

Nov. 25, 1941.

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2,263,977

PAINT SPRAYING APPARATUS

Filed May 4, 1938

3 Sheets-Sheet 1

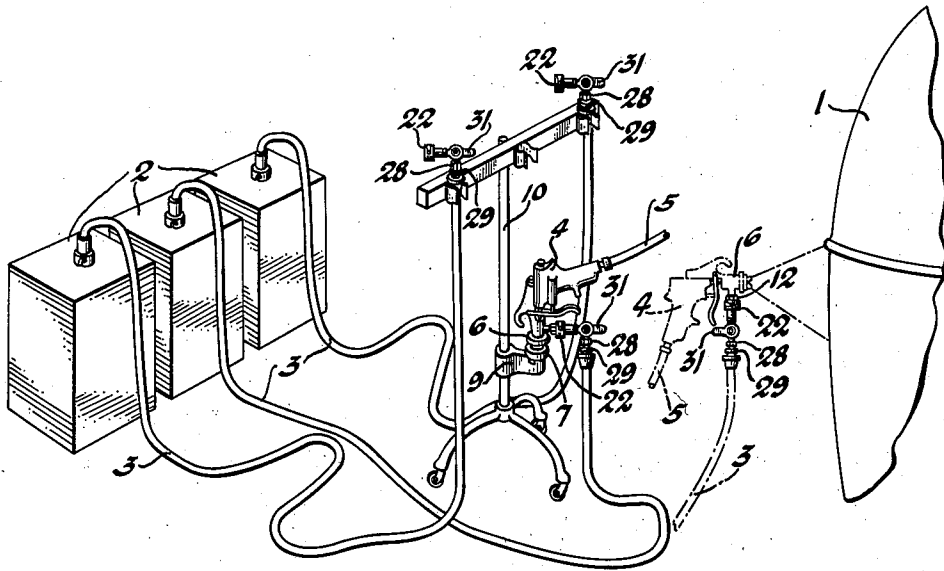


Fig. 1

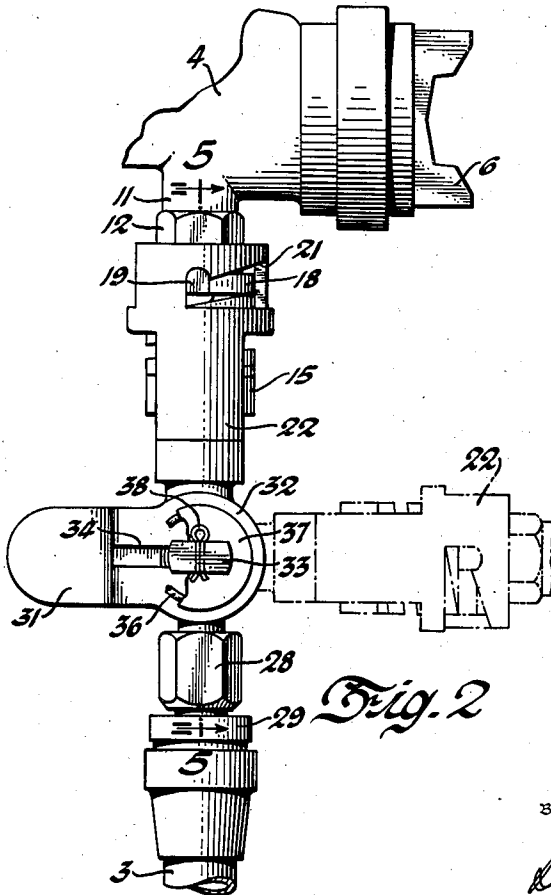


Fig. 2

