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MECHANISM FOR APPLYING LUTING TO GLASS
FEEDER ORIFICE RINGS
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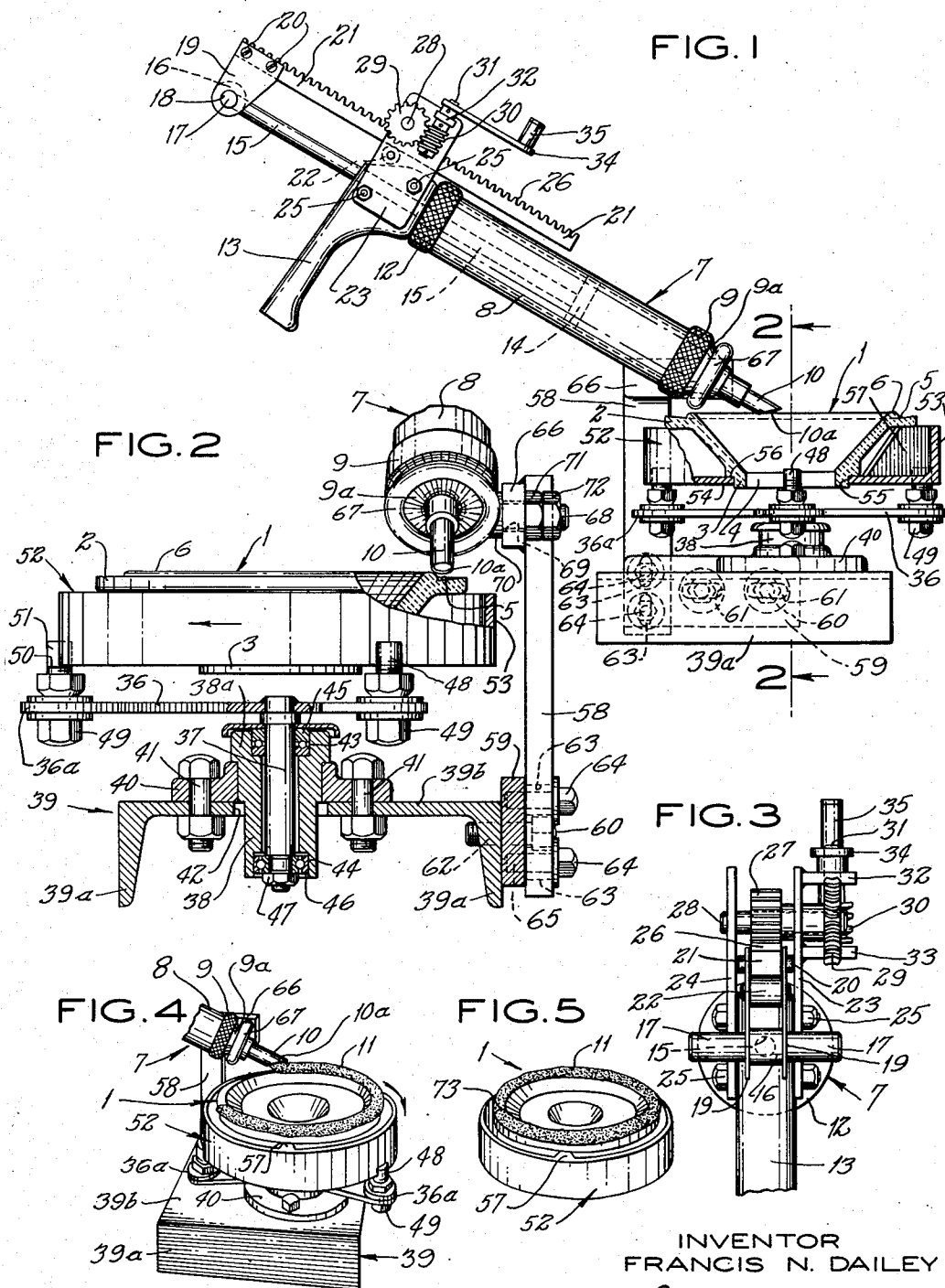
FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5



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MECHANISM FOR APPLYING LUTING TO
GLASS FEEDER ORIFICE RINGSFrancis N. Dailey, Rockville, Conn., assignor to
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This invention relates generally to the art of luting orifice rings so as to provide a glass-tight seal between such an orifice ring and the bottom outlet wall of a glass feeder spout when the orifice ring has been applied to such spout.

An object of the invention is to provide a conveniently usable mechanism for applying glass luting quickly, accurately and effectively to orifice rings.

