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(72) Inventors:
• **Tallevi, Gabriele**
Fano (Pesaro) (IT)
• **Tallevi, Celso**
Fano (Pesaro) (IT)

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(74) Representative: **Negrini, Elena**
Agazzani & Associati S.r.l. & Studio Ing.
Giampaolo Agazzani,
Via dell'Angelo Custode 11/6
40141 Bologna (IT)

(71) Applicants:
• **Tallevi, Gabriele**
Fano (Pesaro) (IT)
• **Tallevi, Celso**
Fano (Pesaro) (IT)

(54) **Machine for detecting and levelling ground depressions, by spreading of suitable material, particularly fit for the maintenance of sport grounds**

(57) A machine for detecting and levelling ground depressions, by spreading of suitable material, is constituted essentially by:

- a bucket (4) fit to be rotated into the loading and distribution positions of the filling material;
- a distributing device (9) of the material to be spread;
- a rotating spreader (13);

- a ground touching device, that determines the automatic spreading of the material, when a wide dimension depression is detected. The touching device is adjustable, in such a way to allow the regulation of the intervention threshold.

Besides, the machine is fit to spread uniformly the filling material onto the whole ground.

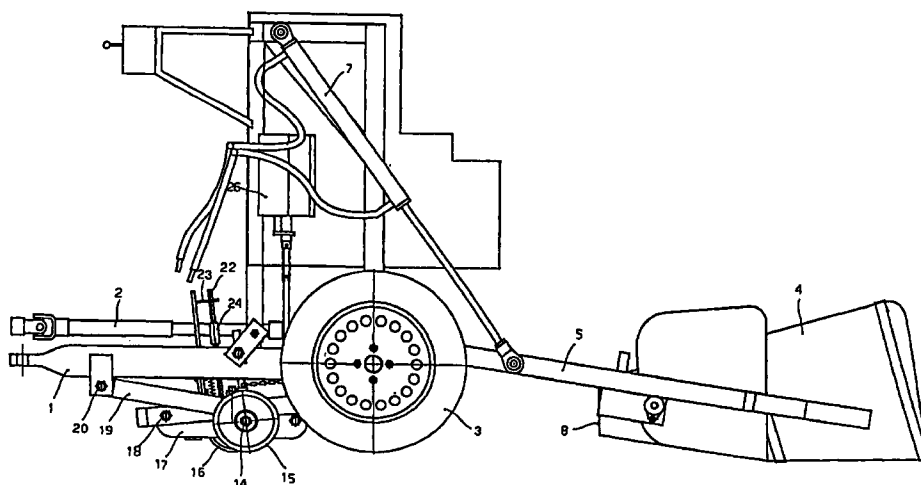


FIG. 1

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Description

[0001] The invention concerns a machine particularly fit for the maintenance of sport grounds, able to detect ground depressions and level them by spreading suitable filling material, without modifying the due slopes.

[0002] Currently the game ground depressions, caused by settling and treading, are manually filled with a shovel or with a net hauled by a device, and passed over the material previously put down.

[0003] For closing small holes the manual intervention is effective, while for the substantial depressions such an intervention requires a lot of time and it would be difficult and inaccurate for obtaining also the modification of the expected slopes.

[0004] The purpose of the present invention is to make more precise, more rapid and easy the levelling of game grounds.

[0005] The machine herein described, hauled and driven by a small tractor, is equipped with a bucket rotating from the loading to distribution positions of the filling material, with a regulating device of the material to be distributed, with a rotating spreader and with a ground touch device, which provides the automatic material spreading, when a depression of substantial dimensions is detected.

[0006] The touch device is adjustable, in such a way to allow the regulation of intervention threshold. In particular it is also possible to spread uniformly the filling material on the whole field, or to repeat this operations with time, without covering and choking the grass, in correspondence of a wide depression.

