

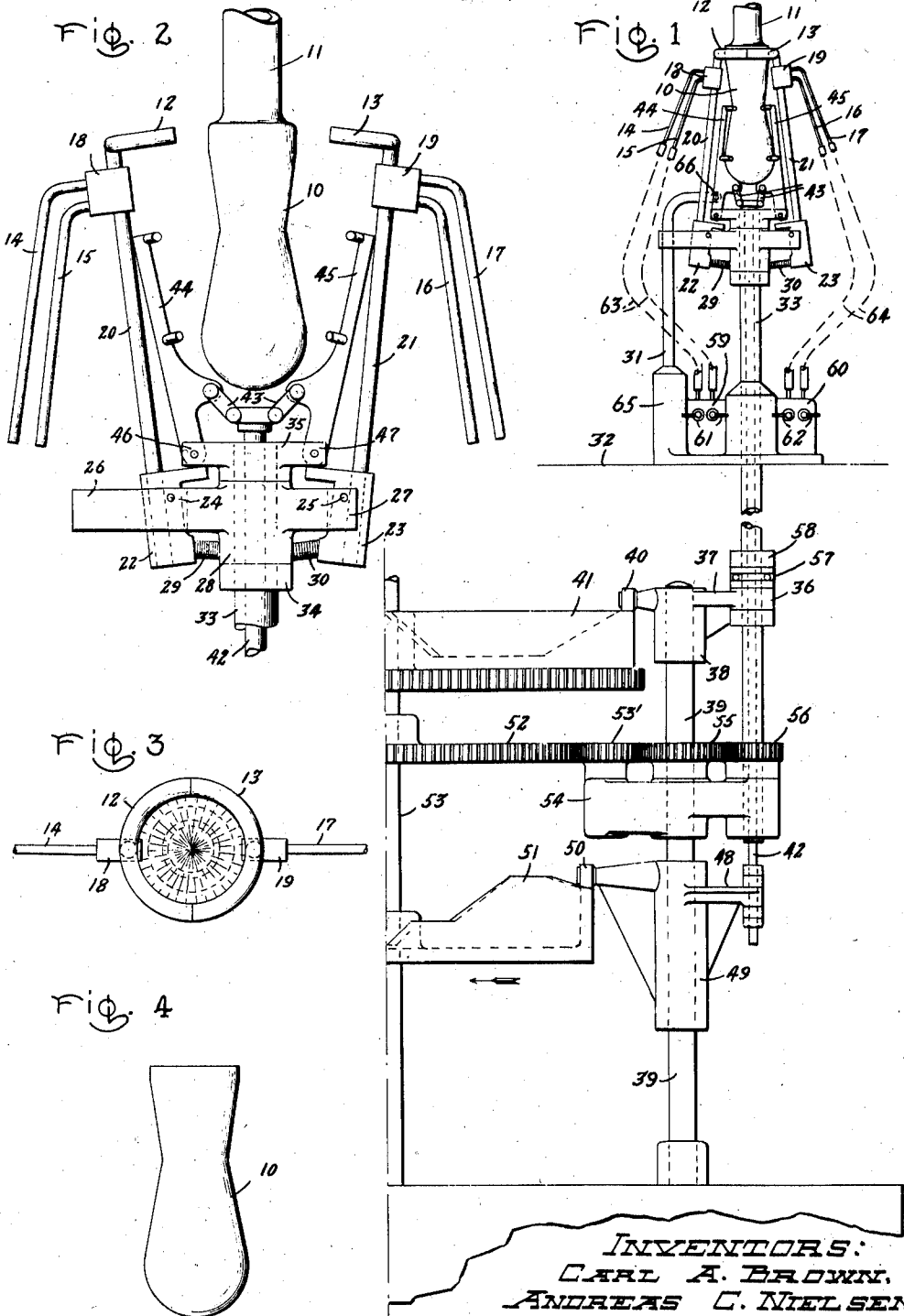
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C. A. BROWN ET AL

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GLASS SEVERING METHOD AND APPARATUS THEREFOR

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INVENTORS:  
CARL A. BROWN,  
ANDREAS C. NIELSEN,  
BY *Wendell S. Lunt*  
THEIR ATTORNEY.

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# UNITED STATES PATENT OFFICE.

CARL A. BROWN AND ANDREAS C. NIELSEN, OF CLEVELAND, OHIO, ASSIGNORS TO  
GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## GLASS-SEVERING METHOD AND APPARATUS THEREFOR.

