

(12) STANDARD PATENT APPLICATION (11) Application No. AU 2016228198 A1
(19) AUSTRALIAN PATENT OFFICE

(54) Title
IMPROVEMENTS TO SERVICEABLE POLE ASSEMBLIES

(51) International Patent Classification(s)
E04H 12/00 (2006.01) **E04H 12/34** (2006.01)
E04H 12/22 (2006.01)

(21) Application No: **2016228198** (22) Date of Filing: **2016.09.12**

(43) Publication Date: **2016.10.06**

(43) Publication Journal Date: **2016.10.06**

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ABSTRACT

The serviceable pole assembly (10) of this invention has a pole (16) supported by and pivotally connected to an upstanding pole support (11) by a pivot connection (14) which is disposed adjacent the upper end of the pole support (11). The pole (16) may be gravitationally biased to pivot from its upstanding attitude to a lowered position at which a light (50) supported at the end of the pole (16) is disposed at a serviceable height. Releasable locking means (20, 22) are provided for locking the pole (16) to the pole support (11) in the elevated position. A winch assembly (35) which is demountably supported by pole support (11) is provided for raising or lowering the pole (16). The winch (35) has a selectively extendible and retractable cable (39) which may be connected to an eye (41) on the lower end of the pole (16) and spaced from the pivot connection (14) to enable the winch (35) to be operated to pivot the pole (16) between its elevated and lowered positions.

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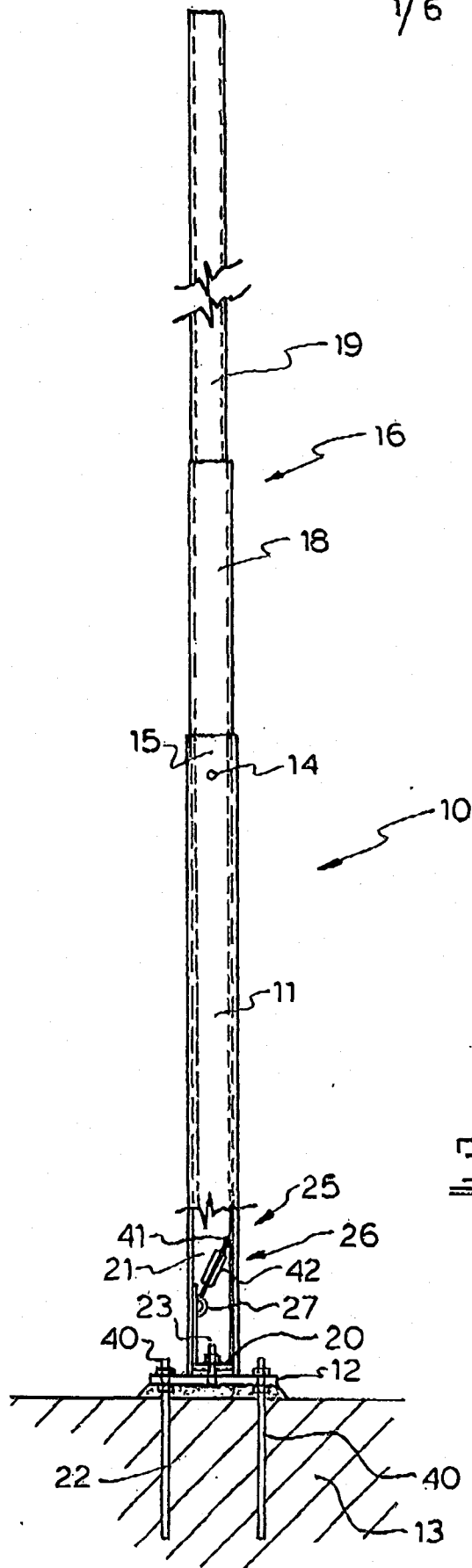


Fig. 1.

TITLE Improvements to serviceable pole assemblies.

TECHNICAL FIELD

This invention relates to serviceable pole assemblies for supporting utilities such as lighting assemblies or signage and the like and which may be readily raised to an elevated position or lowered for servicing the normally elevated utility supported thereby. This invention has particular application to serviceable pole assemblies supporting self-contained battery powered light assemblies.

BACKGROUND ART

Serviceable poles which may be lowered to access the utility supported thereby have been utilised in the past. Mostly these have been in the form of a counterweighted pole supported for rotation from a substantially inverted position for accessing the upper end of the pole to a raised position with the supported light uppermost and vice versa. A disadvantage of such pole assemblies is that the counterweighted end may not exactly balance the weight of the supported utility so that the pole itself may be either difficult to raise or lower in an easily controlled fashion. Furthermore, the weight and cost of such poles increases with the weight of the supported utility for reasons of balance rather than necessary structural strength. The additional weight increases the cost of manufacture, transport and installation of such pole assemblies often necessitating the use of a crane or the like for erection. In addition the high position of the pole pivot makes these types of poles relatively heavy and bulky in appearance as a result of the necessary size of the fixed pole support.

This invention aims to provide an improved serviceable pole which will be reliable and efficient in use and of slender tidy appearance. In one aspect this invention aims to provide a serviceable pole which will alleviate at least one of the aforementioned disadvantages associated with the presently available serviceable poles. In a further aspect this invention aims to provide an improved pole supported self-contained light assemblies.

