

April 8, 1941.

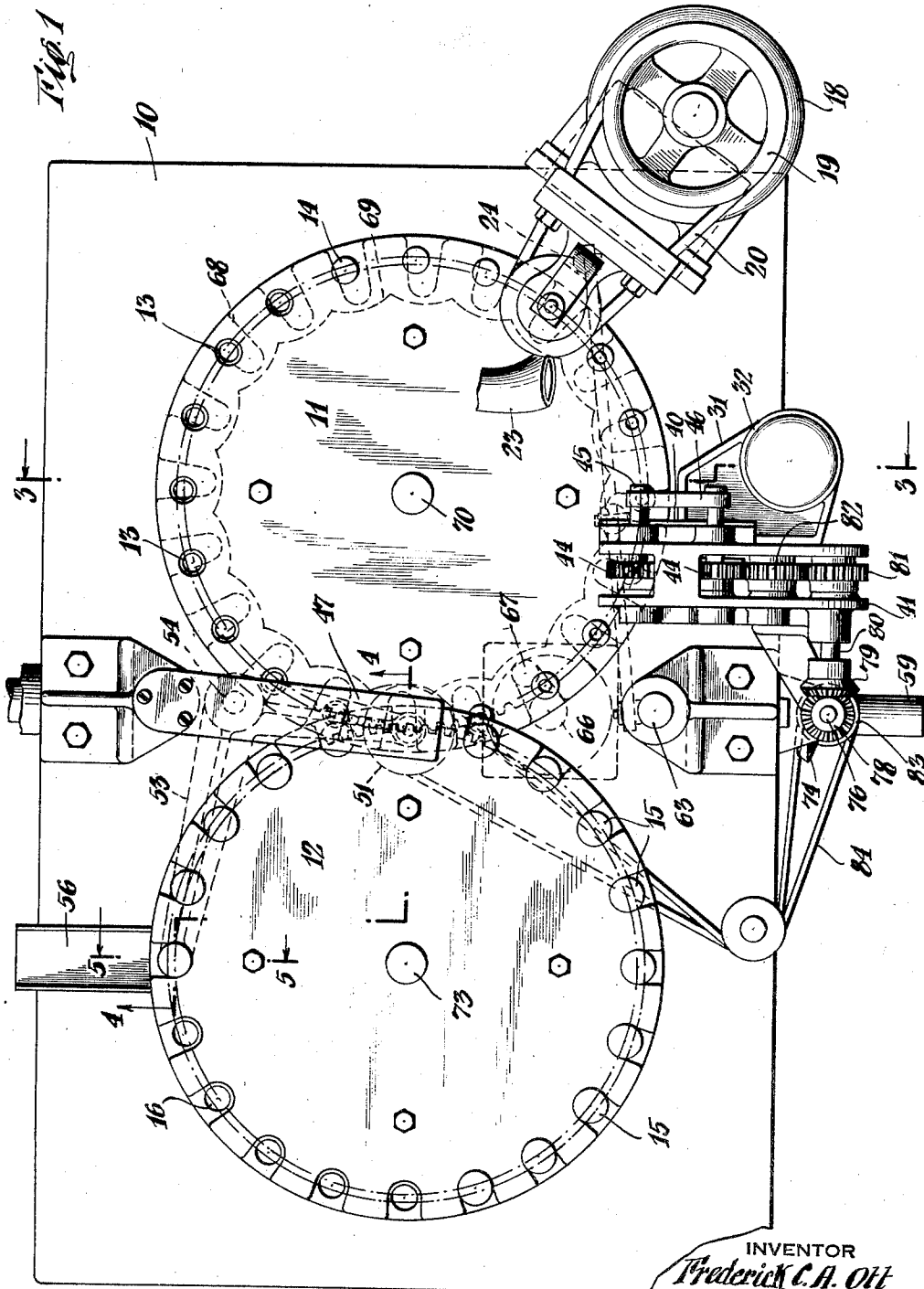
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2,237,359

