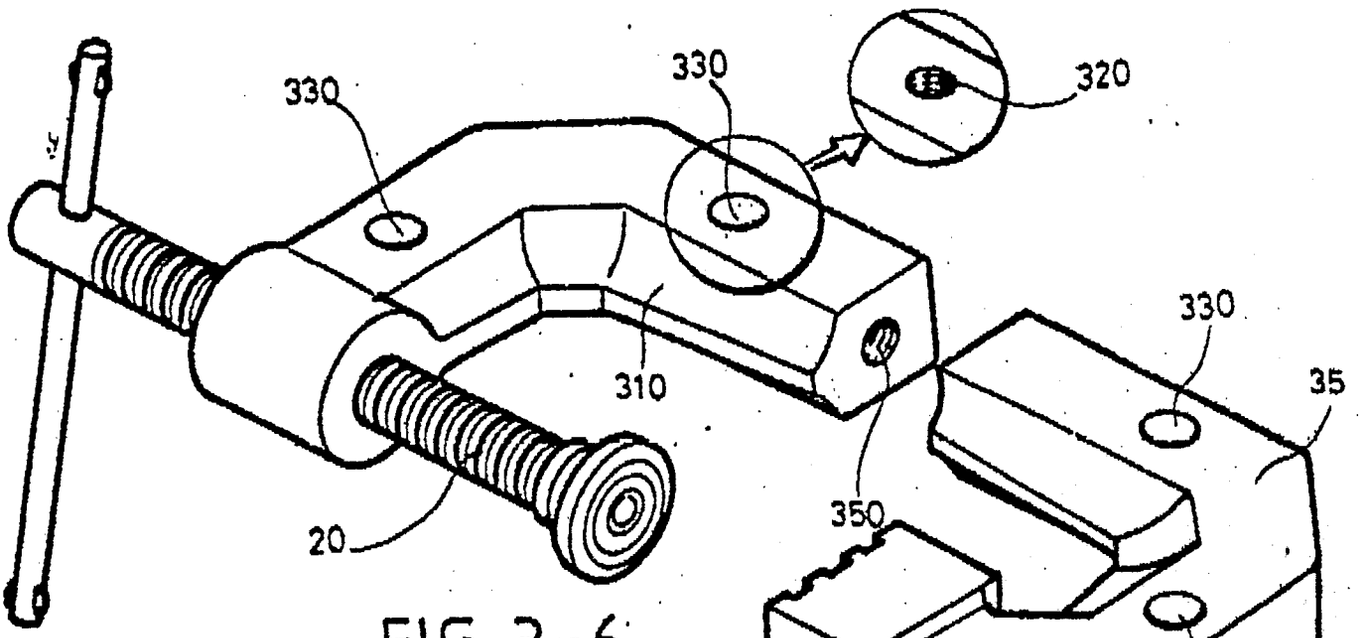

FIG. 3-6

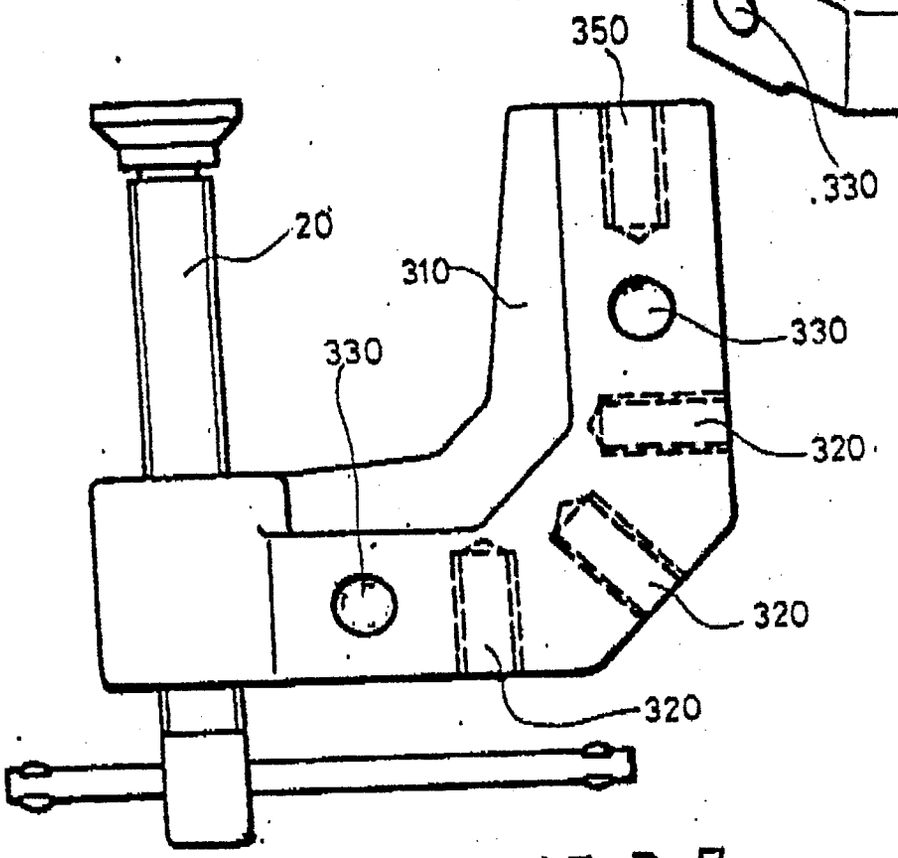

FIG. 3-7

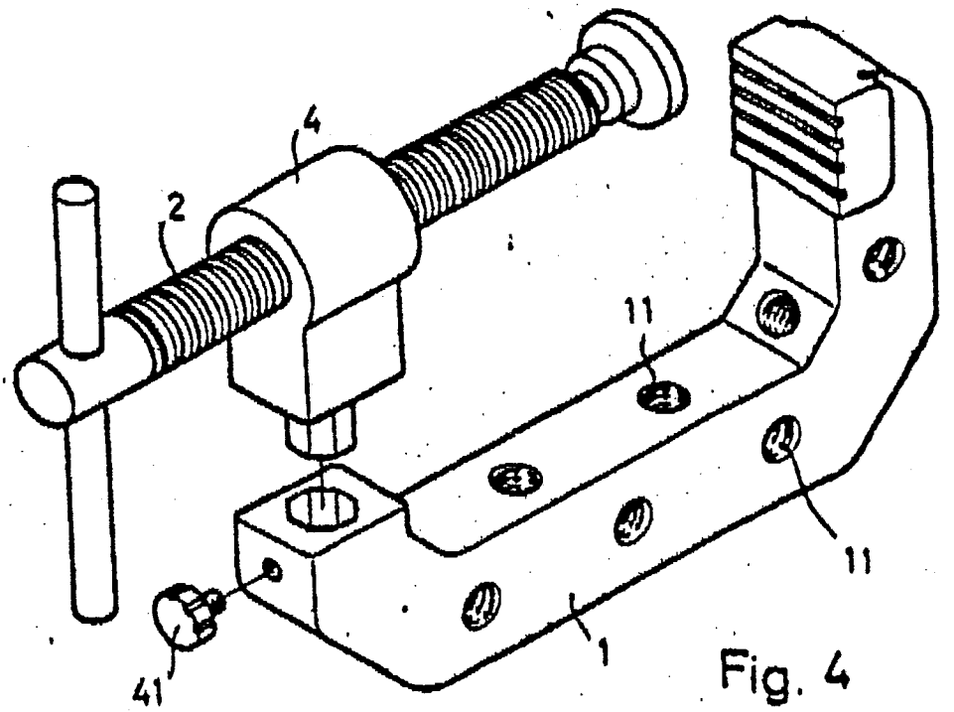

Fig. 4

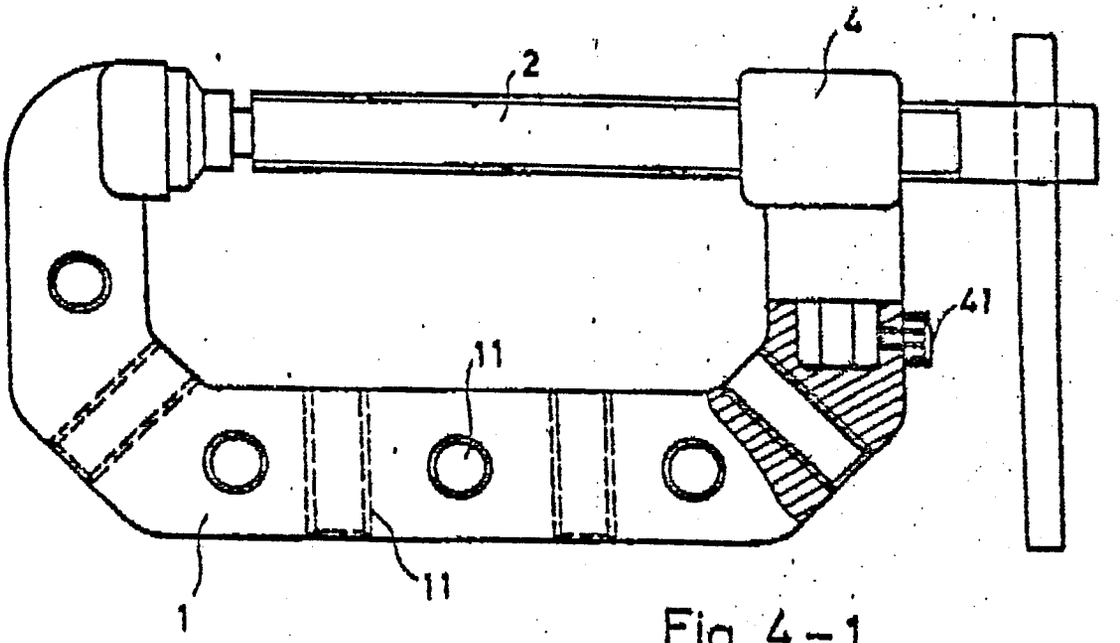

Fig. 4-1

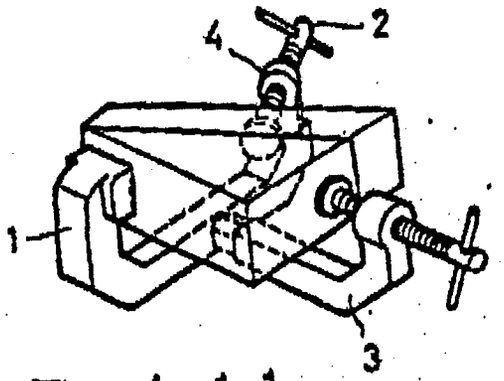

