

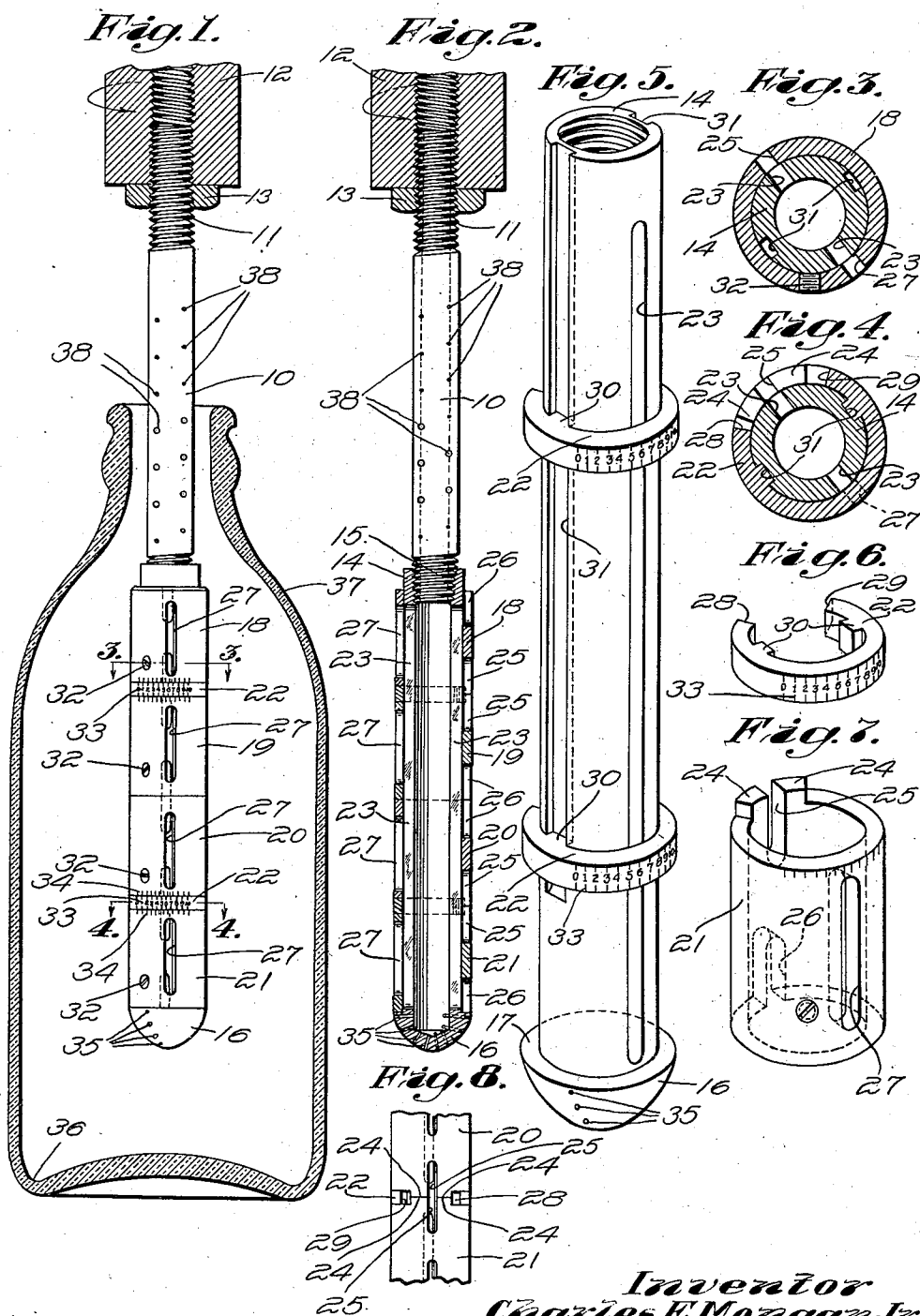
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ADJUSTABLE NOZZLE FOR TEMPERING BOTTLES AND OTHER GLASS CONTAINERS

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ADJUSTABLE NOZZLE FOR TEMPERING
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This invention relates to improvements in nozzles for applying cooling fluid to the interior of bottles and other glass containers, particularly in treating such containers to effect tempering thereof.

An object of the invention is to provide a nozzle of the character described which can be readily and accurately adjusted to vary in zones extending longitudinally of the nozzle the discharge of cooling fluid therefrom.

A further object of the invention is to provide a nozzle of the character described which can be adjusted to effect independent adjustment of the discharge of cooling fluid therefrom at any one of a plurality of different places along the length of the nozzle.

A further object of the invention is to provide a nozzle for applying cooling fluid to all points on the inner surface of a bottle or other glass container according to a predetermined cooling pattern which can be varied at will in zones extending longitudinally of the container.

