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Jack assembly for a jockey wheel

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(56) Related Art
US 6010154 A
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US 5911437 A
US 4316601 A
EP 430643 B1

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ABSTRACT

A jack assembly for a jockey wheel including a telescopic column for attachment to a towed vehicle, to raise and lower a draw bar of the vehicle, wherein the column includes a drive mechanism with a rotary input arranged to couple to a bit of an electric power tool so that activation of the power tool causes the input to rotate and the column to extend or retract.

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JACK ASSEMBLY FOR A JOCKEY WHEEL

FIELD OF THE INVENTION

[0001] The present invention relates to a jack assembly for a jockey wheel.

BACKGROUND OF THE INVENTION

[0002] A jockey wheel for a towed vehicle such as a caravan may include a telescopic jack clamped to a drawbar of the caravan and a wheel connected to a lower end of the jack. A permanently fixed hand crank is used to raise and lower the wheel to assist in connecting or releasing the drawbar from a towing vehicle.

[0003] The physical force needed to wind the jack up and down is beyond the capabilities of many people, particularly elderly people.

[0004] A hydraulic jack for lifting or supporting a vehicle is also available. The hydraulic jack is height adjustable by pumping a lever up and down. However, the hydraulic jack can also be physically challenging to operate and, once pressure is removed from the jack, there is no easy way to collapse the jack down for storage.

OBJECT OF THE INVENTION

[0005] The present invention seeks to provide a jack assembly that is easier to use.

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SUMMARY OF THE INVENTION

[0006] In accordance with the present invention, there is provided a jockey wheel including a telescopic column for attachment to a towed vehicle, to raise and lower a draw bar of the vehicle, wherein the column includes: a drive mechanism with a rotary input that rotates to cause the column to extend or retract; and a gear box with a rotary connector adapted to connect to and be driven by a power tool, wherein the gear box drives the input so as to provide for geared operation of the drive mechanism.

[0007] Preferably, the rotary input is located at one end of the column and the gear box includes a housing that sits over the end of the column such that the rotary input connects with an output gear of the gear box.

[0007a] Preferably, the jockey wheel fitted with the gear box is portable and demountable from the draw bar.

[0008] Preferably, the gear box includes an input gear coupled to the rotary connector.

[0009] Preferably, the input has a square thread for receipt in a corresponding socket of the output gear and the input gear includes a square shaped socket for receipt of the bit.

[0010] Preferably, the rotary input includes a pin to lock the output gear onto the input.

Paragraphs [0011] to [0014] intentionally deleted.

[0015] Preferably, the jockey wheel includes a coupling at a lower end of the assembly for connection with a mount of a wheel.

[0016] Preferably, the coupling includes a release pin to hold the mount to the column.

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[0017] Preferably, the column has a series of ribs at spaced locations along the extent of the column, to engage in a clamp for securing the jack assembly to the vehicle.

[0018] Preferably, the column has at least three ribs.

Paragraph [0019] intentionally deleted.

[0020] In yet another broad aspect, there is provided a kit of parts, including a jockey wheel, as described above and a bit for a power tool to couple with the rotary input.

[0020a] Preferably, the kit includes a stabilising plate fitted with a mount that is adapted to be connected in place of a wheel of the jockey wheel.

[0021] Preferably, the kit includes a handle for manual operation of the drive mechanism. Preferably, the handle is adapted to connect to the rotary connector of the gear box.

[0022] Preferably, the kit includes an adapter to connect the bit to a rotary drive of another device, such as a stabilizing leg device, of a vehicle.

[0023] Preferably, the kit further includes a power tool and battery pack.

[0024] In another aspect, there is provided a vehicle to be towed including the jockey wheel, as described above, fitted to a draw bar of the vehicle.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The invention is described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1a is side view of a jockey wheel including a jack assembly;

Figure 1b is a front view of the jockey wheel;

Figure 1c is a perspective view of the jockey wheel;

Figure 2 illustrates a clamp for holding the jockey wheel;

Figure 3 is a perspective view of a release pin;

Figure 4 is a base plate for use with the jack assembly;

Figure 5 is a perspective view of a gear box;

Figure 6 is a partial sectioned view of the jack assembly with the gear box fitted;

Figure 7 is an isometric view of a bit for a power tool;

Figure 8 is a perspective view of a handle for manual operation of the jack assembly;

Figure 9 is a perspective view of a kit bag;

Figure 10 is a perspective view of a power tool, charger and battery pack; and

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Figure 11 is a perspective view of adaptors for leg stabilizing devices.

DETAILED DESCRIPTION OF THE INVENTION

[0026] Referring firstly to Figure 1, a jockey wheel 1 is shown as including a jack assembly 2 that has a coupling 3 at a lower end 4 that connects with a mount 5 of a wheel 6. The mount 5 is held in place by a release pin 7.

