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(54) Hoist for quickly lifting and positioning an object to a suitable height

Hebevorrichtung zum schnellen Heben und Positionieren eines Objektes in eine gewünschten Höhe

Dispositif de levage pour lever rapidement et positionner un objet à une hauteur désirée

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Description

[0001] The present invention relates to a hoist, and more particularly to a hoist for quickly lifting and positioning an object to a suitable height and having a simple structure.

[0002] A conventional hoist in accordance with the prior art usually has a complicated structure that needs a lot of time for manufacturing. However, the manpower cost becomes high day by day. The manufacturer must simplify the structure of the conventional hoist to decrease the manufacturing cost and effectively enhance the effect of the conventional hoist.

[0003] The present invention has arisen to mitigate and/or obviate the disadvantages of the conventional hoist.

[0004] US-A-4 600 348 discloses a hoist comprising a hollow mast having multiple legs pivotally connected to the mast, a fixed pulley being mounted to a top end of the mast, a telescopic post partially received in the mast and longitudinally movable relative to the mast, a controlling device mounted to the mast and including a reel and a crank for rotating the reel, a cable having a first end secured on the reel and a second end secured on an upper end of the telescoping post after detouring on the fixed pulley and a return pulley mounted to a bottom end of the telescoping post, a telescoping rod partially and slidably received in the telescopic post, a pulley mounted on an upper end of the telescopic post, and a cable having a first end secured on a top end of the mast and a second end secured on the lower end of the telescopic rod after detouring the pulley.

[0005] The main objective of the present invention is to provide an improved hoist for quickly lifting and positioning an object to a suitable height and having a simple structure.

[0006] According to the invention, this is achieved by a hoist according to the features of claim 1. Advantageous further embodiments are described in the subclaims.

[0007] Consequently, the hoist of the present invention has a simplified structure for reducing the manufacturing cost. The telescopic post and the telescopic rod simultaneously upwardly extend so that the hoist of the present invention can quickly lift the object to a suitable height.

[0008] Further benefits and advantages of the present invention will become apparent after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

Fig. 1 is a perspective view of a hoist for lifting and positioning an object to a suitable height in accordance with the present invention;

Fig. 2 is a partially cross-section view of the hoist in Fig. 1;

Fig. 3 is an operational top plan view of a controlling device of the hoist in accordance with the present invention; and

Fig. 4 is an operational view of a reel of the hoist in accordance with the present invention.

[0009] Referring to the drawings and initially to Figs. 1-4, a hoist for quickly lifting and positioning an object to a suitable height in accordance with the present invention comprises a mast (10) that is hollow. A slider (11) is movably sleeved around the mast (10). Multiple legs (12) each includes a first end pivotally connected to the slider (11) by a first pivot (13) and a second end having a roller (17) mounted thereon for easily moving the hoist of the present invention. The mast (10) includes a lower end having a connecting seat (14) mounted thereon. A stretcher (15) includes a first end pivotally connected to the connecting seat (14) and a second end pivotally connected to a corresponding one of the multiple legs (12) by a second pivot (16) so that the multiple legs (12) is foldable relative to the mast (10).

[0010] A fixing member (110) is mounted to the slider (11) to selectively hold the slider (11) in place on the mast (10). In the preferred embodiment of the present invention, the fixing member (110) is a screw and securely abutting an outer periphery of the mast (10) after being screwed through the slider (11).

[0011] A stopper (18) includes a first end pivotally connected to the connecting seat (14) and a second end adapted to push a supporting surface to prevent the hoist of the present invention from an unexpected movement.

[0012] An operating arm (20) has a first end pivotally connected to a top of the mast (10) by a third pivot (21) and multiple positioning holes (22) laterally defined in the operating arm (20).

[0013] A linkage (23) has a first end pivotally connected to the mast (10), and a second end extending into the operating arm (20) and aligning with a corresponding one of the multiple positioning holes (22). A wedge (24) extends through the corresponding positioning hole (22) and the second end of the linkage (23) to hold the second end of the linkage (23) in place and adjust an elevation of the operating arm (20).

[0014] A telescopic post (30) partially received in the mast (10) and longitudinally moved relative to the mast (10). The telescopic post (30) includes a lower end received in the mast (10) and having an end piece (not numbered) attached thereon. The end piece abuts an inner periphery of the mast (10) to prevent the telescopic post (30) from being wavered. A fixed pulley (31) is mounted to a top end of the mast (10).