It has been customary prior to the present invention to prepare a luting mixture of clay and water and to work or roll this mixture by hand to the desired consistency and form and then to apply such luting to the upper surface of an orifice ring to be installed by finger action on the part of the workman. This is a slow operation and moreover tends to result in a luting ring which is far from uniform in cross-sectional shape and dimensions at different places around the top of the orifice ring. This is an undesirable condition. If the differences are too great or abrupt, improper positioning of the orifice ring may result when the orifice ring and the luting thereon are applied against the bottom of the feeder spout bottom outlet wall or the required glass-tight seal may not be provided at all points between the orifice ring and the bottom outlet wall. The operation of applying luting satisfactorily to an orifice ring by manual action necessarily was dependent upon the judgment, skill and careful attention of the workman.

The present invention obviates the above and other shortcomings and disadvantages of the prior art practice of applying luting by hand to an orifice ring. The mechanism of the present invention for applying luting will dependably provide on the orifice ring a luting ring which is of a predetermined, desirable cross-section and is substantially uniform throughout. Also, the luting applying mechanism of the present invention may be operated by a workman who need not be highly trained or skilled in the work. The invention, therefore, eliminates trouble from unskilled or careless hand luting.

By greatly reducing the time required to apply luting to an orifice ring as compared with the hand operation customarily employed prior to the invention, the time for absorption of water from the luting by the more or less porous orifice ring is greatly reduced and the luting therefore may be in a more plastic condition when forced up in place under and against the spout. This aids in the provision of the desired seal and glass-tight joint between the orifice ring and the bottom of the feeder spout.

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The mechanism of the present invention also permits use of a clay-water luting mixture of thinner consistency than can be worked by hand and thus permits application to an orifice ring of a luting of clay with less plastic component than can be worked by hand. This results in less shrinkage of the luting after it has been applied and is up to working temperature.

Application of luting to an orifice ring by the mechanism of the present invention also has the further advantage that it permits a clay-water luting mixture to be made in advance of an orifice ring change and kept in an airtight chamber that is provided in such mechanism where it will not dry out appreciably until applied, even though kept for several hours.

Other objects and advantages of the present invention hereinafter will be pointed out or will become obvious from the following description of a practical embodiment of the invention as shown in the accompanying drawings, in which

Fig. 1 is a view mainly in side elevation, showing mechanism of the present invention in position to apply luting to the upper surface of the orifice ring, the latter being shown in vertical section in a holder therefor which is partially broken away and in section;

Fig. 2 is a relatively enlarged view of the mechanism as viewed from a vertical plane indicated by the section line 2—2 of Fig. 1, the orifice ring and its holder being shown in elevation except for small portions of the side walls thereof which are broken away and shown partially in section;

Fig. 3 is a partial rear end view of a luting gun or extruding device of the mechanism as shown in Fig. 1;

Fig. 4 is a perspective view of the means to rotatably support the orifice ring for rotation about its axis during application of luting thereto from the luting gun, only a fragmentary forward end portion of the latter being shown; and

Fig. 5 is a perspective view of the orifice ring in its holder after application of a ring of luting thereto.

An orifice ring suitable for use in a well known glass feeder is indicated at 1 in Figs. 1, 2, 4 and 5. As best seen in Fig. 1, such orifice ring is generally of inverted frusto-conical shape and has an externally flanged upper end portion as indicated at 2, and a relatively reduced, or smaller substantially cylindrical lower end portion, indicated at 3, formed internally to provide a final discharge orifice 4 of the desired cross-sectional configuration and size. Such an orifice ring, which is conventional and may vary widely in specific shape

and in the relative dimensions of different portions thereof from the example shown, customarily is applied to the lower end of an outlet wall in the bottom of a refractory glass feeder spout (not shown) by pressing it firmly to place against and in alignment with such outlet wall after glass luting has been placed on the upper surface of the orifice ring for the purpose of providing a glass-tight seal and joint between the orifice ring and the feeder spout outlet wall, the orifice ring of course being retained in place during the period of its service. It is necessary to replace orifice rings frequently in the operation of a glass feeder, as when it is desired to effect a change in the size of the final discharge orifice from which glass is to be fed or because the orifice ring has been rendered unsuitable for further use by reason of wear, breakage or other cause. It, therefore, is importantly advantageous to be able to apply luting to such an orifice ring quickly, accurately and uniformly.