SUMMARY OF INVENTION

With the foregoing in view, this invention in one aspect resides broadly in a serviceable pole assembly including:-

a pole;

an upstanding pole support;

a pivot connection adjacent the upper end of the pole support connecting the pole to the pole support whereby the pole is gravitationally biased to pivot from an elevated position to a lowered position at which the top end of the pole is disposed at a serviceable height;

releasable locking means for locking the pole in the elevated position to the pole support, and

mounting means for mounting a selectively extendible and retractable member between the lower end of the pole and the pole support and spaced from said pivot connection whereby the length of the selectively extendible and retractable member may be selectively varied to control the pivotal movement of the pole between its elevated and lowered positions.

Preferably the base portion of the pole beneath the pivot connection and the pole support are disposed adjacent one another when the pole is disposed in the elevated position, either side by side or preferably in a nesting arrangement so as to minimise the visual bulk of the lower part of the pole assembly and whereby the lower end of the pole moves away from the pole support as the pole is lowered from its elevated position. This arrangement enables the selectively extendible and retractable member to be a tension member such as a rope, cable or chain. This rope, cable or chain could be terminated at one end at a ram, a screw actuator or a winch drum supported within the pole or the upstanding member and being externally operable to extend or retract the rope or chain. Alternatively the lower end of the pole may incorporate a lateral extension having a remote end which moves towards the pole support as the pole is lowered enabling the selectively extendible and retractable member to be a compression member such as a hydraulic or pneumatic ram connected between the remote end and the pole support.

The tension member may be a winch cable extending from a winch supported externally of the pole support and the pole and fixedly with respect to the pole support and having its cable terminated on the lower end of the pole. The winch may be mounted directly on the pole support or on a removable mounting associated with the pole support.

The pole may be of any suitable cross-section such as round, oval or rectangular or a combination of cross-sections. In a preferred form, when elevated, the base part of the pole beneath the pivot mounting nests within a complementary open-section pole support such that the exposed part of the pole substantially closes the open-section pole support in which it nests. The base of the pole could be hollow or solid and suitably an aperture is formed in the lower nesting wall of the pole support through which a winch cable may extend from the pole to a winch.

Preferably the base portion of the pole beneath the pivot connection is hollow and complementary apertures are provided adjacent the lower ends of the nesting walls of the pole and the pole support through which the winch cable may extend from an internal mounting on the pole to an externally mounted winch. These apertures are suitably of a sufficient size as to enable a rope or cable to be manually engaged with a releasable connection within the pole. Further it is preferred that the mounting means provides a releasable mounting for a winch, which may be manually or electrically operated for example, to raise or lower the pole between its elevated and lowered positions. In this arrangement the winch and the winch cable may be removed after the pole has been elevated and locked in position and reconnected only when required to lower the pole.

Preferably the winch is of a type in which the cable is tensioned against an inbuilt resistance within the winch, which may be a brake or gearing for example, which is effective during extension and retraction of the cable so that the cable is maintained in its partially extended/retracted attitude when it is not being operated. With this arrangement the weight of the partially lowered pole and its supported utility cannot alone cause the partially extended/retracted cable to extend. Such winches will be hereinafter referred to as self-locking winches.

The releasable locking means may be a latch which is spring or gravitationally biased to a latched attitude or it may be a pin which is inserted through mating apertures in the base of the pole and the pole support when the pole is in the elevated position. Alternatively it may be a member which is located on the pole support and held captive in the pole in its elevated position. The releasable locking means may include a limited over-centre movement of the pole about the pivot connection which biases the pole to the elevated

position and which bias has to be overcome before the pole can pivot from its elevated position.

The pivot mounting is preferably disposed at a height of less than two metres above the base of the pole support and preferably at a comfortable working height in the order of one to one and one half metres such that when the pole is lowered to a substantially horizontal attitude ready access is provided to the top end thereof and to any utility mounted thereon. Lowering only to a substantially horizontal attitude is preferred as it positions the lower end of the pole at its maximum lateral distance from the pole support such that a significant radial spacing is maintained between the pivot mounting and a tension cable connected between the lower end of the pole and the lower end of the pole support, whereas rotation of the pole significantly beyond this horizontal position increases the rate of reduction of this radial distance with pole rotation, requiring more tension in the tension member to support the pole and greater all round strength of components to resist this load. This would substantially increase the cost of manufacture of the pole assembly.

The upstanding pole support suitably includes an apertured base plate adapted to be secured to threaded anchors protruding upwardly from a support footing. These threaded anchors are suitably arranged to extend upwardly beyond the base plate so as to provide the releasable mounting for the winch mounting means. The latter may be an elevated mounting for a manual winch so as to enable the winch to be operated comfortably from a standing position and the elevated mounting may provide a guide pulley adjacent the base of the pole support about which the winch cable passes from the winch to the lower end of the pole to maximise the radial distance of the cable from the pivot mounting. Alternatively the pole support may support an electric winch adjacent the base of the pole support.

In another aspect this invention resides in a serviceable pole assembly including:-

- a pole;
- an upstanding pole support for supporting the pole;
- elevated pivot means securing the pole to the pole support;
- releasable locking means for locking the elevated pole to the pole support, and
- mounting means for releasably mounting a winch to said pole support spaced from said pivot means with the winch cable thereof connected to the pole at a position spaced

from said pivot means whereby the winch cable extends by operation of the winch to lower the pole.

