May 9, 1933. R. J. BEATTY 1,908,303

APPARATUS FOR COMPLETING PRESSED BLOWN WARE OR BLOWN WARE

Filed May 18, 1929 3 Sheets-Sheet 1

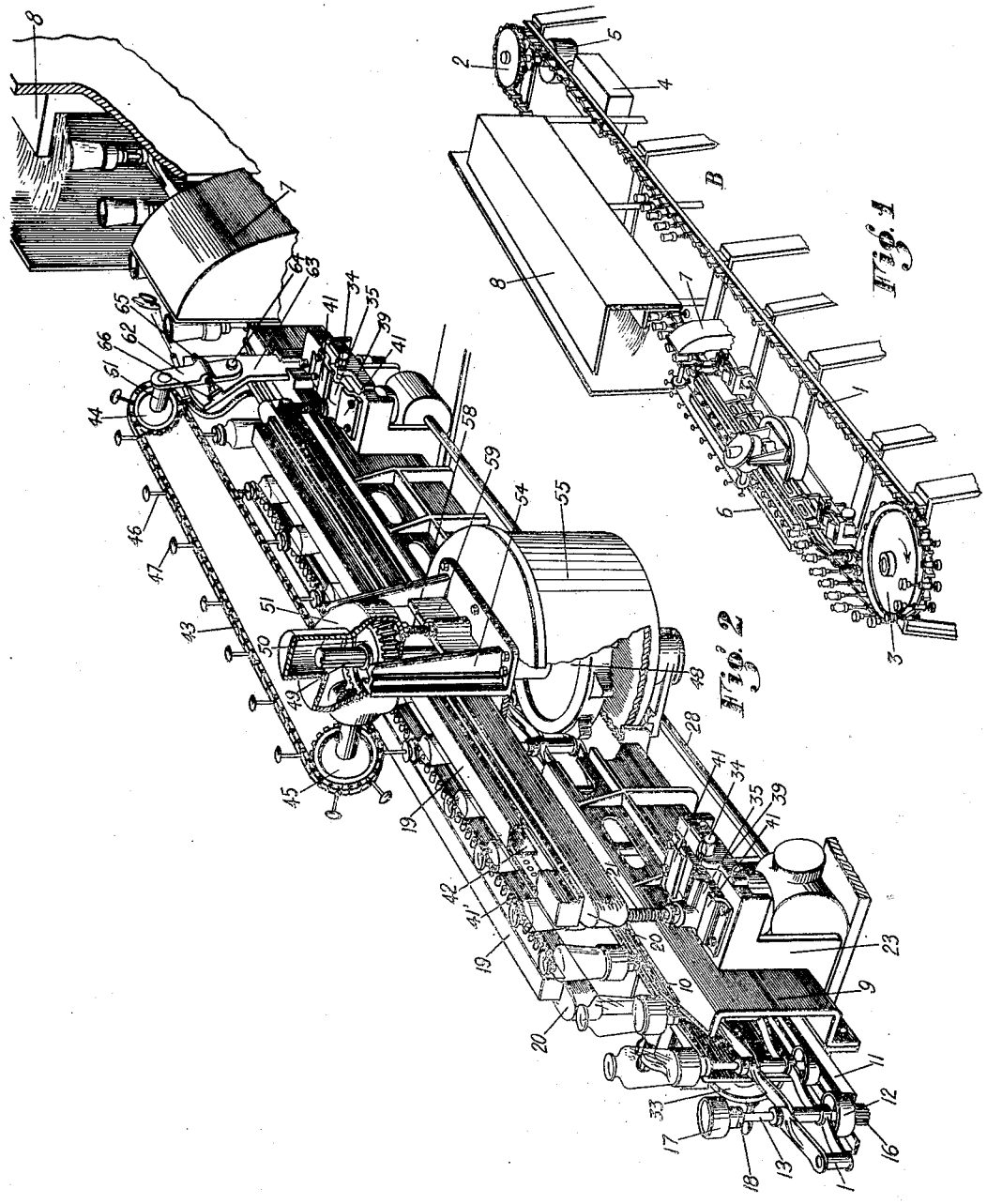

Fig. 1

Fig. 2

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Filed May 18, 1929 3 Sheets-Sheet 2

