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(71) Applicant: **Veneta Tecnologie SRL**
36075 Montecchio Maggiore (VI) (IT)

(72) Inventors:
- **Gelai, Luciano**
  36073, Cornedo Vicentino (VI) (IT)
- **Stevanovic, Dragan**
  36075, Montecchio Maggiore (VI) (IT)

(74) Representative: **Bonini, Ercole et al**
Studio Bonini srl
Corso Fogazzaro 8
36100 Vicenza (IT)

(54) Sprayer particularly suitable for spraying bitumen emulsions.

(57) The invention is a sprayer (1) for bitumen emulsions, comprising: a frame (2) resting on wheels (3, 4); guide means (8) that are combined with the frame (2) and can be manoeuvred by the operator (O); supporting means (10) for a tank (R) containing the bitumen emulsion to be sprayed and associated with the frame (2); means (7) for spraying the bitumen emulsion that can be grasped by the operator (O); a pumping unit (5) comprising a pipe (6a) for drawing the bitumen emulsion from the tank (R) and a delivery pipe (6b) connected to the spraying means (7). The pumping unit (5) belongs to a removable support structure (15) associated with the frame (2) via coupling means (16).

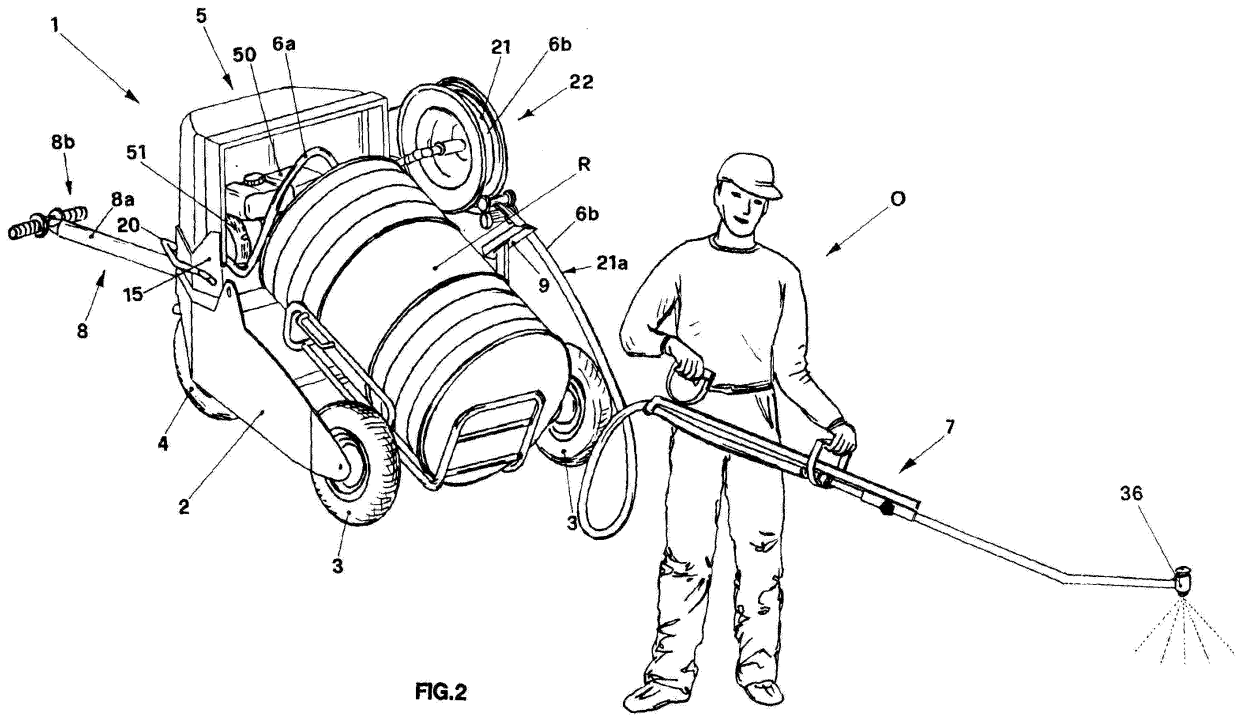


FIG.2

EP 1 647 631 A2

Description

[0001] The invention concerns a sprayer particularly suitable for spraying bitumen emulsions when asphalting surfaces.

[0002] It is known that when asphalting surfaces these are properly prepared by spraying a bitumen emulsion that serves as binding agent between the ground and the asphalt layer that will be laid.

[0003] Such emulsion is usually sprayed by means of spraying machines that substantially comprise a frame installed on wheels that supports a drum containing the bitumen emulsion and a pumping unit that draws the emulsion from the drum and conveys it to a spray lance that is held by the operator.

[0004] The sprayer is guided and the spray lance is manoeuvred manually by one or two operators.

[0005] The spraying machines described are particularly suitable for treating surfaces that are not too large since, being manual and controlled by the operator, they are not economic to use on wide surfaces.

[0006] For this reason, when it is necessary to treat wide surfaces, hydraulic spraying systems that can be loaded on a motor vehicle are usefully employed, for example the spraying system disclosed in the Italian Patent no. 0000243554.

[0007] According to the Patent mentioned above, the spraying system comprises a frame that can be loaded on a motor vehicle and supports a tank containing the bitumen emulsion to be sprayed, and a spraying unit constituted by an hydraulically controlled spraying bar, fed by a pumping unit that draws the bitumen emulsion from the tank and conveys it to the spraying bar.

[0008] The two types of spraying machines described are therefore destined to different sectors of application, in particular the manual sprayers provided with wheels are especially suited to carry out spraying work on limited surfaces, while the hydraulic spraying systems that can be loaded on motor vehicles are especially suitable for treating wide surfaces. They can also be autonomously transported over long distances.

[0009] Both sprayers, however, have a series of drawbacks and limitations.

[0010] A first drawback that is common to both sprayers is represented by the need, for the user, to have at least one manual wheeled sprayer and at least one hydraulic spraying system, either of them being suitable for use according to the different type of application.

[0011] Another drawback is due to the fact that, since the two machines are not interchangeable, the user is forced to schedule the work to be carried out very carefully, in such a way as to avoid planning for the same period and in different places works that must be done with the same sprayer, if only one sprayer per type is available.

[0012] A further drawback of manual sprayers with wheels is represented by the fact that it is difficult to load on them the tank containing the bitumen emulsion to be sprayed.

[0013] In fact, they are equipped with inclined folding chutes that allow the operator to load the tank by rolling it up the above mentioned chutes and positioning it in an apposite cradle obtained in the frame of the sprayer.

[0014] When the tank has been placed in the cradle, it must be further rotated by the operator, who places the access hole in the highest position, in such a way as to ensure that the suction pipe can be inserted without pouring the emulsion onto the ground due to gravity.

[0015] Another recognized drawback of the known manual sprayers is due to the fact that the delivery pipe connecting the pumping unit to the spray lance must be sufficiently long to allow the operator to cover a wide working area with no need to keep moving the sprayer. Since the delivery pipe is not supported by any type of supporting means, during work it comes in contact with the ground and gets dirty with bitumen, dirtying in turn the machine and the operator and negatively affecting the quality of the working method.

[0016] A further drawback of said known manual sprayers is constituted by the fact that during the periods of inactivity the bitumen emulsion present on the nozzle of the spray lance and on the filter of the suction pipe inserted in the tank tends to dry and clog the passage holes.

