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(54) **A combination tool.**

(57) A combination tool in the form of a monkey wrench, or pipe wrench, includes a reversible adjustable jaw (8). The adjustable jaw has two working surfaces (12, 13) which face away from one another and which can be turned to coact with the fixed jaw (5) of the tool by reversing (P) the adjustable jaw, such as to obtain different tool functions, in the described and illustrated case either a monkey wrench function or a pipe wrench funtion.

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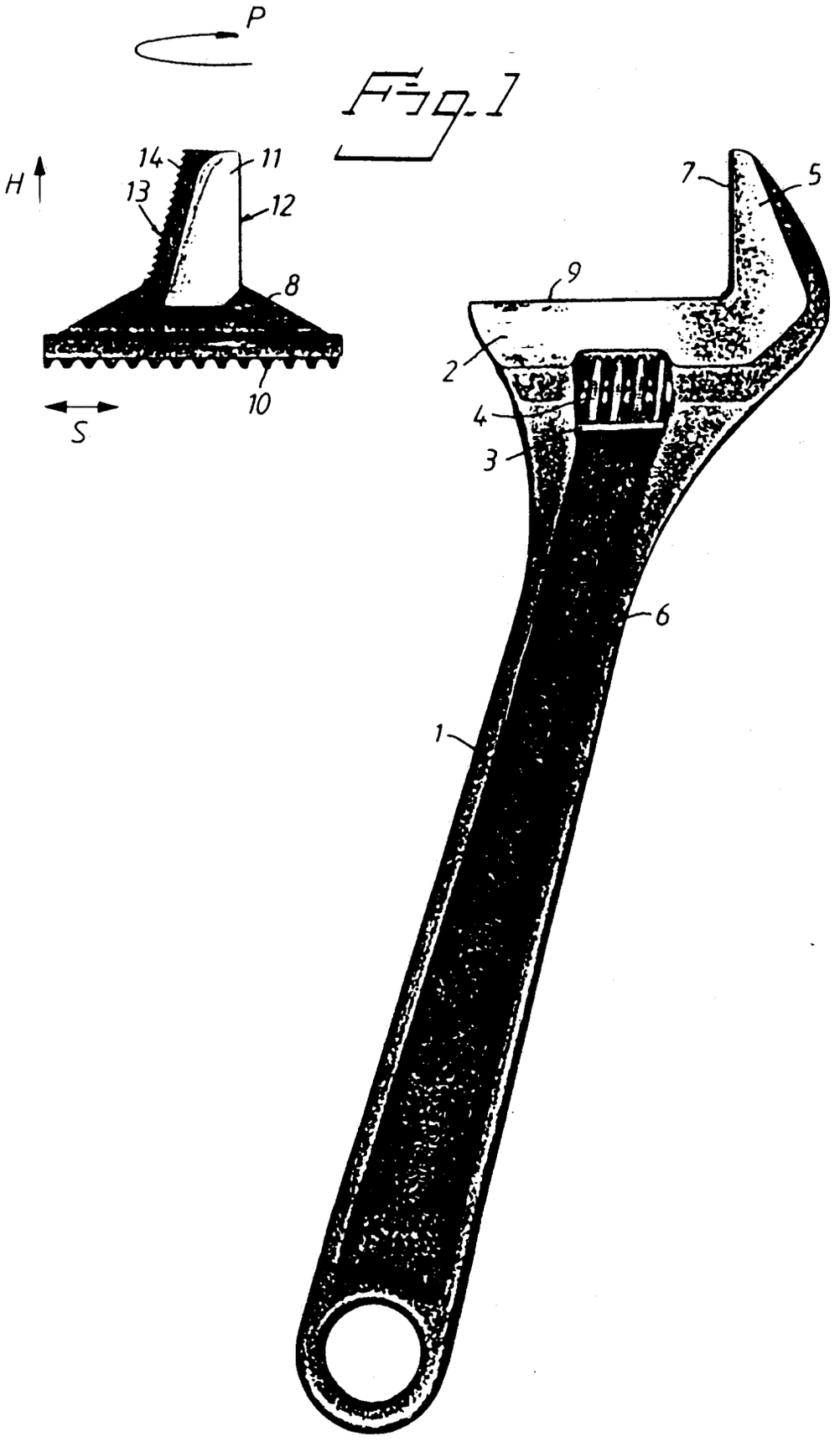
Fig. 1



