

No. 774,403.

PATENTED NOV. 8, 1904.

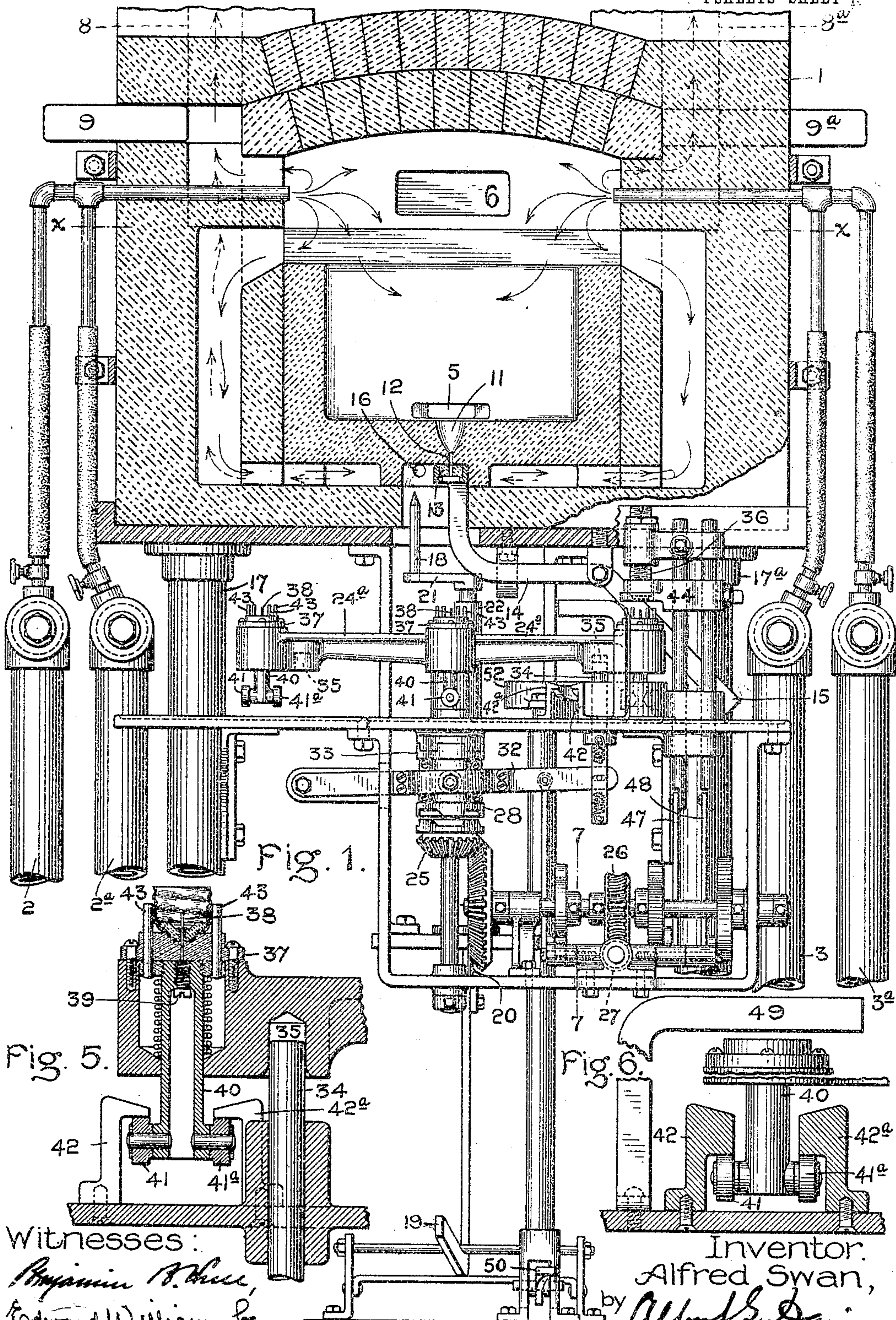
A. SWAN.

MACHINE FOR MAKING BASES FOR INCANDESCENT ELECTRIC LAMPS.

APPLICATION FILED MAR. 25, 1901.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses:  
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*Edward Williams, Jr.*

Inventor:  
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by *Albert S. Davis*  
Atty.



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4 SHEETS—SHEET 2.

Fig. 2.