Fig. 4-1-1

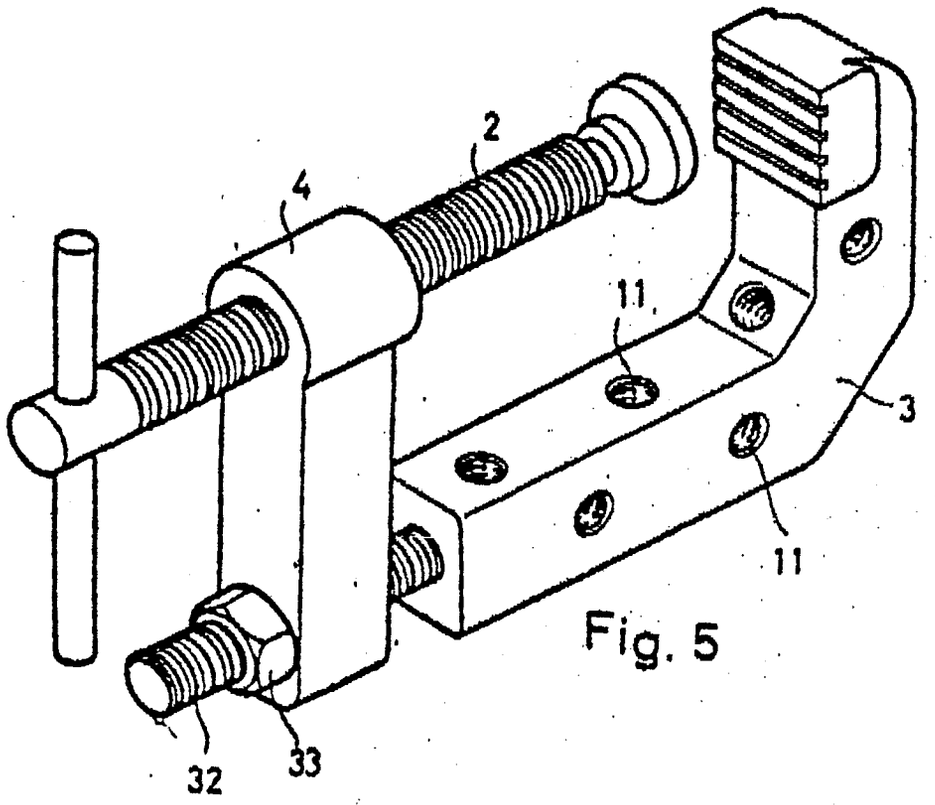

Fig. 5

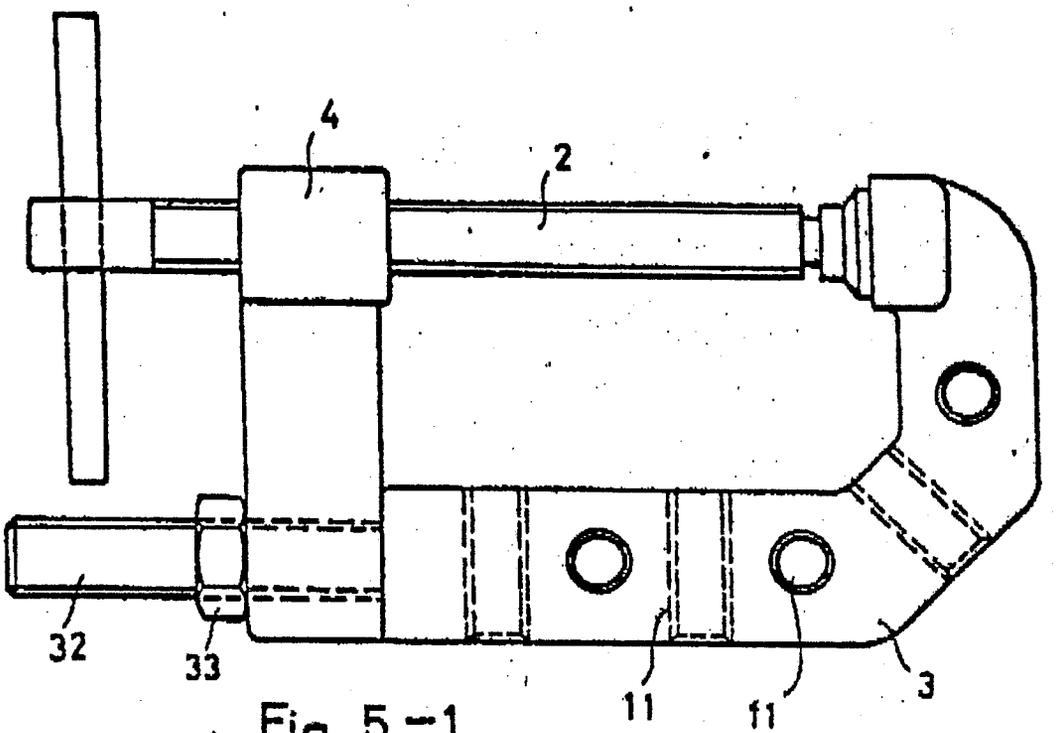

Fig. 5 -1

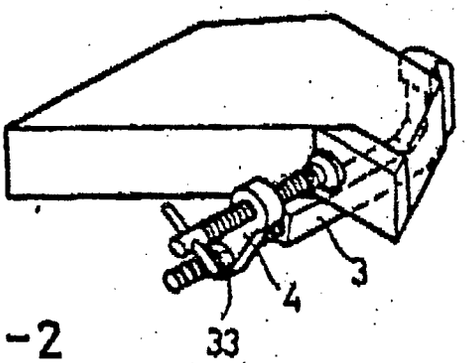

Fig. 5-2

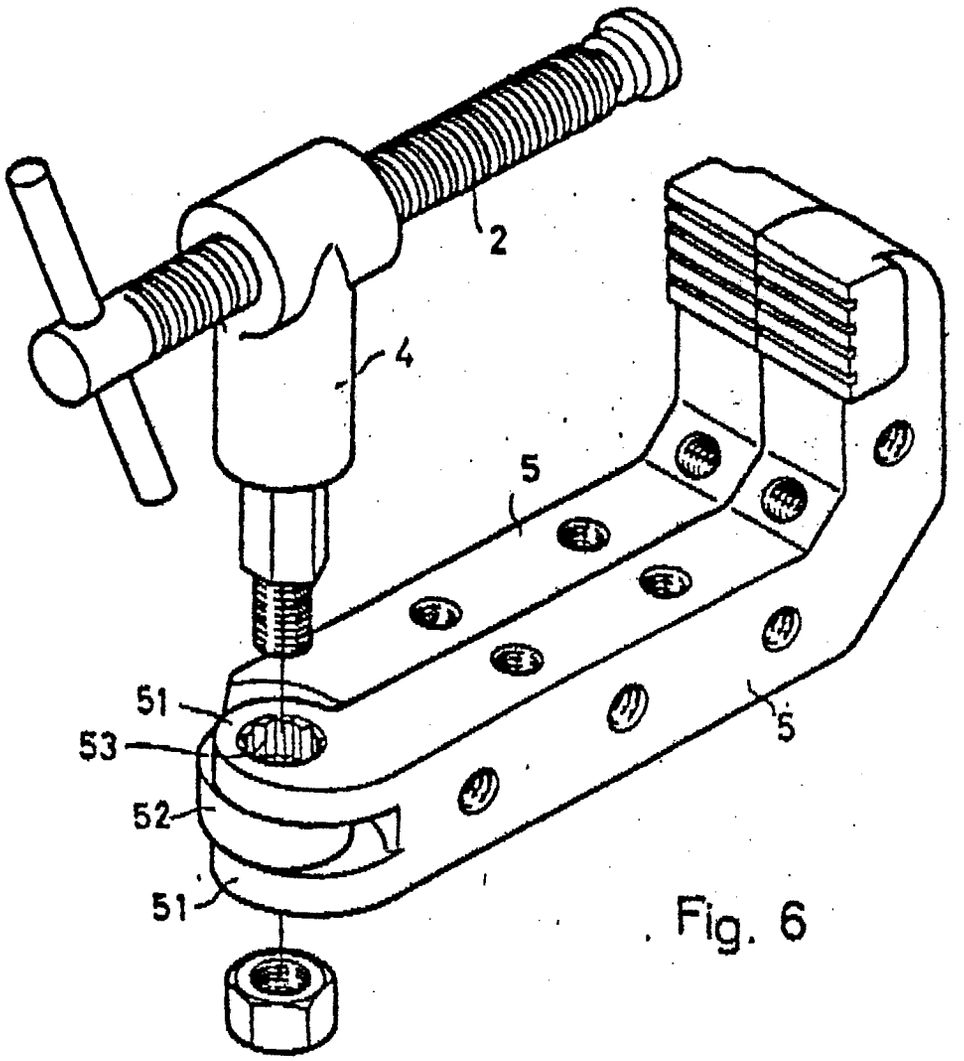

