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MULTICHROMATIC SPRAYING APPARATUS

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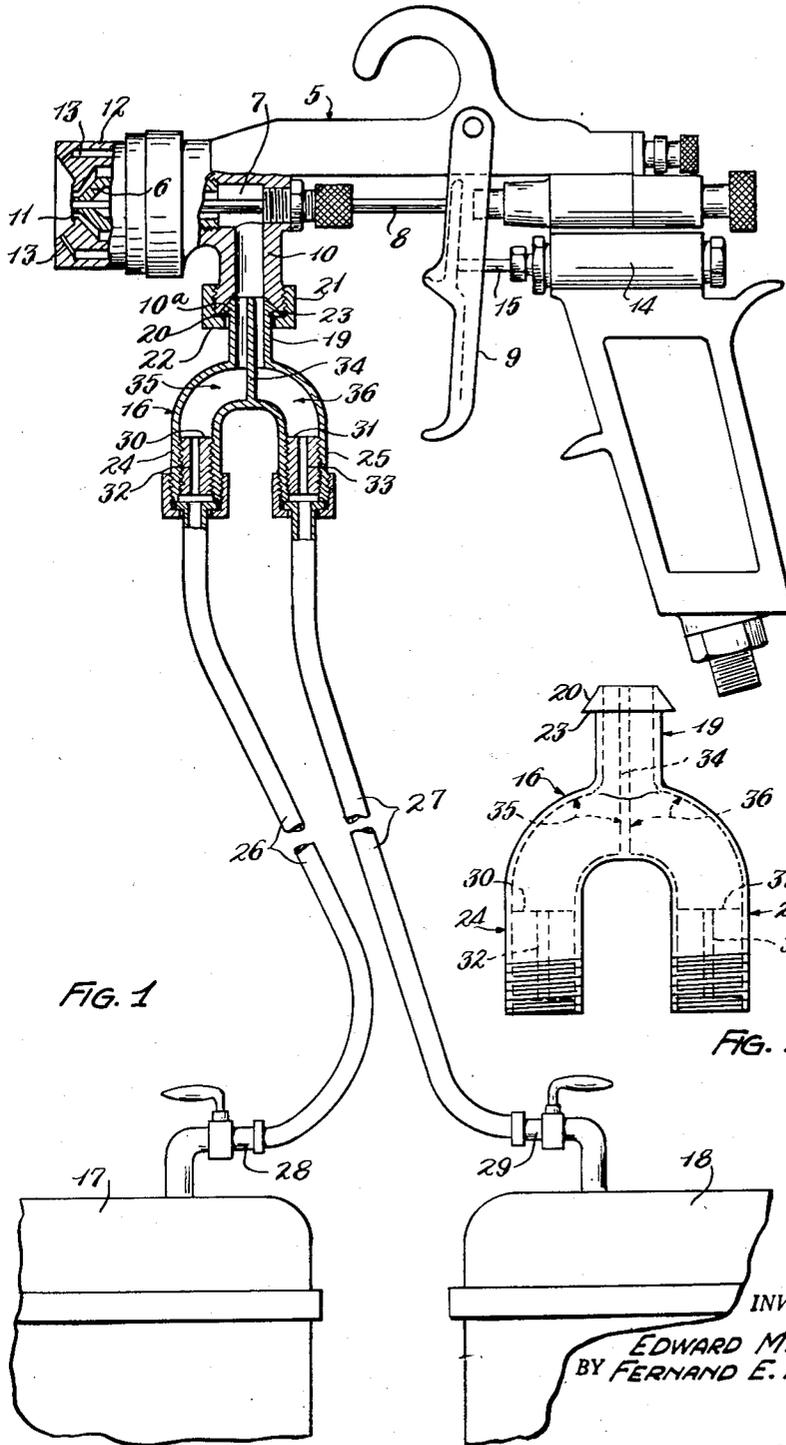


FIG. 1

FIG. 2

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## UNITED STATES PATENT OFFICE

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## MULTICHROMATIC SPRAYING APPARATUS

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2 Claims. (Cl. 299—140)

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This invention relates to improvements in hand-held spraying appliances of the spray-gun type.

