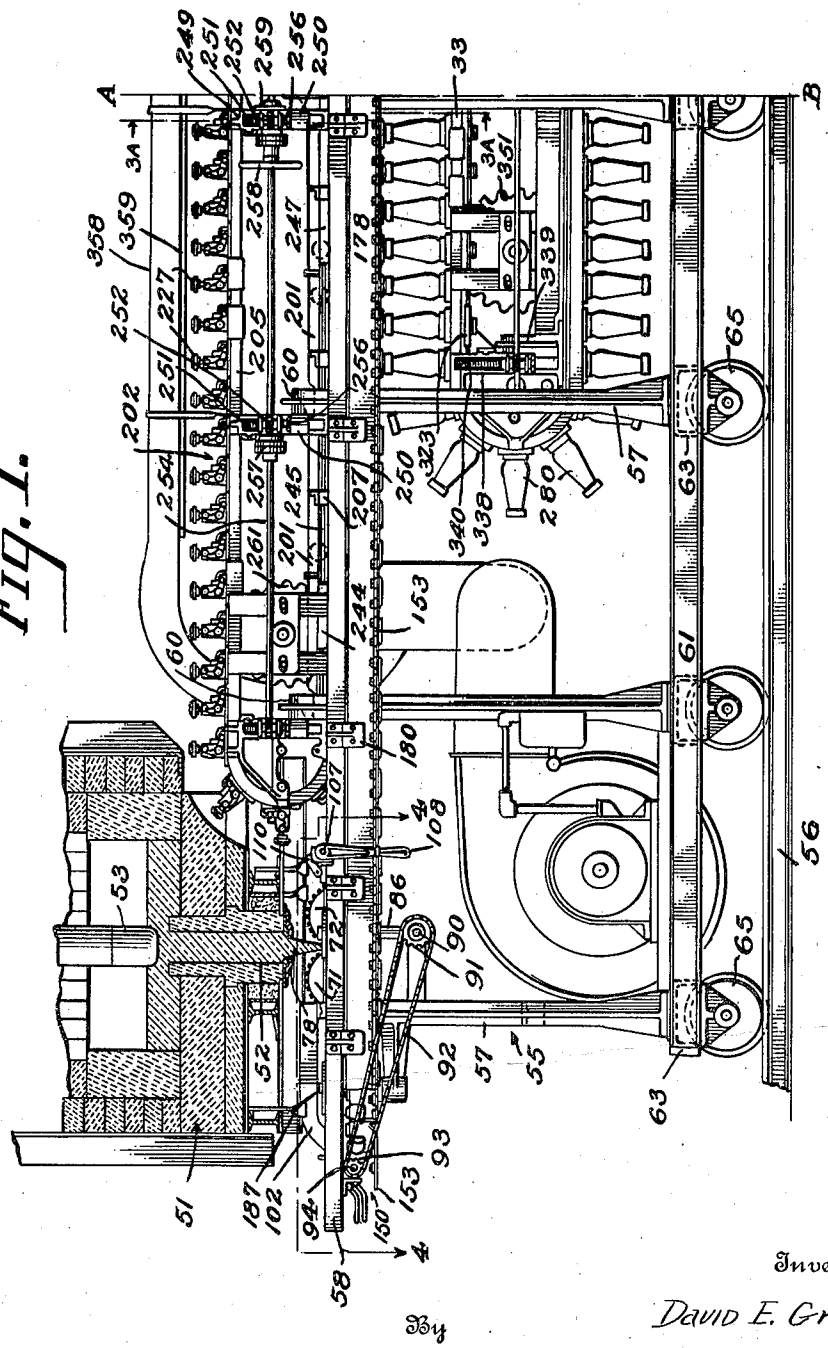
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BLOWING MECHANISM FOR GLASS WORKING MACHINES

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Fig. 1.



