

H. DOUCHAMP.
 AUTOMATIC AIR VALVE MECHANISM FOR GLASS DRAWING APPARATUS.
 APPLICATION FILED JAN. 29, 1909.

938,305.

Patented Oct. 26, 1909.

3 SHEETS—SHEET 1.

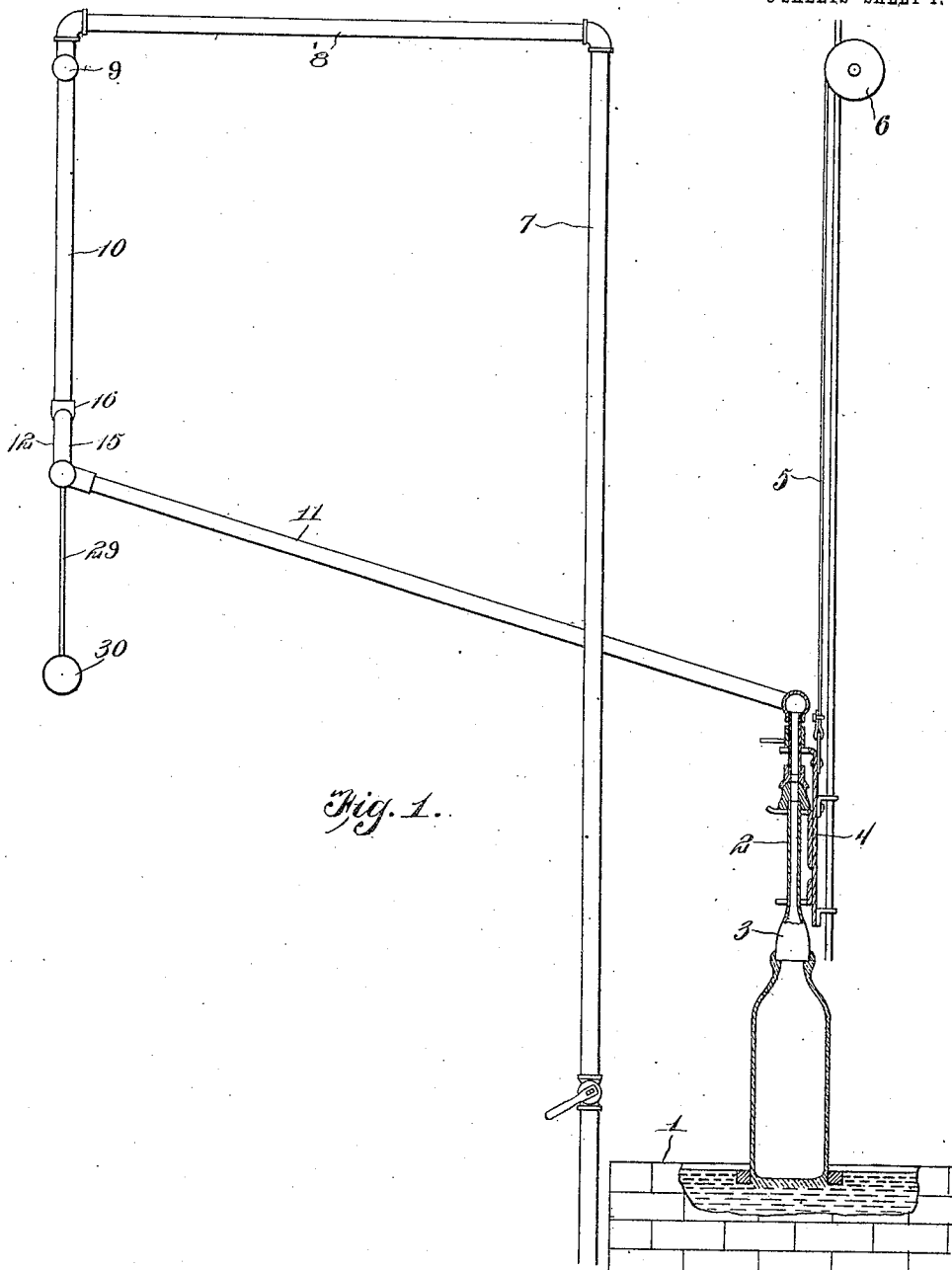


Fig. 1.