In a further aspect this invention resides broadly in a method of servicing a plurality of pole supported utilities each supported by a pole assembly as defined in the preceding paragraph, the method including forming substantially identical mounting means on each pole assembly whereby an identical winch may be releasably connected to any one of the pole assemblies;

connecting a winch to one pole assembly whereby the winch may be operated to elevate and lower the pole of that pole assembly;

lowering the pole and servicing the utility supported by that pole;

operating the winch to elevate the pole and the serviced utility and locking that pole in the elevated position, then releasing the winch from that pole assembly and mounting it on the next pole assembly for servicing the utility supported thereby and repeating this sequence until all utilities have been serviced.

In yet a further aspect this invention resides broadly in an elevated light assembly including:-

a serviceable pole assembly,

a light assembly supported by the upper end of said serviceable pole assembly, the light assembly having a light, a battery for powering the light and battery recharging means for recharging the battery which may be a solar panel or a wind powered generator or other independent battery recharging means, and said serviceable pole assembly being of a form as variously defined above.

DESCRIPTION OF EMBODIMENTS

In order that this invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings which illustrate a typical embodiment of this invention, wherein:-

Fig. 1 is a side view of a serviceable pole assembly illustrating the pole in its elevated position;

Fig. 2 is a side view corresponding to Fig. 1 but illustrating the pole lowered by a releasable winch assembly to its lowered serviceable position;

Fig.3 is a side view illustrating the vertical to horizontal progression of the pole;
Fig 4 is a perspective view illustrating the pole in its lowered serviceable position;
Fig. 5 is a perspective view illustrating the locking arrangement for locking the pole to the pole support and for connecting the detachable winch mount;
Fig. 6 is a perspective view illustrating a typical arrangement of a self contained light assembly according to another aspect of this invention, and
Fig. 7 illustrates the ease of working on the lowered pole..

As illustrated in Figs 1 to 5 one form of a serviceable pole assembly 10 according to this invention includes an upstanding channel shaped pole support 11 fixed at its lower end to a base plate 12 which is bolted to a footing 13 and extending upward to a height of about 1.5 metres above the footing to a pivot mounting 14 for the pole assembly 16 and formed between extended opposed side walls 15 of the channel shaped member 11. This pivot mounting 14 enables the pole 16 to pivot therebetween from its elevated position to a substantially horizontal readily accessible servicing position as illustrated in Fig. 2. In this embodiment the pole assembly 16 includes a base part 18 formed from square tube section and an upper pole part 19 formed round tube section. When elevated, the base part 18 below the pivot mounting 14 nests closely within the channel shaped pole support 11. The pivot mounting 14 may be formed by a fixed pin or a removable pin to allow the pole assembly 10 to be separated into two sections during transport.

Referring specifically to Figs. 4 and 5 it will be seen that the pole assembly 16 is normally retained in this elevated position by a centrally apertured jamb plate 20 which locates about a central stud 22 extending upwardly from the base plate 12 and within the lower end 23 of the elevated pole where it is held captive by the encircling side walls 21 of the base part 18. This jamb plate 20 is held gravitationally in its locking position and for additional security it may be clamped in position by a nut threaded onto the central stud 22 as illustrated in Fig. 5.

While the jamb plate 20 is held captive in the lower end 23 it may be slid upwardly within the lower end 23 away from the stud 22 and removed through complementary access openings 25 and 26 provided in the nesting walls of the pole support 11 and the base part 18. These openings 25, 26 also provide access to the interior of the base part 18 where a

fixed eye 27 is mounted on the opposing side wall 30 of the base part 18 which is terminated by a base wall 31 which is slotted at 32 to enable the base wall to pivot across the central stud 22 to and from its nested position within the channel shaped pole support 11.

In use, the jamb plate is not removed until the pole is held tightly in its nested position within the pole by the winch cable. For this purpose a self-locking manually operated winch 35 is supported by a winch mounting 36 which is removably bolted to the extended shafts of the threaded rods 40 which secure the base plate 12 to the footing 13. The winch mounting 36 provides an elevated bracket 37 from which the winch 35 may be hung as well as a lower mount supporting a guide pulley 38 about which the winch cable 39 may pass from the winch 35 to be fed through the complementary access openings 25 and 26 to the fixed eye 27. Typically the winch cable 39 is terminated by a hook which may be engaged with the internal fixed eye 27.

As an extra safety feature a screw-adjustable latch or turnbuckle 42 which is suspended from a further fixed eye 41 welded to the inner face of the pole support 11. This latch 42 has a hooked end which may be engaged about the eye 27 and tightened to prevent separation of the base part 12 from the pole support 11. Typically this latch is removed before the cable is attached to the eye 27 then tightened and it this latch 40 is replaced as soon as the cable 39 is unhooked from the eye 27.

After the winch cable 39 has been attached to the eye 27 and tightened by operation of the winch 35, the jamb plate 20 is slid off the stud 22 enabling the weight of the pole assembly 16 to urge it towards the lowered position thereafter the position of the pole can be controlled by operating the winch 35 which winds out the cable 39 to lower the pole assembly 16 or winds in the cable to raise the pole assembly 16. At all times the cable 39 is tensioned and the pole assembly 16 is supported in the position to which it has been pivoted by operation of the winch. Suitably stop means are provided to prevent over rotation of the pole substantially beyond the horizontal position. This can be achieved by having a separate external limiting chain connected between the base part 18 and the pole support or by having a fixed length cable 39 on the winch 35 which is at its maximum extension when the pole is substantially horizontal.