Technical Field

The present invention relates to a handtool, and more specifically to a combination tool in the form of an adjustable spanner, or monkey wrench, comprising a handle that carries on one end a head which includes one fixed jaw and an adjustable jaw. The adjustable jaw can be set positionally by means of a manually manipulated worm screw and includes working surfaces facing away from one another. Each one of the working surfaces is intended to coact with the fixed jaw working surface in dependence of how the adjustable jaw is turned.

Background Art

Monkey wrenches of this kind have been known for almost a century; see Swedish Patent No. 4 066 granted to J P Johansson on the 11 th May 1892. The same inventor, J P Johansson, was also the creator of the modern pipe wrench as we know it today; see Swedish Patent No. 1 636 (17th August 1888). The monkey wrench and the pipe wrench have been used widely the world over.

Over the past decades different proposals have been made for combining the monkey wrench with other tools. The majority of these proposals, however, have resulted in a clumsy combination tool which cannot be used effectively as a monkey wrench or for any other purpose. For instance such a combined pipe and monkey wrench is known from US Patent Specification No. 721,444 of 24th February 1903. The combination tool described therein has an adjustable jaw within which the manually operated worm screw is journalled. The inside thread of the screw coacts with a threaded stem separating the working surface of the fixed jaw in two areas. The small length of the worm screw being restricted by the constructive design makes the use of the tool uncertain and less reliable. Also, the old-fashioned main design of the tool makes it quite unsuitable for effective use.

Disclosure of the Invention

Accordingly, the object of the present invention is to provide an effective combination tool which can be used in a safe and reliable manner. The fitter using the tool must not be restricted in his work, e g by the tool handle, and he must be able to do the work with as little movement as can be for having a good result.

This object is achieved in accordance with the invention in that the worm screw is journalled in the handle in such a way that the outside thread of the screw coacts with a rack part formed at the base of a mainly triangular body belonging to the adjustable jaw, said adjustable jaw having a jaw part which projects from the apex of said triangular body, where the working surfaces of the adjustable jaw are formed at the surfaces of the jaw part faced away from one another.

In the case of the inventive combination tool, the two working surfaces of the reversible adjustable jaw are configured so that, together with the fixed jaw, they form a spanner-grip engagement either for tightening nuts or bolts, in accordance with a conventional monkey wrench, and a pipe-wrench grip for tightening tubular bodies, in accordance with a conventional pipe wrench. The working surface on the adjustable jaw that forms part of the pipe-wrench grip will preferably have a teeth pattern of substantially saw-tooth shape with the points of the teeth facing the slide parth for the adjustable jaw.

In accordance with a preferred embodiment of the inventive combination tool, the adjustable jaw has substantially the shape of an isosceles triangle. To make it possible to turn or reverse the working function of the tool the adjustable jaw has to be moved to a position where the jaw part is free to be turned. This can be obtained by totally releasing the adjustable jaw from the worm screw. According to another conceivable embodiment of the adjustable jaw, said jaw part is pivotally mounted on the apex of the triangular body so as to facilitate switching of the tool between its monkey-wrench and pipe-wrench functions.

Description of Preferred Embodiments

The inventive combination tool will now be described in more detail with reference to an exemplifying embodiment of the tool illustrated in the accompanying drawings, in which

Fig. 1 illustrates a preferred embodiment of an inventive combination tool, with the adjustable jaw shown removed from said tool;

Fig. 2 illustrates the same combination tool with the adjustable jaw turned to a position for use as a pipe wrench; and

Fig. 3 again shown the same combination tool, but with the adjustable jaw turned to a position for use as a monkey wrench.

The inventive combination tool is constructed as a monkey wrench, or an adjustable spanner and includes a handle 1 which merges at one end with a head 2. In the fashion of monkey wrench, the head 2 includes an opening 3 in which a manually manipulated worm screw 4 is rotatably journalled. The head also includes a fixed jaw 5 which is substantially an extension of one edge 6 of the handle 1. The jaw 5 has a working surface 7 which faces inwardly from the edge surface 6.

