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(54) Auger

(57) Manually operable auger (1) having a drill rod (9) and a cross-rod (2) having ends on which handles (4) have been attached, the cross-rod being provided with ascending ends, the handles comprising ends defining convex handle portions that are bulging with respect to the cross-rod ends.

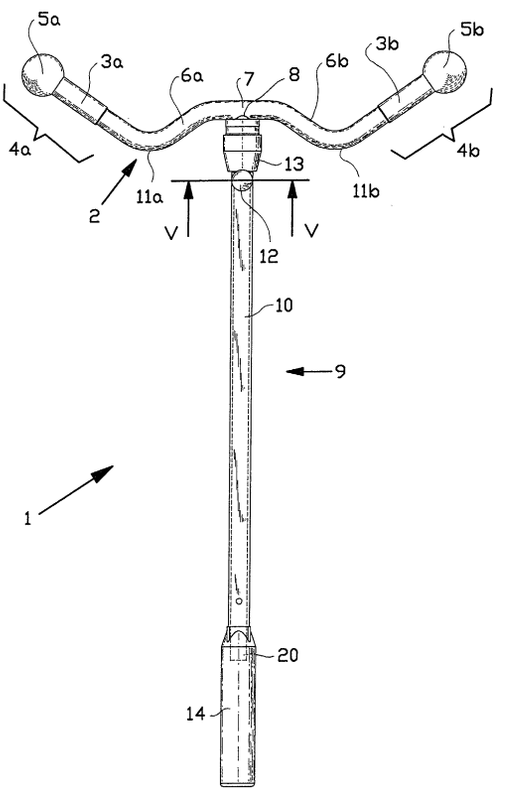

FIG. 1

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Description

[0001] The invention relates to a manually operable auger having a cross-rod on which handles have been attached.

[0002] In practice manually operable, T-shaped augers are known having a drill rod, the one end of the drill rod being provided with a drill piece, and the other end of the drill rod being provided with a straight cross-rod having handles which cross-rod is arranged perpendicular to the drill rod. The worker engages the ends of the cross-rod of the T to rotate the auger and to keep it straight up. The drilling can take place in remote areas.

[0003] The known auger has the drawback that it is difficult to operate because during drilling the hands of the operator have to follow a circular track during which the wrists have to turn in another position again and again. Over a large part of the stroke (the stroke being the drill movement an operator can let the auger make without taking his hands from the auger and without having to move position) the wrist are thus bent in an uncomfortable position. Another result is that it is necessary to frequently switch from one handle to the other during drilling because the wrists can only bend to a limited extent.

[0004] It is an object of the invention to improve on this.

[0005] From one aspect the invention to that end provides a manually operable auger having a drill rod and a cross-rod having ends on which handles have been attached, the cross-rod being provided with ascending ends, the handles comprising ends defining convex handle portions that are bulging with respect to the cross-rod ends. This provides the advantage that the hands of a person are able to move round with respect to the convex handle portions when drilling as result of which the wrists need not to be turned so much. During one and the same stroke a larger angular displacement of the auger can be realised in which the wrists can be turned to an acceptable degree during the entire stroke. During drilling the wrists and hands take up a ergonomic advantageous position. The convex handle portions are well-accessible from the inside and easier to engage for the hands of an operator, while the hands in the lowest position of the auger can remain free from the soil.

[0006] In an advantageous manner the ascending ends of the cross-rod inwardly - preferably fluently-change into, with respect to the drill rod, outwardly downward sloping intermediate portions. As a result it can be achieved that despite the ascending ends the convex handle portions are brought at a comparable height to the upper end of the drill rod. From an ergonomic point of view this position of the handles is advantageous. Moreover the transitional area of the ascending ends and the outwardly downward sloping intermediate portions can be advantageously used to pull the auger out of the soil after a hole has been drilled in the soil.

[0007] The ascending ends and/or the downward sloping intermediate portions can extend straight inclined or alternatively be bent.

[0008] Preferably the angle of the inclined ascending ends and/or downwardly inclined sloping intermediate members is 30-60 degrees, preferably approximately 35 degrees, with respect to the horizontal.

[0009] Preferably the cross-rod has a central portion that is perpendicular to the longitudinal direction of the auger. In this way the cross-rod offers the user -in addition to the ascending and possibly downward sloping portions- a conventional portion. The user can thus always choose a suitably oriented engagement portion.

[0010] In an ergonomic advantageous embodiment the cross-rod has kind of a W-shape.

[0011] In further embodiments the convex handle portions extend above, under and/or in a plane perpendicular to the drill rod with respect to the cross-rod and/or the convex handle portions are convex in a plane that contains the cross-rod and/or in a plane perpendicular to the cross-rod. The convex handle portions are then easily accessible to the hands of the worker.

