

Dec. 18, 1951

K. E. ARVEDLUND
SPRAY PAINTING APPARATUS

2,579,357

Filed Sept. 10, 1946

2 SHEETS—SHEET 1

Fig. 1

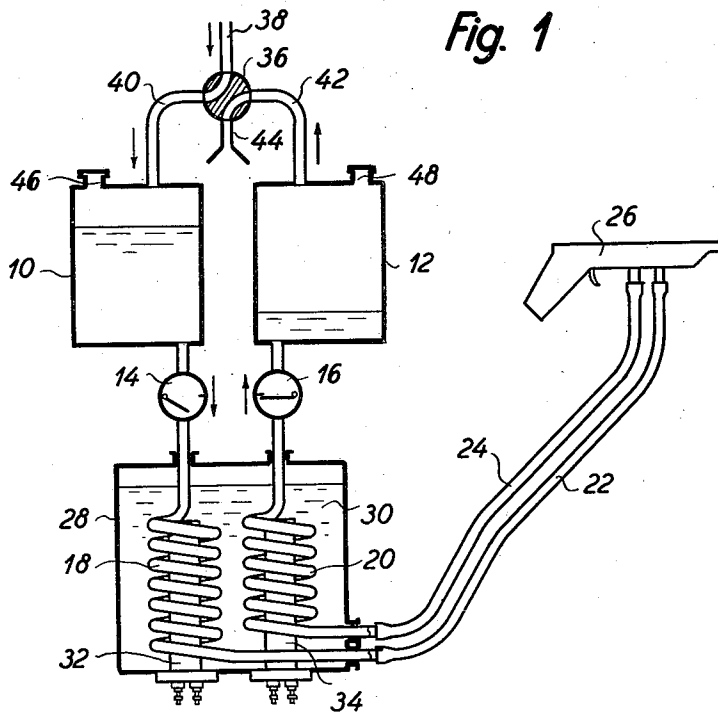
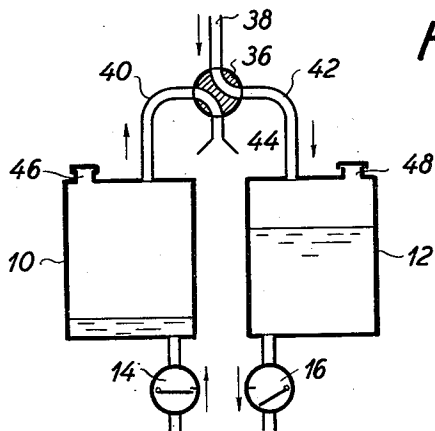