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Referring to Figs. 6 and 7 it will be seen that a self-contained light assembly 50 according to this invention includes a serviceable pole 10 supporting a solar panel 51 at its upper end 33, batteries 52 beneath the panel and a light assembly 53 supported on the pole assembly 16 below the solar panel 51. Controllers, not shown are also supported below the solar panel 51 for controlling the charging of the batteries 52, which are suitably lightweight lithium-ion batteries, and discharging for powering the light. Motion sensors 54 are built into the light assembly 53 and for conserving the batteries, if battery levels decrease to say 30% of capacity for example, the light output may be programmed to dim to a lesser wattage or to only operate when the motion detectors detect nearby motion.

Poles assemblies according to this invention provide cost savings through economical construct, lightweight and ease of use. Furthermore the initial installation may be performed with the base of the pole disconnected from the pole support which is relatively short and easily manipulated onto its footing where it is secured by the fixed studs in the footing. Thereafter the winch mount may be connected to those same studs, the winch positioned and its cable led around the guide pulled to the eye 27 on the outwardly extended base part 18. The pole may then be easily raised by winching in the cable. Suitably the opening 26 in the pole support 11 is closed by a removable plate (not shown) when the pole assembly 10 is in its operative supporting position and which need only be removed for servicing operations.

The footing may be of conventional poured concrete form or it may be of the type having a top plate provided with the necessary upstanding studs and supporting angled sockets through which long steel members may be inserted and driven into the ground in a splayed arrangement to provide the necessary ground anchor. The use of this type of footing enables the footing to be installed and the pole erected in the one visit to the pole site.

Where a plurality of such poles are utilised such as in a park or the like, one winch assembly may be utilised to service all poles and the utilities supported thereby. For this purpose the winch 35 supported by the removable and re-locatable winch mounting 36 which is removably bolted to the extended shafts of the threaded rods 40 which secure the base plate 12 to the footing 13 constitutes a portable lowering tool. Without the correct

winching equipment or portable lowering tool it is difficult for an unauthorised person to lower the pole in a controlled manner so as to retrieve an undamaged utility therefrom. Thus theft of the valuable equipment atop the pole is difficult. As the pole can pivot to one side only, placement of the poles along a walkway can be arranged to be lowered away from the walkway or road for servicing without hindering access along the walkway or road.

It will of course be realised that while the foregoing has been given by way of illustrative example of this invention, all such and other modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as is defined by the appended claims.

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I CLAIM:-

1. A serviceable pole assembly including:-
 - a pole;
 - an upstanding pole support;
 - a pivot connection adjacent the upper end of the pole support connecting the pole to the pole support whereby the pole may be gravitationally biased to pivot from an elevated position to a lowered position at which the top end of the pole is disposed at a serviceable height;
 - releasable locking means for locking the pole in the elevated position to the pole support, and
 - mounting means for mounting a selectively extendible and retractable member between the pole and the pole support and spaced from said pivot connection whereby the length of the selectively extendible and retractable member may be selectively varied to control the pivotal movement of the pole between its elevated and lowered positions.
2. A serviceable pole as claimed in claim 1, wherein a demountable winch provides the selectively extendible and retractable member extending between the lower end of the pole and the pole support.
3. A serviceable pole as claimed in claim 1 or claim 2, wherein when elevated, the base part of the pole beneath the pivot connection nests with the pole support.
4. A serviceable pole as claimed in claim 3, wherein an aperture is formed in the lower nesting wall of the pole support through which a winch cable may extend from the pole to an externally accessible winch.
5. A serviceable pole as claimed in claim 4, wherein the base part of the pole beneath the pivot connection is hollow and complementary apertures are provided adjacent the lower ends of the nesting walls of the base part and the pole support through which the winch cable may extend from an internal mounting on the pole.

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6. A serviceable pole as claimed in any one of the preceding claims, wherein the upstanding pole support includes an apertured base plate adapted to be secured to threaded anchors which extend upwardly beyond the apertured base plate so as to provide releasable mountings for a winch.
7. A serviceable pole as claimed in any one of claims 3 to claim 6, wherein the base part of the pole is terminated by a base wall which is slotted to locate about a fixed upstanding stud associated with the pole support as the pole is pivoted to its elevated position and wherein an apertured jamb plate is captively slidable within said base part whereby it may be slid along said base part into engagement with said stud to lock the pole to the pole support.
8. A serviceable pole as claimed in any one of claims 5 to 7, wherein the complementary apertures are of a sufficient size as to enable a rope or cable to be manually engaged with and disengaged from said internal mounting.
9. A serviceable pole as claimed in any one of the preceding claims, wherein said mounting means is a releasable mounting which supports an elevated winch and a turning pulley for the winch cable beneath said winch and about which pulley the winch cable may pass to said pole.
10. A serviceable pole as claimed in any one of claims 2 to 9, wherein said winch is a self-locking winch.
11. A serviceable pole as claimed in any one of the preceding claims, wherein said pivot mounting is disposed at a height less than two metres above the base of the pole support.
12. A serviceable pole assembly including:-
 - a pole;
 - pole support means for supporting the pole;
 - elevated pivot means securing the pole to the pole support means;

releasable locking means for locking the elevated pole to the pole support means,
and

mounting means for releasably mounting a winch to said pole support means spaced from said pivot means with the winch cable thereof connected to the pole at a position spaced from said pivot means whereby the winch cable extends by operation of the winch to lower the pole.