[0012] Preferably the convex handle portions are spherical. The spherical shape is easy to engage by a hand. In a preferred embodiment the convex handle portions are rotatable with respect to the cross-rod. Thus it is achieved that a yet even more ergonomic advantageous position of the hands is possible when drilling.

[0013] The invention furthermore provides a cross-rod having handles, which handles comprise convex handle portions, suitable for an auger according to the invention.

[0014] An exemplary embodiment of the invention will be described below by way of example on the basis of the figures.

[0015] Figure 1 shows a front view of a manually operable auger according to the invention.

[0016] Figure 2 shows the same auger of figure 1 in perspective view.

[0017] Figure 3 shows the parts of the auger shown in figure 1 and 2 that are a part of the connection of the drill rod with the actual drill.

[0018] Figure 4 shows the auger in a telescopically extended position.

[0019] Figure 5 shows a cross-section of the auger of figure 1, near the upper end of its rod.

[0020] Figure 6 shows a number of consecutive stages in the use of the auger of figure 1.

[0021] Figure 1 shows an auger 1 having a cross-rod 2 having ends 3A, 3B. At the ends 3A, 3B thermal/electric insulated handles 4A, 4B are attached with respective ball-shaped portions 5A, 5B. The ends 3A, 3B extend outwardly and upwardly inclined with respect to the drill rod 9 at an angle of approximately 35 degrees to the horizontal and change into, with respect to the drill rod 9, outwardly and downwardly inclined oriented intermediate portions 6A, 6B, which also extend at an angle of approximately 35 degrees to the horizontal, but

with an opposite sign. The transition of the ends 3A, 3B to the intermediate portions 6A, 6B is formed by smoothly formed lifting points 11a, 11B, the lifting points 11A, 11B being particularly suitable for pulling the auger 1 out of the soil again after drilling a hole in the soil. A central portion 7 of the cross-rod connects the intermediate portions 6A, 6B to each other. At the location of the connection point 8 the cross-rod 2 is connected to the drill rod 9.

[0022] The drill rod 9 is formed by an outer rod 10 and an inner rod 20 which are designed telescopically extendable with respect to each other. In the position depicted in figure 1 the inner rod 20 is slid inside the outer rod 10. A stop button 12 is provided which secures the inner rod 20 and the outer rod 10 with respect to each other, both in the retracted and in the extended position. The stop button 12 can form a stop against the ground surface, as a result of which the user notices that the cross-rod has reached a certain level and that for ergonomic reasons it is wise to stop pressing in.

[0023] Alternatively a securing clip, clamp coupling or spring clip can be used instead of the stop button 12.

[0024] At the upper side of the drill rod 9 a ratchet pawl 13 is provided which can operate clockwise or anticlockwise or in both directions.

[0025] At the lower end of the drill rod 9 a sleeve 14 is slid over the outer rod 10 the sleeve 14 being a part of the connection of the outer rod 10 to the drill head. The parts that are a part of the connection of the outer rod 10 to the drill head are shown in detail in figure 3.

[0026] Figure 2 shows the auger 1 from figure 1 in perspective view. The sleeve 14 has a substantially cylindrical shape. The outer rod 10 and the inner rod 20 have a square design. However other shapes for the outer rod 10 and the inner rod 20 are also possible: pentagonal or polygonal, oval or rectangular.

[0027] The cross-rod 2 is formed from a cylindrical rod and has a W-shape. The cross-rod 2 is connected such to the drill rod 9 that the cross-rod 2 and the drill rod 9 are situated in one plane.

[0028] Figure 3 shows the parts of auger 1 shown in figure 1 and 2, which parts form the connection of the outer rod 10 to the actual drill. To that end the lower side of the outer rod 10 is provided with a cylindrical part 17 that changes into a semi-cylindrical part having a flat stop surface 15 with a cavity 16. The actual drill -that is not shown- is also provided with a semi-cylindrical end having a flat stop surface, intended to abut the stop surface 15 in connection. The stop surface of the end of the drill is to that end provided with a little pin that fits in the cavity 16 as a result of which both stop surfaces are unable to move with respect to each other in a direction parallel to the contact surface. Alternatively the stop surface 15 can also be provided with a little pin and the stop surface of the drill can be provided with a cavity.

[0029] A bayonet sleeve 18 having a slot 19a-f is slidably arranged around the outer rod 10. The slot 19 then surrounds a pawl 21 connected to the outer rod 10 so that the bayonet sleeve 18 can only slide according to the slot 19a-f over the pawl 21. By sliding the bayonet sleeve 18 downwards on the outer rod 10 it is achieved that the lower part of the bayonet sleeve 18 partially lies over the semi-cylindrical part of the outer rod 10 and the semi-cylindrical end of the drill. As a result both stop surfaces cannot tilt and give way to each other and the connection of the drill to the outer rod 10 is realised. The cam 21 will be confined after the coupling in the end 19a of the slot 19a-f. Should as a result of the movement through the soil the sleeve 18 be left behind with respect to the drill, the cam 21 will end up in the slot end 19b. Rotation of the sleeve then cannot result in movement of the cam 21 through the slot portion 19c, as a result of which otherwise decoupling might be induced.