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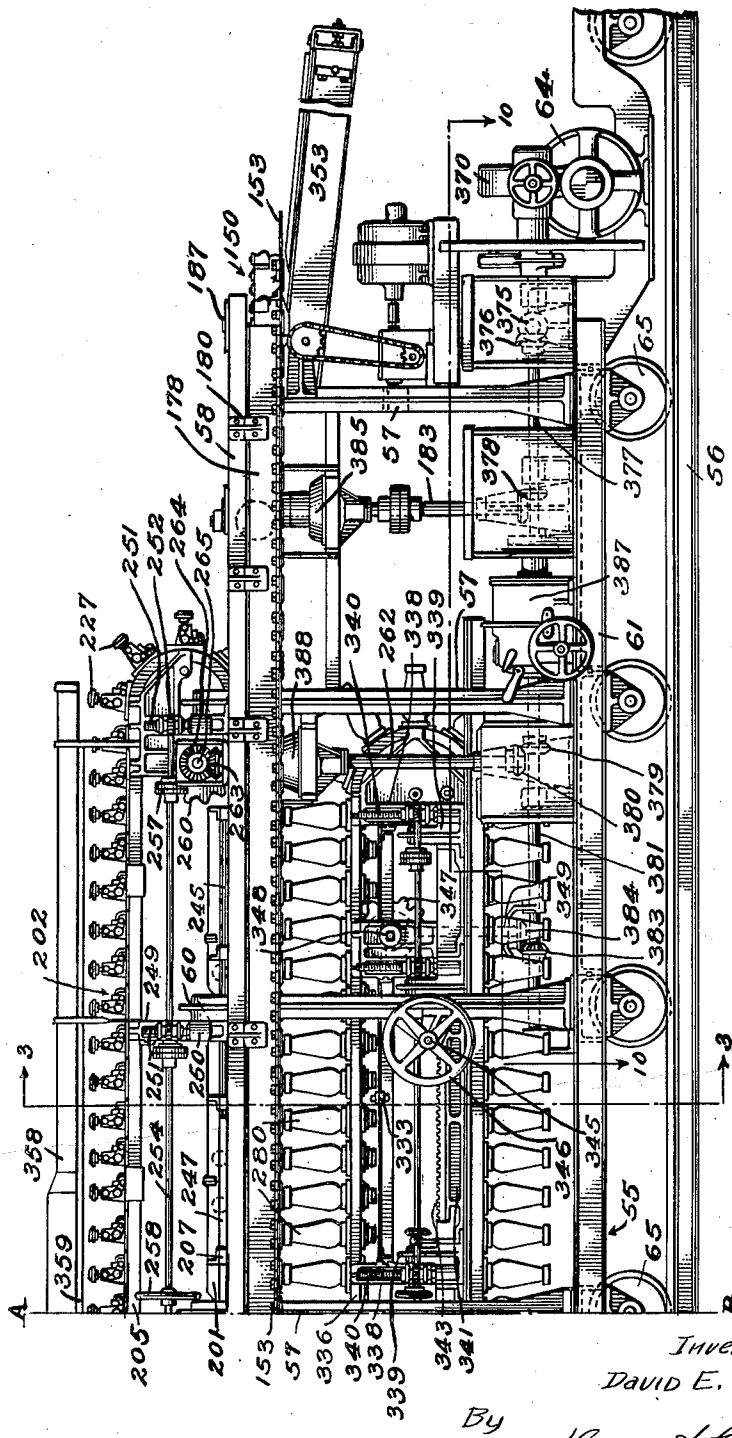
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BLOWING MECHANISM FOR GLASS WORKING MACHINES

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Fig. 2.



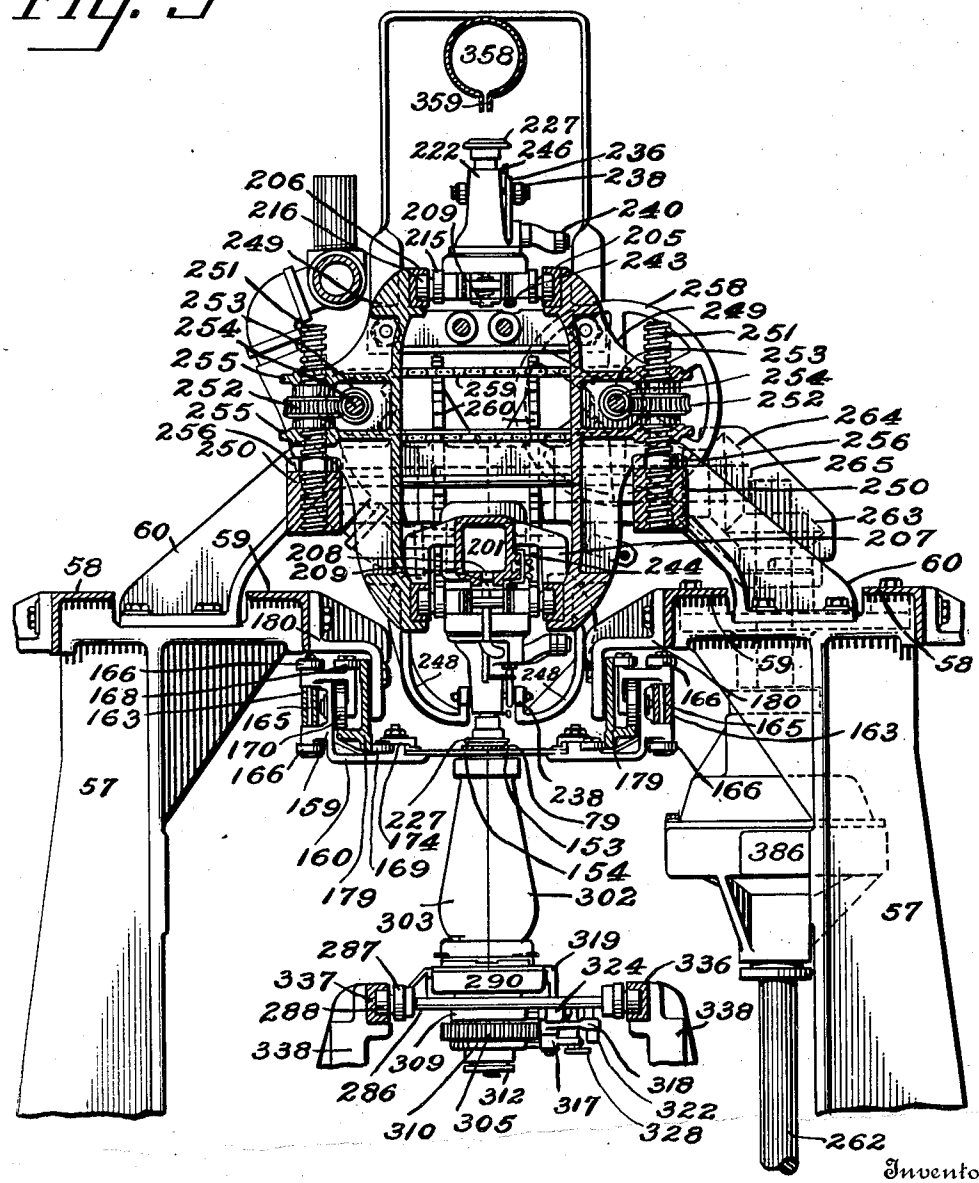
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BLOWING MECHANISM FOR GLASS WORKING MACHINES