[0017] When the machine is used again after the inactivity, the above results in a bad spraying operation and a bad suction process that, at worst, may also make it necessary for the operator to carry out cleaning cycles.

[0018] Another drawback of the known manual sprayers is due to the fact that, in order to allow the operator to work at a sufficient distance to avoid being hit by the jet sprayed on the ground, the spray lance must be rather long.

[0019] This represents an impediment when the sprayer must be moved, since the size of the spray lance makes it more difficult to be transported.

[0020] A further specific drawback of the hydraulic spraying means that can be loaded on motor vehicles is their high cost.

[0021] The present invention intends to overcome the limitations and drawbacks described above.

[0022] In particular, it is a first aim of the invention to produce a spraying machine for bitumen emulsions that is versatile and can be used either as manual wheeled sprayer guided by the operator or as self-propelled sprayer loaded on a motor vehicle.

[0023] A further aim of the invention is to produce a sprayer that makes it possible to carry out the same spraying treatments that can be performed with the hydraulic spraying systems that can be loaded on motor vehicles, with no need to make considerable investments.

[0024] It is a further aim of the invention to produce a spraying machine for bitumen emulsions in which the delivery pipe connecting the pumping unit to the spraying means does not touch the ground during the spraying

operations.

[0025] It is a further aim of the invention to produce a spraying machine provided with means suited to prevent the bitumen emulsion from drying in the spray nozzle and in the suction pipe filter during the periods in which the sprayer is not used.

[0026] Last but not least, a further aim of the invention is to produce a sprayer provided with spraying means that in rest position are shorter than the spraying means of the known sprayers.

[0027] The aims mentioned above have been achieved through the implementation of a sprayer for bitumen emulsions that, according to the main claim, comprises:

- a frame resting on wheels that in turn rest on the ground;
- guide means of said sprayer that are combined with said frame and can be manoeuvred by the operator;
- supporting means for a tank containing said bitumen emulsion to be sprayed, combined with said frame;
- means for spraying said bitumen emulsion that can be held by the operator;
- at least one pumping unit comprising a suction pipe suited to draw said bitumen emulsion from said tank and one delivery pipe connected to said spraying means;

and is characterized in that said at least one pumping unit belongs to a removable support structure combined with said frame via coupling means.

[0028] According to a preferred embodiment of the invention, the coupling means comprise one or more pins belonging to the frame and one or more holes belonging to the support structure, wherein each one of said pins is suited to fit into one the corresponding holes.

[0029] Split pins arranged transversally with respect to the part of each pin protruding from the corresponding hole prevent said pins from coming out.

[0030] According to another embodiment of the invention the holes, instead of being made in the support structure, may be made in the frame and therefore the pins will be made in the support structure.

[0031] The support structure of the pumping unit is also provided with handles to enable positioning of the pumping unit on the flatbed of a vehicle, preferably but not necessarily a truck, a van or a similar vehicle.

[0032] An unwinder-winder unit is provided to support the suction pipe, said unwinder-winder unit being of the known type available on the market and being applied to the frame of the sprayer through a rotation pin that allows it to be directed in such a way as to follow the direction in which the delivery pipe is unwound and automatically rewound when the operator manoeuvres the spraying means.

[0033] The sprayer is also equipped with a solvent liquid container, supported by the frame, which houses the filter positioned at the end of the pipe drawing the emulsion from the tank, as well as the spraying means nozzle.

[0034] The spraying means are constituted by a rigid rod and a rigid pipe connected to the delivery pipe of the bitumen emulsion to be sprayed, telescopically coupled to each other.

[0035] The sprayer frame is also provided with supporting means suited to support the spraying means when they are not used and are in rest position.

[0036] Advantageously, the sprayer subject of the invention, being provided with a removable pumping unit, ensures greater flexibility of use, since the user can move the pumping unit from the sprayer frame to the flatbed of a vehicle according to his/her preferences and needs. In this way, the sprayer changes from a manual rotated sprayer into a self-propelled sprayer.

[0037] Still advantageously, the presence of an unwinder-winder unit keeps the delivery pipe constantly stretched, prevents it from touching the ground and from getting dirty with the bitumen emulsion and makes it easier for the operator to manoeuvre the spraying means.

[0038] Equally to advantage, the presence of the container of solvents for the bitumen emulsion allows the filter and the spray nozzle contained therein to be kept clean, thus preventing them from getting clogged in case of long periods of inactivity.

[0039] Still to advantage, the telescopic configuration of the spraying means makes it possible to reduce their size and improve the manoeuvrability of the sprayer, mainly during transport in conditions of inactivity, when the spraying means are supported by the apposite supporting means fixed to the frame.

[0040] The aim and advantages described above will be highlighted in greater detail in the description of a preferred embodiment of the invention that is supplied as an indicative, non-limiting example with reference to the enclosed drawings, wherein:

- Figures 1 and 2 are two different axonometric views of the sprayer carried out according to the invention;
- Figure 3 is a side view of the sprayer shown in Figures 1 and 2;
- Figures from 4 to 6 represent some details of the sprayer subject of the invention shown in Figures 1 and 2;
- Figure 7 shows a part of the sprayer subject of the invention installed on a self-propelled vehicle;
- Figures from 8 to 10 represent some details of the sprayer carried out according to the invention.

[0041] The sprayer subject of the invention is represented in its whole and in different views in the Figures from 1 to 3, where it is indicated as a whole by 1.

[0042] It can be observed that it comprises a frame 2 resting on a pair of front wheels 3 and on a rear wheel 4, with which a tank R containing the bitumen emulsion to be sprayed and a pumping unit, indicated as a whole by 5, are combined.

[0043] The pumping unit 5 comprises a suction pipe

6a that is connected to the tank **R** for drawing the emulsion and a delivery pipe **6b** connected to means **7** for spraying the same bitumen emulsion.

[0044] In rest position said spraying means are supported by a support **9** fixed to the frame **2** that can be observed in the Figures 1 and 3, while during operation they are held by an operator **O,** as shown in Figure 2.

[0045] In particular, the frame **2** is also combined with guide means indicated as a whole by **8,** which comprise a rod **8a** hinged to the frame **2** in correspondence with the rear wheel **4,** provided with a handle **8b** supplied to be used by the operator **O.**

[0046] According to the invention, the pumping unit 5 belongs to a removable support structure 15 that is combined with the frame 2 via coupling means 16 that can be seen in the whole in Figure 6.

[0047] According to the preferred embodiment of the invention described herein with reference to Figures 5 and 6, the coupling means 16 comprise four pins 17 belonging to the frame 2 and four holes 18 belonging to the support structure 15, wherein each one of said pins 17 is suited to fit into a corresponding hole **18**.

[0048] In a different embodiment of the invention that is not described herein, the pins, instead of belonging to the frame 2, may belong to the support structure 15 and in this case the holes, instead of belonging to the support structure 15, will belong to the frame 2. Furthermore, the pins and holes may be present in a number different from four.

[0049] It can thus be observed, with particular reference to Figure 6, that the pumping unit 5 is combined with the frame 2 by inserting the pins 17 in the corresponding holes 18 present in the support structure 15.

