

12

EUROPEAN PATENT APPLICATION

21 Application number: 86102867.8

51 Int. Cl.⁴: **E 01 H 5/10**
E 01 H 10/00, E 01 H 5/09

22 Date of filing: 05.03.86

30 Priority: 07.03.85 IT 1979685

43 Date of publication of application:
17.09.86 Bulletin 86/38

84 Designated Contracting States:
AT BE CH DE FR GB LI LU NL SE

71 Applicant: **Morelli, Alberto**
Via Lugano, 10
I-22027 RONAGO (Como)(IT)

72 Inventor: **Morelli, Alberto**
Via Lugano, 10
I-22027 RONAGO (Como)(IT)

74 Representative: **Lecce, Giovanni**
Dott. Giovanni Lecce & C. S.r.l. Via G. Negri 10
I-20123 Milano(IT)

54 **Machine for melting the snow.**

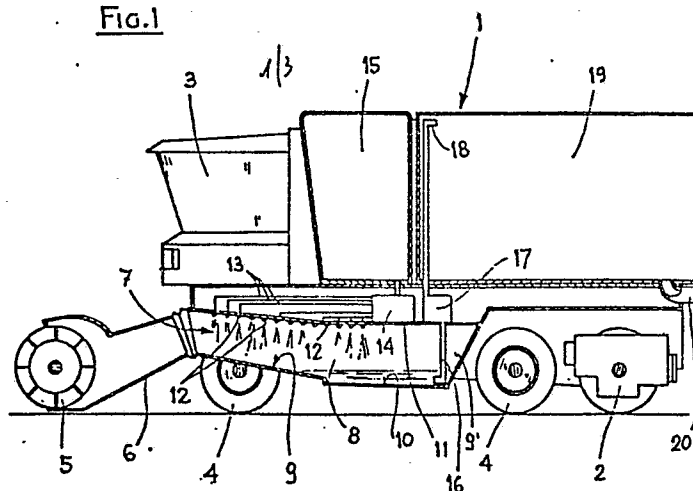
57 A machine for melting the snow, particularly suitable for melting the snow accumulated on the roads, comprising a self-propelled vehicle (1) provided with burners (12) heating a chamber (8) wherein the snow is collected and melted.

A multi-shovel roller (5), connected to a collecting and conveyor tin (6), provides to feed the snow to the melting

chamber (8).

The machine is also provided with a collecting tank (19) and, optionally, with a tank containing an anti-freezing agent which is mixed with the water when it is released on the route.

Fig.1



The present invention relates to a machine for melting the snow, particularly suitable for melting

5. the snow accumulated on the roads.

More particularly, the present invention relates to a machine for melting the snow and for collecting up or dispersing the obtained water, optionally mixed with an anty-freezing agent.

10. As known, for clearing the roads from the snow are generally used heavy vehicles, such as lorries, tractors and bulldozers, provided, at the front part, with blades, wedges, and whirls.

These snow-ploughs are particularly efficient for
15. clearing roads and motorways where the space is sufficiently wide to permit the accumulation of the snow along the edges of roads or motorways without causing danger or creating difficult situations; while, they are not particularly efficient and most
20. unsuitable for clearing the roads in the urban-centre.

The main reason of this ineffectiveness is that the storing of the snow in the edges of the cleared roads is often cause of many drawbacks, such as, for
25. example, the complete obstruction of footpaths, driveways, car parks, bus service stops and spaces reserved to the loading and unloading of public or private materials. For resolving these drawbacks it is necessary a manual work with the shovels to open
30. passages sufficiently wide for the pedestrian

crossing.

Another drawback is the moving of cars, which, previous along the cases of the roads, are trapped in by the accumulated snow.

5. According to the present invention, the above reported drawbacks are overcome by a machine comprising heating means and means supporting said heating means and contacting the same with the snow to be melted.

10. The machine may be any known lorry, tractor or bulldozer which may be provided with a collecting tank and unloading pipe.

The heating means are preferably nozzle burners.