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Our invention relates to methods and apparatus for severing blown glass articles such as bulbs, from the tubing or the surplus neck portion to which they are attached. Our invention may be used to advantage in connection with the production of blown articles from tubing as disclosed in Hofstetter and Rippl Patent No. 1,330,707. It may also be used to advantage, in connection with the production of blown articles by the blow-pipe gather method, to sever the blown article from the surplus neck portion which connects it to the blow iron. These are the principal uses of our invention but it will be obvious that it may also be applied to a blown article which has been removed from a blow iron or glass tube according to the usual practice.

One method which has been followed is to place the article, for instance a bulb as it is removed from the blow pipe, in a so-called cracking-off machine. Here a sharp hot flame is directed against the bulb neck which is then chilled by touching it with a cold edge and this results in a severance along the line of contact. Another method is to invert the bulb so that the neck projects downwardly and to direct an intense flame against it in the proper plane so that the surplus neck is melted off and drops of its own weight. The first of these methods has the objection that it requires annealing of the bulb to prevent breakage. The second method requires inversion of the bulb and so additional handling. By our invention, as distinguished from the first method, the severance of the blown article is accomplished by heat alone and still the product is left with a clean sharp edge in the plane of severance. Moreover special annealing is not required. As distinguished from the second method, our invention does not require inversion of the bulb. Moreover our invention is applicable to the removal of finished bulbs from the blow-pipe, which is not true of the second method.

The cutting-off of bulbs as they are produced from tubing, as described in the patent above referred to, must necessarily be done in such a way as to leave a uniform end on the tubing which remains so that it will be ready for the formation of another bulb. This object is secured by our invention, and moreover this is accomplished without constriction of the neck of the

blown article at the plane of severance. The blown article as thus produced is ready for further operations such as the insertion of the filament and supports in the case of bulbs for incandescent lamps.

Further features and advantages of our invention will appear from the detailed description thereof which follows and from the accompanying drawing.

In the drawing Fig. 1 is a side elevation partially broken away of one form of apparatus embodying our invention; Fig. 2 is a side elevation on an enlarged scale of the more important parts of the apparatus; Fig. 3 is a top plan view of the cutting-off burner in closed position; and Fig. 4 is a side elevation of a cut-off bulb.

Referring to the drawing, 10 is a bulb depending from a tube 11. 12 and 13 are two semi-circular segments of a ring burner having orifices around its inner circumference so as to direct flames toward a common center when the segments are brought together. Gas and air are supplied to said burner by pipes 14, 15, 16 and 17 leading to mixing chambers 18 and 19 with which said burner segments connect. The said segments are supported by rods 20 and 21 which are mounted in blocks 22 and 23 pivoted at 24 and 25 to arms 26 and 27 extending from a hub 28. Springs 29 and 30 extend from said hub to said blocks. The said hub does not rotate, being held against rotation by a standard 31 which passes through one end of the arm 26 and is supported upon the bed 32 of the machine. The hub 28 is loosely mounted on a hollow shaft 33, being held in position by the collars 34 and 35 carried by said shaft. The hollow shaft 33 extends down through the bed of the machine and is supported by the collar 36 carried by an arm 37 extending from a sleeve 38 which rides on a vertical shaft 39 supported on the base of the machine. Extending from said sleeve is a roller 40 which rides on a cam 41 so shaped as to cause the said roller to be depressed or elevated at certain intervals and to cause a depression or elevation of the parts carried by sleeve 38. The hollow shaft 33 has extending therethrough a rod 42 which extends the entire length thereof and has a pair of links 43 at its upper end which are pivotally connected to gripper arms 44 and 45 pivotally supported at their lower ends on arms 46 and 47 extending from

the collar 35. The rod 42 is carried by an arm 48 extending from a sleeve 49 riding on the shaft 39 and having a roller 50 extending therefrom which rides on a cam 51.

5 Rotation is given to the shaft 33 by a central pinion or gear 52 mounted on a main drive shaft 53. In case the bulb is rotated by other means, the rotation of shaft 33 is synchronous therewith. The gear 52 meshes  
10 with pinion 53' carried by a bracket 54 which also carries idler 55 which meshes with pinion 53' and also with the pinion 56 splined upon the shaft 33. An anti-friction bearing 57 is provided between collar 36 and  
15 collar 58 on shaft 33. The air and gas pipes 14 and 15 and also 16 and 17, are connected respectively to the distributors 59 and 60 controlled by valves 61 and 62. Flexible connections 63 and 64 are provided between said  
20 mixing chambers and the pipes 14, 15, 16 and 17. An air reservoir 65 has a nozzle 66 connected thereto through the hollow standard 31 and the blast from said nozzle is directed against the bulb in its lowermost position.