[0050] Once the coupling operation has been completed, to ensure the stability of the union, a split pin **30** is inserted in a transversal through hole **17b** present in the end **17a** of each pin **17** protruding from the corresponding hole **18.**

[0051] In this way, the accidental separation of the pumping unit **5** from the frame **2** is avoided.

[0052] To keep the support structure 15 and therefore the pumping unit 5 in its whole spaced from the frame 2, the pins 17 are made in such a way as to be coaxial to corresponding cylindrical cores 19 fixed to the frame 2 and having a greater diameter than the pins 17.

[0053] In this way, the annular surface **19a** on which the support structure **15** rests is defined.

[0054] On the outside of the support structure 15 there are handles 20 that can be grasped by the operator to separate the pumping unit 5 from the frame 2 and position it on the flatbed **P** of a self-propelled vehicle **T,** as illustrated in Figure 7.

[0055] The tank R containing the bitumen emulsion is housed by supporting means 10 that, as can be observed in particular in Figure 1, comprise a shaped structure 11 for resting the side of the tank R that ends with a lower surface 12 on which the base of the tank R can be placed.

[0056] The shaped structure 11 is provided with a cross shaft 13 for connection to the frame 2, in such a way as to be rotary and facilitate loading of the tank R, which can be carried out by rotatingly overturning it around the shaft **13.**

[0057] In this way, loading the tank **R** containing the bitumen emulsion is not excessively difficult, since it is sufficient to place it on the lower surface **12** and rest it against the shaped structure **11** that is then revolved around the shaft **13** so that the tank **R** is easily arranged in working position.

[0058] In particular, it can be observed that before loading it is sufficient to place the access hole **Ra** of the tank **R** in the position shown in Figure 1, so that it is located in the highest front position when the tank R is in the operating position shown in Figure 2.

[0059] Thus, the emulsion it contains cannot be poured out and the insertion of the suction pipe 6a is facilitated.

[0060] As regards the pumping unit 5, as shown in particular in Figure 4 it comprises a pump 50 connected to the suction and delivery pipes 6a and 6b, respectively, and combined with power means, in particular an engine 51, suited to set it rotating. Alternatively, the power means may be an electric motor.

[0061] In particular, the suction pipe **6a** with the corresponding filter **28** places the suction opening of the pump 50 in communication with the inside of the tank R and the delivery pipe 6b places the delivery opening of the same pump 50 in communication with the spraying means 7.

[0062] In particular, the spraying means 7 comprise, as can be observed in Figures 9 and 10, a rigid rod 40 provided with first holding means 41 at the operator's disposal and a rigid pipe 42 provided at one end with the spray nozzle 36 and at the opposite end with means 43 for coupling to the delivery pipe 6b.

[0063] In an intermediate position there are second holding means **44** at the disposal of the operator **O.**

[0064] Furthermore, the rigid rod 40 and the rigid pipe 42 are connected to each other via connection means indicated as a whole by 49.

[0065] It can be observed that said connection means 49 allow the rigid rod 40 to be telescopically connected to the rigid pipe 42 and comprise a tubular coupling 45, fixed to the rigid rod 40 via weldings 46, with a longitudinal hole passing through its whole length 47 and slidingly housing the rigid pipe 42.

[0066] Screw means indicated as a whole by 48 and manoeuvrable by the operator allow the rigid pipe 42 to be locked inside the tubular coupling 45 in the desired position.

[0067] Thus, the spraying means 7 can be arranged with the rigid rod 40 and the rigid pipe 42 in the position of maximum extension that can be observed in Figure 2 when the sprayer is in operation or in the position of maximum retraction that can be observed in Figure 1 when the spraying means 7 are arranged in rest position supported by the supporting means 9 connected to the frame 2.

[0068] When the spraying means 7 are arranged in rest position on the supporting means **9,** the spray nozzle **36** is positioned inside a container **32** containing solvent liquid **L** and visible in Figure 1 and in greater detail in Figure 8.

[0069] The container 32 is constituted by a prismatic container 33 having two openings 34 and 35 for the passage, respectively, of the filter 28 positioned at the end of the suction pipe 6a and the spray nozzle 36 positioned at the end of the spraying means 7.

[0070] The presence of the solvent liquid **L** inside the prismatic container **33** allows the filter **28** and the nozzle **36** to remain wet, thus preventing them from getting clogged due to the hardening of the bitumen emulsion during the periods of inactivity of the sprayer.

[0071] To avoid any contact of the delivery pipe 6b with the surface being treated and to prevent it from dirtying during the spraying process, the sprayer comprises an unwinder-winder unit 22 for the delivery pipe 6b, combined with said frame 2 and suited to ensure that during spraying the section 21a of said delivery pipe 6b included between the unwinder-winder 22 and the spraying means 7 remains stretched.

[0072] As regards the unwinder-winder 22 that can be observed in particular in Figures from 1 to 3, this is of the known type available on the market and comprises a pulley **25** on which the delivery pipe **6b** is wound, combined via a first pin 24 with a support bracket 27 supported by the frame 2 of the sprayer.

[0073] The pulley 25 rotates around the first pin 24 and internally is provided with elastic twist means 31 that can be observed in Figure 3, interposed between the pulley 25 and the support bracket 27, in such a way as to obtain an elastic rotation of the pulley 25 around the pin 24.

[0074] It can also be observed that the support bracket 27 is connected to the frame 2 via a second pin 29 that defines a vertical rotation axis Y of the bracket 27 and of the unwinder-winder unit **22** in its whole, to follow the movements of the spraying means 7 induced by the movements of the operator.

[0075] Finally, it can be observed that the support bracket **27** is also provided with guide rollers **37** facing each other, between which the delivery pipe **6b** slides.

[0076] Although not represented in the figures, in the unwinder-winder unit there are means for locking the elastic twist means 31 that, if desired by the operator, can void the twist effect when the pipe is unwound.

[0077] In this way, the operator can unwind the desired section of pipe and release the elastic twist means 31 when he intends to rewind it, in such a way as to recover and rewind it automatically.

[0078] Operatively, the operator after loading the tank R on the sprayer, inserts the filter 28 of the suction pipe 6a in the tank R itself and, grasping the handle 8b of the rod 8a, guides the sprayer to the work position.

[0079] At the same time, another operator, who grasps the spraying means 7 as shown in Figure 2, sprays the bitumen emulsion onto the ground.

[0080] Alternatively, a single operator may manoeuvre the sprayer and set it in working position and then, grasping the spraying means, spread the bitumen emulsion onto the ground.

[0081] If operating needs require it, the pumping unit **5** can be separated from the frame 2 of the sprayer and, as shown in Figure 7, be positioned on the flatbed **P** of a self-propelled vehicle **T** on which the tank **R** containing the bitumen emulsion to be sprayed is also positioned.

[0082] It is clear that in this case the tank **R** containing the bitumen emulsion can be larger, depending on the work to be carried out, or there may be more than one tank on the flatbed of the vehicle.

[0083] Two operators provide for separating the pumping unit 5 from the frame 2 and positioning it on the vehicle T; first they remove the split pins 19 associated with the pins 17 and then, grasping the handles 20, they lift the pumping unit 5 from the frame 2 and load it on the flatbed P of the self-propelled vehicle T.

[0084] The suction pipe 6a with the relevant filter 28 positioned at its end is inserted in the tank R, while the spraying means 7 associated with the delivery pipe 6b are grasped by the operator who provides for spraying the emulsion onto the ground.

