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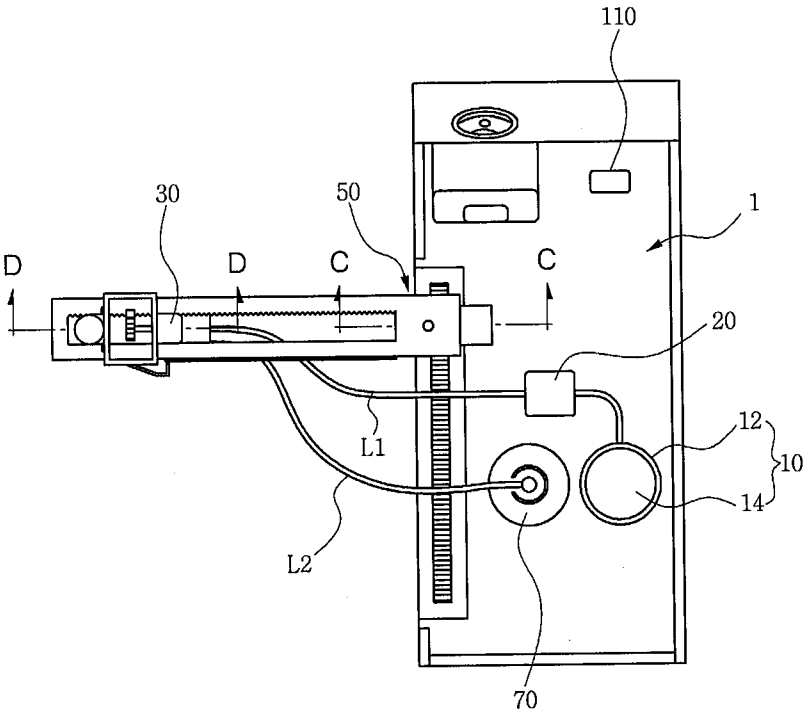
(54) **Title:** ROAD LINE-MARKING VEHICLE



(57) **Abstract:** Disclosed herein is a road line-marking vehicle, which allows marking work to be smoothly and continuously performed. The road- line marking vehicle has a marking-material supply means filled with a marking material, a pump for forcibly moving the marking material from the marking-material supply means, an air compressor for generating compressed air, and a marking material spray means for spraying the marking material on a road. The marking -material spray means has a cylindrical marking-material feeding pipe, an air feeding pipe, and a rotatable spray nozzle assembly. The marking-material feeding pipe guides the marking material . The air feeding pipe defines a passage for feeding the compressed air. The spray nozzle assembly is in close contact with the air feeding pipe, and has a plurality of spray nozzles. Thereby, when one of the spray nozzles is blocked, the spray nozzle assembly is rotated, to use a different neighboring spray nozzle.

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[DESCRIPTION]

[Invention Title]

ROAD LINE-MARKING VEHICLE

[Technical Field]

The present invention relates, in general, to road line-marking vehicles and, more particularly, to a road line-marking vehicle, which allows marking work to be smoothly performed when a road line, a U-turn symbol, and other symbols are marked on a road, in addition to allowing the marking work to be continuously performed.

[Background Art]

Generally, traffic lanes are marked on a road, on which vehicles travel, in yellow or white color, using one or two rows of solid or dotted lines, as set forth in regulations.

Meanwhile, symbols, such as a U-turn symbol, a left-turn symbol, or a landmark including a destination, are marked on the road, in addition to road lines.

As such, the method of marking all symbols on a road, including road lines, is typically classified into a spraying method and a melting method. In the case of using paint, according to the spraying method, all

equipment required for marking a road line is loaded into a loading box of a vehicle. While the vehicle is running, a marking material, such as paint, is sprayed through a nozzle. According to the melting method, a marking material obtained by mixing crushed rock ($CaCO_3$) and resin with other additives in predetermined proportions is used. The marking material is put into a melting tub mounted on a loading box of a vehicle, and is heated to be melted. The molten marking material is applied to mark a road line.

The spraying method and the melting method are selected according to the characteristics of a road. The spraying method is more advantageous with respect to working speed, but is problematic in that marks may wear out in a short period of time. The melting method is advantageous in that marks can be maintained for a lengthy period of time. However, the melting method is problematic in that working speed is slow, and the marking material must be melted using LPG or other substances when the marking material must be removed due to a change in traffic lanes, and thus it is difficult to remove the marking material.

In the case of the spraying method, paint contained in a paint container is sprayed through the nozzle. However, the position of the spray nozzle is fixed such

that the spray nozzle faces downwards. Thus, when the spray nozzle is used, after marking work has been conducted and a considerable time has passed, the spray nozzle may be blocked. In this case, since the marking work is interrupted in order to perform the work of replacing the nozzle, work efficiency is lowered.

Furthermore, when impurities are contained in the marking material, the nozzle must be repaired and replaced with another one, so that work efficiency is lowered.

【Disclosure】

【Technical Problem】

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a road line-marking vehicle, which is provided with a plurality of spray nozzles, so that, when one spray nozzle is blocked during marking work, a neighboring spray nozzle is displaced, and the marking work can continue.

【Technical Solution】

In order to accomplish the object, the present invention provides a road line-marking vehicle, having a

marking-material supply means 10 filled with a marking material, a pump 20 for forcibly moving the marking material contained in the marking-material supply means 10, an air compressor 70 for generating compressed air, and a marking-material spray means 30 for spraying the marking material on a road, wherein the marking-material spray means 30 includes a cylindrical marking-material feeding pipe 32, into which the marking material fed from the marking-material supply means 10 is guided, an air feeding pipe 34 provided outside the marking-material feeding pipe 32 to be spaced apart from the marking-material feeding pipe by a predetermined interval, and defining a passage 35 for feeding the compressed air generated by the air compressor 70, and a spray nozzle assembly 36 coming into close contact with an outer circumferential surface of an end of the air feeding pipe 34, with a plurality of spray nozzles 37 being arranged on the spray nozzle assembly at regular intervals, so that, when one of the spray nozzles is blocked, the spray nozzle assembly is rotated, to use a different neighboring spray nozzle.

【Advantageous Effects】

As described above, while a road line, a U-turn

symbol, a left-turn symbol, or a landmark including a destination is marked on a road using a road line-marking vehicle according to the present invention, one of the spray nozzles may become blocked. In this case, the blocked spray nozzle is replaced with a neighboring spray nozzle, thus allowing marking work to be continuously performed. Further, the time spent replacing or repairing the spray nozzle is reduced, so that work efficiency is improved.