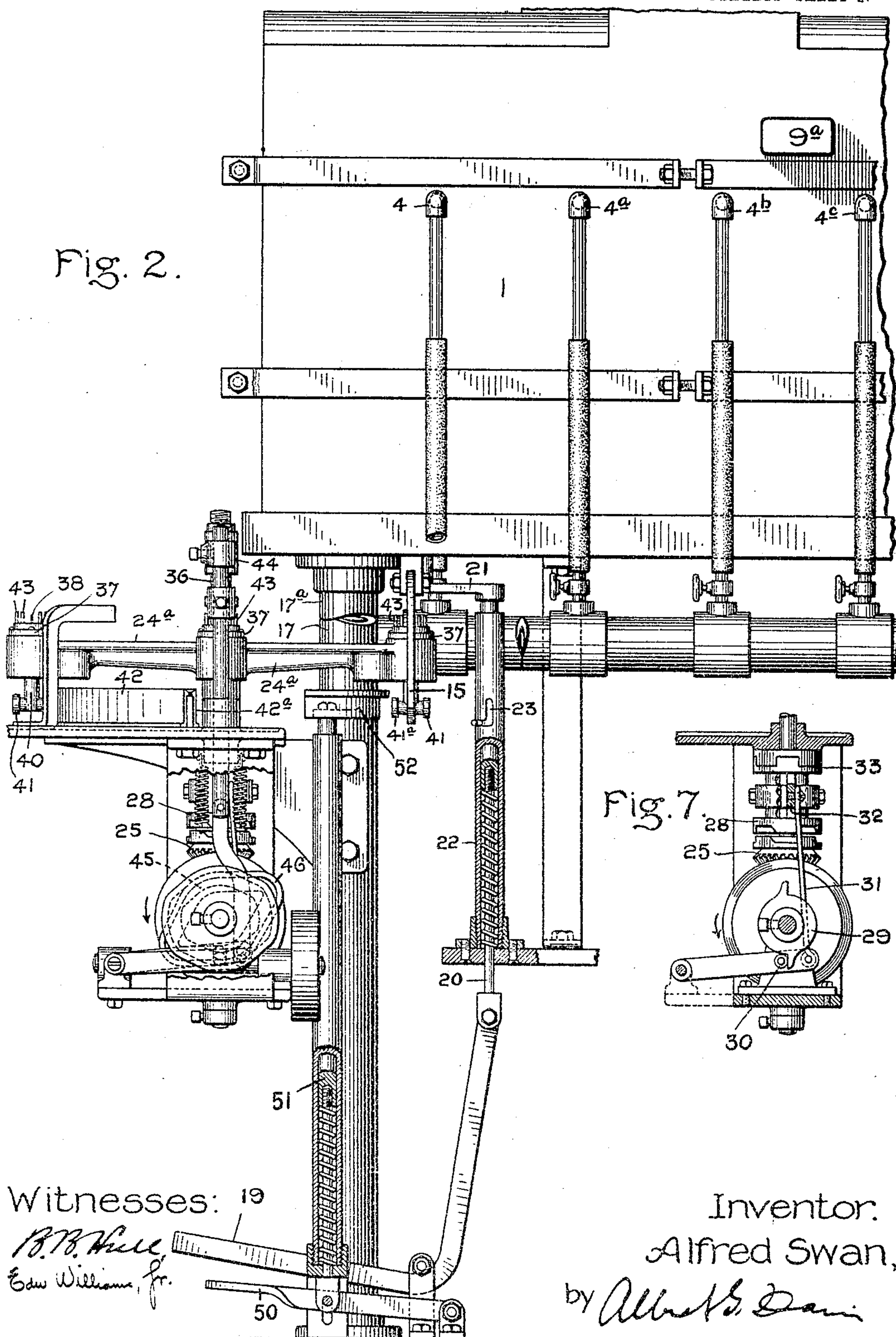


Fig. 7.