[0030] Intended decoupling takes place by manipulating the sleeve 18 so that cam 21 moves through the slot portions 19c, 19d and 19e. The sliding of the bayonet sleeve 18 with respect to the outer rod 10 can take place by means of a sleeve 14 which is clampingly arranged about the bayonet sleeve 18, so that the sleeve 18 follows the movement of the sleeve 14. The sleeve 14 is made of soft, somewhat flexible material, so that the user is also provided with a pleasant engagement point having a good grip in wet or cold weather conditions when carrying the auger. As a result of the low-positioned position of said engagement point the auger can be carried easily and stably held on the sleeve 14 and at the location of the upper end, for instance the ratchet 13.

[0031] Figure 4 shows the auger 1 in a situation in which the outer rod 10 is telescopically extended with respect to the inner rod 20. Said telescopic extending is useful when one wants to drill a deeper hole. One then starts to drill with the auger 1, the inner rod 20 being slid inside the outer rod 10. When one has approached the soil close enough with the cross-rod 2 while drilling, the stop button 12 is operated and the inner rod 20 is pulled out of the outer rod 10. Subsequently the outer rod 10 and the inner rod 20 are secured with respect to each other in the extended position by means of the stop button 12 and drilling can be proceeded with.

[0032] Apart from using an outer rod 10 and an inner rod 20 which are telescopically slidable with respect to each other, it is also possible to arrange a separate extension to the auger 1 as a result of which one can drill even deeper. The above-mentioned steps can be repeated, which is schematically shown in figure 6, in which an drill part 30 has been coupled to the lower end of the auger 1 and is pushed from ground level 101 into the soil 100 while forming a hole 102. After the lower end 40 hits the ground level 101 the rods 10 and 20 are extended: the user can then keep his hands on the cross-rod 2 above an ergonomic safe height h1, in this example approximately 65-70 cm, preferably 67 cm. After pulling out the balls 5A, 5B are at an for instance 20 cm higher level h2, after which the user is able to press the auger 1 in a physically advantageous manner further

into the soil 100, until the button 12 hits the ground level 101 and the user knows that the height of approximately h1 has been reached. Then the auger is pulled out of the hole 102, the drill 30 is decoupled and an extension rod 40 is coupled to the lower end of which the drill 30 is coupled. The thus extended assembly is then put in the hole 102 again, the auger being in a retracted position. The steps described earlier are repeated then.

[0033] As a result of the ball-shaped portions 5A, 5B of the auger 1 shown in the figures, it is achieved that during drilling the hand may turn with respect to the ball-shaped portions 5A, 5B as a result of which the wrists need not be turned to a disagreeable degree. An additional advantage is that during the same stroke a larger angular displacement of the auger can be achieved. The wrists and the hands take up an ergonomic advantageous position during drilling.

[0034] Because the ball-shaped portions 5A, 5B have been arranged on outwardly inclined and upwardly extending ends 3A, 3B of the cross-rod 2 and because the ball-shaped portions 5A, 5B are situated higher than the central portion 7 of the cross-rod 2 the handles 4A, 4B can be reached well from the inside during the entire stroke.

[0035] The ratchet 13 has been provided so that during drilling the hands need not be removed from the handles 4A, 4B. The auger 1 can be kept closer to the body and drilling close to a wall, tree or other obstacle is now possible as well.

[0036] The ball-shaped portions 5A, 5B can be designed rotatable with respect to the ends 3A, 3B of the cross-rod 2 as a result of which the hands have to move round less with respect to the ball-shaped portions 5A, 5B whereas the hands indeed take up an ergonomic advantageous position during drilling: instead of only the hands moving round over the ball-shaped portions 5A, 5B, the ball-shaped portions 5A, 5B also move round with respect to the cross-rod 2.

[0037] As can be seen in figure 5 the rods 10 and 20 are not round in this example, in this case rectangular, particularly square. Because in that case the rods 10 and 20 cannot rotate with respect to each other, the stop button 12 will always be correctly positioned before the hole or in the holes into which it should extend. This is beneficial to the ease of use. Furthermore the torque of the one rod is transferred on the other rod at the location of the corners so that the pin of the stop button is not loaded excessively. Furthermore the polygonal cross-section increases the rigidity against bending. It is noted that the unround cross-section discussed above can also be advantageously utilised in augers having the up until now commonly used cross-bars.