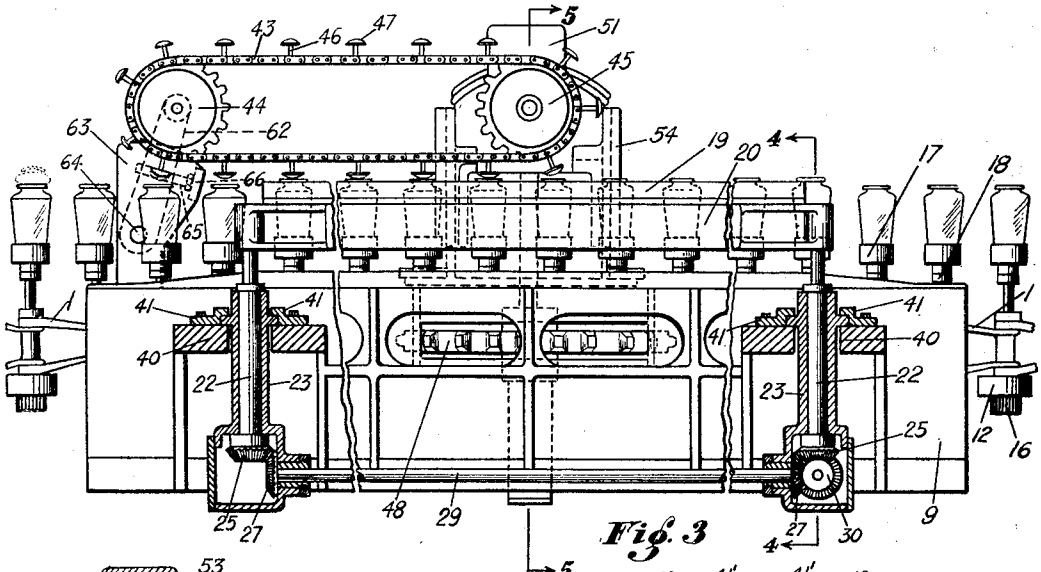

Fig. 3

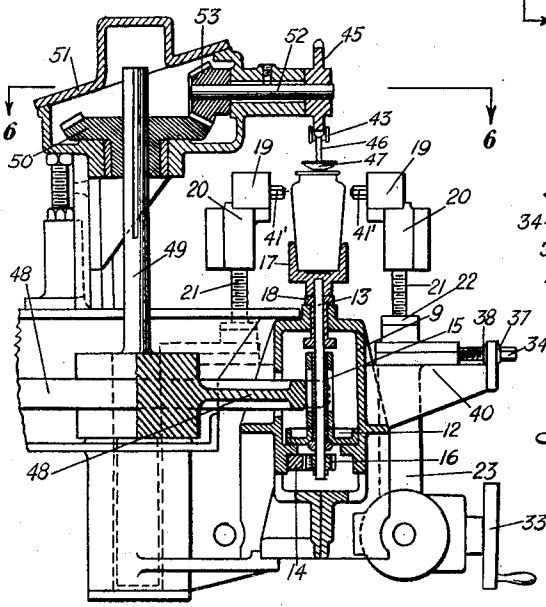

Fig. 5

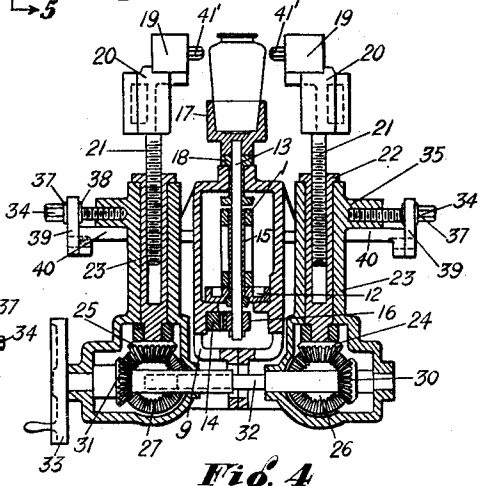

Fig. 4

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APPARATUS FOR COMPLETING PRESSED BLOWN WARE OR BLOWN WARE

Filed May 18, 1929 3 Sheets-Sheet 3

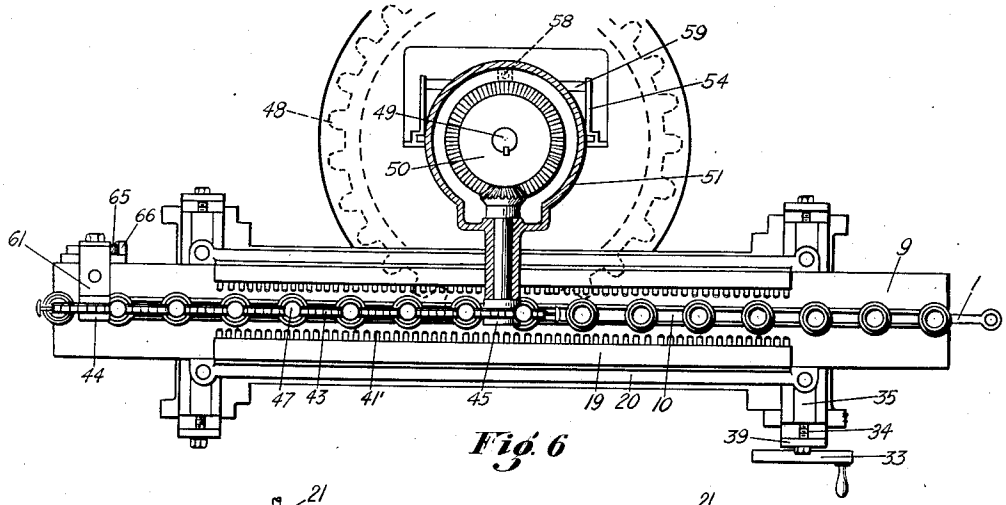

Fig. 6

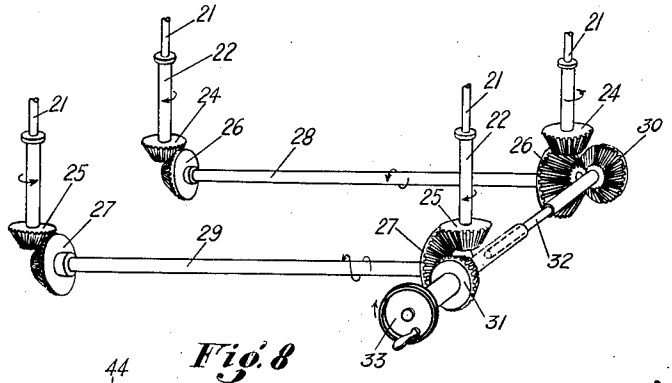

Fig. 8

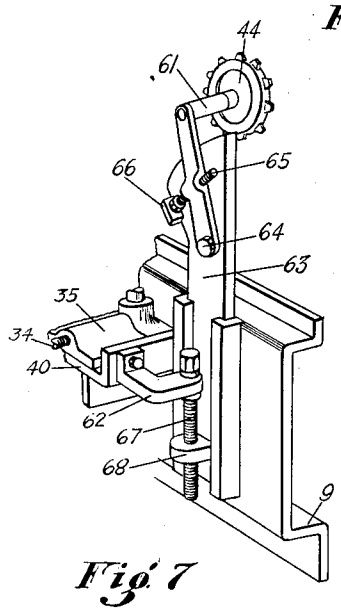

Fig. 7

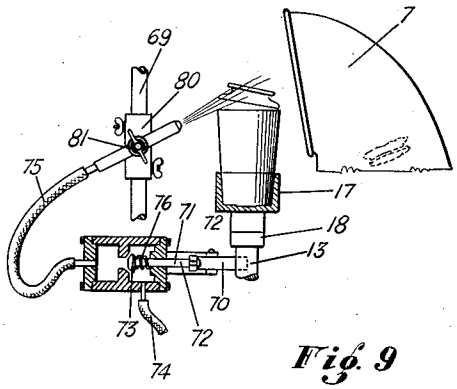

Fig. 9

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UNITED STATES PATENT OFFICE

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APPARATUS FOR COMPLETING PRESSED BLOWN WARE OR BLOWN WARE

Application filed May 18, 1929. Serial No. 364,099.

My invention relates to apparatus for completing pressed blown ware or blown ware. It has to do, particularly, with the treatment of a blown blank which results in the conversion of this blown blank into a finished article.

Heretofore, the most common method of treating a blown blank to convert it into a finished article has consisted in passing the blank through a lehr and then subjecting it to a series of operations in relatively independent units. The blank was transferred progressively from one unit to another manually. The relatively independent units usually embodied a device for severing the cap from the blown article, a grinder for grinding the edges of the article at the point of severance, a melting and glazing unit and a lehr through which the article was passed to minimize or remove the strains set up in the melting and glazing operation. It is readily apparent that, with such process, the article would be subjected to a very great amount of handling with a consequent high labor cost.