[0007] The invention is described in detail, with reference to the attached drawings in which:

- figure 1 shows a side view of the machine, with the bucket at loading position;
- figure 2 shows a schematic view of the partially sectioned machine, with the bucket lifted in operative position;
- figure 3 shows a schematic top view of the machine, with some sectioned parts;
- figure 4 shows a view of the touch device and the related mechanism;
- figure 5 shows a top view of a part of the touch device;
- figure 6 shows a side view of an enlarged detail of the mechanism operated by the touch device.

[0008] In these figures, numeral 1 indicates the drawbar, which is coupled to a small tractor, numeral 2 a cardan joint shaft, to be connected to the tractor power takeoff, numeral 3 indicates the wheels. Numeral 4 indicates a bucket, supported by articulated arms 5, hinged at 6 to the frame, figure 2.

[0009] The arms 5 can be lowered or lifted by means of hydraulic jacks 7, to bring the bucket in loading position, as in figure 1, or in working position, as in figure 2.

The filling material, contained in the lifted bucket 4, go down through a lower opening 8 of this latter, in a controlled way, when a finned distributing cylinder 9 is rotated, figures 2 and 3.

[0010] The distributing device 9 is hinged at 10 and is operated by a gearmotor 11, figure 3, by means of a gearing chain 12. When the distributing device 9 is in a stopped position its fins, opportunely disposed, do not allow the material passage.

[0011] The material dropping from the distributing device 9 in a controlled way, as further explained, is spread onto the ground by a spreader made up of a finned conic disk 13, figures 2 and 3, that is rotated by means of the shaft 2, connected to the power takeoff of the tractor hauling the machine along the ground to be levelled.

[0012] The spreader rotates continuously, while the filling material is dropped from the distributing device 9 only when necessary.

[0013] For this purpose a ground touch device is provided so as to locate automatically the zones in which the material has to be deposited. A shaft 14, entirely independent from the examined mobile group, is provided with two wheels 15 at the ends, whose distance determines the width of the ground area where the control is made.

[0014] In the central part of the machine two touching wheels 16 are provided that, together with related brackets 17 hinged in 18, lift and lower depending on the conformation of the ground to be levelled. The shaft 14, supporting the two end wheels 15, is supported by brackets 19, hinged in 20.

[0015] The touching wheels 16, by means of the oscillating brackets 17 and a base 21 integral therewith, act on a rod 22 that is longitudinally moved on supports 23, as better evident in figure 4 and in the detail of figure 6. On the rod 22 is splined an adjustable sleeve 24, placed in such a way to start up the switch 25, causing the start or the stop of the rotating distributing device 9 and therefore the spreading of the filling material.

[0016] For avoiding the spreading of the material also into small diameter holes, the distributing device activation is also checked by a timer, or however by a circuit giving the input only if the touching wheel movement is prolonged for pre-established time.

[0017] Varying the position of the sleeve 24 and the timer delay it is possible to define the machine automatic intervention ways, depending on the ground type and on the treatment to be done. In such a way the complete filling of a deep depression can be avoided, avoiding the choking of the grass. It is also possible to spread the filling material onto the whole ground.

[0018] Numeral 26 indicates an actuator for the touching device lifting during the machine transfer.

[0019] The distributing container of the filling material can be constituted by the bucket 4 itself, or can be placed in fixed position over the spreader 13.

[0020] The distributing device 9 can be operated by

means of a circuit controlled by a sensor, placed in such a way to detect the touching device position.

the jacks (7) for lifting and lowering said bucket (4) are operated by the tractor hauling said machine.

Claims

1. Machine for detecting and levelling ground depressions, by spreading of suitable material, particularly fit for the maintenance of sport grounds, characterized in that includes a container provided with a distributing device (9) of the material to be distributed, a rotating spreader (13) placed under said distributing device (9) and a ground touching device fit to operate said distributing device (9) for the automatic spreading of the material in correspondence of the detecting of ground depression by means of said touching device.