[0085] It is therefore clear, according to the above description, that the sprayer carried out according to the invention achieves all the aims set.

[0086] In particular, greater versatility of use is obtained, since the sprayer can be used as a manual wheeled sprayer, but the pumping unit can also be separated from it and loaded on the self-propelled vehicle.

[0087] In this way, a self-propelled vehicle of any type is transformed into a self-propelled sprayer, simply by using the pumping unit of the sprayer subject of the invention.

[0088] The presence of the unwinder-winder 22 allows the section 21 a of the delivery pipe 6b included between the unwinder-winder 22 and the spraying means 7 to be constantly stretched, thus preventing the pipe from getting dirty due to contact with the surface on which the bitumen emulsion is sprayed.

[0089] In this way, the spraying machine in its whole, and above all the operator do not get dirty and the latter can enjoy more comfortable working conditions.

[0090] The presence of the container **32** with solvent liquid prevents the drying of the bitumen emulsion present on the filter **28** and on the nozzle **36** of the spraying means 7 during the periods of inactivity of the sprayer, so that they remain efficient and ready to be used when necessary.

[0091] Finally, the telescopic configuration of the spraying means 7 allows their length to be reduced, thus reducing also the overall dimensions of the sprayer when said spraying means are in rest position, supported by the supporting means 9. Therefore the sprayer subject of the invention, when combined with any self-propelled vehicle, can also be used as the hydraulic spraying means that can be loaded on motor vehicles.

[0092] Also the aim to produce a low-cost self-propelled sprayer is thus achieved, by simply installing the pumping unit of the sprayer subject of the invention on the flatbed of the self-propelled vehicle itself.

[0093] It is clear that upon implementation the spraying machine subject of the invention may have any shape and size.

[0094] In particular, the coupling means that allow the pumping unit to be removably connected to the frame of the spraying machine can be carried out in a different way than described and illustrated.

[0095] Any further construction change made to the sprayer subject of the invention, not described and not illustrated herein, must certainly be considered protected by the present invention, provided that they fall within the scope of the following claims.

Claims

1. Sprayer (1) for bitumen emulsions comprising:

- a frame (2) resting on two wheels (3, 4) that in turn rest on the ground;
- guide means (8) of said sprayer that are combined with said frame (2) and can be manoeuvred by the operator (O);
- supporting means (10) of a tank (R) containing said bitumen emulsion to be sprayed, associated with said frame (2);
- means (7) for spraying said bitumen emulsion that can be held by the operator (O);
- at least one pumping unit (5) comprising a suction pipe (6a) suited to draw said bitumen emulsion from said tank (R) and a delivery pipe (6b) connected to said spraying means (7);

characterized in that said at least one pumping unit (5) belongs to a removable support structure (15) combined with said frame (2) via coupling means (16).

2. Sprayer (1) according to claim 1), **characterized in that** said coupling means (16) comprise one or more pins (17) belonging to said frame (2) and one or more holes (18) belonging to said support structure (15), each one of said pins (17) being suited to fit into one of said holes (18).

3. Sprayer (1) according to claim 2), **characterized in that** each one of said pins (17) belongs to a cylindrical core (19) protruding from said frame (2) and having larger diameter than the corresponding pin (17) to define an annular surface (19a) for resting said support structure (15).

4. Sprayer (1) according to claim 1), **characterized in that** said coupling means (16) comprise one or more holes (18) belonging to said frame (2) and one or more pins (17) belonging to said support structure (15), each one of said holes (18) being suited to house one of said pins (17).

5. Sprayer (1) according to claim 2), 4), **characterized in that** it comprises constraint means constituted by split pins (30), each one of which is transversally inserted into a corresponding through hole (17b) made in the end (17a) of a corresponding pin (17) that protrudes from the relevant hole (18).

6. Sprayer (1) according to claim 1), **characterized in that** it is provided with handles (20) applied to said support structure (15).

7. Sprayer (1) according to claim 1), **characterized in that** said supporting means (10) comprise a shaped structure (11), suitable for resting the side of said tank (R), provided with a lower surface (12) where the base of said tank (R) rests and with a cross shaft (13) for rotatingly coupling it to said frame (2).

8. Sprayer (1) according to claim 1), **characterized in that** said guide means (8) comprise a rod (8a) hinged to said frame (2) in correspondence with one of said wheels (4) with a handle (8b) at the disposal of the operator (O).

9. Sprayer (1) according to claim 1), **characterized in that** said spraying means (7) comprise:

- a rigid rod (40) provided with first holding means (41) at the disposal of the operator (O);
- a rigid pipe (42) provided at one end with means (43) for coupling to said delivery pipe (6b), at the opposite end with a spray nozzle (36) and in intermediate position with second holding means (44) at the disposal of the operator (O);
- connection means (49) suited to telescopically join said rigid rod (40) and said rigid pipe (42) to each other.

10. Sprayer (1) according to claim 9), **characterized in that** said connection means (49) comprise a tubular coupling (45) fixed to said rigid rod (40) and provided with a longitudinal hole (47) passing through its whole length and slidingly housing said rigid pipe (42).

11. Sprayer (1) according to claim 10), **characterized in that** said tubular coupling (45) is provided with screw means (48) that can be manoeuvred by the operator (O) to lock said rigid pipe (42) inside said tubular coupling (45).

12. Sprayer (1) according to claim 1), **characterized in that** said pumping unit (5) comprises a pump (50)

associated with power means (51) suited to set it rotating, said pump (50) being connected to said suction pipe (6a) arranged inside said tank (R) and to said delivery pipe (6b) connected to said spraying means (7).

13. Sprayer (1) according to claim 12), **characterized in that** said suction pipe (6a) is provided with a filter (28) positioned in the end inserted in said tank (R).

14. Sprayer (1) according to claim 1), **characterized in that** it comprises an unwinder-winder unit (22) of said delivery pipe (6b), combined with said frame (2) and suited to ensure that during spraying the section (21 a) of said delivery pipe (6b) included between said unwinder-winder (22) and the spraying means (7) remains stretched.

15. Sprayer (1) according to claim 14), **characterized in that** said unwinder-winder unit (22) comprises a pulley (25) on which said delivery pipe (6b) is wound, said pulley (25) being combined with said frame (2) via a support bracket (27) and being provided with twist elastic means (31) interposed between said pulley (25) and said support bracket (27).

16. Sprayer (1) according to claim 15), **characterized in that** said support bracket (27) is provided with a first pin (24) to which said pulley (25) is rotantingly coupled.

17. Sprayer (1) according to claim 15), **characterized in that** said support bracket (27) is provided with a second pin (29) for connection to said frame (2), defining a vertical rotation axis (Y) of said support bracket (27).

18. Sprayer (1) according to claim 14), **characterized in that** said support bracket (27) is provided with guide rollers (37) for said delivery pipe (6b).

19. Sprayer (1) according to claim 1), **characterized in that** it comprises a container (32) of solvent liquid supported by said frame (2), said container (32) being suited to house a filter (28) positioned at the end of said suction pipe (6a) and a spray nozzle (36) belonging to said spraying means (7).

20. Sprayer (1) according to claim 6), **characterized in that** said container (32) of solvent liquid comprises a prismatic container (33) in which it is possible to identify openings (34, 35) for the passage of said filter (28) and of said spray nozzle (36).