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Fig. 3



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BLOWING MECHANISM FOR GLASS WORKING MACHINES

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Fig. 4.

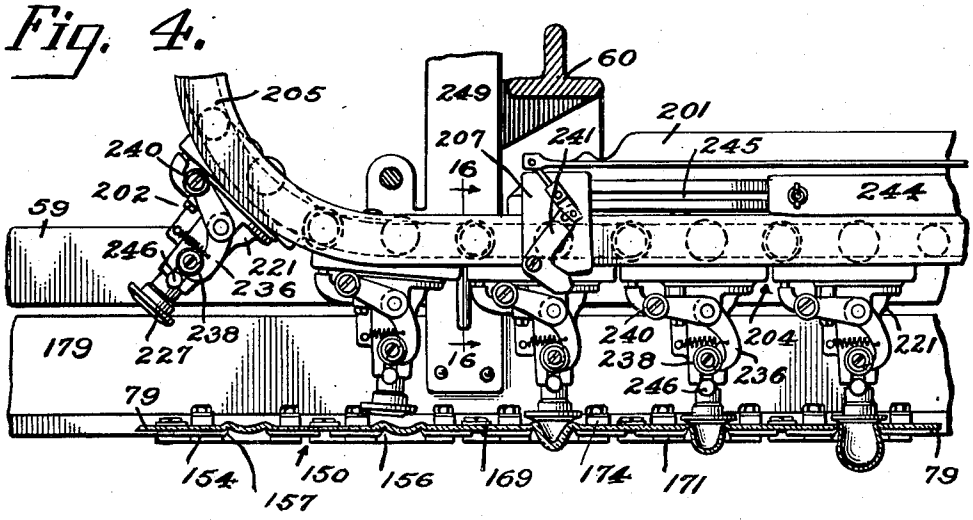


Fig. 5.

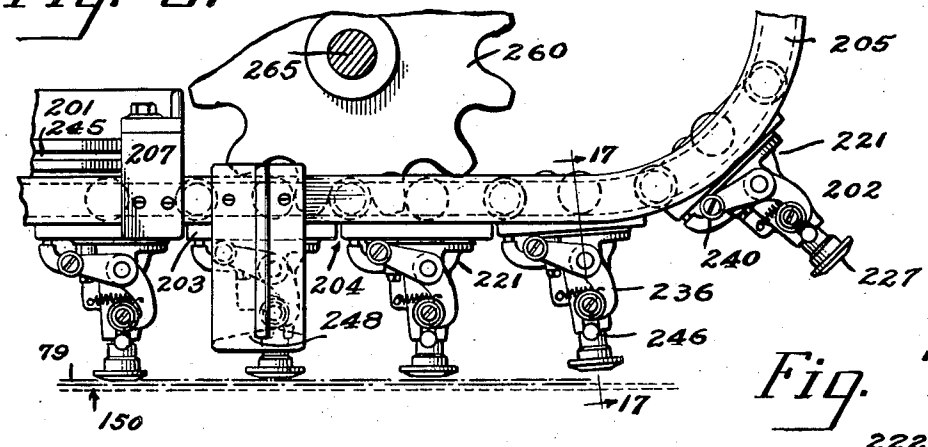


Fig. 7.

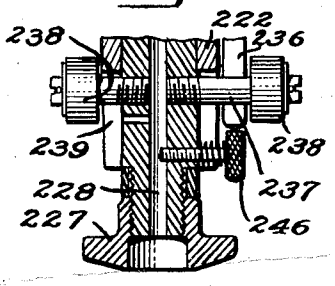
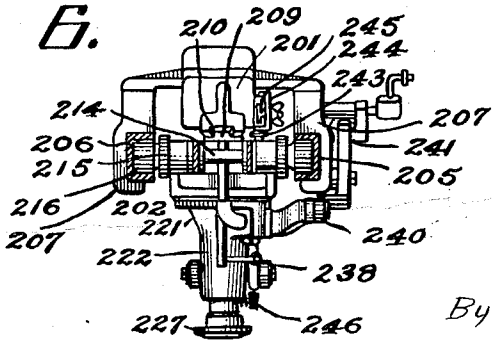


Fig. 6.



