

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 613 220 A1

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **93301376.5**(51) Int. Cl.⁵: **H01R 43/042**(22) Date of filing: **24.02.93**(43) Date of publication of application:
31.08.94 Bulletin 94/35(84) Designated Contracting States:
**AT BE CH DE DK ES FR GB GR IE IT LI LU MC
NL PT SE**(71) Applicant: **Liu, Lien-Huang**
No. 17 Alley 166,
Lane 68, Sua-Yuan Rd.
Feng-Yuan City, Taichung Hsien (TW)(72) Inventor: **Liu, Lien-Huang**
No. 17 Alley 166,
Lane 68, Sua-Yuan Rd.
Feng-Yuan City, Taichung Hsien (TW)(74) Representative: **Jones, Michael Raymond**
HASELTINE LAKE & CO.
Hazlitt House
28 Southampton Buildings
Chancery Lane
London WC2A 1AT (GB)(54) **Crimping tool having terminal locating device.**

(57) A crimping tool having terminal locating device is composed of a first clamping member, a second clamping member, a base, a pair of clamping members, a stopping member, and a pressing member. The first and the second clamping members can be caused to join together and are provided respectively on their first clamping end and second clamping end with teeth and grooves. The base is fastened to the first clamping end and provided with a receiving surface and a first elongate slot. Each of the clamping members is provided with a clamping surface. The stopping member has a stopping surface facing a lateral side of the first clamping end. The pressing member has an elastic portion and a pressing portion provided with a pressing surface. A receiving space is formed jointly by the receiving surface, the clamping surfaces, the stopping surface and the pressing surface. The receiving space can be so adjusted as to locate therein a terminal of any shape and any dimension.

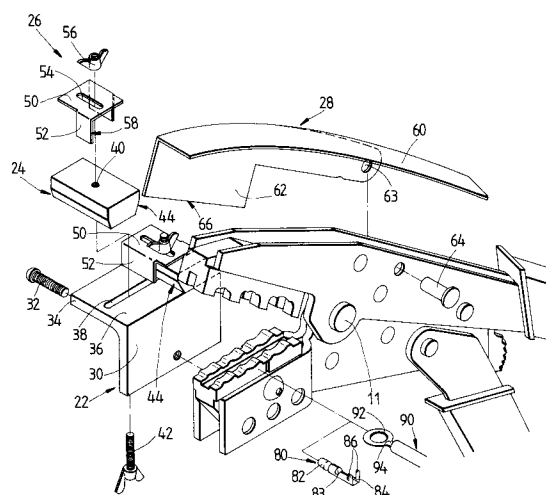


FIG. 2

EP 0 613 220 A1

FIELD OF THE INVENTION

The present invention relates to a terminal crimping tool, and more particularly to a crimping tool having a terminal locating device.

BACKGROUND OF THE INVENTION

The prior art terminal crimping tool comprises a first clamping member of rod-shaped construction and a second clamping member, which are pivoted respectively at the mid-section thereof to a pivot and are provided respectively and correspondingly several teeth and grooves. The terminal to be clamped is arranged on the teeth in such a manner that the end of the terminal having electrical wires is pressed into a predetermined shape.

The prior art terminal crimping tool described above is generally not provided with a terminal locating device. As a result, an operator must use his or her both hands to do the job of clamping the terminal, so as to prevent the terminal from moving aside or falling on the floor. Such a maneuver as described above often brings about a poor coupling of the terminal.

With a view to overcoming the drawback of the prior art crimping tool described above, the U.S. Patent Numbers 2,359,083 and 3,673,848 disclose respectively a crimping tool having a terminal locating device. The crimping tool disclosed in the U.S. Patent Number 2,359,083 is provided with a means capable of adjusting the length of the portion of terminal which is located outside the crimping tool. However, such crimping tool is not provided with a means capable of locating the portion of the terminal which remains outside the crimping tool, thereby making the terminal vulnerable to moving aside during the clamping operation. The crimping tool disclosed in the U.S. Patent Number 3,673,848 is provided with a receiving space for use in accommodating the portion of the terminal which remains outside the terminal. However, the receiving space is surrounded by a spring piece and is therefore suitable for use in accommodating only those terminals having certain specific dimensions. In addition, such receiving space is not provided with a means capable of locating securely a terminal of cylindrical construction, or circular chip construction.