[0027] The jack assembly 2 includes a telescopic column 8 with a series of external ribs 9, arranged lengthwise of the column 8. A rotary input 10 is available at an upper end 11 of the assembly 2. The input 10 has a square shaped thread 12 and a locking pin 13.

[0028] Rotation of the input 10 activates an internal drive mechanism 14 that causes the column to extend or retract in response to movement of the input. The mechanics of the drive mechanism, for converting rotary movement into linear movement would be readily apparent to a person skilled in the art.

[0029] With regard to Figure 2, the jockey wheel 1 can be mounted to a drawbar 15 of a towed vehicle such as a caravan (not shown) by way of a clamp 16. The clamp 16 includes a quick release lever 17 and custom designed security nut 18 to restrict unauthorized tampering or removal of the jack assembly 2.

[0030] As can be seen, the jockey wheel 1 has been clamped at the lowermost rib 9 so the jockey wheel 1 is raised high for transport. Most commercially available jockey wheels only have two ribs that restrict the height the jockey wheel can connect to the drawbar and, as a result, a traditional jockey wheel generally needs to be removed for transit in order to provide sufficient clearance with a road surface or the like.

[0031] In any case, if required, the wheel 6 can be removed from the jack assembly 2, by firstly removing the release pin 7. The pin 7 is shown in more detail in Figure 3. A resilient brace 19 loops from a head 20 of the pin 7 around a shank 21. To release the pin

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7, the brace 19 is slipped off the shank 21 and the pin 7 is then pulled free of the coupling 3.

[0032] Once the wheel 6 has been removed, a replacement support plate 22, as shown in Figure 4, can instead be fitted to the jack assembly 2. The plate 22 has a collar 23 arranged to slide over the coupling 3 and be anchored in place using the release pin 7. The plate 22 has greater support capacity compared to the wheel 6 and is suitable for carrying the weight load of the vehicle/caravan on either hard or soft support surfaces.

[0033] The jack assembly 2 can be actuated by direct drive applied to the rotary input 10, such as by a suitable power drill or the like. However, power requirements may be excessive for direct drive of the rotary input 10.

[0034] Instead of being driven directly by the power tool, the rotary input 10 may instead be driven by an intermediate gear box 24, as shown in Figure 5.

[0035] The gear box 24 has a casing 25 with a top and bottom plate 26, 27. A small input gear 28 is provided to connect with a power tool and that drives a larger output gear 29 arranged to couple directly to the rotary input 10.

[0036] The output gear 29 is mounted on two bushes 30 and has an associated socket 31 to receive and connect with the rotary input 10 projecting from the column 8.

[0037] The input gear 28 also has two bushes 32 and an associated connector 33, in the form of a square shaped socket 34, keyed to the input gear 28.

[0038] In relation to the gear box 24, the input and output gears 28, 29 are designed but not limited to operation on a x:y ratio ensuring the square thread 12 is not stripped by rapid revolutions of the power tool used to drive the rotary input 10. The casing 25 is fully enclosed and requires no maintenance. The gears 28, 29 may be manufactured from any material including but not limited to nylon. The casing 25 may also be manufactured from

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any material although stainless steel is preferred.

[0039] With reference now to Figure 6, the gear box 24 is mounted over a top end 35 of the column 8 so that the socket 31 of the output gear 29 fits over and engages the rotary input 10 of the drive mechanism 14. The gear box 24 is fitted into a housing 36 that is connected by fasteners to a flange projecting from the column. An opening 37 is provided in the housing 36 to allow access to the connector 33 by a corresponding shaped driving bit 38, as shown in Figure 7.

[0040] The bit 38 has a square shaped head 39 and a tail 40 that fits in a chuck of a power tool. The bit 38 and connector 33 may have an opposite construction where the connector 33 has a square thread and the bit 38 is shaped like a square nut. As a further alternative, the bit and connector may have different profiles such as, for example, matching hexagonal profiles or the like.

[0041] In either case, the bit 38 is designed to fit with the connector 33 through the opening 37 to provide geared driving force to rotary input 10. By engaging the smaller gear 28, the bit 38 is able to extend and retract the column 8, with less torque than would be required with direct drive of the input 10.

[0042] Since the torque requirements are reduced, the drive mechanism 14 can also be readily operated manually. For that purpose, a handle 41, as shown in Figure 8, is provided.

