

H. HILDE.
GLASS BLOWING MACHINE.

APPLICATION FILED FEB. 12, 1904.

3 SHEETS—SHEET 1.

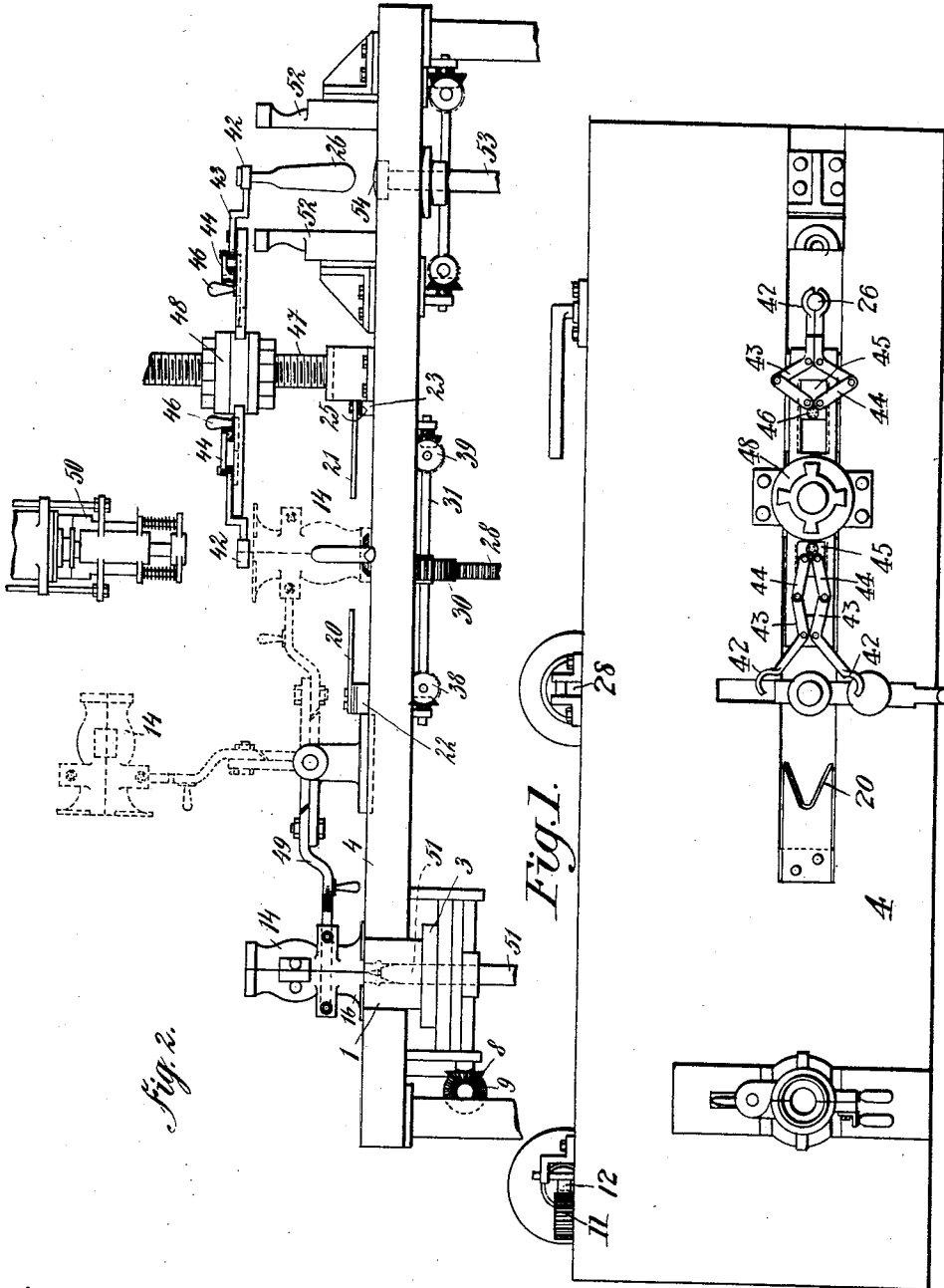


Fig. 2.

Fig. 1.