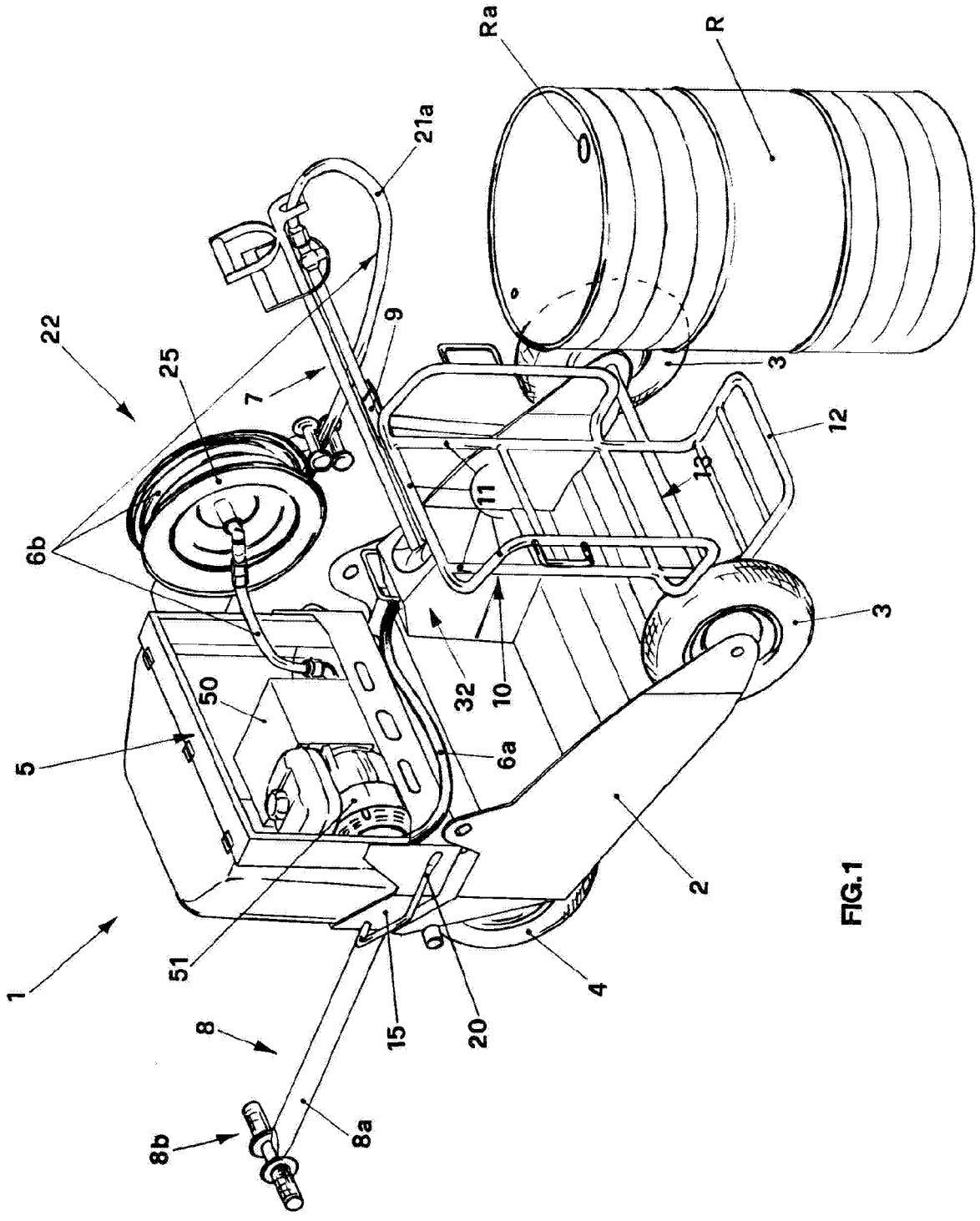


FIG.1

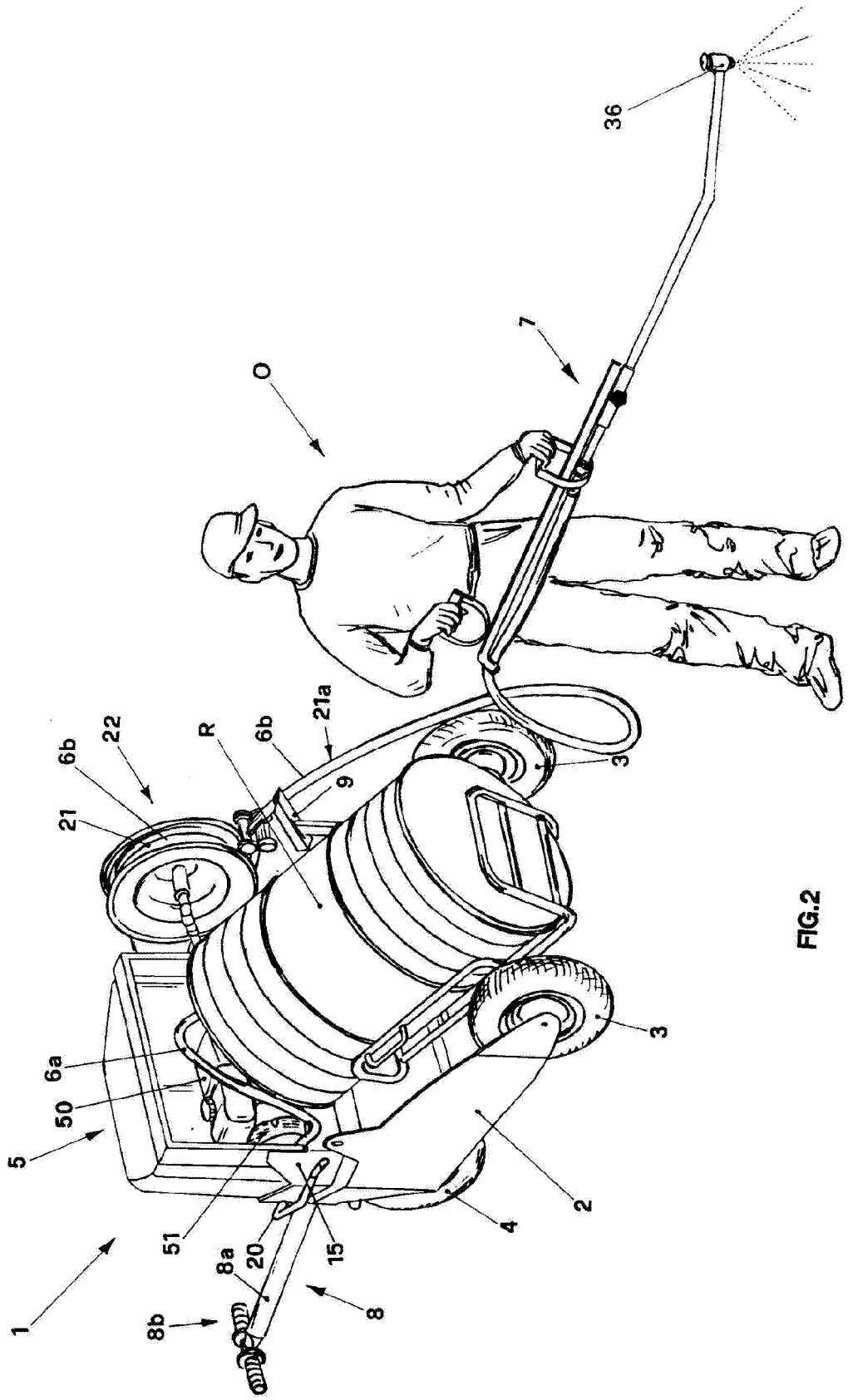
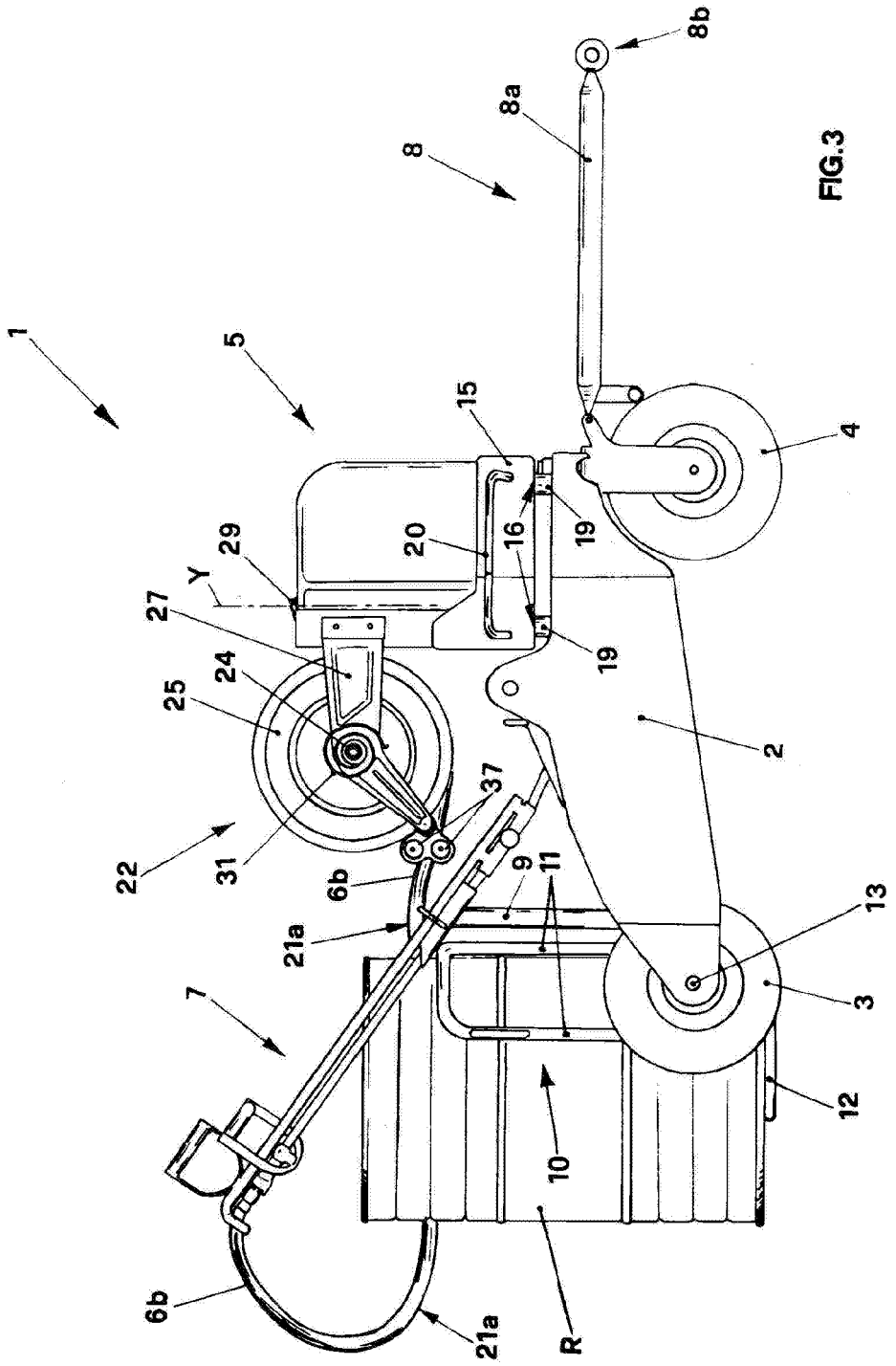


FIG.2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37
22
31
6b
9
11
13
21a
7
3
12
10
6b
21a
R