The means supporting the heating means and contacting

15. said heating means with the snow may be a chamber provided with heating means and wherein the snow is admitted; pannels supporting the heating means and moved in sliding contact with the ground to be cleared; metallic rollers inside heated by the
20. heating means; a hopper or feedbox provided with burners etc.

By the machine of the present invention the following results may be obtained:

the snow removed from the roads is collected or
25. directly melted; the water produced is collected in tanks or unloaded directly onto the ground along the vehicles pathway, optionally mixed with an anty-freezing substance; as the machine moves along, it generates passageways in the snow perfectly clean,
30. without making the situation worse in any way,

meaning that, it will clean directly without leaving residues along the edges of the roads.

The advantages obtained by the machine of the present invention consist essentially in that no accumulation
5. or whatever obstruction of snow is formed in the borders of the cleared roads; the snow immediatly melted in water, reducing the volume and easing the evacuation problems, which may be by the direct unloading into the sewers through manholes, by
10. collecting the water into tanks, basins or canals, or by the direct disperse of the water onto the ground, preferably mixed with an anty-freezing substance.

In order to better understand the main feature of the machine of the present invention, the same will be
15. reinafter described with reference to the figures which illustrate some preferred, exemplified and not-limiting embodiments of the present machine and wherein:

- fig. 1 represents a longitudinal cross-section view
20. of a first embodiment of the machine of the present invention;

- fig. 2 represents a side schematic view of the machine of figure 1;

- fig. 3 represents a side schematic view of a second
25. embodiment of the machine of the present invention;

- fig.4 represents a side schematic view of a third embodiment of the machine of the present invention;

- fig.5 represents a side schematic view of another embodiment of the machine of the present invention,
30. and

- fig. 6 represents a side schematic view of a further possible embodiment of the machine of the present invention.

With reference to figures 1 and 2, the machine for melting the snow essentially comprises a self-propelled vehicle (1), provided with an engine (2) and a driver's cabin (3). The machine, schematically illustrated in the figures, may have the structural and operative characteristics of the well known snow-ploughs or heavy vehicles used for the movement of the grounds. It can, therefore, be provided with two or four wheel traction (4); it can be anteriorly or posteriorly steered or else on the two axis; it can have two or more axis; it can be provided with wheels of the equal or different diameter and/or with pneumatics particularly adapt for its movement on the snow.

According to the present embodiment, the machine is provided, at the front part, with a multiple shovel roller (5), arranged in transversal way and pared up with a collecting and conveyor tin (6). The roller (5) is vertically regulable by a pneumatic piston and rotated by means of the same vehicle engine or by an independent engine.

The collecting and conveyor tin (6) is articulated to a mouth (7) of a melting chamber (8).

Chamber (8) is arranged at the bottom of the vehicle (1) and extends along all the width and height of the vehicle including the axis of the wheels (4). The chamber (8) is formed by a front enclined inferior

wall (9) terminating in a transversal loading tank (10), by a top wall (11) provided with a plurality of burners (12), downwardly extending, and by an end wall (9').

5. The combustible is stored in a tank (15) and fed to burners (12) through conductors (13) regulating station (14).

When the vehicle (1) is moved along a road to clean, the roller (5) collects the snow and pushes it into 10. the transversal mouth (7).

The snow slides along the enclined inferior wall (9) wherein the flames of the burners (12) melt the snow. As the snow liquifyies, the derivating water is collected into tank (10) and fed to the collecting 15. tank (19) through a suction pipe (16), a pump (17) and a discharge duct (18). The suction pipe (16) draws in the lower part of the tank (10) and may be provided with a filter.

The collecting tank (19) is provided with an 20. unloading pipe (20).

When the tank (19) is full, the water obtained from the melting of the snow, can be unloaded into sewers through man-holes which are found along the roads or else it can be unloaded in other fit places.

25. The advancement of the vehicle (1) creates paths free from snow, wide as the multiple shovel roller (5), without causing obstructions by heaps of snow on the edges of the roads.