Witnesses

Louis P. Heinrichs
 C. C. Hines.

Inventor
 Henry Douchamp

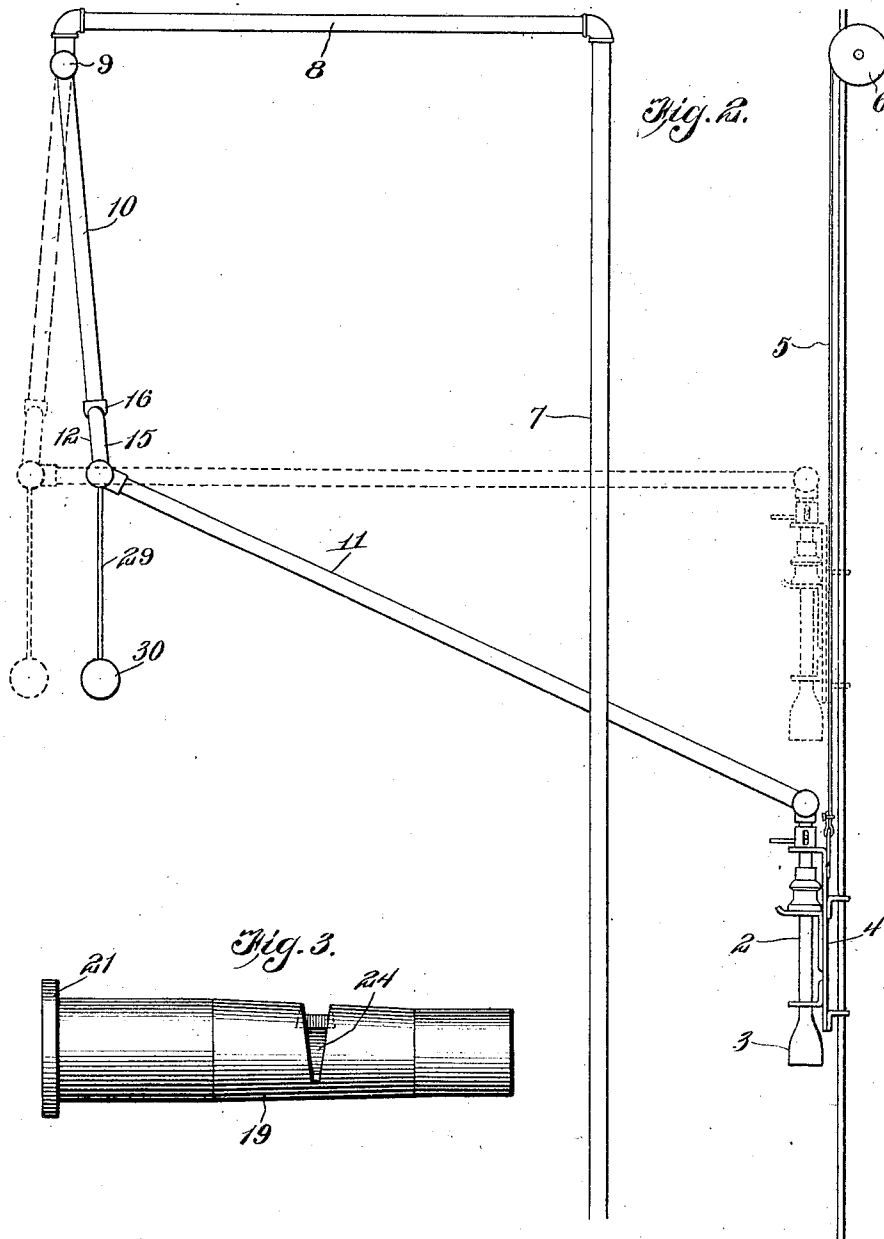
By Victor J. Evans
 Attorney

H. DOUCHAMP.
 AUTOMATIC AIR VALVE MECHANISM FOR GLASS DRAWING APPARATUS.
 APPLICATION FILED JAN. 29, 1909.

938,305

Patented Oct. 26, 1909.

3 SHEETS—SHEET 2.



Witnesses

Louis B. Heinrichs
 C. C. Hines.