APPLYING MACHINE

Filed Sept. 29, 1937

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

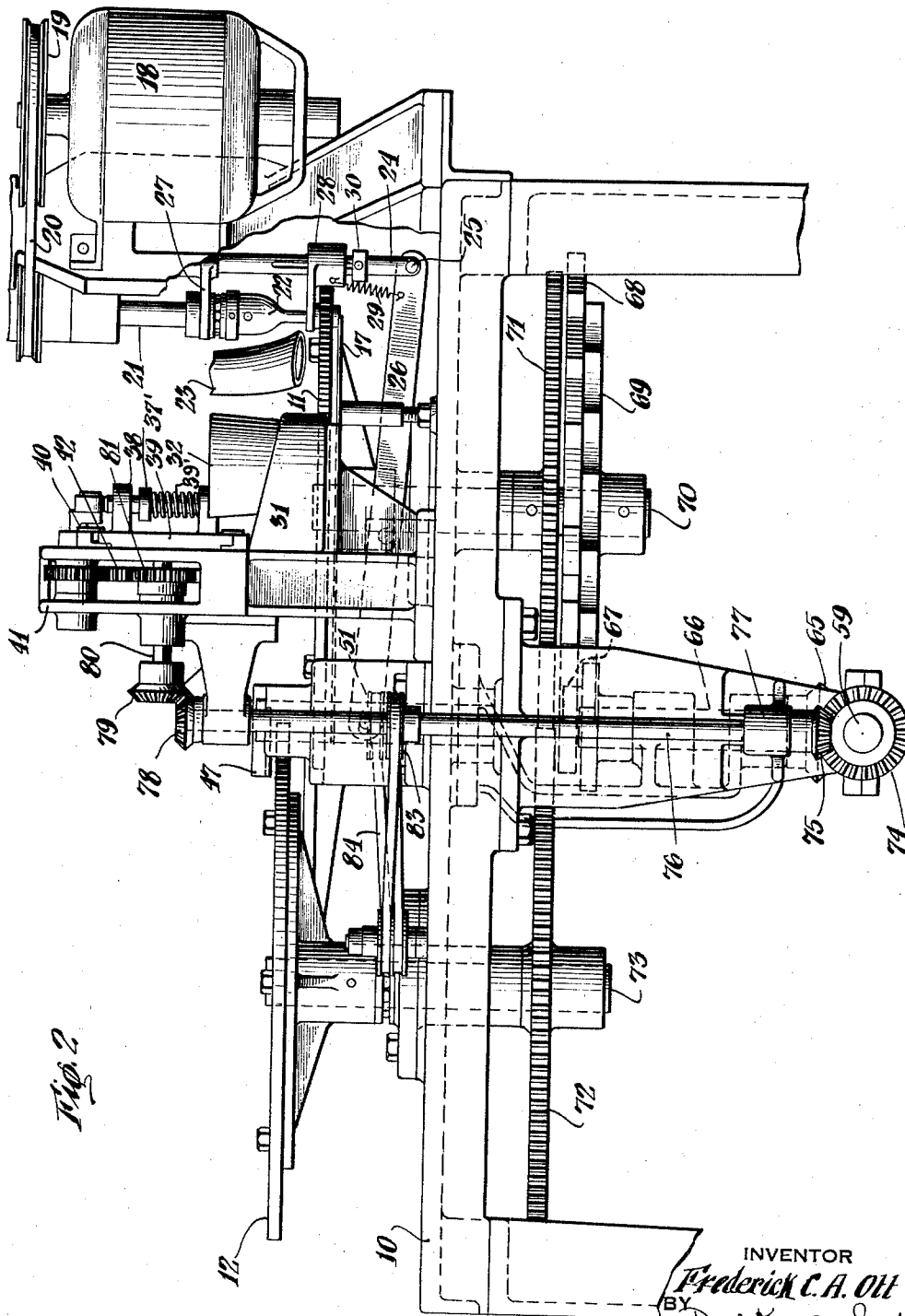


Fig. 2