The vehicle illustrated in fig. 3 is substantially 30. identical to the vehicle of fig. 1, apart from the

terminal part wherein the unloading duct (20') of the collecting tank (19') is connected, through a regulable mixer (21), to the unloading duct (22) of another tank (23), containing an anti-freezing agent.

5. From the mixer (21), the mixture anti-freezing agent and water is fed to a distributor (24) provided with a possible mixing fan and discharge spraying pipes (25).

In this way, the water deriving from the melting of 10. the snow, mixed with anti-freezing agent, is redistributed from the back of the vehicle onto the path cleared from the snow.

The anti-freezing agent prevents that ice will be formed on the cleared path, and, further, facilitates 15. the melding of the remaining small layer of snow, as the convoyer tin (5) cannot be slid into contact with the ground.

Figure 4 illustrates a machine (1') for melting the snow particularly suitable for the application on the 20. existing vehicles. It essentially comprises a metallic pannel (26), which is hinged at (27) in the front part of the vehicle. The pannel (26) is vertically regulable by means of idraulic or pneumatic pistons (28). The pannel (26) is provided 25. with a plurality of burners (12'), turned to the ground and applied by the fuel through flexible ducts (13'), pumping and regulating station (14') and tank (15').

When the burners (12') are lit and the flames put 30. near the layer of snow, this latter melts. In this

way the vehicle (1') moving forward, forms a passage by dissolving the meeting snow.

The figure represents a vehicle particularly suitable for a melting snow device it is however, obvious that 5. the above movable pannel (26) can be applied to the front part of any vehicle, such as, for example, lorries, tractors, bulldozers and similar heavy vehicles capable to carry also a combustibile tank which is needed for the burners and a station for 10. moving idraulic pistons (28). Pannel (26) and the idraulic pistons (28) may be mounted onto a plate or a vertical structure (29), which is indipendent from the vehicle, and may be applied to the front part thereof.

15. For a better position of pannel (26) relative, to ground, it may be provided with an anterior guide roller (30) and/or side small wheels (31). In the presence of big layers of snow to melt, the pannel (26) is preferably in a more or less inclined 20. position, so that its back part adheres, as more as possible, to the ground while the front part is substantially at the same level of the snow layer.

Figure 5 illustrates another alternative embodiment of the present machine.

25. The structure of this machine is substantially the same of that of a known stone-crasher, except that rollers (32) and (33) are hollow inside and have the outside surface in metallic plate.

The burners (12") are applied in radial directions on 30. the central axis (34) and are fed by the fuel, stored

in tank (15") through flexible ducts (13"), and power station (14").

The burners (12") overheat from the inside the surface of the rollers (32) and (33), which, by
5. moving forward, melt the flattened snow.

The action of the two sequential rollers (32) and (33) guarantee the complete dissolution of the snow.

The machine may be provided with anterior shovel roller (35) which helps the movement and the
10. distribution of the snow onto the anterior roller (32). Similar solution can be foreseen with only one roller.

The above described machine may be obtained by substituting the rollers of the known stone-crasher
15. vehicles, which may assume a double functions according to the requests.

The embodiment of the present machine illustrated in fig. 6, represents a machine for the dissolution of the snow in which the snow is collected by a known
20. anterior mechanical shovel (36) and unloaded into a superior drainage hopper (37) around which the burners are disposed. The fuel is fed to the burners from the tank (15) through ducts (13).

The obtained water is collected in the below tank
25. (19"), having the same structure of that described for the embodiments of figures 1, 2 or 3.

The embodiments of the present machine shown in figures 4 and 5 provided with snow melting means and wherein the obtained water is released on the route,
30. may be provided, if it is the case, with supplemental

0194565

9

tanks (38) for an anti-freezing agent and with a
discharge sprinkler (39).