The conventional spray gun has a single liquid inlet through which liquid is delivered under pressure to a liquid passage leading to a liquid discharge nozzle. The discharge orifice of said nozzle is normally closed by a spring-biased needle valve which is opened by a trigger element which also serves to open a normally closed spring-biased air valve controlling the delivery of compressed air to an air nozzle fitted over the liquid nozzle. The air nozzle is provided with a central orifice through which atomizing air is delivered in an annular stream enveloping the stream of liquid issuing from the liquid nozzle. The air nozzle is also provided with so-called fanning ports through which part of the compressed air is directed against the atomized stream of liquid to effect a flattening or fanning out of said stream.

Conventional spray guns having a single liquid inlet have long been used in the paint industry for applying chromatic finishes to various products. With such guns, the application of multichromatic finishes, such as hammered or spot pattern finishes, toned hammer finishes, and diffused pattern finishes, require several operations since each colour is applied in a separate spray by a separate "gunning" procedure.

It has recently been demonstrated that multichromatic finishes, superior to those obtained when the component colours are applied by separate "gunning" operations with conventional spray guns, can be obtained by the use of a specially designed spray gun through which the component colours are simultaneously applied in a single spray. This special gun is provided with separate liquid inlets opening at different points into a single liquid passage in which the component colours are appropriately mixed or blended immediately prior to being discharged in a single spray through the discharge orifice of a liquid nozzle located at the discharge end of said passage. Each liquid inlet is connected by a separate conduit to a pressure supply vessel containing one component colour of the finish. Removable bushing-type inserts of predetermined bore dimensions are fitted in the liquid inlets of the gun to control the amount of each of the component colours introduced into the liquid passage of the gun. These inserts are interchangeable with other inserts of different bore dimensions to give different flow and pattern effects.

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With the use of the special gun described herein it is also possible to produce many different kinds of attractive and useful multi-component finishes by spraying together a plurality of coating materials that are of exactly the same hue and shade but differ in other respects, such as normality (as used in Physical Chemistry) and/or viscosity. For example, two perfectly clear coating materials having no pigment at all can be sprayed together under certain conditions to produce a very distinct frosted or hammered multi-component finish effect.

According to this invention the superior multi-component finishes applied in a single spray by the aforesaid special spray gun are duplicated by the use of a conventional spray gun equipped with a multi-branch adapter attachment having one branch coupled to the single liquid inlet nipple of the gun and having each of a plurality of remaining branches connected, by a separate liquid supply line, to a pressure vessel containing one of the component coating materials of the multi-component finish. In this case, the inserts which control the flow and pattern effects are fitted in those branches of the adapter attachment which are connected to the paint or enamel-containing pressure vessels.

A preferred embodiment of the invention is shown in the accompanying drawings, in which—  
Figure 1 is a side view of a conventional spray gun equipped with our improved multi-branch adapter attachment and shows the manner in which the attachment is applied by connecting one branch thereof to the single liquid inlet nipple of the gun and connecting each of the remaining branches to the liquid outlet fitting of a liquid pressure vessel containing one of the component coating materials of the multi-component finish which is applied, in a single spray, through the liquid nozzle of the gun.

Figure 2 is a side view of the adapter attachment per se.

In these drawings we have shown a conventional spray gun 5 having a liquid nozzle 6 located at the discharge end of a liquid passage 7. The discharge orifice of nozzle 6 is normally closed by a spring-biased needle valve 8 which is operated to open position by a conventional valve-controlling trigger 9. Liquid is delivered under pressure to a single liquid inlet nipple 10 opening into liquid passage 7. In the open position of valve 8 a stream of liquid is discharged from nozzle 6 and is enveloped by an annular stream of atomizing air discharged through the central orifice 11 of a conventional air nozzle 12.

The air nozzle is fitted on the liquid nozzle in the usual manner and is provided with conventional fan ports 13 through which compressed air is directed against the atomized stream of liquid to effect a flattening and fanning out of said stream. A normally closed spring-biased air valve 14 controls air passages in the gun (not shown) through which compressed air is supplied to the central orifice 11 and fan ports 13 of air nozzle 12. Valve 14 includes a valve stem 15 against which trigger 9 acts to open said valve.