[0015] A controlling device (40) is mounted in a second end of the operating arm (20) opposite to the mast (10). The controlling device (40) includes a shaft (41) laterally extending through the controlling device (40) and having a threaded portion (42) formed on the shaft (41) after extending through the controlling device (40). A drive gear (44) is mounted around the threaded portion (42), a brake pad (46) is mounted around the threaded portion (42) and a washer (45) is mounted between the drive gear (44) and the brake pad (46). The drive gear (44),

the washer (45) and the brake pad (46) can be laterally moved on the shaft (41) due to the threaded portion (42). A ratchet wheel (43) is mounted on the threaded portion (42) to prevent the washer (45) and the brake pad (46) from detaching from the shaft (41). A crank (411) is mounted on the shaft (41) for driving the ratchet wheel (43) and the drive gear (44).

[0016] A pawl (47) is pivotally mounted to the controlling device (40) by an axle (48) for selectively being engaged to the ratchet wheel (43) to make the ratchet wheel only rotate in a single direction and a torsion spring (49) is mounted around the axle (48) for providing a restitution force to the pawl (47).

[0017] A reel (50) is pivotally mounted in the controlling device (40). A driven gear (51) is laterally mounted to one end of the reel (50) and engaged to the drive gear (44) so that the reel (50) is rotated when the crank (411) is circularly operated.

[0018] At least two first cables (52) each has a first end secured on the reel (50) and a second end secured on a bottom end (32) of the telescopic post (30) after detouring on the fixed pulley (31) so that the telescopic post (30) is moved relative to the mast (10) when the reel (50) is rotated to reel the at least two first cables (52).

[0019] A telescopic rod (60) is partially and slidably received in the telescopic post (30). The telescopic rod (60) includes a lower end slidably received in the telescopic post (30) and an upper end having adapted to support and lift an object. An end piece (not numbered) is attached to the lower end of the telescopic rod (60) and abuts an inner periphery of the telescopic post (30) to prevent the telescopic rod from being wavered.

[0020] A pulley (61) is mounted on an upper end of the telescopic post (30). At least two second cables (62) each has a first end secured on a top end (64) of the mast (10) and a second end secured on the bottom end (63) of the telescopic rod (60) after detouring the pulley (61) so that the telescopic rod (60) upwardly extends when the two second cables (62) are pulled and the telescopic post (30) upwardly extends.

[0021] When operating the hoist in accordance with the present invention, the user only needs to rotate the crank (411) for driving the drive gear (44), the driven gear (51) and the reel (50), thereby reeling the at least two first cables (52) on the reel (50) to upwardly moved the telescopic post (30). At the same time, the at least two second cables (62) upwardly move the telescopic rod (60) because each second cable has a second end secured on the lower end of the telescopic rod (60) and a first end secured on the upper end of the mast (10), and is detoured on the second pulley (61) that is mounted to the upper end of the telescopic post (30). As described above, the telescopic post (30) and the telescopic rod (60) upwardly extend at the same time so that the hoist of the present invention can quickly lift the object to a suitable height.

[0022] When stopping operating or the object being lifted to a suitable height, the user only needs to let go the crank (411), and the first cables (52) and the second cables (62) reversely pull the reel (50) due to the gravity Consequently, the driven gear (51) reversely drives the drive gear (44) to laterally push the washer (45) and the brake pad (46) toward the ratchet wheel (43) due to the threaded portion (42) of the shaft (41). The telescopic post (30) and the telescopic rod (60) are fixed when the brake pad (46) laterally abuts the ratchet wheel (43) and the pawl (47) can prevent the ratchet wheel from being reversely rotated. Consequently, the hoist of the present invention can effectively position the object on a suitable height.

[0023] As shown in the figures of the preferred embodiment of the present invention, the hoist of the present invention has two first cables (52) and two second cables (62) so that the present invention has no immediate danger when one of the two first/second cables (52/62) is broken. Consequently, the security of the hoist is enhanced. In addition, the two first cables (52) and the two second cables (62) are respectively connected to the telescopic post (30) and the telescopic rod (60) and do not extending through the telescopic post (30) and the telescopic rod (60) so that the telescopic post (30) and the telescopic rod (60) can maintain the completeness of the structures of the telescopic post (30) and the telescopic rod (60).

[0024] As described above, the hoist of the present invention comprises a simplified structure for reducing the manufacturing cost. The telescopic post (30) and the telescopic rod (60) simultaneously upwardly extend so that the hoist of the present invention can quickly lift the object to a suitable height, and the pawl (47) only allows the ratchet wheel being rotated in a single direction so that the present invention can effectively positioning the object at the suitable height.

