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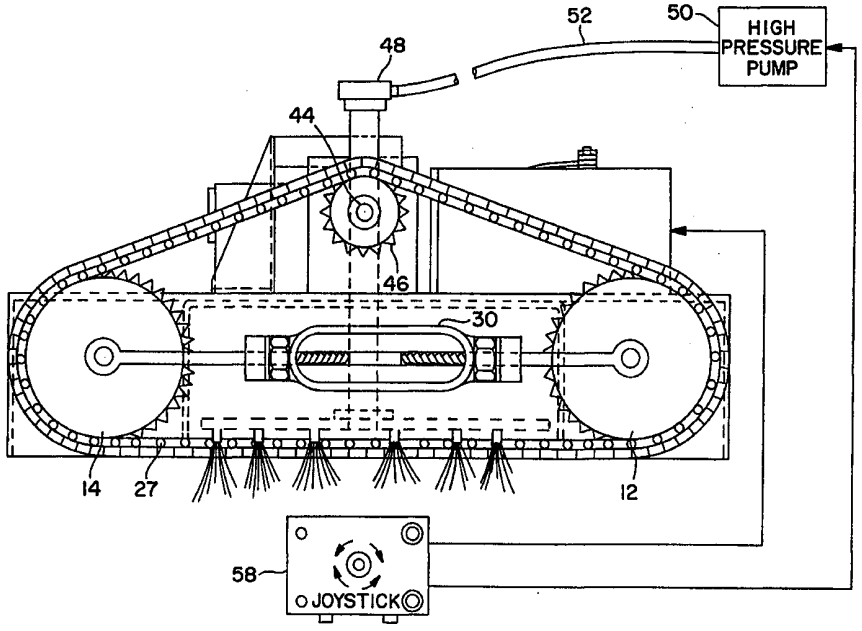

(57) Abstract

A remotely controlled pressurized liquid dispensing mobile unit having a pair of magnetic tracks by which the unit is attracted to and moved along a metallic body to which the pressurized liquid is dispensed.

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REMOTELY CONTROLLED PRESSURIZED LIQUID DISPENSING MOBILE UNIT

TECHNICAL FIELD

The present invention relates, in general, to the treatment of metallic surfaces and, in particular, to the cleaning of large metallic surfaces by the application of water under very high pressure.

BACKGROUND OF THE INVENTION

There are many large metallic structures, such as the hulls of ships, oil storage tanks, gas holders and buildings, which require maintenance. Such maintenance can include cleaning paint, rust and debris from the surface of the structure.

Among the ways these structures are cleaned is grit blasting. Grit blasting is expensive and exposes the operators of the equipment to health hazards.

Another common practice for cleaning large metallic structures is to apply water under high pressure to the surface being cleaned. There are many remotely controlled pressurized water dispensing mobile units in use today for cleaning large metallic surfaces. Generally, these units suffer from one or more shortcomings. Some are very expensive. Others function at much too slow rates. Probably, the most serious shortcoming of such units is that the pressure of the water being dispensed is limited by the "holding" capability of the mobile unit to the surface of the metallic structure being cleaned. As the water pressure is increased, the back pressure tends to separate the mobile unit from the surface being cleaned. Higher pressures are desired because higher pressures increase the effectiveness of the mobile cleaning unit resulting in greater efficiency and reduced costs.

SUMMARY OF THE INVENTION

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, includes a frame having first and second parallel longitudinal sides, first and second gear wheels mounted to the frame at

the first longitudinal side of the frame for rotary movement relative to the frame, and third and fourth gear wheels mounted to the frame at the second longitudinal side of the frame for rotary movement relative to frame. A first endless track having a plurality of magnetic sections extends between and around the first and the second gear wheels for movement parallel to the first longitudinal side of the frame as the first and the second gear wheels undergo rotary movement and a second endless track having a plurality of magnetic sections extends between and around the third and the fourth gear wheels for movement parallel to the second longitudinal side of the frame as the third and the fourth gear wheels undergo rotary movement. Also included in this remotely controlled pressurized liquid dispensing mobile unit are first and second power sources mounted to the frame, first gearing means for coupling the first power source to the first and the second gear wheels to impart rotary movement to the first and the second gear wheels, and second gearing means for coupling the second power source to the third and the fourth gear wheels to impart rotary movement to the third and the fourth gear wheels. This remotely controlled pressurized liquid dispensing mobile unit further includes liquid supply means mounted to the frame for supplying liquid under pressure and liquid dispensing means mounted to the frame for dispensing liquid under pressure. First remote control means selectively actuate the first power source to impart rotary movement jointly to the first and the second gear wheels and the second power source to impart rotary movement jointly to the third and the fourth gear wheels. Second remote control means selectively connect the liquid supply means to the liquid dispensing means.