Inventor:
 Henry Douchamp

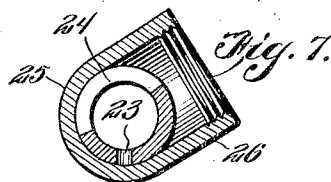
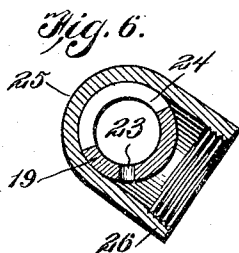
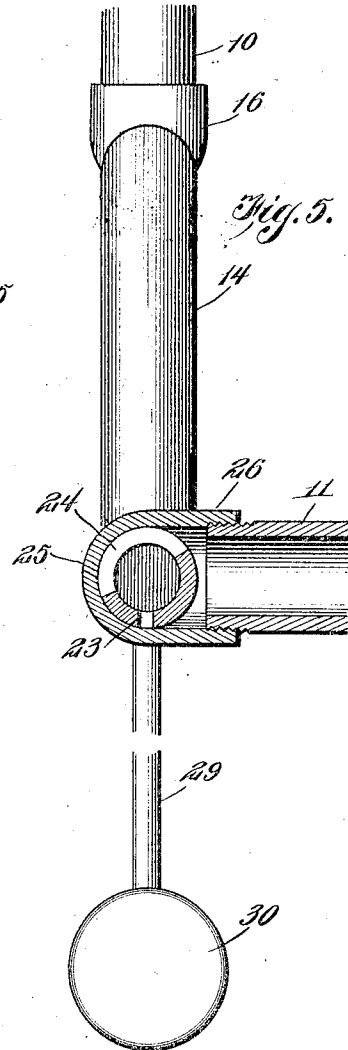
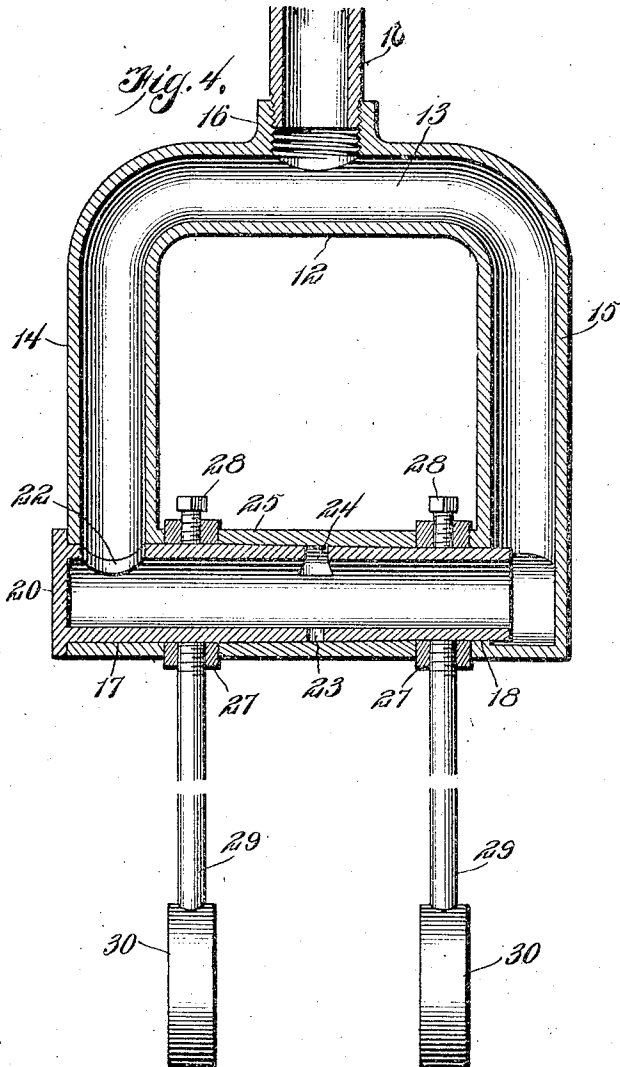
By Victor J. Evans
 Attorney

H. DOUCHAMP.
 AUTOMATIC AIR VALVE MECHANISM FOR GLASS DRAWING APPARATUS.
 APPLICATION FILED JAN. 29, 1909.

938,305.