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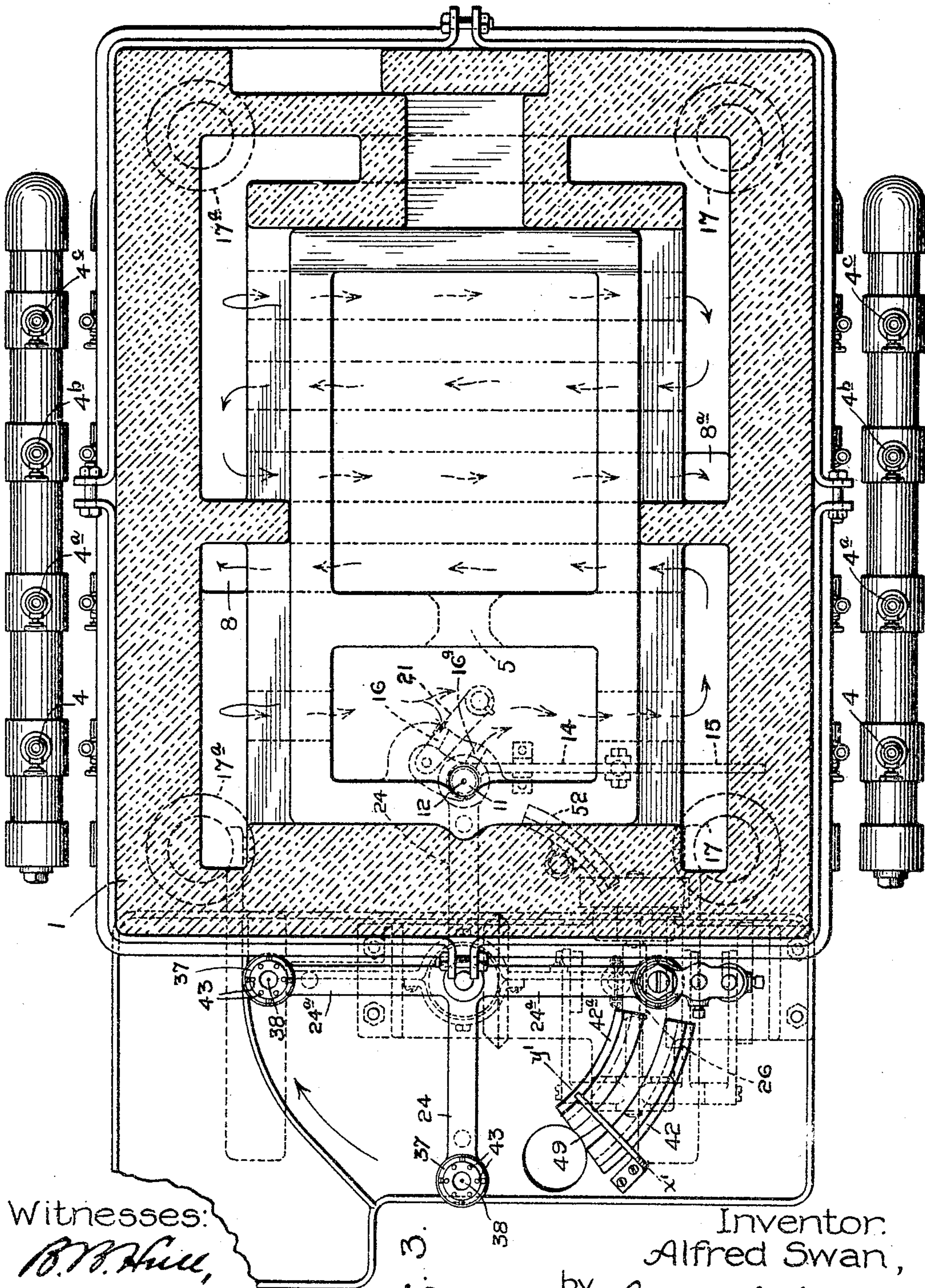
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4 SHEETS—SHEET 3.



Witnesses:

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Fig. 3.

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4 SHEETS—SHEET 4.