My invention contemplates the provision of a method and apparatus or process which will entirely eliminate the necessity for manual intervention in the operations necessary to finish a blown blank between the time the blank is transferred from the first annealing lehr and the time it is converted into a finished article that is ready for use. Also, my invention contemplates the provision of a method and apparatus or process wherein it is possible to reduce the number of steps in the operation of converting a blown blank into a finished article and to rearrange the steps of operation employed in such a way as to produce a superior product in a shorter space of time and with less loss from breakage.

In one form, my invention contemplates taking the blown blanks as they leave a conventional annealing lehr through which they are fed for a period of time and under such conditions that the strain or strains set up in the making will be removed therefrom and transferring them, either manually or automatically, to a conveyor unit which automatically conveys the blown blank to a flame crack-off and rotates these blanks in a proper position while passing them under subjection to a row or rows of flames forming a part of such flame crack-off. As they emerge from the flame crack-off, the caps which have been severed from the blanks and, at the same time, have been prevented from falling off the blanks by suitable holding means, are preferably blown from the blanks automatically. However, the caps may be supported during the severing action by other means, and may be removed either during or after passing through the severing unit.

After leaving the severing unit, the blanks, with the caps removed therefrom, are conveyed automatically by the same conveying unit to and through a glazing and melting unit. After leaving this glazing and melting unit that is associated with or adjacent the conveyor, the articles may be transferred to a sorting and packing table at which point they are packed ready for storage or shipment. However, if desired, the articles may be transferred to a second annealing lehr which may or may not be of the same type as the first lehr and which serves the purpose of removing the strains set up in the article in their passage through the glazing and melting unit.

Various objects and advantageous features of my invention may be seen in the following description and the apparatus which I preferably use in my method or process is shown in the accompanying drawings wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a perspective view of an apparatus embodying all of the features and parts necessary to the method and apparatus disclosed by my invention.

Figure 2 is a perspective view of the flame crack-off unit.

Figure 3 is a view, partly broken away and partly in section, of the flame crack-off unit.

Figure 4 is a sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a view taken on the line 6—6 of Figure 5.

Figure 7 is a perspective view showing the

means for adjusting one end of the chain as regards height and chain tension.