A still further object of the invention is to provide a nozzle of the character described which will afford a wide range of adjustment of the effective discharge of cooling fluid therefrom so that the same nozzle can be used to effect tempering of bottles and other glass containers of widely differing shapes and sizes and requiring widely different tempering treatments.

Other objects and advantages of the invention will hereinafter be pointed out or will become apparent from the following description of an illustrative practical embodiment of the invention as shown in the accompanying drawing, in which:

Figure 1 is a view, mainly in side elevation but partly in vertical section, showing a nozzle of the present invention in an operative position within a bottle;

Fig. 2 is a view, generally similar to Fig. 1, but with the body and head of the nozzle shown in longitudinal vertical section and with the bottle omitted;

Fig. 3 is a transverse section in enlarged form along the line 3-3 of Fig. 1;

Fig. 4 is a transverse section in enlarged form along the line 4-4 of Fig. 1;

Fig. 5 is a relatively enlarged perspective view of the nozzle body as it appears without the outer rotatably adjustable sleeve members of the body structure of the preceding views;

Fig. 6 is a relatively enlarged perspective view of one of the ring sectors of the nozzle body;

Fig. 7 is a relatively enlarged perspective view of one of the sleeve members of the tubular outer structure of the body of the nozzle; and

Fig. 8 is an elevation of a fragmentary portion of the nozzle body, showing the relation between assembled adjacent sleeve members and

their association with an interposed ring sector.

A nozzle embodying the invention may comprise a tubular stem 10 having an externally threaded end portion 11 screwed into an internally threaded rotary chuck or holder 12. A jam nut 13 may be tightened on the threaded portion 11 of the stem 10 against the chuck or holder 12.

The nozzle comprises an elongate hollow body 14 which includes a tubular inner body member 14 having internal screw threads at one end portion thereof for engagement with the externally screw threaded adjacent end portion 15 of the stem 10. The opposite end portion of the inner tubular member 14 may be provided with a hollow head or tip 16 which may be of substantially conoidal or hemispherical form, as shown. This head may be larger externally than the tubular member 14 at its juncture with the latter so as to provide a rearwardly facing shoulder 17. The head or tip 16 may be integral with the member 14 or separate and connected therewith in any suitable known manner.

The body of the nozzle also comprises an outer tubular structure which may include a plurality of rotary sleeves, respectively indicated at 18, 19, 20 and 21, and a plurality of combination spacing, rotation limiting and indicating members 22, each of which comprises a major segment or sector of a complete ring.

The inner body member 14 is provided with a plurality of longitudinally extending narrow discharge apertures or slots 23. In the example shown in the drawing, there are two of these slots 23. They are disposed diametrically opposite each other and each extends in the member 14 from a point adjacent to the threaded connection of that member with the stem 10 to a point adjacent to the opposite end of the member 14.

The sleeves 18, 19, 20 and 21 may be structurally alike, although different sleeves may be arranged in reversed positions on the inner body member, as presently will be described. The description of the sleeve 21, shown in Fig. 7, will suffice as a description of each of the other sleeves.

With reference to Fig. 7, it will be noted that the sleeve 21 comprises a cylindrical member formed with one end surface thereof planiform and with the other end surface thereof also lying in a single plane except for a pair of end extensions or lugs 24. These respectively are located at the opposite sides of an aperture or slot 25 which extends longitudinally in the sleeve for part of the length thereof. The length shown is less than half the length of the sleeve 21. A generally similar slot or aperture 26 extends from the opposite end of the sleeve 21 in alignment

with the slot 25 for approximately a like part of the length of the sleeve, or in other words, less than half the complete length thereof.

At the opposite side of the sleeve 21 from the aligned slots 25 and 26 is a longitudinally extending aperture or slot 27, which extends between points adjacent to the opposite ends of the sleeve. The slot 27 is approximately as long as the combined lengths of the slots 25 and 26 and is in part diametrically opposite or transversely aligned with each of the latter. These slots all may have the same width.

Each member 22, an example of which is shown to advantage in Fig. 6, comprises a major segment or sector of a ring having inner and outer diameters approximating those of the cylindrical sleeve 21. The arcuate space between the ends 28 and 29 of the member 22 is adapted to accommodate and to permit limited angular bodily movement therein of the lugs 24 on one end of the sleeve 21 when these members are in aligned contiguous relation on the inner tubular member 14, as and for a purpose hereinafter explained. The width of the member 22 is approximately twice that of the extent of projection of the lugs 24 from the adjacent end surface of the sleeve member 21.