The orifice ring has its upper surface provided with a shallow circular groove, indicated at 5, Figs. 1 and 2, concentric therewith and extending from its outer periphery for only part of the radial distance to its inner periphery. A slightly raised circular rib or bead 6 may be provided on the orifice ring at the inner edge of the groove 5 and the bottom of such groove may slope radially inward toward such rib or bead. The rib or bead 6 and the groove 5 form a partial seat for luting applied to the orifice ring upper surface and aid in positioning such luting thereon. Any suitable or preferred grooving or formation of the upper surface of such an orifice ring may be employed.

The mechanism of the present invention as shown in the drawings includes a luting gun 7 comprising a cylindrical barrel or casing 8 provided at its forward end with a cap 9 from which projects a luting discharge nozzle 10. The cap 9 may be secured detachably in place on the forward end of the barrel 8 in any suitable known way, no means being shown therefor. The nozzle 10 may be an integral prolongation of the cap 9 or may be formed separately and secured thereto in any suitable known way. The cross-sectional configuration and size of a column of plastic luting issuing from the gun 7, as indicated by way of example at 11 in Fig. 4, will be determined by the internal configuration and size of the discharge end of the nozzle 10. These may have been selected as most suitable or preferred for application of luting to a particular orifice ring and of course may be changed by interchange of different nozzles on the same gun barrel. Thus, a cross-section of the extruded column of plastic luting may be substantially circular as shown, trapezoidal, elliptical or any other desired geometrical shape.

The barrel 8 has a cap 12 on its rearward end. This, like the cap 9, may be detachably secured in place in any suitable known manner. A suitable handle, which may be of a pistol-grip type as indicated at 13 in Fig. 1, may be integral with the rear cap 12 or formed separately and secured thereto or to the rear end of the gun barrel in any suitable known way. The gun structure end parts which have been described so far are conventional and may vary widely in details from those shown.

The gun barrel 8 is of sufficient capacity to accommodate an adequate amount of plastic luting in advance of a slidably fitting piston 14 therein. The luting may be introduced into the

barrel at the forward end thereof after the cap 9 and nozzle 10 have been temporarily removed therefrom for this purpose or in any other suitable way. The piston 14 is operable by a rod 15 which extends slidably through the rear cap 12 and the upper portion of the handle 13 in a conventional way. The rearward end of the rod 15 is attached to a block 16 which has a pair of oppositely extending journal members or trunnions 17 passing through circular openings 18 in the lower portions of a pair of side plates 19, the upper ends of which are rigidly connected, as by screws 20, to the rearward end portion of a rack bar 21. The members 17 may project laterally from opposite sides of the plates 19 sufficiently to enable them to be grasped and manipulated or used as handles if desired.

Rack bar 21 rides over an idle roller 22 which is rotatably mounted between a pair of supporting side plates 23 and 24, respectively, which have their lower portions rigidly secured, as by conventional fastening devices 25, to opposite sides of the upper portion of the pistol-grip handle 13. The rack bar has teeth 26 in its upper edge in mesh with the teeth of a pinion 27 which is rotatably supported between the upper portions of the side plates 23 and 24, as by being mounted on a shaft 28 having portions journaled in suitable bearings in such side plates. The shaft 28 carries a worm wheel 29 on the end thereof projecting beyond the side plate 23, this worm wheel being in mesh with a worm 30 on a short vertical shaft 31 which is rotatably supported by a pair of vertically spaced lugs or ears 32 and 33, respectively, Fig. 3, on the upper end portion of the side plate 23. The upper end portion of the shaft 31 carries a crank 34 having a laterally projecting hand grip member 35 which may be conveniently grasped and turned by one hand of a workman who may be grasping the gun handle 13 in his other hand. By turning the crank, the workman may impart longitudinal movement to the rack bar 21. This, of course, will cause similar movement of the piston rod 15 and of the piston 14 in the barrel 8. Obviously, a forward stroke of the piston 14 in the barrel 8 against a mass of plastic luting therein will force luting from the nozzle 10 in a column of a size and a shape in cross-section which have been predetermined as best suited or preferred for the luting operation to be performed.

Relative rotation between the orifice ring to which luting is being applied and the discharge end of the nozzle of the luting gun may be effected to aid in laying a column of the luting regularly around the upper surface of the orifice ring. The mechanism of the illustrative embodiment of the invention shown includes means for supporting the orifice ring with its axis vertical for rotation about such axis and for supporting the discharge end of the nozzle of the luting gun directly above and in a predetermined desirable relation to the grooved upper surface of the orifice ring when the luting gun is being supported at its rearward end in the hand of a workman and is being operated to effect the desired discharge of luting therefrom. Such mechanism comprises a horizontally disposed spider 36, Figs. 1 and 2, having a depending axial shaft 37 journaled in a vertically disposed tubular housing 38 which is carried by a base 39, all as best seen in Fig. 2. The base 39 may consist of a short channel member of metal or other suitable material, having flanges, designated 39a, turned downward

