No. 842,426. PATENTED JAN. 29, 1907.

H. A. SCHNELBACH.

GLASSWARE HEATING AND FINISHING MACHINE.

APPLICATION FILED AUG. 6, 1906.

2 SHEETS—SHEET 1.

Fig. 1

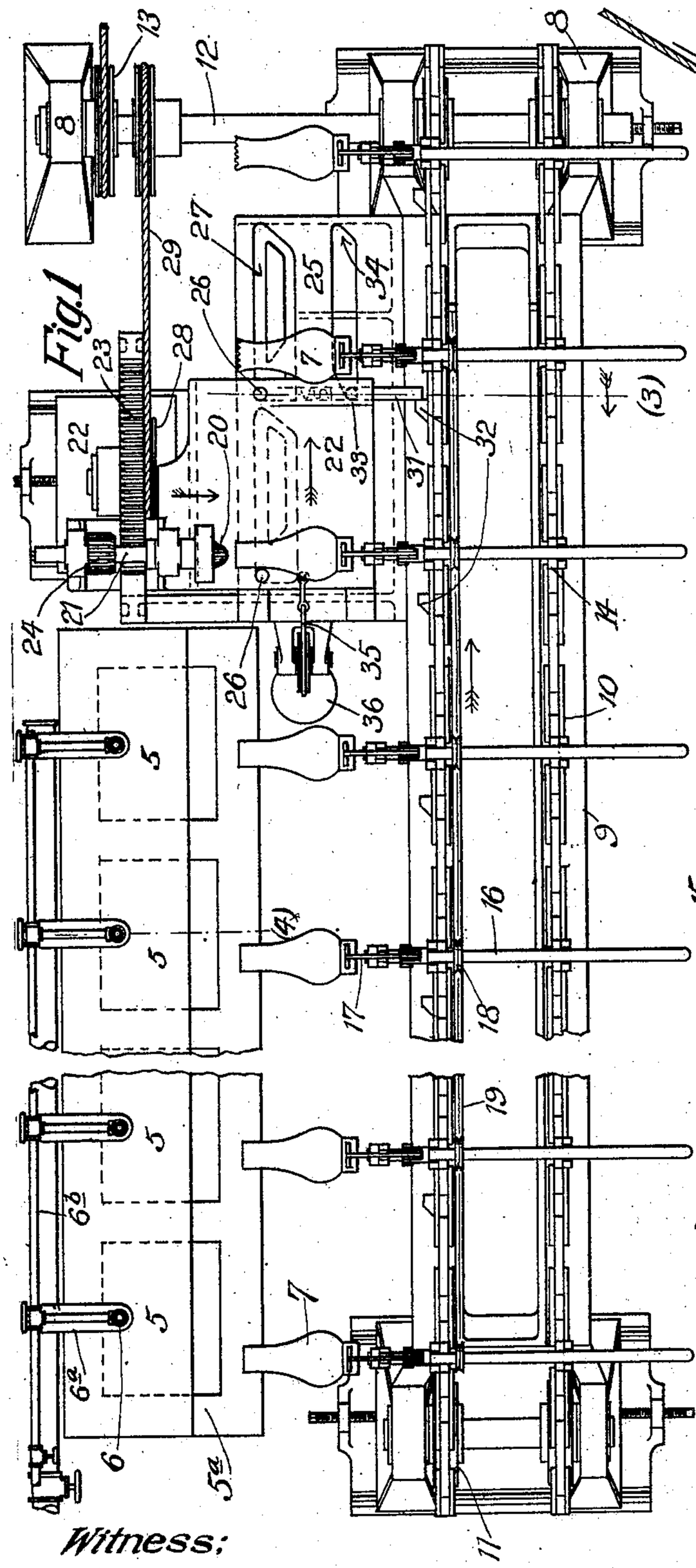

Fig. 2

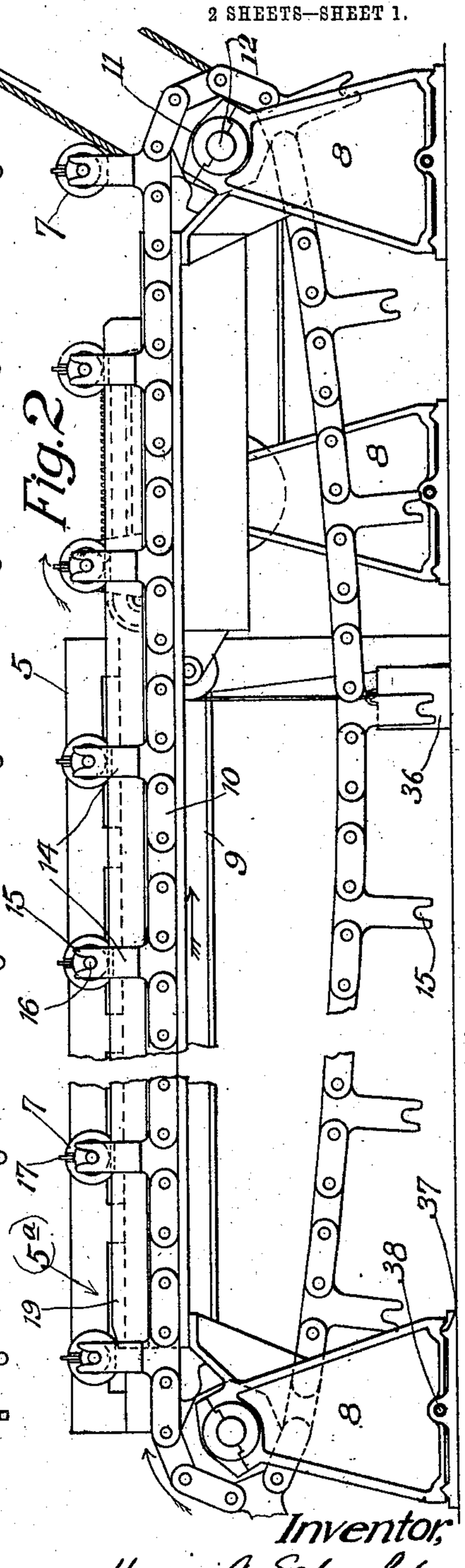

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Fig. 3

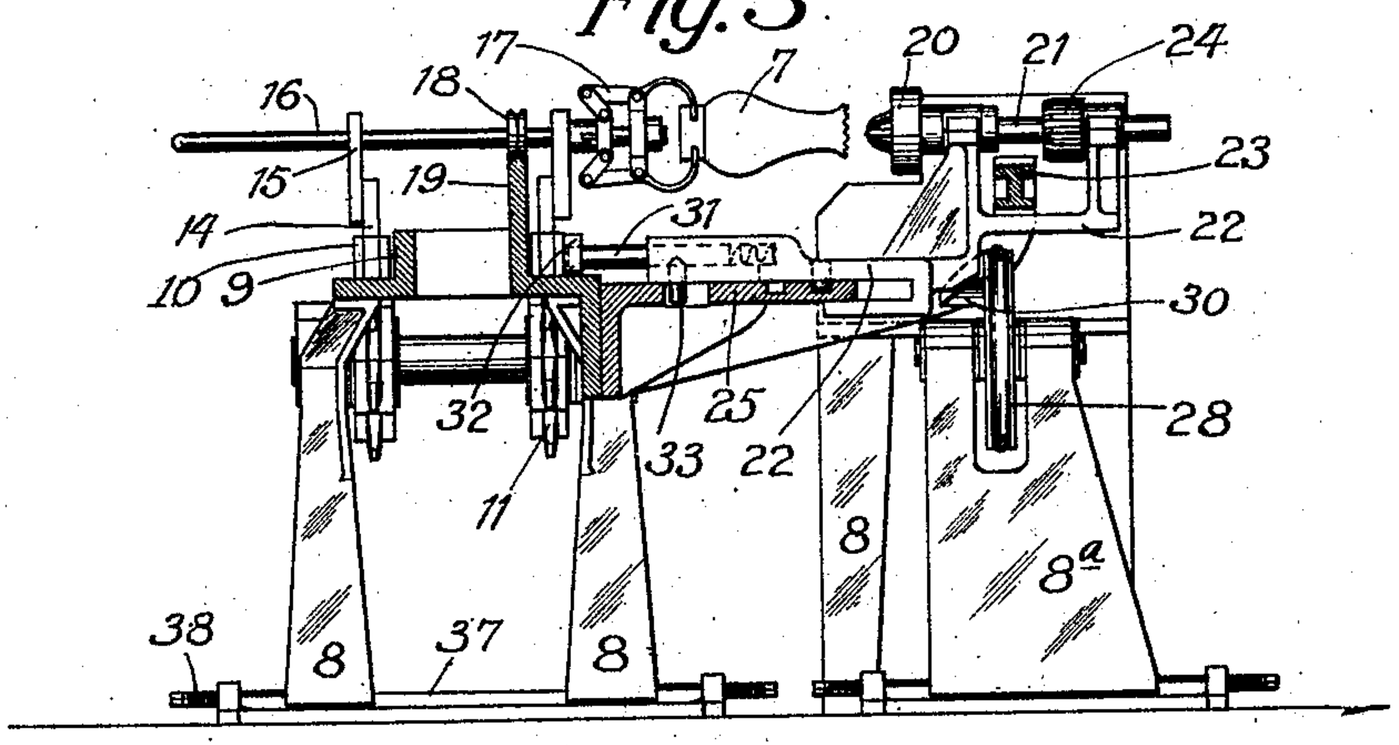
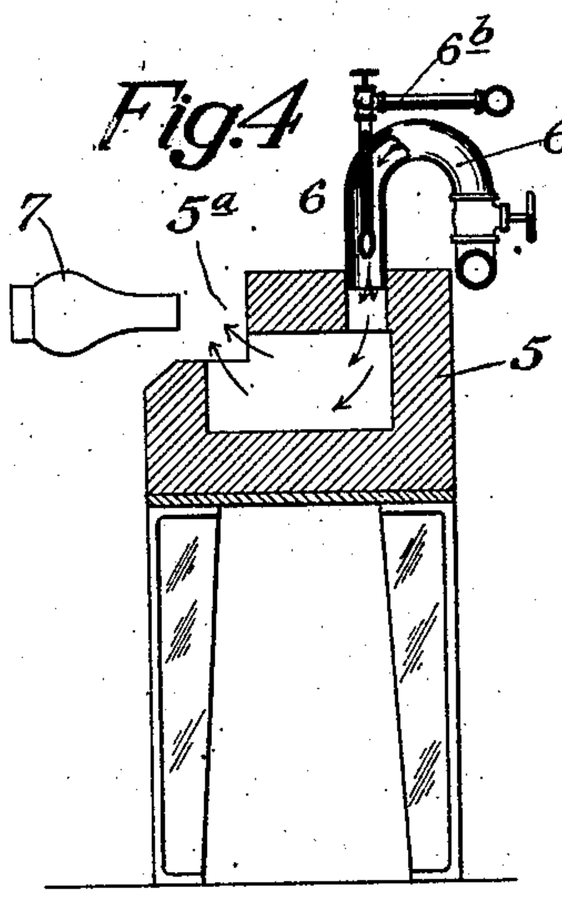


Fig. 4



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UNITED STATES PATENT OFFICE.

HENRY A. SCHNEIBACH, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO MACBETH-EVANS GLASS COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

GLASSWARE HEATING AND FINISHING MACHINE.

No. 842,426. Specification of Letters Patent. Patented Jan. 29, 1907.

Application filed August 6, 1906. Serial No. 329,272.

To all whom it may concern:

Be it known that I, HENRY A. SCHNEIBACH, a citizen of the United States, residing at Pittsburg, in the State of Pennsylvania, have invented certain new and useful Improvements in Glassware Heating and Finishing Machines, for which the following is a specification.

My invention relates to the art of fire-polishing, heating, and finishing glassware—such as lamp-chimneys, bottles, &c.—and particularly to machines for performing all the operations of finishing automatically and at the same time. Its primary objects are to automatically and continuously heat uniformly a series of articles in a particular place and heat them gradually, so as to attain just the right temperature for finishing, to simultaneously carry on the heating with the finishing operations, such as crimping the ends of lamp-chimneys or forming bottle-heads, &c., to provide an automatic finishing-machine, to provide a series of improved sectional furnaces for these purposes, to provide means for operating a crimping-machine, and to generally improve the facility and efficiency of the handling of glass articles in finishing. These objects and other advantages which will hereinafter appear are attained by the devices illustrated as applied to forming lamp-chimneys in the accompanying drawings.

Figure 1 is a plan view of the whole apparatus, and Fig. 2 is a front elevation of the same. Fig. 3 is an end elevation and partial vertical section on the line 3 in Fig. 1 looking in the direction of the arrow. Fig. 4 is a vertical section of one of the compartments of the furnace, taken on the line 4 in Fig. 1 and showing the heating-burner for oil or gas.