【Description of Drawings】

FIG. 1 is a plan view showing a road line-marking vehicle, according to the present invention;

FIG. 2 is a perspective view showing important parts of the road line-marking vehicle, according to the present invention;

FIG. 3 is a bottom perspective view showing a marking-material spray means of the road line-marking vehicle, according to the present invention;

FIG. 4 is a sectional view taken along line A-A of FIG. 3;

FIG. 5 is a sectional view taken along line B-B of FIG. 4;

FIG. 6 is a sectional view taken along line B-B of FIG. 4, when a spray nozzle assembly of the marking-

material spray means according to the present invention is rotated;

FIG. 7 is a sectional view taken along line C-C of FIG. 1;

FIG. 8 is a sectional view taken along line D-D of FIG. 1;

FIG. 9 is a block diagram of a system of the road line-marking vehicle, according to the present invention; and

FIG. 10 is a plan view showing the case of marking a U-turn symbol using the road line-marking vehicle, according to the present invention.

【Best Mode】

Hereinafter, the characteristics of a road line-marking vehicle, according to the present invention, will be described in detail with reference to the accompanying drawings.

FIG. 1 is a plan view showing a road line-marking vehicle, according to the present invention, FIG. 2 is a perspective view showing important parts of the road line-marking vehicle, according to the present invention, FIG. 3 is a bottom perspective view showing a marking-material spray means of the road line-marking vehicle, according to the present invention, FIG. 4 is a sectional

view taken along line A-A of FIG. 3, FIG. 5 is a sectional view taken along line B-B of FIG. 4, FIG. 6 is a sectional view taken along line B-B of FIG. 4, when a spray nozzle assembly of the marking-material spray means according to the present invention is rotated, FIG. 7 is a sectional view taken along line C-C of FIG. 1, FIG. 8 is a sectional view taken along line D-D of FIG. 1, FIG. 9 is a block diagram of a system of the road line-marking vehicle, according to the present invention, and FIG. 10 is a plan view showing the case of marking a U-turn symbol using the road line-marking vehicle, according to the present invention.

As shown in FIGS. 1 and 2, a road line-marking vehicle 1 according to the present invention includes a marking-material supply means 10, a pump 20, a marking-material spray means 30, and a feeding means 50. The marking-material supply means 10 is filled with a marking material, such as paint. The pump 20 forcibly discharges the marking material from the marking-material supply means 10. The marking-material spray means 30 sprays the marking material, which is forcibly moved by the pump 20, onto a road surface. The feeding means 50 functions to feed the marking-material spray means 30.

Hereinafter, the respective components will be described in detail.

The marking-material supply means 10 is provided with a body 12 and a lid 14, and is mounted on the vehicle 1. The body 12 has space for holing the marking material therein. The lid 14 is provided on the upper end of the body 12 to prevent the marking material from evaporating, and is opened or closed to replenish marking material.

The vehicle 1 further includes an air compressor 70 which is used to force compressed air into the marking-material spray means 30. The liquid marking material, loaded into the marking-material supply means 10, is forced into the marking-material spray means 30 by means of the pump 20.

Further, the feeding means 50 is connected at one end thereof to a side of the vehicle 1, and feeds the marking-material spray means 30 in the lengthwise direction of the vehicle, which is the X-axis direction, or in a transverse direction of the vehicle, which is the Y-axis direction, or in a vertical direction, which is the Z-axis direction. The marking-material spray means 30 is mounted to the other end of the feeding means 50.

Referring to FIGS. 3 to 6, the marking-material spray means 30 includes a cylindrical marking-material feeding pipe 32, an air feeding pipe 34, and a spray

nozzle assembly 36. The marking-material feeding pipe 32 guides the marking material, such as paint, which is fed from a pipe L1 connected to the marking-material supply means 10. The air feeding pipe 34 is provided outside the marking-material feeding pipe 32 in such a way as to be spaced apart from the marking-material feeding pipe 32 by a predetermined interval, thus forming a passage 35 for feeding the compressed air which is generated by the air compressor 70. The spray nozzle assembly 36 is provided on an end of the marking-material feeding pipe 32 and the air feeding pipe 34. The spray nozzle assembly 36 is in close contact with the outer circumferential surface of one end of the air feeding pipe 34, with a plurality of spray nozzles 37 arranged on the spray nozzle assembly 36 at regular intervals.

Meanwhile, one end of the marking-material feeding pipe 32 is closed, and a marking-material flow hole 32a is vertically formed in one side of the marking-material feeding pipe 32 to face the ground surface. Further, a marking-material flow hole 34a, which is the same as the marking-material flow hole 32a of the marking-material feeding pipe, is formed in the air feeding pipe 34 which is provided outside the marking-material feeding pipe 32. A hollow coupling pipe 38 is connected at opposite ends thereof to the corresponding marking-material flow

holes 32a and 34a, in such a way as to communicate with the marking-material flow holes 32a and 34a.

Further, one end of the air feeding pipe 34 is closed. Air flow holes 34b and 34b' are formed on opposite sides of the marking-material flow hole 34a to be spaced apart from each other by a predetermined distance, and pass through the air feeding pipe to communicate with the exterior. The compressed air contained in the passage 35, defined in the air feeding pipe 34, is discharged through the air flow holes 34b and 34b'.

The spray nozzle assembly 36 includes a body 36a having the shape of a cap. The body 36a is rotatably in close contact with the outer circumferential surface of one end of the air feeding pipe 34. One or more spray nozzles 37, 37', and 37" are provided on the outer circumferential surface of the body 36a at regular intervals.

In this case, the spray nozzles 37, 37', and 37" have the same shape. Each of the spray nozzles 37, 37', and 37" has a marking-material discharge hole 37a that passes through the center of a body thereof. A plurality of air discharge holes 37b and 37b' is formed around the marking-material discharge hole in such a way as to face an end of the marking-material discharge hole 37a. Each

of the spray nozzles 37, 37', and 37" is sealed at a joint part thereof to the outer circumferential surface of the body 36a through a welded part 37c.

