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(54) Scaffold clamp and method for realising it

(57) The scaffold clamp has a body (1) shaped in such a way as to be adapted to be produced by cold molding.

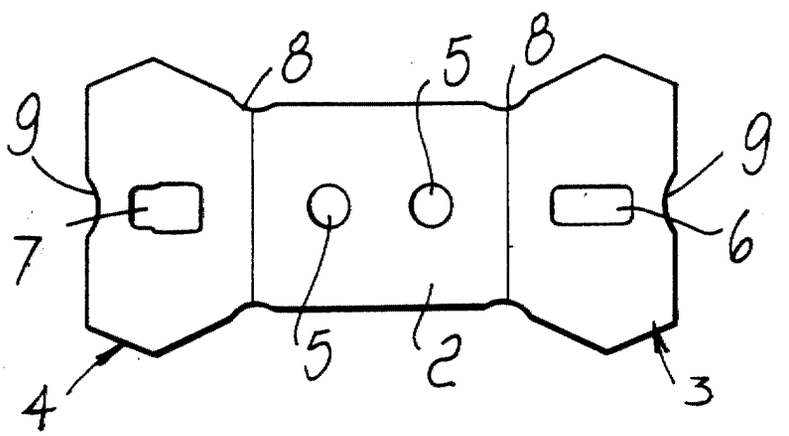

Fig. 1

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Description

[0001] The present invention relates to a scaffold clamp and to a process for producing it.

[0002] As known, the scaffold clamps currently used are realised through a melting method.

[0003] Said clamps exhibit excessive thickness and size for the purpose they are intended for.

[0004] This implies a use of excess material that does not impair the resistance of the clamp, but is a useless contribution of material in unloaded areas.

[0005] As a consequence thereof, also the weight of the clamp is more than what necessary.

[0006] Moreover, the realization through melting does not allow a realization of pieces in series with the same dimensional characteristic and design tolerances.

[0007] In this situation, the technical object at the basis of the present invention is that of solving the above-mentioned disadvantages of the prior art.

[0008] Within this technical object, an important purpose of the present finding is that of devising a scaffold clamp having reduced thickness and size, with a minimum contribution of material, the mechanical resistance being at least equal to that of the prior art.

[0009] Further purpose of the present finding is that of realising a clamp which should allow a precise contact between clamp-tube, wedge-clamp, disk-wedge, maintaining its mechanical characteristics constant in time.

[0010] Further purpose of the present finding is that of devising a process which should allow realising a shaped scaffold clamp, which should allow removing excess material, normally present also in the areas not concerned by the stresses into the clamp.

[0011] Another purpose of the present finding is that of devising a process which should allow realising pieces in series with an absolute precision of the design tolerance ranges so as to guàrantee quality and resistance characteristics in time.

[0012] This object, as well as the purposes specified above, are substantially attained thanks to a scaffold clamp characterised in that it exhibits a body configured in such way as to be realised through cold molding.

[0013] Advantageously, the process for realising said clamp is characterised in that said clamp is produced through cold molding in a plurality of steps.

[0014] Further features and advantages of the finding will appear more clearly from the following description of a preferred but not exclusive embodiment of a process for realising a clamp and of a scaffold clamp according to the invention, and of the process for its realization, illustrated by way of an indicative and not limitative example in the attached drawings. In such drawings:

- Figure 1 shows a plan view of the body obtained after the first operation of the first molding step;
- Figure 2 shows a side elevation view of the body obtained after the first operation of the first molding step;
- Figure 3 shows a plan view of the body after the second operation of the first molding step;
- Figure 4 shows a side elevation view of the body after the second operation after the first molding step;
- Figure 5 shows a plan view of the body after the third operation of the first molding step;
- Figure 6 shows a side elevation view of the body after the third opèration of the first molding step;
- Figure 7 shows a plan view of the body after the second molding step;
- Figure 8 shows a perspective view of the body after the second molding step;
- Figure 9 shows a plan view of the finished clamp;
- Figure 10 shows a perspective view of the finished clamp;
- Figure 11 shows a perspective view of the clamp-wedge-octagonal plate-tube connection.

[0015] With reference to the above figures, the scaffold clamp according to the invention is realised through cold molding.