Patented Oct. 26, 1909.

3 SHEETS—SHEET 3.



Witnesses

Louis R. Heinrichs
 C. C. Hiner.

Inventor
 Henry Douchamp
 By Victor J. Evans
 Attorney

UNITED STATES PATENT OFFICE.

HENRY DOUCHAMP, OF SMETHPORT, PENNSYLVANIA, ASSIGNOR TO SMETHPORT GLASS COMPANY, OF SMETHPORT, PENNSYLVANIA, A CORPORATION OF WEST VIRGINIA.

AUTOMATIC AIR-VALVE MECHANISM FOR GLASS-DRAWING APPARATUS.

938,305.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed January 29, 1909. Serial No. 474,955.

To all whom it may concern:

Be it known that I, HENRY DOUCHAMP, a citizen of the United States, residing at Smethport, in the county of McKean and State of Pennsylvania, have invented new and useful Improvements in Automatic Air-Valve Mechanism for Glass-Drawing Apparatus, of which the following is a specification.

This invention relates to an automatic air valve mechanism for glass drawing apparatus of that type designed for drawing hollow glass articles.

The object of the invention is to provide a valve mechanism which will be opened and closed by the upward and downward movements of the drawing mechanism, and which in the upward movement of said mechanism as the cylinder or roller is drawn out will automatically supply a gradually increasing volume and pressure of air to the cylinder through the blow-pipe and bait, thereby insuring an accurate supply of air, in volume and pressure, to the cylinder as the length of the latter increases to produce a perfect article.

Another object of the invention is to provide an automatic valve which will obviate the necessity of employing hand-operated valves and the uncertainties resulting from hand-manipulation, which will be accurately controlled by the drawing-tool to supply the exact amount of air required, and which is susceptible of ready and convenient adjustment to regulate its action, to an exceedingly accurate degree.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a diagrammatic view of a glass drawing apparatus embodying my invention. Fig. 2 is a side elevation, on an enlarged scale, of the upper portion of the air supply pipe and automatic valve, showing the movement of the jointed pipe sections in full and dotted lines. Fig. 3 is a view of the hollow valve plug. Fig. 4 is a cross section through the valve mechanism on line 3—3 of Fig. 3. Fig. 5 is a section on line 5—5 of Fig. 4. Figs. 6 and 7 are detail cross-sections through the valve proper showing the relative positions of the

parts when the valve is fully closed and fully opened.

Referring to the drawings, 1 designates the furnace or pot containing the supply of molten glass from which the cylinder or hollow article is to be drawn; 2, the drawing tool, comprising a blow-pipe of ordinary form carrying the bait 3; 4, the frame or carriage supporting said tool and by which it is designed to be raised and lowered; and 5 a hoisting rope or cable connected with the carriage and passing over an elevated guide pulley 6. Any suitable construction of furnace or pot, carriage and hand or power operated hoisting mechanism may be used.

The air supply pipe 7 extends vertically and communicates at its lower end in practice with any suitable source of air supply. The upper end of the pipe is provided with a rigid horizontal branch 8, to the outer end of which is jointed, as at 9, a depending swinging pipe section 10. The lower end of this pipe section 10 is jointed or pivotally connected by the parts forming the ordinary valve mechanism to the outer end of a swinging pipe section 11, which is pivotally connected at its inner end to the carriage 4 or blow-pipe 2 and communicates with the upper end of the latter. In the lowered position of the carriage 4 shown in Fig. 2, which is the position it occupies when the bait is initially brought into contact with the batch of molten glass at the limit of downward movement of the blow-pipe, the two pipe sections 10 and 11 inclined downwardly and inwardly at an oblique angle to perpendicular, as indicated in full lines. As the carriage is raised in the drawing operation, the pipe section 11 will be carried upward with it until, when the carriage reaches the limit of its upward movement, the pipe section 11 will be raised to a horizontal position and will in its movement transmit a forward swinging movement to the pipe section 10 which will pass to a reverse oblique position to the vertical, as indicated in dotted lines.