CLAIMS

1. A machine for melting the snow, particularly suitable for melting the snow accumulated on the roads, consisting of a self-propelled vehicle provided with heating means and means supporting said heating means and contacting the same with the snow to be melted.
2. A machine according to claim 1, wherein the heating means are nozzle burners.
3. A machine according to claim 1 or 2, wherein the means supporting and contacting the heating means with the snow is a chamber arranged at the bottom of the vehicle and provided with an adduction mouth, with a tank and with burners mounted on the top wall.
4. A machine according to claim 3, wherein the mouth is articulated to a collecting and conveyor tin provided with a vertically regulable multiple shovel roller moving on the road to clean.
5. A machine according to claim 3 or 4, further comprising a suction pipe, having an end arranged at the bottom of the tank of the chamber, a suction pump, a discharge duct and a collecting tank provided with unloading pipe.
6. A machine according to claim 5, wherein the unloading pipe is connected through a regulable mixer to the unloading duct of another tank containing an anti-freezing agent.
7. A machine according to claim 1, wherein the means supporting and contacting the heating means with the

snow is a metallic pannel hinged to the front part of the vehicle and vertically moved by idraulic or pneumatic pistons.

8. A machine according to claim 7, wherein the pannel
5. is provided with an anterior guide roller and with side wheels.

9. A machine according to claim 1, wherein the vehicle is a stone-crasher having al least a hollow roller and provided with burners applied in radial
10. directions on the axis of the hollow-roller.

10. A machine according to claim 9, wherein an anterior shovel roller is arranged in the front part of the stone-crashes.

11. A machine according to claim 1, wherein the
15. vehicle comprises an anterior mechanical shovel, a collecting tank and burners arranged around the surface of the hopper.