[0025] Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

Claims

1. A hoist for quickly lifting and positioning an object to a suitable height comprising:

a hollow mast (10) having multiple legs (12) pivotally connected to the mast (10) for standing the mast (10), a fixed pulley (31) being mounted to a top end of the mast (10);
an operating arm (20) having a first end pivotally connected to a top of the mast (10);
a linkage (23) having a first end pivotally connected to the mast (10) and a second end connected to the operating arm (20) for supporting the operating arm (20);
a telescopic post (30) partially received in the

mast (10) and longitudinally movable relative to the mast (10), the telescopic post (30) having a lower end received in the mast (10);
a controlling device (40) mounted in a second end of the operating arm (20) opposite to the mast (10), the controlling device (40) including a shaft (41) laterally extending through the controlling device (40) and having a threaded portion (42) formed on the shaft (41), a drive gear (44) and a brake pad (46) each mounted around the threaded portion (42), the drive gear (44) and the brake pad (46) can be laterally moved on the shaft (41) due to the threaded portion (42), a ratchet wheel (43) mounted on the threaded portion (42) such that the brake pad (46) is prevented from detaching from the shaft (41), the brake pad (46) being situated between the ratchet wheel (43) and the drive gear (44), and a crank (411) mounted on the shaft (41) for driving the ratchet wheel (43) and the drive gear (44);
a pawl (47) pivotally mounted to the controlling device (40) for selectively being engaged to the ratchet wheel (43) such that the ratchet wheel (43) is rotated in a single direction only;
a reel (50) pivotally mounted in the controlling device (40), and a driven gear (51) laterally mounted to one end of the reel (50) and engaged to the drive gear (44) so that the reel (50) is rotated when the crank (411) is circularly operated;
at least two first cables (52) each having a first end secured on the reel (50) and a second end secured on a bottom end of the telescopic post (30) after detouring on the fixed pulley (31) so that the telescopic post (30) is moved relative to the mast (10) when the reel (50) is rotated to reel the at least two first cables (52);
a telescopic rod (60) partially and slidably received in the telescopic post (30), the telescopic rod (60) including a lower end slidably received in the telescopic post (30) and an upper end adapted to support and lift an object; and
a pulley (61) mounted on an upper end of the telescopic post (30), and at least two second cables (62) each having a first end secured on a top end of the mast (10) and a second end secured on the lower end of the telescopic rod (60) after detouring the pulley (61) so that the telescopic rod (60) upwardly extends when the two second cables (62) are pulled and the telescopic post (30) upwardly extends.

2. The hoist as claimed in claim 1, wherein the operating arm (20) comprises multiple positioning holes (22) laterally defined therein and the second end of the linkage (23) extends to align with a corresponding one of the multiple positioning holes (22), a wedge extending through the corresponding one of the multiple positioning holes (22) and the second end of the linkage (23) for adjusting an elevation of the operating arm (20).

3. The hoist as claimed in claim 1 further comprising a stopper (18) including a first end pivotally connected to a lower end of the mast (10) and a second end pushing a supporting surface such that the hoist is prevented from an unexpected movement.