Claims

1. Manually operable auger having a drill rod and a cross-rod having ends on which handles have been attached, the cross-rod being provided with ascending ends, the handles comprising ends defining convex handle portions that are bulging with respect to the cross-rod ends.

2. Auger according to claim 1, **characterized in that** the ascending ends of the cross-rod inwardly -preferably fluently- change into, with respect to the drill rod, outwardly downwardly inclined oriented intermediate portions.

3. Auger according to claim 1 or 2, **characterized in that** the ascending ends and/or sloping intermediate portions of the cross-rod extend outwardly inclined.

4. Auger according to claim 4, the angle of the inclined ascending ends and/or inclined sloping intermediate members being 30-60 degrees, preferably approximately 35 degrees, with respect to the horizontal.

5. Auger according to any one of the preceding claims, **characterized in that** the cross-rod has a central portion that is perpendicular to the longitudinal direction of the auger.

6. Auger according to any one of the preceding claims, **characterized in that** the cross-rod has a W-shape.

7. Auger according to any one of the preceding claims, **characterized in that** the convex handle portions extend above, under and/or in a plane perpendicular to the drill rod with respect to the cross-rod and/or **in that** the convex handle portions are convex in a plane that contains the cross-rod and/or in a plane perpendicular to the cross-rod.

8. Auger according to claim 7, **characterized in that** the convex handle portions are spherical, preferably ball-shaped.

9. Auger according to claim 8, **characterized in that** the ball-shaped convex handle portions have a radius of approximately 20-30 mm, preferably 25 mm.

10. Auger according to any one of the preceding claims, **characterized in that** the cross-rod and the drill rod are situated in one plane.

11. Auger according to any one of the preceding claims, **characterized in that** the convex handle portions and the other parts of the handles have been provided with thermal and/or electric insulation.

12. Auger according to any one of the preceding claims, **characterized in that** the convex handle portions

are rotatable with respect to the cross-rod.

13. Auger according to any one of the preceding claims, the drill rod comprising two tubes that are telescopically moveable with respect to each other, as well as means for securing the mutual position of both tubes, the tubes having substantially similarly shaped, unround, preferably polygonal, cross-sections and more preferably rectangular or square cross-sections.

14. Auger according to claim 13, the securing means comprising a stop button, situated at the transition between both tubes and forming a protrusion.