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Fig. 9.

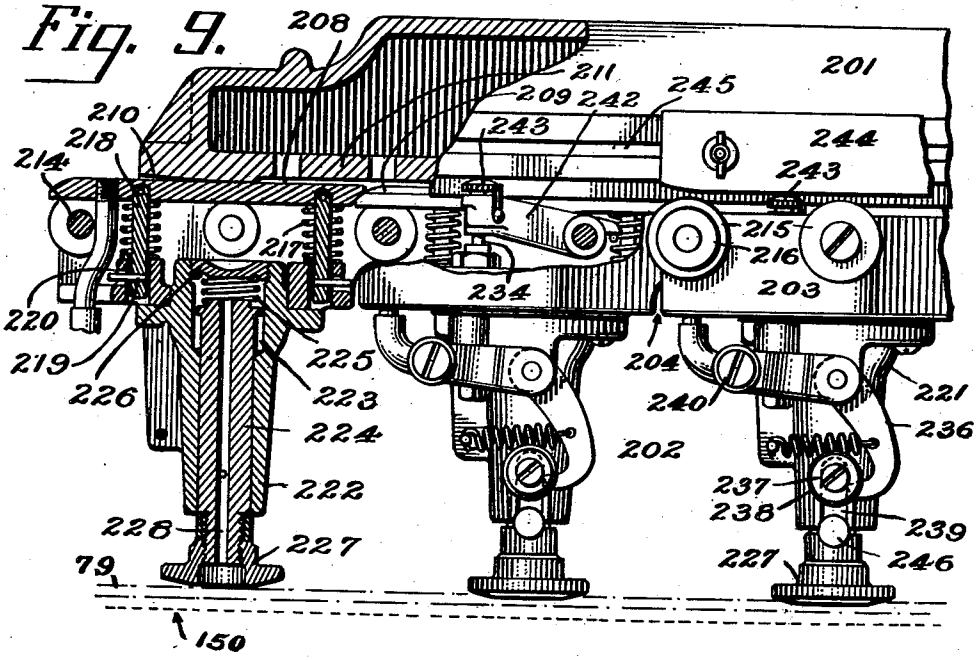


Fig. 10.

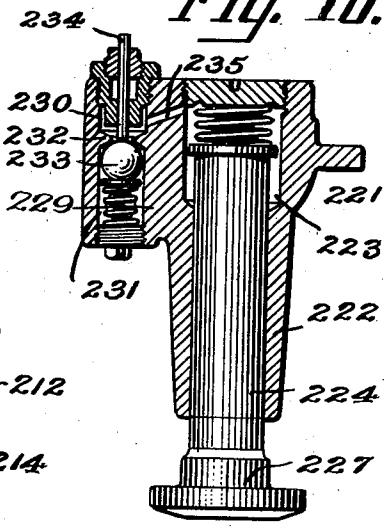
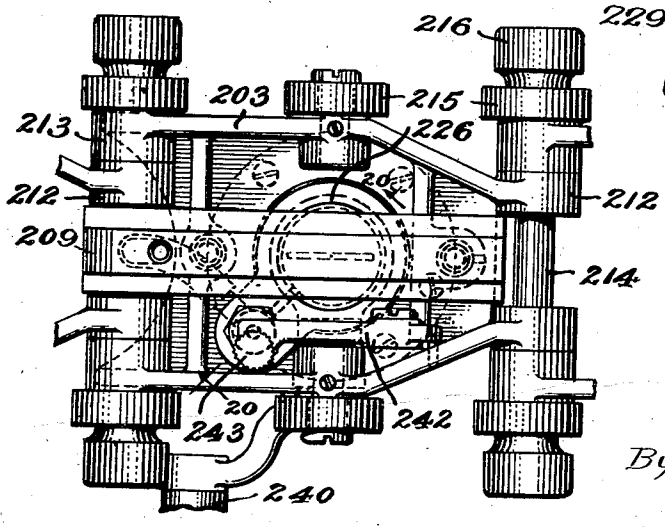


Fig. 8.