Figure 8 is a perspective view of the means for adjusting the burner element vertically simultaneously.

Figure 9 is a sectional view showing the air finger which I preferably utilize for removing the severed caps from the blanks.

In Figure 1 of the drawings, I have shown one embodiment of my invention as comprising an endless chain conveyor 1 that is driven by a sprocket 2 and passes around a sprocket 3. The sprocket 2 is, in turn, driven by a suitable motor element 4 that drives the sprocket 2 through the medium of suitable gearing 5. Such conveyor chain receives the blown blanks, that have been first treated in a conventional type of lehr, at station A and conducts them to and through a flame crack-off unit 6. It conducts these blown blanks to and through this crack-off unit wherein they are subjected to burner crack-off members which will be hereafter described in detail. Mechanism is provided, which will also be hereinafter described, for causing rotation of these blanks while under subjection to the crack-off flame.

After leaving the crack-off unit 6, these blanks with the severed caps thereon pass into subjection to a finger of air which blows each cap into a waste chute 7. A means which will be hereinafter described in detail has been provided for preventing the severed caps from falling off or otherwise leaving the blown blanks prior to the time the blanks reach a position adjacent the point at which they are subjected to the action of the finger of air. If desired, means may be provided, between the end of the crack-off unit, from which the glass articles emerge, and the finger of air for chilling the glass articles at the line at which the tops are severed therefrom, to insure positive removal of the tops from the articles.

After the blanks, with the caps removed have passed beyond the air finger, they pass into and through a glazing and melting unit 8. This glazing and melting unit may take any suitable form and it serves the purpose of glazing and fire-polishing the glassware and melting and smoothing the top edges of the articles.

The articles, upon leaving the glazing and melting unit, are then preferably removed from the apparatus at or near station B and means may be provided at this station for removing the finished articles and either packing them in containers or removing them to a place of storage.

The crack-off unit may vary as to form but the detailed construction of the form which I have shown is disclosed best in Figures 2, 3, 4, 5 and 6. This construction is substantially as follows:

Such crack-off unit consists of a frame 9, made in two parts. These parts are connected together at their lower ends as best shown in Figure 2 and are of such shape as to form an opening 10 between the upper edges thereof when the frame parts are in assembled relation. Each part of the frame is provided with angle iron ways 11 upon which travel the coaster bearings 12, that are rigidly mounted upon spindles 13. One part of the frame 9 carries a rack 14. The spindles 13 are rotatable in bushings 15 that are driven or otherwise inserted into the joints between the links of the conveyor chain 1, and these bushings form a bearing surface for such spindles.

A pinion gear 16 is rigidly mounted upon the lower end of each spindle in such position that it will mesh with the rack 14 and rotate the spindle. Mounted upon each spindle 13 immediately above the joints made in connecting the links of the conveyor chain and immediately below a cup 17, which is rigidly mounted upon the extreme upper end of each spindle, is a spool 18. The spool 18 makes a sufficiently tight fit with the opening 10 in the frame 9 to prevent lateral movement or wabbling of the spindle 13 as it passes through the crack-off unit.

A pair of oppositely disposed burners 19 are carried by horizontal supports 20, the burner elements 19 being of any suitable material. These horizontal supports have threaded rods 21 rigidly attached to opposing ends thereof and depending downwardly therefrom. Each threaded rod 21 extends into an internally threaded sleeve 22 which is carried by and forms a part of laterally adjustable members 23 that may or may not be connected to or form a part of the frame members 9.