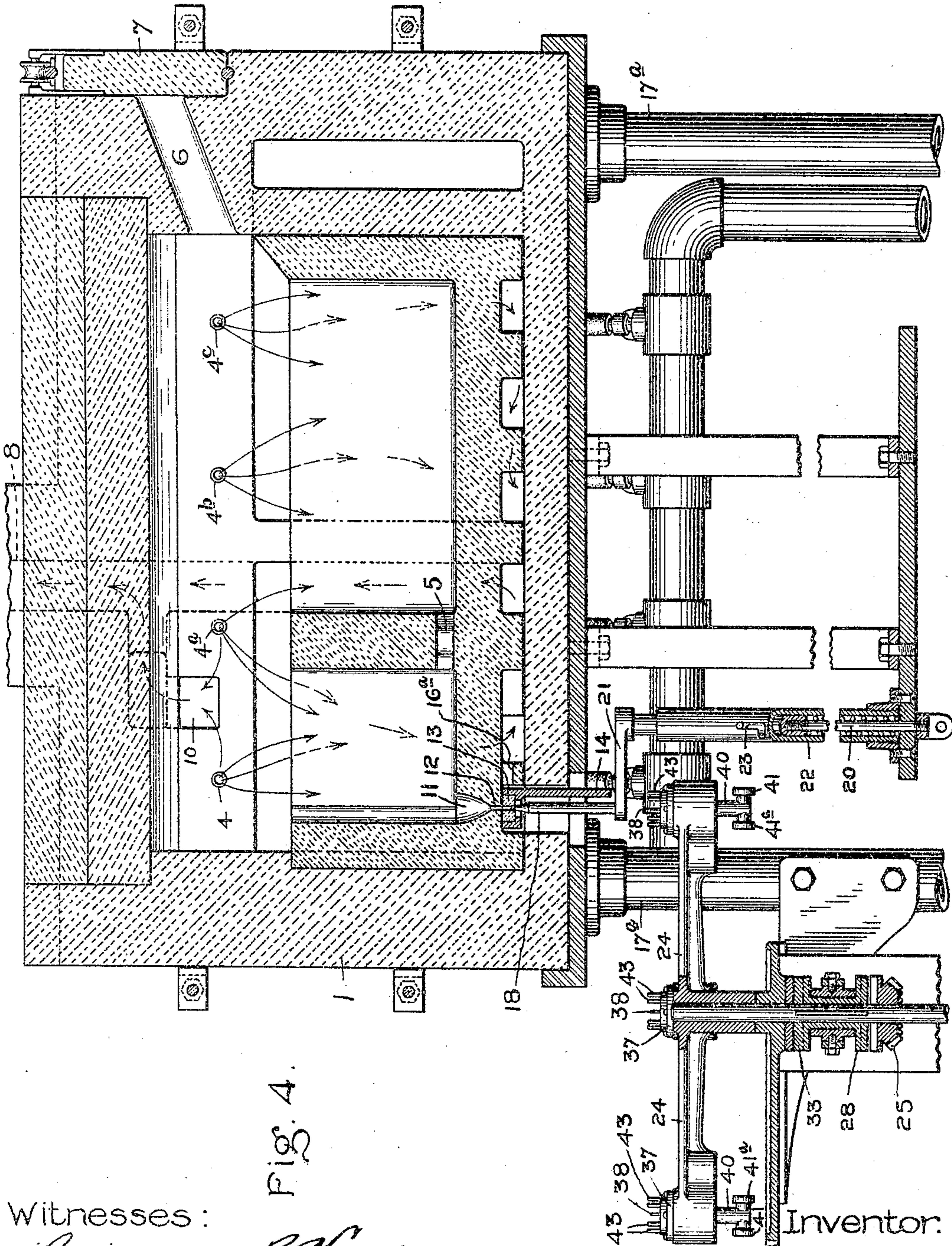


Fig. 4.

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# UNITED STATES PATENT OFFICE.

ALFRED SWAN, OF NEW YORK, N. Y., ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## MACHINE FOR MAKING BASES FOR INCANDESCENT ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 774,403, dated November 8, 1904.

Application filed March 25, 1901. Serial No. 52,707. (No model.)

*To all whom it may concern:*

Be it known that I, ALFRED SWAN, a subject of the King of Great Britain, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Making Bases for Incandescent Electric Lamps, of which the following is a specification.

This invention relates to glass-molding machines, the particular object being the manufacture of an improved base for incandescent electric lamps.

The bases of Edison lamps are commonly composed of a brass shell, which constitutes one terminal of the filament, and a centrally-positioned contact constituting the other terminal of the filament, the two being held in definite relation by a plaster-of-paris filling. Sometimes a porcelain compound is used in place of the plaster-of-paris. The type of base to which this invention relates is similar in some respects to the porcelain type, but is cheaper to manufacture. The brass shell and center contact are connected rigidly together by a web of glass in which both parts are firmly seated. A construction of this kind was fully described in a companion application, Serial No. 53,882, filed by me on or about April 1, 1901. My present invention relates to the manufacture of these bases, although some of its features are applicable to other products.