SUMMARY OF THE INVENTION

It is therefore the primary objective of the present invention to provide a terminal crimping tool with a terminal locating device having a receiving space for use in locating securely the portion of the terminal which remains outside the clamping portion of the crimping tool. The receiving space is

provided with a means capable of adjusting the dimension of the receiving space in a wide range so as to accommodate a terminal having any dimension.

5 It is another objective of the present invention to provide a terminal crimping tool with a terminal locating device capable of pressing and coupling securely the portion of the terminal which remains outside the clamping portion of the crimping tool and which is of cylindrical construction.

10 It is still another objective of the present invention to provide a terminal crimping tool with a terminal locating device capable of pressing and coupling securely the portion of the terminal which remains outside the clamping portion of the crimping tool and which is of circular chip construction.

15 In keeping with the principles of the present invention, the foregoing objectives of the present invention are attained by a crimping tool having a terminal locating device. The crimping tool comprises a first clamping member and a second clamping member, which are pivoted by means of a pivot. Each of the first clamping member and the second clamping member has a first clamping end and a second clamping end, which are opposite to each other and are provided thereon respectively a plurality of teeth and grooves. The crimping tool of the present invention is characterized in that it further comprises a base, a pair of clamping members, a stopping member, and a pressing member. The base is fastened securely on the lateral side of the first clamping end and is provided thereon with a receiving surface facing upwards and with a first elongate groove parallel to the lateral side of the first clamping end. The two clamping members are provided thereon respectively with a receiving surface movable along the direction of the longitudinal axis of the first elongate groove, and with a clamping end on the lateral side thereof. The stopping member has a locating portion mounted movably on a predetermined portion of the clamping member. A stopping portion extends from the lateral side of the locating portion to reach between the clamping ends and has a stopping surface facing the lateral side of the first clamping end. The pressing member is mounted on a predetermined portion of the second clamping end and is provided thereon with an elastic portion and a pressing portion extending downwards a predetermined length and having a pressing surface facing downwards.

50 A receiving space is formed jointly by the receiving surface, the clamping surface, the stopping surface, and the pressing surface. The receiving space can be adjusted to correspond with the teeth or the groove. The receiving space has a depth and a width, which can be so adjusted as to accommodate a terminal having any dimension.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a perspective view of a first preferred embodiment of the present invention.

FIG. 2 shows an exploded view of the first preferred embodiment of the present invention.

FIG. 3 is a front elevational view of the first preferred embodiment of the present invention, showing that a terminal has not been clamped by the crimping tool of the present invention.

FIG. 4 is a front elevational view of the first preferred embodiment of the present invention, showing that the terminal is being clamped by the crimping tool of the present invention.

FIG. 5 shows a sectional view taken along the line 5-5 as shown in FIG. 4.

FIG. 6 shows a sectional view of a second preferred embodiment of the present invention taken along the line 5-5 as shown in FIG. 4.

FIG. 7 shows a front elevational view of a third preferred embodiment of the present invention.

FIG. 8 shows a sectional view of the third preferred embodiment taken along the line 8-8 as shown in FIG. 7.

FIG. 9 shows a sectional view of a fourth preferred embodiment of the present invention taken along the line 8-8 as shown in FIG. 7.

FIG. 10 shows a left elevational view of a fifth preferred embodiment of the present invention.

FIG. 11 shows a sectional view of the fifth preferred embodiment of the present invention taken along the line 11-11 as shown in FIG. 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1-5, a terminal crimping tool 10 of the present invention is shown to comprise a first clamping member 12 and a second clamping member 16, which are pivoted by means of a pivot 11, and a terminal locating device 20. The first and the second clamping members 12 and 16 are provided respectively with a first clamping end 13 and a second clamping end 17, which are opposite to each other and which can be made to join together. The first clamping end 13 has a first clamping block 14 mounted thereon and provided thereon with three teeth 15 spaced at a predetermined interval. The second clamping end 17 has a second clamping block 18 mounted thereon. The underside of the second clamping block 18 is provided with three grooves 19 spaced at a predetermined interval. The three teeth 15 engage the three grooves 19 at such time when the first and the second clamping ends 13 and 17 join together.