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so that its web portion, designated 39b, will be supported at a desirable height above a main supporting surface, such as a floor or table, not shown. This should be sufficient to afford clearance beneath the web for depending portions of the vertical shaft 37 and its housing 38. As shown, the tubular housing 38 has its upper end portion externally enlarged at 39a to partially overlie and rest upon a supporting ring 40 which is secured to the web portion 39b of the base by bolts 41. The thus supported tubular housing depends through an opening 42 in the web portion 39b of the base. The upper and lower ends of the bore of the tubular housing 38 may be counter-bored, as indicated at 43 and 44, respectively, to accommodate upper and lower anti-friction thrust bearing units 45 and 46, respectively, and the extreme lower end portion of the shaft 37 may be screw threaded and a nut 47 may be screwed thereon against the lower bearing unit 46. This arrangement maintains the parts just described in assembled relation while permitting convenient and easy disassembly thereof when desired. Such arrangement also assures relatively free rotation of the spider 36 around the axis of the spider shaft 37.

The spider 36 has three projecting arms 36a. The outer end portions of these arms carry short upstanding ring supporting and centering members 48. These may be upstanding shanks of headed studs 49 secured to the spider arms, such shanks being partially cut-away vertically at their inner sides from their upper ends for part of their height to provide upwardly facing supporting shoulders 50 and inwardly turned centering faces 51 on the stud shanks. In the example shown, these are appropriately located to support and center the orifice ring indirectly by directly supporting and centering a substantially dish-shaped holder 52 for the orifice ring. The holder 52 is that in which the orifice ring is held when applied to a feeder spout bottom outlet and the arrangement permits the orifice ring to remain therein for the luting operation and continuously thereafter for application of the orifice ring to the feeder spout and while it is in place on the latter. The holder 52 comprises a cylindrical side wall 53 and a flat bottom 54. The bottom 54 of the holder 52 has a central opening 55 which provides a seat for the lower end portion 3 of the orifice ring 1 when the latter has been lowered into the holder until a downwardly facing shoulder 56 on the body of the orifice ring rests upon the holder bottom 54 around the opening 55. At this time, the flanged upper end portion of the orifice ring may rest upon a plurality of angularly spaced inwardly extending radial webs 57 which are provided in the holder 52. The structural arrangement assures firm support of the orifice ring in the holder in concentric relation thereto. In actual use, the available space in the holder between the orifice ring and the holder side wall and bottom would be filled with granular insulation (not shown). When the holder has been placed on the spider 36 in supported and centered relation thereon, the orifice ring in the holder will be axially aligned with the spider supporting shaft 37 for rotation with the spider about the axis of such shaft. Obviously, any other suitable orifice ring holder may be employed and if service conditions permit, suitable provision may be made to support and center the orifice ring directly on the spider.

A standard 58 is mounted on the base 39 at one side of the latter so as to be adjustable verti-

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cally and also horizontally along the base within limits. This is accomplished in the illustrative mechanism shown by fastening a horizontal bar 59 to one of the supporting flanges 39a of the base by means of cap screws 60 extending through horizontal slots 61 and engaged with threaded openings 62 in the flange 39a of the base. This permits longitudinal adjustment of the bar 59 relative to the base when the screws 60 have been loosened. The standard is provided with vertical slots 63 in its lower portion and cap screws 64 extend therethrough into threaded engagement with suitable openings 65 in the horizontal bar 59, thereby providing for limited vertical adjustment of the standard relative to its support.

The upper end portion of the standard 58 carries a laterally extending bracket arm 66, Figs. 1, 2 and 4. An eyebolt 67 has a shank 68, Fig. 2, extending loosely through an opening 69 in the bracket arm 66 so that a shouldered inner end portion 70 of the eyebolt shank bears against the inner side face of the bracket arm 66, i. e., the side thereof that faces toward the orifice ring on the rotary spider. The eyebolt is restrained against accidental displacement from the position shown on the arm 66 by nuts 71 and 72 on the projecting end portion of the eyebolt shank, the nut 71 being tightened sufficiently against the bracket arm 66 and the nut 72 against the nut 71 to prevent accidental or unintended turning of the eyebolt about its axis while permitting such turning or swiveling movement when the rearward end of the luting gun is raised or lowered by a workman while the forward end of the gun rests in the eyebolt.