13. A method of servicing a plurality of pole supported utilities, the method including supporting each utility on a serviceable pole as claimed in any one of the preceding claims;
forming substantially identical mounting means on each pole assembly whereby an identical winch may be releasably connected to each of the pole assemblies;
connecting a winch to one pole assembly whereby it may be operated to elevate and lower the pole of that pole assembly;
lowering the pole and servicing the utility supported by that pole;
operating the winch to elevate the pole with the serviced utility and locking that pole in the elevated position, then releasing the winch assembly from that pole assembly and mounting it on another pole assembly for servicing the utility supported thereby and repeating this sequence until the desired utilities have been serviced.

14. An elevated light assembly including:-
a serviceable pole assembly as claimed in any one of claims 1 to 12;
a light assembly supported by the upper end of said serviceable pole assembly, the light assembly having a light, a battery for powering the light and independent battery recharging means.

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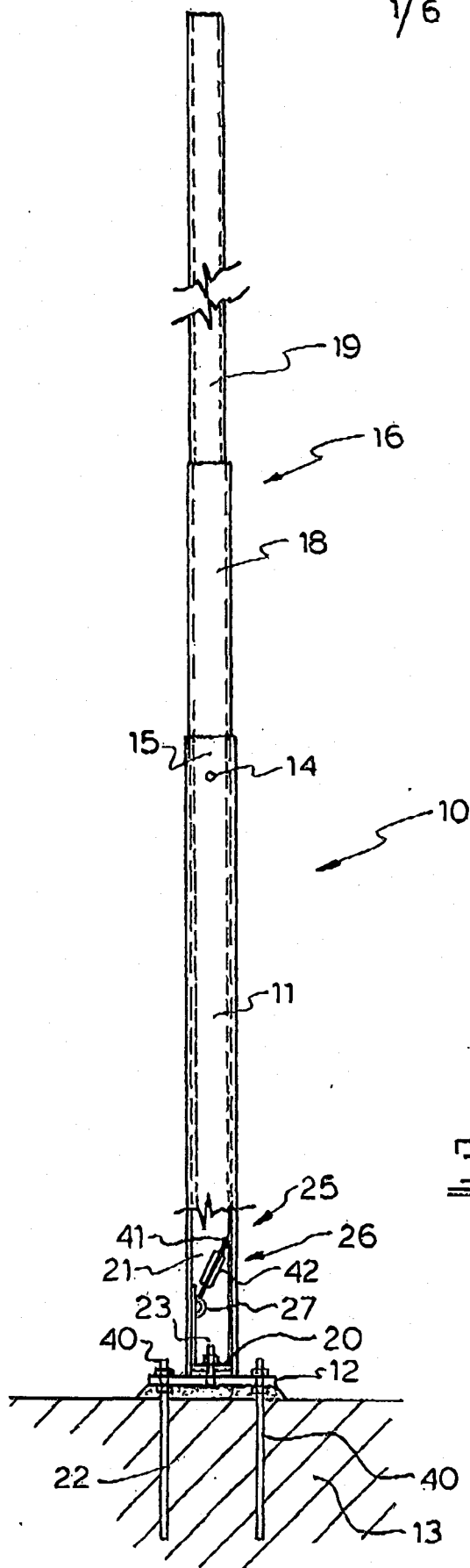


Fig. 1.

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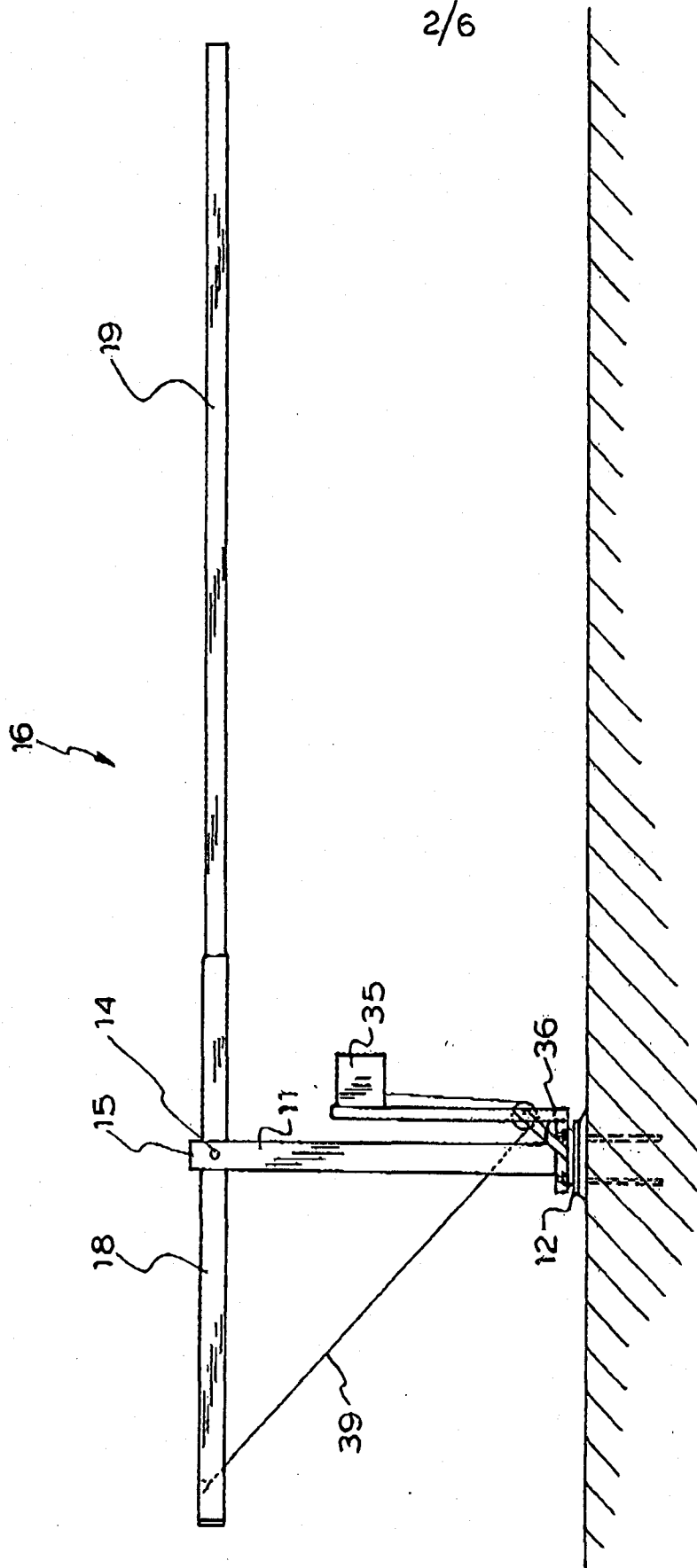