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2. Machine according to claim 1, characterized in that further includes a bucket (4), designed to be rotated from the loading to the distribution positions of the filling material, that, during the levelling operation, acts also as container and distributing device (9) of said material.

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3. Machine according to anyone of preceding claims, characterized in that said touching device is constituted by two end wheels (14), whose distance determines the width of the depression detecting area, and one or two inner touching wheels (16), that detect the ground undulations and, by means of position sensors (24, 25), operate said distributing device (9), when the difference in level exceed a predefined value.

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4. Machine according to anyone of preceding claims, characterized in that said touching device is adjustable, in such a way to allow the regulation of the intervention threshold; and that, by adjusting the touching device, is also possible to spread uniformly on the whole ground the filling material, or to repeat the operation with time.

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5. Machine according to anyone of preceding claims, characterized in that for avoiding that also small diameter holes can cause the material spreading, the distributing device (9) operation is also checked by a timer, or by a circuit that gives the input to the distributing device (9) only if the movement of touching wheels (16) is prolonged for pre-established time.

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6. Machine according to anyone of preceding claims, characterized in that the container distributing device (9) is placed in fixed position over said spreader (13).

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7. Machine according to anyone of preceding claims, characterized in that the rotating spreader (13) and

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8. Machine according to anyone of preceding claims, characterized in that the touching device assembly is lifted by means of an actuator (26) during the transfer of said machine.

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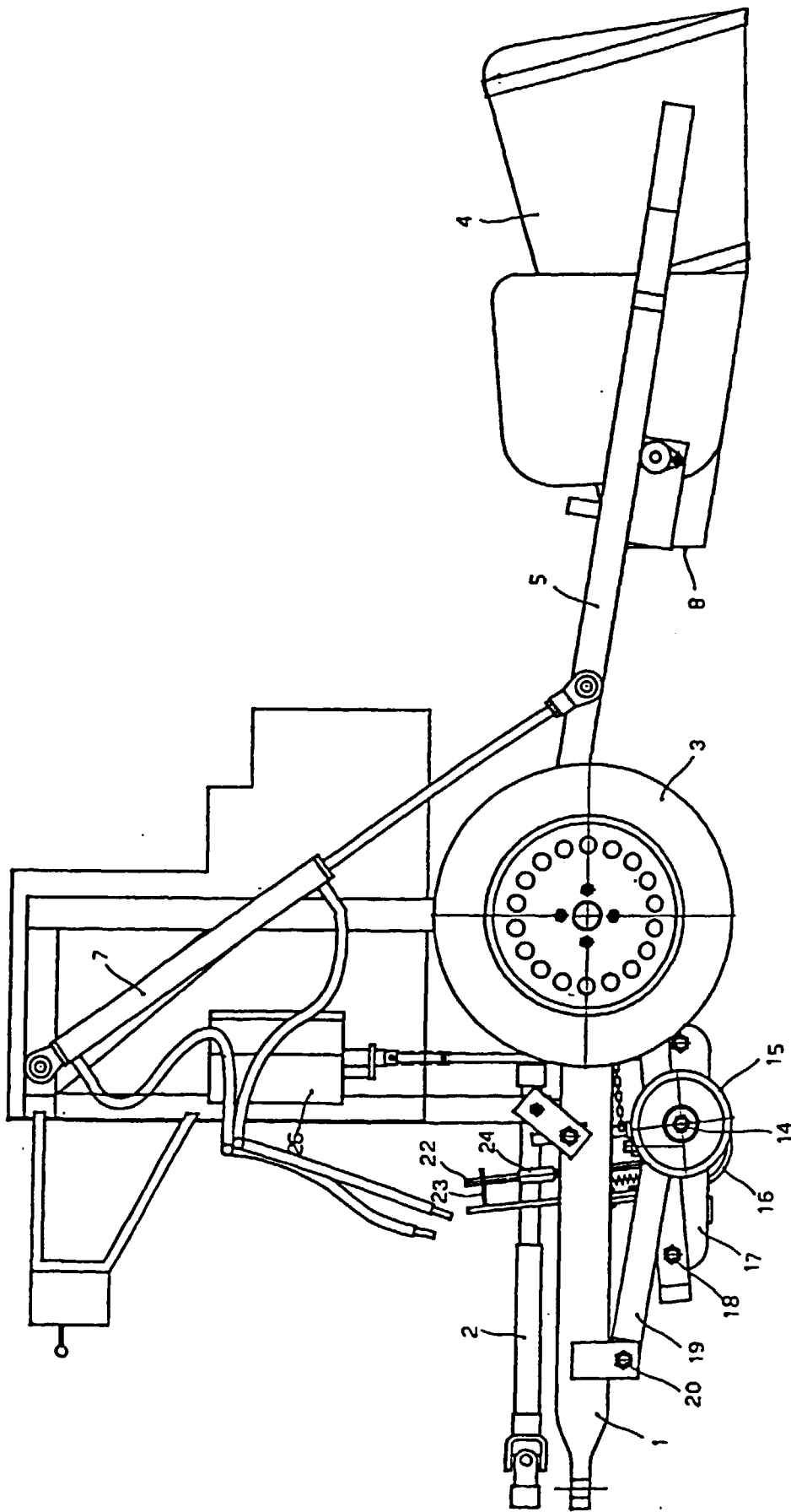