The automatic valve mechanism is shown in detail in Figs. 4 to 7, inclusive, and comprises a U-shaped body or casing 12 embodying an upper horizontal frame 13 and depending vertical branches 14 and 15. The branch 13 is provided with an internally threaded inlet projection 16 receiving the lower threaded end of the pipe section 10, by which it is coupled thereto, while the

lower end of the branch 14 is formed with a transverse opening 17 and the inner side of the lower end of the branch 15 with a lateral opening 18. A hollow, tapered valve plug 19 extends between the lower ends of the branches 14 and 15, one end of the plug passing through the transverse opening of the branch 14 and the other end of the plug entering the branch 15 through the opening 18. The first named end of the plug is closed by a head 20 having a flange 21 to hold it from inward longitudinal movement and is provided in its side with a port 22 communicating with said branch 14, while the opposite end of the plug is open and in direct communication with the branch 15 which it enters.

The plug is provided in its lower side with a comparatively small primary feed port 23 and in its upper or diametrically opposite side with a transversely extending tapering feed port or passage 24, which, as shown in Figs. 3, 6 and 7, extends approximately half way round the circumference of the plug and is of V-form. The said port and passage are arranged midway of the length of the plug, which portion of the plug fits within and extends through a hub or sleeve 25 having a central rearwardly extending internally threaded projection or union 26 receiving the outer threaded end of the pipe section 11. The hub or sleeve is of less length than the distance between the lower ends of the branches 14 and 15 of the casing 12, and between the same are arranged collars 27 which hold the parts against relative endwise movement and are secured to the valve plug by set screws 28, thus detachably securing the plug in position. From these collars depend arms 29 carrying weights 30 which are fixed through the collars to the valve plug and operate as gravity pendulums to normally maintain the valve plug in a fixed position relative to the hub and pipe sections as the latter swing, while permitting the hub to turn upon the plug in one direction or the other to control the feed port 23 and passage 24. The plug is preferably longitudinally tapered and the openings 17 and 18 and bores of the hub and collars correspondingly tapered to secure a close fit of the plug to prevent any material leakage of air to the atmosphere from the joint. It will be observed from the foregoing description that the valve body or casing 12 forms a union coupling the valve to the pipe section 10, and coöperates with the hub 25 to form a knuckle joint pivotally connecting the said pipe section 10 with the pipe section 11.

Figs. 1 and 2 show the normal position of the parts in full lines, and Fig. 6 the normal arrangement of the parts of the valve, from which it will be observed that the feed port 24 is wholly closed by the hub 25, while the

port 23 is open for the feed of a small amount of air to the blow-pipe, whereby provision is made for the formation of the cap in the initial part of the operation. When this is accomplished, the drawing action is commenced for the production of the cylinder or roller by elevating the carriage and blow pipe in the usual way. As the length of the cylinder increases during the drawing action, it will be readily understood that the volume and pressure of air supplied thereto should be uniformly and progressively increased. This uniform feed of the air in increased volume and pressure is accomplished by a gradual automatic opening of the feed passage 24 by the outward movement of the jointed pipe sections 10 and 11. As the carriage 4 moves upwardly, it will be apparent that the branch 11 will be moved upward with it and also moved outward and will transmit an outward swinging movement to the branch or pipe section 10, by which, although the valve plug is maintained in a relatively fixed position through the gravity action of the weighted arms, a relative turning movement between the plug and hub will be effected, and which will progressively increase as the pipe section 11 is moved upward and the pipe section 10 outward. This movement of the hub is sufficient to close the primary feed port 23 after the cap is formed and the drawing movement of the drawing tool is continued, and at this time to expose the narrowest portion of the feed slot or passage 24, for the supply of a comparatively small amount of air to the blow-pipe at this stage in the drawing operation. As the drawing operation progresses, however, and the length of the cylinder or roller is increased, the continued upward movement of the pipe section 11 and outward movement of the pipe section 10 results in the slot 24 being gradually opened until, at the end of the drawing operation, it is open to its fullest extent. Hence the volume and pressure of air supplied to the blow pipe and cylinder during the drawing operation will be uniformly and progressively increased, as requirement demands, by which the production of a perfect cylinder or roller is insured. When the cylinder is removed and the carriage lowered to dispose the parts in proper position for the beginning of the next ensuing operation, the feed slot 24 will be closed and the port 23 again opened for the feed of the initial small quantity of air.