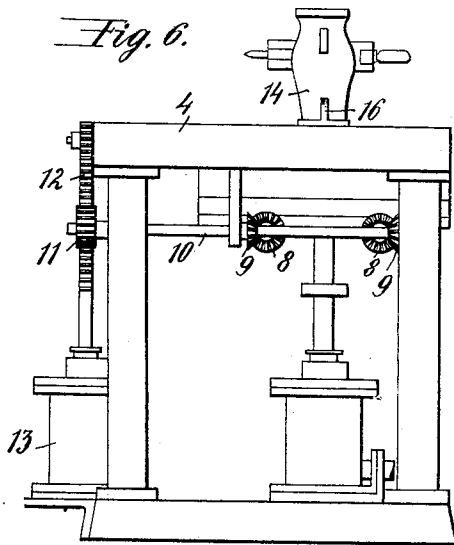
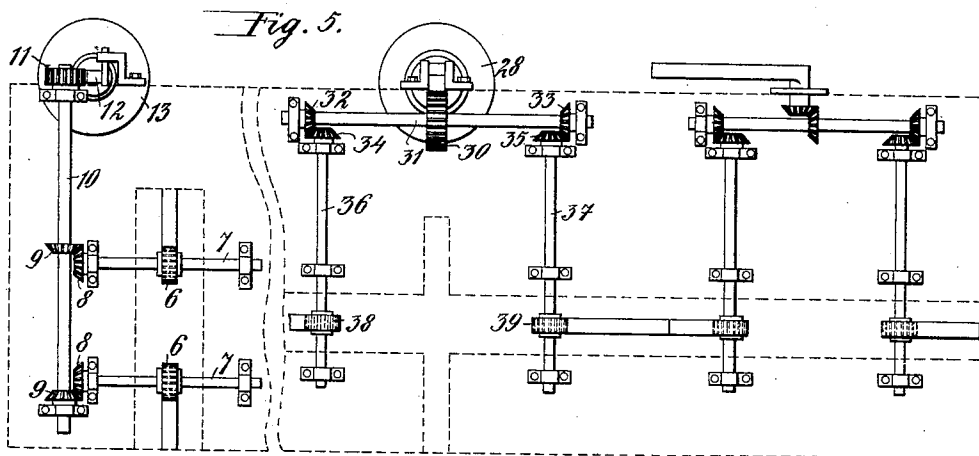
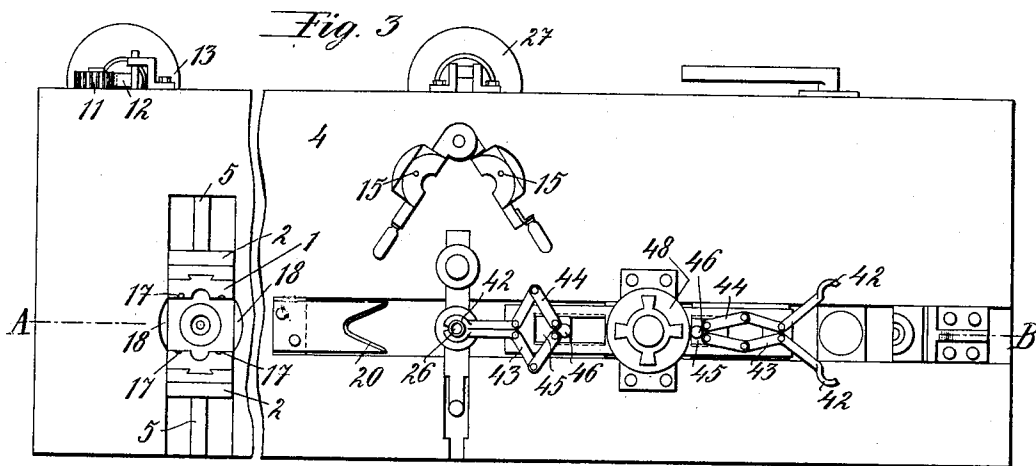
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3 SHEETS—SHEET 2.