Patentansprüche

1. Hebezeug zum schnellen Heben und Positionieren eines Gegenstandes in eine geeignete Höhe, aufweisend:

einen Hohlmast (10) mit mehreren Beinen (12), die mit dem Mast (10) zum Aufstellen des Mastes (10) schwenkbar verbunden sind, wobei eine fixierte Umlenkrolle (31) an einem oberen Ende des Mastes (10) montiert ist;
einen Betätigungsarm (20) mit einem ersten Ende, das mit einer Spitze des Mastes (10) schwenkbar verbunden ist;
ein Gestänge (23) mit einem ersten Ende, das mit dem Mast (10) schwenkbar verbunden ist, und einem zweiten Ende, das mit dem Betätigungsarm (20) zum Abstützen des Betätigungsarmes (20) verbunden ist;
eine Teleskopsäule (30), die in dem Mast (10) teilweise aufgenommen und relativ zu dem Mast (10) längs bewegbar ist, wobei die Teleskopsäule (30) ein unteres Ende aufweist, das in dem Mast (10) aufgenommen ist;
eine Steuervorrichtung (40), die an einem zu dem Mast (10) entgegengesetzten zweiten Ende des Betätigungsarmes (20) montiert ist, wobei die Steuervorrichtung (40) eine Welle (41), die sich seitlich durch die Steuervorrichtung (40) hindurch erstreckt und einen Gewindeabschnitt (42) aufweist, der an der Welle (41) ausgebildet ist, ein Antriebsrad (44) und einen Bremsbelag (46), die jeweils um den Gewindeabschnitt (42) herum montiert sind, wobei das Antriebsrad (44) und der Bremsbelag (46) infolge des Gewindeabschnitts (42) auf der Welle (41) seitlich bewegt werden können, ein Ratschenrad (43), das an dem Gewindeabschnitt (42) derart montiert ist, dass verhindert wird, dass sich der Bremsbelag (46) von der Welle (41) löst, wobei sich der Bremsbelag (46) zwischen dem Ratschenrad (43) und dem Antriebsrad (44) befindet, und eine Kurbel (411) aufweist, die an der Welle (41) zum Antreiben des Ratschenrades (43) und des Antriebsrades (44) montiert ist;
eine Sperrklinke (47), die an der Steuervorrichtung (40) schwenkbar montiert ist, um selektiv

mit dem Ratschenrad (43) derart in Eingriff zu stehen, dass das Ratschenrad (43) in nur einer einzigen Richtung gedreht wird;
eine Rolle (50), die in der Steuervorrichtung (40) schwenkbar montiert ist, und ein Antriebsrad (51), das an dem einen Ende der Rolle (50) seitlich montiert ist und mit dem Antriebsrad (44) derart in Eingriff steht, dass die Rolle (50) gedreht wird, wenn die Kurbel (411) kreisförmig betätigt wird;
wenigstens zwei erste Seile (52) mit jeweils einem ersten Ende, das an der Rolle (50) befestigt ist, und einem zweiten Ende, das an einem unteren Ende der Teleskopsäule (30) befestigt ist, nachdem es an der fixierten Umlenkrolle (31) umgelenkt ist, so dass die Teleskopsäule (30) relativ zu dem Mast (10) bewegt wird, wenn die Rolle (50) gedreht wird, um die wenigstens zwei ersten Seile (52) zu wickeln;
eine Teleskopstange (60), die in der Teleskopsäule (30) teilweise und verschiebbar aufgenommen ist, wobei die Teleskopstange (60) ein unteres Ende, das in der Teleskopsäule (30) verschiebbar aufgenommen ist, und ein oberes Ende aufweist, das geeignet ist, einen Gegenstand zu tragen und zu heben; und
eine Umlenkrolle (61), die an einem oberen Ende der Teleskopsäule (30) montiert ist, und wenigstens zwei zweite Seile (62) mit jeweils einem ersten Ende, das an einem oberen Ende des Mastes (10) befestigt ist, und einem zweiten Ende, das an dem unteren Ende der Teleskopstange (60) befestigt ist, nachdem es an der Umlenkrolle (61) umgelenkt ist, so dass die Teleskopstange (60) nach oben ausfährt, wenn die beiden zweiten Seile (62) gezogen werden und die Teleskopsäule (30) nach oben ausfährt.

2. Hebezeug nach Anspruch 1, wobei der Betätigungsarm (20) mehrere Positionierungslöcher (22) aufweist, die darin seitlich definiert sind, und das zweite Ende des Gestänges (23) in Ausrichtung zu einem entsprechenden einen der mehreren Positionierungslöcher (22) verläuft, wobei sich ein Keil durch das entsprechende eine der mehreren Positionierungslöcher (22) und das zweite Ende des Gestänges (23) hindurch zum Einstellen einer Höhe des Betätigungsarmes (20) erstreckt.

3. Hebezeug nach Anspruch 1, ferner aufweisend einen Stopper (18) mit einem ersten Ende, das mit einem unteren Ende des Mastes (10) schwenkbar verbunden ist, und einem zweiten Ende, das eine Stützfläche derart andrückt, dass das Hebezeug an einer unerwarteten Bewegung gehindert wird.