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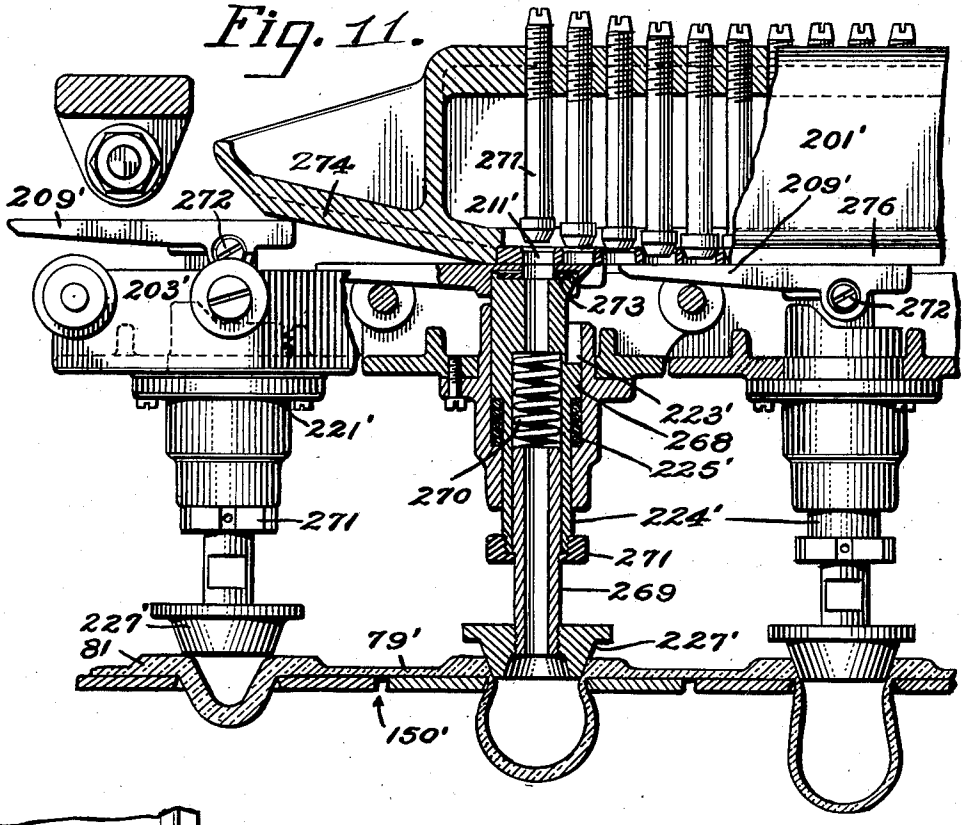
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BLOWING MECHANISM FOR GLASS WORKING MACHINES

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Fig. 11.



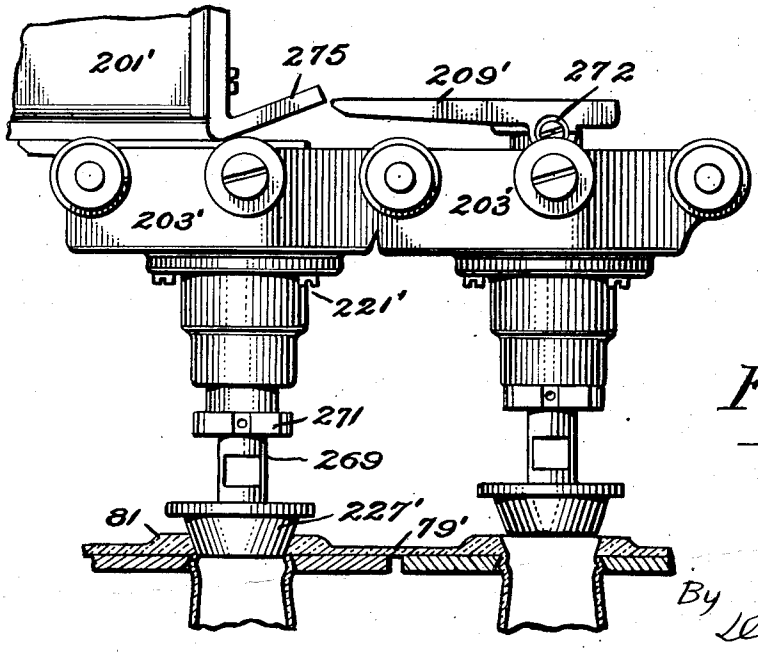


Fig. 12.

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UNITED STATES PATENT OFFICE

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BLOWING MECHANISMS FOR GLASS WORKING MACHINES

Application filed June 3, 1927. Serial No. 196,214.

This invention has for its object to provide a novel construction in blowing mechanisms for glass working machines in which blow heads moving in a closed path have their operative run straight, and it consists in the construction, arrangement and combination of several parts as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, in which corresponding parts are designated by corresponding marks of reference:

Figs. 1 and 2 together constitute a side elevational view of a complete machine in which the blowing mechanism forming the subject of this application may be used, Fig. 1 showing the machine from its feed end to approximately its middle portion and Fig. 2 showing the machine from this intermediate point to the delivery end;

Fig. 3 is a similar view, on an enlarged scale, on line 3A—3A of Fig. 1, but also showing the means for effecting simultaneous adjustment of the blowhead system;

Figs. 4 and 5 are, respectively, longitudinal sectional details of the blowing mechanism as the blowheads approach and leave the ribbon;

Fig. 6 is a transverse vertical section on the line 16—16 of Fig. 4, showing a blowhead unit as it enters the blowbox;

Fig. 7 is a transverse vertical section on the line 17—17 of Fig. 5, showing the lower end of a blowhead unit on an enlarged scale;

Fig. 8 is a plan view of a blowhead unit;

Fig. 9 is a longitudinal view, partly in section, showing the relative positions of the blowhead units, blowbox, and puff cam;

Fig. 10 is a 45° vertical section through a blowhead valve and spindle on the line 20—20 of Fig. 18;

Figs. 11 and 12 are longitudinal views, partly in section, near the feed and delivery ends, respectively, of a machine embodying the invention of this application, showing blowhead units, a blowbox and a cam differing from those of the preceding figures.