FIG. 1

0194565

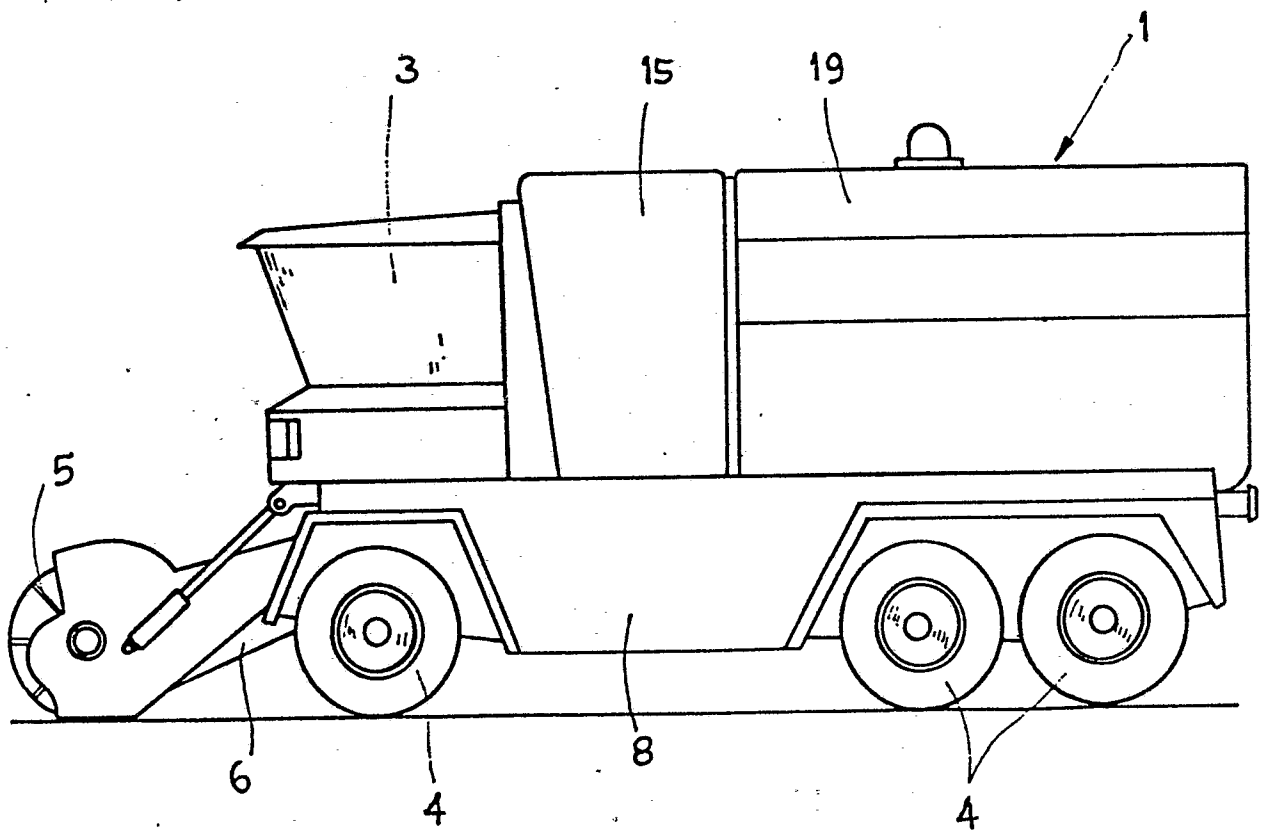