Further, a handle 39 protrudes from a side of the outer portion of the body 36a. Thus, when the marking-material discharge hole 37a of one of the spray nozzles (e.g. 37) is blocked by impurities or the like, a worker holds the handle 39 and rotates the body 36a of the spray nozzle assembly 36 so that a different, neighboring, spray nozzle (e.g. 37') faces downwards. Thereby, the marking-material flow hole 34a of the air feeding pipe 34 communicates with the marking-material discharge hole 37a, and the air flow holes 34b and 34b' communicate with the air discharge holes 37b and 37b', thus allowing marking work to be smoothly performed.

A plurality of locking holes 40, 40', and 40" is formed in the outer circumferential surface of the air feeding pipe 34 along the same track at regular intervals. A wing 42 is rotatably connected to an edge of the sidewall of the body 36a of the spray nozzle assembly 36 via a hinge 41, with a locking piece 42a protruding from the inner surface of the wing 42. Thereby, when the spray nozzle assembly 36 is coupled to an end of the air feeding pipe 34, the locking piece 42a of the wing 42 is fitted into one of the locking holes

40, 40′ and 40″. Fastening parts 43 and 44, provided on the outer ends of the wing 42, are fastened to each other, thus preventing the spray nozzle assembly 36 from being removed from the air feeding pipe 34.

In this case, the fastening parts 43 and 44 comprise a fastening loop 43a and a fastening latch 44a coupled to the fastening loop 43a. A general fastening structure, such as that used in a lunch box or the like, is used as the fastening parts of the present invention. Since such a fastening structure is known to those skilled in the art, it will not be described in detail herein.

Such a spray nozzle assembly 36 is coupled to the feeding means 50, so that the spray nozzle assembly 36 may move in X-axis/ Y-axis/ Z-axis directions.

In a detailed description, as shown in FIGS. 2, 7, and 8, the feeding means 50 includes an X-axis feeding means 52, a Y-axis feeding means 56, and an elevating means 60. The X-axis feeding means 52 feeds the marking-material spray means 30 in the lengthwise direction of the vehicle, that is, the X-axis direction. The Y-axis feeding means 56 feeds the marking-material spray means 30 in the transverse direction of the vehicle, that is, the Y-axis direction. The elevating means 60 moves the marking-material spray means 30 up and down. The X-axis

feeding means, the Y-axis feeding means, and the elevating means are driven using a motor, a rack, and a pinion.

That is, the X-axis feeding means 52 includes a guide member 53 which is mounted to one side of the vehicle in the lengthwise direction thereof. A first body 54 is provided to move along the first guide member 53. Further, a first motor 55 is provided on one side of the first body 54, and a pinion 55a is secured to a drive shaft of the first motor 55. A rack 53a is provided on the upper surface of the first guide member 53 in a lengthwise direction thereof.

Meanwhile, a first position indicating means 53b, having the shape of a metal band on which scales are marked at regular intervals, is provided on a surface of the first guide member 53 in the lengthwise direction thereof. A first position sensing means 52a is mounted to a side of the first body 54 in such a way as to face the first position indicating means 53b, and functions to precisely control the position when the first body 54 is moved. Preferably, the first position sensing means 52a comprises a photo sensor having a light emitting part and a light receiving part.

A second guide member 57 is provided on the upper end of the first body 54 in the transverse direction of

the vehicle. A second position indicating means 57b, having the shape of a metal band on which scales are marked at regular intervals, is provided on a surface of the second guide member 57 in a lengthwise direction thereof. A second body 58 is mounted to the upper end of the second guide member 57 and moves along the second guide member 57.

In this case, the second guide member 57 is rotatably supported on the upper end of the first body 54 via a rotating shaft 58a. Thus, when the vehicle finishes marking work and moves to another place, the second guide member 57 rotates to be parallel to the X-axis guide member 53, thus allowing the vehicle to be easily moved.

Further, a second position sensing means 56a, having the same construction as the first position sensing means 53b, is mounted to one side of the second body 58 to face the second position indicating means 57b, and functions to precisely control the position when the second body 58 moves in the Y-axis direction. In this case, a second motor 59 is provided on one side of the second guide member 57 to move the second body 58 in the Y-axis direction. A pinion 59a is fastened to an end of a drive shaft of the second motor 59, and a rack 57a is mounted to one side of a central opening of the

second guide member 57 in a lengthwise direction thereof. Thus, when the second motor 59 is driven and the pinion 59a is rotated, the second body moves horizontally along the rack 57a engaging with the pinion 59a.

Meanwhile, a third motor 61 is provided on a side surface of the second body 58, a pinion 61a is integrally provided on a drive shaft of the third motor 61, and a third guide member 62 having a rack 62a is provided. One side of the marking-material spray means 30 is connected to one end of the third guide member 62.

The third guide member 62 is moved up and down by the third motor 61, thus axially elevating the marking-material spray means 30 secured to the lower portion of the third guide member 62. When marking work is not conducted, the marking-material spray means 30 is moved upwards. Conversely, when marking work is conducted, the marking-material spray means 30 moves downwards towards the surface of the ground, thus spraying the marking material.

Of course, a third position indicating means 63, having the shape of a metal band on which scales are formed at regular intervals, is provided on the surface of the third guide member 62 in a lengthwise direction thereof. A third position sensing means 60a, having the

same construction as the first position sensing means 52a, is mounted to the upper portion of the second body 58 to face the third position indicating means 63, and detects the moving distance of the third guide member 62 when it is moved in the Z-axis direction, thus precisely controlling a position.

Through such a construction, a road line-marking operation can be conducted automatically or manually. That is, road lines, such as those indicating traffic lanes, may be automatically marked in response to the manipulation of a switch. Alternatively, road lines may be marked through manual manipulation.

Meanwhile, the construction of the X-axis feeding means 52, the Y-axis feeding means 56, or the Z-axis feeding means 60 of the elevating means 50, have only been described as having the motor, the rack, and the pinion. However, the X-axis feeding means, the Y-axis feeding means, or the Z-axis feeding means may use various known means, such as a hydraulic cylinder or a pneumatic cylinder, which is included in the present invention.

Further, the marking material may use general paint. However, the marking material may use a material obtained by melting a powder-phase material. In this case, the body 12 of the marking-material supply means

10 is made of a metal material, and a burner (not shown) is provided under the body 12 and heats a powder-phased material using an energy source, such as LPG, to melt it.

More preferably, a reflector supply means (not shown) may be further provided on the rear end of the marking-material spray means 30, and may apply a reflector, such as glass beads, which are reflected by the light emitted from headlights of vehicles at night.

Hereinafter, the operation of the road line-marking vehicle, according to the present invention, will be described in detail with reference to FIGS. 1 to 9.