As with conventional monkey wrenches, the inventive combination tool includes an adjustable jaw 8 having a rack part 10 which in cooperation with the worm 4, enables the adjustable jaw to be moved along a slidepath 9 provided on the head 2. According to one preferred embodiment of the invention, the adjustable

jaw 8 can be removed completely from the head 2 and turned or reversed in the manner indicated by the arrow P in Fig. 1.

The adjustable jaw 8 advantageously has the shape of a triangle, with the rack part 10 provided on the base thereof. In the case of the illustrated embodiment of the combination tool, the adjustable jaw 8 has the shape of an isosceles triangle, the apex of which merges with a jaw part 11. This jaw part 11 has two working surfaces 12, 13, which face away from one another. One working surface, 12, is preferably smooth and plane-parallel with the working surface 7 of the fixed jaw 5, said working surface 12 and said working surface 7 together forming a spanner-grip, as illustrated in Fig. 3. The other working surface 13 is preferably knurled or serrated or provided with some other pattern and forms together with the working surface 7 of the fixed jaw 5 an acute angle such as to form a pipe-wrench grip, as illustrated in Fig. 2. The patterned working surface 13 preferably presents a number of mutually parallel, transversely extending teeth 14 which extend over the working surface essentially at right angles to the vertical and horizontal tool-setting positions H and S, as seen in Fig. 1. The teeth pattern 14 has substantially the shape of saw-tooth, the points of the teeth facing the slide path 9.

The acute angle defined by the working surface 13 of the adjustable jaw 8 and the working surface 7 of the jaw 5 will preferably be about 15 to 44 degrees. This provides a maximum gripping effect on a cylindrical workpiece, as indicated in Fig. 2.

The inventive combination tool can thus be used as a pipe wrench, in accordance with Fig. 2, in which the gripping width can be readily adjusted by means of the worm screw 4, and also as a conventional monkey wrench, in accordance with Fig. 3.

When switching the combination tool from a pipe wrench function to a monkey wrench function, or vice versa, the adjustable jaw 8 is moved by the worm screw 4 until the adjustable jaw is completely free from the head 2, as illustrated in Fig. 1. The adjustable jaw 8 can then be turned (the arrow P) so that either its working surface 12 or its working surface 13 faces towards the working surface 7 of hte fixed jaw 5, so as to obtain the desired tool function, wherafter the adjustable jaw 8 is returned to the slide path 9 and into engagement with the worm screw 4, for adjustment to an appropriate gripping width.

A measurement scale 15 may be provided along the slide-path 9 on that surface of the head 2 which faces towards the fitter when the combination tool is held in a correct working position, so as to facilitate adjustment of the tool-gripping width. Such a measuring scale 15 is indicated schematically in Figs. 2 and 3, and may be graduated in millimetres, inches or some other appropriate unit of measurement. In this case, the measurement scale 15 is started and finished with stop indicator areas 19. The two areas 19 are used as a warning to the fitter that the combination tool must not be used when coacting markers 16, 17 on the adjustable jaw 8 are within these areas or have passed outside thereof. Thus, the markers 16, 17 have to stay in between the stop indicators 19, i e the nuts or tubes must not be smaller than four units and not greater than 45 units as shown with the exemplifying scale 15 in Figs. 2 and 3.

The adjustable jaw 8 is provided with different markers 16, 17, 18. The markers or indices 16, 18 are assigned the working surface 13, i e are intended for the pipe wrench grip shown in Fig. 2. The marker 16 coacts with the measuring scale 15 while the other marker 18 indicates the pipe centre height above the slide path 9. These two markers or indices 16, 18 coact with the measuring scale 15 only when the adjustable jaw 8 is turned such that the working surfaces 7 and 13 coact with one another. Similarly, the marker 17 coacts with the measuring scale 15 solely when the adjustable jaw 8 is turned for coaction between the working surfaces 7 and 12.