When a member 22 is disposed on the inner body member 14 between adjacent sleeves, as between the sleeves 20 and 21, as shown in Figs. 1, 2 and 8, the arcuate gap between the ends 28 and 29 will accommodate the abutting lugs 24 of the adjacent relatively reversed sleeves so that the adjacent slots 25 of these two sleeve members form in effect a longitudinally extending slot. This arrangement also permits each of these sleeve members to be independently rotated about its axis to a limited extent before one or the other of its lugs 24 contacts with the adjacent end 28 or 29 of the adjacent member 22. The member 22 is prevented from turning with the sleeve or relative to the member 14 by the engagement of inwardly extending lugs 30 on the member 22 with longitudinally extending opposite grooves or keyways 31 on the tubular member 14.

In assembling the parts of the nozzle body, as shown in Figs. 1 and 2, the sleeve 21 is placed on the member 14 with the flat end of such sleeve against the shoulder 17 next to the head or tip of the nozzle body 1. A member 22 is then placed on the inner body member 14 against the sleeve 21, the latter being turned angularly about the axis of the member 14 so that the lugs 24 of the sleeve will be located in the arcuate gap between the ends 28 and 29 of the member 22. The slots in the opposite portions of the sleeve then will be located radially outward from the discharge slots or apertures 23 in the member 14. The sleeve 20 is now placed on the inner body 14 with the endwise projecting lugs 24 of such sleeve turned forwardly or toward the sleeve 21. This is followed by another sleeve, specifically the sleeve 19, which is placed on the inner member 14 in a reverse position from that occupied by the sleeve 20. In other words, the two flat end surfaces of the sleeves 19 and 20 abut each other. Another of the members 22 is now placed on the tubular member 14, followed by the sleeve 18. The relative positions of the sleeves 19 and 18 in respect to each other, and to the intervening member 22, are the same as those of the sleeve 21 and 20 and their intervening member 22.

With the arrangement just described, the longitudinal discharge slot 23 in the inner member 14

of the nozzle body at one side of the latter will be located radially inward from the aligned slots 26 and 25 in the sleeves, while the other slot 23 in the member 14 will be similarly located with relation to the aligned slots 27 in these sleeves. As best seen in Fig. 2, the arrangement of the nozzle body parts, as just described, provides vertically overlapping discharge apertures or slots of approximately like lengths along the greater part of the nozzle body. The width of the elongated streams of fluid discharge from the nozzle body at one side thereof through the slots 27 and the width of the streams of fluid discharge from the slots 25 and 26 at the opposite side of the nozzle body may be adjusted from zero to the full width of these slots by the angular adjustment of the sleeve about the axis of the angular body. This adjustment may be made independently and to different extents in zones extending longitudinally of the nozzle body by independent adjustment of the several sleeves. A set screw 32 may be threaded through a suitable opening in each sleeve against the inner tubular member 14 to retain that sleeve member in its angularly adjusted position.

The extent of angular adjustment of each sleeve for the purpose of regulating the discharge of fluid from that portion of the nozzle body at opposite sides thereof may be predetermined nicely by the use of a Vernier scale, which includes graduations 33 on the adjacent member 22 and cooperative graduations 34 on the sleeve member. Thus, the lateral fluid discharge from the nozzle body may be selected and adjusted accurately according to the particular service requirements at any time.

The head or tip 16 of the nozzle body may be provided with discharge orifices so located and of such size or sizes as are deemed best adapted for the service intended. As shown, orifices indicated at 35 are provided in a series which extends transversely across the head or tip 16 and are of different sizes at different places on the head. Specifically, the orifices 35 which will be directed toward the inner corners 36 of a bottle 37, or generally similar glass container to be tempered, may be larger than other orifices 35.

The stem 10 of the nozzle likewise may be provided with discharge orifices suitably located and of such size or sizes as conditions warrant or make desirable. In the example shown, the stem 10 is provided with four longitudinally extending series of spaced orifices 38. The respective series of orifices 38 are spaced angularly around the periphery of the stem 10 and certain of the orifices 38 of each series are larger than others. Thus, the orifices 38 which will be turned toward the thicker portions of the neck of the bottle 37 may be larger than other orifices 38.

In using the nozzle to temper a bottle, for example, such nozzle and the bottle may be supported with relation to each other so that the nozzle will depend within the bottle to the position desired, as to that shown in Fig. 1. It of course will be understood that the holder or chuck 12 may be suitably formed to conduct a cooling fluid under pressure from any suitable source of supply (not shown) to the stem of the nozzle. The cooling fluid will be discharged from the nozzle through all available discharge orifices or outlets. Relative rotation between the nozzle and the bottle may be effected in any suitable known way and by the use of any suitable known means. Differential cooling of different portions of the bottle may be effected by independent ad-

ustment of the several sleeves, as required. Thus, greater or more rapid cooling may be effected of thicker portions of the walls of the bottle than of the thinner portions of such walls.