A control panel 110 is mounted to one side of the vehicle 1 to control the whole system. Electric power 100 is supplied from the vehicle 1 or an additional supply source to the control panel 110. The control panel 110 includes a memory unit 120, a control unit 130, and a display unit 140. The memory unit 120 stores system programs and data on the width/length/interval of traffic lanes, a U-turn symbol, or a left-turn symbol. The control unit 130 compares data of the memory unit 120 with external monitoring data, thus outputting a control signal. The display unit 140 comprises an LED or an LCD, which displays the controlled state.

Thus, when a power switch 102 is operated to drive the system, the control panel 110 initializes the system. In such a state, a position adjusting switch 104 is manipulated to conduct marking work. At this time, motor drivers (not shown) of the X-axis/ Y-axis/ Z-axis feeding means 52, 56, and 60 are driven, so that the first to third motors 55, 59, and 61 are moved to the upper surface of a road which is to be marked. In this case, the X-axis/ Y-axis/ Z-axis feeding means 52, 56, and 60 are sequentially moved to initial start positions.

Meanwhile, the first to third position sensing means 52a, 56a, and 60a detect whether the respective feeding means reach the start positions, and transmit the detected signals to the control unit 130. The control unit 130 compares the detected signals with preset data stored in the memory unit 102, thus moving the feeding means to correct positions.

In the case of drawing a straight road line, one of mark selection switches 106, which are finely divided into a road line/ a U-turn mark/ a left-turn mark/ a central line/ a landmark, is selected. Thus, in the case in which a simple straight road line is painted, a road-line switch 106 is selected. In this case, the X-axis feeding means is driven to move the vehicle only in the

X-axis direction, and slowly moves the marking-material spray means 30 in the lengthwise direction of the vehicle. When a marking start switch 108 is manipulated, the control unit 130 transmits a control signal to the pump 20 and the air compressor 70, thus driving the pump 20 and the air compressor 70. As the pump 20 is operated, the marking material is forcibly fed from the marking-material supply means 10 to the marking-material spray means 30. Further, as the air compressor 70 is operated, the compressed air is forcibly input into the marking-material spray means 30.

The marking material is fed from the line L1, connected to the marking-material supply means 10, to the marking-material spray means 30. The marking material passes through the interior of the marking-material feeding pipe 32, the marking-material flow hole 32a formed in an end of the marking-material feeding pipe 32, the coupling pipe 38, and the marking-material flow hole 34a formed in the air feeding pipe 34, and is discharged to the marking-material discharge hole 37a formed in the spray nozzle 37 of the spray nozzle assembly 36. The compressed air of the air compressor 70 passes through the passage 35 of the air feeding pipe 34 and the air flow holes 34b and 34b' formed in the end of the air feeding pipe 34, and is discharged through the

air discharge holes 37b and 37b' of the spray nozzle assembly 36. Thus, while the marking material is sprayed and a mark is formed on the road, the X-axis feeding means 52 is driven. Thereby, the marking-material spray means 30 moves slowly along the first guide rail 53 in the lengthwise direction of the vehicle 1, thus painting the straight road line.

Meanwhile, in the case of drawing a U-turn symbol or a left-turn symbol, the vehicle moves in the X-axis direction and Y-axis direction, thus marking the symbol. At this time, if the symbol is partially painted while the vehicle moves alternately in the Y-axis direction and the X-axis direction, the marking material sprayed in the liquid phase may spread. Thus, as shown in FIG. 10, it is preferable that a marking plate 200 be additionally provided, thus preventing the marking material from spreading. In the marking plate 200, only a design or letter is cut away.

When the spray nozzle 37 of the spray nozzle assembly 36 is blocked during the marking work, the fastening parts 43 and 44 of the wing 42 are released from each other. Next, the wing 42 is rotated, so that the locking piece 42a is removed from an associated locking hole 40 formed in the outer circumferential surface of the air feeding pipe 34. In such a state, a

worker holds and rotates the handle 39 provided at a predetermined position on the spray nozzle assembly 36 so that another spray nozzle 37′ or 37″ faces downwards. At this time, the marking-material flow hole 34a of the air feeding pipe 34 communicates with the marking-material discharge hole of the spray nozzle 37′ or 37″. Further, the air flow holes 34b and 34b′ are adjusted to communicate with the air discharge holes of the spray nozzle 37′ or 37″. Thereafter, the wing 42 is rotated again, so that the locking piece 42a is inserted into the locking hole 40′ or 40″, and the fastening parts 43 and 44 of the wing 42 are fastened to each other. In this way, it is possible to continuously conduct marking work.

In the case of painting a long central line or road line, preferably, the vehicle 1 is driven at a predetermined speed, for example, a speed of 10 km/h or less, and continuously performs marking work.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

【Industrial Applicability】

As described above, the present invention provides a road line-marking vehicle, which allows marking work to be smoothly performed when a road line, a U-turn symbol, and other symbols are marked on a road, in addition to allowing the marking work to be continuously performed.

【CLAIMS】

【Claim 1】

A road line-marking vehicle, having marking-material supply means (10) filled with a marking material, a pump (20) for forcibly moving the marking material contained in the marking-material supply means (10), an air compressor (70) for generating compressed air, and marking-material spray means (30) for spraying the marking material on a road, wherein

the marking-material spray means (30) comprises:

a cylindrical marking-material feeding pipe (32), into which the marking material fed from the marking-material supply means (10) is guided;

an air feeding pipe (34) provided outside the marking-material feeding pipe (32) to be spaced apart from the marking-material feeding pipe by a predetermined interval, and defining a passage (35) for feeding the compressed air generated by the air compressor (70); and

a spray nozzle assembly (36) coming into close contact with an outer circumferential surface of an end of the air feeding pipe (34), with a plurality of spray nozzles (37) being arranged on the spray nozzle assembly at regular intervals, so that, when one of the spray nozzles is blocked, the spray nozzle assembly is

rotated, to use a different neighboring spray nozzle.

【Claim 2】

The road line-marking vehicle according to claim 1, wherein the marking-material feeding pipe (32) is sealed at an end thereof, with a marking-material flow hole (32a) being formed at a predetermined position in the marking-material feeding pipe, and the air feeing pipe (34) has a marking-material flow hole (34a) which is the same as the marking-material flow hole of the marking-material feeding pipe, with a coupling pipe (38) being provided such that opposite ends thereof communicate with the marking-material flow holes (32a, 34a), and a pair of air flow holes (34b) is formed at predetermined positions around the marking-material flow hole (34a) of the air feeding pipe (34) to discharge the compressed air from the passage (35), so that the compressed air is discharged through one of the spray nozzles (37) of the spray nozzle assembly.

