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71 Applicant: JAPAN STEELS CORPORATION KABUSHIKI
KAISHA
18-5, Hongo 1-chome Bunkyo-ku
Tokyo 113(JP)

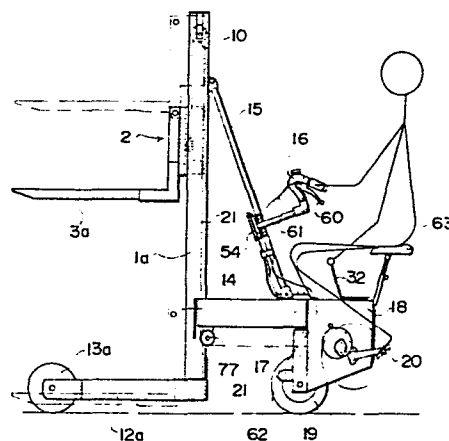
72 Inventor: Douglas, Fir c/o JAPAN STEELS
CORPORATION K.K.
18 - 5 Hongo 1 Chome
Bunkyo Ku Tokyo(JP)

74 Representative: Cabinet BERT, DE KERAVENTANT &
HERRBURGER
115, Boulevard Haussmann
F-75008 Paris(FR)

54 Running cargo handling device.

57 A fork member (2) is vertically movably provided between vertical pillars (1, 1a) erected at a proper spacing, legs (12, 12a) are provided forward respectively from both ends of a horizontal member (11) provided at the lower ends of the vertical pillars (1, 1a), running wheels (13, 13a) are provided at the tips of the respective legs (12, 12a), a gear box (18) having a driving wheel (19) below is horizontally rotatably provided through a gear box connecting base (14) in the rear of the vertical pillars (1, 1a) and is made horizontally rotatable by a handle (16) and the fork member (2) is lifted and lowered and the driving wheel (19) is rotated by switching the rotations of the crank pedals (20, 20a) provided on the gear box (18).

FIG. 1



SPECIFICATION

Title of the Invention:

RUNNING CARGO HANDLING DEVICE

Technical Field

This invention relates to a running cargo handling device with a manpower which can lift, lower and run a fork member, is economical and cheap in the cost and is simple and safe to operate.

Background Technique

Almost all of conventionally provided running cargo handling devices have internal combustion engines as prime movers.

However, there is a first defect that the entire device is very high in the cost, that is, the internal combustion engine and controlling means are costly.

There is a second defect that the internal combustion engine as a power source necessarily consumes a large amount of such fuel as petroleum and is expensive and uneconomical to maintain and control.

There is a third defect that the device requires a skill to operate and is dangerous to misoperate.

In the present invention, such defects as

are mentioned above are eliminated, a fork member is lifted, lowered and run, the structure is simple, the cost is low, no such fuel as petroleum is consumed, the maintenance and control are not expensive and are economical and the device can be simply operated by anyone.

Disclosure of the Invention

In the present invention, a fork member is vertically movably provided between vertical pillars erected at a proper spacing, legs are extended forward respectively from both ends of a horizontal member provided at the lower ends of the above mentioned vertical pillars, running wheels are provided at the tips of the respective legs, a gear box connecting base is provided in the rear between the above mentioned vertical pillars, a gear box having a driving wheel below is horizontally rotatably borne at the rear end of the gear box connecting base so as to horizontally rotate the gear box with a handle and the gear box is provided with crank pedals, a transmitting mechanism transmitting the rotations of the crank pedals to the above mentioned driving wheel, a gear mechanism transmitting the rotations of the crank pedals to a wire drum winding a wire to lift and lower the fork member, a switching mechanism for

switching the rotations of the crank pedals to the transmitting mechanism or the gear mechanism and a braking mechanism preventing the reverse rotation of the wire drum.

Brief Description of the Drawings

Fig. 1 is an elevation of a device according to the present invention.

Fig. 2 is a plan view of the same.

Fig. 3 is a left side view of the same.

Fig. 4 is a partly sectioned magnified elevation of a gear box part.

Fig. 5 is a sectioned view on line A-A in Fig. 4.

Fig. 6 is a magnified sectioned view of a clutch part.

Fig. 7 is a magnified sectioned view of a brake mechanism part.

Fig. 8 is a perspective view of the brake mechanism part.

Fig. 9 is a perspective view of a fork member.

Fig. 10 is a plan view showing the relation of the fork member with vertical pillars.

Fig. 11 is a plan view showing a handle and steering mechanism.

Fig. 12 is a plan view of a gear changing

lever part.

Fig. 13 is a sectioned view of a driving wheel part.

Best Form for Working the Invention

The present invention shall be explained in detail in the following with reference to the accompanying drawings.

Vertical pillars 1 and 1a made of C-sectioned steel members are provided at a proper spacing and a fork member 2 is vertically movably provided between them as shown in Figs. 9 and 10.