Revendications

1. Engin de levage destiné à lever et positionner rapidement un objet à une hauteur appropriée, ledit engin de levage comprenant :

un mât creux (10) comportant de multiples pieds (12) raccordés à pivotement au mât (10) afin de soutenir le mât (10), une poulie fixe (31) étant montée à une extrémité supérieure du mât (10) ;
un bras d'actionnement (20) comportant une première extrémité raccordée à pivotement à la partie supérieure du mât (10) ;
une bielle (23) comportant une première extrémité raccordée à pivotement au mât (10) et une deuxième extrémité raccordée au bras de commande (20) pour supporter le bras d'actionnement (20) ;
un montant télescopique (30) reçu partiellement dans le mât (10) et mobile longitudinalement par rapport au mât (10), le montant télescopique (30) comportant une extrémité inférieure reçue dans le mât (10) ;
un dispositif de commande (40) monté dans une deuxième extrémité du bras d'actionnement (20) opposée au mât (10), le dispositif de commande (40) incluant un arbre (41) s'étendant latéralement à travers le dispositif de commande (40) et comportant une portion filetée (42) formée sur l'arbre (41), un pignon menant (44) et un patin de frein (46) montés chacun autour de la portion filetée (42), le pignon menant (44) et le patin de frein (46) pouvantt être déplacés latéralement sur l'arbre (41) en raison de la portion filetée (42), une roue à cliquet (43) montée sur la portion filetée (42) de sorte que le patin de frein (46) est empêché de se détacher de l'arbre (41), le patin de frein (46) étant situé entre la roue à cliquet (43) et le pignon menant (44), et une manivelle (411) montée sur l'arbre (41) pour entraîner la roue à cliquet (43) et le pignon menant (44) ;
un cliquet (47) monté à pivotement sur le dispositif de commande (40) pour l'engagement sélectif avec la roue à cliquet (43) de sorte que la roue à cliquet (43) est tournée dans un seul sens ;
un dévidoir (50) monté à pivotement dans le dispositif de commande (40), et un pignon mené (51) monté latéralement sur une extrémité du dévidoir (50) et engagé avec un pignon menant (44) de sorte que le dévidoir (50) est tourné lorsque la manivelle (411) est actionnée circulairement ;
au moins deux premiers câbles (52) comportant chacun une première extrémité fixée sur le dévidoir (50) et une deuxième extrémité fixée sur une extrémité inférieure du montant télescopi-

que (50) après déviation sur la poulie fixe (31) de sorte que le montant télescopique (30) est déplacé par rapport au mât (10) lorsque le dévidoir (50) est tourné pour embobiner les au moins deux premiers câbles (52) ;
une barre télescopique (60) reçue partiellement et à coulissement dans le montant télescopique (30), la barre télescopique (60) incluant une extrémité inférieure reçue à coulissement dans le montant télescopique (30) et une extrémité supérieure destinée à supporter et lever un objet ; et
une poulie (61) montée sur une extrémité supérieure du montant télescopique (30), et au moins deux deuxièmes câbles (62) comportant chacun une première extrémité fixée à une extrémité supérieure du mât (10) et une deuxième extrémité fixée à l'extrémité inférieure de la barre télescopique (60) après déviation sur la poulie (61), de sorte que la barre télescopique (60) s'étend vers le haut lorsque les deuxièmes câbles (62) sont tirés et le montant télescopique (30) s'étend vers le haut.

2. Engin de levage selon la revendication 1, dans lequel le bras d'actionnement (20) comprend de multiples trous de positionnement (22) ménagés latéralement dans ledit bras d'actionnement et la deuxième extrémité de la bielle (23) s'étend de façon à s'aligner avec un trou correspondant des multiples trous de positionnement (22), une clavette s'étendant à travers le trou correspondant des multiples trous de positionnement (22) et la deuxième extrémité de la bielle (23) pour régler une élévation du bras de commande (20).

3. Engin de levage selon la revendication 1, comprenant en outre une butée (18) incluant une première extrémité raccordée à pivotement à une extrémité inférieure du mât (10) et une deuxième extrémité poussant une surface de support de telle sorte que l'engin de levage est empêché d'effectuer un mouvement inopportun.