【Claim 3】

The road line-marking vehicle according to claim 1 or 2, wherein the spray nozzle assembly (36) comprises:

a body (36a) having a shape of a cap, and rotatably coming into close contact with the outer

circumferential surface of the end of the air feeding pipe (34); and

a plurality of spray nozzles (37) provided on an outer circumferential surface of the body (36a) to be arranged at regular intervals, each of the spray nozzles having a marking-material discharge hole (37a) which passes through a center of a body of the spray nozzle, with a plurality of air discharge holes (37b) being formed in predetermined positions around the marking-material discharge hole to face an end of the marking-material discharge hole (37a).

【Claim 4】

The road line-marking vehicle according to claim 3, further comprising:

a handle (39) provided at a predetermined position on the body (36a) to allow a worker to easily rotate the spray nozzle assembly.

【Claim 5】

The road line-marking vehicle according to claim 1 or 2, wherein the air feeding pipe (34) has on the outer circumferential surface thereof a plurality of locking holes (40) which are arranged at regular intervals, and

a wing (42) is rotatably mounted to an edge of a

sidewall of the body (36a) of the spray nozzle assembly (36) via a hinge (41), with a locking piece (42a) protruding from the wing to be detachably locked to a corresponding locking hole (40), and fastening parts (43, 44) are provided to outer ends of the wing (42) in such a way as to be detachably fastened to each other, thus preventing removal from the air feeding pipe (34).

【Claim 6】

The road line-marking vehicle according to claim 1, wherein the marking-material spray means (30) is moved in a predetermined direction by feeding means (50) which is provided at a predetermined position on the vehicle.

【Claim 7】

The road line-marking vehicle according to claim 6, wherein the feeding means (50) comprises:

X-axis feeding means (52) for feeding the marking-material spray means (30) in a lengthwise direction of the vehicle (1), which is an X-axis direction;

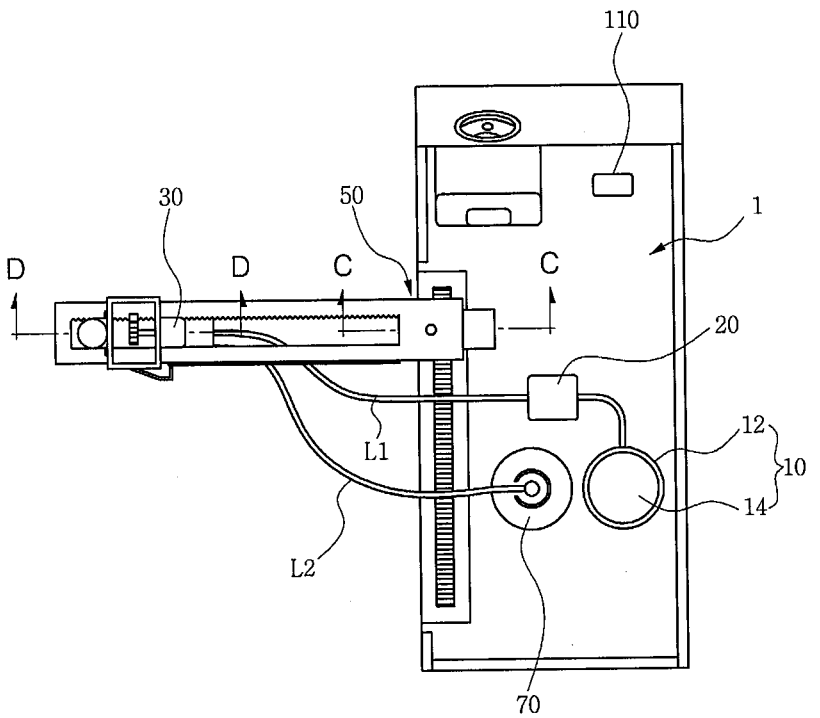
Y-axis feeding means (56) for feeding the marking-material spray means (30) in a transverse direction of the vehicle (1), which is a Y-axis direction; and

elevating means (60) for moving the marking-

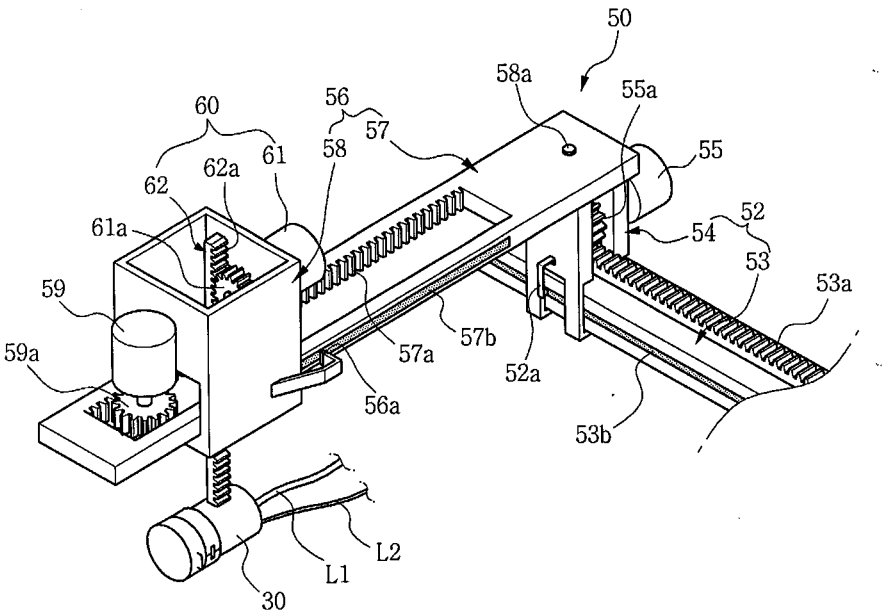
material spray means (30) up and down.