[0043] The handle 41 has a lever arm 42 and a grip 43, to which turning moment is applied. The arm 42 is attached to a female connector 44 designed to receive a square shaped key (shown in phantom lines 54) of the same configuration as the head of the bit 38. A grub screw 45 is provided to releasably fasten the key 54 into the female connector 44. To use the handle 41, the key 54 is simply inserted into the rotary connector 33 and the handle 41 can then be turned to generate turning movement of the input gear 28, output gear 29 and rotary input 10, so as to manually extend and retract the column 8.

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[0044] Referring now to Figure 9 and 10, the jack assembly 2, with the column 8, gear box 24, wheel 6 and base plate 22, bit 38 and handle 41 are preferably provided as a kit of parts in a kit bag 46, together a power tool 47, batteries 48 and a charger 49 so the entire invention is portable and designed to weigh only in the order of 15kgs.

[0045] The kit of parts can also include adapters 50, 51 that have connecting sockets 52 to operate other equipment and devices of the vehicle. For example, the adapter 50 may be configured to fit with wheel nuts, while the adapter 51 may be designed as an extension piece to raise and lower a leg of a stabilizing device of a caravan. An end 53 of each adapter 50, 51 is preferably configured to be driven by the power tool 47 via the bit 38.

[0046] As may be appreciated from the above, the gear box 24 in combination with the power tool 47 eliminates users having to perform any physical winding or pumping motion and so minimizes the chance of injury/strain occurring when loading or unloading a drawbar of a caravan of the like from a towing vehicle.

[0047] As such, the invention is suitable for use for almost any age, gender or level of fitness.

[0048] The jockey wheel 1 is also designed to be easily substituted for a conventional jockey wheel and no modifications to an existing towed vehicle/caravan are required.

[0049] The ability to use a cordless power tool 47 is a unique aspect of the invention. The battery packs 48 and portable power tool 47 mean the invention can be used in remote locations where there is no mains power, although the charger 49 is provided so that the batteries 48, preferably re-chargeable lithium ion batteries, can be recharged when power is available.

[0050] The adapter 50 also allows for mechanical raising and lowering of stabilizing legs of caravans, which is a process previously requiring users to lower themselves to the

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ground and manually wind the legs up or down using a horizontal winding arm.

[0051] The invention can, in fact, allow for faster loading and unloading of a vehicle, such as a caravan, from a towing vehicle with minimal effort, reducing the total time by 50% to 80%, depending on whether stabilizing legs are used.

[0052] It should also be appreciated the present invention also has application to other equipment or devices where rotary mechanical input is required such as with standard vehicle jacks or the like.

[0053] The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as, an acknowledgement or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

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LIST OF PARTS

1. Jockey wheel
2. Jack assembly
3. Coupling
4. Lower end
5. Mount
6. Wheel
7. Release pin
8. Column
9. Ribs
10. Rotary input
11. Upper end
12. Square thread
13. Locking pin
14. Drive mechanism
15. Drawbar
16. Clamp
17. Lever
18. Security nut
19. Brace
20. Head
21. Shank
22. Support plate
23. Collar
24. Gear box
25. Casing
26. Top plate
27. Bottom plate
28. Input gear
29. Output gear

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- 30. Bushes
- 31. Socket
- 32. Bushes
- 33. Connector
- 34. Socket
- 35. Top end
- 36. Housing
- 37. Opening
- 38. Bit
- 39. Head
- 40. Tail
- 41. Handle
- 42. Lever arm
- 43. Grip
- 44. Female connector
- 45. Grub screw
- 46. Kit bag
- 47. Power tool
- 48. Batteries
- 49. Charger
- 50. Adapter
- 51. Adapter
- 52. Sockets
- 53. End
- 54. Key

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CLAIMS:

1. A jockey wheel including a telescopic column for attachment to a towed vehicle, to raise and lower a draw bar of the vehicle, wherein the column includes:
a drive mechanism with a rotary input that rotates to cause the column to extend or retract; and
a gear box with a rotary connector adapted to connect to and be driven by a power tool, wherein the gear box drives the input so as to provide for geared operation of the drive mechanism.
2. The jockey wheel of claim 1, wherein the rotary input is located at one end of the column and the gear box includes a housing that sits over the end of the column such that the rotary input connects with an output gear of the gear box.
3. The jockey wheel of claim 2, wherein the jockey wheel fitted with the gear box is portable and demountable from the draw bar.
4. The jockey wheel of claim 2, wherein the gear box further includes an input gear coupled to the rotary connector.
5. The jockey wheel of any one of claims 2 to 4, wherein the rotary input has a square thread for receipt in a corresponding socket of the output gear and the input gear includes a square shaped socket for receipt of a bit of the power tool.
6. The jockey wheel of any one of claims 2 to 4, wherein the rotary input includes a pin to lock the output gear onto the input.
7. The jockey wheel of claim 1, further including a coupling at a lower end of the column for connection with a mount of a wheel.