Fig. 2

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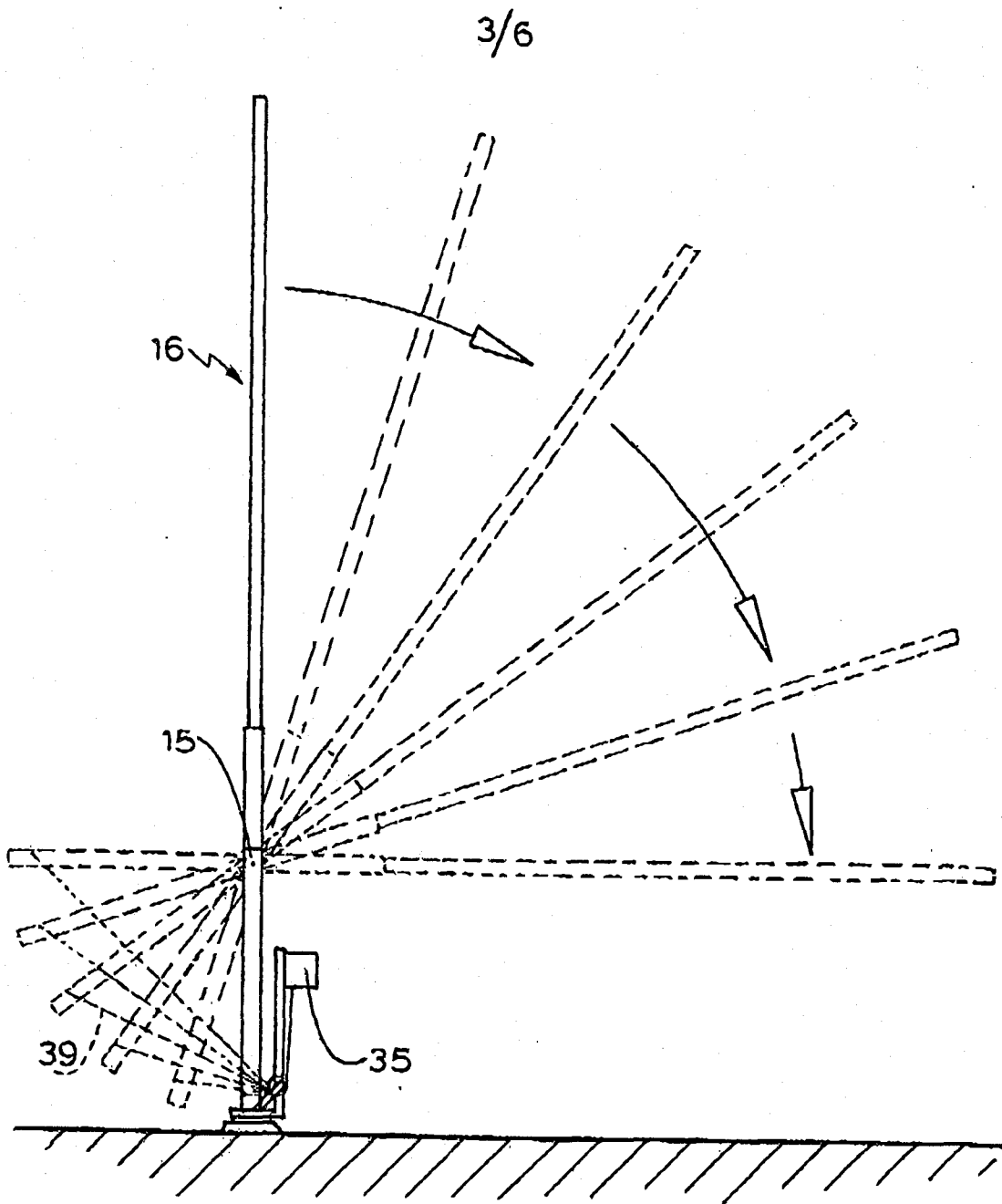


Fig. 3.