【DRAWINGS】

【Figure 1】



【Figure 2】



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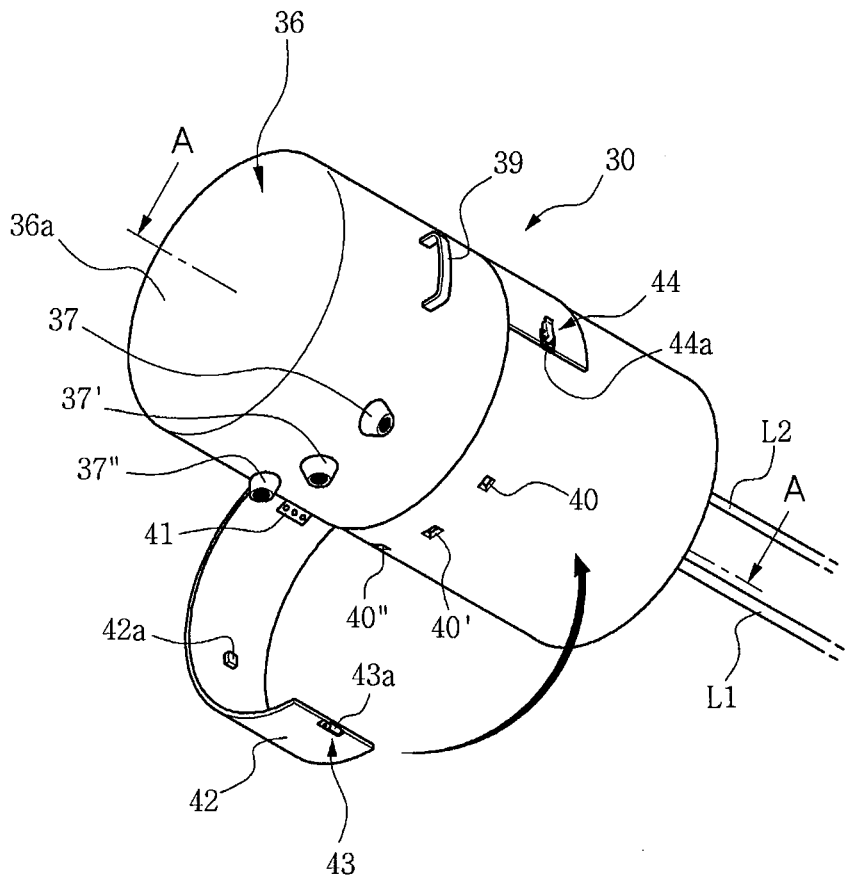

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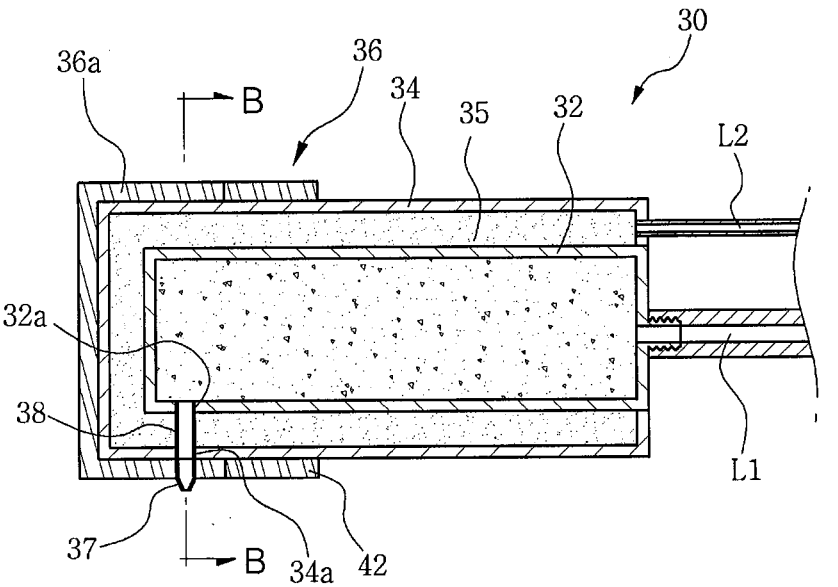

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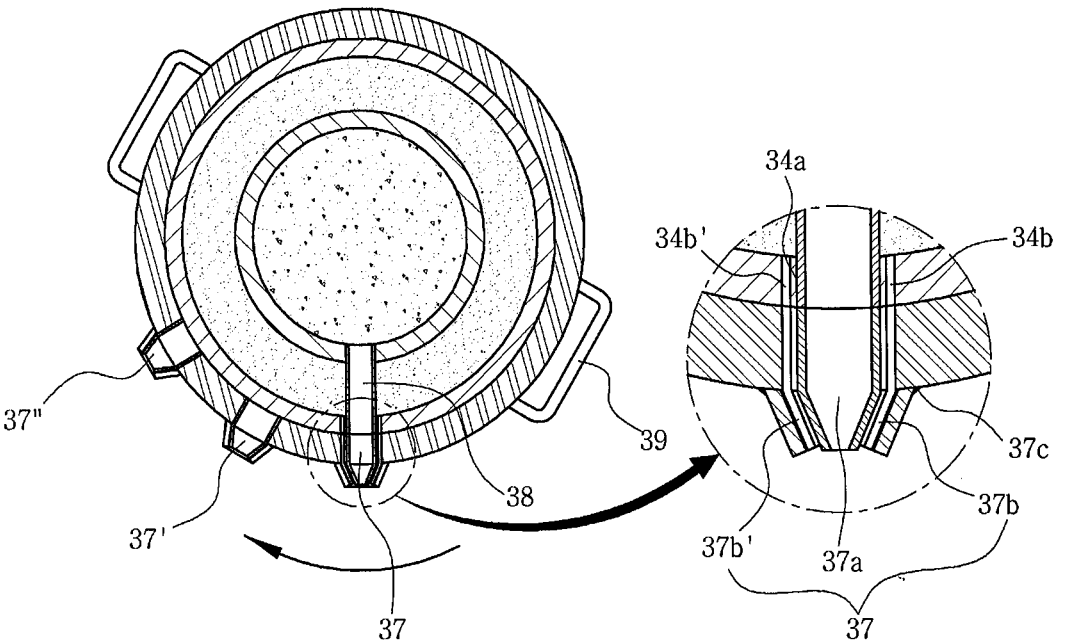