In carrying out the invention I provide a furnace in which the glass mixture is maintained in fusion in a state of free mobility, so that the glass mixture will flow freely like water. Gas and air pipes are applied to the furnace and means provided by which the heat may be maintained to keep the glass in a fluid condition. In the bottom of the furnace is a small opening, through which, while the machine is running, the glass is permitted to flow in an uninterrupted stream, means being provided for shutting off the stream when the machine is stopped. Beneath the furnace is a group of molds or supports in which the parts of the lamp-base or other article to be molded are set, these molds preferably being arranged so that while some of the bases are in process

of being filled with liquid glass and pressed into shape others are in a position to be assembled by the operator or operators. The molds are carried on a rotary head adapted to have an interrupted movement controlled automatically by the machine, by which the assembled parts of the base are brought first beneath the stream of fluid glass and held there for a sufficient interval to receive the proper amount of the glass to constitute the web between the shell and center contact, after which the mold and shell which it carries are quickly shifted beneath a die, where the glass is pressed into shape, firmly uniting the parts of the base. Another automatic movement of the machine then ejects the finished base and consecutively brings other bases beneath the stream of molten glass and die. By permitting the stream of glass to flow uninterruptedly the aperture in the bottom of the furnace does not clog up, and the machine is always in condition to supply the bases fed by the rotary carrier with glass of the best working consistency. While these improvements are of particular advantage in the manufacture of lamp-bases, certain features are applicable also to other uses where it is desired to cheaply mold such a material as glass.

My invention therefore comprises in a generic sense a molding-machine having a reservoir of fused material and means for shifting a mold beneath a feed-opening from the reservoir to receive a charge of the molten material and then bring it beneath a die for giving it a definite shape.

It comprises also in a broader sense a new process of working glass, which consists in maintaining it in a mobile fluid condition, discharging it directly into a mold, and then pressing it into shape by means of a die. No claim is, however, made for this method in the present application, being reserved for a companion application forming a division of this, Serial No. 124,900, filed September 26, 1902.

It involves also various features of construction, which will be hereinafter more fully described and will be definitely indicated in the claims appended to this specification.

In the accompanying drawings, which illus-



trate the invention, Figure 1 is a sectional elevation of a machine embodying my improvements. Fig. 2 is an elevation on a plane at right angles to that of Fig. 1. Fig. 3 is a top plan, the furnace being in section on line  $xx$  of Fig. 1. Fig. 4 is a partial sectional elevation on a plane at right angles to that of Fig. 1. Fig. 5 is an enlarged detail view of one of the base-carriers. Fig. 6 is an enlarged detail of the arrangement for ejecting the finished base, being a section on line  $x'y'$  of Fig. 3; and Fig. 7 is a detail view of the clutch controlling the intermittent feed of the bases and of the cam for controlling the same.

1 represents a glass-furnace made of fire-brick or other refractory material, to which gas and air are fed in regulated volumes to furnish the necessary heat to keep the glass melted by means of pipes  $2\ 2^a\ 3\ 3^a$  at the sides of the furnace, from which branch pipes communicate on each side of the furnace with a plurality of pipes or nozzles  $4\ 4^a\ 4^b\ 4^c$ . Within the furnace is a melting-pot, the walls of which are made of refractory material and which is provided with two chambers communicating with one another through an opening 5 at or near the bottom of an intermediate partition or diaphragm dividing the pot into two chambers. The larger chamber is intended to receive the frit or raw material from which the glass is made, containing a percentage of cullet or broken glass which after the machine has been running may be supplied from the part of the glass passing through the aperture in the pot and not used in the bases. The bottom of the pot is channeled, as indicated in Figs. 1, 3, and 4, to secure a uniform distribution of the hot gases of combustion. The arrows in Figs. 1, 3, and 4 show the manner of effecting this distribution. The furnace is provided with a charging-hole 6, which may be closed when in action by a sliding door 7. Flues  $8\ 8^a$ , leading to the chimney, provide a draft which may be regulated by dampers  $9\ 9^a$ , and a damper 10 is provided, as shown in Fig. 4, to place the upper part of the furnace in direct communication with the chimney. In the bottom of the small chamber of the melting-pot is a conical recess 11, communicating with a small bore 12, against which is normally held when the machine is in action a perforated button 13, of porcelain or other refractory material, mounted on an iron arm 14, adapted to be controlled by a hand-lever 15. The channels under the melting-pot are arranged so as to direct a part of the products of combustion around this porcelain nozzle, as will be seen in Figs. 1, 3, and 4, branch openings  $16\ 16^a$  (see Fig. 3) permitting a part of the products of combustion to be diverted from their path and circulate around the nozzle 13, thereby preventing the glass from chilling in said nozzle and obstructing the feed. The furnace is supported on an iron casting held by pillars  $17\ 17^a$ , between which

is supported the molding apparatus. An iron pin 18, having a conical tip, is arranged to close and open the glass-feed opening at the pleasure of the operator and is controlled by a foot-lever 19, linked to a spring-pressed rod 20, carrying a crank 21, in which the pin 18 is mounted. The rod 20 is contained in a fixed tube 22, in the wall of which is a right-angled slot 23, through which projects a pin mounted on an extension of the spring-pressed rod. Thus the operator by shifting laterally the treadle 19 permits the spring-pressed rods to be shifted in the slot 23 and brings the tapering pin 18 into the feed-opening of the melting-pot. It may be removed by pressing the treadle with the foot and then pushing it in the opposite direction, so as to lock the pin in the angle of the slot.

