Dec. 14, 1937. H. A. ROSELUND 2,102,382

SPRAY HEAD

Filed Jan. 16, 1936

FIG. 1.

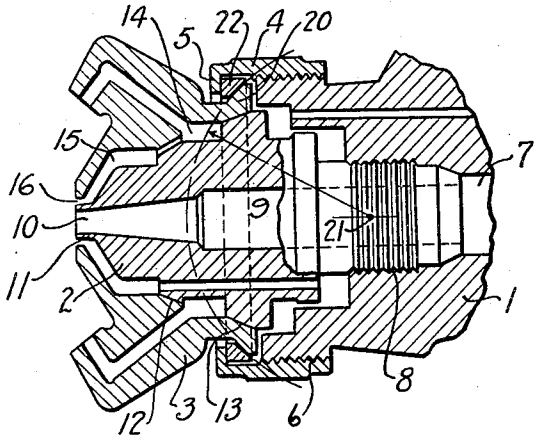


FIG. 2.

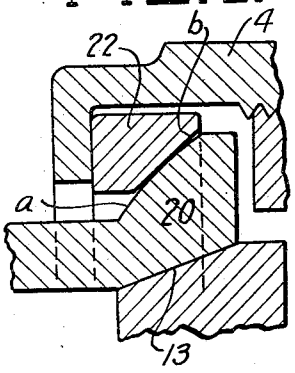


FIG. 3.

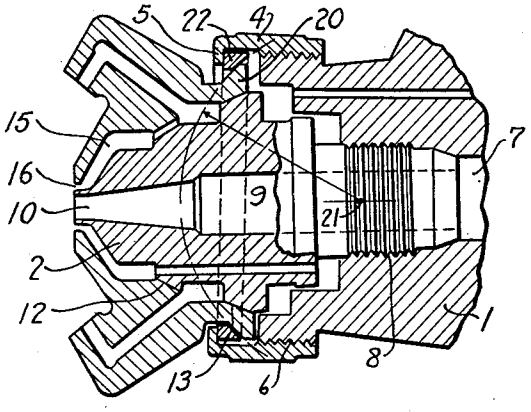


FIG. 4.

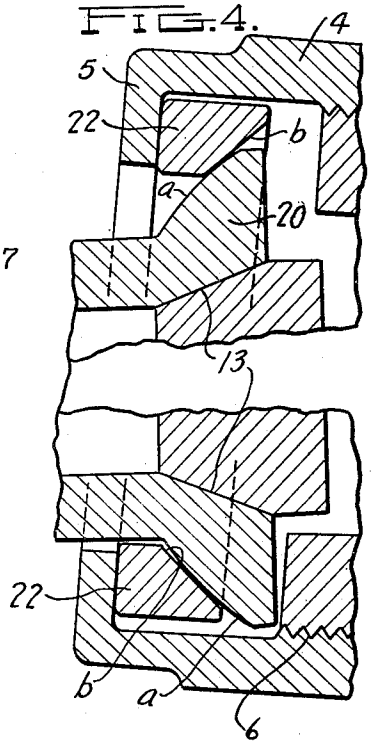
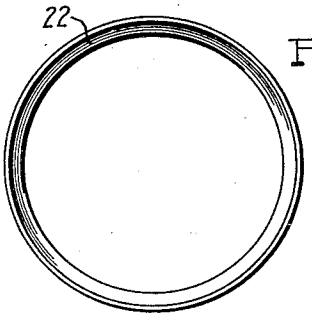


FIG. 5.



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UNITED STATES PATENT OFFICE

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SPRAY HEAD

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Application January 16, 1936, Serial No. 59,433

6 Claims. (Cl. 299—140.1)

This invention relates to spray guns of the type adapted for applying surface coating materials in spray-form, and pertains particularly to the spray heads of such guns.

Apparatus of this character customarily employ inner and outer separable nozzles having concentric orifices, one for the discharge of the coating material and the other for the discharge of air, and the inner nozzle being threaded into the gun body while the outer nozzle is drawn to its seat on the inner nozzle by a union nut threaded on the body. In the manufacture of such spray heads, extreme care has been necessary in order that the threads on the gun body, both for the union connection and for the inner nozzle, may be in true parallel relation, and if either of such threaded portions is out of true, a tightening of the union sufficient to prevent leakage would cause a tilting of the outer nozzle relative to the inner nozzle, thus throwing the discharge orifices thereof out of coaxial register causing a distorted and imperfect spray stream when the gun is operated.

The object of the present invention is the provision, in association with the said union connection, of simple, efficient and inexpensive means, which is automatically operable to effect a clamping together of the two nozzles with their discharge orifices in true coaxial relation irrespective, within reasonable limits, of the extent to which either the union thread or the inner nozzle thread is out of true with respect to the other.

