Jan. 20, 1953 L. W. LAMMIMAN 2,626,122

SPRAY GUN VALVE

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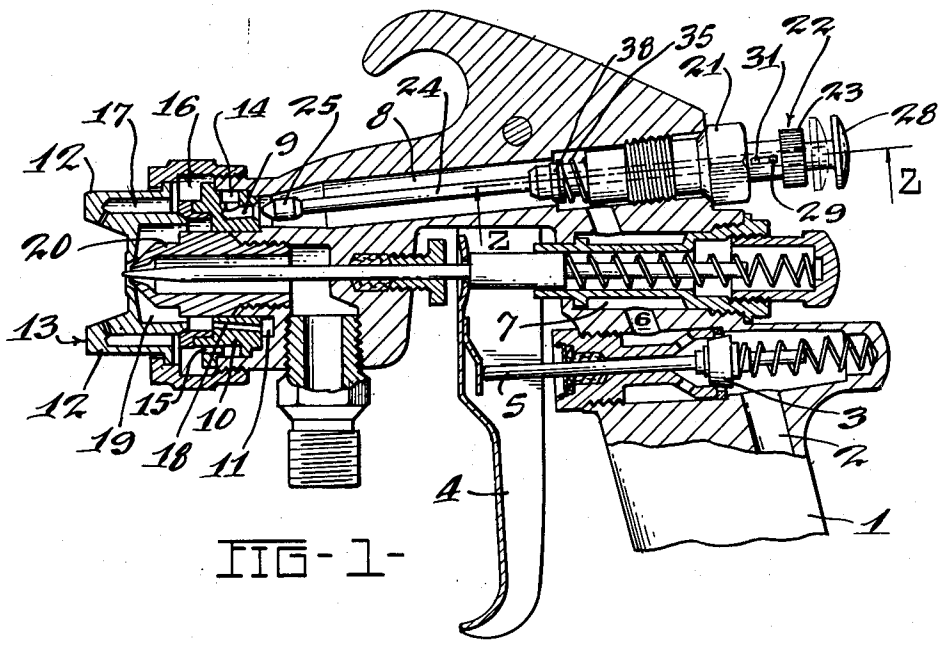


FIG-1-

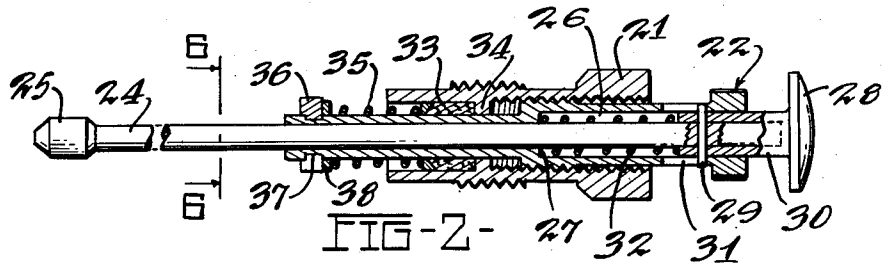


FIG-2-

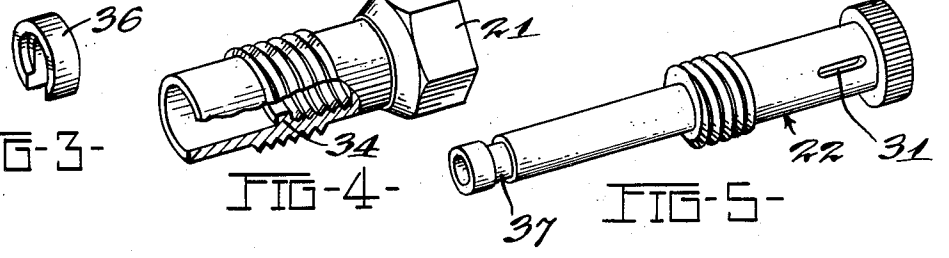


FIG-3-

FIG-4-

FIG-5-

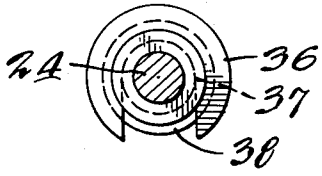


FIG-6-

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SPRAY GUN VALVE

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4 Claims. (Cl. 251—2)

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This invention relates to air valves for spray guns utilizing compressed air for atomizing the spray material and for diametrically opposed air jets for flattening the atomized material stream into fan shape. In order to secure spray patterns of various widths adaptable for effectively coating surfaces of different areas, it is customary to have an adjustable valve in the passage delivering air for such jets. The flattening force of the air jets is reduced or increased by closing or opening movement of the valve.