As shown best in Figures 3 and 4, bevel gears 24 and 25 are rigidly secured to the lower ends of each sleeve member 22. Referring to Figures 3, 4 and 8 and particularly to Figures 4 and 8, it will be seen that the bevel gears 24 and 25 mesh with bevel gears 26 and 27 that are rigidly secured to horizontally disposed rods 28 and 29. It will further be seen that the bevel gears 26 and 27 are rotated by means of bevel gears 30 and 31 that are oppositely disposed on a horizontal shaft 32 and rigidly secured thereto. A hand wheel 33 is provided for rotating the shaft 32 which will result in rotation of the other bevel gears, shafts and sleeves hereinbefore described. The sleeves 22 hereinbefore described that are disposed at opposite ends of the horizontal shafts 28 and 29 are provided with right and left hand internal threads respectively. This is also true of the depending threaded rods 21 that are disposed at the opposing ends of each burner element support 20.

In the operation of this part of the apparatus it will be seen by referring to Figure 8, that rotation of the hand wheel 33 in a clock-

wise direction will result in rotation of the horizontal rods or shafts 28 and 29 in opposing directions through the medium of the system of bevel gearing hereinbefore described. In a like manner, rotation of the horizontal shafts 28 and 29 will result in rotation of the internally threaded sleeves 22 disposed at each end of each respective shaft in opposing directions. Thus, since the internally threaded sleeves 22 disposed at opposing ends of the respective horizontal shafts 28 and 29 are provided with right and left hand threads and the oppositely disposed depending rods 21 on each burner element support 20 are provided with right and left hand threads respectively, it will be seen that rotation of the hand wheel 33 in a clock-wise direction will result in equal movement of each burner element vertically in one direction and the rotation of the hand wheel 33 contra-clockwise will result in equal movement of the burner elements vertically in the opposite direction. Thus, a means for adjusting the burner elements equally and simultaneously in a vertical direction is provided.

Referring to Figures 2, 3 and 4 of the drawings, it will be noted that there is a member 23 which forms a housing for the sleeves 22 and the bevel gearing which provides a means for actuating the sleeves to adjust the burner elements equally and simultaneously in a vertical direction disposed on each side of the frame 9. It will also be noted that each member 23 is independently adjustable in a lateral direction towards and away from its opposing member and the frame 9.

As a means for accomplishing such lateral adjustment of the members 23, screw bolts 34 are threaded into a horizontally extending portion 35 of each member 23 as shown in Figure 4. The outer end of each screw bolt 34 is provided with collars 37 and 38 which are so disposed on the screw bolts as to embrace a vertically extending plate 39, rigidly attached to a horizontally extending portion 40 of the frame 9, when the screw bolts are disposed therein. Guides 41 are disposed on each side of each horizontally extending portion 35 of each member 23 to prevent vertical movement or lateral adjustment of the members 23 in one direction while permitting lateral adjustment of the members in the opposite direction. By providing such adjusting means, movement of the burner element towards and away from each other is provided for. In Figures 4 and 8 it will be seen that the shaft 32 is so constructed as to permit such lateral adjustment of the burner elements without affecting the connection between the respective beveled gears hereinbefore described.

The burner elements 19 are preferably made up of a double row of burner castings, one row on each side of the line of travel of the tumblers or similar glass articles, and each casting is equipped with a row of burner nozzles 41'. Also, as will be seen in Figure 2, a baffle 42 is provided so as to distribute the incoming gases evenly throughout the interior of the burner castings. Each row of burner castings preferably consists of a plurality of such castings that are the same as to length and placed end to end on one of the supports 20. Further, each separate burner casting is preferably independent of the others as far as fuel control is concerned. However, it will be understood that each burner element may be made in one piece or consist of any desired number of burner castings and these may be dependent upon each other in the matter of fuel control if such construction is desired.

A means, operating in conjunction with the crack-off unit, has been provided to keep the severed caps from falling off or otherwise becoming separated from the blanks prior to the time the blanks emerge from the crack-off unit. This means consists of a sprocket chain 43 that is adapted to travel around sprockets 44 and 45, the sprocket 45 being driven. Such sprocket chain is provided along its length with spaced outwardly extending arms 46. Each of these arms has a convex member 47 rigidly secured to the outermost end thereof. The convex members are adapted to enter the mouth of the blank caps at a certain point in their travel through the crack-off unit and thus prevent the caps from being removed from the blanks.