Beneath the furnace is a rotary head provided with a plurality of arms  $24\ 24^a$ , &c., of which four are shown in the type of machine illustrated. This head is mounted on a rotary spindle carrying a loose gear driven by a worm-wheel 26 in gear with the worm 27, mounted on the drive-shaft of the machine. A clutch 28, feathered on the shaft secured to the rotary head, is adapted to be shifted downwardly (see Figs. 1 and 4) to clutch the gear 25 to the spindle. In the position shown in Fig. 1 the gear has been disconnected and the head is in a position of rest, cooperating clutch-jaws on the sleeve and a fixed part of the frame holding the parts in a position of rest. The clutch is shifted by means of a cam 29, driven by the shaft on which the worm-wheel 26 is mounted. This cam is shown in detail in Fig. 7 provided with two diametrically opposite projections cooperating with a roller 30, carried by a pivoted lever, to which is linked by a rod 31 a shifting-lever 32, pivoted to the clutch. In the position shown in Fig. 7 the clutch has just been thrown out of action, which, as will be seen, is effected instantly, disconnecting the rotary spindle from the driving-gear and bringing it to rest by engagement of the upper clutch members 33. It is important that this position should be perfectly definite, since it is the position in which one base is in position to receive the molten glass and another in position to be pressed by the die. I therefore provide an auxiliary alining device consisting of a spring-pressed pin 34, (see Fig. 1,) mounted on the bench and raised or lowered into the plane of rotation of the base-carrying arm. The upper part of this rod enters a recess in the rotary arms, as indicated at 35, and this brings the parts of the base in accurate alinement with the die 36, presently to be described. Each of the arms of the rotary head is provided with a plate 37, having a central recess through which projects a spring-pressed pin 38, mounted on the end of an adjusting-screw 39 and carried by a spring-pressed tube 40, in the lower end of which are mounted rollers



41 41<sup>a</sup>. These rollers, as the head is rotated, ride under stationary guides 42 42<sup>a</sup>, having inclined deflecting edges to shift the tube 40 downwardly and withdraw the pin 38 from the plate 37. A row of pins 43, arranged in a circle, form an open receptacle for the shell of the lamp-base, and the pin 38 steadies the center contact.

The parts in an assembled position, with the closed web pressed into shape, are shown in Fig. 5. Thus it will be apparent that when the head is rotated, being shifted a quarter of a revolution in the present type of machine each time the head is clutched to the drive-gear, the two pieces of the lamp-base in one of the arms are brought beneath the melting-pot and the stream of glass fed into the shell. It is held in this relation for a short period while the cam 29, Fig. 7, makes a half-revolution, after which it is put in clutch with the gearing and rapidly shifted beneath the die, being centered in accurate relation thereto by means of the clutch members 33 and pin 34, as already described. When beneath the die, the plate 44, Fig. 1, will be shifted downwardly, so as to surround the upper part of the shell, and the die 36 brought against the soft charge in the shell. These movements are effected by means of two cams. (Seen in side elevation in Fig. 1 and in end elevation in Fig. 2.) The cams are each provided with cam-grooves 45 46, angularly displaced relatively to one another, as seen in Fig. 2. In the grooves are rollers connected to pivoted rods 47 48, which respectively shift the die and the plate 44. The cam-grooves have a somewhat different shape, as seen in Fig. 2, by which the plate 44 is shifted first around the shell and is withdrawn after the die has been removed from the base. After the glass has been pressed into shape the clutch is again operated and the rotary head shifted, carrying the finished base past the cam-plates 42 42<sup>a</sup>, (shown in Fig. 3,) by which the pins carried by the spring-pressed tube 40 are lowered away from the lamp-base, and a bar 49 (see Figs. 3 and 6) sweeps the base from the arm and permits it to drop into the receptacle under the operator's bench.