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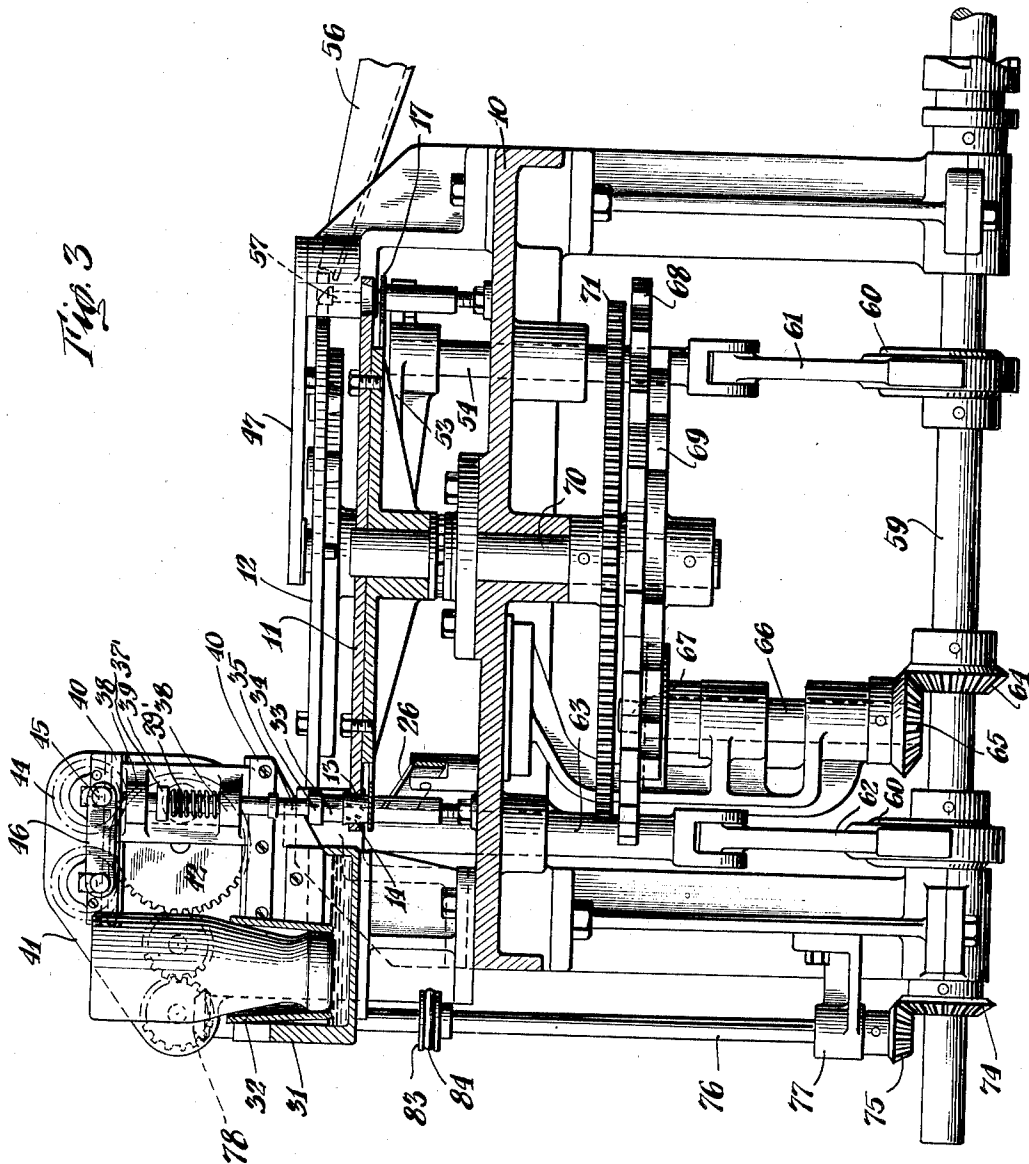
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APPLYING MACHINE