It also will be understood that the nozzle may be included in a mechanism which will include means (not shown) of any suitable known construction and mode of operation for positively cooling the exterior of the bottle or other glass container.

The length of the nozzle may be varied to meet various requirements by using nozzle body parts of different lengths and more or less of the parts which are alike or substantially duplicates. Many other changes in or modifications of the structure of the illustrative nozzle shown in the drawing and herein particularly described will readily occur to those skilled in the art.

I claim:

1. A nozzle of the character described comprising a tubular body member having a longitudinally extending narrow discharge aperture at one side thereof, a longitudinal series of sleeves on the body member, each independently rotatable around the axis of the body member independently of the body member, each sleeve having an elongate narrow aperture adapted to uncover a portion of the aperture in the body member for the full width of said last named aperture when the sleeve is angularly adjusted on the body member to a particular position thereon and to vary to zero the extent that said portion of the aperture in the body member will be open on rotation of said sleeve member from said particular position in either direction, and ring segments on the body member between adjacent sleeves, said ring segments being secured against rotary movement relatively to the body member so that the ends of each ring segment are located at opposite sides of the longitudinally extending discharge aperture in said tubular body member at substantial distances from said opposite sides of that aperture, the adjacent sleeves on said tubular body member having longitudinally extending lugs at their adjacent ends projecting into the arcuate gap between the ends of the intervening ring segment, the free ends of said lugs being close to each other, said lugs being formed to provide slots therein constituting end extensions of the elongate narrow apertures in said sleeve and the width of said lugs being sufficiently less than that of the gaps between the ends of the ring segment to permit said angular adjustments of said sleeves on said tubular body member.

2. A nozzle of the character described comprising a tubular body member having a pair of opposite longitudinally extending narrow discharge apertures in the walls thereof, a longitudinal series of sleeves rotatably mounted on the body member, each having an elongate aperture at one side thereof adapted to register with a portion of one of the longitudinally extending apertures in the body member, each of said sleeves also having aligned apertures in the opposite side thereof extending from the opposite ends of the sleeve longitudinally thereof for approximately half the length of the first named aperture in the sleeve and past the level of the adjacent end of said first named aperture in the sleeve, said aligned second named apertures in each sleeve being adapted to register with portions of the second longitudinally extending aperture in the body member when the first named aperture in said sleeve is in register with

the first longitudinally extending aperture in the body member, and means for limiting the rotary movements of the sleeves on the body member.

3. A nozzle of the character described comprising a tubular body member having a pair of opposite longitudinally extending narrow discharge apertures in the walls thereof, a longitudinal series of sleeves rotatably mounted on the body member, each having an elongate aperture at one side thereof adapted to register with a portion of one of the longitudinally extending apertures in the body member, each of said sleeves also having aligned apertures in the opposite side thereof extending from the opposite ends of the sleeve longitudinally thereof for approximately half the length of the first named aperture in the sleeve and past the level of the adjacent end of said first named aperture in the sleeve, said aligned second named apertures in each sleeve being adapted to register with portions of the second longitudinally extending aperture in the body member when the first named aperture in said sleeve is in register with the first longitudinally extending aperture in the body member, and means for limiting the rotary movements of the sleeves on the body member, said nozzle also having a hollow head at one end of said tubular body member, said head being provided with discharge orifices.

4. A nozzle of the character described comprising a tubular body member having a pair of opposite longitudinally extending narrow discharge apertures in the walls thereof, a longitudinal series of sleeves rotatably mounted on the body member, each having an elongate aperture at one side thereof adapted to register with a portion of one of the longitudinally extending apertures in the body member, each of said sleeves also having aligned apertures in the opposite side thereof extending from the opposite ends of the sleeve longitudinally thereof for approximately half the length of the first named aperture in the sleeve and past the level of the adjacent end of said first named aperture in the sleeve, said aligned second named apertures in each sleeve being adapted to register with portions of the second longitudinally extending aperture in the body member when the first named aperture in said sleeve is in register with the first longitudinally extending aperture in the body member, means for limiting the rotary movements of the sleeves on the body member from positions at which said apertures in the sleeve and in the body member are in register, said nozzle also having a hollow head at one end of said tubular body member, said head being provided with discharge orifices, and a tubular stem connected with the tubular body member at the end opposite said head, said tubular stem having spaced lateral discharge orifices in the walls thereof.

5. A nozzle of the character described comprising a tubular stem, said stem having continuously open lateral discharge orifices of predetermined fixed sizes at predetermined places along the length and around the periphery thereof, an elongate tubular body connected with the other end of said stem, said elongate tubular body having a longitudinal series of spaced lateral discharge outlets of variable size, and a hollow head at the end of the elongate body opposite from the stem, said head having spaced continuously open orifices of fixed size.

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