[0016] Clamp 20 comprises a substantially quadrangular plate 2 exhibiting two wings 3, 4 on two opposed portions. Said wing 3 comprises at least a first portion 14, a second portion 10, a third portion 11, each substantially having a trapezoidal shape.

[0017] The first portion 14 is connected, through the larger base, to the quadrangular plate 2, and its angles 8 with said plate 2 are bevelled so as to facilitate the bending.

[0018] Similarly, wing 4 comprises at least a first portion 15, a second portion 12, and a third portion 13, each substantially having a trapezoidal shape.

[0019] The first portion 15 is connected, through the larger base, to the quadrangular plate 2, and its angles 8 with said plate 2 are bevelled so as to facilitate the bending.

[0020] Portions 14 and 15 are bent with respect to plate 2 so as to form a 90° angle with the same.

[0021] Similarly, portions 10 and 11 exhibit a trapezoidal shape and are connected, through the larger bases, to said first portion 14, forming a 90° angle, and portions 12 and 13, also having a trapezoidal shape, are connected to the central portion 15 of wing 4, forming a 90° angle with the same.

[0022] Moreover, clamp 20 exhibits curved chamfers 9 on the side of the central portions 14, 15 of wings 3, 4 opposed to that connected with plate 2.

[0023] Said curved chamfers have two functions: that of allowing an easy bending of portions 10, 11, 12, 13 of wings 3, 4, and that of guaranteeing a perfect contact between clamp 20 and tube 19, as said chamfer has a bending radius substantially equal to that of tube 19.

[0024] The quadrangular plate 2 exhibits, centred along its greater axis, two circular apertures 5 adapted for the connection with other connecting elements.

[0025] The first portion 14 of wing 3 exhibits an aper-

ture 6 having substantially rectangular shape equal to a section of wedge 16, and it is adapted to house and lock it.

[0026] The first portion 15 of wing 4 exhibits an aperture 7 whose half width shape is equal to the width of aperture 6, and the other half width is greater, so as to allow an easy insertion of the same wedge 16.

[0027] Said apertures 6, 7 are adapted to receive a wedge 16 for the connection to an octagonal plate 17 fixedly connected to the tubes 19 of the scaffold.

[0028] In the bending portion between plate 2 and wings 3, 4, there are present some stiffening grooves 21.

[0029] The result obtained is a clamp 20 with a reduced thickness adapted to interact with a wedge 16 and an octagonal plate 17 connected to a vertical tube 19 of the scaffold.

[0030] In fact, the octagonal plate 17 exhibits shaped holes 18, and it inserts between the bent wings 3, 4, of clamp 20 so as to align one of its shaped holes 18 with apertures 6, 7 of wings 3, 4, which after the bending are orthogonal to the quadrangular plate 2.

[0031] As wedge 16 inserts into the three aligned holes 6, 18, 7, it engages at the same time with clamp 20 and plate 17.

[0032] The process for implementing the clamp described above according to the finding is advantageously realised through cold molding through the sequence of three steps.

[0033] The first cold-molding step is realised by using at the same time a first, a second and at least a third punch which simultaneously work on a steel strip.

[0034] The punches carry out three different operations: the first punch works on a steel strip; the second punch works on the body preformed by the first punch, and the third punch works on the body preformed by the second punch.

[0035] In the first operation, the strip is sheared so as to obtain a body 1 comprising a quadrangular plate 2 and two wings 3 and 4 connected to the shortest side of plate 2.

[0036] At the same time as the shearing, a drilling operation is carried out, in which two apertures 5 with a circular shape, aligned according to the longest axis of plate 2, adapted for the connection with other elements, and simultaneously, two holes 6, 7, substantially at the centre of wings 3, 4, are realised.

[0037] Body 1, obtained from the shearing and drilling, is shaped in the bending portions; in this way, the bending is facilitated, and the body is rendered lighter since the material present in the areas not concerned by the stresses, which thus do not impair the clamp resistance, is removed.

[0038] During the second operation of the first step, portions 10, 11, 12, 13 of wings 3, 4 are bent according to the line that connects the bevelled angles 8 and the chamfers 9 with respect to the plane of plate 2, and at the same time portions 6 and 7 of the wings are bent.

[0039] Finally, the last operation of the first steps consists of the further bending of wings 3 and 4 by 30° with respect to plate 2.

[0040] Said bends are carried out by means of a molding press of about 200 tons.