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4 Sheets-Sheet 3



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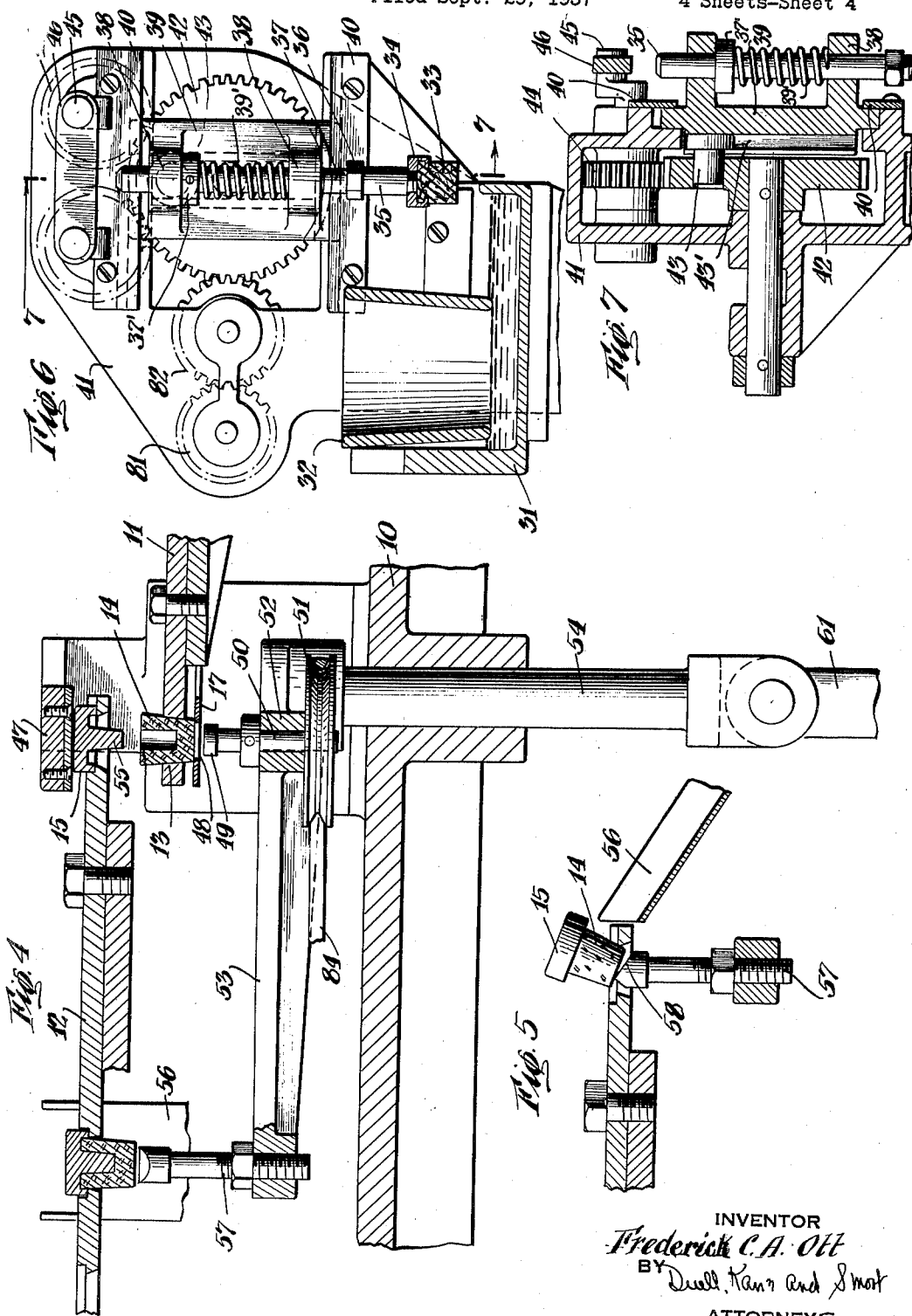
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APPLYING MACHINE

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,237,359

APPLYING MACHINE

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Application September 29, 1937, Serial No. 166,432

6 Claims. (Cl. 144—280)

This invention relates to a structurally and functionally improved applying or assembling machine.

In its more specific aspects the present invention aims to provide a machine of this character which will be of particular value in the assembling of tops for receptacles and especially tops involving a disk or head portion to which a sealing plug is secured. Ordinarily the disk or head portion may be formed of wood, molded phenol resin, or other suitable materials, and the plug may be formed of cork. While this is a preferred unit to be produced by the present machine, it is to be understood that with or without suitable modification the present apparatus might readily be employed to advantage for the production of units formed of different materials.

Thus, it is an object of the invention to provide an apparatus of this type and by means of which the plugs will be treated so that they may be properly applied and coupled to cap or disk portions.