For illustration I have shown a machine designed to heat and fire-polish and at the same time crimp the ends of lamp-chimneys. It will be understood that the chimney when made has the small end cut with a sharp edge, which makes it necessary to smooth it, either by grinding or by the process known as "fire-polishing." The chimney also has to be heated gradually up to a soft state, and then it is operated upon by a crimping-tool to form the well-known pearl top or bead edge. These operations have heretofore been performed separately and in machines which were not automatic unless for the fire-polishing. It has also been customary after the fire-polishing to again heat the chimney by another operation for the purpose of crimping the ends, the chimney being handled manually and being carried on a "snap," removed and placed in a constantly-revolving crimping-machine. This all results in great expense and waste of time, as well as additional danger of breakage by reason of the increased handling and the second heating, while uniformity of product was dependent entirely upon the skill of the individual operator. My machine avoids these difficulties and cheapens the manufacture in general.

It will be seen from Figs. 1 and 4 that I have provided a continuous series of furnace-compartments 5, which are generally six in number and are formed, as shown in Fig. 4, with a slotted opening 5^a at the upper and outer corner, so that the flame provided by the gas or oil burner 6 is directed upwardly against the lamp-chimney 7 when carried over slot 5^a, as shown. These furnace-compartments 5 are placed side by side, and the slot 5^a for exit of the flame is continuous along the series, as will be seen from Fig. 1. In order to properly heat the chimney without breakage, these furnaces have varying degrees of heat, starting at the left of Fig. 1 with a comparatively low temperature and ending at the one to the right with a temperature high enough to render the glass easily plastic for the operation of the finishing-tool. The form of furnace shown in Fig. 4 is especially adapted to this work and is one of the elements of my invention.

The burner may be of any desired form, the invention not being limited to any method of heating; but the device shown is well adapted to the purposes. It consists of an air-pipe 6^a and a jet-pipe 6^b for introduction of gas or of oil in a vaporized state.

In front of the furnace-compartments 5 and mounted adjustably in position relative to the furnace is a frame consisting of uprights 8 and a horizontal support 9, which may be of any desired form to support and guide the continuous traveling chain 10, preferably driven upon sprockets 11 on the shaft 12, which in turn is driven by a band or cord on the sheaf 13. Some of the links of the chain 10 are provided with upright

supports 14, ending in forks 15, which may carry the handle 16 of any convenient form of snap 17 for holding the lamp-chimney 7 or other article being operated upon. In order that the glass article may be uniformly heated around its circumference and also for the important purpose of preventing the glass from becoming distorted when it softens, I provide for revolving the snap 17 and the article as it travels in front of the furnaces by placing a grooved roller 18 upon the handle 16 and having it engage an upwardly-extended guide-flange 19 on the frame 9. By this means the snap, with its chimney, being placed upon one of the pairs of forks 15 at the left of the machine is carried gradually across the front of the furnaces and exposed to the different flames and in the meanwhile is rapidly rotated in place, so that the end of the chimney is uniformly and gradually brought to the proper heat and preserved in shape. The flange 19 and the pulley 18 being of the groove form, Fig. 3, insures the articles all being at the same distance from the flame and prevents their displacement in a lateral direction.

When the article has been brought to the proper heat as it reaches the end of the furnace, as shown in Fig. 1, it comes opposite to the finishing-tool, which in this case is shown as a common crimper 20. This crimper is mounted upon a shaft 21, which is carried in a movable frame 22 and is capable of shifting to and from the position of the chimney. Mounted upon the fixed support 8 is a fixed rack 23, and on the shaft 21 is a pinion 24, which is normally out of engagement with the rack 23, as shown. From Fig. 3 it will be seen that the frame 22, carrying the crimper, slides upon a fixed table 25 on the support 8 and is movable thereover in two directions and guided by means of pins 26 and slots 27 in the fixed table-plate 25. The frame 8^a carries a constantly-revolving wheel 28, which is driven by means of a cord 29 from a sheave on the shaft 12. This wheel has a cam 30, which at the proper time engages the movable frame 22, as will be apparent from Fig. 3, and pushes said table over in the direction of the arrow toward the carrier and article. The first effect of this is to engage the pinion 24 with the rack 23 and at the same time engage the crimping-tool 20 with the lamp-chimney 7. At the same time the pins 26 move over in the slot 27 so that the carriage 22 may move forward, and a spring-bolt 31, sliding in a socket on the carriage 22, projects outwardly and engages a dog 32 on the traveling carrier-chain 10. On the bolt 31 is provided another pin 33, engaging slot 34 in the fixed plate 25. Now action of the dog 32, engaging the pin 31, is to drag the carriage 22 forward in register with the moving glass article 7, and at the same time pinion 24 revolves the crimper and forms the end of the chimney or other article, as desired. When this operation is accomplished and the carriage 22 has moved forward the proper distance, the pins 26 first strike the inclined part of the cam-slot 27, which withdraws the carriage 22, removing the pinion 24 from mesh with the rack and relieving the crimping-tool from the article. At nearly the same time or shortly afterward the slot 34 draws the bolt 31 backward by means of its pin 33, so as to disengage the dog 32 on the traveling chain. At this point the carriage 22 is drawn back by a cord 35, which is operated by weight 36 or by a spring or any other convenient means. The carriage and crimping-tool thus return immediately in time to catch the next chimney 7 and repeat the operation just described.

