April 3, 1956 A. HARDER 2,740,670

SPRAY GUNS

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Fig. 1

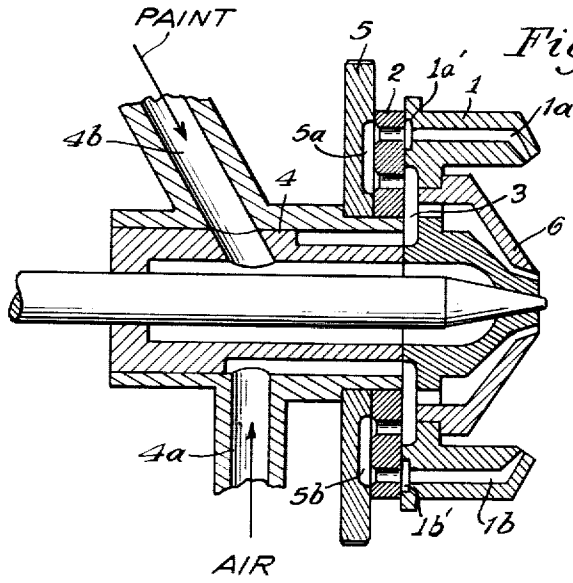

Fig. 2

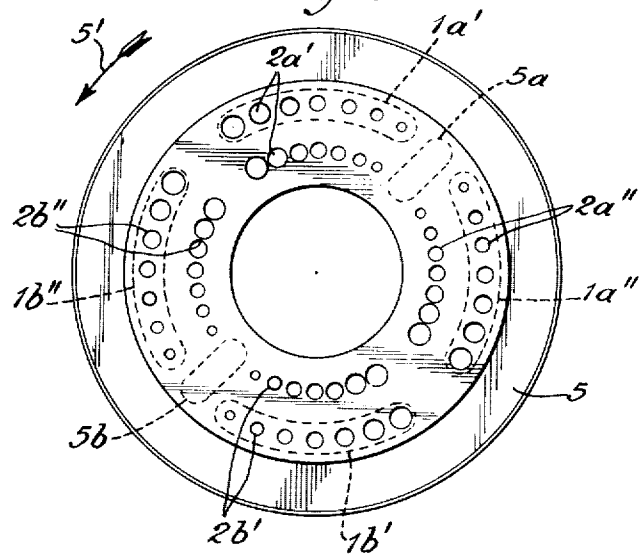

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Fig. 3

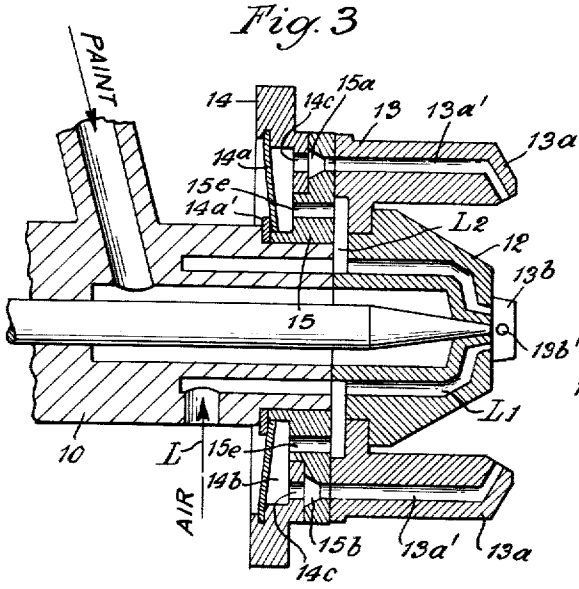


Fig. 6

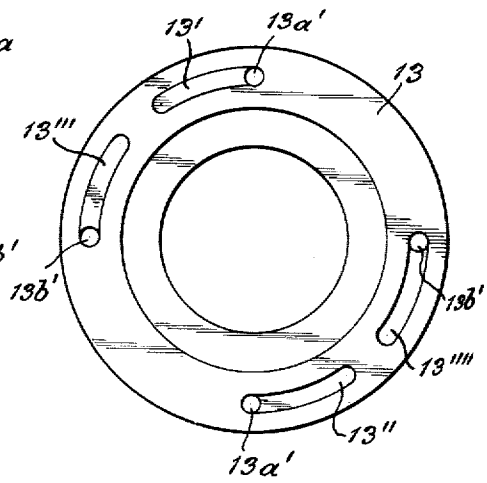


Fig. 4

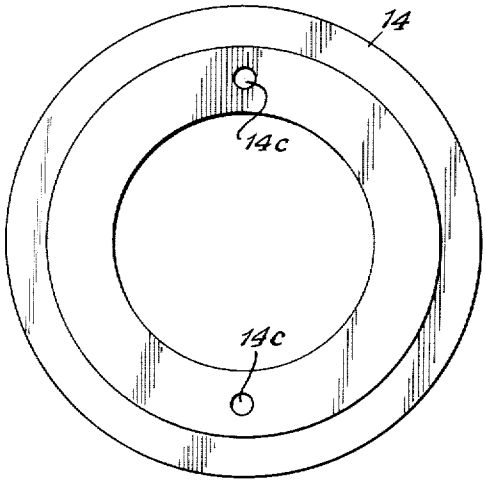
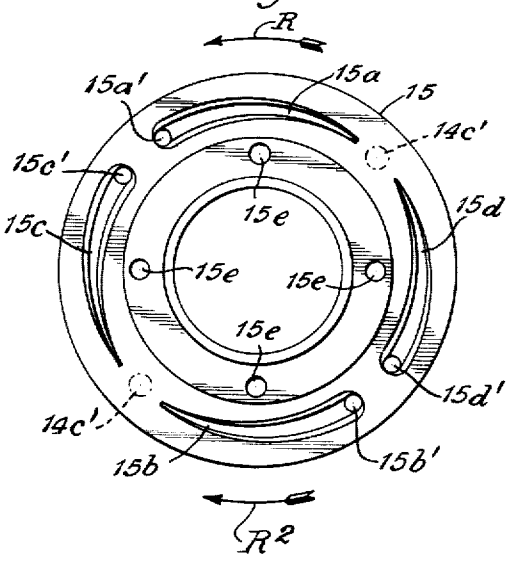


Fig. 5



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SPRAY GUNS

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Claims priority, application Germany December 29, 1951

2 Claims. (Cl. 299—140.1)

The invention relates to improvements in spray guns and is particularly directed to a novel construction of a spray head for a spray gun.

It is an object of the invention to provide a spray head producing a circular spray with additional air passages adapted to convert the circular spray into a flat spray and to provide for this purpose a very simple control disc for controlling the amount of additional air which converts the circular spray into the desired flat spray.

Another object of the invention is to provide a spray head producing a circular spray with means adapted to convert the circular spray gradually and continuously into a flat spray.

Still another object of the invention is to provide a spray head producing a circular spray with a control disc adapted to be rotatably adjusted about the axis of the main spray nozzle and to convert by means of additional air the circular spray selectively into a vertically positioned flat spray and into a horizontally positioned flat spray.