Fig. 6

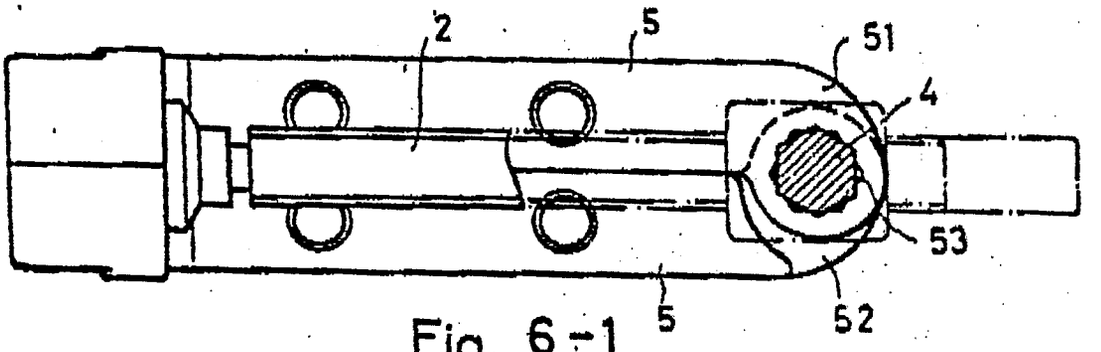

Fig. 6-1

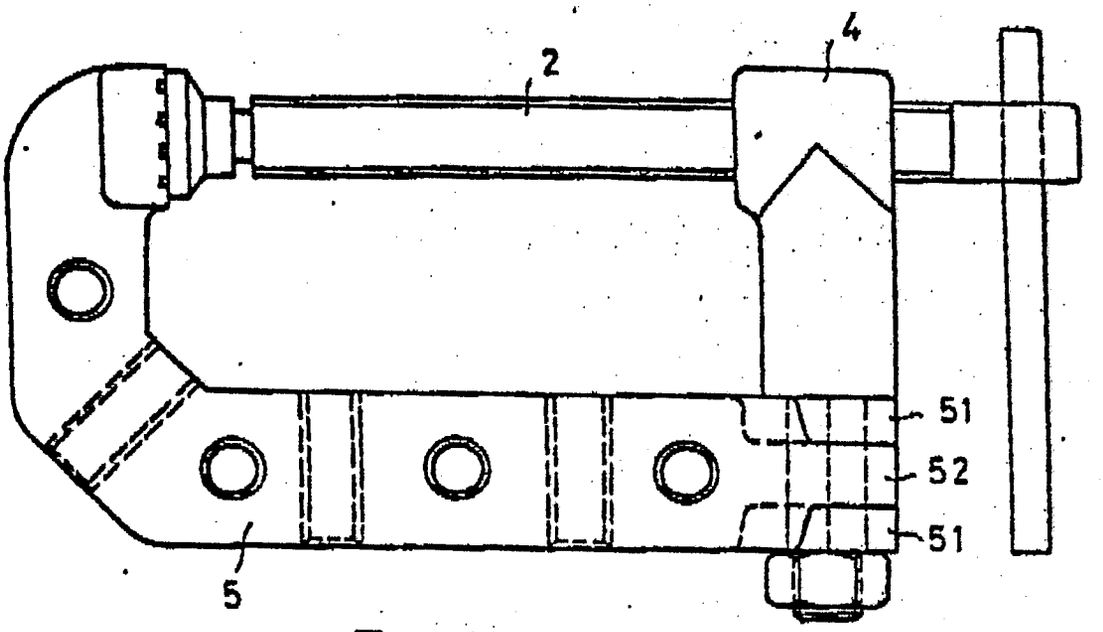

Fig. 6-2

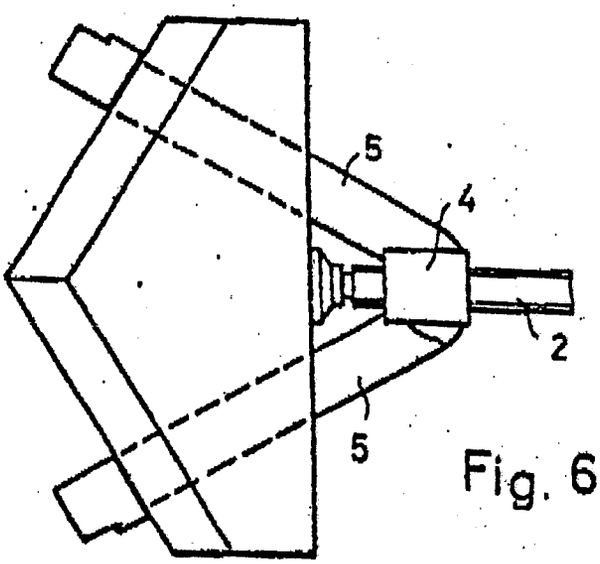

Fig. 6-3

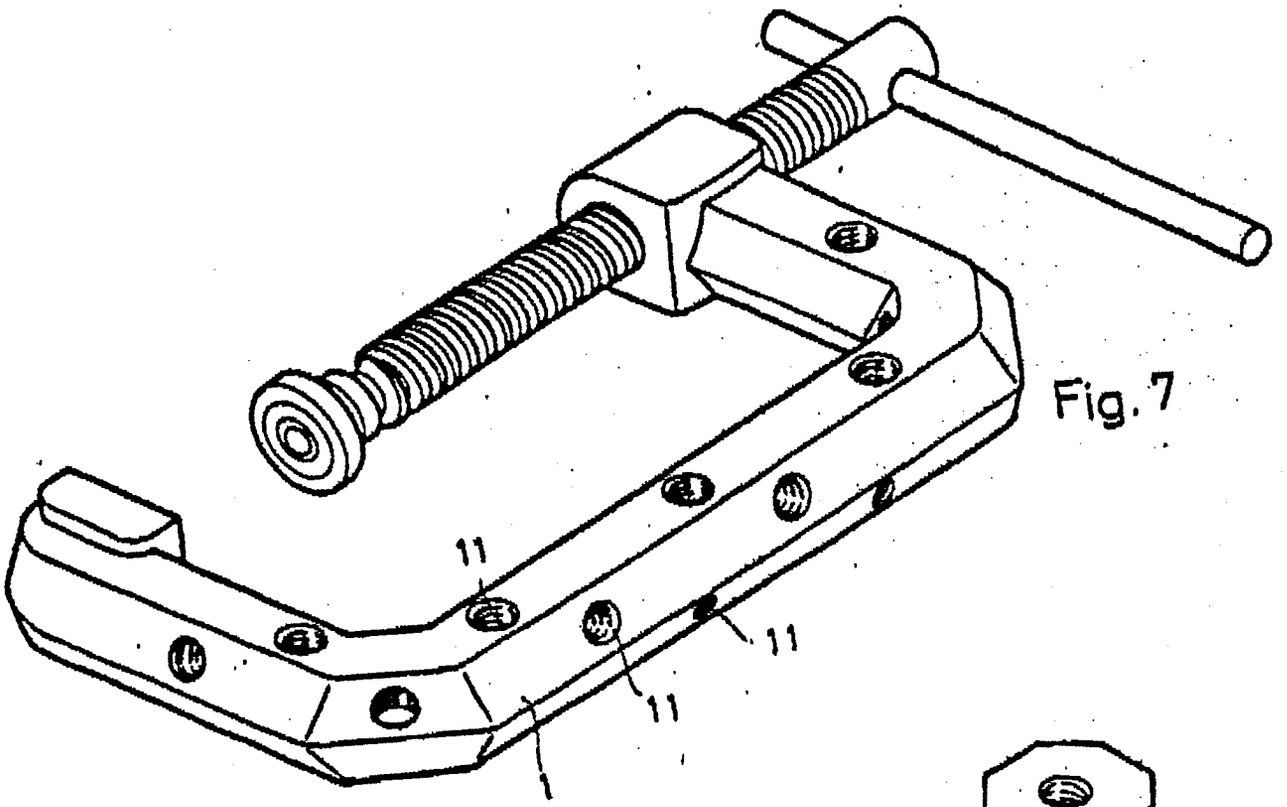

Fig. 7