In order to allow for different lengths of glass articles being used, the supports 8 may be mounted upon sliding ways 37 and be moved by screw-rods 38, as shown in Fig. 3, so that the entire machine may be adjusted in position relative to the furnaces.

The feature of removability of the holders or snaps for the article is important, as it sometimes happens that an article is thicker or heavier than the average, and in such case it can be readily taken off, handling it by the snap, and placed farther back on the carrier, so as to travel again through a part of the heat zone. The adjustability of the position of the carrier toward the furnace and the fact that the ware is always in plain view of the operator are also important features where the articles sometimes vary in size or length.

It will be understood that a large number of the rods 16, with the snaps 17, may be provided and adjusted to fit the articles, so that the articles are easily handled in putting on or taking off, and manifestly a return-carrier of any ordinary construction may be used for handling the snaps conveniently.

The machine may thus be operated by two operators, one at one end to place the snaps with the articles in the forks 15 and another at the far end to remove the finished chimney.

It will be understood, of course, that the same machine may be used for any glass article requiring a finish made while it is in a plastic state.

The entire operation is automatic, and since every one of the articles goes through exactly the same manipulation the product will be thoroughly uniform, and there is no extra handling, so that breakage is thus reduced to a minimum.

Of course the rods 16 may be fixed in place as permanent parts of the machine in the forks 15, and the snap 17 may be opened and the article 7 placed therein directly, so as to avoid the handling of the snaps themselves.

Various other advantages of the apparatus will readily occur to mechanics familiar with the art.

Having thus described my invention and illustrated its use, what I claim as new, and desire to secure by Letters Patent, is the following:

1. The combination with a graduated heating-furnace, of automatic mechanical devices for continuously moving glass articles through the heat zone and finishing the article after it is softened, without removal from the machine.

2. The combination with a furnace having a series of graduated heating-chambers, of mechanism for continuously carrying glass articles through the zones of heat and simultaneously revolving them, and mechanism movable with said carrying mechanism for finishing the article after it is heated.

3. The combination with a furnace having a series of graduated heating-chambers, of mechanism for moving glass articles through the heating zone and simultaneously revolving them to preserve their shape, and finishing mechanism operating in line with said motion, whereby the finishing is done without stopping the moving carrier mechanism.

4. The combination with a furnace and a carrier for moving a glass article therethrough, of a traveling finishing-tool operating on the article as it moves, whereby the motion of the article through the furnace is uninterrupted by the finishing operation.

5. The combination with a furnace and a continuously-traveling carrier for glass articles, of a finishing-tool intermittently traveling with said carrier and articles after they pass through the furnace, without interrupting their motion.

6. In a glass-finishing apparatus a furnace consisting of a continuous series of heating-compartments forming an uninterrupted heat zone and having graduated degrees of heat, and automatic means for continuously translating and revolving articles through said zones of heat.

7. The combination with a heating-furnace and means to continuously move articles therethrough, of coöperating automatic mechanism to immediately finish the articles after they are heated.

8. The combination with automatic means for gradually and evenly heating glass articles, of an automatic moving finishing-tool adapted to operate on said articles without interrupting their progress through the zone of heat.

9. In a finishing apparatus a furnace comprising a series of graduated compartments each comprising a chamber having a slot opening obliquely upward and communicating with the contiguous outlets for operation on an article exposed to the heat, and burners for supplying flame in each compartment.