It will be seen from the foregoing description, that my invention provides an automatic air valve mechanism which dispenses with the use of hand-operated valves and the uncertainties resulting from hand manipulation, and which is accurately controlled in action by the operative movement of the drawing tool and in exact accordance

with the speed of movement thereof so as to gradually supply a properly increasing volume and pressure of air to the blow pipe and cylinder. By this mode of operation exactly the amount of air required at each stage in the drawing of the cylinder and no more is supplied, by which an absolute certainty of action is insured, resulting in the production of cylinders or rollers which are of uniform thickness and excellence in each operation of the apparatus. If at any time the valve mechanism should feed too much or too little air, this defect may be positively and accurately corrected by adjustment of the collars 27 on the valve plug to regulate the relative positions of the plug and the weighted controlling arms.

Having thus fully described the invention, what is claimed as new, is:—

1. In an apparatus for drawing hollow glass articles, a drawing tool having an air feed passage, an air supply pipe provided with a controlling valve, and a valve actuating device connecting said valve with the drawing tool, said device forming an air conduit communicating with the air passage of the tool.

2. In an apparatus for drawing hollow glass articles, a drawing tool provided with an air passage, an air supply pipe having a rotary controlling valve, and an actuating device connecting said valve with the drawing tool, said device forming an air conduit between the valve and the air feed passage of the tool.

3. In an apparatus for drawing hollow glass articles, a drawing tool having an air feed passage, an air supply pipe provided with relatively movable sections, and a valve connected with and actuated by the movements of said sections, one of said sections being connected with the drawing tool and forming an air conduit communicating with the air passage thereof.

4. In an apparatus for drawing hollow glass articles, a drawing tool having an air feed passage, an air supply pipe, a jointed conductor connecting said pipe with the drawing tool and movable with the latter, and a valve in said jointed conductor arranged to be opened and closed by the movements thereof.

5. In the art of manufacturing glass, a gatherer adapted to draw glass in cylindrical or other inclosed form, a conductor for feeding a cooling liquid to the draw, said conductor having a portion movable with the gatherer, and a regulating valve in said conductor controlled by the movement of said movable portion.

6. In the art of manufacturing hollow glass articles, a drawing tool, a pipe for supplying a cooling fluid to the draw, said pipe being provided with a movable portion, and connecting means between the drawing tool

and movable portion of the pipe for moving the latter, said movable pipe portion being provided with a controlling valve actuated by the movement thereof to regulate the supply of fluid to the draw.

7. In the art of manufacturing hollow glass articles, a drawing tool, a pipe for supplying a cooling fluid to the draw, said pipe being provided with jointed sections, one of said sections being connected for movement with the drawing tool, and a regulating valve between said jointed sections and controlled by the movements thereof.

8. In an apparatus for drawing hollow glass articles, a drawing tool having an air feed passage, an air supply pipe, conductors pivotally connected with said pipe and the drawing tool, and a valve forming a pivotal connection between said conductors and opened and closed by the movements thereof under the movements of the drawing tool.

9. In an apparatus for drawing hollow glass articles, a drawing tool having an air feed passage, an air supply pipe provided with a controlling valve, and a direct actuating connection between said valve and the drawing tool, said connection forming an air conduit leading from the valve to the tool.

10. In an apparatus for drawing hollow glass articles, a drawing tool having an air feed passage, an air supply pipe, a conductor pivoted to the pipe and carrying a valve member, a second conductor pivoted to the drawing tool and connecting with the air passage therein and carrying a complementary valve member, said valve members forming a pivotal connection between the conductors, whereby the valve is adapted to be opened and closed in the movements of the drawing tool.

11. In the art of manufacturing hollow glass articles, a gatherer adapted to draw glass in cylindrical or other inclosed form, said gatherer having an opening to communicate with the draw, an air supply pipe provided with jointed sections, one of said sections being connected for movement with the gatherer and communicating with the opening therein, and a regulating valve at the point of intersection of the jointed pipe sections and opened and closed by the reverse movements thereof on the up and down movements of the gatherer.