It will be understood that the invention is not restricted to the advantageous embodiment of the inventive combination tool described above with reference to the accompanying drawings and that this embodiment can be modified with the scope of the invention. Thus, it is conceivable to rotatably mount the jaw part 11 of the adjustable jaw 8 in the base body. With this alternative, the adjustable jaw 8 need not be completely removed from the head 2 when changing the gripping mode of the tool, although the adjustable jaw 8 should be suitably arranged to pass an outer position before it is possible to turn the jaw part 11. For instance, the slide path 9 should be constructed to lock the jaw part 11, in a set gripping position until the adjustable jaw 8 is moved to a release position, in which the jaw part 11 can be rotated.

The aforedescribed combination tool is intended to function as a pipe gripping wrench and a monkey wrench. It will be understood, however, that the working surfaces 7, 12,and 13 can be configured for other purposes, for instance they may be given configurations appropriate with other known types of wrenches or spanners, or may be provided with a knife edge or cutter which enables the tool to be used as a tube cutter, cable stripper, etc. The invention is therefore not restricted to the specific embodiment described above, but may incorporate all conceivable variants that lie within the concept of the invention as described in the following claims.

Claims

1. A combination tool in the form of a monkey wrench having a handle (1) and a head (2) which includes a fixed jaw (5) and an adjustable jaw (8), said adjustable jaw can be set positionally by

means of a manually manipulated worm screw (4) and includes working surfaces (12,13) facing away from one another, each of said working surfaces being intended to coact with the fixed jaw (5) working surface (7) in dependence of how the adjustable jaw (8) is turned, said combination tool being characterized in that the worm screw (4) is journalled in a known manner in the handle (1), the worm screw outside thread coacts with a rack part (10) formed at the base of a mainly triangular body belonging to the adjustable jaw (8) having a jaw part (11) which projects from the apex of said triangular body, said jaw part having said working surfaces (12, 13) of the adjustable jaw (8) formed on surfaces faced away from one another.

2. A tool according to claim 1, being characterized in that said jaw part (11) has two working surfaces (12,13) which face away from one another, one (12) of which together with the working surface (7) of the fixed jaw (5) forming a spanner grip intended for nut or bolt tightening purposes, while the second one (13) of the jaw part working surfaces together with the fixed jaw (5) working surface (7) forms a wrench grip intended for tightening tubular work-pieces.

3. A tool according to claim 1 or 2, being characterized in that said adjustable jaw (8) can be released from the head (2) by being moved by the worm screw (4), to make a turning action possible for having the function of the tool shifted.

4. A tool according to claim 3, being characterized in that said adjustable jaw (8) is totally released from the head (2) and after being turned once again being introduced in the slide path (9) and into engagement with the worm screw (4) so as to be set to required gripping width.

5. A tool according to claim 3, being characterized in that the jaw part (11) of said adjustable jaw (8) is rotatably mounted in the triangular body.

6. A tool according to claim 5, being characterized in that to make said turning of the jaw part (11) possible said adjustable jaw (8) has to pass an outer position by being moved by the worm screw (4) and after being turned once again being introduced into the slide path (9) constructed to lock the jaw part (11) in a set gripping position.

7. A tool according to claim 2, being characterized in that the working surface (13) of the adjustable jaw (8) formed as a wrench grip has a teeth pattern (14) of substantially saw-tooth shape with the points of said teeth facing the slide path (9).

8. A tool according to any of claims 1-7 and including a measuring scale (15) formed on the head (2) along the slide path (9), said tool being characterized in that the adjustable jaw (8) is provided with different markers (16,17,18) which are assigned to respective working surfaces (12, 13) such as to indicate in coaction with the measuring scale (15) the gripping width to which the tool has been adjusted.

9. A tool according to claim 8, said tool being characterized in that solely that marker (16, 17, 18) which is assigned respectively to the positional setting of the spanner grip or the pipe grip will coact with the measuring scale (15).

10. A tool according to claims 8 or 9, being characterized in that the markers (16,18) for the pipe grip setting include two indices, one (16) of which coacting with the measuring scale (15) and the second one (18) indicating the pipe centre height above the slide path (9).

11. A tool according to any of claims 8-10, being characterized in that the measuring scale (15) is started and/or stopped with stop indicators (19) within which the markers (16,17) of the adjustable jaw (8) are to be when making use of the tool.