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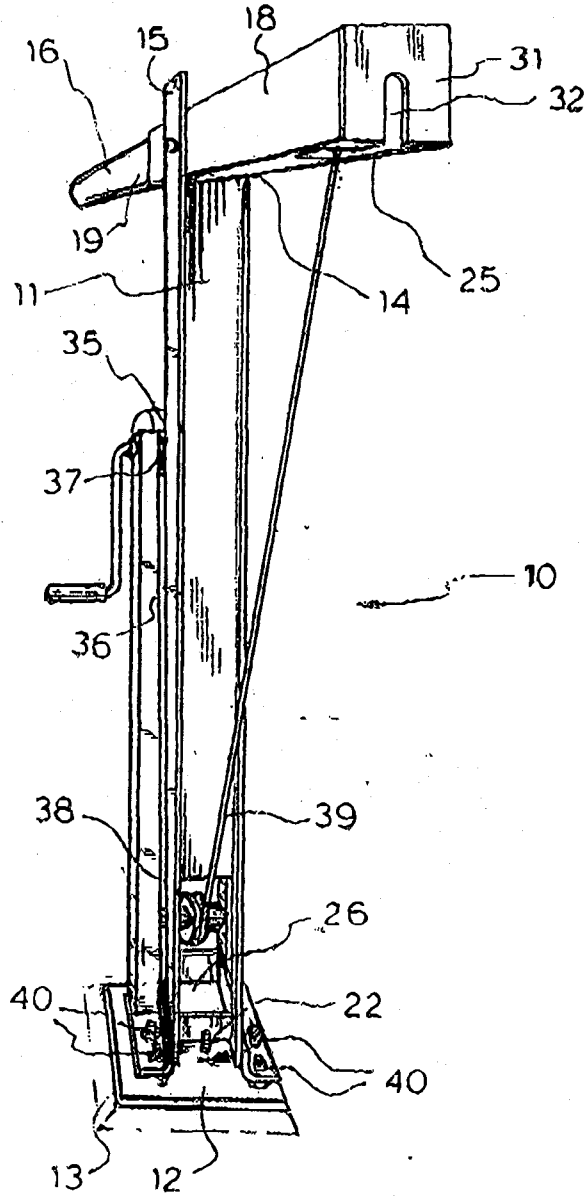


Fig. 4

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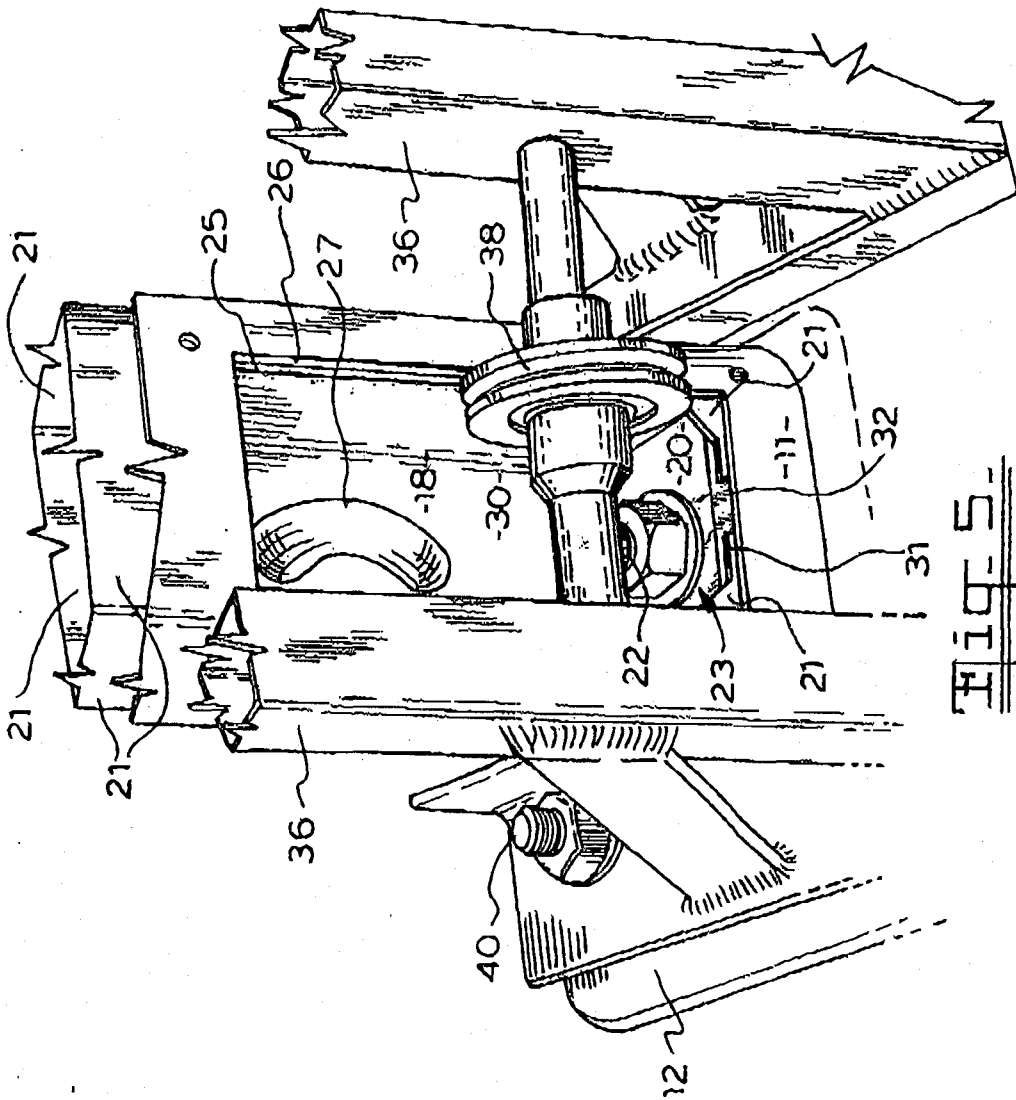