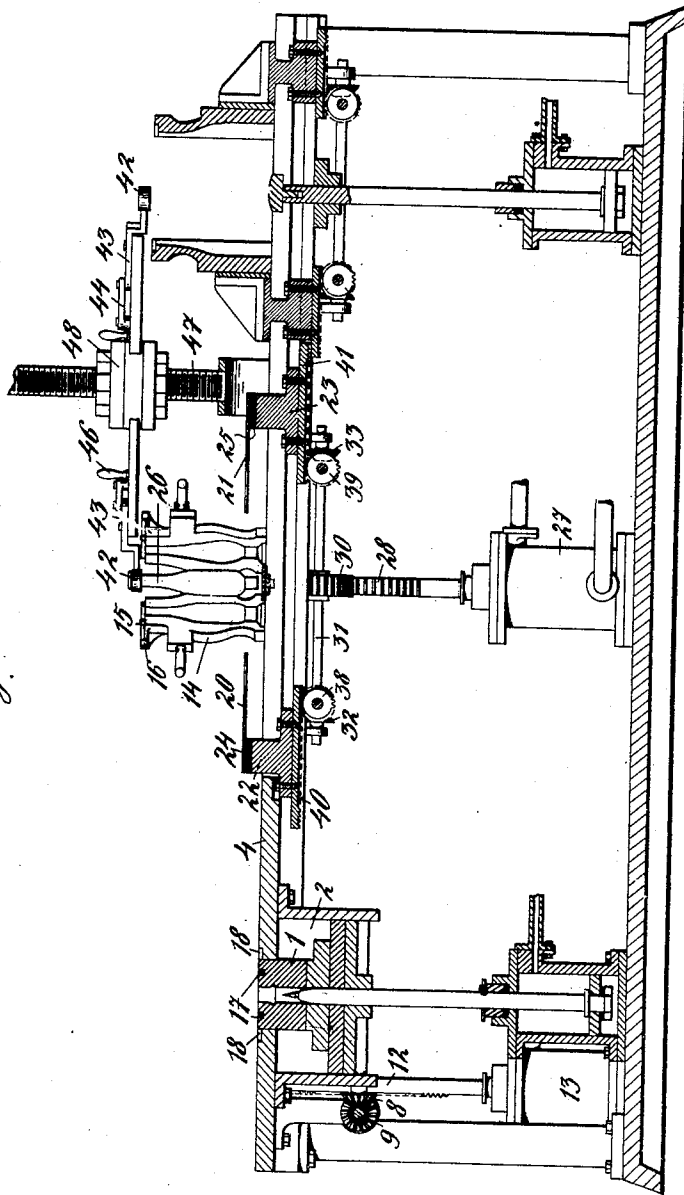


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Th. Franz.

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Fig. 4.



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UNITED STATES PATENT OFFICE.

HERMANN HILDE, OF ROSSWEIN, GERMANY.

GLASS-BLOWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 784,744, dated March 14, 1905

Application filed February 12, 1904. Serial No. 193,218.

To all whom it may concern:

Be it known that I, HERMANN HILDE, a subject of the King of Prussia, Emperor of Germany, residing at Rosswein, in the Kingdom of Saxony, German Empire, have invented certain new and useful Improvements in Glass-Blowing Machines, of which the following is a specification.

My invention relates to improvements in machines for blowing bottles and similar hollow glassware, and relates in particular to that class of machines in which the molten glass is introduced into the inverted body and head molds and thereupon the body-mold swung within the range of a pressing or blowing apparatus located adjacent to the first said place of work in such manner that the mold stands upright.

By means of my improvements more convenient and rapid work is insured, inasmuch as the head-mold always stands in the correct position for use.

With prior machines of this class the head-mold, detachably connected to the body-mold, has after formation of the bottle-head to be swung with the body-mold within the range of the body-blowing device, located adjacent to the head-forming device or charging device of the mold, and subsequently returned to the first working position. Since in these machines the body-mold partly takes or grips over the head-mold, the body-mold has to be removed first, whereupon the head-mold also can be opened and returned to the head-forming device. From this it is clear that this work demands a large number of manipulations, which quickly tire the workman and owing to their complicated nature diminish the capacity of the machine. I overcome the defect referred to by making the head-mold in permanent connection with the head-forming device in such manner that it can be opened and closed, but on the body-mold being swung round to the body-blowing device remain in the head-forming device, and is thus always in position for use. Arrangements are also made which when there is too large an amount of molten glass in the body-mold enable the surplus glass to be cut off from the body after the latter has been released from the body-mold before

or after blowing out or, if desired, twice—that is to say, before and after blowing out.