A further and more specific object of the invention is that of combining in the same machine improved mechanism whereby plugs will be drilled and coated with, for example, an adhesive substance.

Another object is that of furnishing an assembling machine in which the plugs will be properly applied to the cap or disk portions of the tops and so that there will be little if any likelihood of these parts subsequently separating from each other.

Still another object is that of constructing a machine of this type and by means of which the units may be assembled and completed with great rapidity and discharged from the machine.

An additional object is that of furnishing a mechanism of relatively few parts, each individually simple and rugged in construction, these parts operating over long periods of time with freedom from all difficulties.

With these and other objects in mind, reference is had to the attached sheets of drawings, illustrating one practical embodiment of the invention, and in which:

Fig. 1 is a top plan view of a forming and applying machine;

Fig. 2 is a side view thereof;

Fig. 3 is a transverse sectional view taken along the lines 3—3 and in the direction of the arrows of Fig. 1;

Figs. 4 and 5 are enlarged fragmentary sec-

tional views taken along the line 4—4 and 5—5 and in the direction of the arrows of Fig. 1;

Fig. 6 is a transverse sectional view of the glue applying unit, and

Fig. 7 is a sectional view taken along the line 7—7 and in the direction of the arrows of Fig. 6.

In these views the numeral 10 indicates the deck of the machine and upon which turntables 11 and 12 are rotatably mounted. The former is, as shown, arranged below the horizontal plane of the latter and the peripheral zones of these turntables overlap.

Turntable 11 is formed with a series of openings 13 which receive plugs 14. Turntable 12 is also formed with a series of openings 15, each receiving top or disk elements 16. While the plugs and tops may, as afore brought out, be formed of any desirable and suitable material, they are preferably constructed of cork and phenolic resin, respectively. The plugs and tops may be distributed one within each of openings 13 and 15, or they may be placed therein by any suitable type of mechanism (not shown). Suffice it to say, however, that as viewed in Fig. 1, plugs 14 may be placed one within each of the openings 13 of turntable 11, from, for example, the position adjacent the uppermost edge of the turntable through a zone of ninety degrees in a clockwise direction. Conversely, tops may be distributed within openings 15 from, for example, a position slightly to the left of the upper edge of turntable 12, throughout a zone of substantially one hundred and eighty degrees in a counter-clockwise direction. Also, the openings of turntable 11 may extend above a supporting strip 17, especially as shown in Fig. 2, and which will prevent the plugs from passing through these openings.

Associated with turntable 11 is a drilling machine or unit which has been best shown in Figs. 1 and 2. This unit may conveniently include a motor 18 driving a pulley 19, which, by means of a belt 20, serves to drive a spindle 21. The latter has affixed to it a drill 22 disposed in a plane such that it may be projected through any one of the openings 13 as the latter move below it. Also, a tube 23 may be provided at this point and be connected to a suitable source of suction to constantly remove material which has been severed from the bodies of the plugs. It is intended—according to the present invention—that these plugs be drilled throughout only a portion of their length so that one end of the same is uninterrupted while the second end of the same presents the mouth of the bore formed

by the drill 22. Obviously, however, the extent to which drilling is resorted may accord entirely to the desires of the operator and the purpose for which the sealing elements or units are to be subsequently employed.

Thus, as the turntable is moved intermittently and in a manner hereinafter described, the drill may be lowered upon the turntable coming to rest; this resulting in bores being formed in the plugs. Any plug material thus removed will not clog the machine because of the suction nozzle 23.

The lowering and raising of drill 22 is effected by a rod 24 connected through a pin 25 to a beam 26; such connection conveniently being established by forming the rod with a slot within which such beam rides. The depth to which the bore is to be cut may be regulated by a member 27, affixed to rod 24 and suitably connected to the spindle so that upon the member being reciprocated the drill will be correspondingly moved. If a deeper or shallower bore is to be formed this may obviously be accomplished by simply adjusting member 27 to any desired position along rod 24.