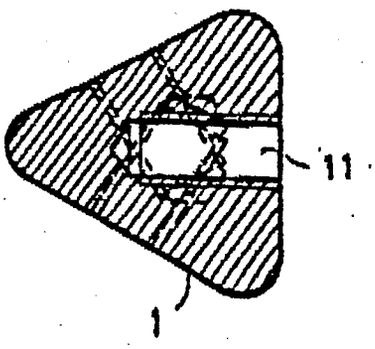

Fig. 7-2

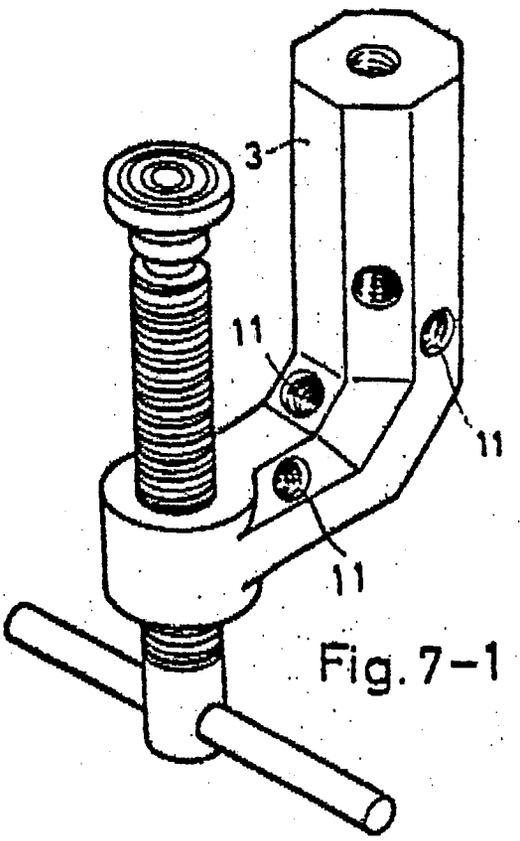

Fig. 7-1

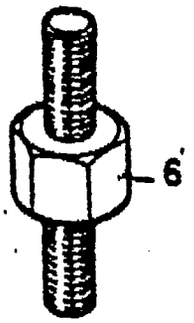

Fig. 8

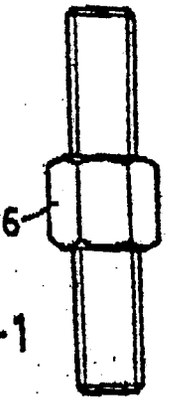

Fig.8-1

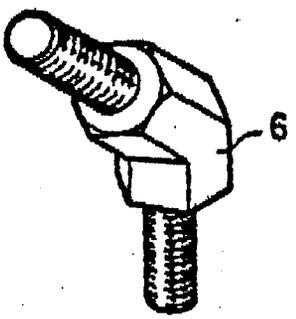