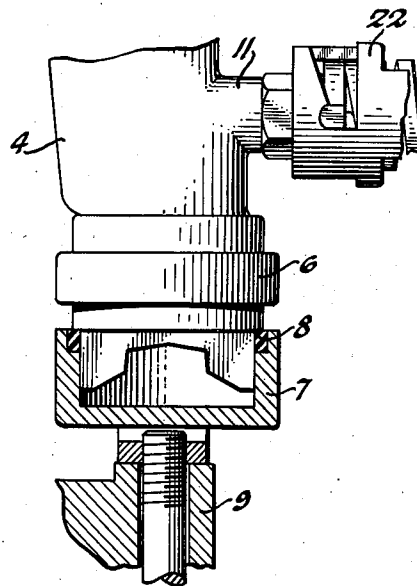


Fig. 3

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3 Sheets-Sheet 2

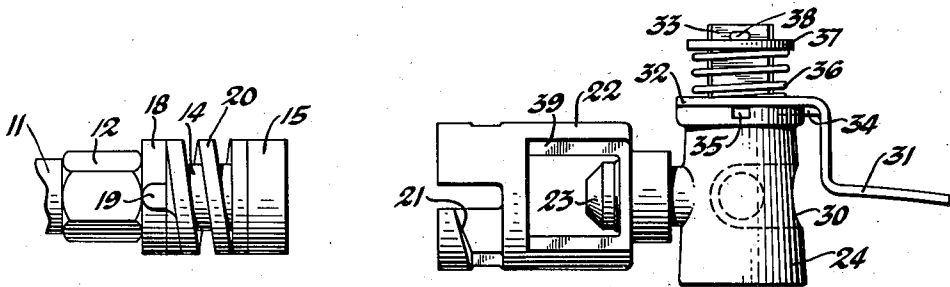


Fig. 4

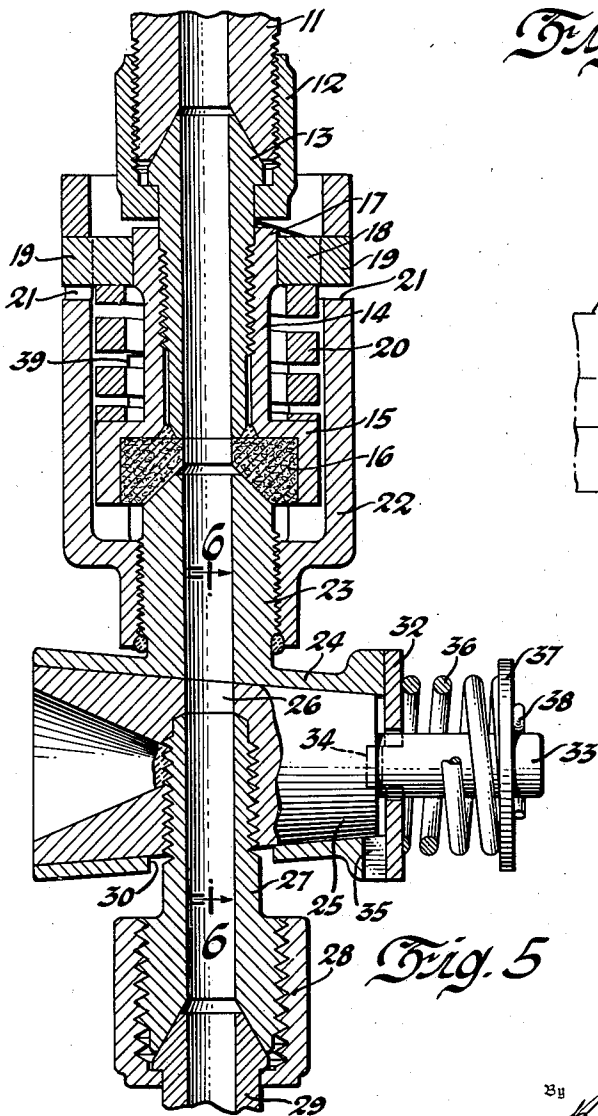
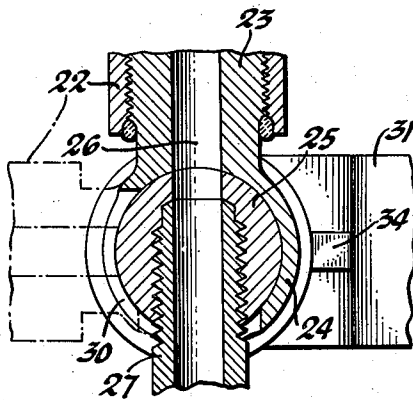


