United States Patent

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[54] **NOZZLE FOR SUPPLYING FILLER MATERIAL BETWEEN ADJACENT SURFACES**
4 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **401/265**
[51] **Int. Cl.** **E04f 21/12**
[50] **Field of Search** 401/261, 262, 263, 264, 265, 266, 267, 6, 25, 26, 27, 9, 10, 139, 193; 222/566, 327

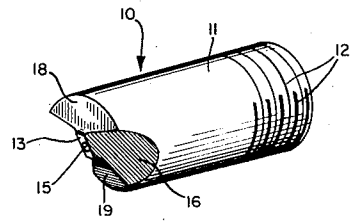
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Primary Examiner—Wm. H. Grieb
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ABSTRACT: A nozzle for supplying filler material to a void formed between adjacent surfaces is described which comprises a cylindrical barrel having connecting means at one end and an applicator tip at the other end. A bore extends through the barrel and has a constant diameter portion near the tip end thereof. The tip end is formed by the geometric intersection of essentially four beveled surfaces, i.e. a pair of opposed angular cheeks controlling side-to-side movement, vertical depth of the nozzle aperture in the void, and formation of a seal in the void between adjacent contiguous surfaces; a leading surface permitting the nozzle to follow the line of application and also depressing any previously filled voids of this same material which intersect at an angle; and a trailing surface adapted to permit the tip to strike the exposed surface of the filler material clean as the nozzle progresses.



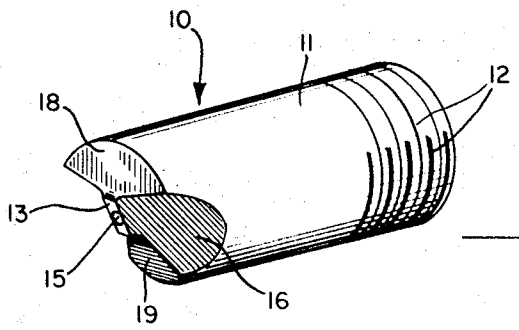


Fig. 1

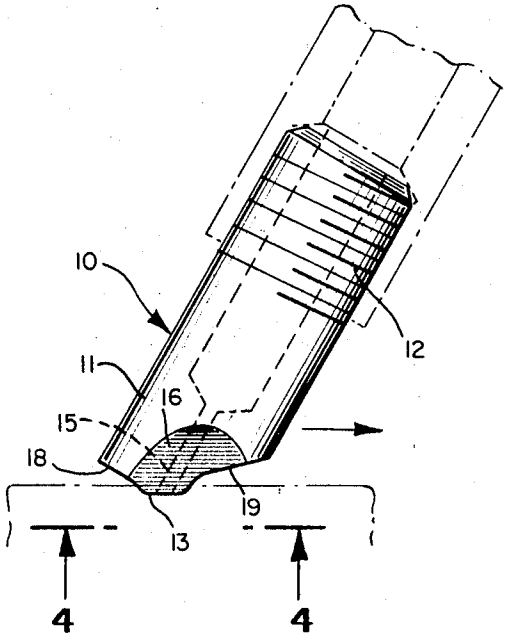


Fig. 2

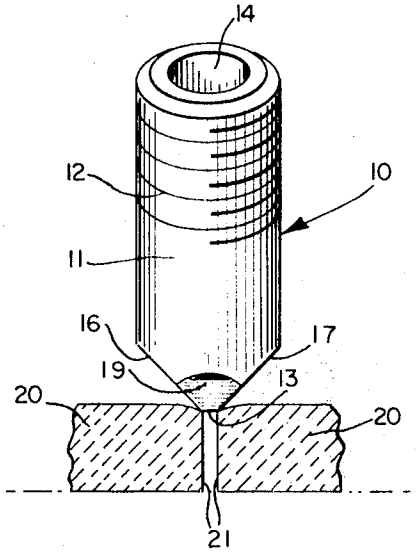


Fig. 3

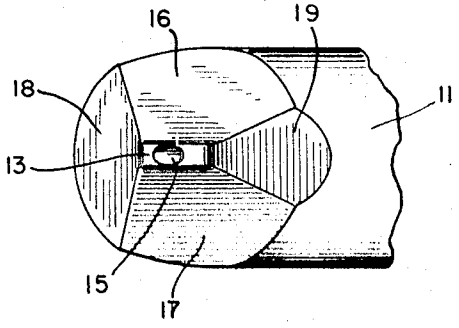


Fig. 4

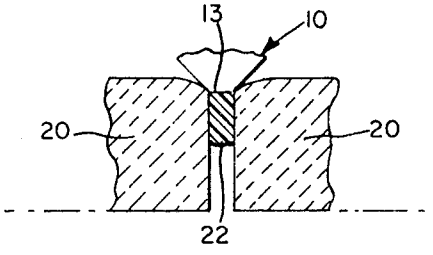


Fig. 5

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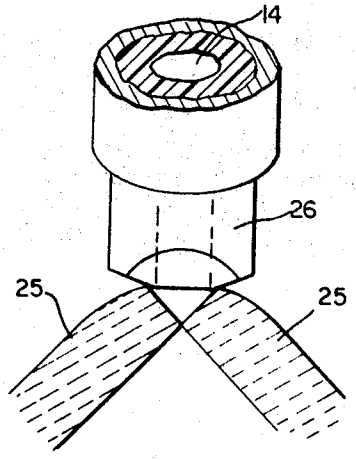