This invention will be described as it has been embodied in the machine shown in Figures 1 and 2, which is fully described in the application of Woods and Gray, Sr. No. 183,491 and which comprises means for delivering a ribbon of plastic glass on an endless carrier apron. 150, moving in a horizontal closed path. The carrier is perforated at intervals, and by preference the ribbon has bosses formed thereon, the ribbon being so fed to the carrier that the bosses are positioned above the perforations, through which latter glass sags, to be inclosed in molds 280 moving, during their operative period, in unison with the carrier apron. The blowing of the glass so inclosed in the molds is effected by the following means which form the subject of this application.

Located above a portion of the operative run of the conveyor 150 is the blowing mechanism, comprising a fixed reservoir of blowing air in the form of a blowbox 201 (Figs. 4, 5 and 9) and a series of movable blowhead mechanisms 202 cooperating therewith and with the ribbon conveyor. The blowbox 201, which is long in comparison with its width and depth, and extends forwardly from a point adjacent to the point where the ribbon 79 contacts with the conveyor.

Between the conveyor and the blowbox passes the blowhead assembly, mounted on a series of links 203, articulated in the form of a belt 204 running on a pair of continuous rails 205, 206, arranged in vertical planes with an operative run below the box 201 and above the conveyor 150 and a return run above the box, with return bends beyond the ends of the box.

Illustrated herein are two types of blowing mechanism which, for convenience, will be designated as the valve (Figs. 3, and 4 to 10) and the valveless type (Figs. 11 and 12).

The valve type

The bottom of the blowbox 201 is slotted, as at 208, (Figs. 3, 6 and 9) on the central longitudinal plane of the machine. The lower surface of the box is channelled, as at 210, in alignment with the slot. The channel and slot receive central ribs on the upper face of slide shoes 209 which constitute part of the blowhead belt 204, the shoe on each side of the rib making contact with the lower surface of the box on the sides of the slot. The top of

the rib, as its shoe moves into the slot, contacts with the base of the channel and prevents escape of air therethrough. For structural reasons the two walls of the slot may be connected, as shown, by transverse webs 211, but the top of the rib should not contact with these, as a chamber containing air at blowbox pressure should be located at all times above the tops of the ribs, escape therefrom being prevented by the shoes.

The blowhead mechanisms 202 are alike, the terms top and bottom having reference to the position such mechanism occupies when below the blowbox 201 and in the operative run of the belt 204. Each section of the latter is formed by one of the links 203 (Fig. 8). These links are U-shaped in vertical cross section and at each corner each link has a bearing 212 or 213 to receive a pin 214 by which it is connected to the adjacent link, the bearings at one end being closer together than at the other to permit narrow bearings 212 on one link to slip between wider bearings 213 on the adjacent link. A drive roller 215 is mounted on connecting pin 214 adjacent to the outer surface of each of the wide bearings 213, and on the outer side of each drive roller 215 is mounted a supporting roller 216. An additional drive roller 215 is rotatably mounted on either side of link 203 mid-way of its length but in longitudinal alignment with the first drive roller 215.

Carried on guide pins between the side webs of each of the links is the shoe 209 having a longitudinal rib on the upper surface thereof adapted to be received within the blowbox slot 208. The shoes are pressed upwardly against the bottom of the box, to make a tight contact therewith, by springs 217 which are mounted on guide pins 218, which are secured to the undersides of the shoes, the lower ends of the pins being slidably keyed to the bottom webs of the links 203 by retaining pins 219 that engage recesses 220 in such webs. When a plurality of blowhead mechanisms are on a straight run the shoe of each one abuts on and makes close contact with the shoes upon adjacent links. Thus a series of shoes below the slot 208 completely closes the latter except for exit of blowing air as will be hereinafter referred to.

The individual blowhead mechanisms 202 each consist of a body 221 which, in the form shown in certain of Figs. 1–10, consists of a housing 222 let into the bottom of the link 203 at the upper end and provided with an axial bore 223 that is enlarged at its upper end (Figs. 9 and 10). In the bore there is mounted a shouldered blow head spindle 224 which forms a tight but sliding fit in the lower portion of the bore. A spring 225, whose upper end bears against a plug 226 that is screwed into the upper end of bore 223, normally pushes the shoulder of the spindle into contact with the lower end of the enlarged portion of the bore. At its lower end blowhead spindle 224 is threaded to receive a blowhead 227. As best shown in Fig. 9, the spindle 224 and blowhead are provided with an axial central bore 228 for the passage of the blowing air. As best shown in Figs. 4 and 9, the blowhead 227 has a flat bottom for cooperation with the orifices 156 in orifice plates 155, its edges being chamfered. The blowhead spindle 224 is also provided with a vent from the bore 228 through a side wall.