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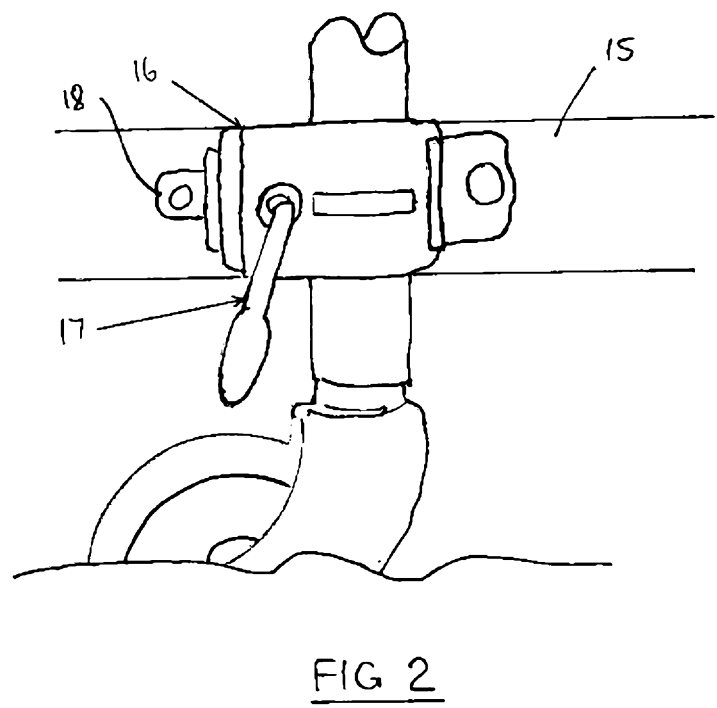
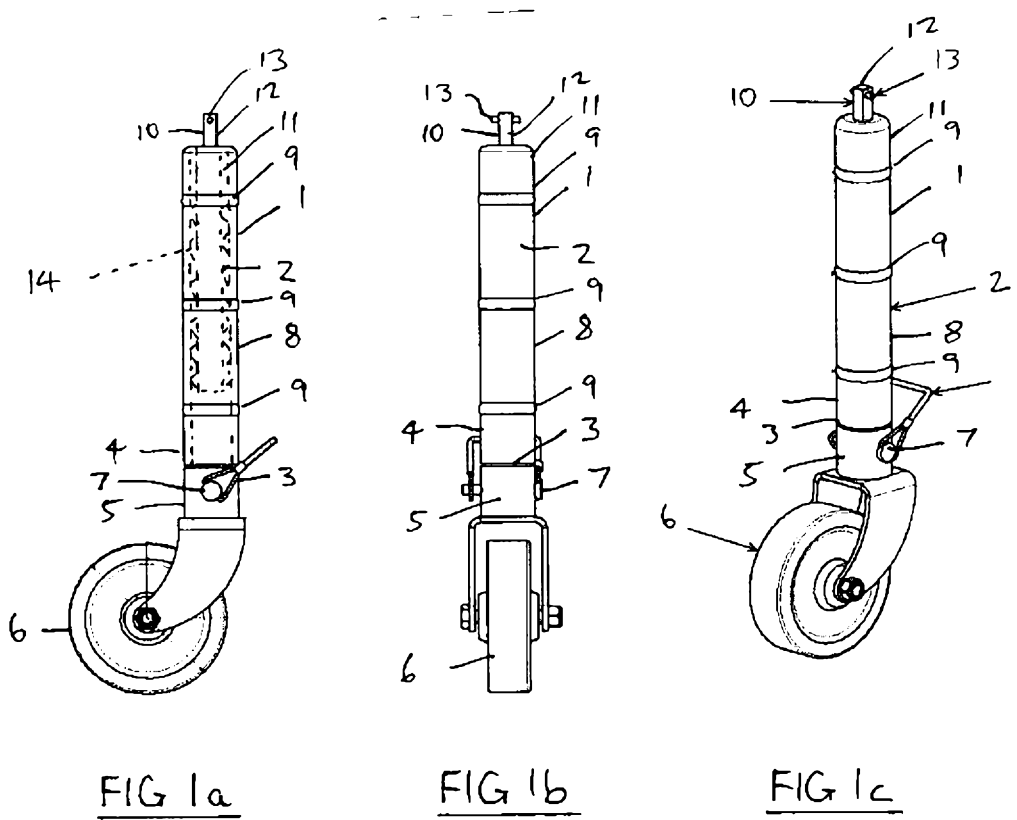
- 13 -