Fig. 7

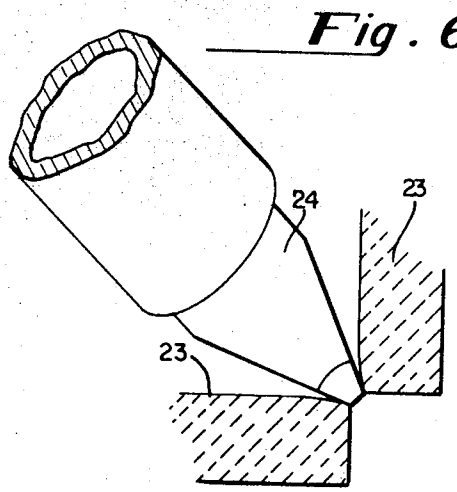


Fig. 6

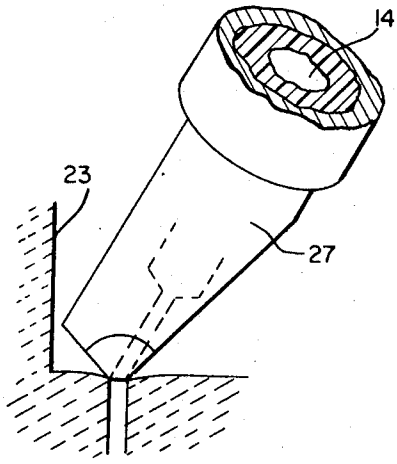


Fig. 8

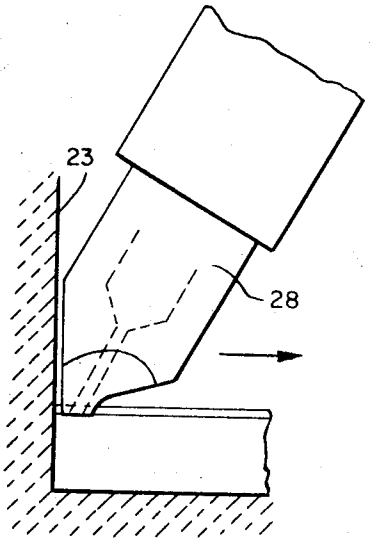


Fig. 9

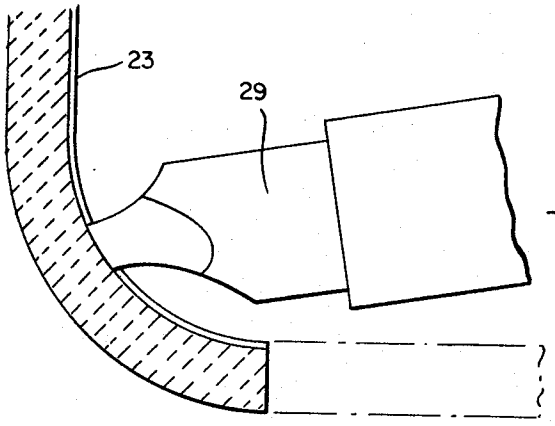


Fig. 10

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NOZZLE FOR SUPPLYING FILLER MATERIAL BETWEEN ADJACENT SURFACES

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a nozzle adapted to apply filler material into the void formed by two adjacent parallel edges or the like in a way that ensures the appropriate placement and surface contour of the material with little or no additional cleanup of the contiguous surfaces after application.

2. Description of the Prior Art

Heretofore, the conventional nozzles available separately or in combination with a prepackaged supply of filler material or the like are of cone-shaped configurations and have relatively thin walls of constant wall thickness. By reason of the conical shape, any wearing away of the tip caused an increase in the aperture size and therefore resulted in an uncontrolled size of ribbon of material extruded from the nozzle. This leaves much to be desired, not only in the appearance of the filled joint, but in the shaping and cleanup necessary due to the excessive amount of material extruded. Such configuration also has no "striking" capabilities, that is, the ribbon of material laid down produced a convex shape that apparently bulged from within the surfaces between which it was placed. To the contrary, the trade desires a smooth, flat or concave surface of filler material which appears to blend smoothly with the edges of the contiguous surfaces forming the void.