It is sometimes desirable to remove a base from the machine before reaching the die if the parts should have received too much material or receive it improperly from the furnace. In such a case the operator may withdraw the shell before reaching the die by operating a treadle 50, to which is connected a spring-pressed rod 51, on the upper part of which is mounted a cam-plate 52. This normally lies above the rollers 41 41<sup>a</sup>, attached to the base-carrying tube; but when the treadle 50 is operated it is depressed, so as to be in the plane of rotation of the rollers, and has a cam-face, which operates in the same manner as the cams 42 42<sup>a</sup>, already described, serving to withdraw the pins and free the lamp-base,

which drops into a receptacle beneath the operator's table.

Thus it will be seen that all parts of the melting operation are automatic except the assembling of the parts in the molds or carriers. As two of the arms on the four-part rotary head are always free to the operator, he may assemble the parts of these arms while the other two are under the glass-feed and the die, respectively.

The molten glass flowing when the arms are in the act of being shifted may be received in a box or vessel on the floor and is useful as cullet for mixing with the raw material of which the glass is made and which is necessary to the manufacture of good glass.

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

1. A machine for making bases for incandescent lamps, comprising a reservoir for insulating material, having a feed-outlet open during the entire operation of the machine whereby a continuous stream of molten material flows therefrom, a plurality of molds arranged to receive the metallic parts of a base and hold them in proper relative position, means for shifting the molds intermittently into the path of the stream, means for maintaining a predetermined dwell of each mold under the stream, and means for compressing the molten material into a definite shape.

2. A glass-molding apparatus comprising, in combination, a reservoir for molten glass, means for heating the glass therein, said reservoir having a feed-opening for supplying a continuous stream of molten glass, a plurality of molds, means for shifting them intermittently into the path of the stream, means for maintaining a predetermined dwell of each mold under the stream to assure a definite quantity of delivered material, and an automatically-operated die for compressing the molten glass into a definite shape.

3. A machine for making bases for incandescent lamps, comprising a reservoir of fluid glass metal having a feed-outlet open during the entire operation of the machine whereby a continuous stream of molten glass flows therefrom, a mold arranged to receive the metallic parts of the base and hold them in proper relative position, means for shifting the mold into and out of the stream, a die for compressing the glass in the mold, and means operated by the machine for removing the finished article from the mold.

4. A glass-molding machine, comprising a reservoir of fluid glass metal having a feed-outlet open during the entire operation of the machine whereby a continuous stream of molten glass flows therefrom, a mold, means for intermittently shifting it into the stream, an automatic die operating on the material in the mold after it is withdrawn from the stream, and a plug for stopping the feed when the machine is out of action.



5. A machine for making bases for incandescent lamps, comprising a reservoir of fluid glass metal having a feed-outlet open during the entire operation of the machine whereby  
 5 a continuous stream of molten glass flows therefrom, a plurality of molds beneath the same arranged to receive the metallic parts of a base and hold them in proper relative position, a rotatory frame carrying the molds,  
 10 means for shifting them successively under the stream to receive a regulated quantity of glass, a die for compressing the material in the molds, and means for retaining the compressed article in position while the die is being withdrawn.

6. A machine for making bases for incandescent lamps, comprising a reservoir for molten glass metal having a feed-outlet open during the entire operation of the machine  
 20 whereby a continuous stream of molten glass flows therefrom, a rotatory frame beneath the same, molds mounted thereon arranged to hold the base parts in proper relative position, means for shifting them successively under the stream and out of it, a reciprocating  
 25 die mounted in operative relation to the mold after being withdrawn from the stream, and means for depressing the die.

7. A machine for making lamp-bases, comprising a reservoir for molten glass, means for heating the glass therein, said reservoir having a feed-opening for delivering a continuously-flowing stream of fluid glass, a rotatory frame beneath the reservoir, a plurality of  
 35 molds carried by the frame arranged to hold the base parts in proper relative position, a power-driven member, a periodically-operated clutch between the frame and said member, a die, means for arresting rotation when the  
 40 molds are in definite relation to the stream and die, and gearing for depressing the die when a mold containing the base parts and a charge of fluid glass is brought beneath it.

8. A machine for making lamp-bases, comprising a reservoir for molten insulating material having a feed-outlet open during the entire operation of the machine, whereby a  
 45 continuous stream of molten material flows therefrom, a power-driven shaft, a mold arranged to receive the metallic parts for a base and hold them in proper relative position, a frame carrying the mold and a clutch for periodically connecting it with the shaft, said  
 50 mold crossing the stream of molten material, a die in the path of the mold, a detent for arresting the mold under the stream and die, and a power-operated cam for depressing the die when the mold is detained under it.