As usually constructed this valve has a tapered inner end which seats within the air passage, a threaded shank by which it is rotatably mounted, and an external knurled head for manual adjustment. In order to provide a broad range of adjustment a relatively fine thread is utilized. It is thus possible to set the valve for a very particular flow of air that will shape the spray pattern most suitably for a certain type of surface.

In many spray finishing operations the character of the products being coated is such that a single width of spray is satisfactory for all purposes. However, in other finishing processes, there are occasional surfaces of restricted area, for which a wide spray pattern, selected for a major part of the coating work, is not suitable.

Since excessive waste from overspray or too heavy a coating results from the use of too wide a spray pattern, under such circumstances it is desirable for the operator to temporarily screw the spray width valve at least part way toward a closed position. He must subsequently carefully open it again to the predetermined setting considered best for the predominant type of surfaces. Because of the fine thread on the valve shank, considerable rotary movement is required in this closing and opening of the valve and valuable time is lost in the accompanying interruption of the spraying operation.

The purpose of my invention is the provision of a valve structure for controlling the air delivered to flattening jets in a spray gun in which the advantage of close adjustment is retained and which in addition has means for easy and rapid manual closing and self-opening movement of the valve with stop means limiting the opening movement to the valve position previously selected for normal use.

This improved action is secured by mounting the valve for both gradual threaded adjustment and independent sliding axial movement. This is accomplished by having an unthreaded valve shank fitting snugly for relative axial movement within an exteriorly threaded rotatable sleeve

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and providing between the valve shank and sleeve a longitudinal slot and pin connection.

An embodiment of my invention is hereafter described in detail and illustrated in the accompanying drawings in which—

Figure 1 is a central vertical longitudinal section of a spray gun incorporating the invention;

Figure 2 is an enlarged longitudinal section of the valve assembly taken on the line 2—2 of Figure 1;

Figure 3 is a perspective view of the horse shoe lock washer which holds the packing spring in place;

Figure 4 is a perspective view with a portion broken away of the valve assembly casing;

Figure 5 is a perspective view of the valve position adjusting sleeve; and

Figure 6 is a sectional view taken on the line 6—6 of Figure 2 through the valve shank.

The spray gun of Figure 1 is a conventional design to which my invention has been adapted. It has a depending handle 1 in which there is an air supply passage 2. The air travels therethrough past air valve 3 which is opened by rearward movement of the trigger 4 against the exteriorly extending valve spindle 5. The air then flows upwardly from the valve chamber through port 6, around casing 7, and into the horizontal bore 8. At the forward end of bore 8 are two outlets. One is a forwardly continuing passage 9 into the air partitioning member 10. The other outlet is the annular chamber 11 behind the member 10. The outlet passage 9 is for air travelling to the horns 12 of the air cap 13 to form opposed spray flattening jets. The air from passage 9 reaches the horns by way of the encircling chamber 14, a series of ports 15 through a flange of the member 10, and hence into annular chamber 16 behind the bores 17 into the horns. The outlet chamber 11 is for primary atomizing air which travels forwardly through an annular series of passages 18 into the space 19 between the spray material tip 20 and the air cap 13. From here the air flows out the center orifice of the air cap in atomizing association with the spray material discharged from tip 20.

Into the rear end of bore 8 is threadedly mounted the valve casing 21. Extending through the casing 21 and threadedly connected thereto for axial adjustment is the valve sleeve 22. On the exterior end of sleeve 22 is the knurled head 23 for manual turning and axial positioning of the sleeve. Through the sleeve 22 extends the shank 24 of the valve 25. The shank has a close but slidable fit with the sleeve. The valve 25

seats in the rear end of the horn air outlet passage 9 in the air partitioning member 10.

The rearward portion of the valve sleeve 22 has an enlarged bore 26 terminating at its forward end with shoulder 27.

To the external end of the valve shank 24 is fastened a thumb button 28 by means of a pin 29 which extends transversely through the shank and the shank receiving stud 30 of the thumb button. The ends of the pin enter two oppositely positioned longitudinal slots 31 in valve sleeve 22. A spring 32, lodged within the enlarged bore 26 of the valve sleeve 22, is compressed between the bore shoulder 27 and the forward end of the thumb button stud 30. Through the effect of the spring thrust the valve shank 24 is yieldably held rearwardly in respect to the sleeve 22 to the extent of movement permitted by the pin and slot connection between the valve shank and sleeve. Accordingly the ends of the pin 29 are normally pressed against the rear ends of the slots 31.