SUMMARY OF THE INVENTION

It is apparent therefore that an improved nozzle of the type described must be capable of directing the flow of filler material accurately into the void to the proper depth, and at the same time shape or "strike" the joint formed in order to eliminate a separate, time consuming, cleanup of material on the contiguous surfaces. Additionally the improved nozzle must be capable of being shaped to accommodate various configurations of adjoining surfaces and to not vary its initial delivery of filler material as any wear occurs upon the tip. Moreover, the nozzle must fit standard connections of filler supply packages. These improvements are provided by the nozzle construction of my invention which comprises a cylindrical barrel having threaded connecting means at one end and a shaped applicator tip at the other end. The barrel is bored throughout, with the tip end of the bore having an accurately dimensioned constant diameter. The tip itself is formed by four intersecting beveled surfaces, i.e. a pair of opposed-angled cheeks which control side-to-side movement and vertical depth of the nozzle tip, as well as creating a seal between the void and adjacent contiguous surfaces, a leading surface which permits the nozzle to follow the void and which depresses previously filled void of the same material which intersect at an angle, and a trailing surface adapted to permit the tip to strike the exposed surface of the ribbon of filler material as the nozzle is progressed along the void without causing drag.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a nozzle construction of my invention;

FIG. 2 is a side elevational view of the nozzle of FIG. 1 shown in operative position;

FIG. 3 is a rear view of the nozzle of FIG. 1 shown in operative position;

FIG. 4 is an enlargement of a view taken along the lines and in the direction of the arrows 4—4 of FIG. 2;

FIG. 5 is an enlargement of the view shown in FIG. 3 showing the deposit of filler material by the nozzle;

FIG. 6 is a schematic view of a modification of the nozzle construction of my invention;

FIG. 7 is a schematic view of another modification of the nozzle construction of my invention;

FIG. 8 is a schematic view of another modification of the nozzle construction of my invention;

FIG. 9 is a schematic view of another modification of the nozzle construction of my invention;

FIG. 10 is a schematic view of another modification of the nozzle construction of my invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, FIG. 1 shows a nozzle of my invention, which consists of a cylindrical barrel means 11, having connecting means in the form of threads 12 formed at one extremity thereof. The opposite end of the barrel means 11 forms a tip 13 by reason of the geometric intersection of the surfaces of opposing cheek means 16, 17, trailing surface 18 and leading surface 19. Additionally referring to FIG. 2 and 3, it is seen that there is formed in nozzle 10 centrally of cylindrical barrel 11 a longitudinal bore comprising supply bore portion 14 and constant diameter bore portion 15. The relationship of bore portions 14 and 15 is shown by dotted lines in FIG. 2. The broken lines of FIG. 2 surrounding the threads 12 and extending longitudinally therefrom represent conventional supply means for filler material such as grout, mastic, caulking compound and the like. The remaining broken lines in FIG. 2 represent the level of the adjacent contiguous surfaces 20 shown in section in FIG. 3. It will readily be seen, therefore that the flat tip 13 of the nozzle 10 in FIG. 2 is parallel to the broken level line, and in such position causes the cylindrical barrel 11 to be inclined to the vertical. In this position, the nozzle 10 is capable of depositing a supply of filler material through supply bore portion 14 and constant diameter bore portion 15 in the form of a continuous ribbon 22 between the opposing edge surfaces 21 of adjacent contiguous surfaces 20. To accomplish such application in my preferred manner, the direction of movement of nozzle 10, as shown by the horizontal arrow in FIG. 2 must be observed. The angle to which the leading surface 19 is cutback, or relieved from the tip 13 ensures that the tip 13 will follow the contours of the edges forming the space between opposing edge surfaces 21. The angle to which the trailing surface 18 is cutback, or relieved at a distance spaced from the aperture of the tip 13 such that the ribbon 22 of the filler material is "struck" cleanly as it is deposited, thereby avoiding "drag" and unnecessary "-cleanup." The preferred angles at which the aligned bore portions 14 and 15 are inclined to the work surface are those angles between about 45° and about 75°. At these inclinations, the operator comfort and visibility was at the optimum. At greater angles approaching 90° to the work surface undesirable chatter between the nozzle and the work surface occurred and it became difficult to observe the material to be extruded from the tip 13. At lesser angles approaching the work surface, difficulty was encountered with maintaining the tip in contact with the work surface while maintaining the desired movement of the nozzle at such angle. While the angulation of the opposing cheek means 16, 17, shown in the construction of nozzle 10, is equiangular to both sides of the axis of the aligned bores 14, 15 thereof, it will be seen hereinafter that such angulation is a matter of choice with respect to the application which the nozzle is put. Moreover, the contour of cheeks 16, 17 may be either flat, concave or convex, depending upon the edge contours encountered.