Fig. 9

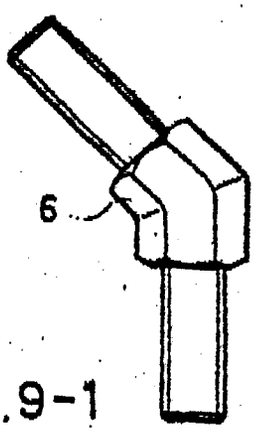

Fig.9-1

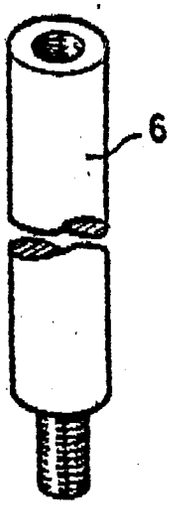

Fig.10

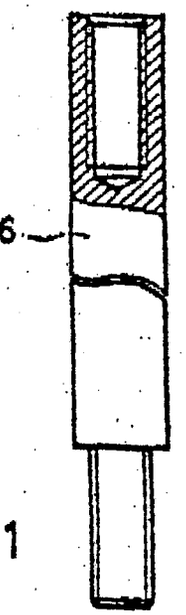

Fig.10-1

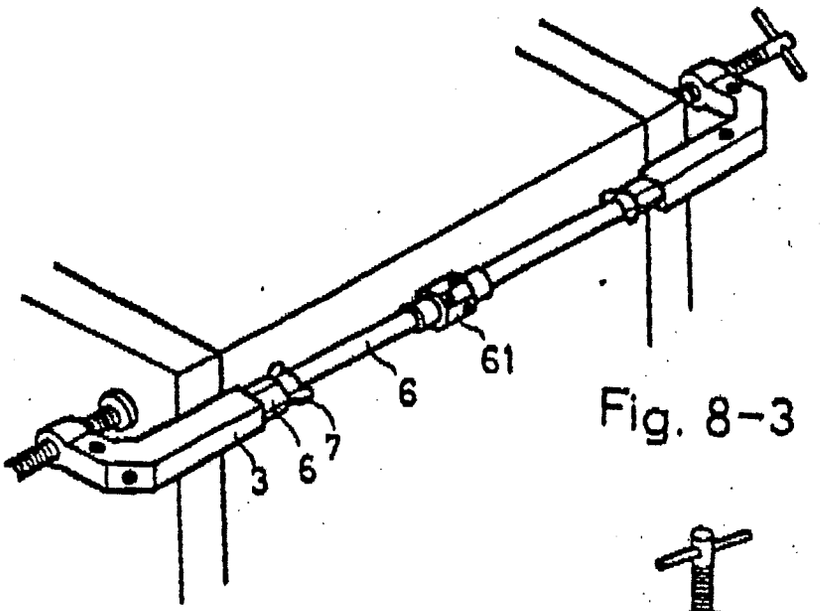

Fig. 8-3