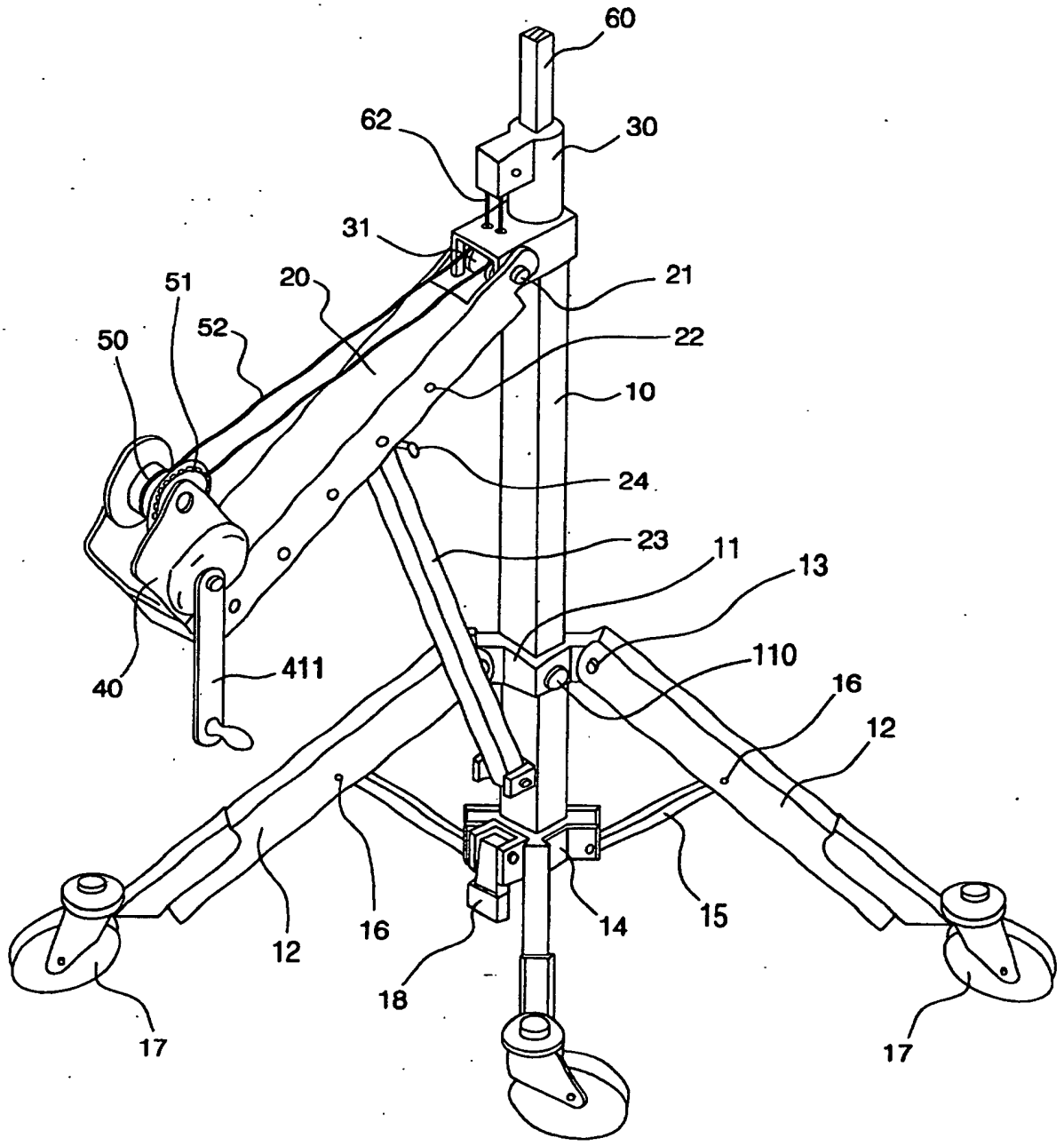

60
62
30
31
21
20
51
52
50
22
10
24
23
11
13
110
16
12
411
40
12
16
14
15
18
17
17