Fig. 2



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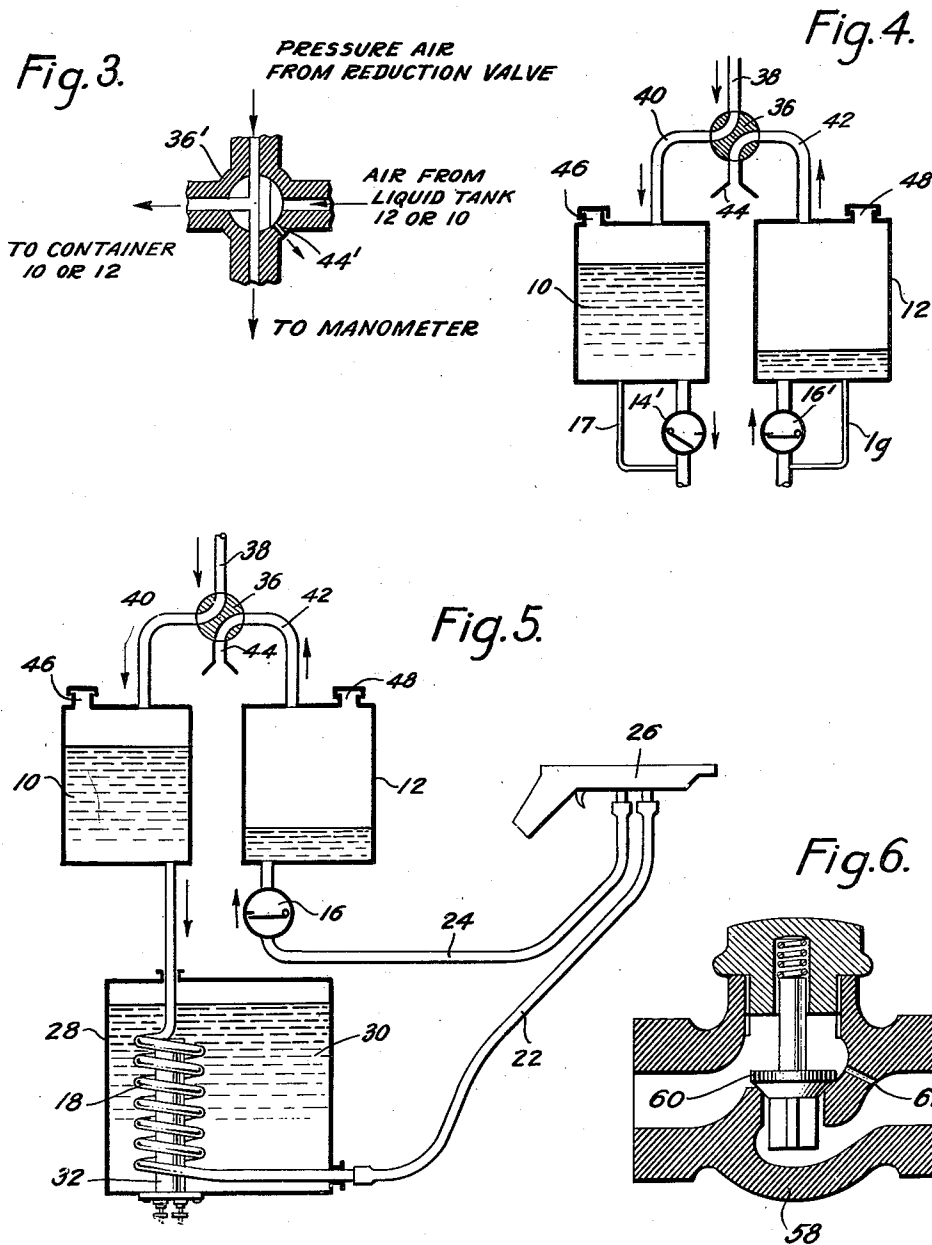
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UNITED STATES PATENT OFFICE

2,579,357

SPRAY PAINTING APPARATUS

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Application September 10, 1946, Serial No. 695,876
In Denmark September 1, 1945

Section 1, Public Law 690, August 8, 1946
Patent expires September 1, 1965

4 Claims. (Cl. 299—58)

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The present invention relates generally to pressure sprays and more specifically to a pressure air spray painting apparatus comprising a storage container for the paint, a spraying device, a conduit connecting the storage container to the spraying device, and emerging in the storage container below the level of the paint therein, means for heating the paint, a receiving container and a second conduit connecting the spraying device to the receiving container, to which the excess of paint not wanted in the spraying device is fed.

In known apparatus of this kind the paint circuit is arranged by means of conduits between the storage container and the receiving container, the paint being held in circulation by means of a special pump unit.

It is an object of the present invention to improve the apparatus of the kind referred to by utilizing the air pressure which is required for spraying the paint, at the same time for circulating the liquid. Thus the special pump unit used in known apparatus becomes superfluous and can be omitted, whereby the apparatus is considerably simplified.

Another object of the invention is the use of means for admitting air pressure in the space above the level of the paint in a first (storage) container in combination with means for creating a suitable counter-pressure against the flow of paint from the spraying device to a second (receiving) container in an air pressure painting apparatus of the type referred to. This counter-pressure permits the pressure required for the spraying to be maintained in the spraying device.

Still another object of the invention is the provision of a valve mechanism whereby the air pressure can, alternatively, be admitted to the receiving container in order to force the paint from the receiving container through the conduits connected to the spraying device back to the storage container.

A further object of the invention is to adapt the apparatus in such a manner, that the two containers may be alternately used as storage container or as recipient.