[0041] In the second step, with a single-step die, wings 3 and 4 are further rotated by 80° with respect to plate 2. These shaping and bending are possible thanks to the use of special highly resistant and at the same time, highly deformable steels with reduced thickness.

[0042] In the last step, the bent body 1 is calibrated through single-step cold molding, and the final size is imparted to it.

[0043] Portions 10, 11, 12, 13 of wings 3 and 4 are further rotated so as to be orthogonal to wings 3 and 4, and wings 3, 4 are bent so as to form a 90° angle with plate 2.

[0044] Moreover, during this step, some stiffening grooves 21 are realised on the outside of the connection bending of wings 3, 4, with the central plate 2.

[0045] The cold molding process allows obtaining a higher precision with respect to melting, and it allows the realization in series of pieces falling within the design tolerance, so as to guarantee steady quality and resistance characteristics in time.

[0046] The clamps obtained with this method are extremely precise; in this way, the clamp 20-plate 17-wedge 16 adherence is optimal, thus guaranteeing a high resistance at any point of the structure which does not decreases with time.

[0047] Several changes and variants can be made to the invention thus conceived, all falling within the scope of the present inventive idea. Moreover, all details can be replaced with technically equivalent elements.

[0048] The materials used, shapes and sizes can be of any kind according to the requirements.

Claims

1. A scaffold clamp **characterised in that** it has a body shaped in such a way as to be adapted to be produces by cold molding.

2. A scaffold clamp according to claim 1, **characterised in that** said body comprises a substantially quadrangular plate having on two opposed areas two wings, each of said wings consisting of at least a first, a second and a third part each having a substantially trapezoidal shape, said first central part being connected through its major base to said quadrangular plate, at least the connecting angles between said plat and said wings being bevelled in order to facilitate the bending thereof.

3. A scaffold clamp according to one or more of the preceding claims **characterised in that** it has chamfers on the side of said central part of said

wings which is opposie to that connected with said rectangular plate.

4. A scaffold clamp according to one or more of the previous claims, **characterised in that** said quadrangular plate forms with said wings an angle substantially equal to 90°.

5. A scaffold clamp according to one or more of the previous claims, **characterised in that** said second and third part of said wings are on the side and are connected to said first central part through their major base and form with said central part an angle of 90°.

6. A scaffold clamp according to one or more of the previous claims, **characterised in that** it comprises two openings on said wings.

7. A scaffold clamp according to one or more of the previous claims, **characterised in that** the respective one of said openings has a rectangular shape and the respective other of said openings is so shaped as to have a portion of width equal to that of said rectangular opening and the remaining portion of greater width than that of said rectangular opening, said openings being adapte to receive a connecting wedge with an octagonal plate fixedly connected the tubes of the scaffolding.

8. A scaffold clamp according to one or more of the previous claims, **characterised in that** said chamfers have a radius of curvature essentially equal to the radius of curvature of the tube which they are in contact with.

9. A scaffold clamp according to one or more of the previous claims, **characterised in that** it has stiffening grooves on the bending side of said central portion of said wings with said rectangular plate.

10. A process for the realization of scaffold clamps according to one or more of the previous clamis, **characterised in that** said clamps are formed through cold molding in a plurality of steps.

11. A processo for the realization of scaffold clamps according to one or more of the previous clams, **characterised in that** the first molding step is carried out using simultaneously a first, a second and at least a third punch which act simultaneously.

12. Process for the realization of scaffold clamps according to one or more of the previous claims, **characterised in that** said punches carry out different operations: the first punch works on a steel strip, the second punch works on the body preformed by the first punch and the third punch works on the body formed by the second punch.

13. Process for the realization of scaffold clamps according to one or more of the previous claims, **characterised in that** said first step has a first operation in which at least the shear of said strip occurs, up to obtain a shaped body which has a quadrangular plate and two wings connected to said plate.

14. Process for the realization of scaffold clamps according to one or more of the previous claims, **characterised in that** in said first operation, simultaneously to said shearing operation, two openings are further formed along the major axis of said rectangular plate and two openings on said central part of said wings.

15. Process for the realization of scaffold clamps according to one or more of the previous claims, **characterised in that** in said first operation, simultaneously to said shearing operation, the angles between said quadrangular plate and said wings are bevelled.