The invention is fully described in the following specification, and while in its broader aspect it is capable of embodiment in numerous forms, one embodiment thereof is illustrated in the accompanying drawing, in which—

Figure 1 is a central longitudinal section of a spray-head and associated portion of a gun body equipped with the invention, with a portion in full and with the axes of the threaded portions of the body in parallel relation; Fig. 2 is an enlargement of a fragmentary portion of Fig. 1; Fig. 3 is a view similar to Fig. 1, with the axis of the body threaded for the inner nozzle non-parallel to the axis of the union thread and illustrating the adjustment feature of the invention to compensate for such out of true relationship; Fig. 4 is an enlarged fragmentary view of a portion of Fig. 3, and Fig. 5 is a face view of the compensating ring.

Referring to the drawing, 1 designates the spray-head carrying end of a spray gun body, and 2 and 3 the inner and outer nozzles, respectively, of the spray-head, which are also commonly referred to, respectively, as material and air discharge nozzles. The outer nozzle 3 has a conical seat on the inner nozzle rearwardly of their discharge tips and is held thereon by a union 4 threaded onto the adjacent end portion of the body 1 and having an inturned flange 5 at its forward end for coaction with the forward side of an annular flange on the rear end of said nozzle to draw the nozzle to its seat when the nut is tightened on the body. The body thread for the nut 4 is designated 6.

The inner nozzle 2 has its rear end threaded into a longitudinally extending bore 7 in the body 1, said bore being provided with a thread 8 for such purpose. The throat bore 9 of the nozzle 2 is adapted to have communication at its rear end through the body bore 7 with a suitable source of supply of the material to be sprayed, and has its forward end restricted to form the discharge orifice 10. The nozzle 2 is enlarged rearwardly of its discharge tip 11 and has an external conical surface concentric to its throat axis with its small end forward, which surface, in the present instance, is divided into two seating portions 12 and 13 by an annular recess 14 provided therein intermediate its ends.

The outer or air nozzle 3 is cupped at its rear side to form a cavity adapted to receive the enlarged outer end portion of the inner nozzle 2. The outer end portion of the wall of such cavity is made of conical form complemental to the conical portions 12 and 13 of the inner nozzle, so as to seat thereon. The body portion of said cavity is spaced from the inner nozzle forwardly of the conical portion 12 to provide an air chamber 15 around the inner nozzle, and the discharge from this chamber is through an orifice 16 which is adapted to concentrically receive the tip 11 of the inner nozzle to form an annular air discharge space therearound, as well understood in the art. The manner of supplying air under pressure to the chamber 15 forms no part of the present invention and need not, therefore, be described.

The present invention resides in the means for clamping or holding the outer nozzle 3 in concentric seated relation on the inner nozzle 2, and consists in part in providing the rear end of the outer nozzle 3 with an outwardly projecting annular radially disposed flange 20, the forward face of which presents a ball-form of seat, which, at any point around the flange, has a common center located on the axis of the inner nozzle, as indicated at 21. Interposed between this

ball-faced flange and the flange 5 of the union 4 is a compensating ring 22, the inner face of which, with respect to the flange 20, presents a preferably conical surface for coaction with the ball face of the flange, as best shown in Figs. 2 and 4. In these figures the ball face of the flange 20 is designated *a*, while the co-acting conical face of the ring 22 is designated *b*. The ring 22 is engaged at its forward side by the union flange 5 and is of a diameter less than the inner diameter of the union 4 so as to permit a limited movement of the ring in the union transverse to its axis. It is found in practice that the best results are obtained by making the conical facing *b* of the ring 22 at substantially a 45° angle to the axis of the ring.

With this form of clamping means, if the axes of the body threads 6 and 8 for the clamping nut 4 and inner nozzle 2, respectively, are in parallel relation, the ring 22, during a tightening of the union nut 4 to effect a firm seating of one nozzle on the other and to prevent leakage of air around the clamped end of the outer nozzle, remains in true concentric relation to the axis of the inner nozzle, as shown in Figs. 1 and 2. Should, however, the axes of the threads 6 and 8 be out of parallel due to an improper cutting of either thread, the clamping ring 22 will be disposed at a slight incline to the axes of the nozzles, and as the tightening of the union nut continues to effect a firm seating of one nozzle on the other and to prevent leakage around the inner end of the outer nozzle, the ring will automatically adjust itself on the ball face *a* of the flange 20 to compensate for the out of trueness of the threads without effecting any lateral tilting of the outer nozzle on the inner nozzle, so as to throw their orifices out of true concentric relation. It is found in practice that where the face of the flange 20, with which the flange 5 of the union nut customarily coacts, is disposed at substantially a right angle to the axis of the nozzle, and the union nut is tightened sufficiently to prevent leakage around the inner end of the inner nozzle when the axes of the threads 6 and 8 are out of true, the outer nozzle will be tilted on the inner nozzle so as to throw their orifices out of coaxial register. This action is prevented, however, by providing the inner side of the flange 20 with a ball face such as *a*, and by interposing a ring 22 between such face and the flange 5 of the nut 4, providing such ring with a face which is preferably conical for coaction with the ball face of the flange 20, and at the same time making the outer diameter of the ring 22 less than the inner diameter of the body portion of the nut 4, so that such ring is permitted to have a floating movement therein and to shift a predetermined extent inwardly or outwardly on the ball surface of the flange 20 in a plane transverse to the nozzle axis. The ring 22 thus adjusts itself to any position relative to the clamping nut and flange 20 made necessary by an out of true condition of either threads 6 or 8.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

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

1. A spray gun having a body, an inner nozzle fixed to the body, an outer nozzle mounted on the inner nozzle, said nozzles having concentric discharge orifices and having conical portions rearwardly of said orifices one seating on the other, said outer nozzle having an outwardly projecting annular flange at its rear end with the forward face of such flange curved about a rearwardly disposed center on the common longitudinal axes of the nozzles, a union nut threaded on the body, and a ring interposed between said flange and nut in contact with the curved surface of said flange for floating movements relative thereto transverse to its axis.