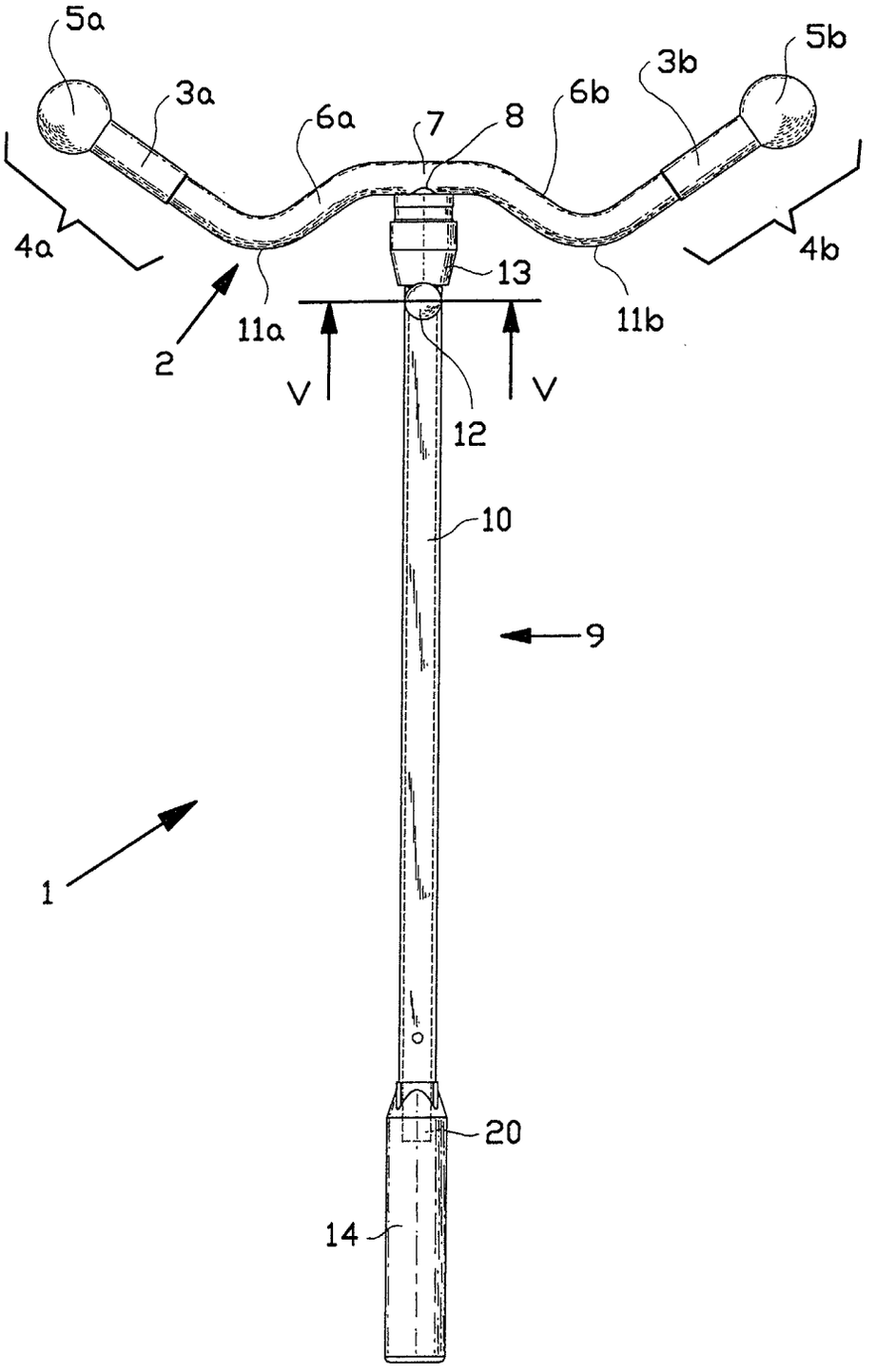

FIG. 1

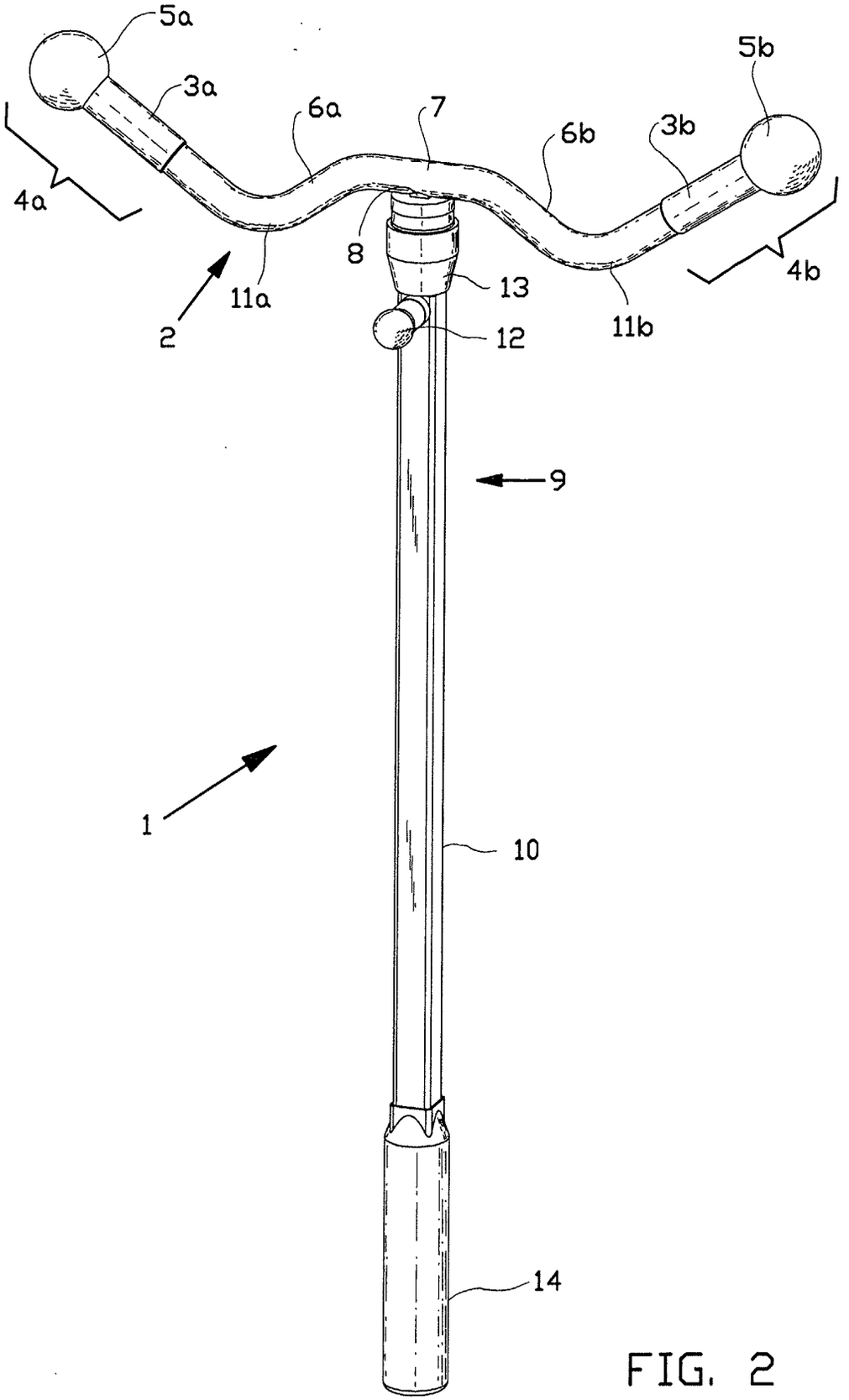

FIG. 2

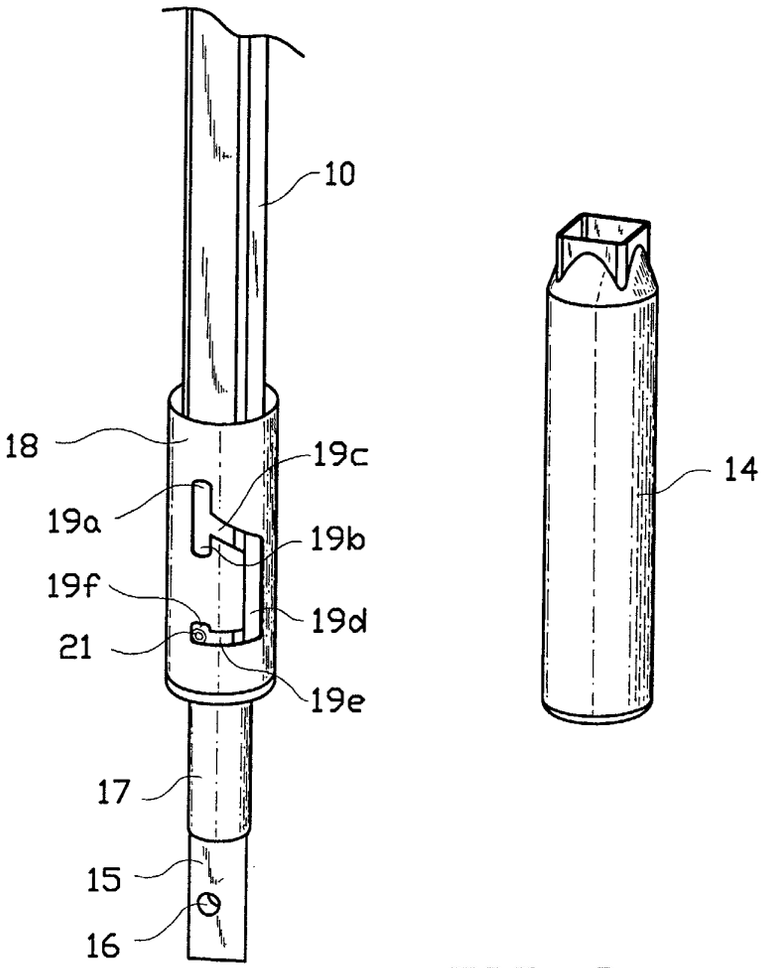

FIG. 3

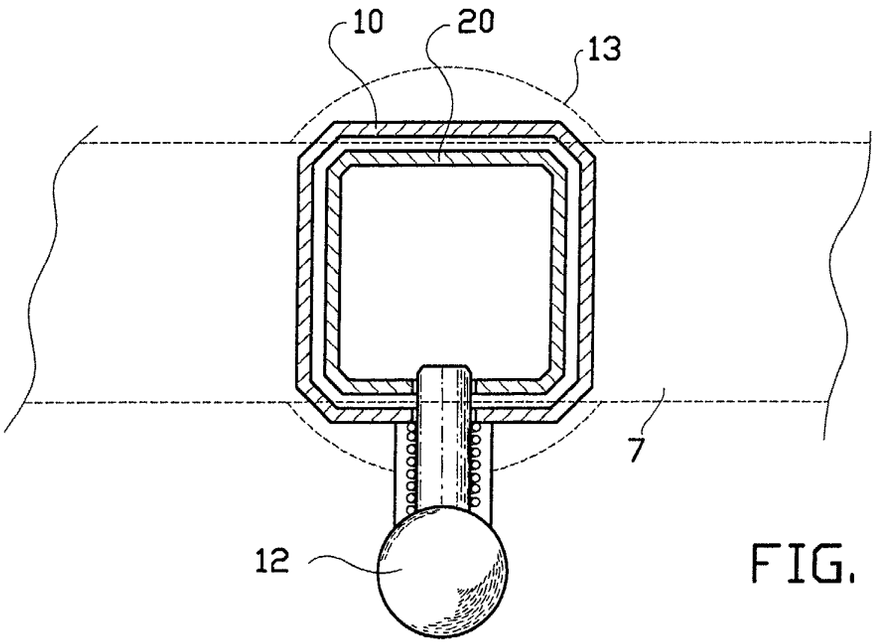

FIG. 5

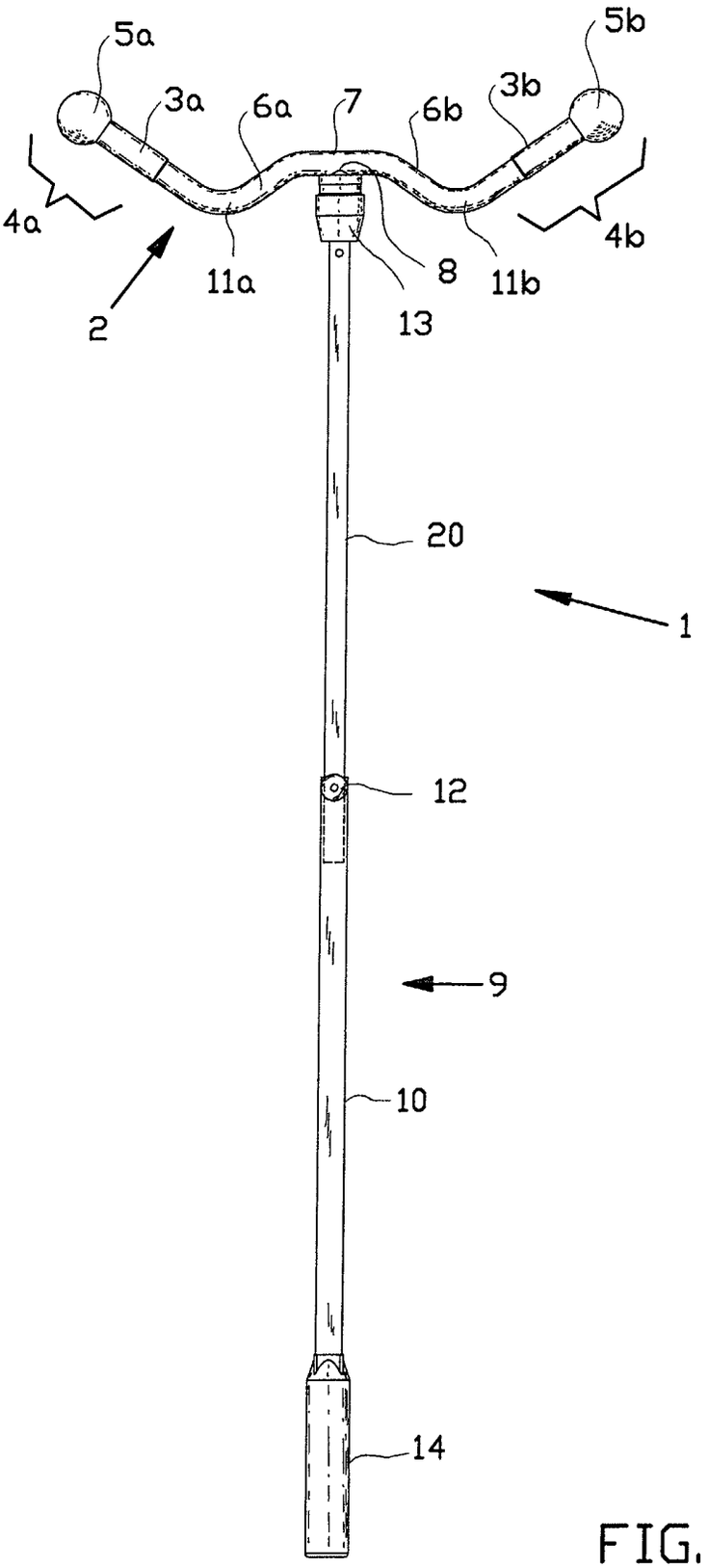

FIG. 4

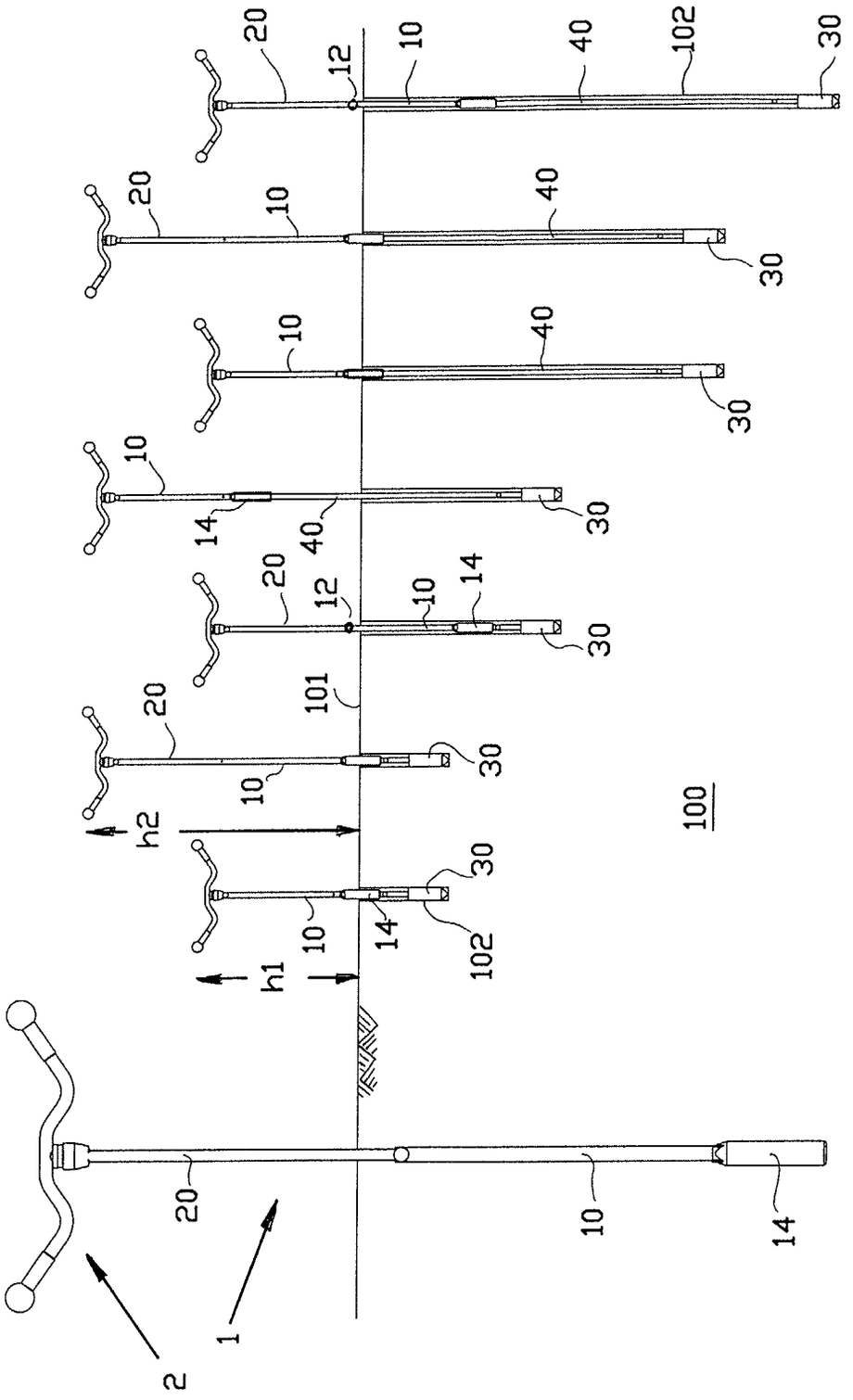
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FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 02 07 8940