Fig. 6



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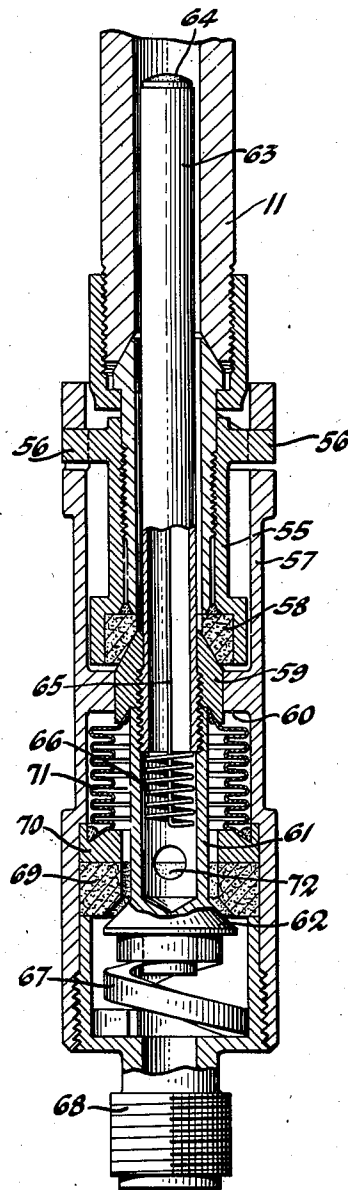
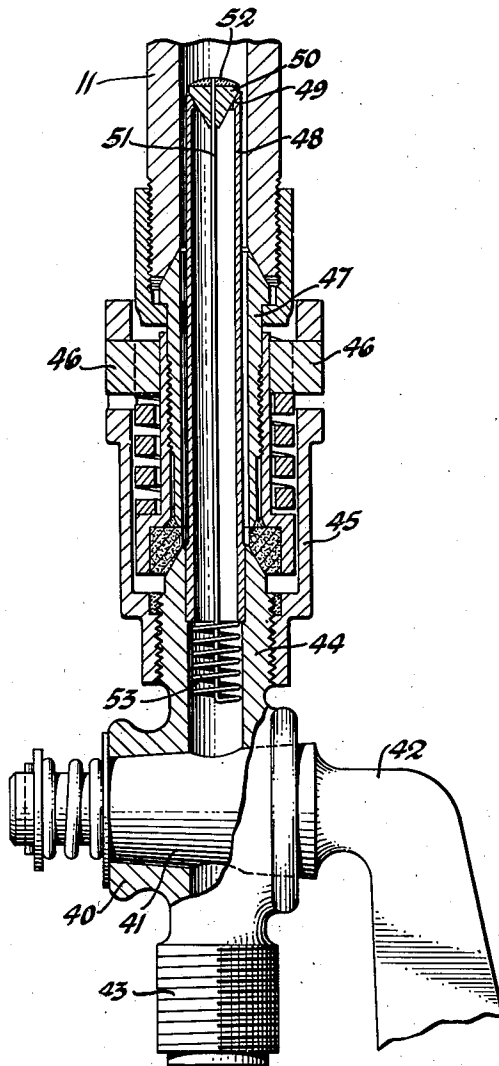
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,263,977

PAINT SPRAYING APPARATUS

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Application May 4, 1938, Serial No. 206,034

2 Claims. (Cl. 137-69)

Air brushes are in general use for applying paint coatings and where more than one color is needed the practice in paint shops heretofore has been to have several guns, one for each color or type of paint on hand. One of the objects of this invention is to reduce operating costs by enabling the use of the same gun for all colors and accordingly the system involves the thorough and quick cleaning of the gun in the change-over from one color to another.

A further object is to provide for the quick attachment to and detachment from the gun of the terminal or free end of a selected paint delivery conduit and for the closure of the conduit at its free end when not in use.

Additional objects and advantages will become apparent during the course of the following specification having reference to the accompanying drawings wherein Figure 1 shows in perspective the system ready for use; Figure 2 is an enlarged view of the detachable valved fitting between the gun and paint supply conduit; Figure 3 is a detail view showing the gun cleaning fixture; Figure 4 is a detail view of the detachable coupling parts separated one from another; Figure 5 is a sectional view taken on line 5-5 of Figure 2; Figure 6 is a detail section taken on line 6-6 of Figure 5, and Figures 7 and 8 are sectional views showing modifications.

Referring to the drawings the automobile body 1 is shown for the purpose of illustration as the object to be painted. In the manufacture of automobiles the assembled bodies are placed on a conveyor line and are painted as they move along but the schedule may call for different colors on successive bodies. Consequently, several paint containers are needed as shown at 2-2. Usually the paint within the storage tanks is under some pressure which helps its movement upwardly through standpipes to which are connected flexible conduits or hoses 3-3. Each hose terminates at its free end in a valved fitting for attachment to the spray gun shown at 4. This applicator gun is of a conventional type and is provided with an air pressure hose 5 controlled by a suitable trigger actuated valve. When the valve is opened air under pressure flows through the gun and draws paint from the supply hose for discharge through the nozzle 6 as is illustrated by the broken lines in Figure 1.