The luting gun may have its forward cap portion suitably tapered as indicated at 9a, Figs. 1, 2 and 4, to fit snugly in the eyebolt when the nozzle protrudes therefrom. It will be obvious that with this structural arrangement, the rearward end of the luting gun may be raised or lowered by the hand of a workman to position the discharge end of the nozzle at the desired distance above the upper surface of the orifice ring. The nozzle 10 of the luting gun may have its discharge end undercut and bevelled as indicated at 10a so as to be more nearly parallel to the plane of the upper surface of the orifice ring than the axis of such nozzle when the discharge end of the nozzle has been brought to a suitable discharge position closely above the orifice ring as, for example, to the position shown in Figs. 1, 2 and 4. This bevelling of the discharge end of the nozzle will assure discharge onto the upper surface of the orifice ring of a full section column of plastic luting in a direction having a downward component and also a forward component in a direction generally tangential of the bead 6 at the inner periphery of the orifice ring. I have found that relative rotation between the orifice ring and the discharge nozzle of the luting gun will be effected at the rate of extrusion of luting from the nozzle of the luting gun assembly by the torque imparted to the orifice ring by and through the column of luting discharged thereon. The luting gun may be operated by a workman who maintains the rearward end thereof in an appropriate position by grasping the handle 13 in one hand while the crank 34 is being turned by the other hand to effect forward movement of the piston 14 in the barrel of the luting gun to force luting therefrom downwardly and forwardly onto the upper surface of the orifice ring. The action is illustrated by Fig. 4 and the result by Fig. 5. Fig. 4 shows the condition at a

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stage when the major portion of a complete ring of luting has been applied. The starting point was, of course, below and slightly in advance of the discharge end of the nozzle 10 and the orifice ring has been rotated by the applied column of luting through the major part of a complete revolution. When a complete revolution of the orifice ring has been effected, the luting will have been applied in a complete circle, the discharged column then being sheared off close to the discharge end of the discharge nozzle so as to form a butt joint with the initial end of the applied luting column as indicated at 73, in Fig. 5.

It will be observed that the ring of luting on the upper surface of the orifice ring has a relatively smooth, regular surface, and is approximately uniform in thickness and contour throughout. This greatly facilitates production of a dependable glass-tight seal of uniform clay luting between the orifice ring and the bottom of the feeder spout outlet wall when the orifice ring with the luting thereon has been raised and pressed to place against the latter in a customary manner. The operation would be the same in the case of an orifice ring having a plurality of discharge orifices as for the single orifice ring shown and described.

Many changes in and modifications of the embodiment of the invention shown in the accompanying drawings and hereinbefore particularly pointed out will now become obvious to those skilled in the art and I, therefore, do not wish to be limited to the details of such illustrative embodiment.

I claim:

1. Mechanism for applying a luting mixture of clay and water or the like to a glass feeder orifice ring comprising a rotor mounted to turn freely on a vertical axis and on which such an orifice ring may be positioned with its axis aligned with the axis of rotation of the rotor and for turning movement with said rotor, and means to discharge such a luting mixture in a plastic column onto the upper surface of the orifice ring on said rotor in a direction such as impart rotation to the orifice ring and rotor by the contact of the discharged column of luting with the orifice ring so as to lay the discharged luting mixture on the orifice ring progressively around the axis thereof.

2. Mechanism for applying plastic luting to

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glass feeder orifice rings comprising a base, a rotor mounted on the base to turn about a vertical axis and adapted to support and position an orifice ring thereon with its axis aligned with the axis of rotation of the rotor, an upright support secured to the base and extending above the level of the rotor at one side thereof and adjacent thereto, an eyebolt mounted on the upper end of said upright support in overlying relation to the upper surface of the orifice ring supported on the rotor, and a luting gun having a nozzle end portion adapted to project through and be supported by said eyebolt with the discharge end of the nozzle in operative position in relation to the upper surface of the orifice ring when said gun is supported manually at the end thereof opposite the nozzle, said eyebolt being adapted to be turned about its axis while in supporting relation to the nozzle end of the gun to raise or lower the discharge end of the nozzle relative to the orifice ring.

3. Mechanism for applying plastic luting to a glass feeder orifice ring or the like comprising a luting gun comprising a barrel, a nozzle on one end of the barrel, a pistol grip handle on the opposite end of the barrel, a piston slidable in the barrel, a piston rod projecting from the second end of the barrel, a rack bar, means carried by said handle for slidably supporting said rack bar for longitudinal reciprocatory movements in parallel relation to the piston rod, means connecting the ends of the piston rod and the rack bar remote from the barrel to cause them to move in unison on longitudinal movement of either, and driving means for the rack bar comprising a crank operatively mounted on the handle, and gearing operatively connecting the crank and the rack bar.

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