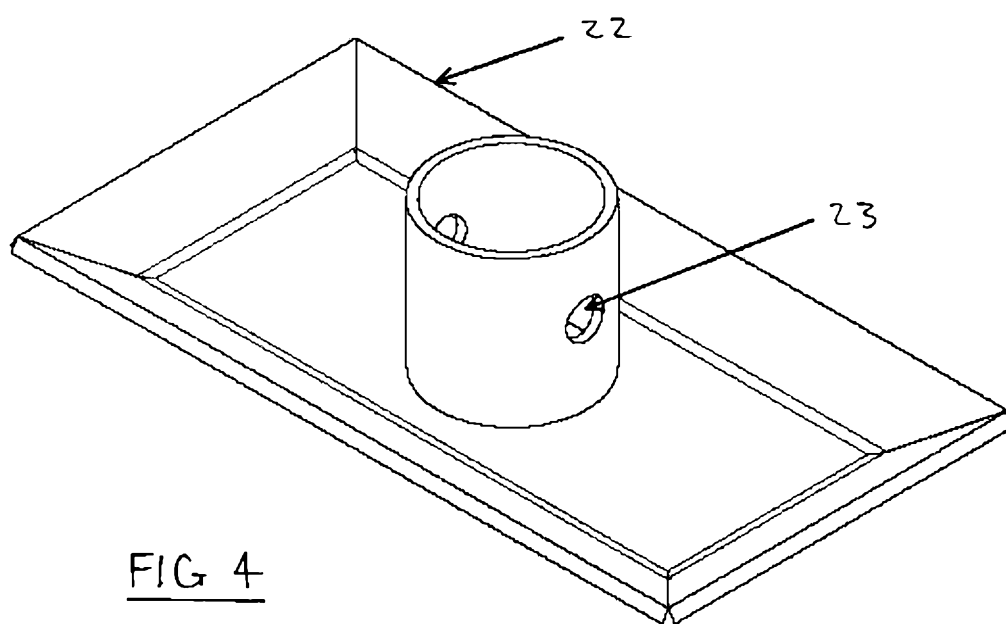
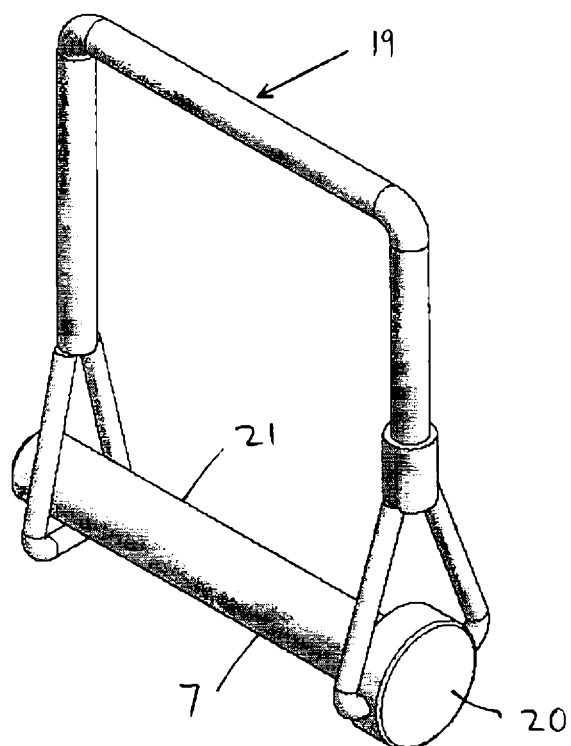
8. The jockey wheel of claim 7, wherein the coupling includes a release pin to rotatably hold the mount to the column.
9. The jockey wheel of claim 1, wherein the column has a series of ribs at spaced locations along the extent of the column, to engage in a clamp for securing the jockey wheel to the draw bar of the vehicle.
10. The jockey wheel of claim 9, wherein the column has at least three ribs.
11. A kit of parts, including a jockey wheel, as claimed in any one of claims 1 to 10 and a bit for a power tool to couple with the rotary input.
12. The kit of claim 11, further including a stabilising plate fitted with a mount which can be connected in place of a wheel of the jockey wheel.
13. The kit of claim 11 or 12, further including a handle for manual operation of the drive mechanism.
14. The kit of claim 13, wherein the handle is adapted to connect to the rotary connector of the gear box.
15. The kit of claim 12 or 13, further including an adapter to connect the bit to a rotary drive of another device, such as a stabilizing leg device, of a vehicle.
16. The kit of any one of claims 11 to 15, further including a power tool and battery pack.
17. A vehicle to be towed including the jockey wheel of any one of claims 1 to 10, fitted to a drawbar of the vehicle.

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18. A jockey wheel, substantially as described with reference to the drawings and/or examples.
19. A kit of parts, substantially as described with reference to the drawings and/or examples.
20. A vehicle, substantially as described with reference to the drawings and/or examples.