As shown in Fig. 9, the fork member 2 is provided in the front with forks 3 and 3a so as to be freely adjustable in the distance between them and on both sides in the rear with guide rollers 4, 4a and 5, 5a. The above mentioned forks 3 and 3a are formed to be L-shaped and a supporting rod 6 is inserted through the upper ends of the forks and is fixed to the upper parts of the fork member 2 so as to freely slide the forks 3 and 3a to be able to freely adjust the distance between them.

Further, as shown in Fig. 10, the guide rollers 4, 4a and 5, 5a are fitted respectively within the vertical pillars 1 and 1a made of C-sectioned steel members. Further, a pulley 7 is provided substan-

tially in the middle in the rear of the fork member 2. A wire fixing part 9 and pulley 10 are provided on the lower surface of an upper frame 8 of the vertical pillars 1 and 1a.

A horizontal member 11 is provided at the lower ends of the vertical pillars 1 and 1a. Legs 12 and 12a are extended forward from both ends of the horizontal member 11 and are provided with running wheels 13 and 13a respectively at the tips.

Then, a gear box connecting base 14 is provided in the rear between the vertical pillars 1 and 1a.

In the drawings, the reference numerals 15 denote reinforcing rods provided between the gear box connecting base 14 and the above mentioned vertical pillars 1 and 1a and a handle 16 is provided in a proper position of the reinforcing rods 15.

Further, a pulley 77 is provided on the side of the above mentioned vertical pillars 1 and 1a below the gear box connecting base 14.

Then, a gear box 18 is fitted to the rear end of the gear box connecting base 14 through a shaft 17 so as to rotate horizontally.

The gear box 18 is provided with a driving wheel 19, crank pedals 20 and 20a, a transmitting mechanism transmitting the rotations of the crank

pedals 20 and 20a to the above mentioned driving wheel 19, a gear mechanism transmitting the rotations of the crank pedals 20 and 20a to a wire drum 22 winding a wire 21 connected to the fork mechanism 2 to lift and lower the fork member 2, a switching mechanism for switching the rotations of the crank pedals to the transmitting mechanism or the gear mechanism and a braking mechanism preventing the reverse rotation of the wire drum 22.

More particularly, as shown in Figs. 5 and 6, the crank pedals 20 and 20a are connected with each other through a driving shaft 23, a sprocket 24 for rotating the driving wheel 19 is provided at one end of the driving shaft 23 so as to be freely rotatable in a fixed position with respect to the driving shaft and speed changing gears 25 and 26 are provided at the other end of the driving shaft 23 so as to slide along the driving shaft 23 and to rotate integrally with the driving shaft 23. That is to say, the speed changing gears 25 and 26 are so formed as to rotate integrally with the driving shaft 23 through a key 27.

In Fig. 13 is shown the driving wheel 19 part. That is to say, a sprocket 28 and brake disk 29 are supported integrally with the driving wheel 19 through a shaft 30 and a chain 31 is hung between the sprocket

28 and the sprocket 24 provided on the above mentioned driving shaft 19.

Further, one of the above mentioned speed changing gears 25 and 26 is made larger than and integral with the other and they are so formed as to be able to be slid along the driving shaft 23 by a switching lever 32 provided from above the gear box 18.

That is to say, arms 33 are provided from the vertical part 32a of the switching lever 32 as shown in Fig. 4 and the tips of the arms 33 are positioned between the speed changing gears 25 and 26 as shown in Fig. 6 so that, when the switching lever 32 is rotated, the speed changing gears 25 and 26 may be slid along the driving shaft 23.

Further, pins 34 are provided on the sprocket 24 side of the speed changing gears 25 and 26 and holes 35 in which the pins 34 are to be respectively inserted are provided in the sprocket 24 opposed to the pins 24. This is a so-called clutch.

The winding of the wire 21 by the wire drum 22 shall be described in the following.

A rotary shaft 36 is provided in parallel with the above mentioned driving shaft 23 within the gear box 18. As shown in Figs. 5 and 7, the rotary shaft 36 is provided with a gear 37 to be meshed with

the speed changing gear 25 slidably provided on the above mentioned driving shaft 23, a gear 38 to be meshed with the speed changing gear 26 and a gear 40 to be meshed with a gear 39 provided integrally with the wire drum 22. Further, between the gears 38 and 40 are provided a brake flange 40 made integral with the gear 38 through a screw 41, a brake liner 43, ratchet gear 44 and brake liner 45 as free from the rotary shaft 36 and further a brake flange 46.

Female screws 47 and 48 are formed respectively in the brake flanges 42 and 46 so as to be screwed with a male screw 49 provided on the rotary shaft 36.

By the way, the brake flange 46 is prevented by a flange 50 formed on the rotary shaft 36 from moving to the gear 40 side.

In the drawing, the reference numeral 51 denotes a ratchet pawl provided from the frame side of the gear box 18, pulled upward at the rear end by a spring 52, always engaged at the tip with the ratchet gear 44 and acting so that the wire 21 may not reversely wound on the wire drum 22.

In the drawings, the reference numeral 53 denotes a guide roller leading the wire 21 to the wire drum 22.