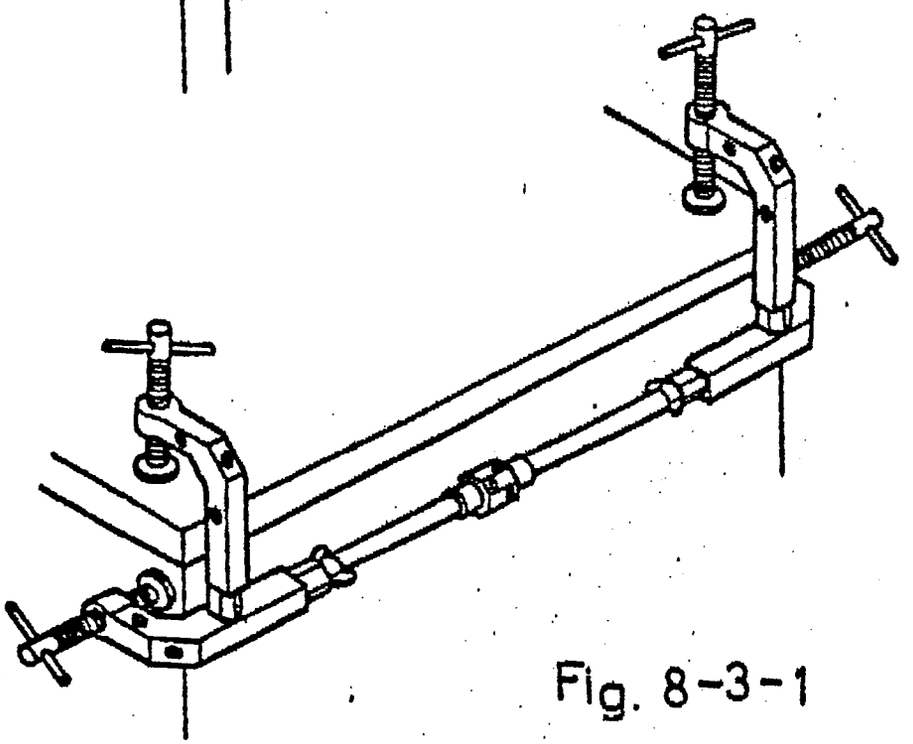

Fig. 8-3-1

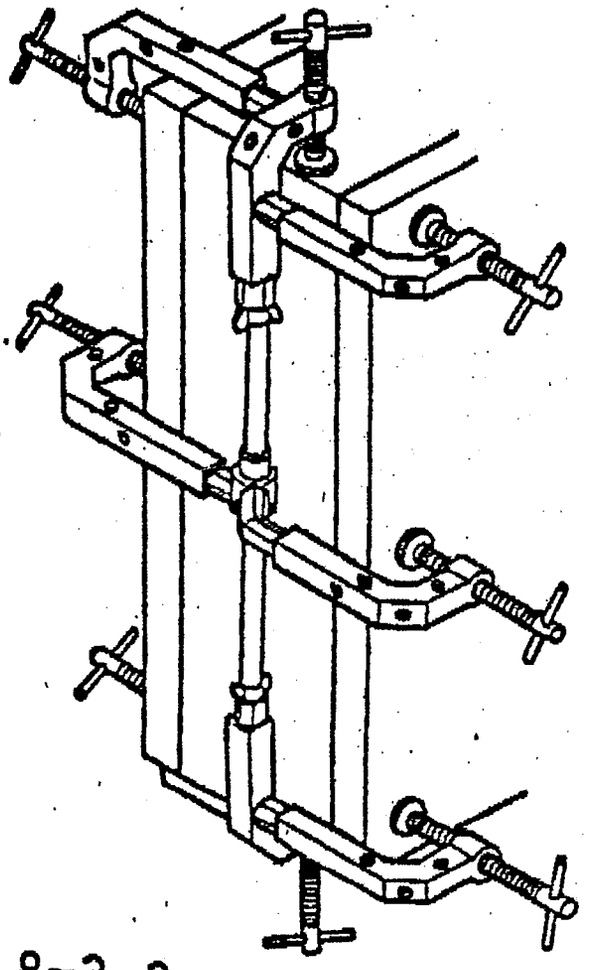

Fig. 8-3-2

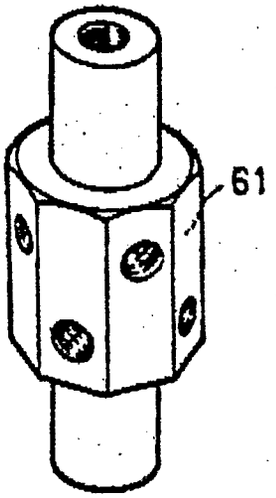

Fig. 11

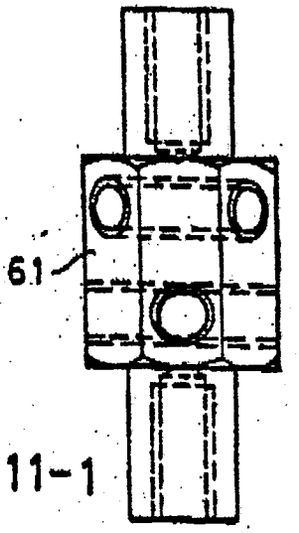

Fig.11-1

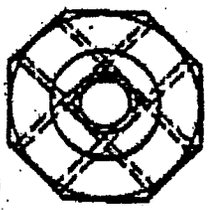