The terminal locating device 20 comprises a base 22, a pair of clamping members 24, a pair of stopping members 26, and a pressing member 28.

The base 22 has a vertical portion 30 fastened to a lateral side of the first clamping end 13 by means of a bolt 32, and a horizontal portion 34 extending outwards and horizontally from the top of the vertical portion 30 and having thereon a horizontal receiving surface 36, and a first elongate slot 38 of a length extending along the direction of the longitudinal axis of the horizontal portion 34 to pass through the top and the bottom surfaces of the horizontal portion 34.

The two clamping members 24 are provided respectively with a threaded hole 40 receiving a bolt 42 extending from the underside of the horizontal portion 34 through the first elongate slot 38. Each of the two clamping members 24 is fastened on the receiving surface 36 by means of the threaded hole 40 and the bolt 42. The clamping members 24 are provided respectively with a clamping surface 44 extending along the direction of the longitudinal axis of the clamping member 24. The clamping surface 44 and the receiving surface 36 form an angle smaller than 90 degrees.

The two stopping members 26 are provided respectively with a locating portion 50 and a stopping portion 52 extending downwards and vertically from the lateral side of the locating portion 50 which is further provided with a second elongate slot 54 parallel to the longitudinal axis of the stopping portion 52. The stopping member 26 is urged against by the bolt 42 with its top extending beyond the top surface of the locating portion 50 so as to mesh with a nut 56. Each of the stopping portions 52 is provided with a stopping surface 58 located at the edge thereof facing the lateral side of the second clamping end 13.

The pressing member 28 of elastic metal material has an elastic portion 60 and a pressing portion 62. The elastic portion 60 has a predetermined length, with its right side urging the top of the second clamping member 16 and with its left side extending to reach over the second clamping end 17. The pressing portion 62 of a predetermined length is bent downwards at the left edge of the elastic portion 60 and is provided with a through hole 63 located at the right side thereof. The pressing portion 62 can be therefore pivoted to the lateral side of the second clamping member 13 by means of a rivet 64. Located at the left side of the pressing portion 62 is a pressing surface 66 facing downwards.

A receiving space 70 is formed jointly by the receiving surface 36, the clamping surface 44 and the stopping surface 58. The depth and the width of the receiving space 70 can be adjusted by adjusting the relative positions of the clamping member 24 and the stopping member 16. In addition, the teeth 15 and the grooves 19 can be also adjusted in correspondence with the receiving

space 70.

A terminal 80 of cylindrical construction has a body 82. When the terminal 80 is clamped by the terminal crimping tool 10 of the present invention, the body 82 of the terminal 80 is received by a pair of insertion slots 83 and 84, with the open ends of the insertion slots 83 and 84 facing upwards and spacing apart. A pair of feet 86 extend from the end of the body 82 for a predetermined length. In operation, the terminal 80 is placed on a tooth 15, with the left end of the terminal 80 arranged in the receiving space 70 and clamped by the receiving surface 36, the clamping surface 44 and the stopping surface 58. When the first and the second clamping ends 13 and 17 are made to join together, the pressing surface 66 of the pressing member 28 is forced into the insertion slot 83 so as to force the two feet 86 to face upwards and to facilitate a groove 19 to force these two feet 86 to bend in a predetermined direction.

As shown in FIG. 6, the second clamping block 18 is provided with a third slot 88 in which the pressing portion 62 of the pressing member 28 moves so that the pressing surface 66 extends over the tooth 15.

As shown in FIGS. 7-9, a terminal 90 having a circular head 92 is clamped by the terminal crimping tool 10 of the present invention. The pressing surface 66 is provided thereon with three notches 68 corresponding in location to the tooth 15. Each of the three notches 68 has an open end facing downwards and having a width greater than a width of a closed end of the notch 68. In operation, the head 92 of the terminal 90 is arranged in the receiving space 70 such that the neck 94, which has a smaller width, is positioned under the pressing portion 62. As a result, when the pressing portion 62 is caused to move downwards so that the inner edge of the notch 68 pushes the neck 94 to force the terminal 90 to swing to become perpendicular to the lateral side of the first clamping end 13, the terminal 90 is then well located for clamping with precision.