By the way, as shown in Fig. 3, the wire 21

is secured at one end to the wire fixing part 9 provided on the upper frame 8 of the vertical pillars 1 and 1a and is wound on the wire drum 22 through the pulley 7 provided on the form member 2, pulley 10 provided on the upper frame 8 and pulley 77 and guide rollers 53 provided on the gear box connecting base 14 in turn.

The steering with the handle 16 shall be described now. As shown in Fig. 11, a steering wheel 54 is secured to the handle 16, wires 55 and 56 are pulled out on both sides of the steering wheel 54, are fixed at the tips to the steering wheel 54, are crossed with each other in the course through tubes 57 and 58 to be led onto the gear box connecting base 14, there the tubes 57 and 58 are fixed and only the wires 55 and 56 are crossed with each other to be fixed to a bracket 64 on the gear box 18 side through a wheel 59 provided in the shaft 17 part.

In the drawings, the reference numeral 60 denotes a brake lever connected to a disk brake 62 through a wire 61 enclosed in a tube as shown in Figs. 1 and 13. The reference numeral 63 denotes a driving seat.

In Fig. 12 is shown a switching position indicating part of the switching lever 32. In the

drawing, L_1 shows a position of the switching lever 32 in case the fork member 2 is slowly and lightly lifted, L_2 shows a position of the switching lever 32 in case the fork member 2 is quickly lifted, N shows a neutral position and D shows a position of the switching lever 32 in the case of driving.

The switching positions of the above mentioned switching levers 32 shall be described. When the switching lever 32 is in the position L_1 , as shown in Fig. 5, the gear 38 will mesh with the speed changing gear 26 and, when the crank pedals 20 and 20a are rotated, the speed changing gear 26, gear 38 and brake flange 42 integral with the gear 38 will be rotated and the female screw 47 of the brake flange 42 will fasten and hold the brake liners 43 and 45 and ratchet gear 44 between the brake flanges 42 and 46 with the relation with the male screw 49 of the rotary shaft 36. In such case, the brake flange 46 will be strongly pressed against the flange 50 of the rotary shaft 36. Therefore, the rotary shaft 36, gear 38, brake flanges 42 and 46, brake liners 43 and 45 and ratchet gear 44 will integrally rotate, the gear 40 fitted to the rotary shaft 36 will also rotate, the gear 39 of the wire drum 22 meshed with the gear 40 will be rotated and the wire drum 22 will be rotated to wind the wire 21

and lift the fork member 2.

When the switching lever 32 is then brought to the position L_2 , the speed changing gears 25 and 26 will slide a little along the driving shaft 23, the gear 38 will disengage with the speed changing gear 26 and the gear 37 will mesh with the speed changing gear 25 and, the same as in the case of the above mentioned L_1 , the wire 21 will be wound by the wire drum 22 and the fork member 2 will be lifted.

In either of the above mentioned cases, the ratchet pawl 51 will be automatically engaged with the ratchet gear 44 in the lifted position of the fork member 2 and the fork member 2 will not naturally lower.

Then, in the case of running in that state, the switching lever 32 is brought to the position D. As a result, the speed changing gears 25 and 26 will be moved to the sprocket 24 side of the driving shaft 23, the pins 34 provided on the speed changing gears 25 and 26 will integrally fit in the holes 35 in the sprocket 24 and the gears 25 and 26 will be disengaged with the other gears 37 and 38 of the rotary shaft.

When the crank pedals 20 and 20a are then rotated, the sprocket 24 will be rotated and the driving wheel 19 will be rotated through the chain 31 and

sprocket 28 to run.

The lowering of the fork member 2 shall be described in the following. In the case of lowering the fork member, the crank pedals 20 and 20a are reversely rotated. As a result, the gear 37 or 38 on the rotary shaft 36 will be reversely rotated and, at the same time, the brake flange 42 will be also reversely rotated.

When the brake flange 42 is reversely rotated, the female screw 47 will be loosened by the relation of the rotary shaft 36 with the male screw 49 and the brake liners 43 and 45 and ratchet gear 44 between the brake flanges 42 and 46 will be momentarily unfastened and, though the ratchet pawl 51 is engaged with the ratchet gear 42, due to the load on the fork member 2 side, the wire drum 22 and gears 39 and 40 will reversely rotate and the fork member 2 will lower.

However, when the crank pedals 20 and 20a are stopped, the brake liners 43 and 45 and ratchet gear 44 will be fastened and held again between the brake flanges 42 and 46 by the force in the reversely rotating direction applied from the wire drum 22 and gears 39 and 40 and the lowering of the fork member 2 will be stopped by the action of the ratchet pawl 51.

Therefore, when the crank pedals 20 and 20a

are slowly reversely rotated, the fork member 2 will be able to be continuously lowered and will be able to be easily stopped in the position of a required height.