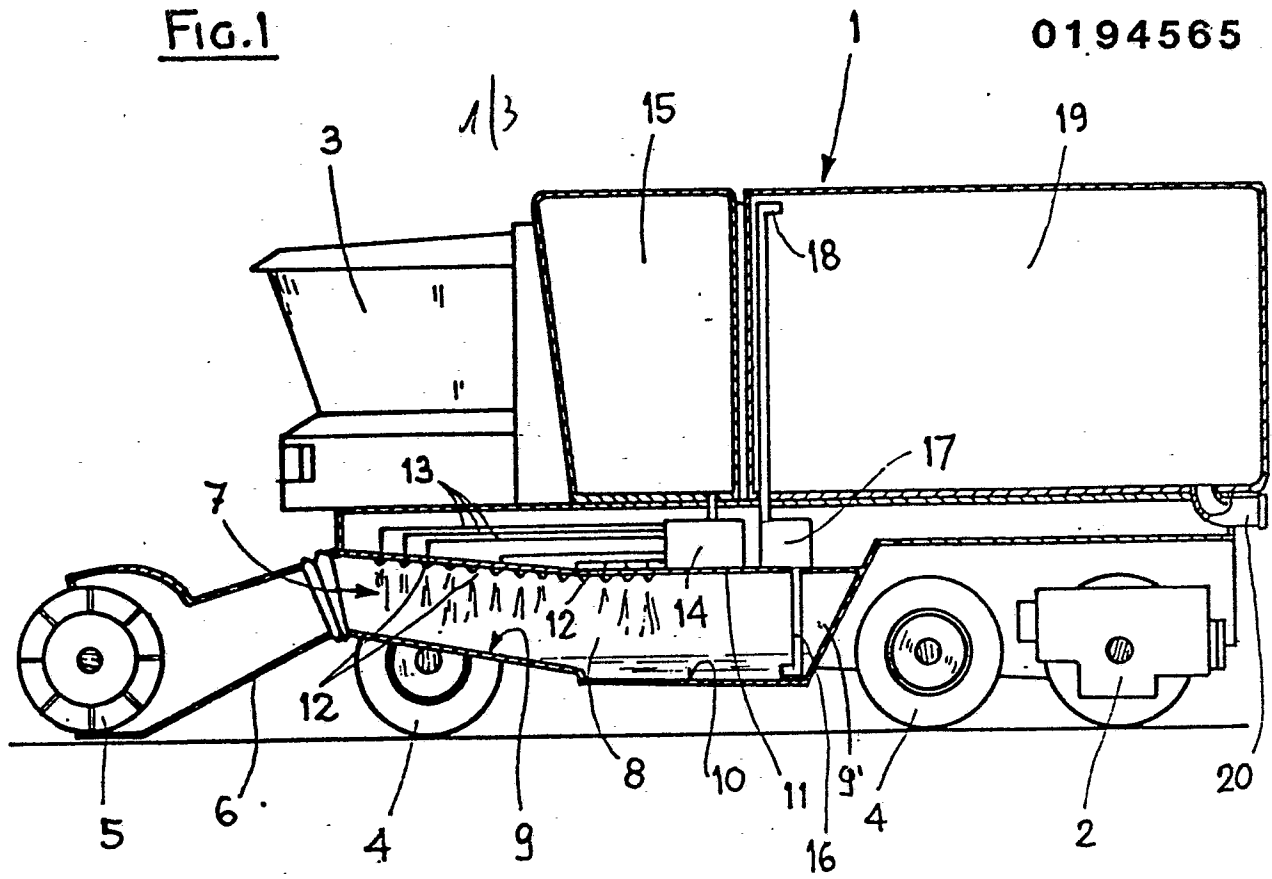