Each of the clamping members 24 can be rotated slightly on the bolt 42 serving as a shaft, so as to make one end of the receiving space 70, which is adjacent to the lateral side of the second clamping end 13, to have a greater width and to make another end of the receiving space 70 to have a smaller width in order to facilitate the accommodation of the terminal 90 having the head 92 of circular chip construction.

Now referring to FIGS. 10 and 11, the pressing member 28 of the present invention is shown to comprise a main body 100, a press rod 104, a screw 107, and a coil spring 108. The main body 100 is fastened securely to the lateral side of the second clamping end 17 by means of two screws

101 and is provided coaxially with a first axial hole 102 and a second axial hole 103, with the first axial hole 102 having an inner diameter greater than an inner diameter of the second axial hole 103. The press rod 104 has an upper end of columnar construction, which is received in the first and the second axial holes 102 and 103 and is provided thereon with a stopping edge 105 having an outer diameter greater than the inner diameter of the second axial hole 103. The press rod 104 has a flat lower end extending beyond the lower side of the main body 100 and having a pressing end 106 facing downwards. The screw 107 is fastened to the upper end of the first axial hole 102. The coil spring 108 is disposed in the first axial hole 103 such that both ends of the coil spring 108 urge respectively the lower end of the screw 107 and the upper end of the press rod 104, so as to prevent the press rod 104 from moving upwards. In operation, the flat lower end of the press rod 104 is inserted into an insertion hole 83 of the cylindrical terminal 80.

Claims

1. A crimping tool having terminal locating device comprising a first clamping member and a second clamping member, which are pivoted by means of a pivot and are provided respectively with a first clamping end and a second clamping end, said first clamping end and said second clamping end being opposite to each other and being capable of joining together, and said first clamping end and said second clamping end provided respectively and oppositely with a plurality of teeth and grooves;

wherein said crimping tool further comprises:

a base fastened securely to a lateral side of said first clamping end and provided with a receiving surface facing upwards and with a first elongate slot parallel to said lateral side of said first clamping end;

a pair of clamping members, each of which is disposed on said receiving surface of said base in such a manner that each of said clamping members is capable of moving along the direction of a longitudinal axis of said elongate slot, said clamping members having respectively a clamping surface on lateral sides of said clamping members opposite to each other;

a stopping member having a locating portion mounted movably on a predetermined position of one of said clamping members, said stopping member further having a stopping portion extending from a lateral side of said locating portion to reach said clamping sur-

face, with said stopping portion provided with a stopping surface facing a lateral side of said first clamping end; and

a pressing member mounted on a predetermined position of said second clamping end and provided thereon with an elastic portion and a pressing portion which extends downwards and has a pressing surface facing downwards;

wherein said receiving surface, said clamping surface, said stopping surface, and said pressing surface form jointly a receiving space which can be adjusted to be corresponding in location to any one of said teeth or said grooves, and which can be so adjusted as to have a desired depth and a desired width.

2. The crimping tool according to claim 1 wherein said clamping members are provided respectively with a threaded hole perpendicular to said receiving surface and with a bolt engaging said threaded hole, said bolt having a lower end extending via said first elongate slot to reach the underside of said base.
3. The crimping tool according to claim 1 wherein said locating portion of said stopping member is provided with a second elongate slot containing a screw and is capable of being moved to and locked at a predetermined position by means of said screw on said clamping members.
4. The crimping tool according to claim 2 wherein said locating portion of said stopping member is provided with a second elongate slot containing a bolt which has an upper end extending beyond an upper surface of said clamping member and having thereon a nut.
5. The crimping tool according to claim 1 wherein said clamping surface and said receiving surface form an angle smaller than 90 degrees.
6. The crimping tool according to claim 1 wherein said pressing portion of said pressing member extends downwards and perpendicularly to be between a lateral side of said second clamping end and said receiving space.
7. The crimping tool according to claim 1 wherein said pressing portion of said pressing member extends downwards and perpendicularly to be over an upper surface of said first clamping end.
8. The crimping tool according to claim 7 wherein said pressing member has an elastic portion of

flake-like construction with an appropriate elasticity, said elastic portion having an end pressing on said upper surface of said first clamping end, said pressing portion bending downwards from a lateral side of said elastic portion and having an end pivoted to a lateral side of said first clamping end.