Also, in order to retain plugs 14 against displacement and during the drilling operation, the rod 24 may slidably mount a bracket 28 formed with an opening of adequate area to accommodate the drill, but of insufficient area to permit of the passage of the plugs. This bracket normally tends to move downwardly, into contact with the upper plug faces, under the urging of a spring 29 which has its opposite ends respectively coupled to the bracket and the beam 26. To periodically elevate the bracket, rod 24 may adjustably mount a collar 30 which, as the rod moves upwardly, engages the bracket and elevates the latter.

Thus, assuming that the movements of beam 26 are properly timed, it will be apparent that turntable 11 will shift to move one of the plugs 14 to a position below bracket 28. Thereupon, rod 24 will be depressed, the bracket will engage the upper face of the plug and continued movement on the part of rod 24 will cause the drill to be projected with respect to the bracket and to thus form a bore within the plug. The depth of this bore will correspond to the position to which member 27 has been caused to assume along rod 24. Thereupon arm 26 will move rod 24 upwardly. This will cause a withdrawal of the drill 22 and any chips will be removed by the suction nozzle 23 or its equivalent. Stop 30 will contact bracket 28 so that as the drill clears the bore (or subsequently thereto), the bracket will be elevated to assume its initial position. Thereupon, turntable 11 will move forward one step, resulting in the presentation of the next succeeding plug to the drilling station and the shifting of the drilled plug towards the gluing station.

Referring to the latter station, there is presented a glue bath or receptacle 31 conveniently provided with a holder 32 to receive a glue reservoir. An applicator is provided by conveniently employing a plug 33 of sponge rubber or equivalent material, and having the upper end of this material confined within a clamping ring or collar 34. The latter is screw threaded or otherwise affixed to a shaft 35. It is consequently obvious that by utilizing a cylindrical section of rubber stock, this may be clamped between the ring and rod 35, so that the end of the applicator is at all times in the form of a plane surface,

proper for contact with the end of a plug to be coated. Also, if it becomes necessary to renew this element, this may readily be done, it being moreover understood that, for example, by a nut 36, or otherwise, the rod 35 may be extended or retracted along rod 37 so that the parts may be properly adjusted.

Rod 37 extends slidably within guides 38, forming a part of a plate 39. This plate is slidably supported between rail portions 40. Rotatably mounted upon a wall 41 which supports rail portions 40 is a gear 42. The latter, by means of a crank pin 43 and slot 43', is coupled to plate 39, it being thus obvious that as gear 42 rotates the plate will be reciprocated between rails 40.

The teeth of gear 42 also mesh with the teeth of gears 44 rotatably supported by wall 41. Each of these gears is coupled to cranks 45—the movements of these cranks being synchronized. Supported by the cranks is a link 46 disposed in line with the end of rod 37. The relationship of the several gears is such that to each revolution of gear 42, gears 44 will be rotated twice. Accordingly if the parts are properly timed, it follows that when plate 39 is in its innermost position, the applicator will be projected to be immersed within the fluid in bath 31. While the applicator is projected incident to the periodic contact which occurs between link 46 and the end of rod 37, it is obvious that the applicator and rod will normally be maintained in retracted position incident to the action of spring 39'. This spring has its lower end bearing against the lower guide 38 while its upper end bears against a collar 37' affixed to rod 37. Likewise, with plate 39 projected to its outer position, the applicator will again be lowered. Due to the fact that in the latter condition of the parts the applicator is in line with one of the plugs 14, it follows that the upper surface of the latter will be coated with glue or its equivalent.

As afore brought out, turntable 12 overlaps turntable 11. Adjacent such point of overlapping, a stop plate 47 may overlie both turntables and strip 17 may be formed with an opening 48. In line with opening 48 there is provided a pin or head 49 secured to rotatable shaft 50. The latter has attached to it a convenient form of driving means such as a pulley 51. Moreover, shaft 50 is supported upon a lever which may conveniently be L-shaped and present arms 52 and 53 respectively. Adjacent the point of juncture of these arms a rod 54 may be coupled. Thus, as rod 54 is projected, the pin or head 49 will move upwardly through opening 48 thus ejecting plug 14 from the opening 13 of turntable 11, and moving the same upwardly to a point at which the stem 55 of the top or disk 16 may enter the bore of plug 14. This movement is continued until the upper edge of the plug is in firm contact with the inner face of the top 15. Consequently, the plug will be attached to the top and a complete article will be furnished, it being borne in mind that strip 47 will prevent any upward displacement of the element 15 during this operation. Moreover the film of adhesive or equivalent material will be evenly and properly disposed over all surfaces which are to adhere to each other, due to the fact that incident to the rotation of shaft 50 the plug will not alone move into contact with the surfaces of the top, but will also be turned with reference to such surfaces. This turning will not occur to an extent such that a detrimental effect would result. In other words, while shaft 50 is turning and