These and other objects of the invention which will appear hereinafter, are accomplished by the simple and practical and inexpensive construction and arrangement of parts hereinafter described and illustrated in the accompanying drawing.

The drawing illustrates by way of example two embodiments of the invention:

Fig. 1 is a longitudinal sectional view of the spray head of one embodiment.

Fig. 2 is an elevation view of the perforated disc and shows also the rotatably adjustable control disc arranged in the rear thereof.

Fig. 3 is a longitudinal sectional view of the spray head of the second embodiment.

Fig. 4 is a front elevation view of the control ring of the second embodiment.

Fig. 5 is a rear elevation view of the grooved ring for varying the cross-sectional area of the additional air passages, and

Fig. 6 is a rear elevation view of the part of the spray head producing a flat spray.

Referring to the drawing, the head part **1** of the spray head is constructed and arranged to produce a flat spray of the circular spray issuing from the central part **6** of the spray head. The part **1** is provided with two diametrically opposed passages **1***a* and **1***b* for additional air which produces a horizontally directed flat spray. The part **1** is also provided with two other diametrically opposed passages, which are not illustrated in the drawing but which are arranged 90° offset from the passages **1***a* and **1***b* and are adapted to selectively discharge additional air, producing a vertically directed flat spray. All these passages communicate rearwardly with arc-shaped groove-like passages **1***a'*, **1***b'*, **1***a''* and **1***b''* illustrated in Fig. 2 as being positioned in front of the perforated disc **2** and arranged in the rear face of the head part **1**.