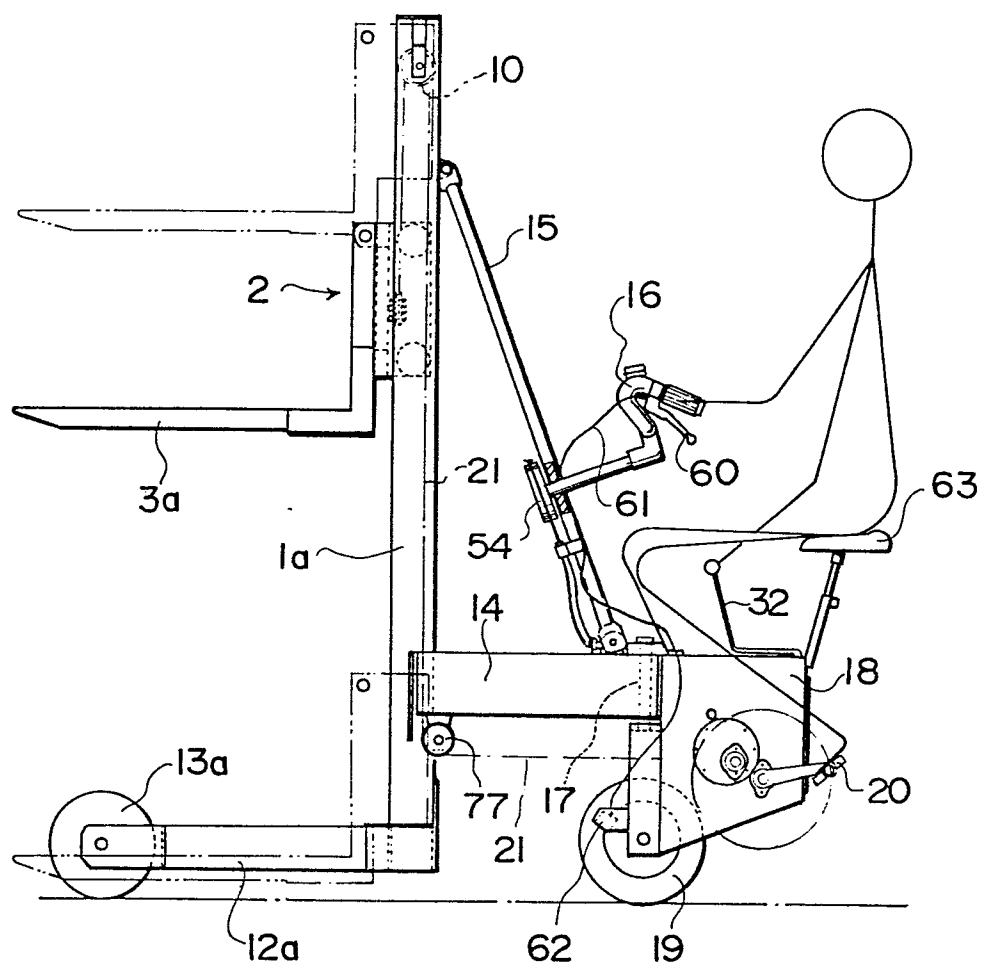
By the way, when the switching lever 32 is brought to the position N, it will be neutral and the fork member 2 will not be able to be lifted, lowered and run. That is to say, then the speed changing gears 25 and 26 will not be engaged with the other gears 37 and 38 or sprocket 24.