Other features and advantages will hereinafter appear in the following detailed discussion of preferred embodiments of the invention taken together with the drawings in which:

Figure 1 is a diagrammatic view of the air pressure spray painting apparatus;

Figure 2 is a partial view of the apparatus of Figure 1 with valves used therein in a different position;

Figure 3 is a partial sectional view, on an en-

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larged scale, of an alternative form of valve means;

Figure 4 is a diagrammatic view of another embodiment of the apparatus;

Figure 5 is a diagrammatic view of a further embodiment of the apparatus, and

Figure 6 is a sectional view of a non-return valve used in the apparatus as means for creating counter-pressure therein.

The apparatus, as shown in the drawings, consists of two paint containers 10 and 12 which are connected through counter-pressure creating non-return valves 14 and 16, respectively, and pipe coils 18 and 20, respectively, to two rubber hoses 22 and 24, respectively, leading to a spray gun 26. The pipe coils 18 and 20 are arranged in a common container 28 containing a liquid 30 adapted to be heated by means of electrical heating elements 32 and 34.

The apparatus includes a valve 36 connected to a compressed airline 38 and connected through lines 40 and 42 to the two paint containers, 10 and 12, respectively. The valve 36 also has an air relief opening 44.

In the position of the valve 36 shown in Figure 1, the compressed-air line 38 communicates with the line 40 leading to the container 10, the container 12 communicating through line 42 with the air relief opening 44. Thus the full air pressure acts on the surface of the paint in the container 10 and the paint is driven through the non-return valve 14, the pipe coil 18 and the hose 22 to the gun 26 from which the paint that is not used in the gun is returned to the apparatus through the hose 24, the pipe coil 20 and the non-return valve 16 to the container 12. Both non-return valves 14 and 16 are adapted to be opened towards the pipe coils 18 and 20, respectively. Therefore, in Figure 1 the valve 14 will be open, the valve 16 being closed. The valves 14 and 16 are so constructed, however, that in the closed position they are not tight thus providing a throttle opening.

As shown in Figure 6 such a valve can comprise a housing 58, in which a spring-operated valve-cone 60 is pressed onto its seat. The throttle opening is provided by a passage 62 in the housing and which connects the inlet side of the valve with its outlet side.

Thus the paint returned cannot flow unhindered into the container 12 but in the valve 16 a counter-pressure arises so that in the gun 26 a sufficient pressure can be obtained for spraying the paint.

When the container 10 has been emptied, the valve 36 is switched to the position shown in

Figure 2. Now the compressed-air line 38 communicates with the container 12, the container 10 communicating with the air relief opening 44. The paint previously supplied to the container 12 will now be led through the valve 16, the pipe coil 20 and the hose 24 to the gun 26, the excess of paint being returned to the container 10 through the hose 22, the pipe coil 18 and the non-return valve 14. In this case the valve 16 will be open and the valve 14 closed, apart from the aforementioned throttle opening. Thus the apparatus works as previously described, with the difference that now the paint is led from the container 12 to the container 10.

Thus the two containers 10 and 12 alternatively work as storage containers for the paint supplied and as recipients for the paint returned. Whenever, the storage container is empty or nearly empty the valve 36 is switched, which can be effected very rapidly, so that there are no interruptions in operation.

The fact that an ample amount of paint is constantly flowing through the hoses 22 and 24 insures that there will always be sufficient hot paint for spraying through the gun 26.

Each of the containers 10 and 12 is provided with a paint filter opening 46 and 48, respectively. It is necessary that the openings be closed air-tight.

In the apparatus disclosed, the non-return valves 14 and 16 may be omitted, if desired, and the counter-pressure on the paint returned may be provided above the liquid level in the recipient instead of in the paint flow.

In that case the means for creating a suitable counter-pressure against the flow of excess of paint from the spraying device to the receiving container, less than the air pressure in the storage container, comprises a valve 36' (Figure 3), used in place of the valve 36 shown in Figures 1 and 2. In the embodiment shown in Figure 3 the broad air relief opening 44 of the valve 36 is replaced by a sufficiently narrow opening 44' to ensure the establishment of a suitable counter-pressure in the container 10 or 12, when the paint is returned from the spray gun 26 to any of these containers. The remainder of the apparatus in this case can be exactly the same as that shown in Figure 1, except for the omission of valves 14 and 16, so that the pipe coils 18 and 20, respectively, directly lead into the containers 10 and 12, respectively.