The housing 222 has an offset lug 229 (Fig. 10) containing upper and lower chambers 230, 231 that are separated by a perforated web 232 to provide a seat for a spring pressed ball valve 233, adapted to be unseated by a pin 234. The upper chamber 230 is connected with the enlarged part of bore 223 by a port 235, and the lower chamber is connected by a flexible pipe with a port in the contact surface of shoe 209.

Except during the operative run of the blowhead mechanisms, each spindle 224 is held in retracted position by a latch 236 pivoted to the blowhead housing 222, said latch being spring held in engagement with one of a pair of studs 237 which are tapped into the lower portion of the spindle (Figs. 7 and 9). Each stud carries a roll 238, for a purpose to be described later, and extends through slots 239 in housing 222. The upper end of a latch 236 carries a roll 240 for sliding engagement with a trip release 241 that is pivoted to one of the brackets 207 (Fig. 4). The trip release may be thrown out of operative position when desired.

When latch 236 releases the spindle, spring 225 forces blowhead 227 downwardly on the glass ribbon 79. Blowing air is not allowed to enter the blowhead spindle, however, until valve 233 is opened by its pin 234 being depressed by an air valve arm 242, which is pivoted in the link 203. Arm 242 is provided with an adjustable screw 243 that, in the travel of a blowing unit, is depressed by a puff cam 244 which is longitudinally adjustable in a T-shaped guide slot 245 in blowbox 201. The air from channel 208 may then pass (Fig. 10) to the blowhead and act on the ribbon 79 above one of the orifices 156 to give the initial puff or puffs, and this will continue until screw 243 rides off from puff cam 244.

The blowbox 201 may be divided into any desired number of compartments, containing air at different pressures, by paper gaskets (not shown), but in practice it has been found that air of two different pressures is satisfactory one of said pressures being used for the puff and the other for the blow. The latter is controlled in time by a blow cam 247 (Figs. 1 and 2), adjustably mounted in a continuation of slot 245, and actuating screw 243.

As an additional means of regulating the

air passing to the ribbon, a set screw 246 (Fig. 7) is tapped into the lower portion of the blowhead spindle 224 in line with the slots 239 in housing 222 and projecting into the bore of the spindle. By adjusting this set screw in and out a very close regulation of the blowing air may be obtained.

When the blowheads reach the vicinity of the end of the rails 205, 206 at the delivery end of the machine, the rolls 238 ride upwardly on a lift cam 248, supported by the rails, and the corresponding spring latch 236 then snaps under stud 237, thus holding blowhead spindles 224 in retracted position (Fig. 5).

The belt formed by the articulated blowhead mechanisms 202, is guided on the rails 205, 206, by the supporting rollers 216, which run in the U channels in the rails.

The rails 205, 206 are each supported by a series of blowhead supporting rail brackets 249 which are supported for vertical adjustment by the yokes 60. For this purpose each of these yokes 60 is provided with a pair of bosses 250, internally threaded to receive threaded supporting studs 251. On each of the latter is mounted an internally threaded worm wheel 252 for engagement with a corresponding worm 253 on a horizontal adjusting shaft 254 that is carried by the corresponding blowhead supporting rail bracket 249. The latter each have yoke fingers 255 to form guide bearings for the vertical travel of the supporting brackets in respect thereto on the supporting studs 251. Each of the latter has a lock nut 256 to prevent its turning in boss 250 when the blowhead supporting rail bracket 249 is being adjusted vertically by the shaft 254. To permit simultaneous vertical adjustment of the brackets 249 on the same side of the machine the several aligned shafts 254 are connected by couplings 257 and are provided with operating handwheels 258. The aligned shafts 254 on the two sides of the machine are geared together by a sprocket chain 259 (Fig. 3) so that the rails for the blowheads can be raised or lowered together by turning the shaft on one side by the wheels 258.

To drive belt 204 on rails 205, 206, the links on the bottom run are caused to engage drive sprockets 260 toward the delivery end. Tandem idler sprockets 261 are provided toward the feed end of the machine to equalize the motion on both runs. Drive sprockets 260 are driven through a vertical blowhead drive shaft 262 on whose upper end is mounted a bevel gear 263 that meshes with a bevel gear 264 on a gear shaft 265 which is mounted in a bracket 249 and carries drive sprockets 260.