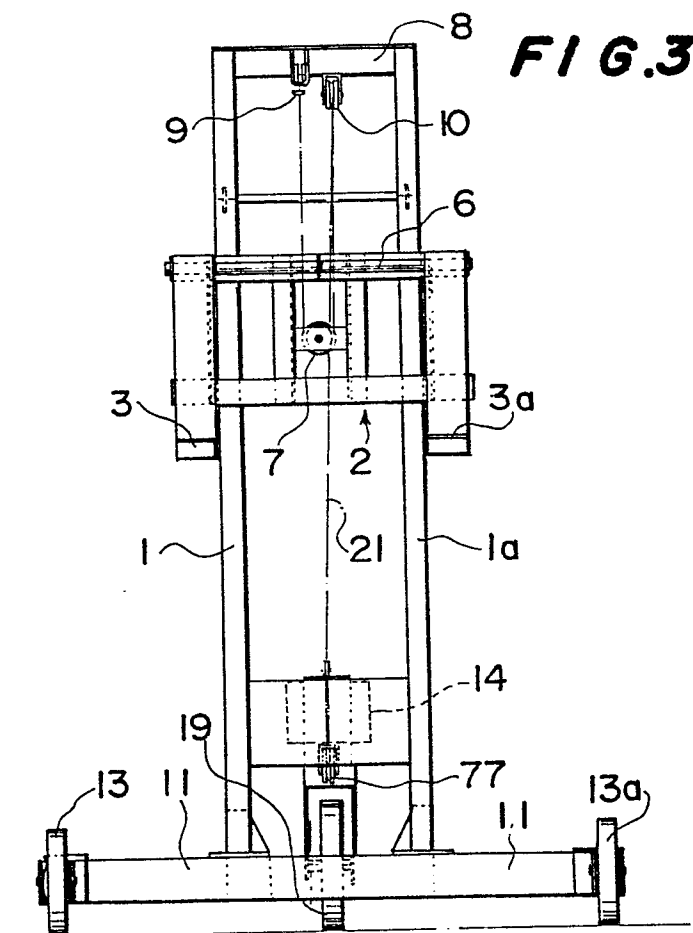
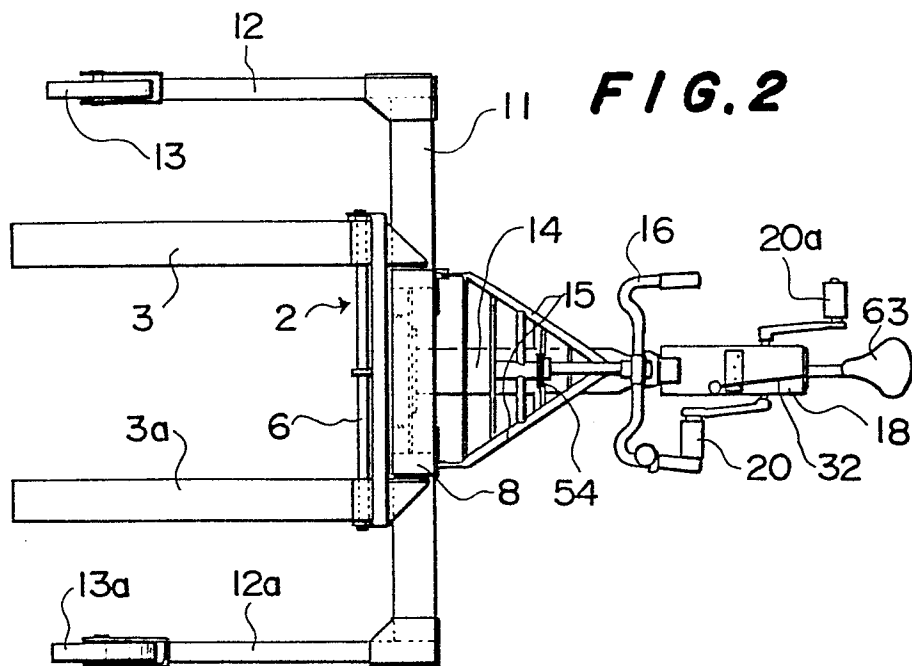
Industrial Utilizability

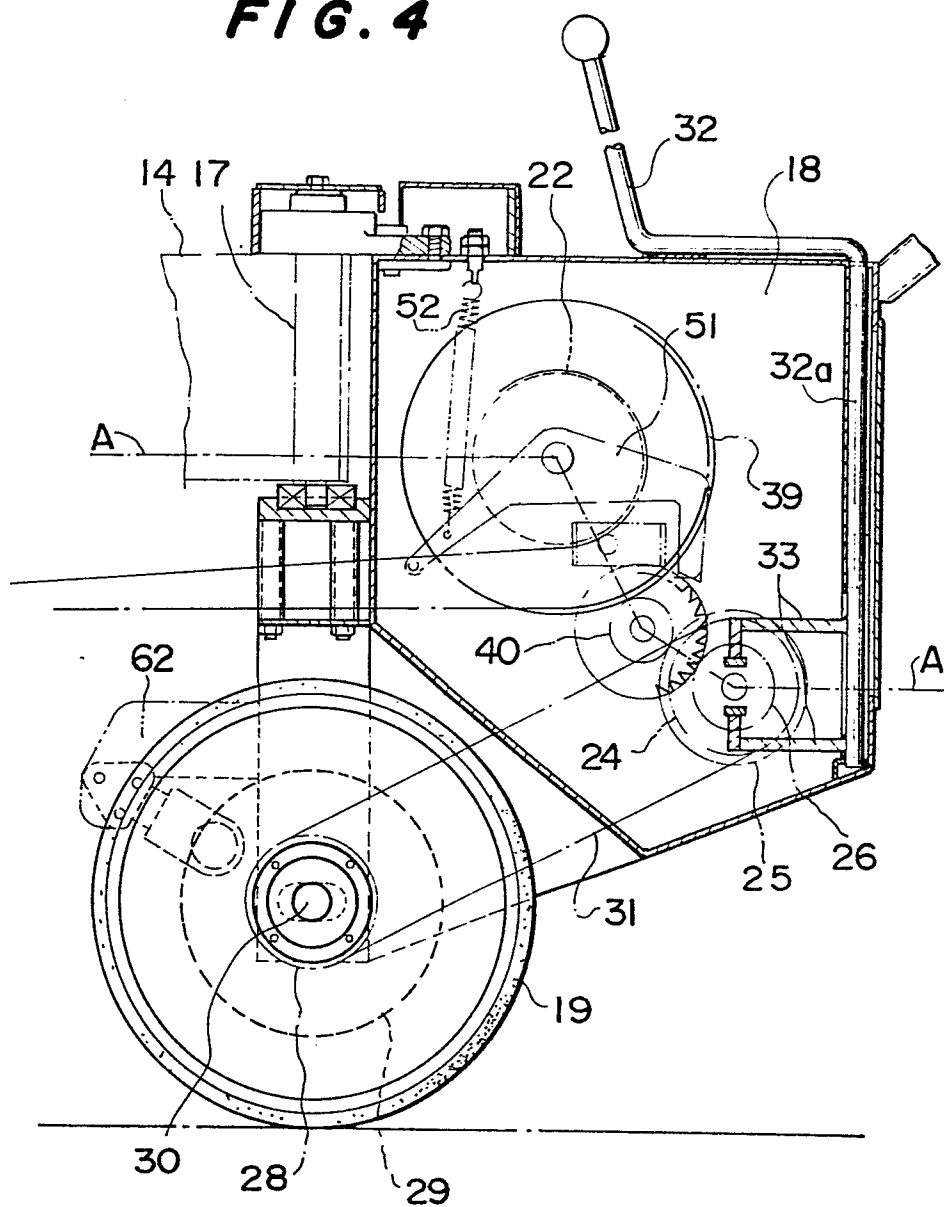
The present invention uses no such fuel as petroleum for a power source, is very economical, can be provided very cheaply, can be operated easily by anyone, is safe and is very high in the industrial utilizability.