16. Process for the realization of scaffold clamps according to one or more of the previous claims, **characterised in that** in the intermediate steps, said body is bent.

17. Process for the realization of scaffold clamps according to one or more of the previous claims, **characterised in that** in the last step said body is calibrated by means of a single mold, whereby the final dimensions for the clamp are set.

18. Process for the realization of scaffold clamps according to one or more of the previous claims, **characterised in that** in said last step, on the bending side of said wings with said rectangular plate, stiffening grooves are formed.

19. Process for the realization of scaffold clamps according to one or more of the previous claims, **characterised in that** said bends are formed in correspondence of said bevelled angles provided between said wings and said plate and said chamfers provided on the opposite side of said central part of said wings with respect to that connected with said rectangular plate.

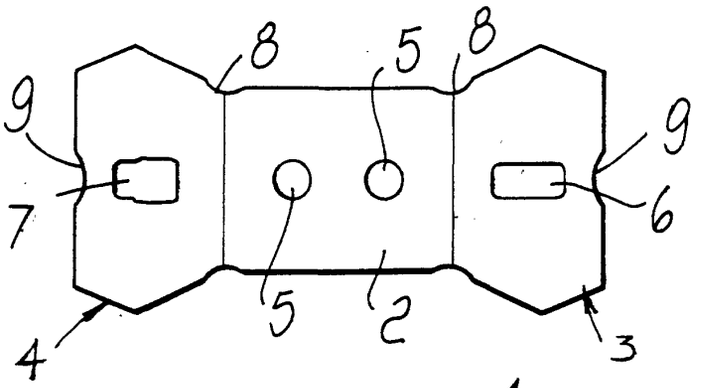

FIG. 1

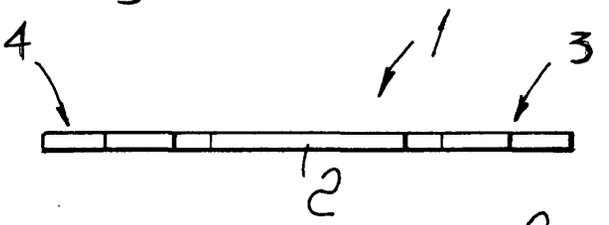

FIG. 2

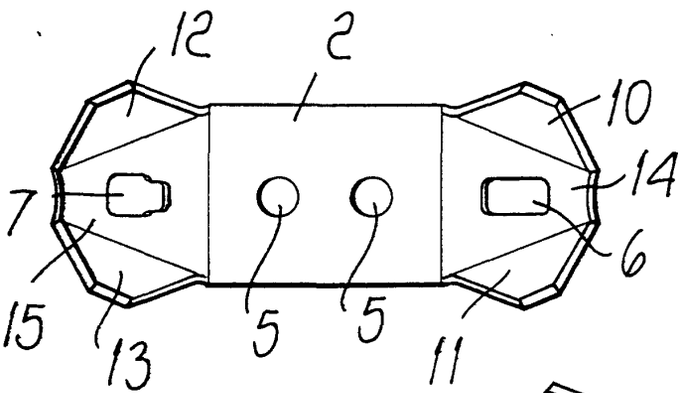

FIG. 3

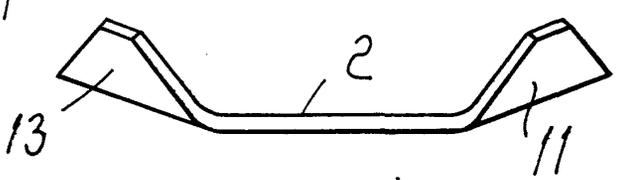

FIG. 4

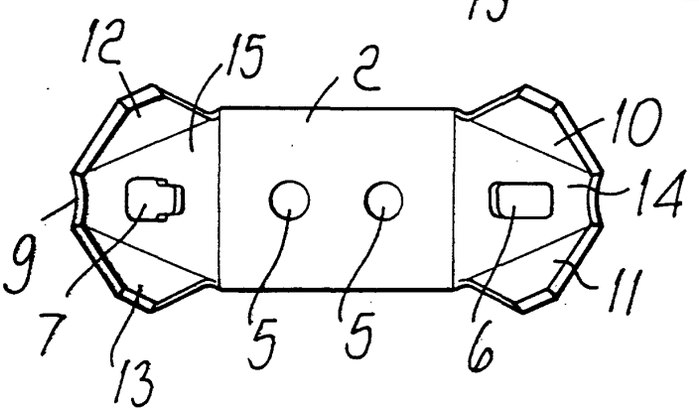

FIG. 5

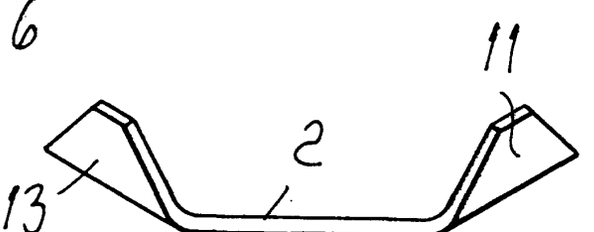

FIG. 6

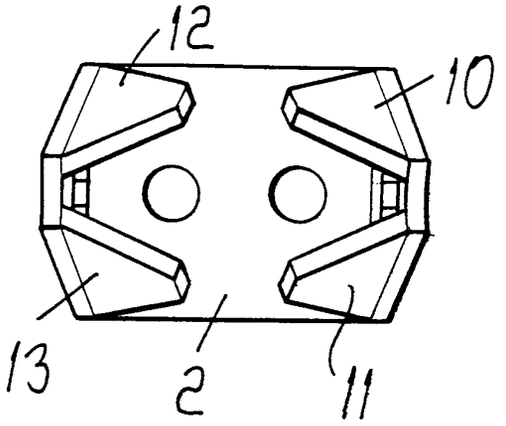

FIG. 7

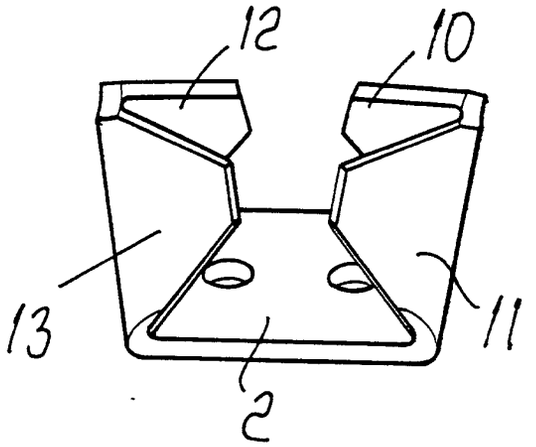

FIG. 8

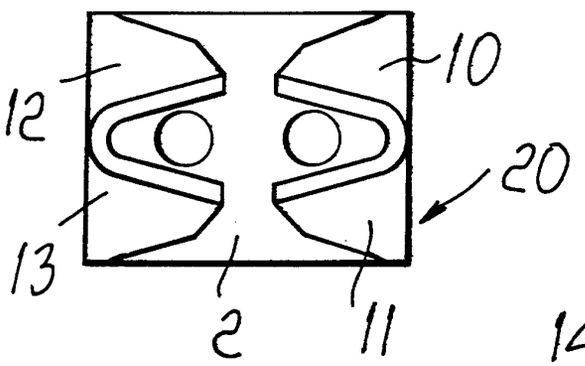

FIG. 9

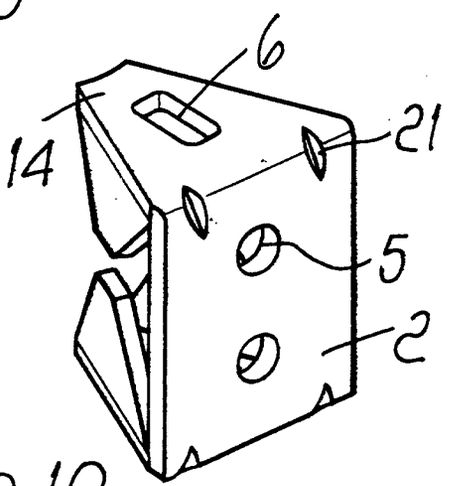

FIG. 10

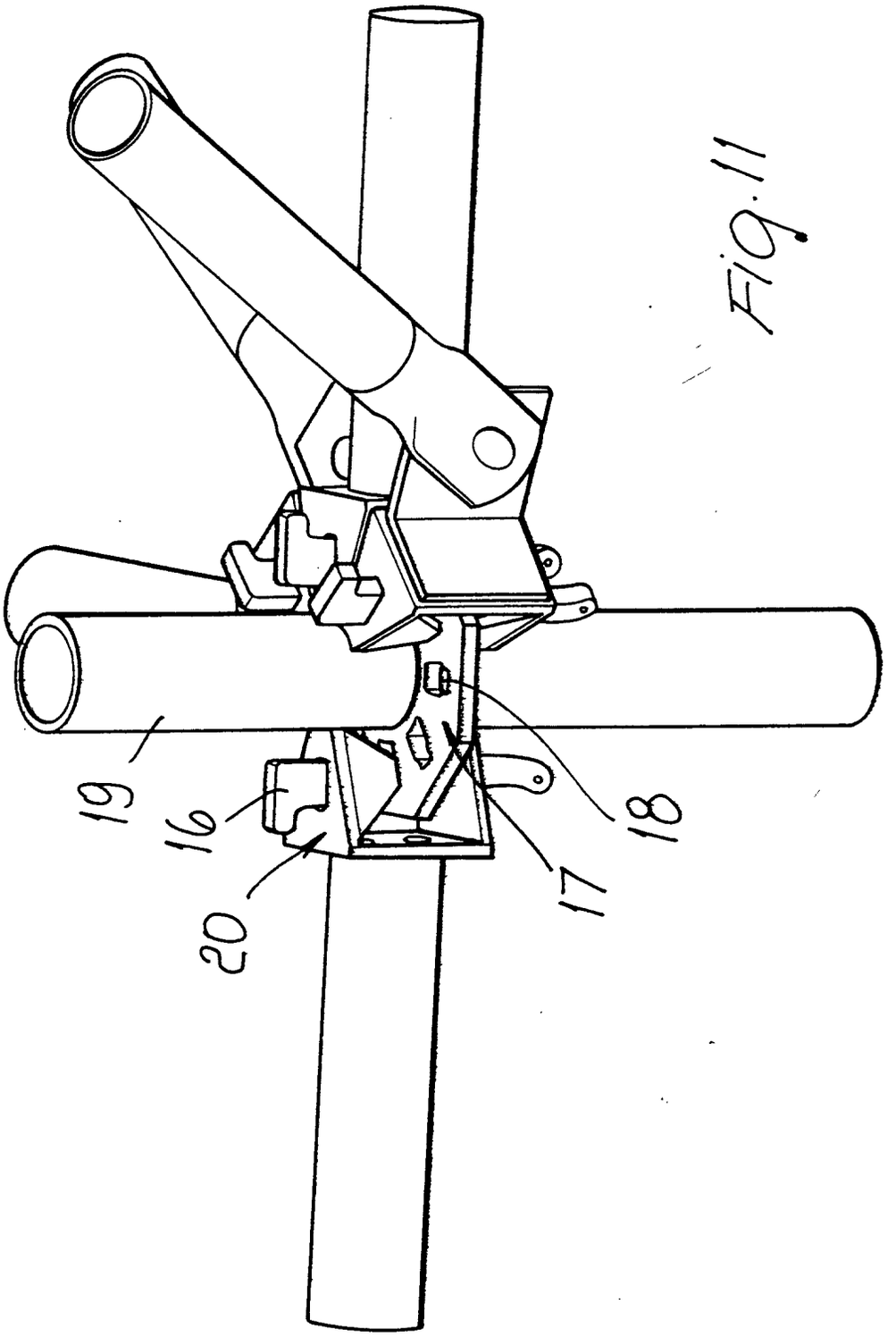

Fig. 11

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 12 3205

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X	US 5 961 240 A (BOBROVNICZKY BERT) 5 October 1999 (1999-10-05) * column 1, line 54 - line 60 * * column 2, line 45 - line 49 * * column 2, line 55 - column 3, line 3 * * column 3, line 4 - line 18 * * column 3, line 57 - line 63 * * figures *	1-6,8, 10-16,19	E04G7/30
Y		7	
Y	WO 93 01380 A (LUBINSKI RONALD) 21 January 1993 (1993-01-21) * page 7, line 3 - line 14 * * figures 5,6 *	7	
A	US 5 217 314 A (PERRUELLE CLAUDE) 8 June 1993 (1993-06-08) * figures *		

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E04G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 February 2001	Andlauer, D

CATEGORY OF CITED DOCUMENTS

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