Fig.11-2

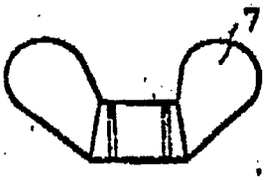

Fig. 12-1

Fig. 12

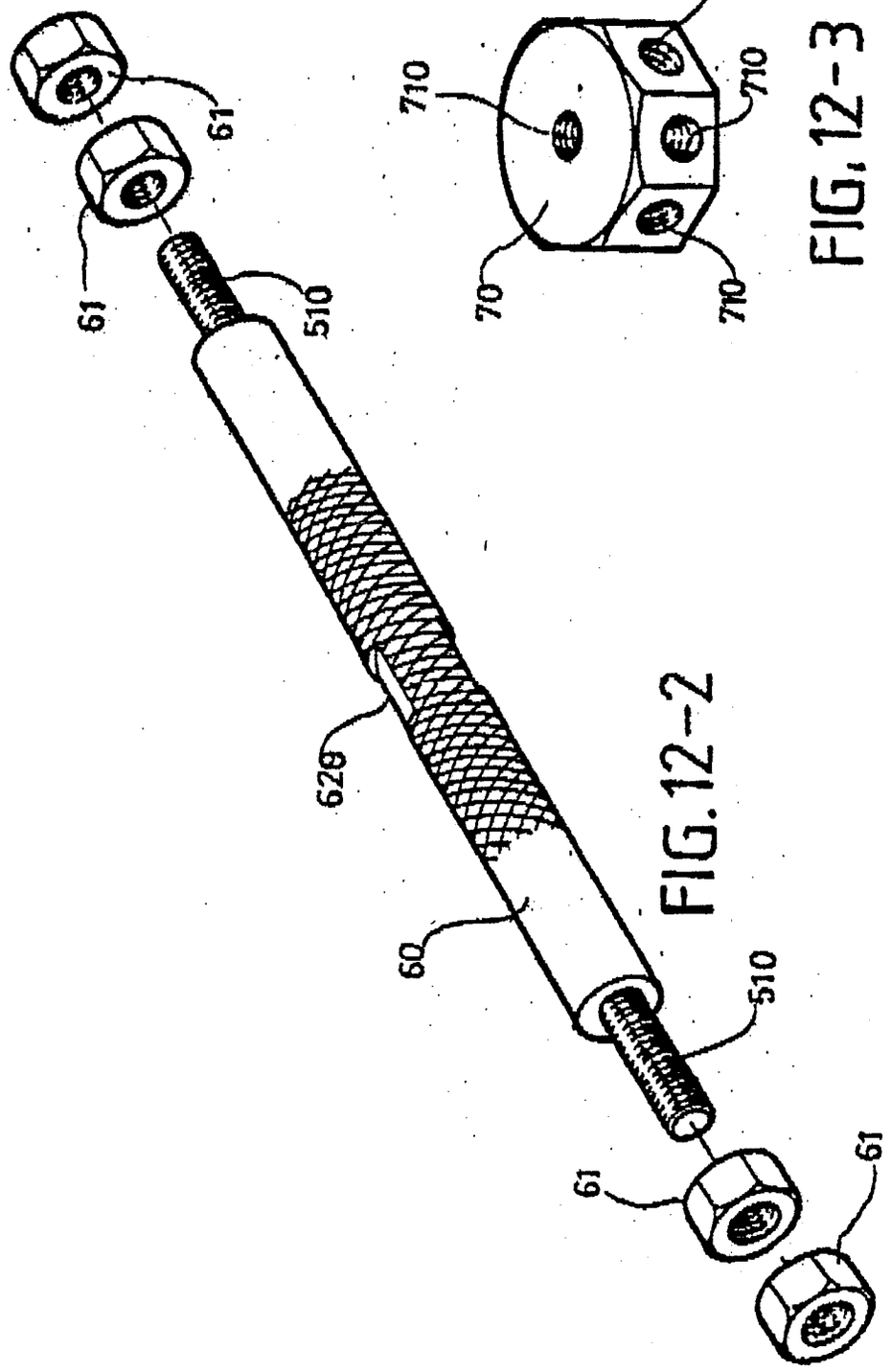

FIG. 12-2

FIG. 12-3

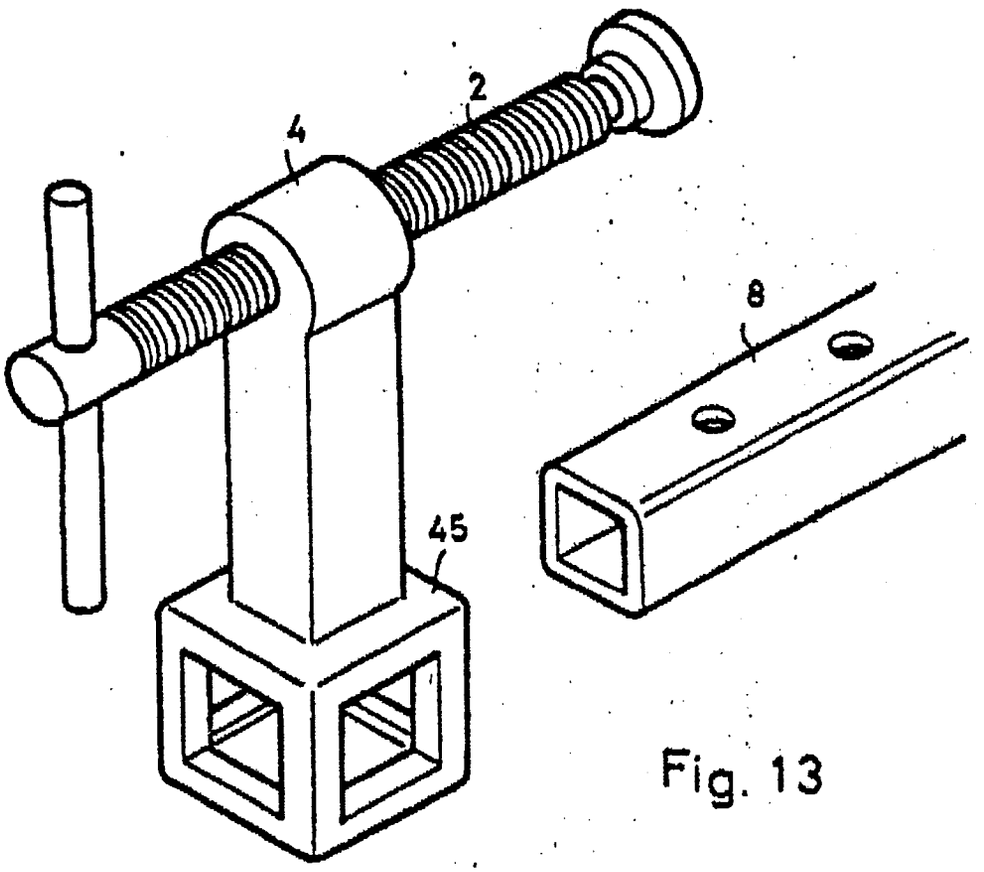

Fig. 13

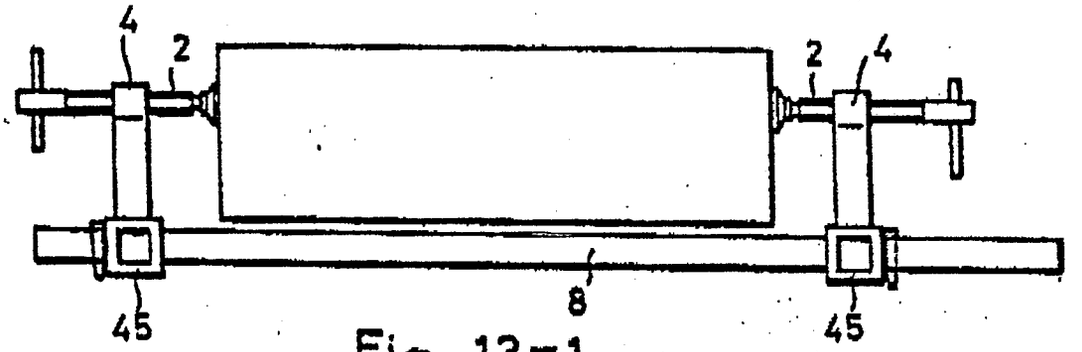