FIG. 1

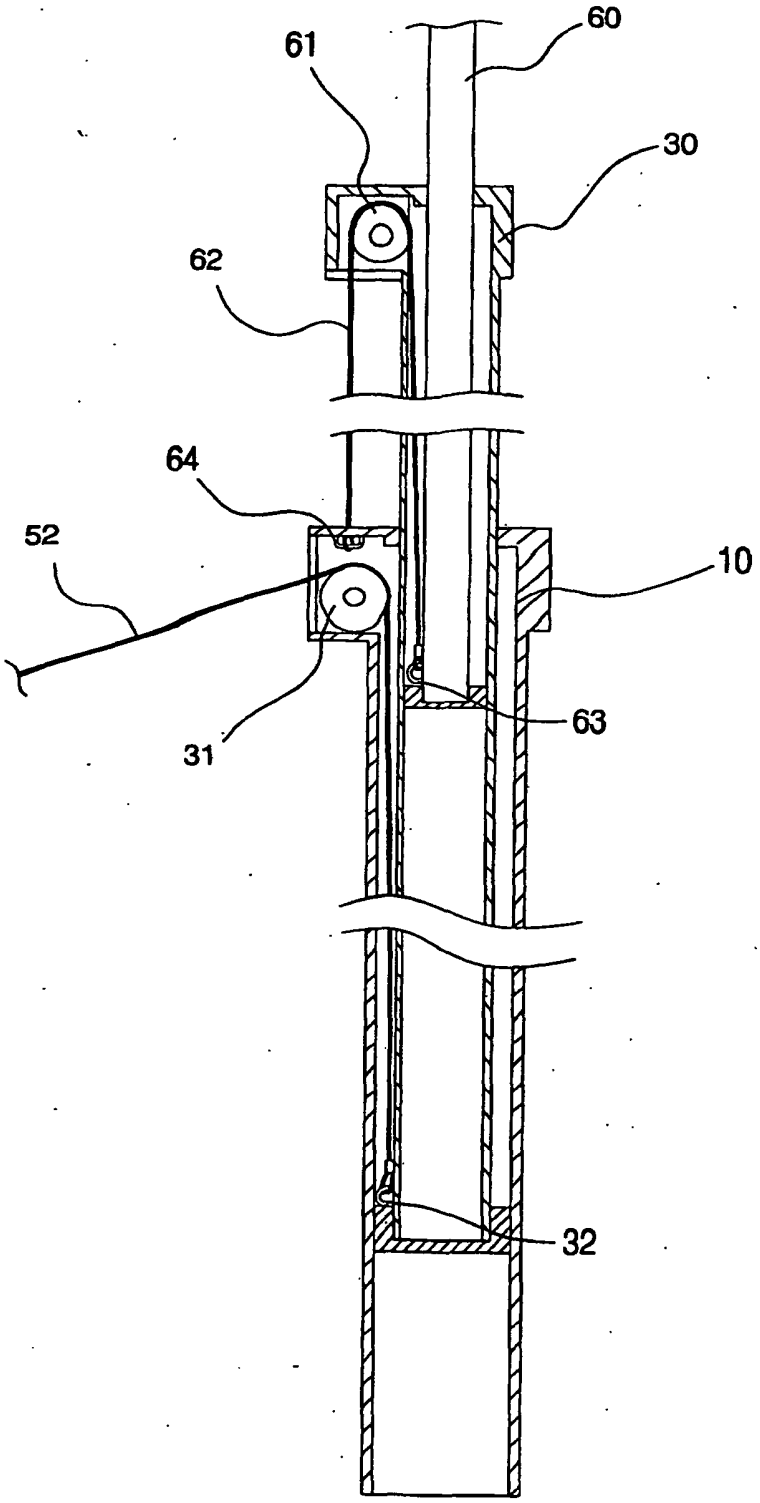


FIG. 2

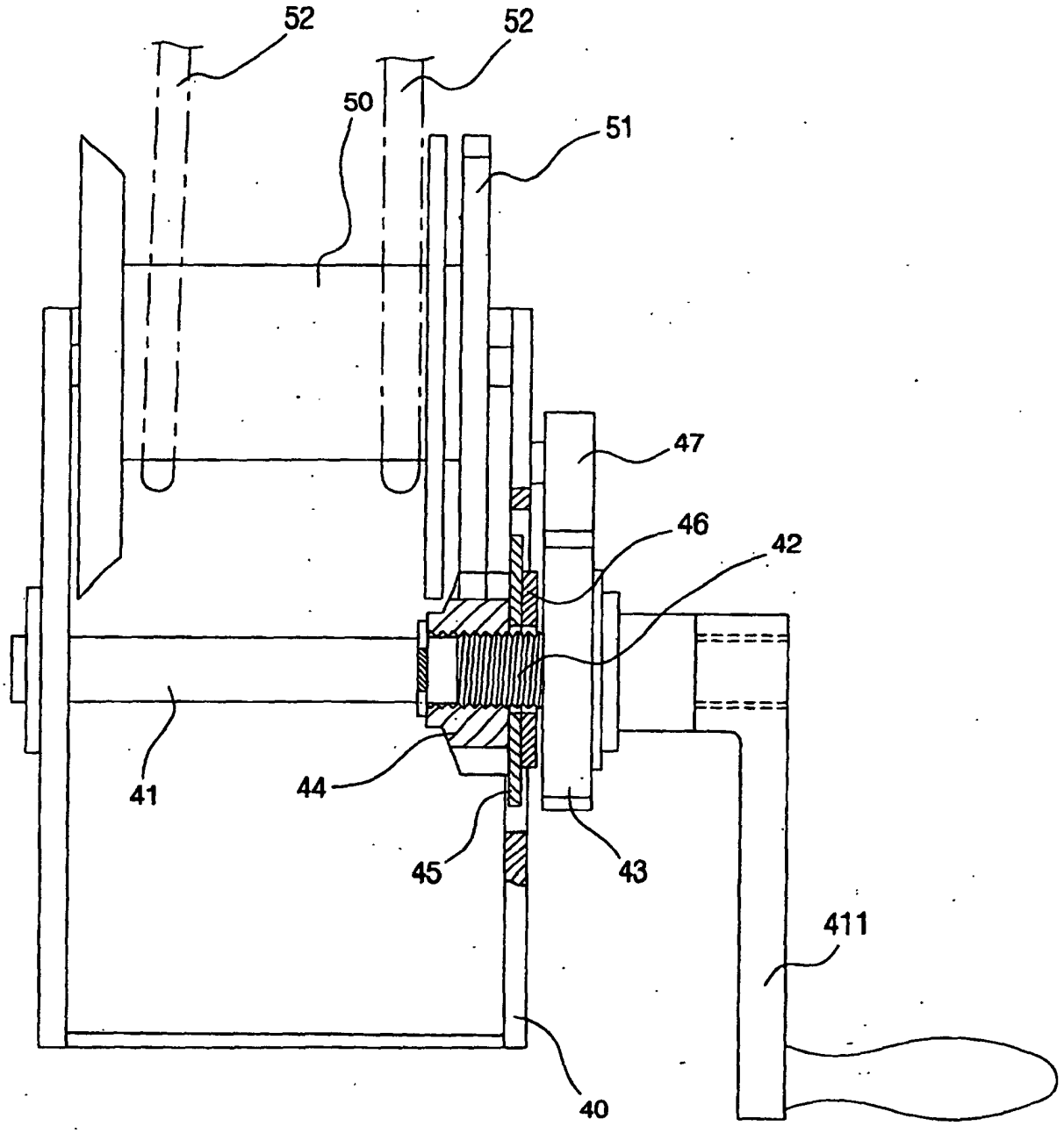