Claim

A running cargo handling device wherein a fork member is vertically movably provided between vertical pillars erected at a proper spacing, legs are extended forward respectively from both ends of a horizontal member provided at the lower ends of the above mentioned vertical pillars, running wheels are provided at the tips of the respective legs, a gear box connecting base is provided in the rear between the above mentioned vertical pillars, a gear box having a driving wheel below is horizontally rotatably borne at the rear end of the gear box connecting base so as to horizontally rotate the gear box with a handle and the gear box is provided with crank pedals, a transmitting mechanism transmitting the rotations of the crank pedals to the above mentioned driving wheel, a gear mechanism transmitting the rotations of the crank pedals to a wire drum winding a wire connected to the fork member to lift and lower the fork member, a switching mechanism for switching the rotations of the crank pedals to the above mentioned transmitting mechanism or gear mechanism and a braking mechanism preventing the reverse rotation of the wire drum.

FIG. 1







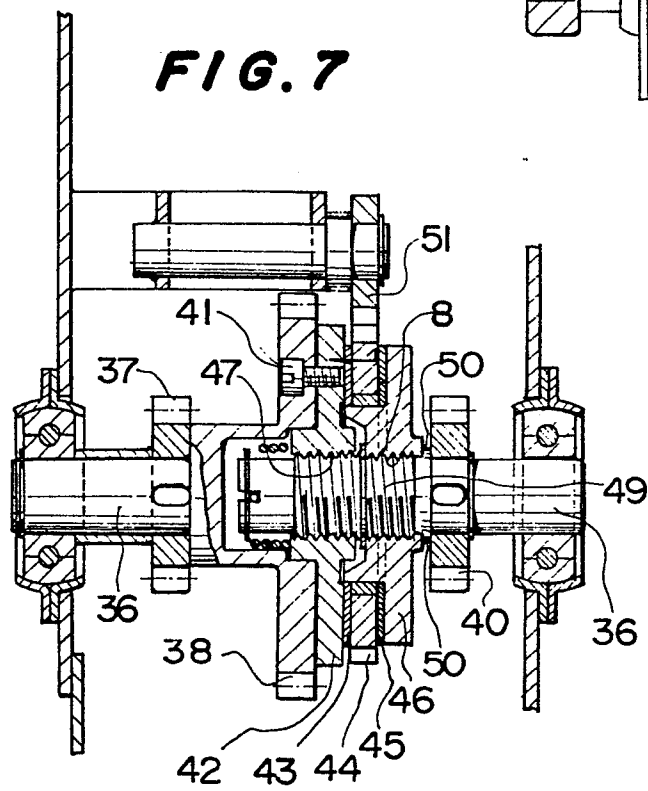
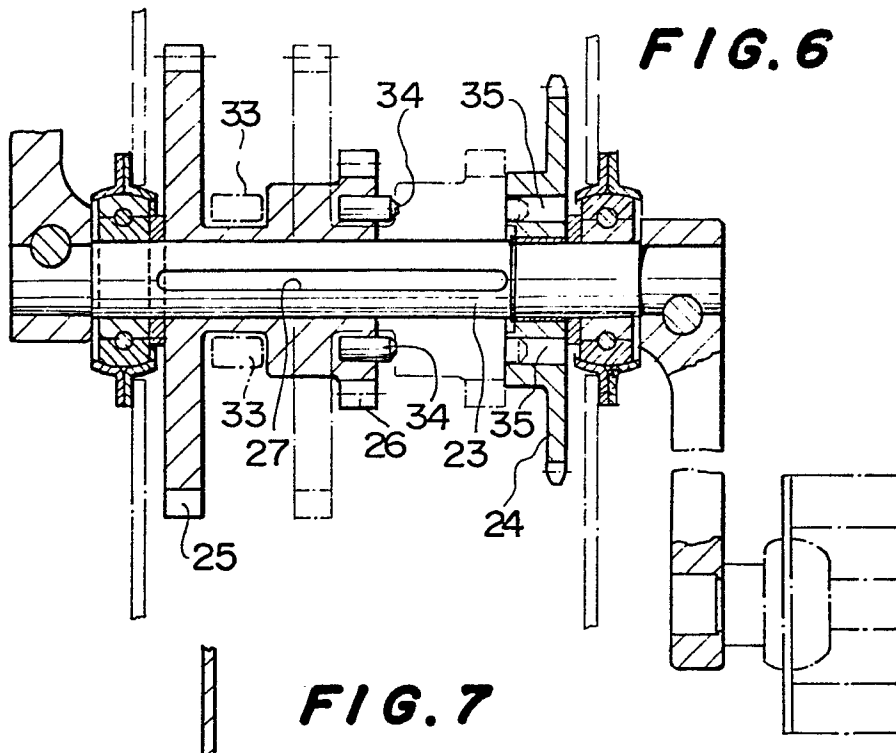