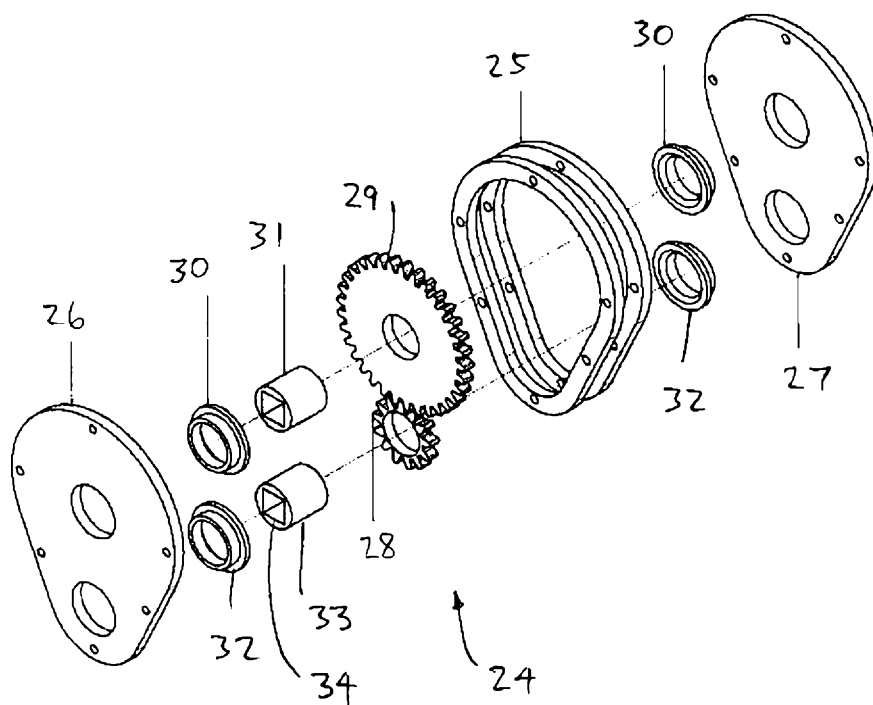


FIG 5

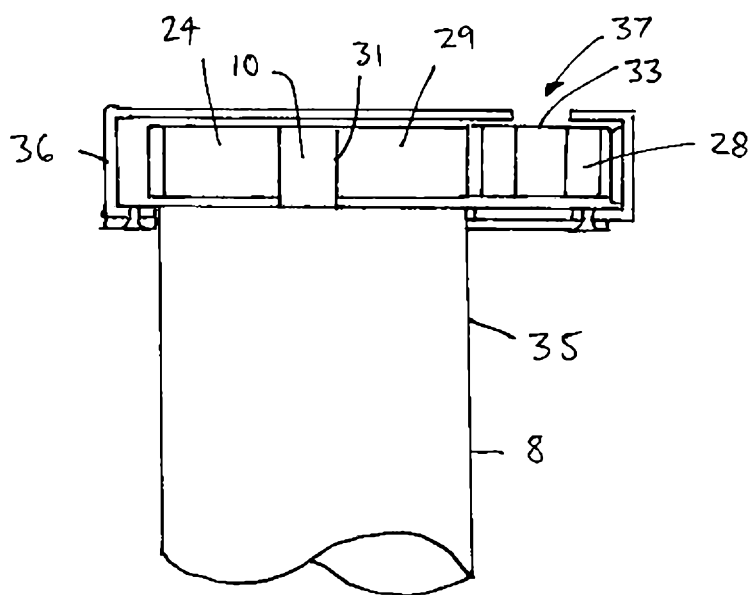


FIG 6