FIG. 3

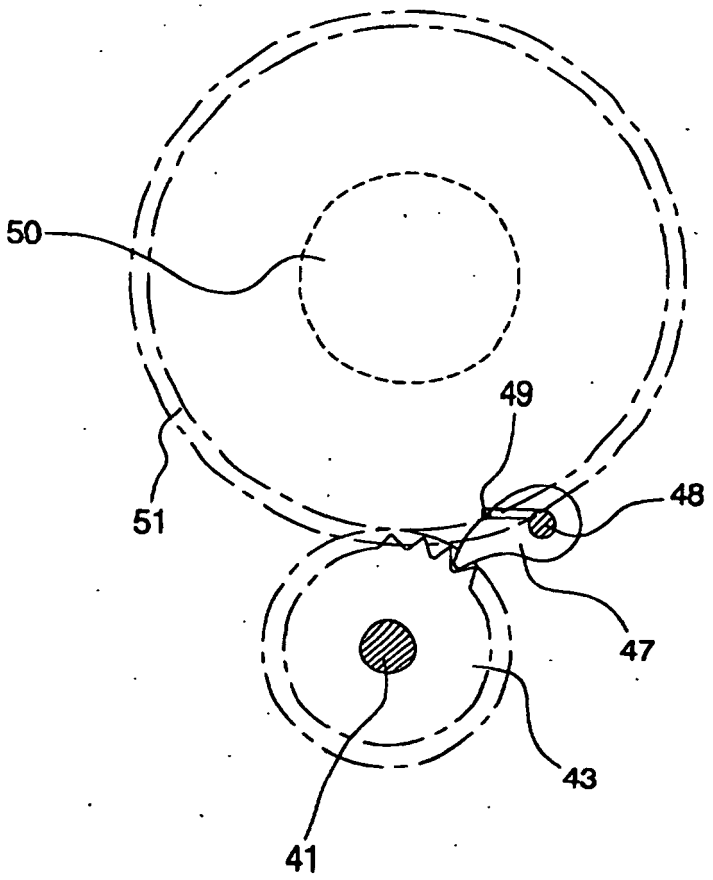


FIG. 4