FIG. 1

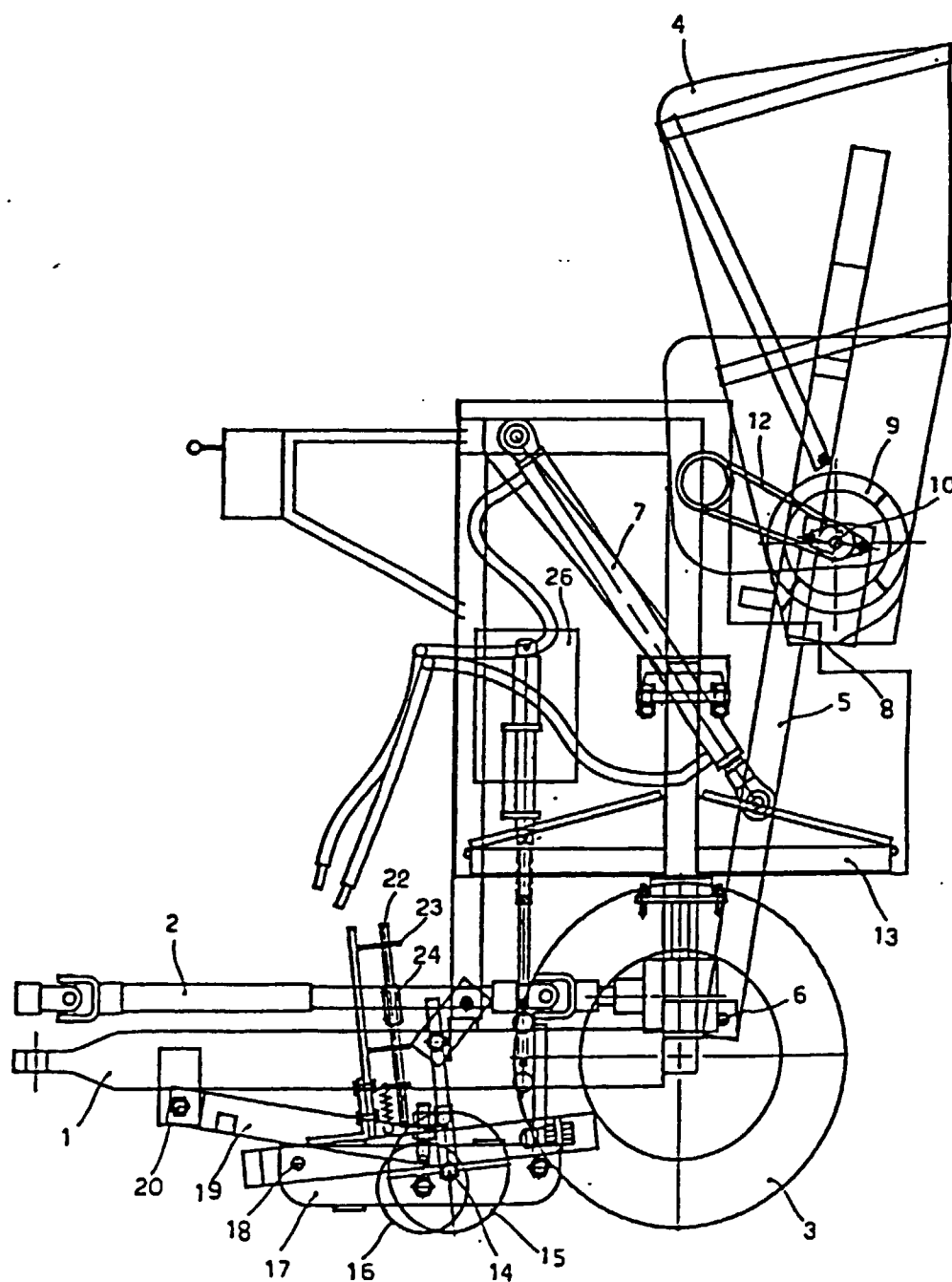