10. A finishing-furnace comprising a graduated series of heating-chambers with separate burners therein, each chamber having a slot for emitting flame and said slots communicating and being in register so that an article may travel continuously through the varying zones of heat, substantially as described.

11. In a heating and finishing apparatus the combination with a furnace, of a horizontal support, a traveling carrier moving thereon, a series of forks on the carrier, a track for engaging a roller, and snaps for carrying articles, having rollers engaging said track when the snaps are laid in said forks, whereby the article is carried through the heating zone of the furnace and simultaneously revolved in its support, substantially as described.

12. In a finishing apparatus the combination with an article-carrier, of a fixed rack, a movable carriage having a revoluble forming-tool and a pinion to engage said rack to revolve the tool, and means to automatically engage and release the said pinion and move the carriage forward with the article-carrier.

13. The combination with means for moving and revolving a glass article, of a shifting carriage carrying a forming-tool and its shaft, a pinion on the shaft of the tool, a fixed rack, and devices adapted to force the tool into engagement with the moving article and engage the pinion and rack and thereupon revolve the tool as the table is shifted over said rack.

14. A finishing-tool for glass articles adapted to coöperate with a continuously-moving carriage for the articles, comprising a shaft carrying a tool and means for shifting the shaft into and out of engagement with the article, means for simultaneously revolving the tool and the article and means for returning the tool and carriage to normal position.

15. The combination with a heating-furnace and a carrier for moving and revolving an article through the heating zone, of an automatic finishing-tool operated by the said moving carrier and mechanism for forcing the tool into engagement with the article, for revolving it as it travels, and for releasing and returning it to position to engage the next article in the series on said carrier.

16. In heating and finishing apparatus the combination with a furnace and a traveling carrier for moving and revolving the articles, of a finishing-tool comprising a shifting table, automatic means thereon to engage the traveling carrier and shift the table, a fixed rack, a shifting shaft on the table carrying a pinion and a forming-tool, and means to engage and disengage said tool and said rack and thereby to revolve the pinion and tool as the table moves, substantially as described.

17. The combination with a graduated furnace, of mechanism to continuously carry articles through the varying zones of heat therein, and a forming-tool and means to re-

ciprocate and intermittently move it along with the carrying mechanism, substantially as described.

18. The combination with a heating-furnace and a traveling carrier for articles to be heated therein, of a driving-shaft for the carrier and a finishing-tool operated by the said driving-shaft to move the tool in consonance with the moving of the carriage, substantially as described.

19. The combination with a furnace and a carrier for moving articles through the zone of heat, of automatic mechanism for engaging and finishing each of the articles as it moves, substantially as described.

20. The combination with a graduated furnace and a continuously-traveling carrier of automatic mechanism movable by and with said carrier for engaging and finishing an article thereon, substantially as described.

21. In a glassware-finishing machine the combination with a constantly-traveling carrier and a furnace having graduated heating zones, of a set of removable holders for the articles and means by which said holders and articles may be placed at any point on the carrier and are revolved locally as they travel through the heat zone.

22. In a glassware-finishing machine the combination of a frame, a horizontal traveling carrier on the frame, a graduated furnace adapted to heat articles on said carrier as it moves, a series of removable snaps or holders adapted to be placed at various places on the carrier and coöperating means on the frame and the snap to revolve the latter as it travels with the carrier, substantially as described.

23. The combination of a furnace having several compartments of varying degrees of heat, said compartments having recessed outlets forming together a continuous heat zone, downward-directed flames in the furnace and means to deflect the heat against the ware, a carrier for glassware provided with means to translate and revolve the ware in front of the furnace, such means including individual holders for the ware removably supported on the carrier.

24. In a machine for finishing lamp-chimneys, the combination with a furnace having an exposed continuous heating zone of graduated intensity from one end to the other, a straightaway carrier located in front of the furnace and having a series of supports for individual ware-holders, a supporting-frame for said carrier having a friction-track, a snap for holding a lamp-chimney provided with a friction-roller adapted to engage said friction-track, and removable from the carrier, whereby each individual article may be placed at various places on the carrier and will engage with the friction-track so as to revolve the article as it is translated.

In testimony whereof I have hereunto signed my name in the presence of two witnesses.

HENRY A. SCHNELBACH.

Witnesses:
CHAS. S. LEPLEY,
F. W. H. CLAY.