9. The crimping tool according to claim 1 wherein said pressing surface of said pressing member is provided thereon with a plurality of notches spaced at a predetermined interval.
10. The crimping tool according to claim 9 wherein each of said notches has a lower end wider than an upper end thereof.
11. The crimping tool according to claim 1 wherein said pressing member comprises:
 - a main body fastened to a lateral side of said first clamping end and provided coaxially with a first axial hole passing through an upper surface of said main body and with a second axial hole passing through a lower surface of said main body;
 - a press rod received in said first axial hole and said second axial hole and provided on an upper end thereof with a stopping edge having an outer diameter greater than an inner diameter of said second axial hole, said press rod further having a flat lower end passing through said second axial hole to emerge beyond the underside of said main body;
 - a screw fastened to an upper end of said first axial hole; and
 - a biasing means received in said first axial hole such that said biasing means is located between a lower end of said screw and an upper end of said press rod.

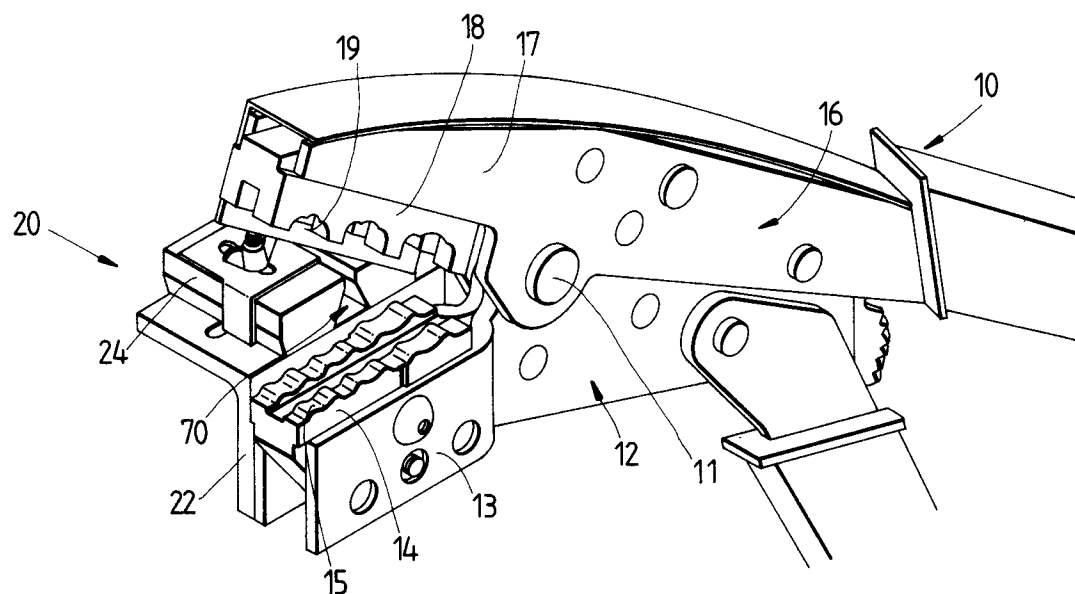


FIG. 1

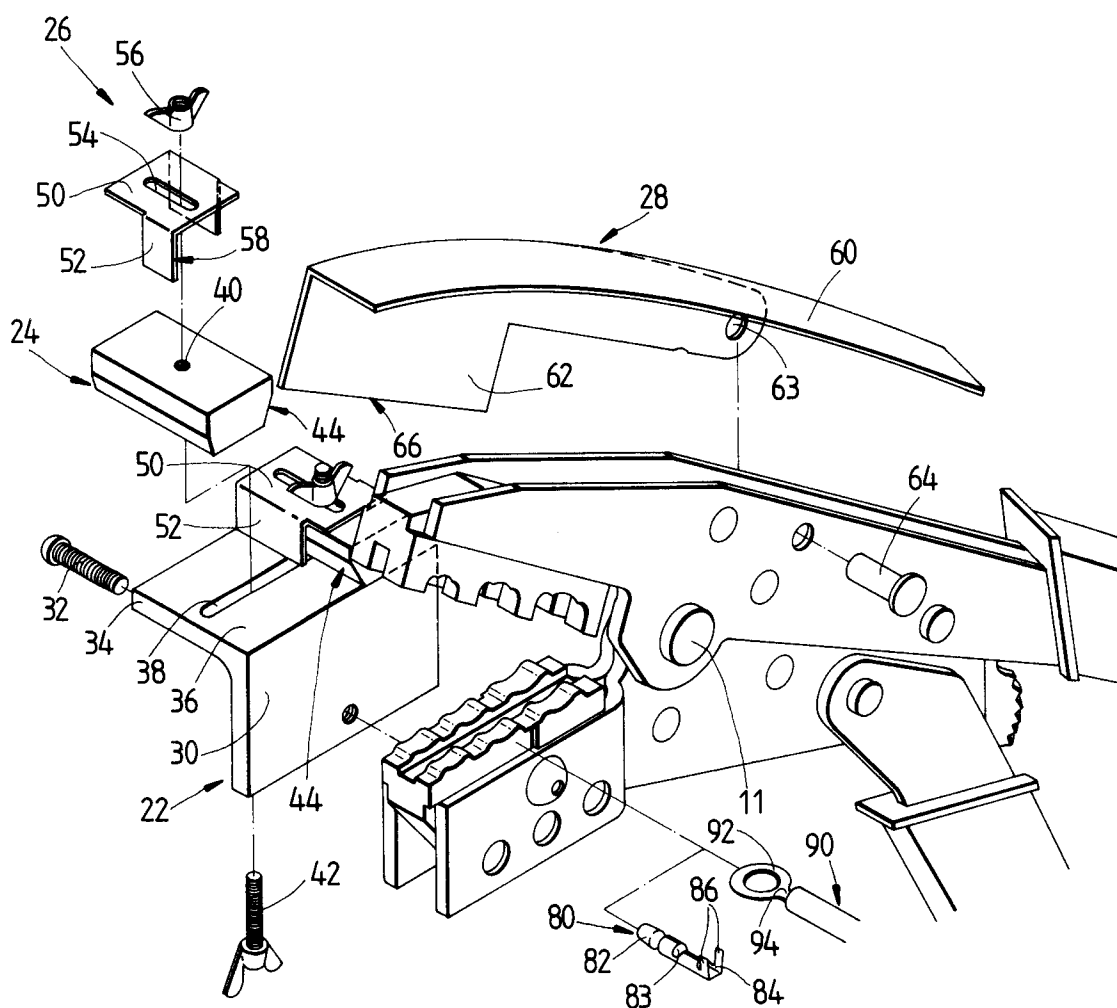


FIG. 2

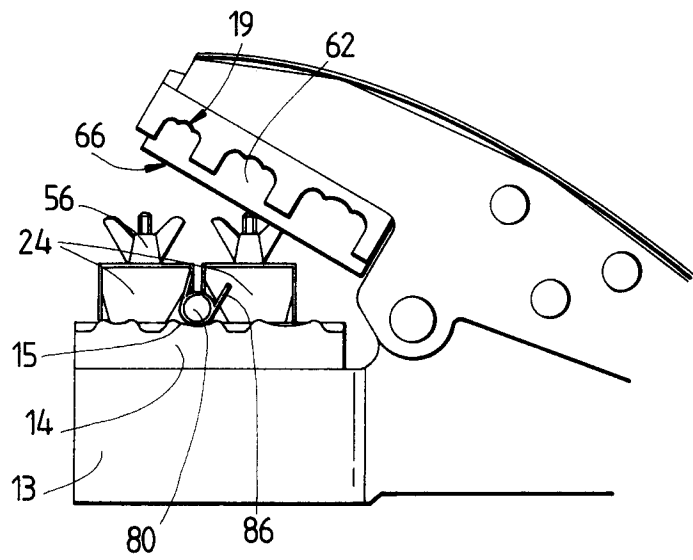


FIG. 3

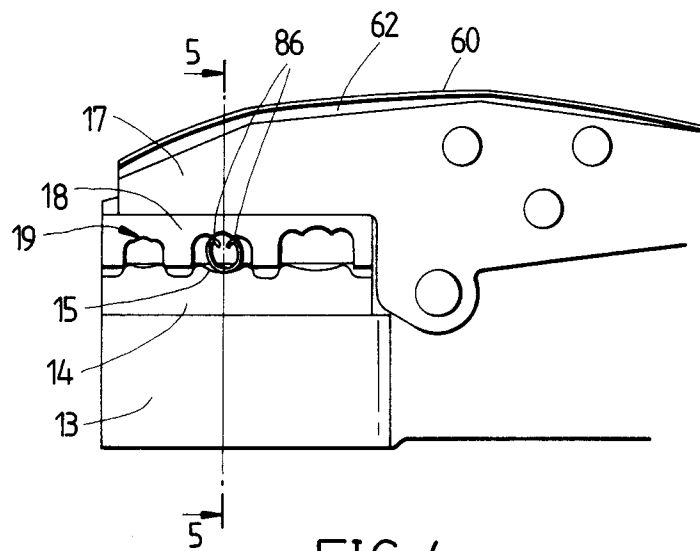