FIG.3

FIG. 4

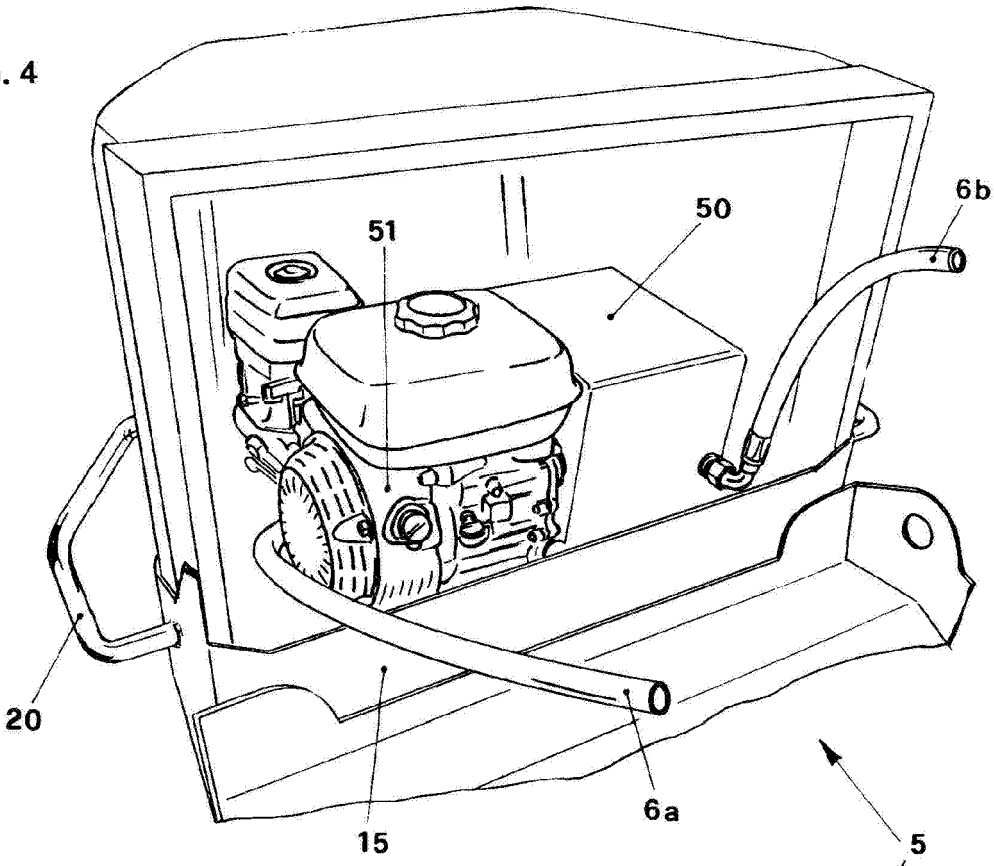
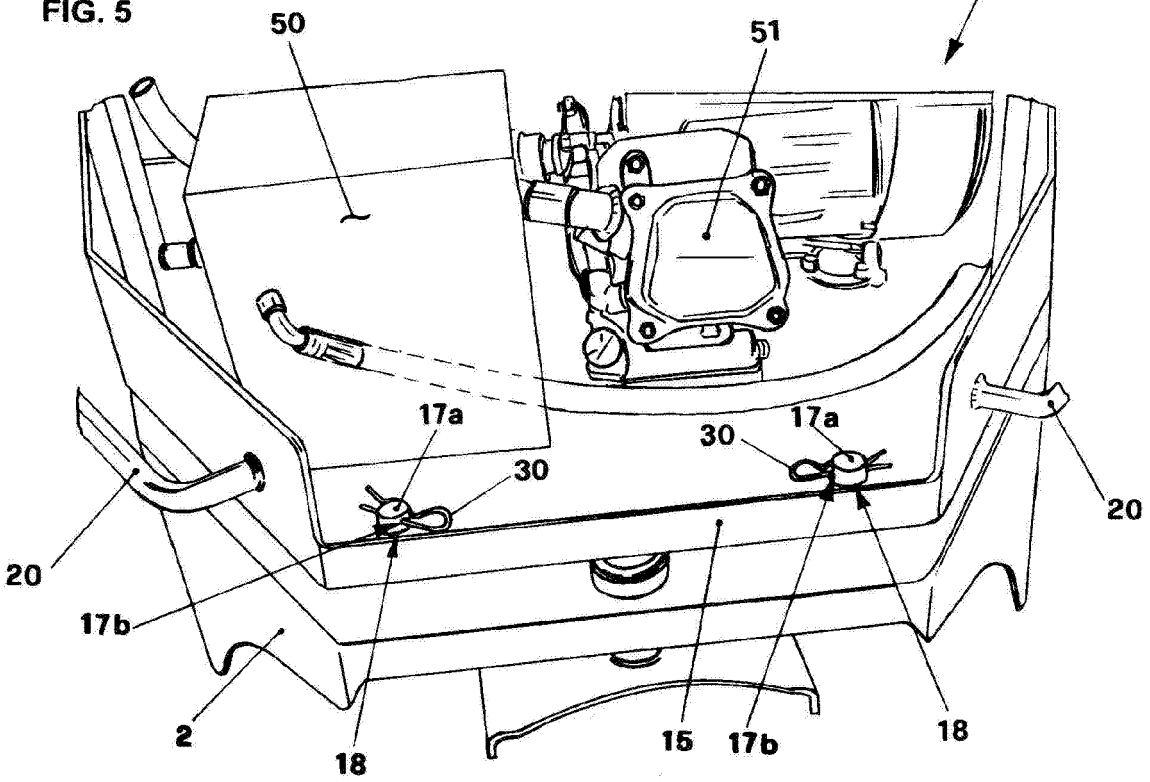