causes rotation of plug 14 as the latter is elevated by rod 54, only a relatively minute degree of rotation will occur on the part of the plug with respect to the top and while the parts are firmly applied to each other. Immediately thereafter pin or head 49 will begin to retract so that its continued rotation will have no further effect on the plug which is now firmly fixed with respect to the top.

It will thus be seen that the plugs are transferred from turntable 11 to turntable 12 with which they now travel to a point adjacent delivery chute 56. Before departing from a consideration of this phase of operation, it is to be noted that as shown, especially in Fig. 4, the openings 13 of turntable 11 are tapered inwardly or downwardly while the openings 15 of turntable 12 are preferably tapered upwardly or outwardly. It has already been noted that strip 17 prevents plugs 14 from moving downwardly to too great an extent, such strip moreover supporting them throughout their entire path of travel. By conveniently having the openings 13 of tapered configuration a firm contact is assured between the plugs and the edges of the openings to thus stabilize the former. Conversely, due to the tapering of openings 15, the end of the plug is guided and squeezed firmly as the latter is rammed upwardly by the pin or head 49. Not alone does this assure a proper contact between the stem 55 and the walls of the bore, but it moreover prevents any probability of dislodgement until a deliberate ejection of the article occurs adjacent the delivery chute. At this point the plugs are in line with arm 53 of the lever which carries an ejector element conveniently including a screw threaded stem 57 and a head 58 presenting angular surfaces the major one of which is inclined toward chute 56. Thus, with rod 54 projected, head 58 will be projected through one of the openings 15, thus ejecting and simultaneously diverting a complete closure element to delivery chute 56.

While various forms of drive may be employed in a machine of this character, it is preferred, aside from rotation of drill 22, to utilize a single primary source of power. To this end there may be supported below the deck of the machine a rotatable shaft 59. The latter mounts cams 60. Coupled to one of these is a crank rod 61 coupled to rod 54 to effect reciprocation of the latter. Coupled to the second cam is a crank arm 62 which may conveniently be secured to a rod 63 coupled to the end of lever 26. In this fashion the lever is rocked to elevate and depress rod 24 and the drill 22.

Also affixed to shaft 59 is a gear 64 which meshes with the teeth of a gear 55 to rotate a shaft 66. The latter mounts a Geneva drive including a roller and stud assembly 67. Positioned below turntable 11 is a Geneva plate assembly including, for example, a slotted plate 68 for co-operation with the stud afore mentioned, and a steady plate 69 to coact with the roller of the assembly 67. Thus, an intermittent movement will be imparted to the shaft 70 mounting turntable 11. A gear 71 may also be secured to this shaft and have its teeth intermesh with a gear 72 affixed to the shaft 73 which supports turntable 12. Thus, the movements of these turntables will be perfectly synchronized.

In order to effect proper operation of the glue applying mechanism, the shaft 59 additionally carries a gear 74, the teeth of which mesh with a gear 75 secured to a shaft 76 rotatably sup-

ported in brackets 77. At its upper end this shaft mounts a gear 78, the teeth of which mesh with the teeth of gear 79 to rotate a shaft 80. In turn, affixed to the latter is a gear 81 the teeth of which mesh with the teeth of gear 82 the teeth of the latter, in turn, meshing with the teeth of gear 42 which will operate the parts in the manner heretofore described.

Finally, it will be observed that shaft 76 may also mount a pulley 83 which drives a belt 84 passing around pulley 51 to thus effect rotation of shaft 50. Of course, the several parts are all conveniently rendered capable of adjustment so that wear and varying conditions of operation may be compensated for.