When a change-over from one color to another is necessary the workman using the structure as in Figure 1, places over the nozzle 6 a domed cover 7 preferably provided with a sealing gasket 8, and with the nozzle covered as shown in Fig-

ure 3, opens the air valve whereupon the air under pressure being trapped by the cover or cap 7 forces any paint within the gun back into the paint delivery hose so as to clean the gun passages and condition it for the next color job. For convenience, the cover 7 may be mounted on an arm 9 carried by the stand 10, which supports the hose ends not in use. If desired the hose may be provided with a glass window to observe the return of the paint but ordinarily this will be unnecessary since the workman will soon accustom himself to the time required to clear the gun. Following the cleaning operation and approximately coincidental with the release of the valve operated trigger the shutoff cock in the hose fitting is moved to closed position and then the fitting may be disconnected from the gun and laid aside without danger of spilling paint or leakage through the free end of the hose. The hose for the desired color is then selected and coupled to the gun and after its valve is opened the spraying operation may be resumed.

The detachable coupling between the gun and hose may involve a nipple carried by the gun to which is secured the valve fitting on the end of the hose. The structure will be best understood from an inspection of Figure 5 where the numeral 11 indicates an apertured boss on the gun to which is secured by coupling nut 12 the headed end of a tube 13. Threaded or otherwise secured on the tube is a sleeve 14 having an enlarged hollow head 15 at one end to receive a replaceable fiber seat 16. At its opposite end the sleeve 14 has a squared head 17 to which is fitted a squared center opening of a ring 18 having diametrically opposite pins 19 so that the ring is slidably keyed to the sleeve. A coil spring 20 interposed between the head 15 and ring 18 urges the ring away from the head.

The pins 19 form a part of a bayonet slot connection and are receivable within slots 21 of the coupling sleeve 22 which is adapted to receive the nipple on the gun. This sleeve 22 is threaded or otherwise fixedly secured to an apertured boss or projection 23 extending laterally from the valve casing 24 and terminating in a conical nose which seats on the fiber washer 16, the parts being maintained in tight sealing engagement through the action of the coil spring 20. Rotatable within the valve housing 24 is a tapered valve plug 25 having a transverse bore 26 which may be brought into and out of alignment with the aperture in the boss 23 and thus constitute a stopcock. Threaded into an enlarged portion of the bore 26 is a coupling 27 to which is secured

by the nut 28 the hose fitting 29 which ordinarily is fitted to the boss 11 of the gun. Thus the hose is rigidly connected with the rotary plug 25 and with the coupler 27 movable within a circumferential slot 30 in the valve casing 24, the hose and associated coupler parts act as an operating lever for imparting movement to the valve plug 25. This operation of the valve is found of considerable help to the operator, who holds the handle of the gun in one hand and with the other hand swings the hose with ample leverage to operate the valve easily. At the same time he may use his thumb to engage the tail 31 of a keeper plate 32 which is keyed to the squared pin 33 projecting from the valve plug 25 and is provided with an inwardly pressed tooth or dent 34 adapted to seat in either of two notches as at 35 spaced apart substantially 90° in the end of the valve casing 24 and which notches determine the open and shut positions of the valve. To maintain the parts against accidental slippage from adjusted position a coil spring 36 bears against the plate 32 at one end and at its opposite end against a washer 37 held on the projection 33 by a cotter pin 38. This spring incidentally holds the conical plug 25 within the tapered casing 24.

As seen particularly in Figure 4 the coupling sleeve 22 is provided with cut out portions as at 39 which expose the tapered end of the projection 23 and render this part easily accessible for cleaning.