9. A machine for making lamp-bases, comprising a rotatory frame carrying a receptacle for the base parts arranged to hold the parts in proper relative position, a reservoir having  
 60 a continuously-open orifice delivering a continuously-flowing stream of molten insulating material, means for bringing the receptacle

into the stream and maintaining it there for a predetermined time so that the base parts receive a definite charge of the insulating material, an automatically-operated die laterally displaced from the feed device for forming  
 70 the material about the base parts, and a stop-pin for arresting the parts in exact alinement with the feed and die.

10. In a machine for making lamp-bases, in combination with means for feeding a continuously-flowing stream of molten insulating material, a rotatory head, a plurality of receptacles for the base parts carried by the head, means for connecting the head periodically with a power-shaft and operating to  
 80 bring one of the receptacles into the stream at each movement, and a die for compressing the material in the receptacles after leaving the stream.

11. A machine for making lamp-bases, comprising a rotatory head containing a plurality of receptacles for the several base parts, a sliding clutch for connecting it with a power-shaft, a cam driven by the shaft-controlling engagement of the clutch, means for arresting  
 90 the head when the clutch is disengaged, and means for feeding a fusible insulating compound between the base parts during a clutch disengagement.

12. A machine for making lamp-bases, comprising a rotatory head containing a receptacle for the base parts, a vertically-movable guide for said parts, means for feeding an insulating compound to unite the parts, and means  
 100 for shifting the guide to free the base.

13. A machine for making lamp-bases, comprising a rotatory head containing a receptacle for the base parts, a clutch for intermittently arresting rotation, means for feeding an insulating compound between the parts to support  
 105 them, a die for pressing it into shape, a mold-plate to inclose the shell, and a cam for moving the die to and from the base parts.

14. A machine for making lamp-bases, comprising a rotatory head containing a plurality of receptacles for the base parts, means for feeding a fused insulating compound between said parts, a die to shape said compound, means for withdrawing the finished base, and  
 110 a device accessible to the operator for removing the base before completed if desired.

15. A machine for making lamp-bases, comprising a rotatory head carrying a plurality of receptacles for the base parts, means for feeding an insulating compound to said parts, a  
 120 die to shape the compound, a plate to retain the base in position while the die is being withdrawn, and means for automatically withdrawing the completed base.

16. A machine for making lamp-bases, comprising a receptacle for the base parts, means for feeding insulating material to the parts when held therein, a die mounted in operative relation to the receptacle for shaping the insulating material, and means independent of  
 130



said die for retaining the base in position while the die is being withdrawn.

17. A machine for making lamp-bases, comprising a rotatory head, molds carried thereby  
5 arranged to receive the metallic parts for a base and hold them in proper relative position, a reservoir for molten insulating material having a feed-outlet, means for shifting the head intermittently to bring a mold into  
10 coöperative relation to said feed-outlet, means for feeding a charge of the material to the mold to unite the base parts but insulate them one from another, and means for ejecting the finished base from the mold.

18. A machine for making lamp-bases comprising a receptacle arranged to receive the two  
15 contacts for a base and hold them in proper relative position one within the other, means for feeding insulating material to the contacts to unite them, and a die to shape the material,  
20 said die and receptacle being so made that a hollow space is left through the insulating material to the inner contact.

19. In a machine for making lamp-bases, a  
25 receptacle for the base parts, one of said parts having an opening therethrough, means for feeding insulating material to the base parts, and a die to shape the material, said die and receptacle being so made that the material is  
30 prevented from closing the opening in the base part.

20. In a machine for making lamp-bases, in

combination with means for feeding a continuously-flowing stream of insulating material, a  
35 receptacle for the base parts, one of said parts having an opening therethrough, a die to shape the material in the receptacle, and means for moving the receptacle into the stream and into coöperative relation to the die, said die  
40 and receptacle being so made that the material is prevented from closing said opening in the base part.

21. A machine for making lamp-bases, comprising a rotatory head, a receptacle for the  
45 base parts carried thereby, means for feeding insulating material to unite the parts, means for shifting the parts of the receptacle relatively to free the base, and means to sweep the base when freed from the receptacle.

22. A machine for making lamp-bases, comprising a rotatory head, a receptacle for the  
50 base parts carried thereby substantially cylindrical in shape, a central pin in said receptacle, means for feeding insulating material to the base parts held in said receptacle to  
55 unite them, and means for moving the pin and sides of the receptacle relatively to the bottom to free the base.

In witness whereof I have hereunto set my hand this 19th day of March, 1901.

ALFRED SWAN.

Witnesses:

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