FIG. 2

FIG. 3

2/3

0194565

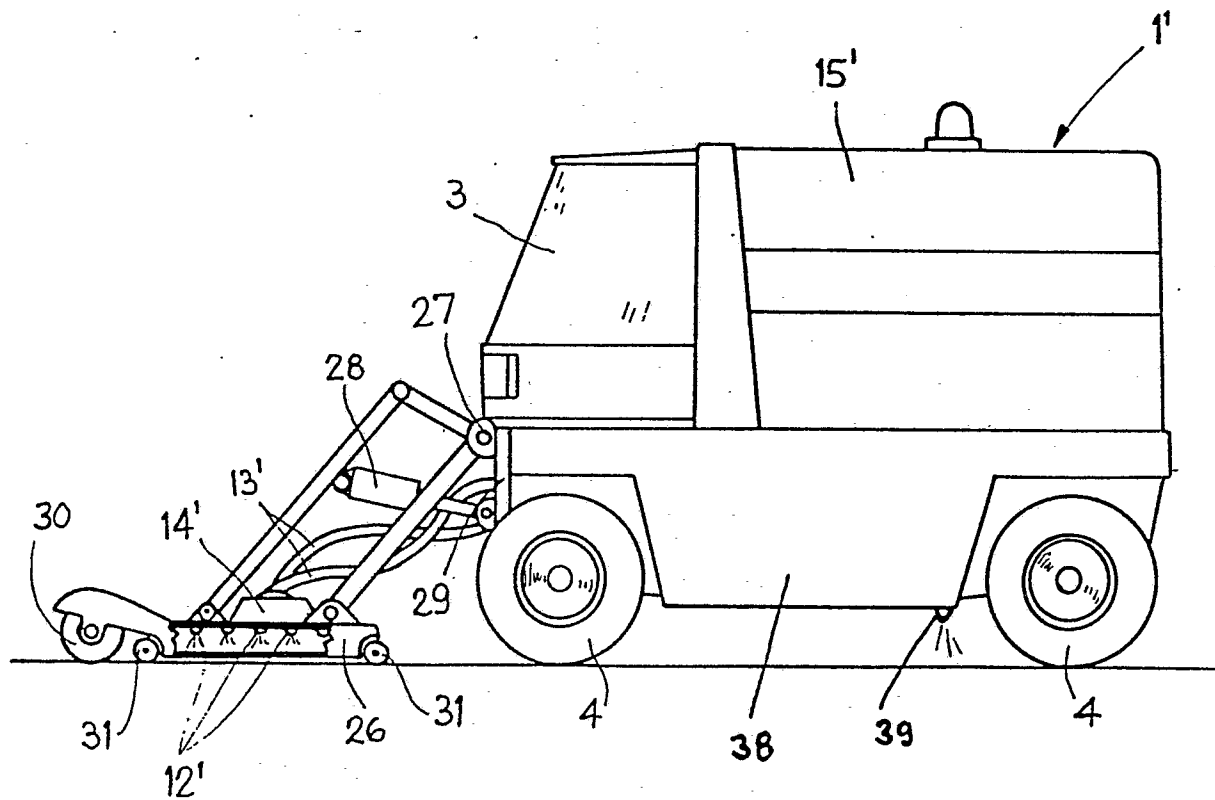
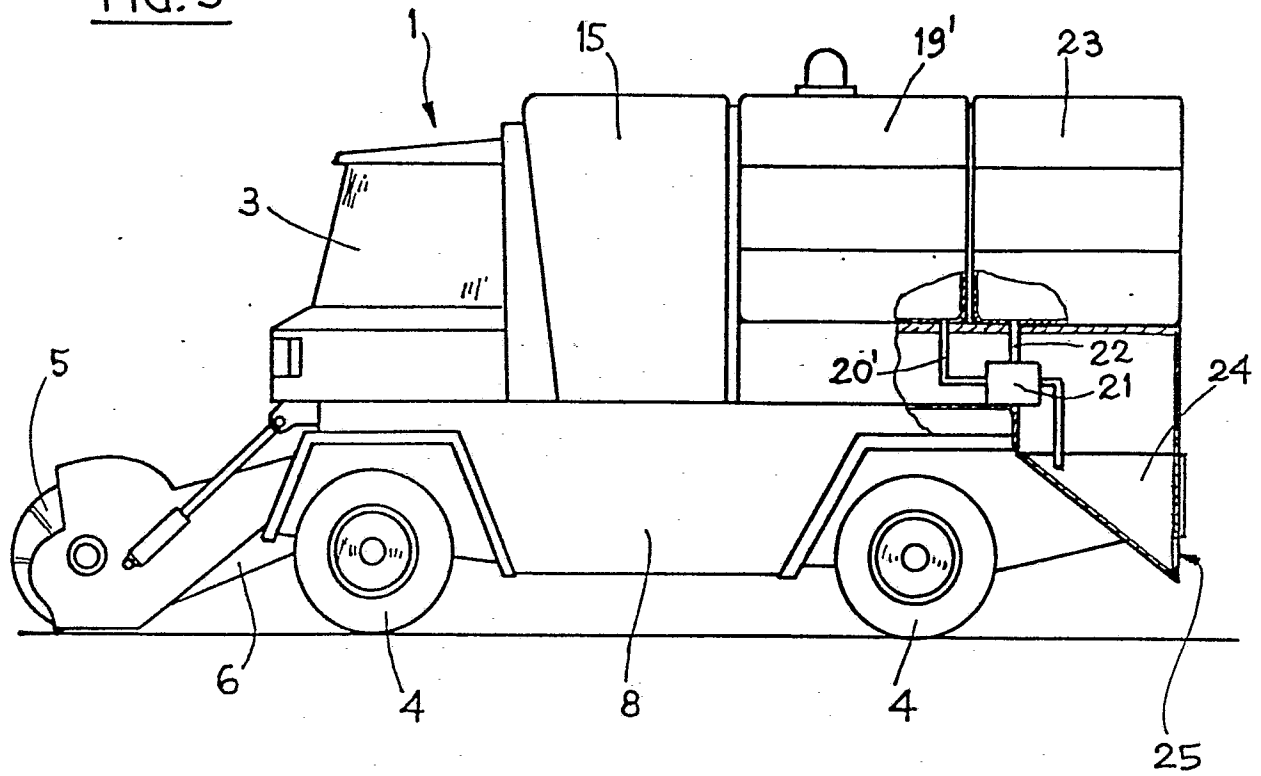