In the valveless type of blowhead construction shown in Figs. 11 and 12, the parts will be designated by primed numerals corresponding to the unprimed numerals which designate the corresponding parts of the type of blowhead construction just described. In the valveless type the blowhead body 221′ is attached to links 203′, similar to links 203, and contains within its axial bore 223′ a sliding hollow spindle 224′, the bore being enlarged at its upper end (Fig. 11). Downward movement of the spindle 224′ is resisted by a coiled spring 225′ interposed between the bottom of the enlarged portion of the bore 223′ and a shoulder 268 on the upper portion of the spindle. The latter carries an internally sliding plunger member 269 which is pressed downwardly, during the operative run of the blowhead mechanisms, by a spring 270 interposed between its upper end and the head of the cavity in the spindle 224′ in which it operates. To limit its downward travel, the lower end of the plunger member 269 is reduced and extends through a stop nut 271 which is threaded on the bottom of spindle 224′. The extreme lower end of the plunger carries a conical blowhead 227′ to contact with the glass ribbon 79′. The shoes 209′ are pivoted at 272 to the top of the blowhead spindle 224′, and a rubber packing 273 is interposed between them, but any other system of connection between the spindle and the shoe, which permits the shoe to align itself and still maintain a seal with the spindle, might be used. Blowhead spindles 224′ are not provided with air vents, such as the vents previously described, and they have no latches to hold them up for a portion of their operative run, this in the present type being due to the springs 225′ which normally hold the spindles and parts carried thereby in an elevated position. To overcome this upward pressure and seat the blowheads 227′ in the ribbon 79′ during the major part of their travel below the blowbox 201′, the forward end of the latter has a cam 274 (Fig. 11) which depresses shoes 209′ as they approach the blowbox (and thus, through the springs 270, the blowheads) and holds them depressed until the end of the blowbox is reached, at which point there is provided a release cam 275 (Fig. 12) that gradually allows the springs 225′ to return the blowheads and shoes to their normally elevated position.

Blowing air is supplied to this type of blowhead mechanism by a modified type of blowbox 201′ (Fig. 11) which has no slot corresponding to the slot 208 previously described, but whose bottom consists of a plate 276 provided with a plurality of air ports 211′ which may be partially or completely closed by a corresponding series of adjusting screws 277 threaded through the top of the blowbox 201′.

The shoes 209′ are held against the under side of the plate 276, and each shoe has a port connected with the interior of the cor-

responding spindle and adapted in travel of the shoe to successively register with the ports 211′, and thus admit air to the plunger 269. In this type the shoes do not make tight contact with shoes on adjacent sides thereof.

It will be noted that each of the types of blowing mechanisms before described comprises a blowbox, combined with a series of articulated sections relatively movable in respect to each other, each section carrying by a resilient mounting a blowing head and a shoe with means actuated on the travel of the shoes beneath the blowbox to resiliently press the heads upon the ribbon of glass, air ports being placed in the shoes to cooperate with the box and to permit the passage of air to the blowheads. In each of these constructions, moreover, throttling valves are interposed in the air passages to the blowheads. In each of them the blowheads, when lowered on the ribbon, serve to anchor the glass on the conveyor. This is especially desirable when a bossed ribbon is used as it assures the maintenance of the bosses over the apertures, even if the ribbon between the bosses should be subsequently severed. In the valveless type these throttling valves are individualized in respect to the several ports in the air box so that the amount of air fed to the spindles in successive positions along the working path may be determined and graduated to obtain the best results.

It should be further noted that, due to the short length of air passages between the blowbox and the blowheads, reduction of pressure in such passages is reduced to a minimum, and that in the valveless type these passages are straight from the throttled air-ports from the box to the blowheads. This permits satisfactory blowing of articles with a very low pressure in the blowbox, and an accurate control of air pressures at the blowheads by the throttling valves.

What is claimed is:

1. In a glass blowing machine, the combination of a stationary blowbox, of a belt composed of a plurality of articulated sections, a shoe cooperating with the box and a blowhead, both carried by and movable in respect to each section and to each other.

2. In a glass blowing machine, the combination of a stationary blowbox, and a belt composed of a plurality of articulated sections, each section having a shoe cooperating with the box, and a blowhead, the shoe and blowhead being both carried by and movable in respect to each section and to each other, and resilient means interposed between the sections and the shoes and between the sections and the blowheads.

3. In a glass blowing machine, the combination of a stationary blowbox having a series of ports therein, means for separately throttling the several ports at will, and a belt comprising articulated sections carrying blowheads and shoes moving past the blowbox with the shoes in cooperative relation with the ports in the box.

4. In a glass blowing machine, the combination with a travelling glass conveyor, of a stationary blowbox and a plurality of blowing means simultaneously movable with the conveyor past the box and having parts movable toward the conveyor and the box independently of each other.

5. In a glass blowing machine, the combination of a blowbox having a series of ports therein, means for separately throttling the several ports at will, and a belt comprising articulated sections, each section carrying a blowhead and having shoes pivoted thereto cooperating with the blowbox.

6. In a glass blowing machine, the combination of a blowbox having a series of ports therein, means for separately controlling the ports at will, a series of shoes having openings therein adapted to register with said ports articulated together and movable in close contact with and relative to the blowbox and spindles having passages communicating with said openings carried by the shoes and moving past the several ports.

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