12. In the art of manufacturing hollow glass articles, a drawing tool, an air supply pipe having a pair of pivoted sections, one of said sections being movable with the drawing tool, and a regulating feed valve at the point of intersection of said pipe sections and controlled by the movements thereof.

13. In the art of manufacturing hollow glass articles, a drawing tool, an air supply pipe provided with jointed sections, one connected with the drawing tool, a regulating feed valve at the point of intersection of the

jointed sections, said valve being gradually opened by the movements of the jointed sections on the operative movement of the drawing tool to supply a progressively increasing volume of air in the progression of the draw, and operating means for the drawing tool.

14. In an apparatus for manufacturing hollow glass articles, a drawing tool having a passage for introducing air into the draw, an air supply pipe including a pair of jointed sections, one of said sections being in communication with the passage of the tool and connected for movement with said tool, and a regulating valve at the point of intersection of said sections, said valve comprising relatively movable members one having a tapering feed passage controlled by the other, the latter being operated to gradually uncover said passage by the movement of the pipe sections in the drawing movement of the tool.

15. In the art of manufacturing hollow glass articles, the combination with a drawing tool having a feed passage, and operating means for said drawing tool, of an air conductor having a movable section connected with the tool and communicating with said passage, and an air feed valve in said conductor opened and closed by the movements of said movable section in the upward and downward movements of the drawing tool.

16. In an apparatus for manufacturing hollow glass articles, a gatherer having a feed passage for introducing air into the article as it is formed, an air feed pipe, jointed conductors communicating between said pipe and gatherer, one of said conductors being connected with the pipe and movable in one plane and the other with the gatherer and movable in a different plane, and a regulating valve arranged at the point of intersection of said conductors so as to be opened by the movement of the conductors in the operation of the gatherer.

17. In an apparatus for manufacturing hollow glass articles, a drawing tool, an air supply pipe, said pipe having jointed sections connected for movement with the drawing tool, and a regulating valve at the point of intersection of said sections.

18. In an apparatus for manufacturing hollow glass articles, a drawing tool, an air feed pipe having jointed sections movable in planes at right angles to each other in the operative movement of the drawing tool, and a regulating valve at the point of intersection of said sections and controlled by the movement thereof.

19. In an apparatus for making hollow glass articles, a drawing tool, an air feed pipe having jointed sections movable in planes at right angles to each other in the operative movement of the drawing tool,

and a valve comprising relatively movable members carried by said pipe sections at their point of intersection and coupling said pipe sections together, one of said members being formed with a tapering feed passage gradually opened by the movement of the pipe sections in the drawing movement of the tool.

20. In an apparatus for manufacturing hollow glass articles, a drawing tool, an air supply pipe having jointed sections movable with the drawing tool, and a valve comprising relatively movable members arranged at the point of intersection of said pipe sections, one of said members being provided with a normally open feed port and tapering feed passage, the latter being gradually opened by the other member on the operative movement of the drawing tool.

21. In an apparatus for manufacturing hollow glass articles, an air feed mechanism controlled by the drawing tool and including a conductor having jointed sections movable in different planes, and a graduating valve at the point of intersection of said sections, comprising relatively movable elements carried by the sections, one of said elements having a normally open feed port and a tapering feed passage, said port being closed and said passage gradually opened by the movement of the other member respectively at the beginning and during the progress of the drawing operation.

22. In an apparatus for manufacturing hollow glass articles, an air feed mechanism automatically controlled by the drawing tool and including a conductor having sections jointed to move at an angle to each other, a valve comprising a hollow plug carried by one of said sections and a hub carried by the other section, said plug being provided with feed apertures controlled by the hub, and gravity controlled means for maintaining the plug in a prescribed position, whereby the hub is adapted to turn thereon and control said apertures in the movements of the sections.

23. In the art of manufacturing hollow glass articles, the combination with a drawing tool having an air passage, of an air supply pipe having movable sections pivotally connected to each other and to the drawing tool and communicating with said air passage, and a valve at the point of intersection of said sections and controlled by the swinging movements of the sections in the up and down movements of the drawing tool.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY DOUCHAMP.

Witnesses:

THOS. W. CAMP,
J. S. WALKER.