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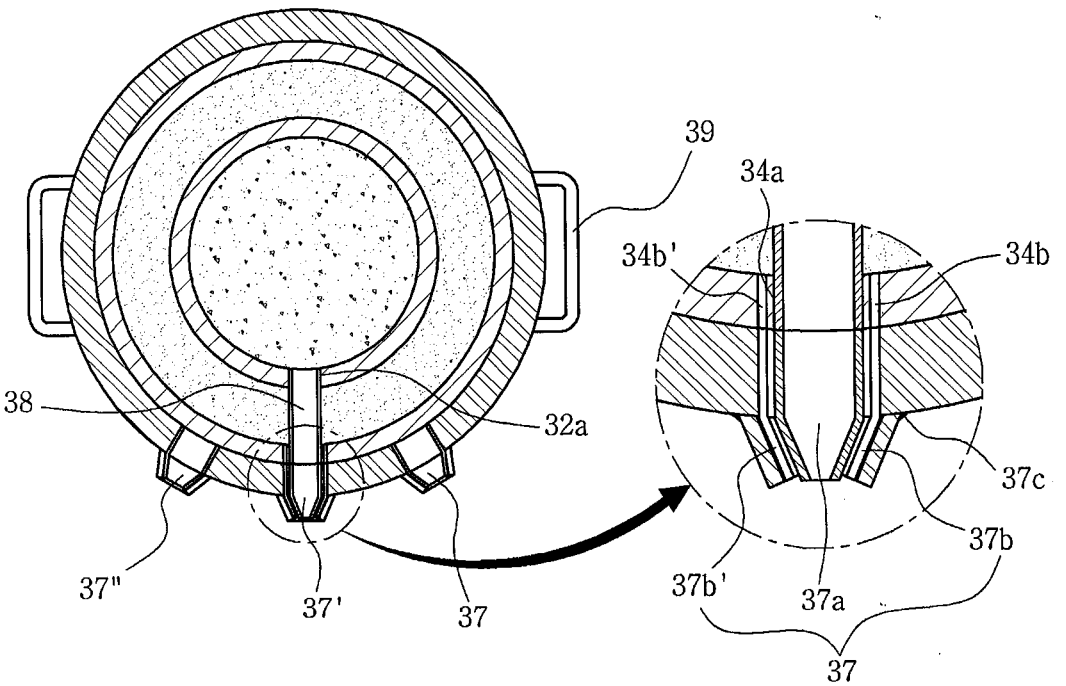
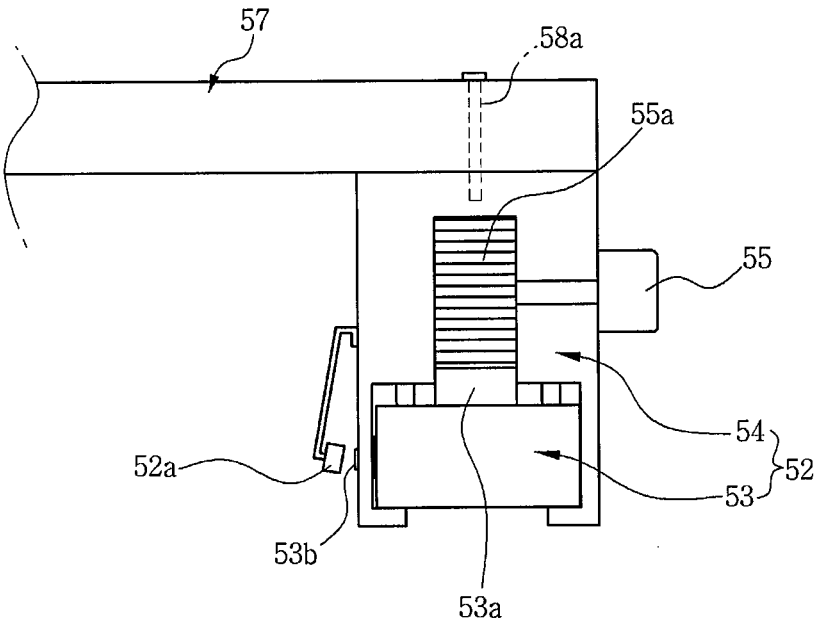
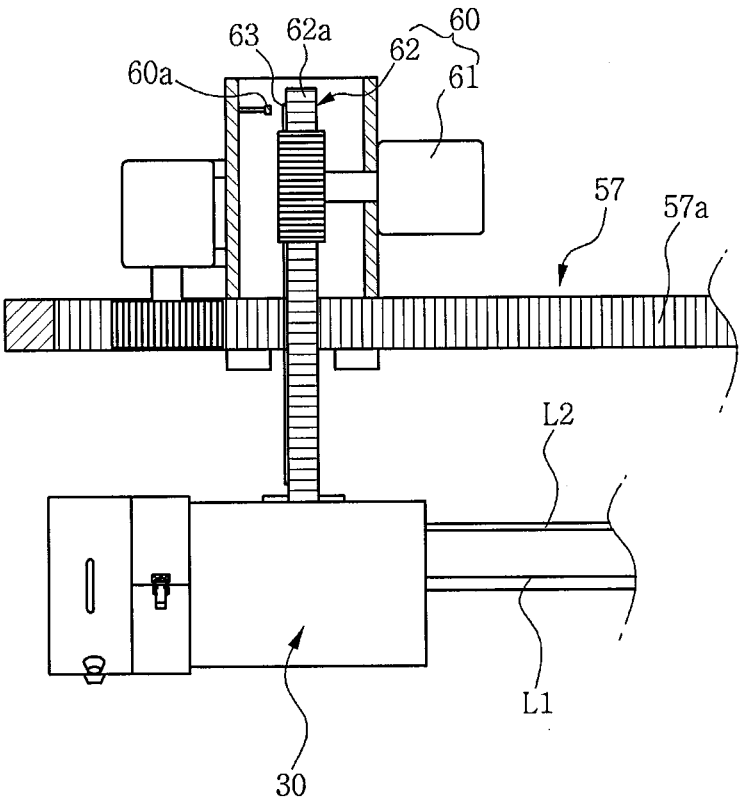