FIG. 9

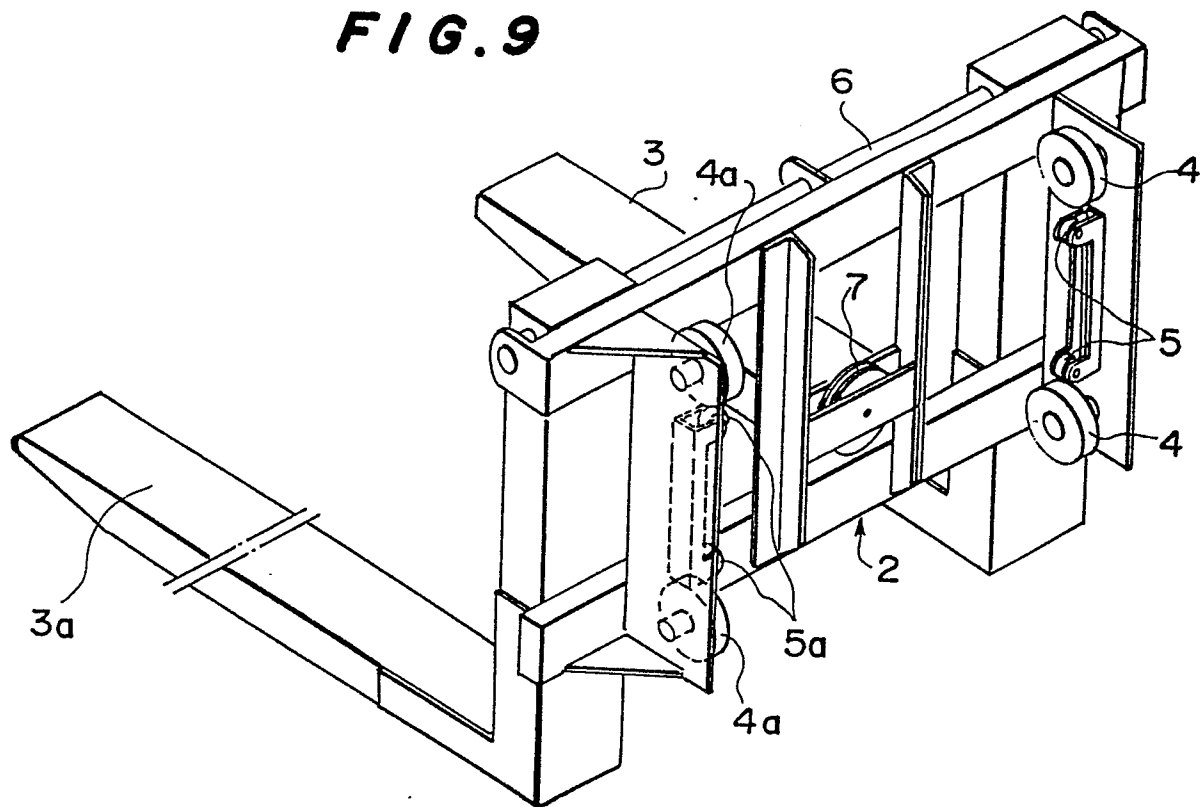


FIG. 10

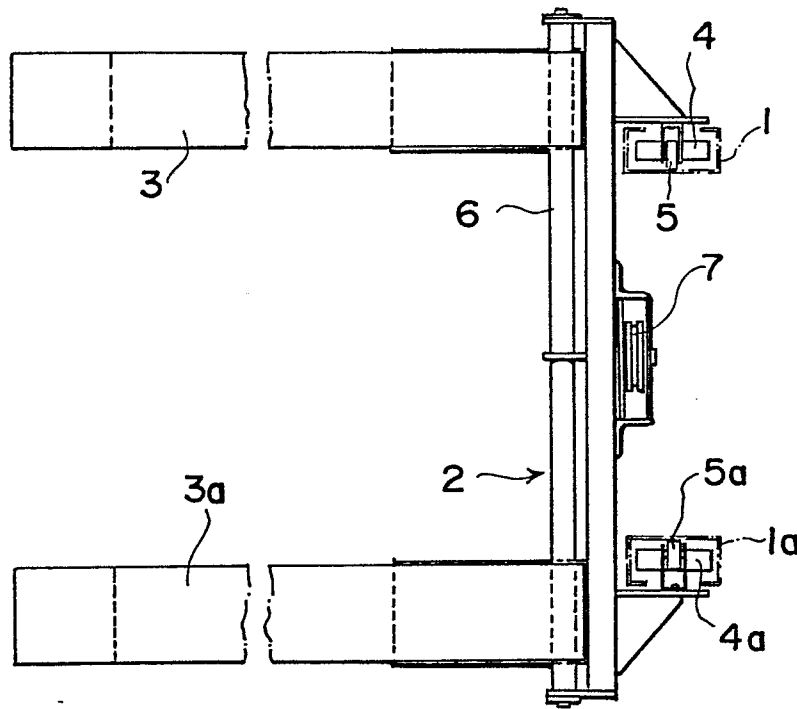
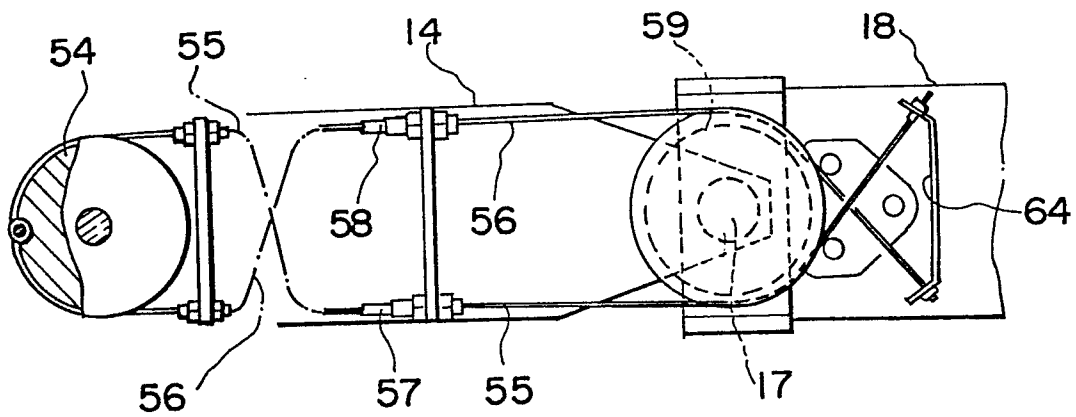


FIG. 11



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FIG. 12

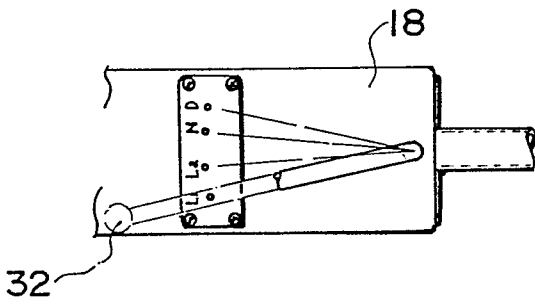
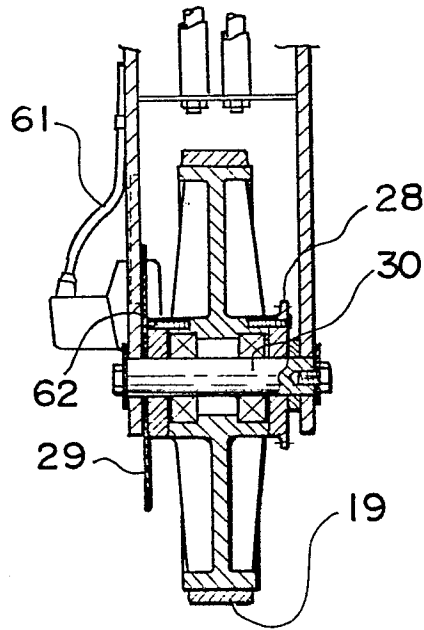


FIG. 13





European Patent
Office

EUROPEAN SEARCH REPORT

0076181
Application number

EP 82 40 1641

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. 3)
Y	--- US-A-3 187 841 (RENSHAW) * claim 1; figures 1, 21 *	1	B 66 F 9/06
Y	--- FR-A-1 164 709 (HERSAN & CIE) * figures 1, 2 *	1	
Y	--- FR-A-1 299 096 (N. SCHLUMBERGER & CIE) * figures 6, 7 *	1	
A	--- FR-A-1 229 113 (NIELSEN) * figures 1, 2 *	1	
A	--- DE-A-2 553 144 (HANDA HEAVY INDUSTRY CO.) * figures 1-3 * & JP - Y2 - 53 - 51574	1	
A	--- CH-A- 246 077 (CONTELLY)		TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
A	--- FR-A-1 059 182 (PETITPAIN)		B .66 F 9/00
P,X	--- WO-A-8 103 482 (JAPAN STEELS CORP.) * abstract; figure 1 *	1	

The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 26-11-1982	Examiner KANAL P K
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