25 In Fig. 2 the apparatus is shown with the burner segments and grippers open but in the raised position. The parts are brought to the position shown in Fig. 1 when the rod 42 is lowered by cam 51 as this closes grippers 44 and 45 and allows springs 29 and 30  
30 to close the burner segments. The gas flame directed against the bulb neck then fuses and cuts through it, the bulb being rotated meanwhile. The shaft 33 then lowers causing the bulb to be drawn down. At the  
35 same time the burners are carried down and follow the bulb directing their flame against the upper edge. This is a very important feature of our invention since the play of  
40 the flame upon the upper edge of the bulb neck gathers back on the solid edge of the bulb neck the hot and plastic film of glass which has been produced by separation of the bulb from the tubing. The result is  
45 that the upper edge is glazed and rounded which gives it a very desirable finish. The rod 42 is then raised to separate the grippers 44 and 45, thus releasing the bulb which may be directed toward a chute (not shown)  
50 by a blast of air from the nozzle 66. The opening of the grippers 44 and 45 also serves to force the burner segments 12 and 13 apart with a compression of the springs 29 and 30. Upon the subsequent lowering of the  
55 rods 42 and the consequent closing of the grippers, the burner segments are brought together by expansion of said springs.

What we claim as new and desire to secure by Letters Patent of the United States, is:—

60 1. The method of severing a hollow glass article from a tubular glass body to which it is attached which consists in directing a sufficiently hot and sharp flame against the same at the desired plane of separation to  
65 cause a fusion and severance while preserv-

ing substantially intact the passage through the hollow glass article and subsequently playing a flame on the severed edge of said article while the same is moved from said tubular body.

70 2. The method of severing a hollow glass article from a tubular glass body to which it is attached which consists in directing a sufficiently hot and sharp flame against the same at the desired plane of separation to  
75 cause a fusion and severance while preserving substantially intact the passage through the hollow glass article and then drawing said article away from said tubular body while directing a flame against its edge  
80 formed by such severance.

3. The method of severing a hollow glass article from a tubular glass body to which it is attached which consists in directing a  
85 sufficiently hot and sharp flame against the neck portion of said article to sever said article while preserving substantially intact the passage therethrough and drawing said article away from said tubular body and at  
90 the same time causing said sharp flame to follow said article and to play upon the edge thereof.

4. The method of severing bulbs from tubular glass bodies which consists in directing a sufficiently hot and sharp flame against  
95 the neck of said bulb to fuse through the same and cause a severance thereof while preserving substantially intact the passage therethrough, drawing said bulb away from said body and, at the same time, causing  
100 said flame to follow at the same speed as the drawing and to continue to play on the edge of said bulb.

5. In an apparatus for severing a hollow glass article from a tubular glass body, the  
105 combination of a burner shaped to surround the said body, means for gripping the said article, supports for said burner and gripping means, and means for simultaneously moving said gripping means and burner  
110 relatively to said body to cause the said burner to follow the line of severance as the said article is drawn away from the said body.

6. In an apparatus for severing a hollow  
115 glass article from a tubular glass body, the combination of a burner comprising movable segments adapted to be closed around the said body, means for gripping the said article, supports for said burner and grip-  
120 ping means, means for simultaneously moving said gripping means and burner relatively to said body to cause the said burner to follow the line of severance as the said article is drawn away from the said body,  
125 and means for opening and closing said burner segments in proper sequence with the operation of said moving means.

7. In an apparatus for severing a hollow glass article from a tubular glass body, 130

the combination of a burner shaped to surround the said body, segmental gripping means adapted to be closed around said article, supports for said burner and gripping means, means for simultaneously moving said gripping means and burner relatively to said body to cause the said burner to follow the line of severance as the said article is drawn away from the said body, and means for opening and closing the segments of the gripping means in proper sequence with the operation of said moving means.

8. In an apparatus for severing a hollow glass article from a tubular glass body, the combination of a burner comprising movable segments adapted to be closed around the said body, segmental gripping means adapted to be closed around said article, supports for said burner and gripping means, means for simultaneously moving said gripping means and burner relatively to

said body to cause the said burner to follow the line of severance as the said article is drawn away from the said body, and means for opening and closing the burner and gripping segments in proper sequence with the operation of said moving means. 25

9. In an apparatus for severing a hollow glass article from a tubular glass body supported in a substantially vertical position, the combination of a burner shaped to surround the said body, means for gripping the said article, supports for said burner and gripping means, and means for simultaneously lowering said gripping means and burner relatively to said body to cause the said burner to follow the line of severance as the said article is drawn away from the said body. 30 35 40

In witness whereof, we have hereunto set our hands this 19th day of July, 1923.

CARL A. BROWN.

ANDREAS C. NIELSEN.