It will be understood that the present invention can be applied for dispensing pressurized water or other liquids for cleaning large metallic surfaces or for dispensing pressurized paint for painting large metallic surfaces.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a front view of a remotely controlled pressurized liquid dispensing mobile unit constructed in accordance with the present invention.

Figure 2 is a side view of the Figure 1 remotely controlled pressurized liquid dispensing mobile unit.

Figure 3 is a top view of the Figure 1 remotely controlled pressurized liquid dispensing mobile unit.

Figure 4 is a bottom view of the Figure 1 remotely controlled pressurized liquid dispensing mobile unit.

Figure 5 is an exploded perspective view of a component of the Figure 1 remotely controlled pressurized liquid dispensing mobile unit.

DETAILED DESCRIPTION OF THE INVENTION

Referring to Figures 1 through 4, a remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, includes a frame **10** having first and second parallel longitudinal sides **10a** and **10b**, respectively. Frame **10** can be fabricated from a suitable metal and provides support for various components of the remotely controlled pressurized liquid dispensing mobile unit to be described.

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, also includes first and second gear wheels **12** and **14**, respectively, mounted to frame **10** at first longitudinal side **10a** of the frame for rotary movement relative to the frame. First gear wheel **12** is mounted to frame **10** by a first axle **16** which extends through and is fixed to first and second bearings **18** and **20**, respectively, fixed to the frame. First gear wheel **12** is free to rotate on first axle **16**. For improved rotation of first gear wheel **12**, the first gear wheel can be mounted to first axle **16** by an idler bearing (not shown). Second gear wheel **14** is mounted to frame **10** by a second axle **22** which extends through and is fixed to third and fourth bearings **24** and **25**, respectively, fixed to the frame. Second gear wheel **14** is free to rotate on second axle **22**. For improved rotation of second gear wheel **14**, the second gear wheel can be mounted to second axle **22** by an idler bearing (not shown).

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, also includes a first endless track **26** having a plurality of magnetic sections **28** extending between and around first gear wheel **12** and second gear wheel **14** for movement parallel to first longitudinal side **10a** of frame

10 as the first gear wheel and the second gear wheel undergo rotary movement. First endless track 26 includes a first endless chain 27 which engages first gear wheel 12 and second gear wheel 14 and extends between and around the first and the second gear wheels. Magnetic sections 28 of first endless track 26 are treads extending transverse to the direction of movement of the first endless track and have magnetic segments imbedded in the treads of the first endless track similar to the magnetic segments 29 in a second endless track 36 shown in Figure 3. For the embodiment of the invention being described, each tread has four rare earth magnetic segments 29 with the magnetic segments in adjacent treads disposed in opposing polarities. Such an arrangement results in increased magnetic effect. A first turnbuckle 30 serves to properly tension first endless track 26.

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, also includes third and fourth gear wheels 32 and 34, respectively, mounted to frame 10 at second longitudinal side 10b of the frame for rotary movement relative to the frame. Third gear wheel 32 is mounted to frame 10 by first axle 16. Third gear wheel 12 is free to rotate on first axle 16. For improved rotation of third gear wheel 12, the third gear wheel can be mounted to first axle 16 by an idler bearing (not shown). Fourth gear wheel 34 is mounted to frame 10 by a second axle 22. Fourth gear wheel 34 is free to rotate on second axle 22. For improved rotation of fourth gear wheel 34, the fourth gear wheel can be mounted to second axle 22 by an idler bearing (not shown).