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.7)
A	US 347 054 A (MORSE F. H.) 10 August 1886 (1886-08-10) * figure 1 *	1-4,6-11	E21B11/00 E02D1/04
A	US 5 662 179 A (FALK JOHAN) 2 September 1997 (1997-09-02) * abstract; figure 1 * * column 1, paragraph 52 - paragraph 58 *	1,5,8-10	
A	GB 2 182 532 A (PATTISSON & CO LIMITED H) 20 May 1987 (1987-05-20) * page 2, line 12 - line 18; figure 1 *	1,5,10, 11	
A	DE 296 05 751 U (GREVING HERBERT DIPL ING FH) 30 May 1996 (1996-05-30) * figure 1 *	1,8-10	
A	US 6 089 133 A (LIAO YOUN CHYUAN) 18 July 2000 (2000-07-18) * abstract; figure 3 *	1,11,12	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B25G
A01B
E02D
E21B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 November 2002	De Neef, K

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22-11-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 347054 A		NONE	
US 5662179 A	02-09-1997	SE 506110 C2	10-11-1997
		AU 671377 B2	22-08-1996
		AU 6940394 A	20-12-1994
		CA 2164112 A1	08-12-1994
		DE 69413685 D1	05-11-1998
		DE 69413685 T2	29-04-1999
		EP 0701466 A1	20-03-1996
		SE 9301854 A	02-12-1994
		WO 9427687 A1	08-12-1994
GB 2182532 A	20-05-1987	NONE	
DE 29605751 U	30-05-1996	DE 29605751 U1	30-05-1996
US 6089133 A	18-07-2000	NONE	

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