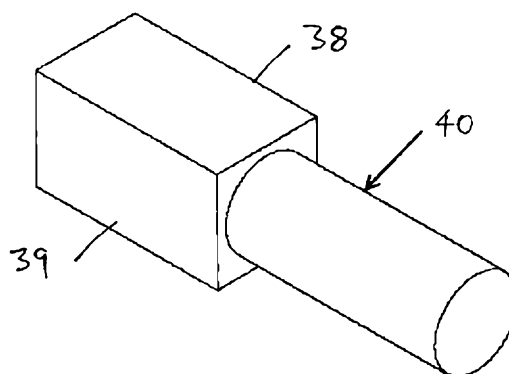


FIG 7

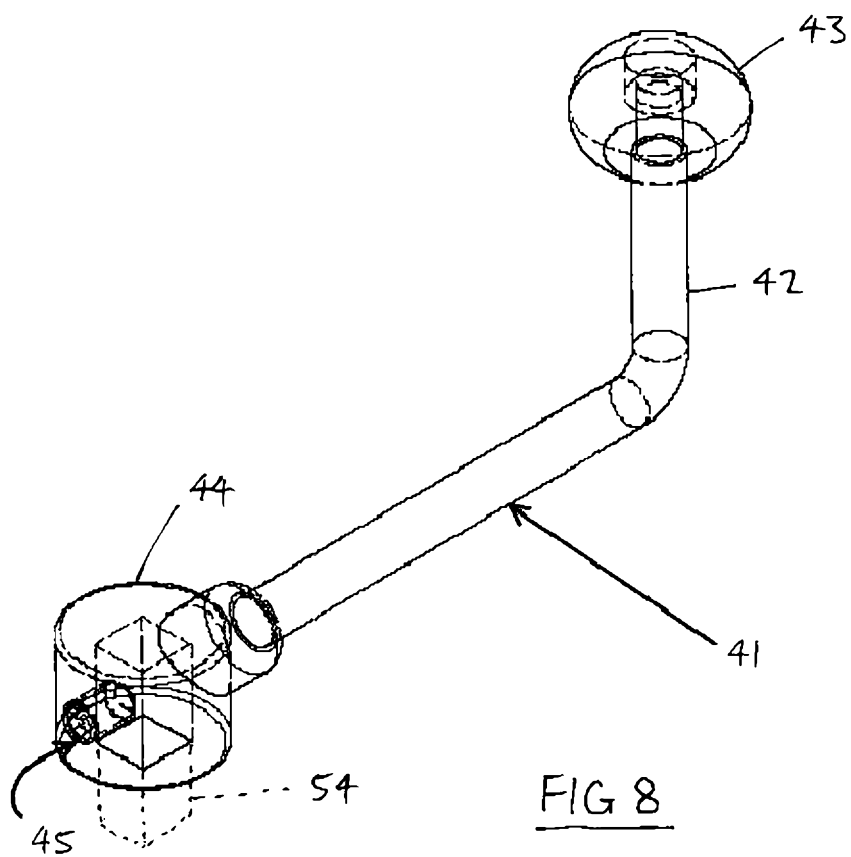


FIG 8

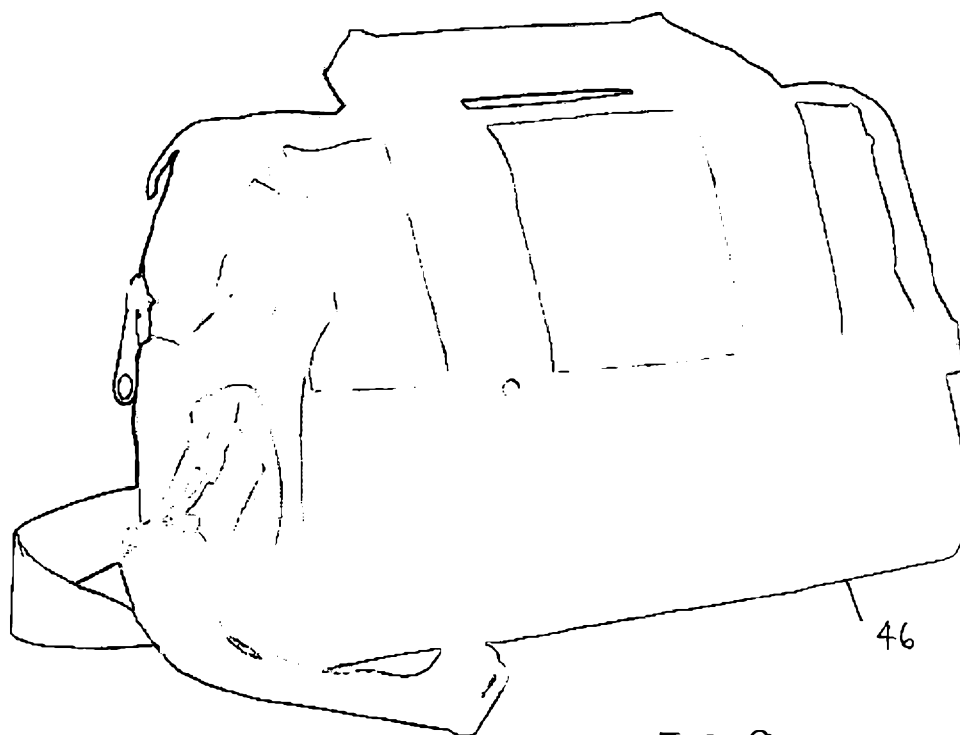