FIG. 5



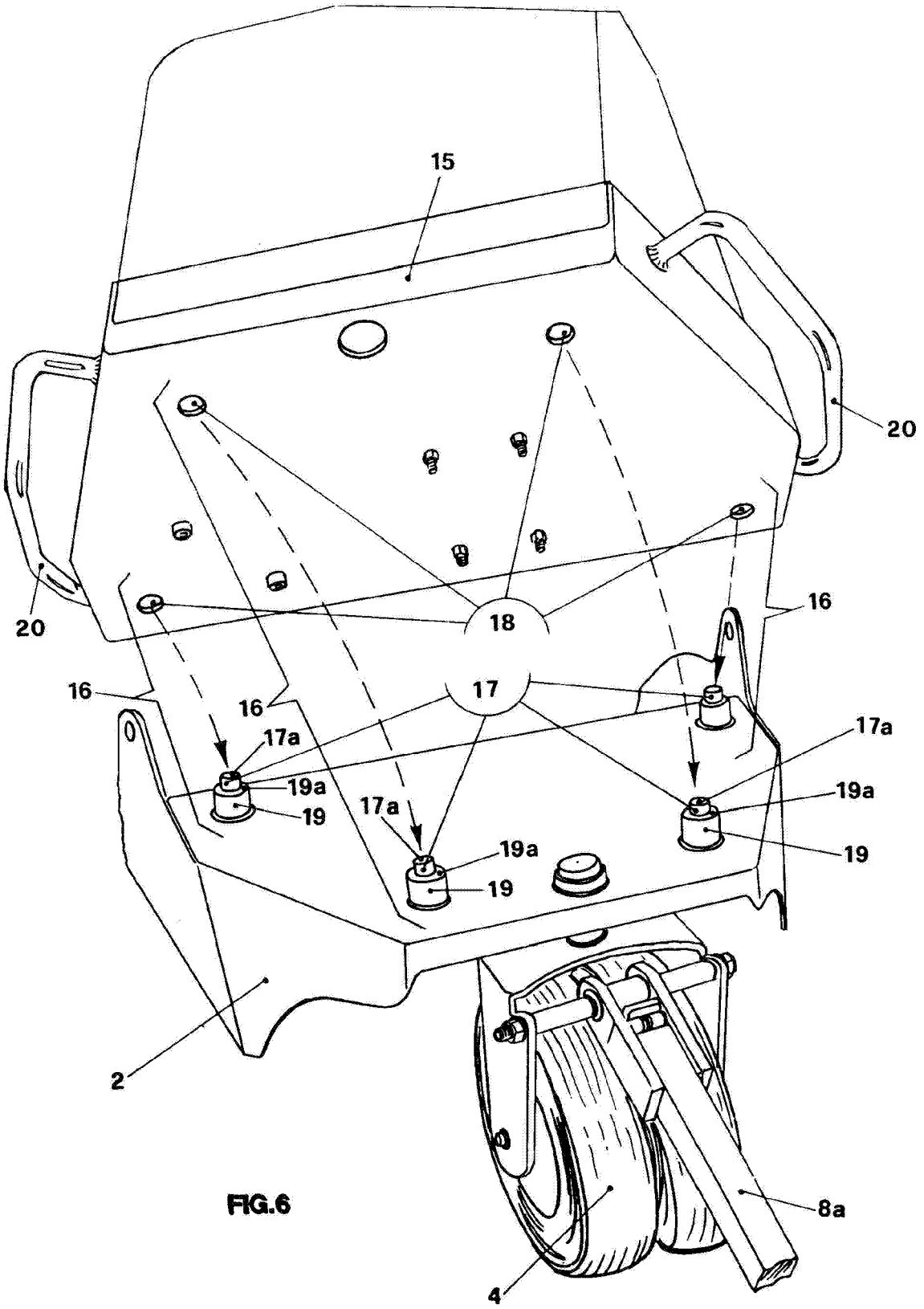


FIG.6

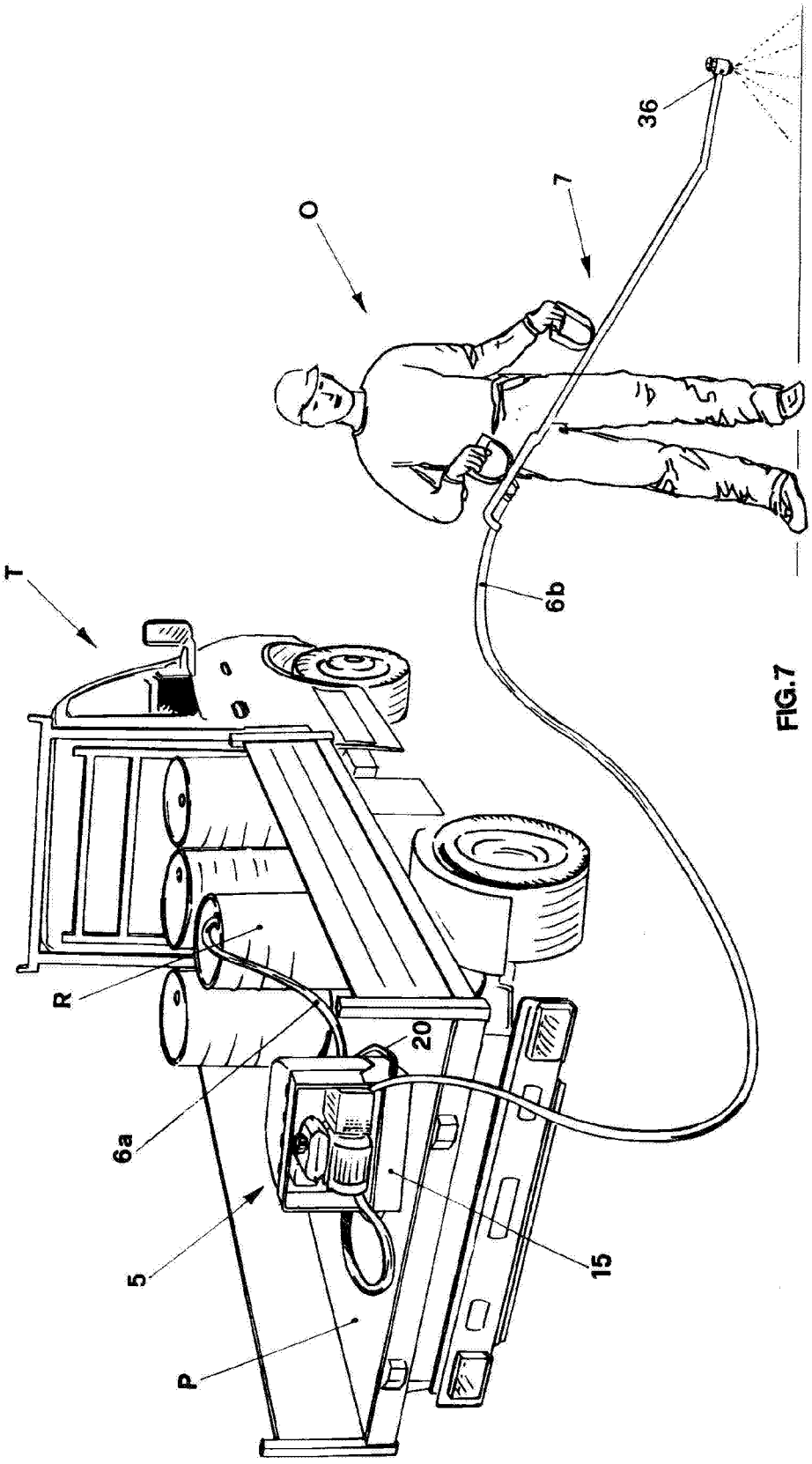


FIG.7

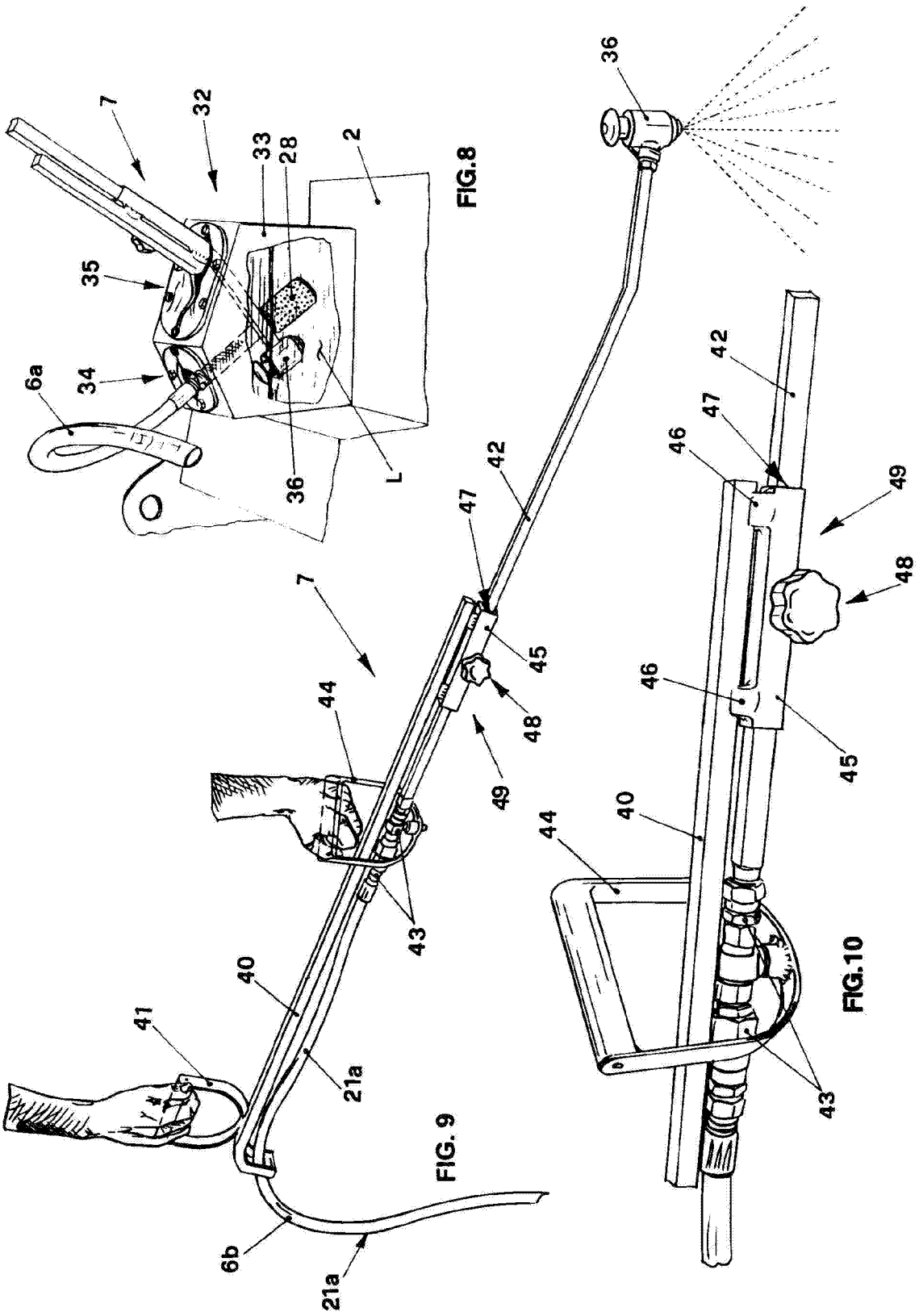

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FIG.8
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6b
21a
FIG. 9
FIG.10