FIG. 4

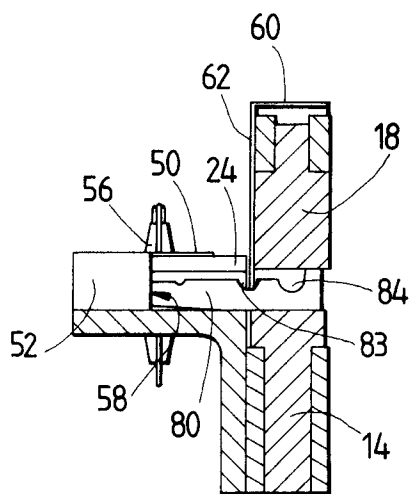


FIG. 5

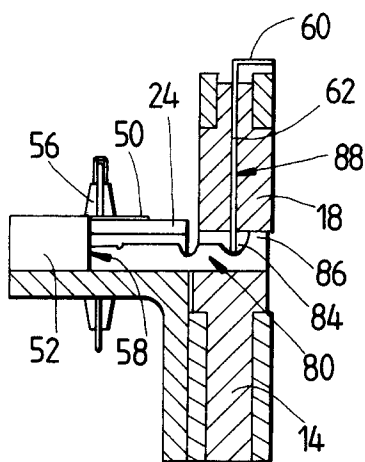


FIG. 6

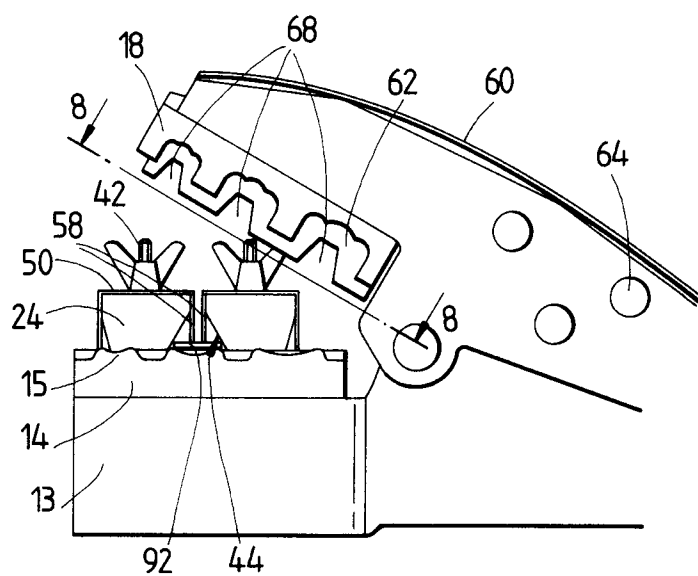


FIG. 7

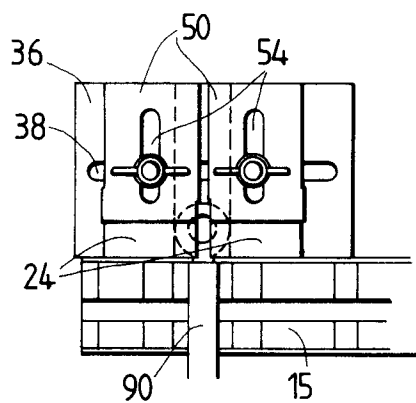


FIG. 8

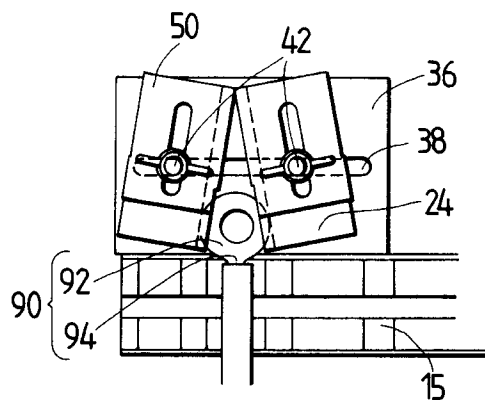


FIG. 9

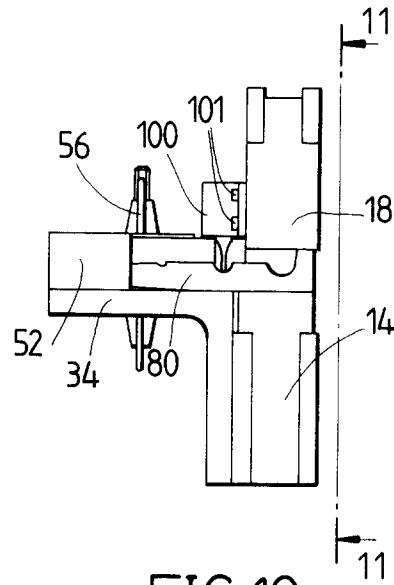


FIG. 10

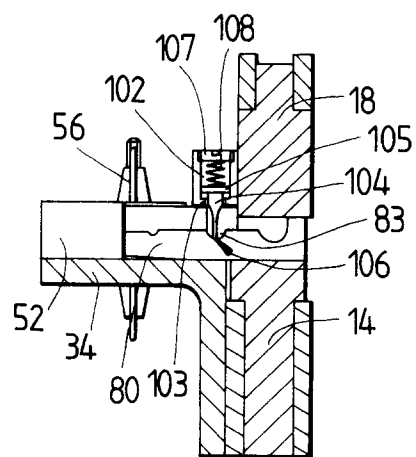


FIG. 11



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 30 1376

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
D,A	US-A-2 359 083 (V.E.CARLSON) * page 1, right column, line 40 - line 44 * * page 2, right column, line 72 - page 3, left column, line 57; figures 1-3,6 *	1,2	H01R43/042
A	US-A-2 411 838 (R.C.SWENGEL) * column 2, line 47 - column 3, line 10; figures 1,3,4 *	1	
D,A	US-A-3 673 848 (G.J.FILIA) * column 1, line 3 - line 23 * * column 1, line 49 - line 56 * * column 3, line 66 - line 75; figures 4-7 *	1	
A	US-A-3 487 524 (G.J.FILIA) * column 4, line 64 - column 5, line 8 * * column 5, line 25 - line 55; figure 4 *	1,6,7	
A	US-A-3 504 417 (G.J.FILIA) * column 6, line 69 - column 7, line 3 * * column 7, line 29 - line 35 * * column 7, line 70 - column 8, line 27; figures 8,11,13 *	1,6,7	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			H01R B25B
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 02 AUGUST 1993	Examiner ALEXATOS G.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			