The perforated disc **2** is arranged stationary in rear of the head part **1** and is provided within the range of the arc-shaped grooves **1***a'*, **1***b'*, **1***a''* and **1***b''* with two concentrically arranged rows of holes **2***a'*, **2***b'*, **2***a''* and **2***b''*. These rows of holes are arranged in pairs in such a manner that the holes of the four rows of holes **2***a'*, **2***b'*, **2***a''* and **2***b''* are positioned in pairs radially opposite each other. The holes in the outer circle are adapted to communicate with the arc-shaped grooves **1***a'*, **1***b'*, **1***a''* and **1***b''*, which in turn communicate with the passages **1***a* and **1***b*, respectively, as shown in Fig. 1, while the coordinated holes in the inner circle communicate with the air chamber **3** in the spray head body **4**.

In the rear of the perforated disc **2** is arranged a rotatably adjustable control disc **5** provided with two diametrically opposed radially extending recesses **5***a* and **5***b* (Figs. 1 and 2). In the position of the control disc **5** shown in Fig. 2, the rows of holes **2***a'*, **2***b'*, **2***a''* and **2***b''* are covered in the rear by the non-recessed portion of the control disc **5**, so that the compressed air entering the spray head at **4***a* and filling the chamber **3** cannot reach the passages **1***a* and **1***b*, because the arc-shaped grooves **1***a'*, **1***b'*, **1***a''* and **1***b''* are closed off. If, however, the control disc **5** is rotated anti-clockwise in the direction of the arrow **5'** (Fig. 2) so that any pair of radially opposed holes **2***a'* and **2***b'*, respectively, are connected with each other by the radial recesses **5***a* and **5***b*, then compressed air passes from the chamber **3** through the inner holes and the recesses **5***a*, **5***b* into the outer holes and from here into the grooves **1***a'* and **1***b'* and from the latter into the passages **1***a* and **1***b*.

The paint to be converted into a spray is admitted to the spray head **4** by the branch passage **4***b*.

The sizes of the holes become greater the farther the control disc **5** is rotated anti-clockwise and, therefore, it is apparent that the amount of compressed air discharged by the passages **1***a* and **1***b* becomes larger the farther the disc **5** is rotated anti-clockwise. In this manner a horizontally flattened spray is produced. If the control disc **5** is rotatably adjusted in clockwise direction so that the radial recesses **5***a* and **5***b* communicate with the rows of holes **2***a''* and **2***b''* then a vertically flattened spray is produced.

Preferably, the control disc **5** is provided with ratchet means, which insures that the disc **5** may be resiliently but positively arrested in each of a number of positions corresponding to each pair of radially opposed holes. The disc **5** may also be provided with a stop, so that in case of an alternate adjustment from a flat spray to a circular spray or from a horizontal flat spray to a vertical flat spray or vice versa, the desired adjustment of the disc **5** may take place quickly and correspond to the particular nozzle employed in the spray gun.

In the embodiment shown in Figs. 1 and 2, the perforated disc **2** is fixedly secured to the part **1** and only the control disc **5** is rotatable. It is, however, also possible to make the perforated disc **2** rotatable in which case the control disc **5** is mounted fixedly.

The air head **6**, which produces a circular spray, is arranged to be readily exchangeable, when it is desired to change the size of the nozzle. It is not necessary to remove the head part **1** when only the air head **6** is to be exchanged.

The Figs. 3 to 6, inclusive, illustrate another embodiment of the invention in which the cross-sectional area of the apertures in the apertured disc during the rotation of a control ring is changed gradually and continuously so as to produce a gradual change of the amount of air discharged by the additional air passages. The center member **10** of the spray gun is provided with a spray head **12** for producing a circular spray and also is provided with an annular spray head **13** for converting the circular spray into a flat spray. The annular spray head **13** is provided with two pairs of nozzles **13***a* and **13***b* ar-

ranged at right angles to each other. These nozzles have passages 13*a'* and 13*b'* for the discharge of air jets which flatten the circular spray containing the paint. The aperture in the control ring 14 has mounted therein a yieldable sheet metal ring 14*a* whose inner circumference extends into an annular groove in the center member 10 and engages therein a washer 14*a'*, so that during the rotation of the disc 14, an excessive wear of the gun member 10, which may consist of brass, is prevented. The control ring 14 is formed with a chamber 14*b* which communicates with two diametrically opposed holes 14*c*.