In the accompanying drawings only such parts of the glass-blowing machine are shown as are essential to proper comprehension of my invention.

Figure 1 is a plan showing the working parts in the first and third positions of work. Fig. 2 is a front elevation with the operating means below the table broken off, and Fig. 3 a plan showing the working parts in the second position of work. Fig. 4 is a section on the line A B of Fig. 3. Fig. 5 is a plan of the driving mechanism located below the machine-table. Fig. 6 is an end elevation of Fig. 1.

The head-mold 1, consisting of several parts, is removably located in slides 2, which move to and from each other in suitable guides 3 of the machine-table 4. The slides 2 are provided with racks 5, Fig. 3, with which mesh the pinions 6, mounted on the shafts 7. The shafts 7 are driven with the aid of bevel-gear 8 9 from the shaft 10, which for its actuation may be provided with a hand-wheel or crank or may be actuated by the aid of a pinion 11 in mesh with a rack on the piston-rod 12 of a compressed-air cylinder 13, as shown, so that on rotation of the shaft 10 in one direction the head-mold opens, while on rotation in the opposite direction it closes.

The reversed body-mold 14 is placed loosely on the table 4 in such manner that it is located exactly above the head-mold 1. To enable more precise guidance, conical pins and a flange 16 may be provided in suitable positions on the body-mold 14, engaging in corresponding apertures 17 in the table 4 or like apertures 18 in the head-mold 1, whereby body and head molds are retained in correct position relatively to each other. Before the mold is being charged with molten glass the plunger 51, Fig. 2, is raised so as to close the mouth of the mold and to hold the glass during the formation of the head, as is well known to those versed in the art. After the bottle-head has been formed the head-mold 1 is opened, so that the body-mold, connected with the oscillating arm 49, Fig. 2, leaving the head-mold behind, can be swung out of the

reversed position into the upright position below the body-blowing device 50, (partly shown in Fig. 2,) as is well understood by those skilled in the art. Since in this position the work on opening of the body-mold is released, a device is furnished at the level of the bottle-head enabling the bottle to be seized by the head above the body-mold, and so held in suspension until the superfluous glass has been cut off and the mold again brought in position. This holding device is fully described below. The cutting off of the superfluous glass from the work or body may be effected, as required, after the mold 14 has been removed prior to blowing out or subsequent to the same or twice—viz., before and after blowing out—with the aid of the cutters 20 and 21. The latter may be vertically adjusted on their holders 22 23 by means of washers 24 25, so that the work or body 26, released by the body-mold 14, is suspended between the knives 20 and 21 at a suitable height. By simple approach of the knives the superfluous glass mass is cut off and falls to the ground. The knives 20 and 21 may be actuated by a compressed-air cylinder 27, the piston-rod 28 of which at its upper end 29 is toothed and is engaged by the toothed wheel 30, which is keyed to the shaft 31. The latter carries at both ends bevel-wheels 32 and 33, engaging in like wheels 34 and 35. The wheels 34 and 35 are mounted on shafts 36 and 37, on which latter the toothed wheels 38 and 39 are keyed. The wheels 38 and 39 engage in racks 40 and 41, bolted to the knife-carriers 22 and 23, respectively. Should the cutting off be effected prior to blowing out the work or body 26, this means uniform weight and capacity of all ware blown in the same mold, whereas by cutting off subsequent to completed blowing-out the glass blown out of the middle and hotter than the remaining walls of the vessel will be separated, so that on subsequent final blowing the glass can expand simultaneously at all parts, whereby the hollow glassware is finished free from every defect.

In the drawings one form of holding device is shown. It consists, essentially, of a pair of tongs 42, the rear limbs 43 of which are jointed by links 44 to a slide 45, provided with a handle 46 in such manner that by sliding the latter opening or closing of the jaws of the tongs is effected. The holding device thus constructed is adjustably secured to the pillar 47, Fig. 2, by means of the cast-iron member 48.

In place of the arrangement above described for opening and closing the head-mold any other desirable device may be employed.

