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NOZZLE FOR SPRAYING CEMENTITIOUS MATERIALS

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Fig. 1

Fig. 2

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NOZZLE FOR SPRAYING CEMENTITIOUS MATERIALS


Original application March 19, 1949, Serial No. 82,404, now Patent No. 2,603,462, dated July 15, 1952. Division and this application April 16, 1955, Serial No. 283,092

2 Claims. (Cl. 299—134)

The present application is a divisional application of our copending application for patent, Serial No. 82,404, filed March 19, 1949, now United States Letters Patent No. 2,603,462, granted July 15, 1952, said application being a continuation-in-part of our application, Serial No. 514,042, filed December 13, 1943, which was abandoned March 30, 1949.

The present invention relates to an improved apparatus for preparing and spraying cementitious materials suitable both for the weatherproofing, waterproofing and restoration of existing masonry and for the construction of new concrete structures.

Another object of the invention is to provide an apparatus of the type indicated above, including a spray gun having an improved adjustable nozzle which is simple in design, economical of construction and reliable and efficient in operation.

A further object of the invention is to provide an apparatus of the type indicated above, including an improved nozzle adapted to receive and spray a thick mixture of liquid and solid materials.

Other objects of the invention will become apparent from the following specifications, from the drawings relating thereto, and from the claims hereinafter set forth.

For a better understanding of the invention, reference may be had to the drawings wherein:

Figure 1 is an elevational view showing a nozzle constructed according to the present invention mounted on an associated hose; and,

Figure 2 is a broken and enlarged sectional view of the apparatus illustrated in Figure 1, taken substantially along the line 2—2 thereof.

Referring to the drawing, the spray gun nozzle 338 comprises a body 344 externally threaded at its outer end and axially and internally threaded at its inner end and mounted on the outer end of the spray gun 328 by an annular element 346 externally threaded for engagement with the threaded inner end of the nozzle body 344. The annular element 346 encircles the outer end portion of a metal reinforcing tube 348 housing the flexible valve sleeve element 359, through which the cement grout is supplied and cooperates with the reinforcing tube 348 to define an annular air chamber 352. The air line 340 is connected at its outer end to the element 346 and communicates with the nozzle body 344. A circle nozzle plate 354 carried in the nozzle body 344 fits over the outer end of the rubber sleeve 359, which in the construction illustrated terminates in an outwardly turned flange portion 356 having a plurality of axially extending apertures 358 communicating with the annular air chamber 352. The nozzle plate 354 has an inwardly projecting central portion 360 which fits within the sleeve 359 and defines a conical central opening 362 therethrough. The outer marginal portion of the nozzle plate 354 is provided with a plurality of equally angularly spaced radially inwardly inclined openings 364 registering at one end with the openings 358, and each adapted to direct a jet of air from the air chamber 352 at a predetermined point on the axis of the nozzle body 344 axially outwardly of the plate 354.

The nozzle body 344 also carries a flexible annular rubber element 366 and an annular orifice controlling member 368 internally threaded for engagement with the externally threaded outer end portion of the nozzle body 344. The member 368 may be moved axially of the nozzle body 344 by means of its threaded engagement with the nozzle body, and upon such axil movement relative to the nozzle body is effective, as hereinafter described, to vary the size of the orifice defined by the flexible element 366. At its inner end, the flexible element 366 has an outwardly extending annular flange 370 gripped between a cooperating shoulder on the nozzle body 344 and an outer marginal portion of the inner face of the nozzle plate 354, outwardly of the openings 364. Spaced inwardly from its outer end the body 344 has an annular inwardly extending projection defining an outwardly presenting annular shoulder 372.

The flexible orifice element 366, in its free or undistorted condition, has an inner cylindrical surface 374 defining the desired maximum orifice opening and extending from a point axially inwardly of the shoulder 372 to the outer end of the element 366. The radially outer surface of the element 366 is shaped to provide an annular radially outwardly extending projection 376 adapted to engage the shoulder 372, a sealing flange portion 378 at the outer end of the element 366, and an intermediate radially outwardly extending annular portion 380 which, upon compression axially, cooperates in varying the size of the orifice defined by the element 366. In the normal or free condition of the element 366, the sealing flange 378 extends radially and axially outwardly. Upon assembly of the nozzle 338, the flange 378 is engaged by an annular element 362 carried by the member 368 and deformed to the position illustrated in Fig. 9 in which it provides a seal preventing the cementitious material from getting into the space between the element 366, the member 368 and nozzle body 344. The element 382 has an inclined inner surface 384 cooperating with the shoulder 372 upon movement of the member 368 axially inwardly to deform the inner surface of the element 366 to some position such as that illustrated in broken lines in Fig. 2, thereby reducing the orifice size. The element 382 is adapted to move into the outer end of the nozzle body 344 upon movement of the member 368 axially inwardly from the position of maximum orifice opening illustrated in Fig. 2. Also, the annular element 382 has an axially inwardly extending flange 386 at its radially outer edge which presses the outer portion of the projection 380 into the outer end of the nozzle body 344 and cooperates in deforming the element 366 radially inwardly.

It will be appreciated that any suitable airline system may be provided for supplying the desired air pressures to the line 330 leading to the spray gun 328. As an instance of a satisfactory pressure in the line 330 for operating the spray gun 328 for the spraying of cement grout, it has been found that a pressure of 60 pounds per square inch in the line 330 gives good results.

While only one specific embodiment of the invention has been illustrated and described in detail, it will be readily appreciated by those skilled in the art that various modifications and changes may be made without departing from the spirit of the present invention.

What is claimed is:

1. An adjustable nozzle comprising a body having an opening therethrough, a flexible member mounted in said opening and having a discharge passage therefrom, an operating member mounted on said body for movement axially of said passage between a first and a second
position, the minimum cross-sectional area of said passage being a predetermined desired maximum when said operating member is in said first position, and means effective upon movement of said operating member to said second position to reduce the minimum cross-sectional area of said passage to a predetermined desired minimum, said flexible member in its free condition having a radially inner wall portion adjacent its axially outer end defining a passage portion of substantially uniform cross-sectional area and a radially outer surface including a conical flange extending axially and radially outwardly from the outer end of said flexible member and adapted to be deformed axially inwardly during assembly of said nozzle to provide an annular seal between said flexible member and said operating member.

2. An adjustable nozzle comprising a body having an opening therethrough, a flexible member mounted in said opening, said flexible member having a discharge passage therethrough, an operating member mounted on said body for movement axially of said passage between a first position and a second position, the minimum cross-sectional area of said passage being a predetermined desired maximum when said operating member is in said first position and means including an annular element engaging said operating member and effective upon movement of said operating member to said second position to reduce the minimum cross-sectional area of said passage to a predetermined desired minimum, said flexible member having an outer surface portion engaging said body to limit radially outwardly movement of said surface portion of said flexible member when said operating member is in said first position, said flexible member having an annular radially outwardly extending projection, said flexible member also having a conical flange which in its free condition normally extends axially and radially outwardly from the outer end of said flexible member, said annular member when in assembled relation with said operating member engaging said conical flange and deforming it axially inwardly to provide an annular seal between said flexible member and said operating member and engaging said projection during movement of said operating member from said first position to said second position to deform said projection and deform said flexible member to effect said reduction of the minimum cross-sectional area of said passage.

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