As illustrated, turntables 11 and 12 will rotate once to each 20 revolutions of shaft 66. Also, shaft 75 may rotate, for example, 140 times to each 70 revolutions of shaft 66, while the head 49 may rotate, for example, 80 revolutions to each 140 rotations of shaft 76. The foregoing furnishes one convenient form of drive ratio which has been found to be satisfactory. Obviously, this might be varied as desired.

Briefly reviewing the operation, it will be seen that with shaft 59 operating, the operator will distribute (automatically or otherwise) plugs 14 within openings 13 and tops 16 within openings 15. Thereupon, each of the plugs is drilled to the desired depth and is subsequently coated with adhesive. Such coating obviously occurs as the turntable indexes and comes to a position of rest. At such position, the parts are timed so that the applicator is projected outwardly or beyond the trough 31 and downwardly into contact with the upper face of the underlying plug. Prior to a further indexing of the turntable, the applicator will move upwardly under the action of spring 35'. It will also be understood that the immersing of the applicator occurs while the turntable is indexing or moving. Thus, an operator is assured that the applicator is properly coated with adhesive due to the fact that the latter is immersed within the trough in the intervals between which it coats successive plugs. After this has occurred, the plugs are twisted into contact with the tops. Of course, if the tops are of the type where this action should not occur, then the drive to the pin or head 49 may be disconnected and this member may, if desired, be locked in place. Accordingly, if the stem 55 of the top be longitudinally ribbed, or corrugated, no detrimental twisting of the parts with respect to each other need, or will occur. These tops have received no treatment up to this point, and while in association with turntable 12. Thereupon, they are ejected and distributed through chute 56 or otherwise.

Thus, among others, the several objects of the invention as afore noted are achieved. It is obvious that numerous changes in construction and rearrangement of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An applying machine including a receptacle to contain a liquid, an applicator, a rod for mounting said applicator, rails, means for guiding said rod along said rails to have sidewise limits of movement within and outside said receptacle, a gear connected to said rod to shift the same to such limits of travel, a pin and slot connection between such rod and gear to furnish such connection, and means for projecting said

rod and applicator in a direction at right angles to the direction of sidewise movement and as the latter reach the limits of such sidewise movement.

2. An applying machine including a receptacle to contain a liquid, an applicator, a rod for mounting said applicator, rails, means for guiding said rod along said rails to have sidewise limits of movement within and outside said receptacle, a gear connected to said rod to shift the same to such limits of travel, a further gear driven by said first named gear, and a crank and link connection extending from said further gear and cooperative with said rod to project the latter and said applicator in a direction at right angles to such sidewise movement and as they reach the limits of such sidewise movement.

3. An applying machine including in combination a drive, a support for an article, means for coupling said support to said drive whereby said support is moved, an applicator, means for mounting said applicator adjacent said support, means connected to said drive and applicator whereby the latter may be moved to positions respectively over-lying and to one side of said support, crank means whereby said applicator may be projected into the plane of said support, and means for coupling said last named means to said drive.

4. An applying machine including in combination a drive, a support for an article, means for coupling said support to said drive whereby said support is moved, an applicator, means for mounting said applicator adjacent said support, means connected to said drive and applicator for projecting the latter towards said support, a spring tending normally to shift said applicator

away from said support, means for effecting sidewise shifting of said applicator into overlapping relationship with respect to and to a point to one side of said support, and means for coupling said last named means to said drive.

5. An applying machine including in combination a drive, a support for an article, means for coupling said support to said drive whereby said support is moved, an applicator, means for mounting said applicator adjacent said support, a receptacle to one side of said support and extending in substantially the same plane as said support, means connected to said drive for causing projection of said applicator into substantially the plane of said support and receptacle, means for shifting said applicator to extreme positions in which the receptacle overlies the article associated with said support and said receptacle, and means for coupling said last named means to said drive.

6. An applying machine including a receptacle to contain a liquid, an applicator, a rod for mounting said applicator, rails, means for guiding said rod along said rails to have sidewise limits of movement within and outside said receptacle, a gear connected to said rod to shift the same to such limits of travel, a pin and slot connection between such rod and gear to furnish such connection, means for projecting said rod and applicator in a direction at right angles to the direction of sidewise movement and as the latter reach the limits of such sidewise movement, and a spring tending to retract said rod and applicator.

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