It is important that the constant diameter bore portion 15 extend from the tip 13 a sufficient distance within the barrel 11 that upon any slight wearing away thereof by natural abrasion, such bore will remain constant, thereby ensuring a consistent supply of filler material. With conventional conical thin wall nozzles, natural abrasion leads to an uncontrolled increased supply of material extruded. For use in filling particularly narrow voids, it is preferable that the constant diameter bore portion have a rectangular or elliptical cross section with the major dimension of the rectangle or ellipse parallel to the length of the void being filled, to facilitate sufficient material being extruded while holding the width of the extruded ribbon to a minimum.

MODIFIED EMBODIMENTS

While the nozzle **10** hereinbefore described is ideally suited to apply a filler material to the void formed by the parallel edges of two adjacent surfaces located in the same plane, in practical experience many other work configurations are encountered. In such cases, which usually involve as well the usual planar arrangement of surfaces, modified nozzle embodiments within the scope of the construction of my invention are required to ensure that the finished line of filler material will closely resemble that made by the basic nozzle **10** with respect to planar surfaces.

Therefore, in FIG. **6**, wherein the surfaces of tiles **23** form an inside angle, the angle of the cheek means of modified nozzle **24** will be less than that of nozzle **10** to allow the line of filler material to be set at the same depth as with nozzle **10** in its designed use. This angle of the cheek means is dependent upon the angle of the surfaces being joined, and should be approximately one quarter of the angle. For example, as in FIG. **6**, with a 90° angle between the surfaces, the angle between the cheeks should be approximately 45°, i.e. twice the 22½° angle of each cheek means from the central axis of the bore means.

Additionally, in FIG. **7**, wherein the contiguous surfaces **25** form an outside angle, the angle of the cheek means of modified nozzle **26** is likewise dependent upon the angle of these surfaces **25**, and should be each equal to approximately one quarter of that angle. For example, as in FIG. **7**, the outside angle of 270° dictates a nozzle tip **26** with its cheeks each angled 67½° to the central axis of the bore means thereof. However, it is also apparent from FIG. **7**, that modified nozzle **26** has a constant diameter bore portion of increased diameter to accommodate the lack of parallelism between the opposing edge surfaces of tiles **25**.

FIG. **8** presents the situation where it is necessary to fill a void which is both parallel to an abutting surface and in close proximity to it, such as for example, an adjoining wall fixture or pipe. In such case, it is difficult if not impossible for an operator to properly hold the nozzle and filler material supply means perpendicular to the work surface. Therefore, modified nozzle **27** has been constructed with unequal cheek angles (75°, 15°), allowing the nozzle to be used at a 30° inclination to the work surface and permitting proper application of the filler material.

FIG. **9** presents the situation where it is necessary to fill a void which runs perpendicular to abutting surfaces. In such case, modified nozzle **28** has been provided wherein the trailing surface **18** thereof is squared off, i.e. set at a 90° angle to the surface of the tip of nozzle **28**. This relieved trailing surface is also, of necessity, placed closely adjacent to the opening of the constant diameter bore portion in the tip.

FIG. **10** presents the situation where it is necessary to fill a void formed by abutting surfaces having concave radii. In such case, modified nozzle **29** has been provided wherein the tip **13** is curved in order to conform to the concave radii of the tile **23**, and the trailing surface **18** and leading surface are relieved to a greater extent that is true with nozzle **10**, to allow for clearance between those surfaces and the curved work surface of the tile **23**.

I claim:

1. A nozzle for the distribution of filler material, having a plastic consistency, comprising

a. generally cylindrical barrel means,

b. central bore means extending longitudinally throughout the extent of said barrel means and forming a supply opening and a tip opening,

c. tip means surrounding said tip opening, said tip means being formed by the intersection of

d. a pair of opposed beveled cheek surface means formed on said barrel means,

e. a beveled trailing surface formed on said barrel means, and

f. a beveled leading surface formed on said barrel means, said leading surface and trailing surface being opposed diametrically and generally equidistantly between said opposed cheek surface means, and wherein said bore means in the vicinity of said tip means has a substantially constant diameter.

2. The nozzle of claim **1** wherein said barrel means is provided with means for connecting a supply package of filler material thereto in the vicinity of said supply opening.

3. The nozzle of claim **1**, wherein the trailing surface intersects said tip means along a line spaced from said tip opening a distance sufficient to permit said tip to strike a clean grout line, but insufficient to cause drag.

4. The nozzle of claim **1**, wherein the angle of bevel of said leading surface is such that it permits sufficient mobility of the nozzle to allow it to follow the contours of the edges of a void whether irregular or straight, and to gently depress the filler material in previously filled voids intersecting at an angle.

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