Fig. 13-1

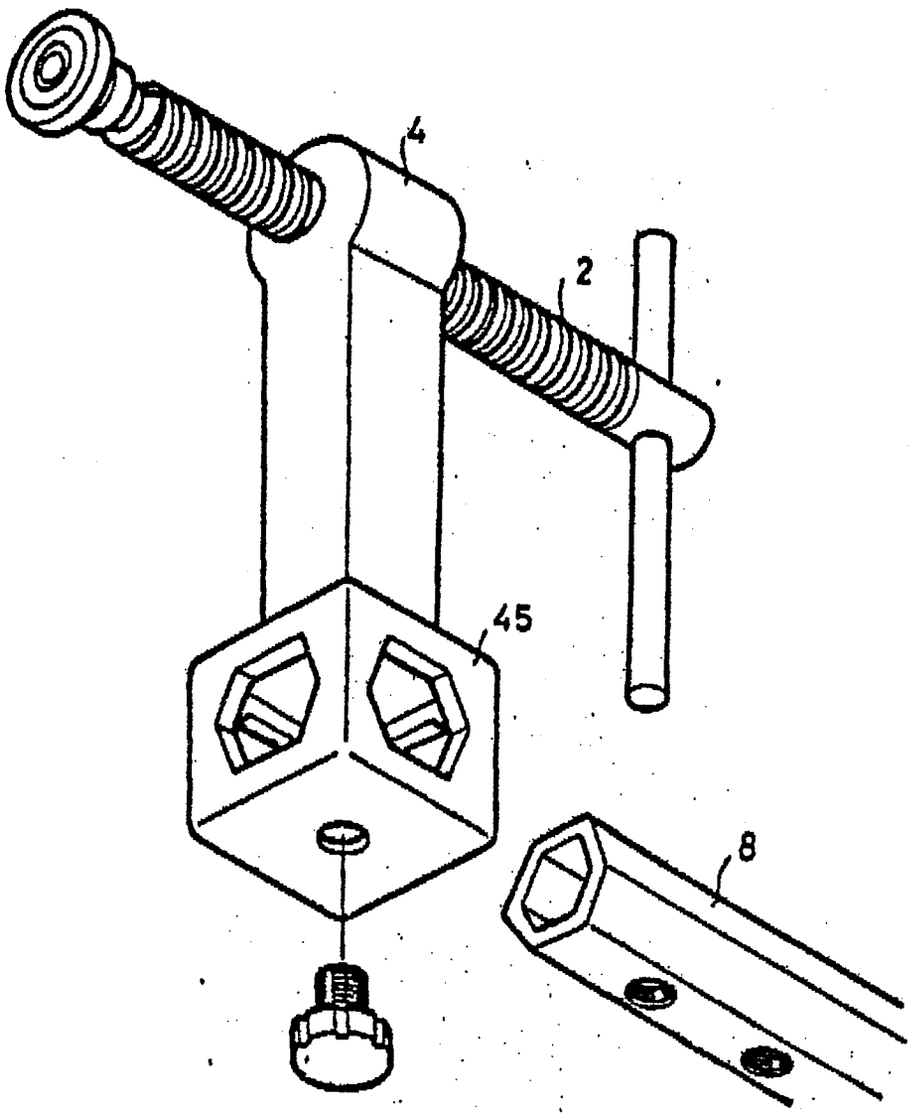

Fig.13-2

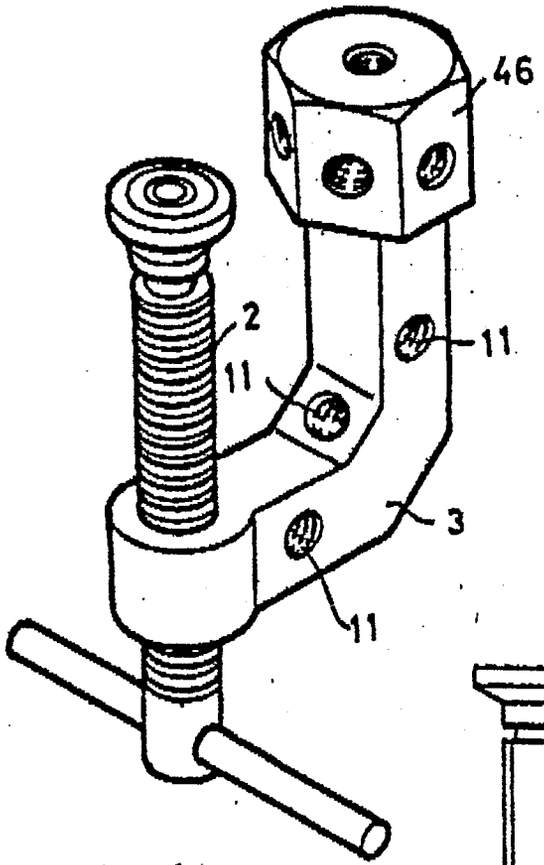

Fig. 14

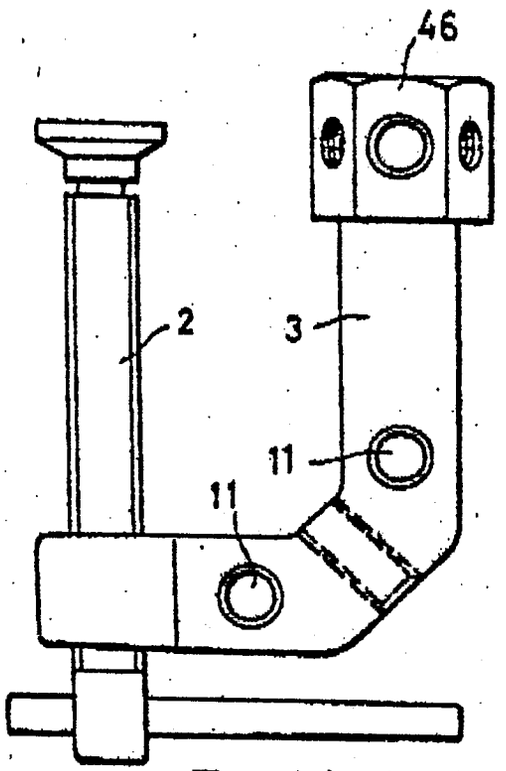

Fig. 14-1

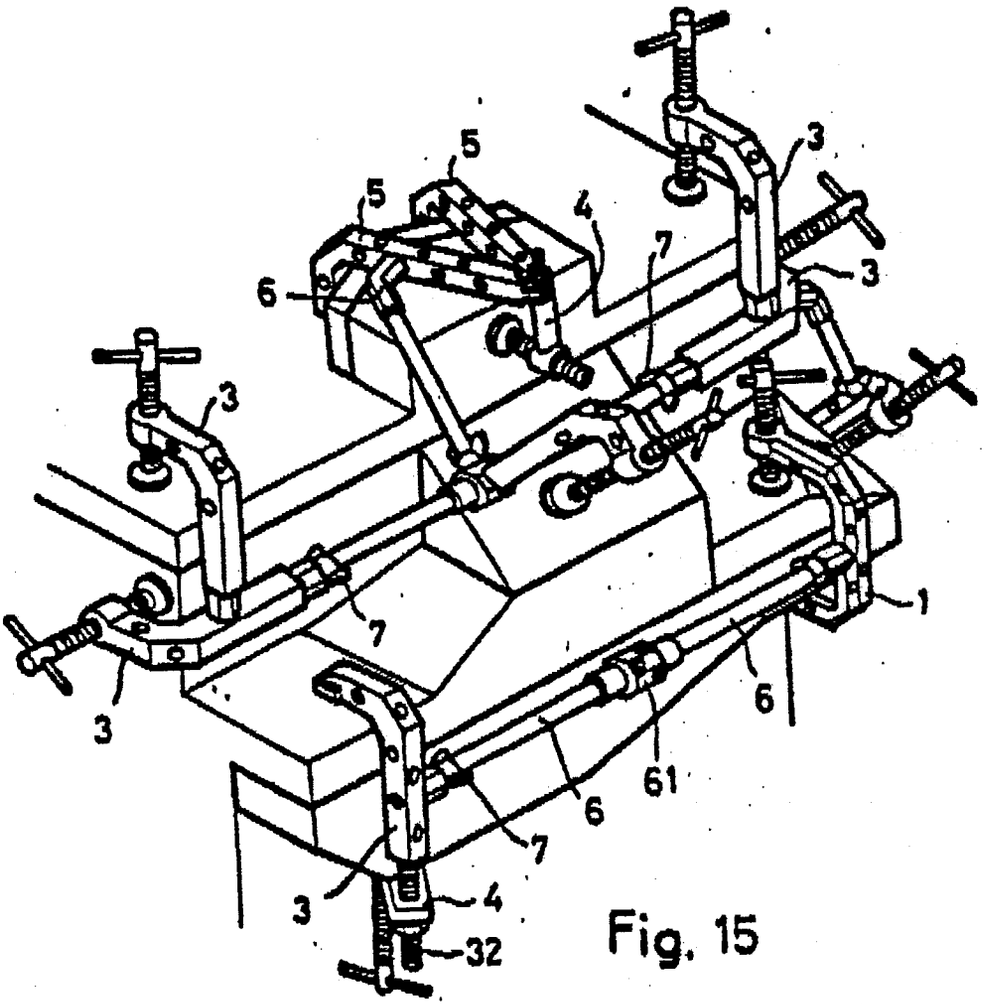

Fig. 15