The sprocket 45 and sprocket chain 43 are driven through the medium of a horizontally disposed sprocket 48 which is so mounted as to coact with and be driven by the conveyor belt or chain 1 which conveys the blanks through the apparatus. A shaft 49 extends vertically upward from the sprocket 48 and is rotated by such sprocket and a bevel gear 50 carried by a housing 51 is splined on the vertical shaft 49 in such manner as to be rotated thereby while, at the same time, being movable along the length thereof. Also carried by the housing 51 is a shaft 52 which shaft has a bevel gear 53 rigidly secured to one end thereof and adapted to mesh with the bevel gear 50 and the sprocket 45 rigidly secured to the other end thereof. Thus, it will be seen that movement of the conveyor belt 1 will result in travel of the sprocket chain 43 in timed relation therewith through the medium of the mechanism just described.

In order that the cap retaining means may be adjusted so as to accommodate various types of ware, that is, blanks of varying heights, the housing 51 is mounted in spaced upright standards 54 that are supported by a housing 55 which covers the sprocket 48 and vertically movable with relation thereto. It will be noted that the upright standards are provided with grooves 56 into which gears 57 on the outer surface of the housing 51 are

adapted to fit. The housing 51 is adapted to rest on the head of a screw bolt 58 which is disposed within a plate 59 mounted between the upright standards 58. By turning this screw bolt 58 the housing 51 may be raised or lowered as desired which will, in turn, move the sprocket chain 43 and the convex members 47 upwardly or downwardly. A lock nut 60 is provided to hold this housing 51 in any desired position of adjustment.

The sprocket 44 is rigidly secured to one end of a shaft 61 that is journaled in an arm 62 which is, in turn, pivoted to a vertically adjustable bracket 63 as at 64. This arm 62 may be moved in an arcuate path about the pivot point 64 to adjust the sprocket 44 towards or away from the sprocket 45. Thus, the sprocket chain 43 is loosened or tightened as desired. Such arm 62 may be moved by turning a screw bolt 65 which is threaded into the pivoted arm 62 and whose head bears against an outwardly extending gear 66 on the adjustable bracket 63 as shown in Figure 2. The bracket 62 may be vertically adjusted by turning a screw bolt 67 which is mounted on an integral part of the frame 9 and is threaded into an outwardly extending internally threaded ear 68 on the bracket 62. This is best shown in Figure 7.

The air finger cap remover is best shown in Figure 9 of the drawings and is constructed as follows:

A tripping mechanism is mounted upon a vertical support 69 and such tripping mechanism is preferably made adjustable as to vertical position on this support. The tripping mechanism preferably comprises a tripping arm 70 that is fulcrumed to a horizontally extending arm 71 as at 72. It will be noted that the outer end of this tripping arm is so positioned that it will contact with the spindles 13 on the conveyor 1 and the opposite end of this tripping arm is attached to a valve stem 72 which forms a part of a valve 73. When the tripping arm 70 contacts with one of the spindles 13 and is moved forwardly, the valve 73 will be pulled open and constant air under pressure will be permitted to flow through the pipe 74, past the valve 73 and through the pipe 75 to contact with the severed top or cap of the tumbler or similar glass article in the conveyor. A spring 76 normally maintains the valve in closed position. As clearly shown in the above figure, the constant air under pressure striking the caps or tops of the tumblers or similar glass articles at the necked end portion thereof will blow these tops into the chute 7 or some other receptacle in the manner shown in this figure. As also shown in the above figure, the constant air pipe 75 passes through or is pivotally attached to a block 80, which block is vertically adjustable on the support 69 so as to bring the pipe 75 to a height required to blow the caps or tops from glass articles of various sizes and into the chute or other receptacle 7. The angle at which the air strikes the severed caps or tops may be regulated by moving the pipe 75 about its pivotal point of attachment 81.