FIG 9

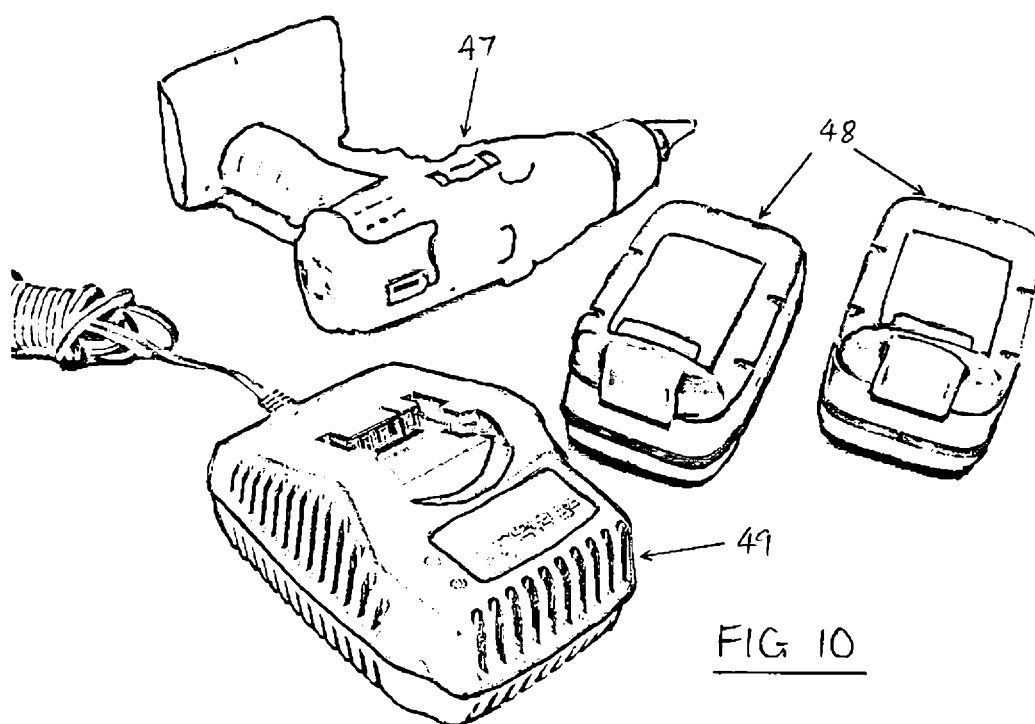


FIG 10

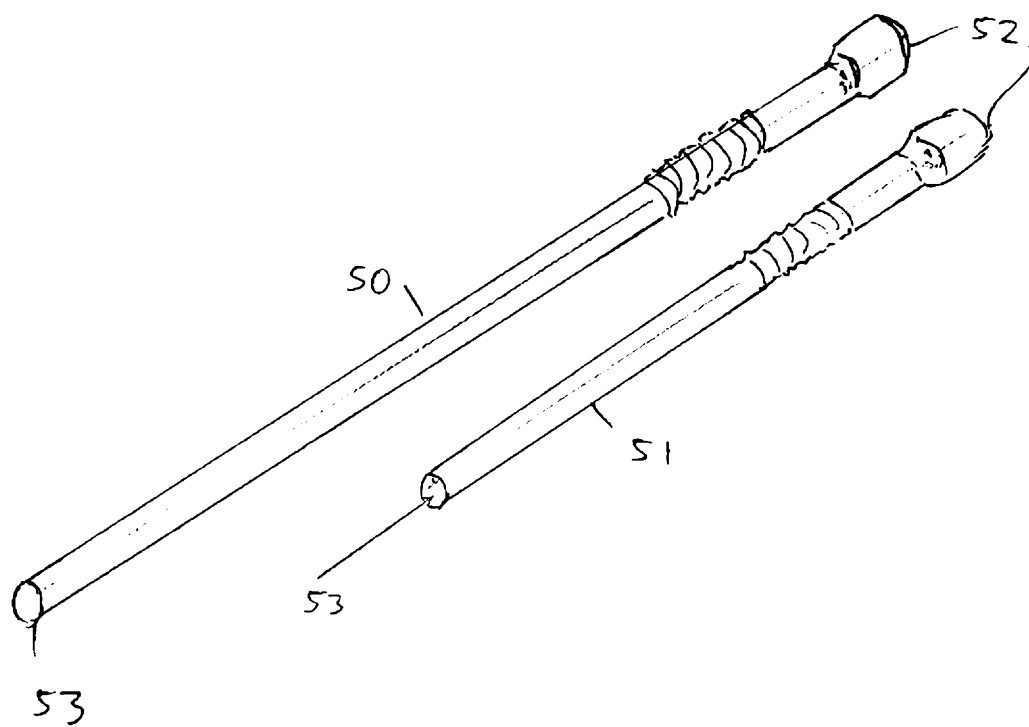


FIG. 11