When the ring 14 is rotated, the two holes 14*c* are moved past arc-shaped slots 15*a*, 15*b* and 15*c*, 15*d*, respectively, arranged in a stationary disc 15, which also is provided with holes 15*e* connecting the air chamber 14*b* in the ring 14 with an annular chamber L_2 in the spray head 12. The slots 15*a* and 15*b* are formed so as to become gradually wider and deeper in the form of a scythe in counter-clockwise direction, while the slots 15*c* and 15*d* are similarly shaped, but in clockwise direction. The widest and deepest ends of these slots communicate with holes 15*a'*, 15*b'* and 15*c'* and 15*d'* in the disc 15.

In the rear of the disc 15 (Fig. 5) is arranged the spray head 13 (Figs. 3 and 6) which is provided with arc-shaped slots 13', 13'', 13''' and 13'''', arranged in communication with the holes 15*a'*, 15*b'*, 15*c'* and 15*d'*. The slots 13', 13'', 13''' and 13'''' are in communication at one of their ends with the passages 13*a'* and 13*b'* as shown in Fig. 3 and establish a connection between the latter and the arc-shaped slots 15*a*, 15*b*, 15*c* and 15*d*.

The compressed air enters the center member 10 at L and passes into an annular space L_1 of the circular spray head 12 and at the same time enters the annular chamber L_2 and the holes 15*e* of the disc 15 to enter the air chamber 14*b* in the control ring 14. When the control ring 14 is rotated so that its two holes 14*c* come to lie in the space between the slots 15*a* and 15*d* or between the slots 15*c* and 15*b*, as shown at 14*c'* in Fig. 5, the holes are covered by the solid portions of the disc 15 and no compressed air can enter the anular spray head 13. If, however, the control ring 14 is rotated counter-clockwise in the direction of the arrow R, (Fig. 5) then the holes 14*c* communicate with the scythe-shaped slots 15*a* and 15*b* until they reach the ends of the slots 15*a'* and 15*b'* in which position the entire cross section of the slots is available for the passage of compressed air so that the largest amount of air passes through the slots 13', 13'' (Fig. 6) and into the passages 13*a'* of the annular spray head 13, thereby horizontally flattening the circular spray of paint issuing from the center portion of the spray head 12.

When the control ring 14 is rotated clockwise (Fig. 5) in the direction of the arrow R_2, the just described function is repeated in connection with the other pair of reversely arranged scythe-shaped slots 15*c* and 15*d*, so that the two passages 13*b'* of the annular spray head 13 are

provided continuously and gradually with more or less compressed air for producing a more or less flattened vertical paint spray.

What I claim is:

1. A spray head for a spray gun including a central part provided with means for producing a circular spray, a head part supported by said central part and provided with two pairs of diametrically opposed passages arranged in planes at right angles to each other each pair of said passages being adapted to discharge compressed air toward the circular spray produced by said central part and to convert said circular spray selectively into two flat sprays in planes at right angles to each other, means forming a compressed air chamber in said central part, and means including a rotatably adjustable control member arranged in cooperative relation with said head part for conducting variable amounts of compressed air from said air chamber into each pair of said diametrically opposed passages.

2. A spray head for a spray gun including a central part provided with means for producing a circular spray, a head part supported by said central part and provided with two pairs of diametrically opposed passages arranged in planes at right angles to each other, each pair of said passages being adapted to discharge compressed air toward the circular spray produced by said central part and to convert said circular spray selectively into two flat sprays in planes at right angles to each other, means forming a compressed air chamber in said central part, a disc provided with four arc-shaped apertures extending concentrically about the axis of the spray head, said apertures have the form of a scythe and being wide and deep at one end and terminating in a point at the other end, and a rotatable adjustable control ring adjacent said disc and having a chamber, holes in said disc connecting said chamber with said compressed air chamber, and two diametrically opposed holes in said control ring adapted to connect said chamber with said arc-shaped apertures in said disc, said control ring during its rotation moving with said two diametrically opposed holes into registration with two of said arc-shaped apertures at a time, thereby effecting a continuous and gradual change in the amount of compressed air flowing selectively through one of said two pairs of diametrically opposed passages in said head part.

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