The adapter attachment provided in accordance with our invention is generally indicated at 15. It comprises a multi-branch fitting through which the component coating materials of a multi-component finish are delivered to inlet nipple 10 of gun 5 from suitable pressure vessels 17 and 18, each containing one of said coating materials. One branch 19, constituting the outlet branch of fitting 16, is provided at its outer end with a conical portion 20 which is held tightly against a conical seat 10a of nipple 10 by a coupling nut 21 which is screwed onto said nipple and is provided with a clamping flange 22 bearing against a shoulder 23 formed by the conical portion 20. The two remaining branches 24 and 25 of fitting 16 are respectively connected by conduits 26 and 27 to liquid outlet fittings 28 and 29 of pressure vessels 17 and 18.

Bushing-type inserts 30 and 31, provided with bores 32 and 33 of predetermined dimensions, are arranged in the liquid inlet branches 24 and 25 of fitting 16. These inserts control the relative amounts of the component coating materials supplied to the liquid inlet 10 of the gun through the fitting 16 and are interchangeable with other inserts of different bore dimensions to give different flow and pattern effects.

Fitting 16 is internally partitioned, as indicated at 34, to prevent premature mixing of the component coating materials of the finish within said fitting. In this connection, it will be noted that partition 34 divides the interior of the fitting into separate flow passages 35 and 36 in which the component colours of the finish are kept separate from each other until they pass into liquid inlet nipple 10 of spray gun 5.

In the use of the spraying apparatus described herein, the component coating materials of the multi-component finish are delivered under pressure from vessels 17 and 18 to inlet branches 24 and 25 of fitting 16 and pass through the separate flow passages 35 and 36 to the liquid inlet nipple 10. When trigger 9 is operated to open needle valve 8 and air valve 14, the component coating materials are simultaneously discharged through the discharge orifice of liquid nozzle 6 in a single stream which is enveloped by an annular stream of atomizing air delivered through the central orifice of air nozzle 12 and the stream of atomized liquid is flattened and fanned out by the impinging jets of compressed air delivered through the fan ports 13 of the air nozzle. The multi-component pattern effects obtained are controlled by the relative bore dimensions of the flow and pattern controlling inserts 30 and 31 and by the usual spray gun adjustments.

Having thus described the nature of our invention and a preferred embodiment thereof, it will be understood that various modifications may be resorted to within the scope and spirit of the invention as defined by the appended claims.

#### We claim:

1. Spraying apparatus for simultaneously applying the component coating materials of a multi-component finish in a single spray comprising a spray gun provided with a spray nozzle and a single liquid inlet opening through which all of said coating materials are passed to said nozzle, a plurality of supply vessels each adapted to contain a component coating material of the multi-component finish, and a multi-branch fitting through which the coating materials are delivered to said inlet opening from said vessels, said fitting having a liquid outlet branch connected to said inlet opening and having a plurality of liquid inlet branches respectively connected to said vessels, said outlet branch of the fitting being internally partitioned axially thereof by a generally diametrically disposed wall to provide separate outlet ducts communicating respectively at one end with the plurality of inlet branches of the fitting and at their opposite ends with said single inlet opening, whereby mixing of said component coating materials is prevented while they are simultaneously flowing through the fitting.

2. In spray gun apparatus for simultaneously applying the component liquid coating materials of a multi-component finish in a single spray, said apparatus including a spray gun having a single discharge orifice and a single inlet opening for supplying a plurality of coating materials thereto, a pair of supply vessels for respectively containing two different coating materials under pressure, and a pair of conduits respectively connected to said vessels for conveying the two coating materials separately to said spray gun; the combination of a multi-branch fitting comprising a pair of inlet branches respectively connected to said conduits for receiving the coating materials therefrom and a single outlet branch connected to the single inlet opening of the spray gun for simultaneously feeding the two coating materials thereto, said outlet branch of the fitting being internally partitioned axially thereof by a generally diametrically disposed wall into two substantially parallel ducts for separately conducting the two coating materials from said inlet branches into the spray gun through said single inlet opening as unmixed substantially parallel flowing streams.

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