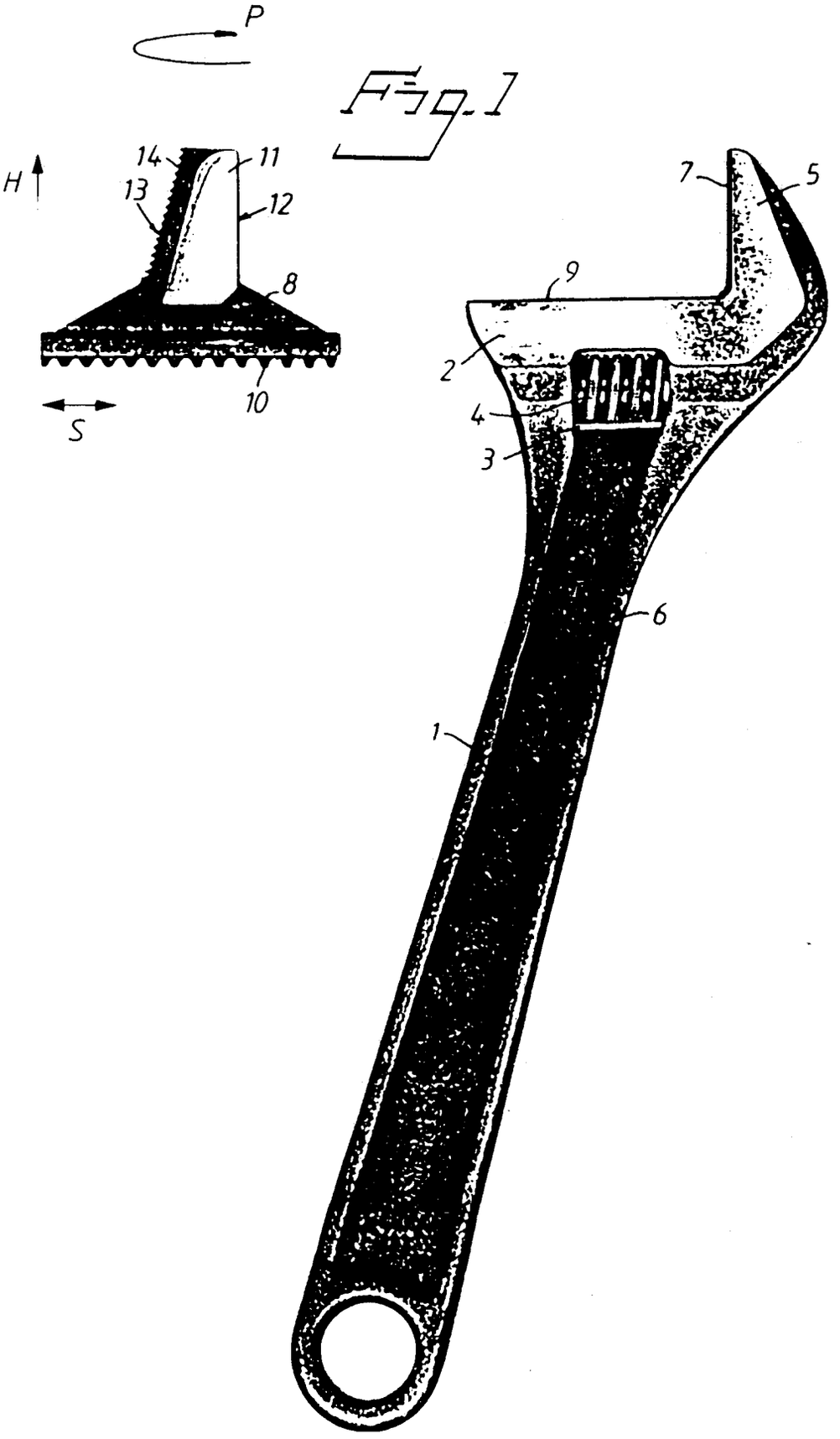


Fig. 1

Fig. 2

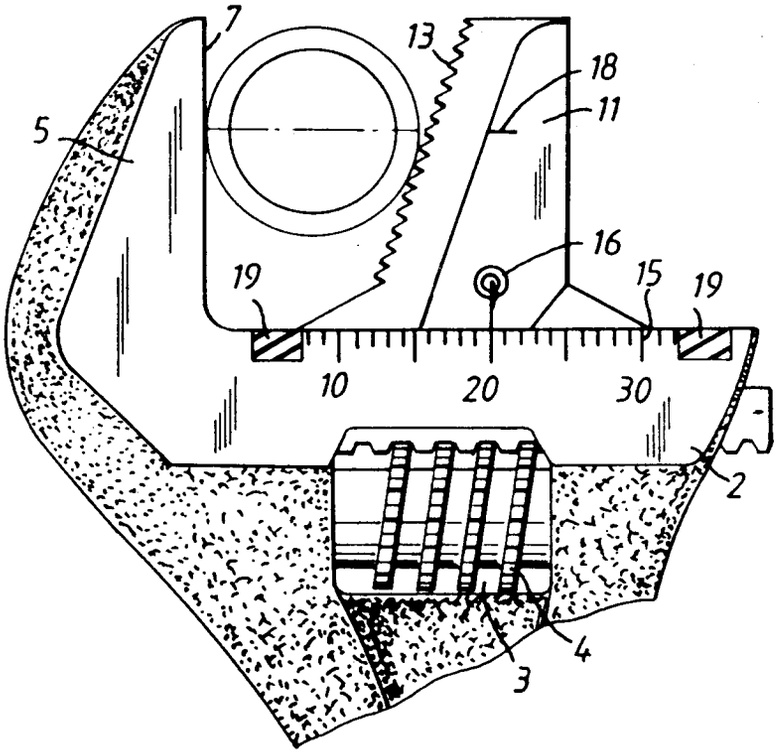
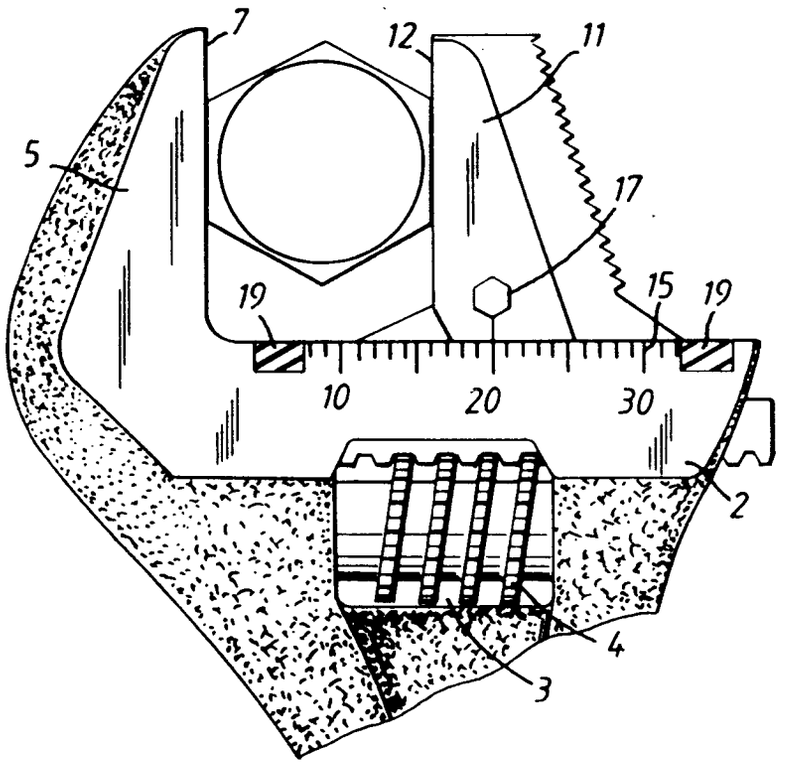


Fig. 3



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EUROPEAN SEARCH REPORT

Application Number

EP 91850178.4

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)
X	US - A - 4 344 339 (PENNER) * Fig. 1,9 *	1-7	B 25 B 13/14
A	FR - A - 2 576 823 (SORGI) * Fig. 1,2 *	8-11	
A	US - A - 2 722 150 (GREEN) * Fig. 1,2 *	8-11	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 25 B 13/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	02-09-1991	BENCZE

CATEGORY OF CITED DOCUMENTS

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