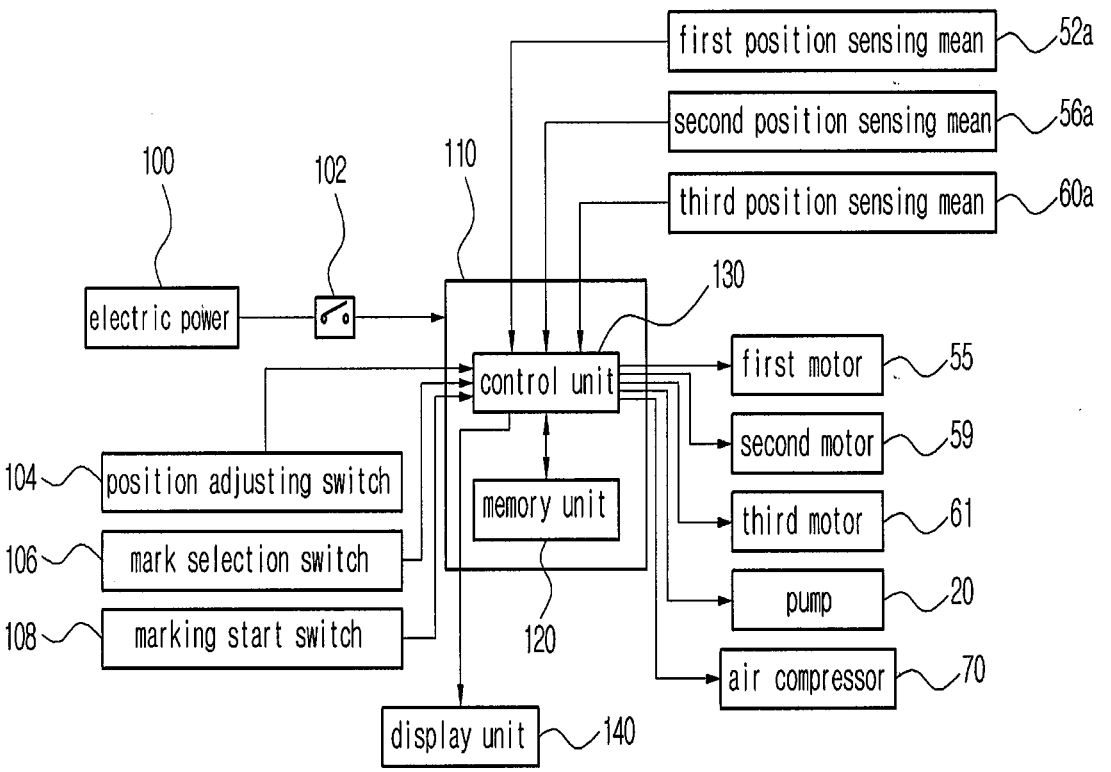
【Figure 7】



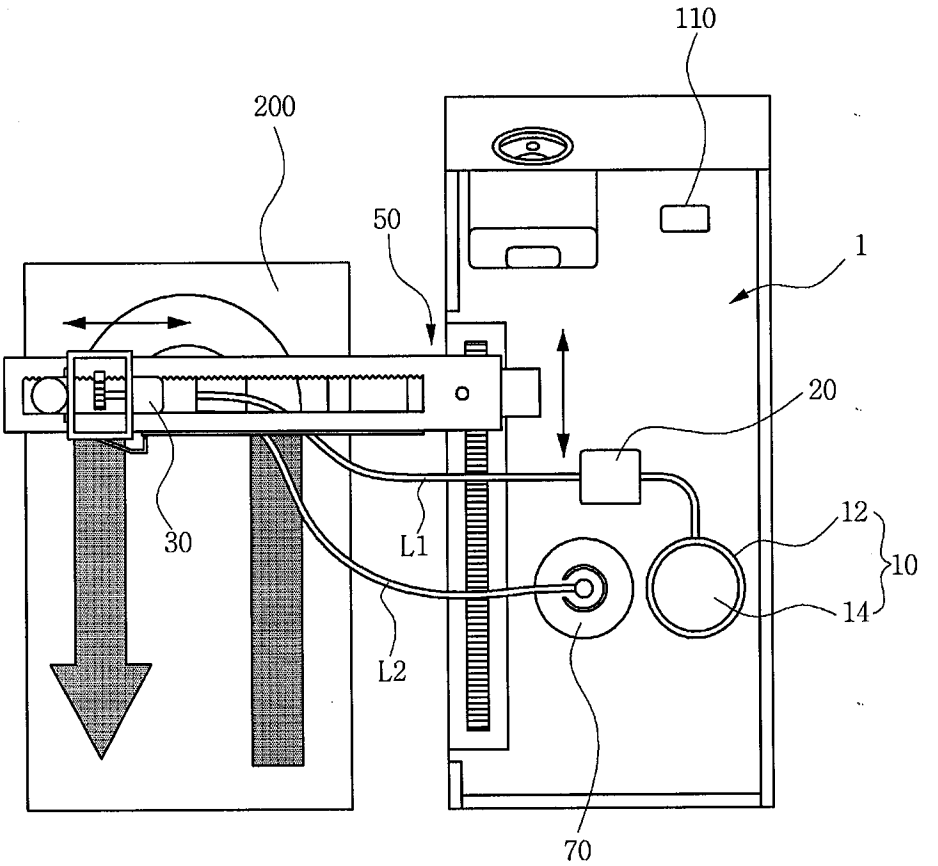
【Figure 8】



【Figure 9】


first position sensing mean
52a
second position sensing mean
56a
third position sensing mean
60a
100
102
110
130
electric power
control unit
first motor
55
second motor
59
third motor
61
pump
20
air compressor
70
104
position adjusting switch
106
mark selection switch
108
marking start switch
memory unit
120
display unit
140

【Figure 10】



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2006/003035

A. CLASSIFICATION OF SUBJECT MATTER

E01C 23/16(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC8 E01C 23/16, B05B 1/10, 1/20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR, JP: IPC as above

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)

e-KIPASS (KIPO internal) & keywords: mark, pump, spray, compressor

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2003-0058930 A (CHOI , JANG-SUN) 7 July 2003 See claims 1-14, and Figs. 1-13.	1-4, 6-7
Y	KR 20-0206219 Y1 (HA, HONG-SIK) 1 December 2000 See page 2, line 10 - page 2, line 34, and Figs. 1-3.	1-4, 6-7
Y	JP 03-119447 U (KABUSIKI KAISHA MARUYAMA SESAKUSHO) 10 December 1991 See Figs. 1-6.	1-4, 6-7
Y	US 5486067 A (HUYNH ET AL.) 23 January 1996 See column 5, line 5 - column 5, line 20, and Figs. 2, 4.	6-7
A	US 5722593 A (JEFF R. MCKENZIE) 3 March 1998 See the abstract.	1-7
A	US 2005/0081783 A1 (HONG, DAEHIE) 21 April 2005 See the abstract.	1-7

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 NOVEMBER 2006 (10.11.2006)	**13 NOVEMBER 2006 (13.11.2006)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	JEONG, Kyu Young Telephone No. 82-42-481-8124

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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