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, also includes a second endless track 36 having a plurality of magnetic sections 38 extending between and around third gear wheel 32 and fourth gear wheel 34 for movement parallel to second longitudinal side 10b of frame 10 as the third gear wheel and the fourth gear wheels undergo rotary movement. As with first endless track 26, second endless track 36 includes a second endless chain (not shown) engaging third gear wheel 32 and fourth gear wheel 34 and extending between and around the third and the fourth gear wheels. Magnetic sections 38 of second endless track 36 are treads extending transverse to the direction of movement of the

second endless track and have magnetic segments **29** imbedded in the treads of the second endless track. As with first endless track **26**, a second turnbuckle (not shown) serves to properly tension second **36** endless track **26**.

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, further includes a first power source **42** and a second power source **43** both mounted to frame **10**. Power sources **42** and 43 preferably are electric motors.

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, further includes first gearing means for coupling first power source **42** to first gear wheel **12** and second gear wheel **14** to impart rotary movement to the first and the second gear wheels. The first gearing means can be a gear box of conventional design and operation having an output shaft **44** on which is mounted a gear **46** which is engaged by first chain **27** of first endless track **26**. As gear **46** rotates, first gear wheel **12** and second gear wheel **14**, also engaged by chain **27**, rotate.

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, further includes second gearing means for coupling second power source **43** to third gear wheel **32** and fourth gear wheel **34** to impart rotary movement to the third and the fourth gear wheels. As with the first gearing means, the second gearing means can be a gear box of conventional design and operation and include a gear similar to gear **46** which is engaged by the chain of the second endless track **36** to couple second power source **43** to third gear wheel **32** and fourth gear wheel **34** to impart rotary movement to the third and the fourth gear wheels.

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, further includes liquid supply means mounted to frame **10** for supplying liquid under pressure. For the embodiment of the invention being described, a high pressure swivel **48** is connected to a remotely located high pressure pump **50** by a hose **52** to receive liquid under high pressure from the high pressure pump.

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, further includes liquid dispensing means mounted to frame **10** for dispensing liquid under pressure. As shown most clearly in Figure 4, the liquid dispensing means, for the embodiment of the invention being described, include a spray bar **54** having a plurality of nozzles **56** through which liquid, supplied from high pressure swivel **48** under high pressure, is dispensed. Spray bar **54** is mounted for rotary movement by suitable means.

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, further includes first remote control means for selectively actuating first power source **42** and second power source **43** impart rotary movement jointly to first gear wheel **12** and second gear wheel **14** and to impart rotary movement jointly to third gear wheel **32** and fourth gear wheel **34**. In particular, the first control means can be a joy stick **58** of conventional construction and operation which transmits signals to a control panel which causes the first power source **42** and the second power source **43** to be actuated. For example, when joy stick **58** is pushed forward, both first power source **42** and second power source **43** are actuated to cause first gear wheel **12** and second gear wheel **14** to rotate in a first direction and third gear wheel **32** and fourth gear wheel **34** to rotate in the same direction with the result that the mobile unit moves forward. The mobile unit will move backwards when joystick **58** is pulled backwards. When joystick 58 is pushed to one side, only one of the power sources is actuated to impart rotary movement to the associated gear wheels with result that the mobile vehicle will turn in a first direction and when joystick **58** is pushed to the other side, only the other power source will be actuated to impart rotary movement to the associated gear wheels with result that the mobile vehicle will turn in a second direction opposite to the first direction.

A remotely controlled pressurized liquid dispensing mobile unit, constructed in accordance with the present invention, further includes second remote control means for selectively connecting the liquid supply means, namely liquid under pressure from high pressure pump **50** through hose **52** to high pressure swivel **48** to the liquid dispensing means, namely spray bar **54**. For the embodiment of the invention

being described, such second control means include a connection between joystick **58** and high pressure pump **50** by which a signal, generated, for example, by the closing of a switch on the joystick is transmitted to the high pressure pump to cause the deliver of high pressure liquid from the high pressure pump through hose **52** to high pressure swivel **48**.

Figure 5 shows a preferred construction of the treads of endless tracks **26** and **36**. Each tread is composed of a frame portion **70** and a body portion **72**. Magnetic segments **29** are received in openings **74** in frame portion **70**. Openings **74** and magnetic segments **29** are sized so that the openings are smaller than the magnetic segments. Magnetic segments **29** are forced into openings **74** under very high forces so that the magnetic segments are held firmly in place in frame portion **70**. Next, frame portion **70** is attached to body portion **72** by suitable means, such as two screws, to form the tread.

While in the foregoing there have been described preferred embodiments of the present invention, it should be understood by those skilled in the art that various modifications and changes can be made without departing from the true spirit and scope of the present invention.