Through the threaded engagement of the sleeve 22 with the fixed valve casing 21 axial movement of the sleeve 22 is secured by manual turning of the knurled head 23. Because of the pin and slot connection between the sleeve 22 and the valve shank 24 and the effect of the spring holding the pin ends at the ends of the slots, axial movement of the sleeve varies the position of the valve 25 in respect to its seat. The amount of air reaching the horn ports is thus controlled and may be predetermined to accommodate the type of surface being finished in respect to the width of spray desired.

When a narrow surface is to be coated and it is desired to momentarily reduce the width of the spray pattern from that selected for large surfaces the operator depresses the thumb button with the thumb of his hand actuating the spray gun and thus pushes the valve 25 toward its seat reducing the flow of spray flattening air from the horns. Under tension of the spring 32 which is temporarily overcome by the thumb pressure the valve is returned to its selected position when the thumb is removed. A spray of proper width is thus again delivered for coating the general run of work, as the return of the valve shank does not disturb the rotary position of the sleeve by which the preferred valve position was previously secured.

For a long period of coating surfaces of limited dimensions the valve 25 may be forced to its seat by turning sleeve 22 sufficiently forwardly. The length of the threads between the sleeve 22 and the casing 21 is sufficient to permit this action.

To prevent leakage between the sleeve and the valve casing, packing 33 is positioned therebetween. It is held against an inner annular flange 34 of the casing 21 by spring 35 which is held in compressed prelation to the packing by the horse-shoe lock washer 36. The latter is positioned in a groove 37. In order to lessen the twisting effect upon the spring 35 from rotary movement of the valve sleeve 22, a loosely mounted washer 38 is inserted between the end of the spring and locking washer 36.

From the preceding it may be understood that the slot and pin engagement between the valve shank and sleeve in association with the spring 32 and the threaded mounting of the sleeve provides means for both gradual adjustment of the valve position and rapid closing and self reopening sliding movement of the valve.

While a slot and screw engagement between the valve shank and the surrounding sleeve is utilized in the preferred embodiment, it is realized that there are analogous structures which would serve as well. For instance a groove of sufficient depth would function as effectively as the slot. Then too, a pin or flattened tongue could be feasibly substituted for the screw. It is not considered that such replacements would depart from the spirit of the invention and that "slot and screw" as herein specified should accordingly be interpreted broadly.

Also, it may be well to point out that it is not essential that the slot be in the sleeve and the pin or screw be in the valve shank as the reverse positioning would work as well. In addition, it may be observed that the valve shank could have a threaded engagement with the sleeve and the latter a slot and screw engagement with the rod without any loss in functions over the preferred form. For this reason the scope of this invention is not considered limited to a particular location of such engaging structures.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a spray gun air valve, means providing an air passage, a valve seat within the forward end of the passage, a valve mounted for axial movement toward and away from said seat, an interiorly threaded casing in fixed position at the rearward end of the passage, a freely rotatable hollow sleeve threadedly engaged within the casing, a shank integral with the valve and extending rearwardly through the hollow sleeve, a connection between the shank and sleeve formed by a pin and a longitudinal slot adapted to provide limited relative longitudinal movement between the shank and the sleeve, an annular shoulder on the shank facing forwardly toward the valve seat, an annular shoulder on the sleeve facing rearwardly away from the valve seat in opposing relation to said first shoulder, a spring compressed longitudinally between said shoulders adapted to thrust the valve shank and valve away from said seat to the limit of movement permitted by the pin and slot connection, a rearward exterior element on the shank for receiving temporary manual pressure to thrust with straight line movement the shank and the valve in opposition to the spring thrust toward the valve seat, and adjusting means on the rearward portion of the sleeve for manual rotation and axial movement of the sleeve upon its threaded engagement with the casing to vary the normal position of the valve as determined by the limit of the spring thrust movement permitted by the pin and slot connection between the shank and the sleeve.

2. A spray gun valve as set forth in claim 1 in which the rearward exterior element on the shank has a hollow stud part into which the end of the shank extends, and the pin of the pin and slot connection extends transversely through the shank and stud part to secure the element to the shank with the ends of the pin extending further into slots in the sleeve to form the pin and slot connection between the shank and the sleeve.

3. A spray gun valve as set forth in claim 1 in which the sleeve has a bore portion closely fitting the valve shank and a rearward enlarged bore portion, the rearward enlarged portion providing a housing for the spring, and the shoulder of the sleeve against which the spring is com-

pressed is formed at the juncture of the two bore portions.

4. A spray gun valve as set forth in claim 3 in which the rearward exterior element on the shank has a hollow stud part into which the end of the shank extends and the forward end of the stud part provides one of the shoulders between which the spring is compressed.

LEWIS W. LAMMIMAN.

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