Referring to the drawings and the preceding description, it will be apparent that I have provided a method and apparatus for completing pressed blown ware or blown ware which embodies numerous novel and highly advantageous features. For instance, I have provided a unit for completing or finishing ware of the above type of such nature that the numerous operations hereinbefore necessary are eliminated to a large extent. Further, the necessity of a number of workmen is also done away with. Various other novel and advantageous features will also be apparent.

The term "crack-off unit" may be understood as defining a unit of any suitable form in which a series of flames, hot enough to set up a cracking strain along a selected line but not hot enough to melt the glass, are used.

Having thus described my invention, what I claim is:

1. Apparatus for removing the tops from articles of glassware comprising a conveyor having a means for severing the tops from said glass articles in association therewith and means for holding said tops in substantially their original position with relation to the main body portion of the articles after severance, said severing means being so disposed that the articles carried by the conveyor will pass therethrough.

2. Apparatus for removing the tops from articles of glassware comprising a conveyor having a means for severing the tops from said glass articles in association therewith, means for holding said tops in substantially their original position with relation to the main body portion of the articles after severance, said severing means being so disposed that the articles carried by the conveyor will pass therethrough, and a glazing and melting means in association with said conveyor.

3. Apparatus for removing the tops from articles of glassware comprising means for severing the tops from said articles and means for holding the caps in substantially their original position with relation to the main body portion of the blank after severance, said severing means embodying burner elements disposed on opposite sides of the path of travel of said articles and means for simultaneously moving said burner elements vertically.

4. Apparatus for removing the tops from articles of glassware comprising means for severing the tops from said articles and means for holding the caps in substantially

their original position with relation to the main body portion of the blank after severance, said severing means embodying burner elements disposed on opposite sides of the path of travel of said articles and means for independently moving said burner elements horizontally.

5. Apparatus for removing the tops from articles of glassware comprising means for severing the tops from said articles and means for holding the caps in substantially their original position with relation to the main body portion of the blank after severance, said severing means embodying burner elements disposed on opposite sides of the path of travel of said articles, means for simultaneously moving said burner elements vertically, and means for independently moving said burner elements horizontally.

6. Apparatus for removing the tops from articles of glassware comprising means for severing the tops from said articles, means for conveying the articles to and through such severing means, and means for holding the tops in substantially their original position with relation to the main body portion of the blanks after severance, said last named means being operable by movement of said conveying means and in timed relation therewith.

7. Apparatus for removing the tops from articles of glassware comprising means for severing the tops from said articles, means for conveying the articles to and through such severing means, and means for holding the tops in substantially their original position with relation to the main body portion of the blanks after severance, said last named means embodying an endless chain provided with outwardly projecting members, and means for adjusting said endless chain to vary the relation between said conveying means and said top-holding device as regards height.

8. Apparatus for removing the tops from articles of glassware comprising means for severing the tops from said articles, means for conveying the articles to and through such severing means, and means for holding the tops in substantially their original position with relation to the main body portion of the blanks after severance, said last named means embodying an endless chain provided with outwardly projecting members, means for adjusting said endless chain to vary the relation between said conveying means and said top holding device as regards height, and means for increasing or decreasing the tension on said chain.

9. Apparatus for removing the tops from articles of glassware comprising a means for severing the tops from said articles, means for holding the tops in substantially their original position with relation to the main body portion of the articles after severance, and means for removing the tops therefrom, said last-named means embodying an upwardly inclined jet of air.

10. Apparatus for removing the tops from articles of glassware comprising a conveyer adapted to convey said articles through a severing unit, said severing unit being adapted to crack off the caps while the articles are traveling on said conveying unit, and means for holding such caps in substantially their original position with relation to the main body portion of said articles after severance and while the articles are traveling with relation to said severing unit.

In testimony whereof I, hereby affix my signature.

ROBERT J. BEATTY.