2. A spray gun having a body, an inner nozzle threaded therein and having a conical portion concentric to its axis, an outer nozzle mounted over and having a conical portion seating on said first conical portion, and means connected to the body for coacting with said outer nozzle to draw and hold it to its seat, said means including a member threaded on the body in substantially parallel relation to the nozzle thread, a spherical-faced flange on the outer nozzle struck from a center disposed rearwardly of such flange and falling on the nozzle axis, and a clamping ring interposed between said member and flange and having a conical face in engagement with the ball face of the flange and disposed at substantially a 45° angle to the ring axis, said ring being movable transverse to the nozzle axis when the means is being tightened whereby to adjust itself to the clamping action and compensate for any lack of parallelism of the axes of the threaded parts.

3. In a spray gun, a body having a cylindrical forward end portion with a centrally disposed threaded socket and an outer threaded part, the threads of said socket and part having their axes substantially coincident, an inner nozzle threaded into said socket and having its discharge end projecting forwardly from the said body part, an outer nozzle seating around and on said inner nozzle with its discharge orifice held in coaxial relation to that of the inner nozzle, said outer nozzle having its inner end disposed forwardly of said body and provided with an annular radially disposed flange the forward face of which is of spherical form struck from a center disposed rearwardly of said flange and falling on the nozzle axis, a ring gasket bearing rearwardly against said face, and a clamping member threaded on the external part of said body and having an inturned flange at its forward end in engagement with the forward side of the gasket and adapted to firmly draw the gasket to its seat on the flange and the outer nozzle to its seat on the inner nozzle when the clamp is tightened, said gasket during such tightening action being adapted to automatically adjust itself on the flange to compensate for any out-of-true relation of the axes of said inner and outer threaded parts.

4. A spray gun having a body with an inner threaded socket and an outer threaded part at its outer end and disposed with their axes in substantially coincident relation, an inner nozzle threaded into said socket, an outer nozzle having a rearwardly seating conical mounting on the inner nozzle with the nozzle discharge orifices coaxially disposed, said outer nozzle having at its inner end portion an annular radially disposed flange, the forward face of which is of spherical form struck from a center falling on the nozzle axis, a ring gasket seating against the spherical face of said flange, and a clamping means threaded on the outer threaded part of

said body and having a portion engaging the front side of the gasket, whereby a tightening of the clamping means on the body acts on said flange through the gasket to firmly hold one nozzle seated on the other and permitting adjustment of the gasket on the spherical face of the flange to compensate for an out-of-true relation of the threaded parts of the body.

5. In a spray gun, a body having a cylindrical forward end portion with an inner threaded socket and an outer threaded part, the thread axes being substantially coincident, an inner material discharge nozzle threaded in and projecting from said socket and having a surrounding forwardly facing conical seat forwardly of the gun body, an outer air discharge nozzle mounted over said inner nozzle on said seat and having the axis of its discharge orifice coinciding with that of the inner nozzle, said outer nozzle having at its rear end an external annular flange disposed forwardly of the outer threaded part of said body and having its forward face of spherical form with its center falling on the inner nozzle axis at one side of the diametric plane of said flange, a ring gasket seating rearwardly against the spherical face of said flange, and a clamp threaded onto the external threaded part of said body and in engagement with the forward side of the gasket to act through it on said flange to hold the outer nozzle to its seat, said gasket being adapted by the clamping action to adjust itself on said flange to compensate for any out-of-trueness of the coaxial relation of the inner and outer threads in said body.

6. In a spray gun, a body having an externally threaded cylindrical forward end portion, an inner nozzle attached to said body end portion in inwardly spaced relation to its thread and in a manner which may place its axis out-of-true coaxial relation to that of said thread, an outer nozzle surrounding and having seating coaction with said inner nozzle to retain their axes in coincident relation, said outer nozzle having at its rear end an annular flange disposed forwardly of the outer threaded part of said body and having its forward face of spherical form with its center falling on the nozzle axis at one side of the diametric plane of said flange, a ring gasket seating rearwardly against the spherical face of said flange, and a clamp threaded onto said body thread in engagement with the forward side of the gasket to act through it on said flange to hold the outer nozzle to its seat on the inner nozzle, said gasket being adapted by a tightening of said clamp to adjust itself on said flange to compensate for any out-of-trueness of the coaxial relation of the axes of said inner nozzle and said thread.

HAROLD A. ROSELUND.