From the mold 14 the blank 26 is transported to another mold 52 to get its final shape by a second blowing operation. As will be seen from Figs. 4 and 2, the grippers or tongs 42 are adapted to rotate in a horizontal plane, so as to bring the blank 26 from the

position shown in Fig. 4 to that shown in Fig. 2—*i. e.*, between the halves of the opened final mold 52. In the latter the blank is blown to final shape by a second blowing device like 50, the piston 53 serving to accommodate in vertical direction the seat 54, Fig. 4, for the blank in the mold 52 to answer special requirements.

The operation of my invention is as follows: The mold 14 having been charged with molten glass, the latter is pressed in the usual manner to form the head in the head-mold 1, closed by the plunger 51. The head-mold is then opened to release the blank, and the mold 14, containing the blank with its head projecting therefrom is lifted and reversed by the swinging arm 49 to upright position below the blowing device 50. The blank being sufficiently expanded by the blowing operation, the tongs 42 clamp the blank at its neck and hold it during the time the mold 14 is being opened and withdrawn, after which any surplus of glass is cut off the blank by means of the cutters 20 and 21. This being done the gripping device 42 to 46 delivers the blank to the mold 52 for blowing it to final shape.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a glass-blowing machine having a bottle-head-forming device located adjacent to a body-blowing device, in combination, a composite, hingeless, head-mold 1 permanently located on the machine-table, a reversed body-mold 14 resting loosely on the head-mold, and means for swinging the body-mold from the head-mold to the body-blowing apparatus, substantially as described.

2. In a glass-blowing machine having a bottle-head-forming device located adjacent to a body-blowing device, in combination, a composite, hingeless, head-mold 1 permanently located on the machine-table, a reversed body-mold 14 resting loosely on the head-mold, means for swinging the body-mold from the head-mold to the body-blowing apparatus, and tongs 42 located adjacent to the body-blowing apparatus, gripping the bottle-head on its being swung round to the said body-blowing apparatus, substantially as described.

3. In a glass-blowing machine having a bottle-head-forming device located adjacent to a body-blowing device, in combination, a composite, hingeless, head-mold 1 permanently located on the machine-table, a reversed body-mold 14 resting loosely on the head-mold, means for swinging the body-mold from the head-mold to the body-blowing apparatus, tongs 42 located adjacent to the body-blowing apparatus, gripping the bottle-head on its being swung round to the said body-blowing apparatus and means for cutting off the superfluous glass, or such glass as is blown out of the body, substantially as described.

4. In a glass-blowing machine having a bottle-head-forming device located adjacent to a

body-blowing device, in combination, a composite, hingeless, head-mold 1 permanently located on the machine-table, a reversed body-mold 14, resting loosely on the head-mold, means for swinging the body-mold from the head-mold to the body-blowing apparatus, tongs 42 located adjacent to the body-blowing apparatus, gripping the bottle-head on its being swung round to the said body-blowing apparatus and means for cutting off the superfluous glass, comprising a pair of vertically-adjustable, pivotal cutters 20, 21, rack-carriers 22, 23 for the same, a compressed-air cylinder 27 having a rack piston-rod 28, 29, a shaft 31, a pinion 30 thereon meshing with the piston-rod rack, bevel-wheels 32, 33 mounted on the said shaft 31, bevel-wheels 34, 35 meshing with said wheels 32, 33, shafts 36, 37 carrying said wheels 11, 12 and pinions 15, 16 keyed to said shafts 36, 37 respectively, each meshing with one of the knife-carrier racks, substantially as described.

5. In a glass-blowing machine having a bot-

tle-head-forming device located adjacent to a body-blowing device, in combination, a composite, hingeless, head-mold 1 permanently located on the machine-table, a reversed body-mold 14 resting loosely on the head-mold, means for swinging the body-mold from the head-mold to the body-blowing apparatus, tongs for holding the bottle-head, comprising gripper-limbs 42, 43 pivoted to a stationary part of the machine, links 44 pivoted at one end to the extremity of the tong-limbs 43, a slide 45 pivoted to the other end of the links 44 and a stationary guiding member for the said slide 45, and means for cutting off the superfluous glass, or such glass as is blown out of the body, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERMANN HILDE.

Witnesses:

CARL GARZ,

FRIEDRICH WEGNER.