Furthermore, the throttle opening in the flow of return paint need not necessarily be provided in the closed non-return valve but it may be provided in a conduit arranged parallel to the valve. An embodiment of this kind is shown in Figure 4, in which only the containers 10 and 12 and the pertaining valves are shown, since the remainder of the spraying apparatus is identical with that shown in Figure 1. In this embodiment non-return valves 14' and 16' are used, but in this case both valves will close tightly so that no throttle opening is formed for permitting the passage of the liquid to be returned to container 10 or 12, as the case may be. In this case the liquid passes through the narrow passage 17 or 19, respectively, when either valve 14 or 16 is closed. These passages provide the means for creating a suitable counter-pressure against the flow of the excess of paint, and the liquid is returned to either container 10 or container 12 depending on the positioning of the valve 36.

In the embodiment shown in Figure 5, the non-return valve 14 is omitted, so that no counter-

pressure will be established in container 10 when liquid is returned from container 12 through valve 16, line 24, spray gun 26, line 22 and coil 18 into the container 10. In this case the container 10 will always be the storage container during spraying, and the container 12 will always be the receiving container into which the excess of paint will be led. When the container is empty or whenever the container 12 is considered to contain a sufficient quantity of the excess of paint from the gun 26, the paint will be rapidly returned from the container 12 to the container 10 by changing the position of the valve 36 so as to lead the pressure air from line 38 into the container 12, whereby the valve 16 will be opened. During this return period the gun 26 cannot be used owing to lack of counter-pressure, which, however, is of no importance as the period is very short. In this case the pipe coil 20 may be dispensed with, as it is not necessary to heat the paint during its return movement. Thus the hose 24 can be connected directly to the valve 16.

It is to be understood that the invention is not limited to the precise construction shown but that other constructions, arrangements of parts, details, features or the like, can be utilized without departing from the scope of the invention as set forth in the appended claims.

I claim:

1. An air pressure spray painting apparatus comprising a storage container for paint to be sprayed, means for heating the paint, a spraying device, a conduit connecting said storage container to said spraying device and emerging in said storage container below the level of the paint therein, a receiving container and a second conduit connecting said spraying device to said receiving container so as to allow excess of paint from the spraying device to be led to the receiving container, the apparatus being provided with means for admitting the air pressure in said storage container in the space above the level of the paint therein so as to expel the paint from said container into the conduit leading to said spraying device, and means for creating a suitable counter-pressure against the flow of paint from said spraying device to said receiving container inferior to the air pressure in said storage container.

2. Apparatus according to claim 1, and wherein the inlet to said receiving container is provided with a throttle opening.

3. An air pressure spray painting apparatus comprising a storage container for paint to be sprayed, means for heating the paint, a spray gun, a conduit connecting said storage container to said spray gun and emerging in said storage container below the level of the paint therein, a receiving container and a second conduit connecting said spray gun to said receiving container so as to allow excess of paint from said spray gun to be led to said receiving container, the apparatus being provided with means for admitting the air pressure in said storage container in the space above the level of the paint therein so as to expel the paint from said container into the conduit leading to said spray gun, and means for creating a suitable counter-pressure against the flow of excess of paint from said spray gun to said receiving container inferior to the air pressure in said storage container, and a valve mechanism operable in a manner whereby the pressure air can, alternatively, be admitted in said receiving container above the level of the paint therein in order to

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press the paint from said receiving container through said second conduit, said spray gun, and said first conduit back into said storage container.

4. In an air pressure spray painting apparatus comprising two paint containers, a spray gun and conduits connecting said spray gun to each of said containers in a manner whereby the paint can be circulated from one of said containers, the storage container, through said spray gun to the other said container, the receiving container, means for creating air pressure in one of said containers above the level of the paint therein, and valve means adapted to alternately create the air pressure in either of said containers so that both said containers may be alternately used as a storage container for the paint,

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both containers being provided with means for creating a counter-pressure in the conduit connecting said container to said spray gun where the said container serves as a receiving container.

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