In the structure of Figure 7 an auxiliary self-closing valve is provided at the tip end of the hose fitting to retain the paint when the hose is uncoupled and to eliminate the need for the nozzle cover 7 previously referred to. This valve extends as close as feasible to the paint discharge nozzle of the gun and, consequently, only a small amount of paint is contained in the nozzle beyond the valve. When changing over from one color to another it is only this small amount of paint which is lost and this is removed with one or two short shots preliminary to directing the gun toward the work for the application of a different color. In this view also is illustrated the use of an ordinary pet cock, whose body 40 contains the rotary plug 41 having a handle 42. One end of the valve body 40 is threaded as at 43 for connection with the usual hose and the other end 44 is threaded for connection with the coupling sleeve 45. The sleeve 45 through a pair of bayonet slots detachably receives the pins 46 on the non-rotatable collar slidably fitted to the hollow tube assembly 47 carried by the gun. In this instance the hollow coupler assembly of the gun encloses a long tubular extension or pipe 48 fitted at one end in the threaded end 44 of the detachable hose fitting. At its opposite end the tube 48 is formed with an internal rib 49 having a tapered seat for the conical valve 50. A wire 51 secured by a drop of solder 52 to the valve 50 extends through the tube and terminates in a spring coil 53 bearing against the inner end of the tube and exerting its force to seat the valve.

When the paint supply hose is coupled to the gun and the handle 42 turned to open the main valve the spraying operation will be under control of the operator in the usual manner. The movement of paint to the gun nozzle will unseat the self-closing valve 50. The unseating is facilitated by reason of the restricted diameter of the internal rib 49 which serves to increase paint pressure acting on the valve to overcome the seating force of the spring 53. Prior to dis-

connection of the paint supply hose the main valve 41 is closed and with the hose uncoupled the paint in the long tube 48 is retained by the valve 50 as long as the hose is not in use. The paint in the gun beyond the valve 50 will be of a small amount and may be quickly discharged by a short flow of air through the gun. Ordinarily this could be done after the gun is coupled to a different hose and since it is customary to test paint flow before starting the spraying operation on the work this testing operation will clear the gun of the previous color without any more waste than would otherwise occur.

The structure of Figure 8 differs primarily in the provision of a main valve for the free end of the hose which is opened and closed automatically with the coupling and uncoupling operations, respectively. In this instance the gun fitting includes the fixed coupling member 55 carrying pins 56 which engage bayonet slots in the detachable hose coupling socket or sleeve 57. The end of the gun carried member 55 is provided with a sealing washer 58 having a tapered seat to receive the tapered nose of the collar 59 slidably guided in the internal rib 60 of the coupling sleeve 57. This collar forms a part of a movable valve assembly including a hollow stem 61 and a head 62 as well as the tubular extension 63 adapted to project into the gun to a point near the discharge nozzle and provided at its tip with a self-seating check valve 64 on the end of the wire 65 terminating in the spring coil 66. The valve head 62 acts against a coil spring 67 seating on the hose fastening nipple 68, whose skirt threads into the socket 57 and holds in place a valve seat 69 of hard fiber or the like as well as a ring 70. To the ring 70 is secured one end of an expansible bellows 71 having its opposite end attached to the collar 59 and serving as a seal against paint leakage. In the coupled position of the parts illustrated the main valve 62 is moved from its seat 69 through engagement of the collar 59 and abutment 58 and paint from the hose is free to enter the hollow stem through one or more side openings 72. When the gun trigger is actuated the movement of the paint will open the auxiliary valve 64 as before described. Similarly only a small amount of paint remains in the gun when a change-over from one hose to another is made and this is cleared out upon initial operation of the trigger. As soon as the parts are uncoupled the main valve 62 is closed automatically by the action of the spring 67.

From the above description it will be apparent that there has been provided an arrangement to enable transfer of the gun from one color supply line to another in the interval required for the conveyor to take up the spacing between successive bodies and bring up the next body to the workman's station.

I claim:

1. In combination, a pair of detachable coupling members, a tubular element slidably mounted in one of the members and projected therefrom for insertion in the other member, a valve formation on said element to close communication between the interior of the element and its associated coupling member, spring means urging the element outwardly to seat said valve, an abutment on said other member engageable with the element in the coupled relation of the parts to shift the element and unseat said valve,

and an outwardly opening spring pressed check valve carried by the projected element to seat on the tip thereof.

2. For connection with a tubular coupling member, a coupling head having an internal valve seat, a spring seated valve engaging said seat and having a hollow guide stem slidably mounted within said head and projected therebeyond for telescopically fitting within the coupling member, a check valve carried by and clos-

5 ing the tip of said hollow stem, a port in the wall of the stem communicating the stem interior with the interior of the head beyond the valve seat, a bellows seal surrounding the stem and being sealed at opposite ends to the head and stem beyond said port and an abutment on the slidable stem arranged for engagement with the coupling member to unseat said spring seated valve.

10 TRACY F. BRACKETT.