Fig. 5-

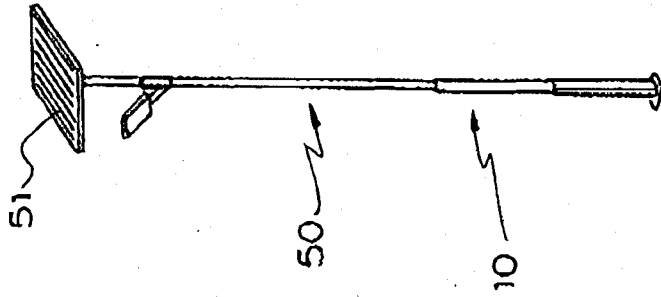


Fig. 6-

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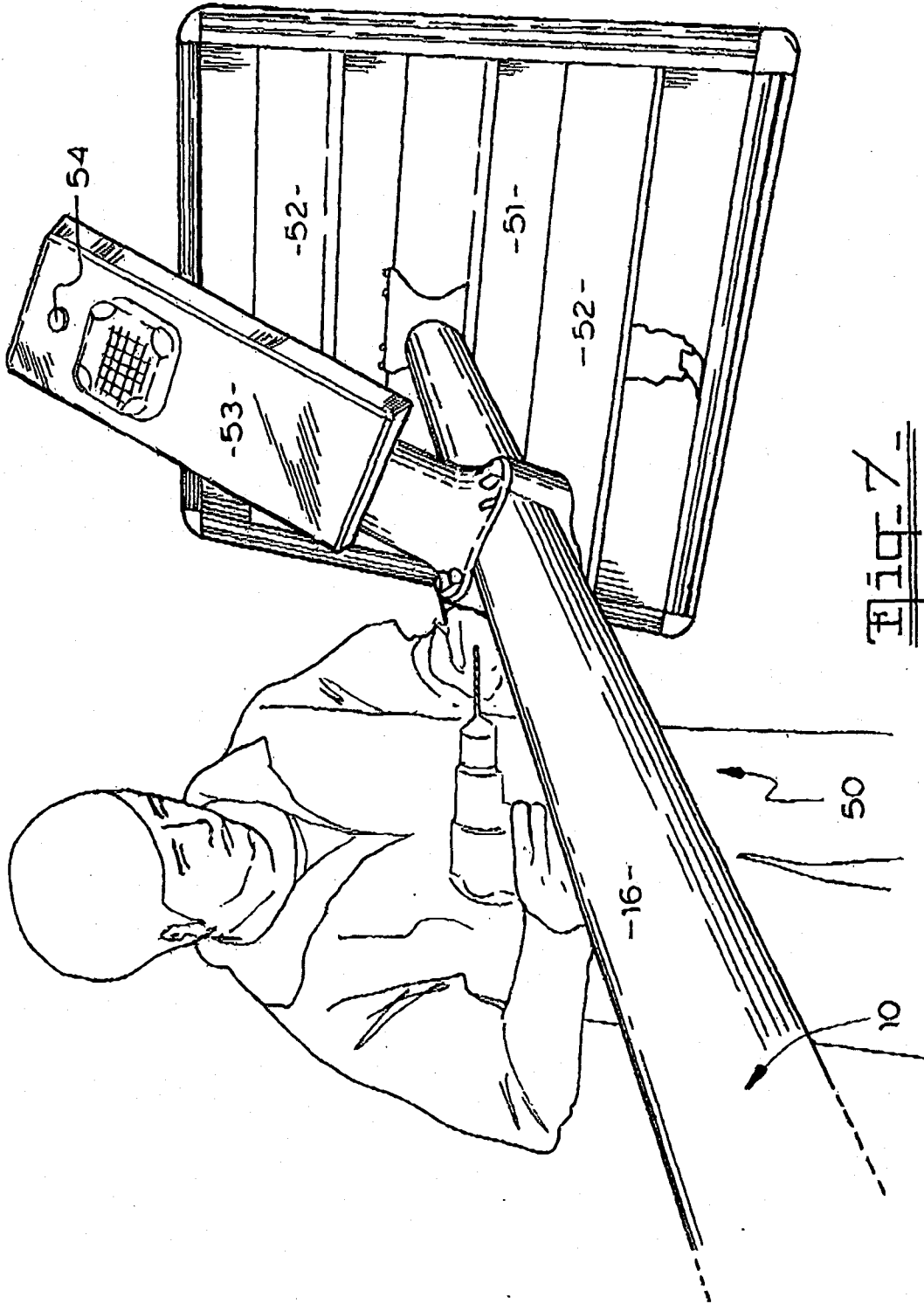


Fig. 7