What is Claimed:

1. A remotely controlled pressurized liquid dispensing mobile unit comprising:

a frame having first and second parallel longitudinal sides;

first and second gear wheels mounted to said frame at said first longitudinal side of said frame for rotary movement relative to said frame;

a first endless track having a plurality of magnetic sections extending between and around said first and said second gear wheels for movement parallel to said first longitudinal side of said frame as said first and said second gear wheels undergo rotary movement;

third and fourth gear wheels mounted to said frame at said second longitudinal side of said frame for rotary movement relative to said frame;

a second endless track having a plurality of magnetic sections extending between and around said third and said fourth gear wheels for movement parallel to said second longitudinal side of said frame as said third and said fourth gear wheels undergo rotary movement;

a first power source mounted to said frame;

a second power source mounted to said frame;

first gearing means for coupling said first power source to said first and said second gear wheels to impart rotary movement to said first and said second gear wheels;

second gearing means for coupling said second power source to said third and said fourth gear wheels to impart rotary movement to said third and said fourth gear wheels;

liquid supply means mounted to said frame for supplying liquid under pressure;

liquid dispensing means mounted to said frame for dispensing liquid under pressure;

first remote control means for selectively actuating:

(a) said first power source to impart rotary movement jointly to said first and said second gear wheels, and

(b) said second power source to impart rotary movement jointly to said third and said fourth gear wheels; and

second remote control means for selectively connecting said liquid supply means to said liquid dispensing means.

2. A remotely controlled pressurized liquid dispensing mobile unit according to claim 1 wherein:

(a) said first endless track includes a first endless chain engaging said first and said second gear wheels and extending between and around said first and said second gear wheels,

(b) said magnetic sections of said first endless track are treads extending transverse to the direction of movement of said first endless track and have magnetic segments imbedded in said treads of said first endless track,

(c) said second endless track includes a second endless chain engaging said third and said fourth gear wheels and extending between and around said third and said fourth gear wheels, and

(d) said magnetic sections of said second endless track are treads extending transverse to the direction of movement of said second endless track and have magnetic segments imbedded in said treads of said second endless track.

3. A remotely controlled pressurized liquid dispensing mobile unit according to claim 2 wherein:

(a) said first and said third gear wheels are mounted to said frame by a first axle about which said first and said third gear wheels rotate, and

(b) said second and said fourth gear wheels are mounted to said frame by a second axle about which said second and said fourth gear wheels rotate.