FIG. 2

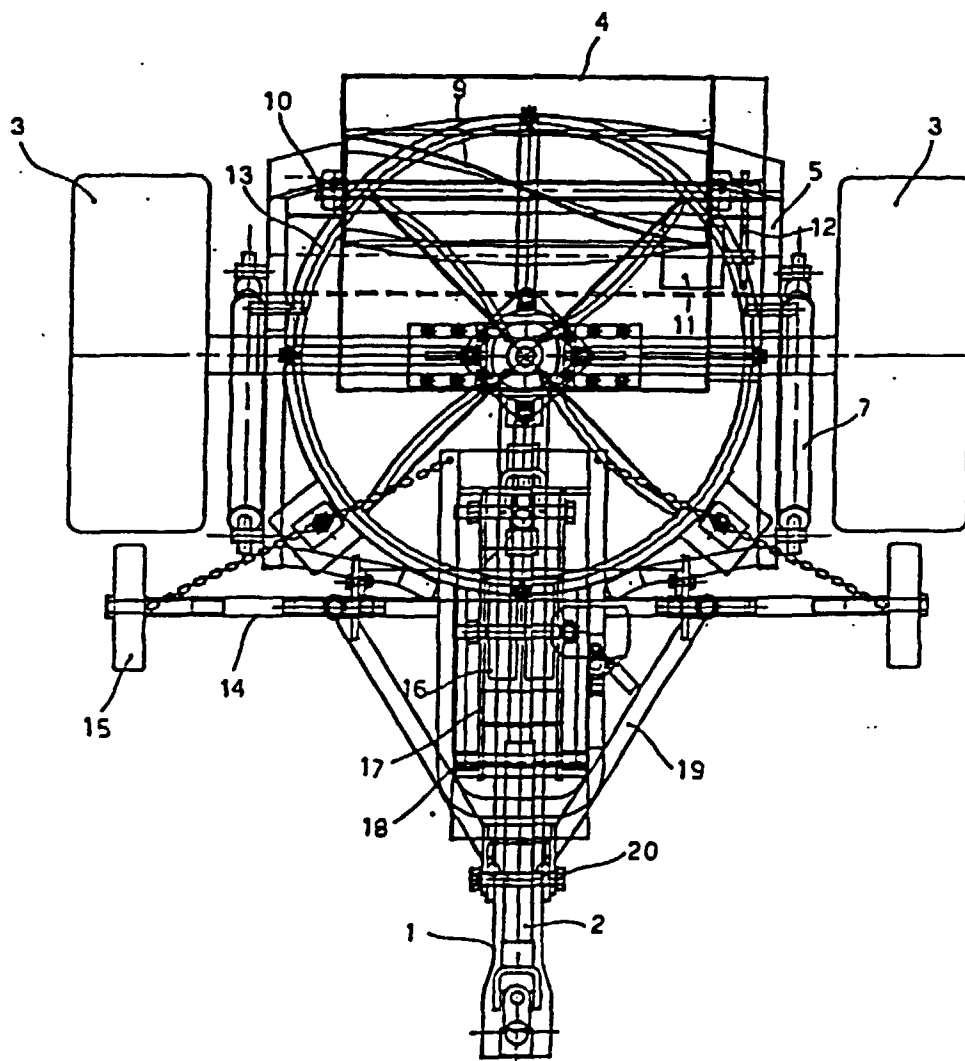


FIG. 3