FIG. 4

3/3

FIG. 5

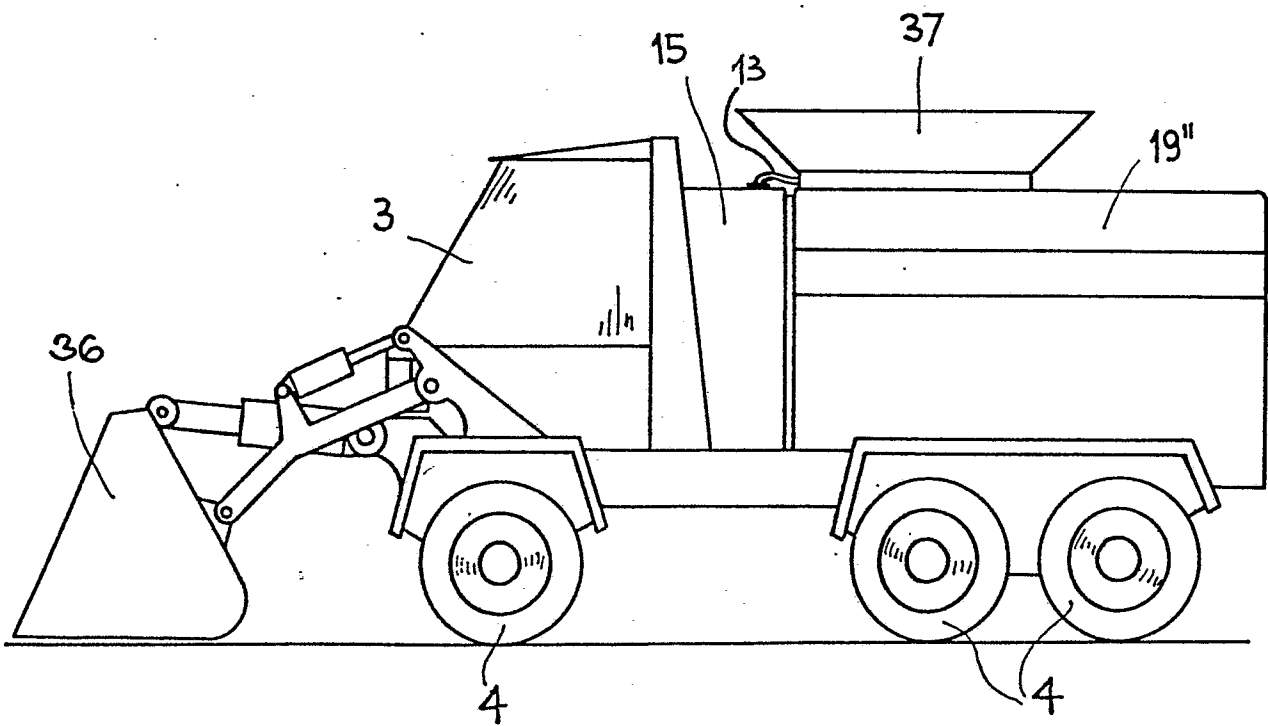
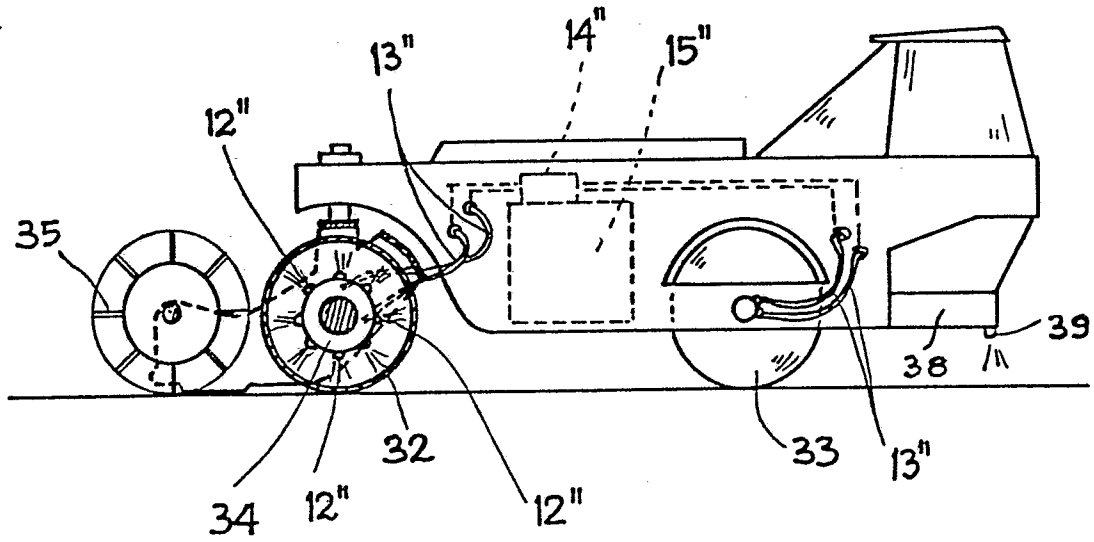


FIG. 6