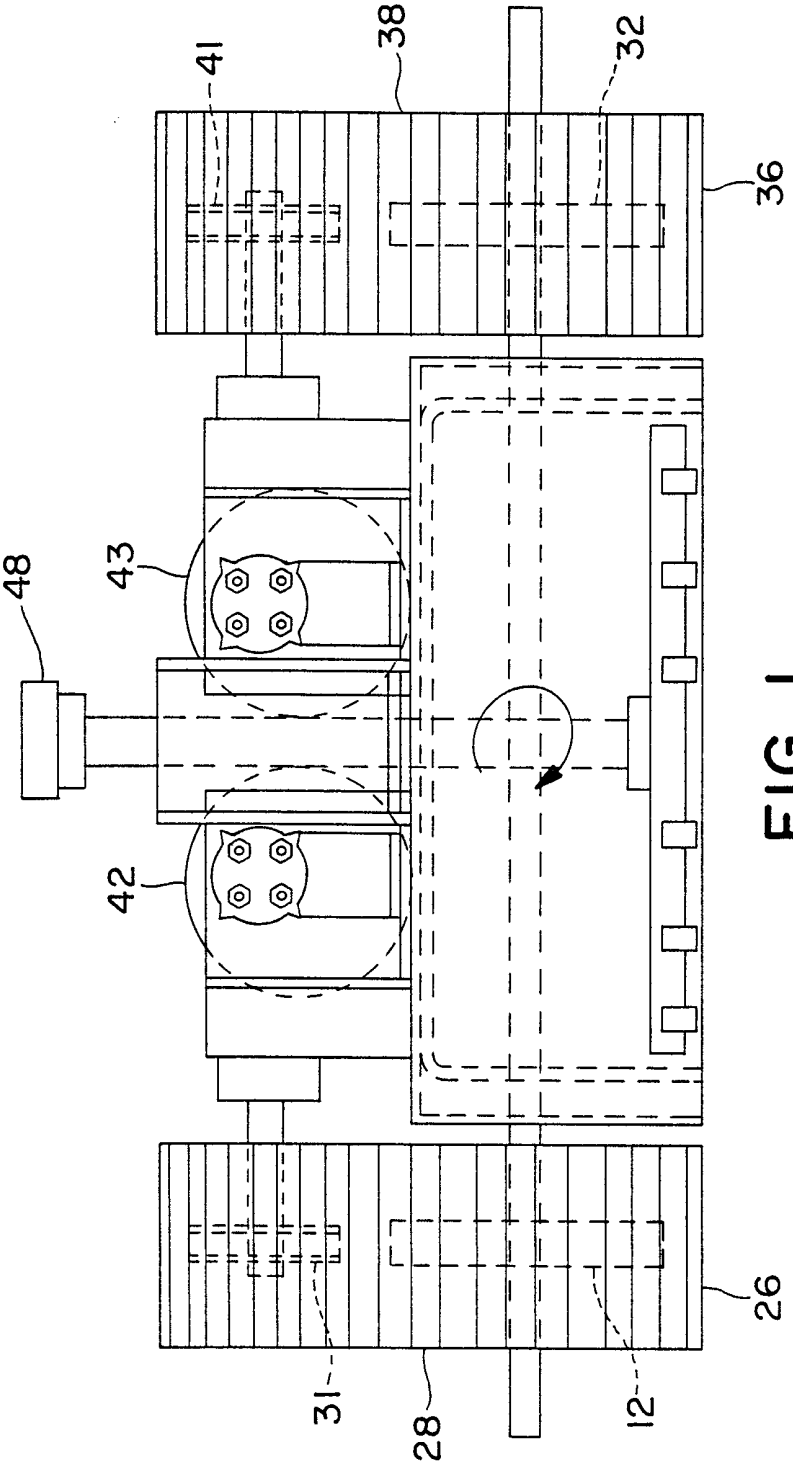


FIG. 1

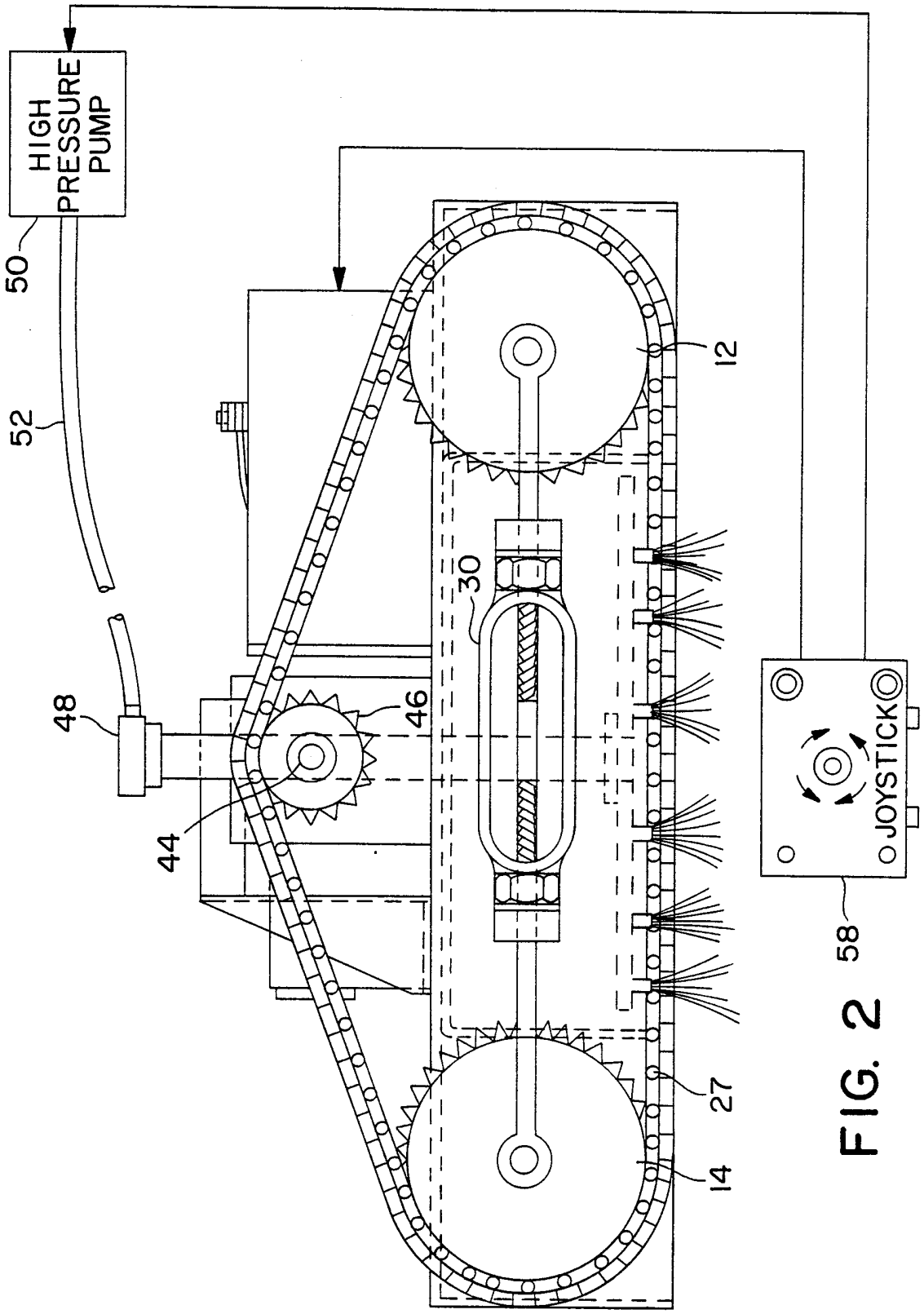


FIG. 2

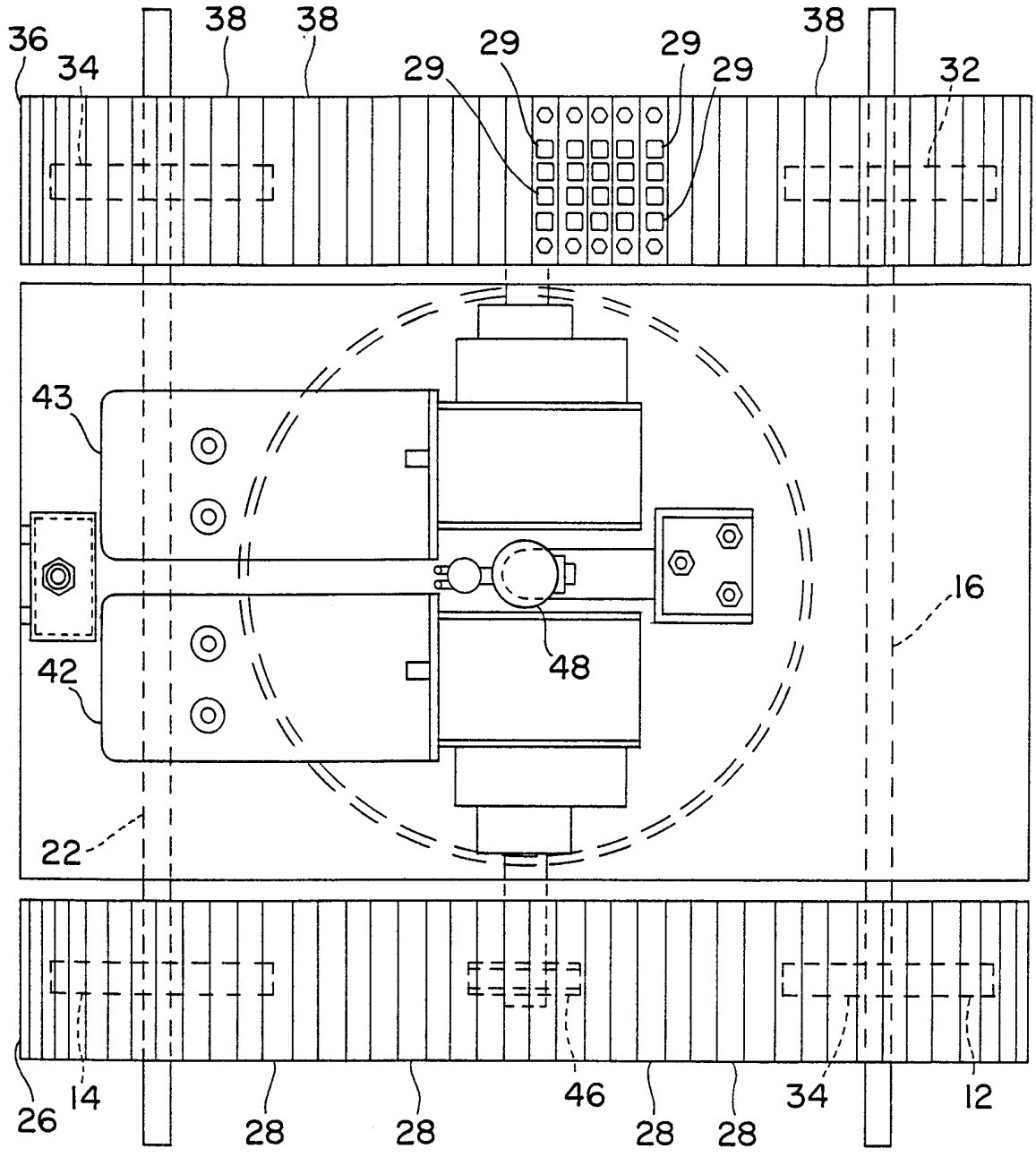


FIG. 3

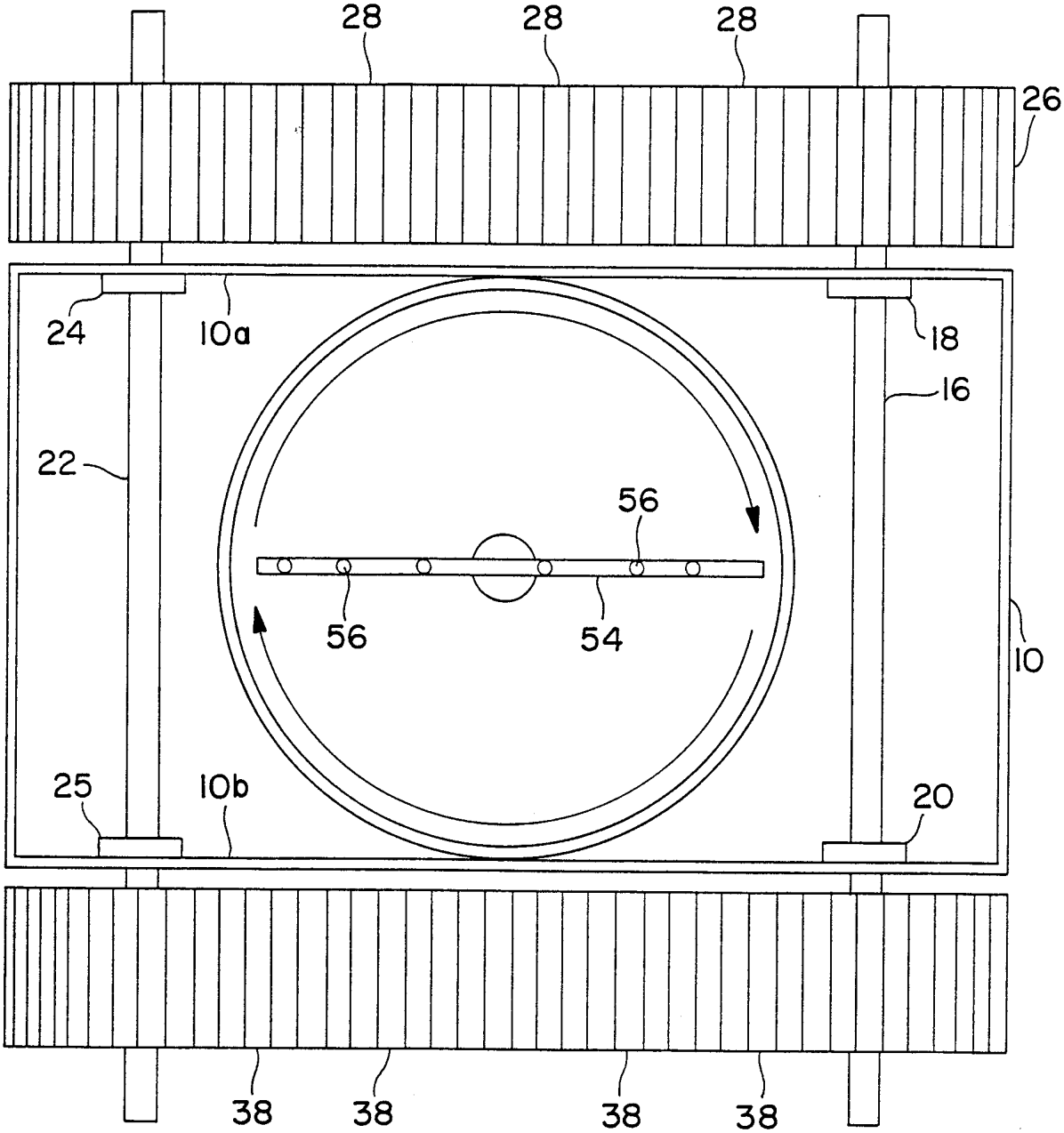
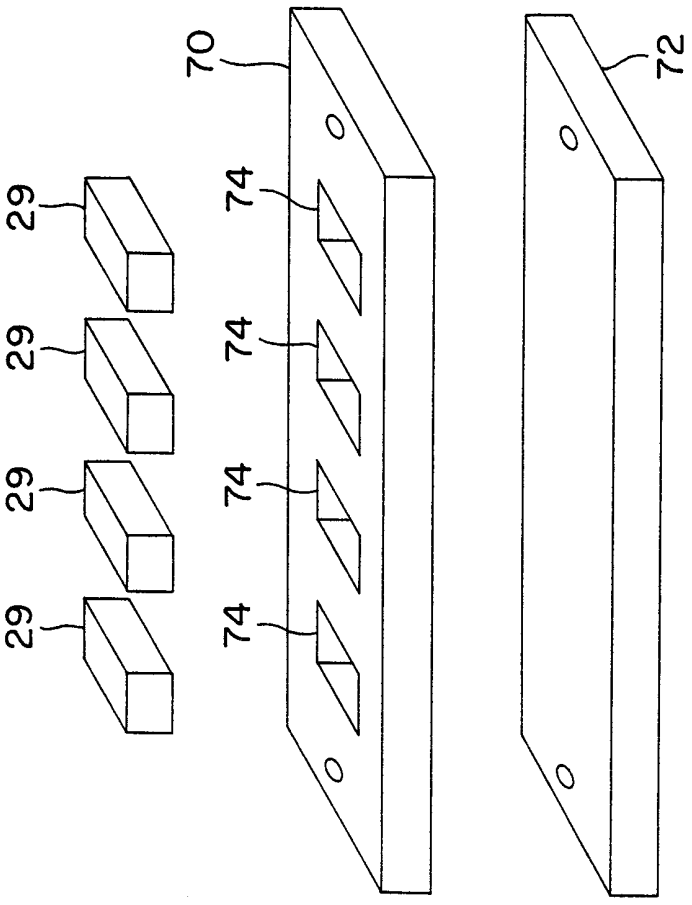


FIG. 4

FIG. 5



INTERNATIONAL SEARCH REPORT

Inte nal Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B08B3/02 B62D55/265

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Minimum documentation searched (classification system followed by classification symbols)
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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 716 006 A (GESTA) 12 June 1996 see column 4, line 57 - column 6, line 52 see column 9, line 27 - line 55	1,2
Y	see claims 5,6,10,11,16; figures 1,3	3
Y	US 5 037 486 A (SLOAN) 6 August 1991 see column 6, line 31 - line 42 see figures 6,7,12	3
X	US 4 890 567 A (CADUFF) 2 January 1990 see column 3, line 36 - column 4, line 36 see column 5, line 29 - column 8, line 13	1
Y	see figures	2,3
Y	US 5 561 883 A (LANDRY) 8 October 1996 see the whole document	2,3

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Category	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 93 11 720 U (SCHLICK) 28 October 1993 see page 9, line 6 - page 14 see claims 1-9; figures	1,2
Y	US 5 285 601 A (WATKIN) 15 February 1994 see column 2, line 27 - column 3, line 32 see column 6, line 58 - line 66 see figures 1-4	1,2

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Information on patent family members

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