FIG. 4

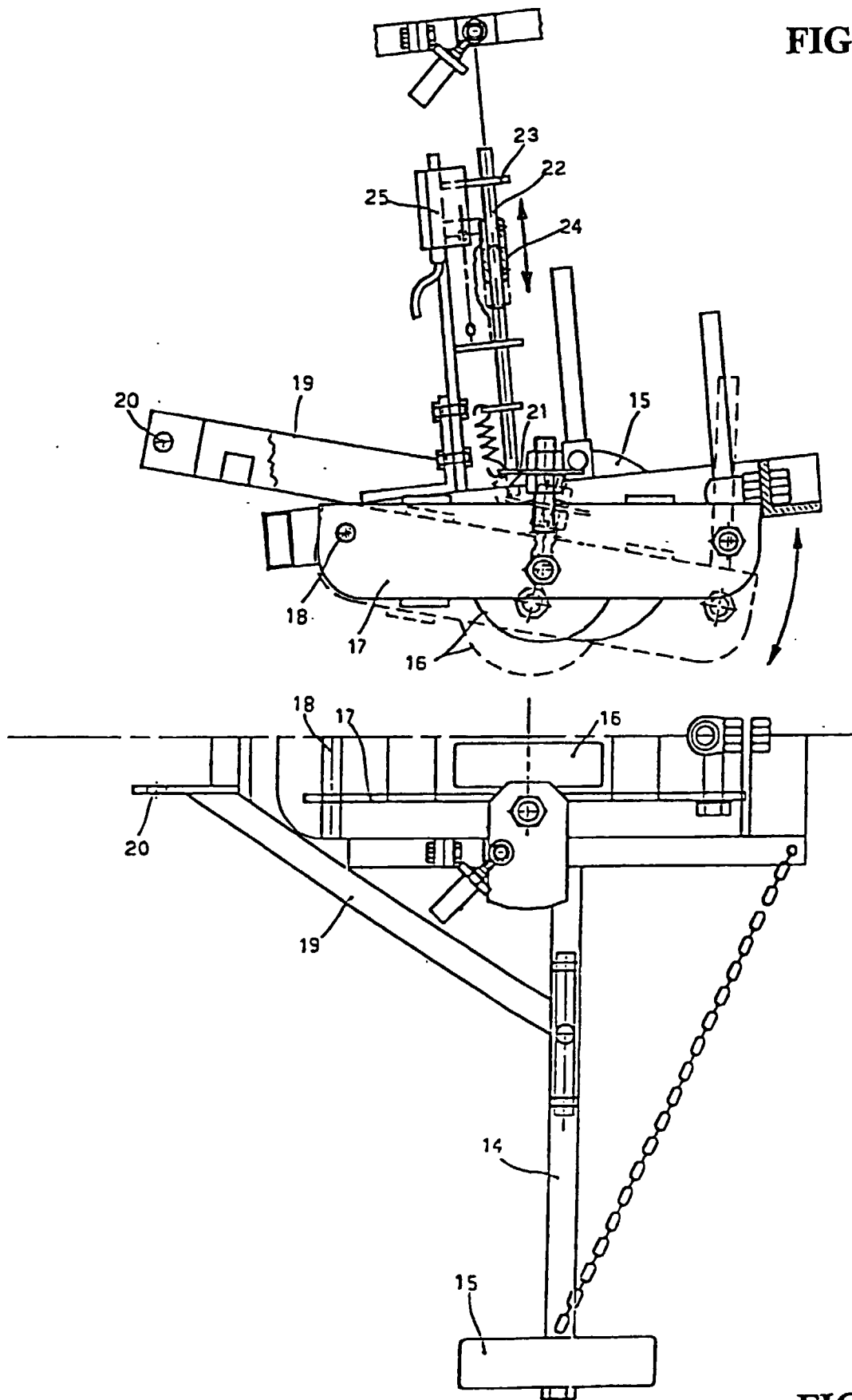


FIG. 5

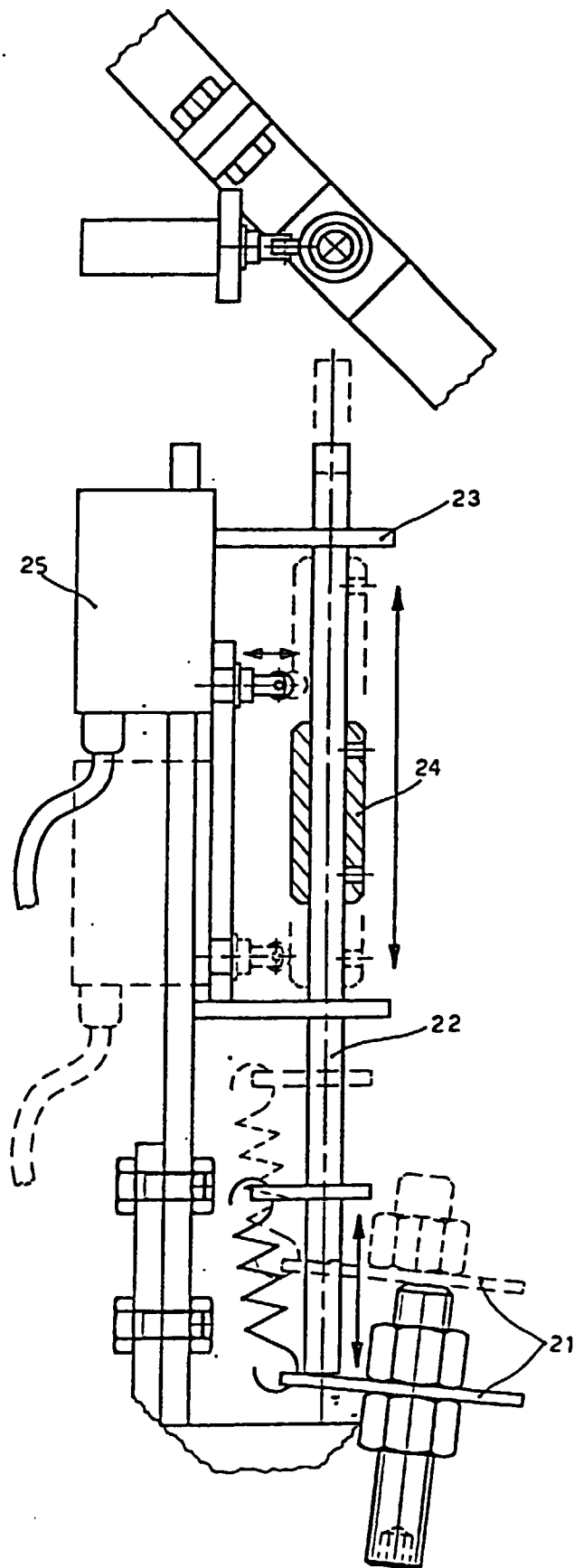


FIG. 6