A. SCHILLER.

BOTTLE BLOWING MACHINE.

APPLICATION FILED JULY 2, 1908.

923,898. Patented June 8, 1909.

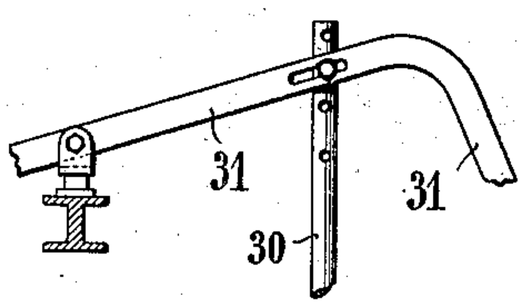

Fig. 3.

Fig. 1.

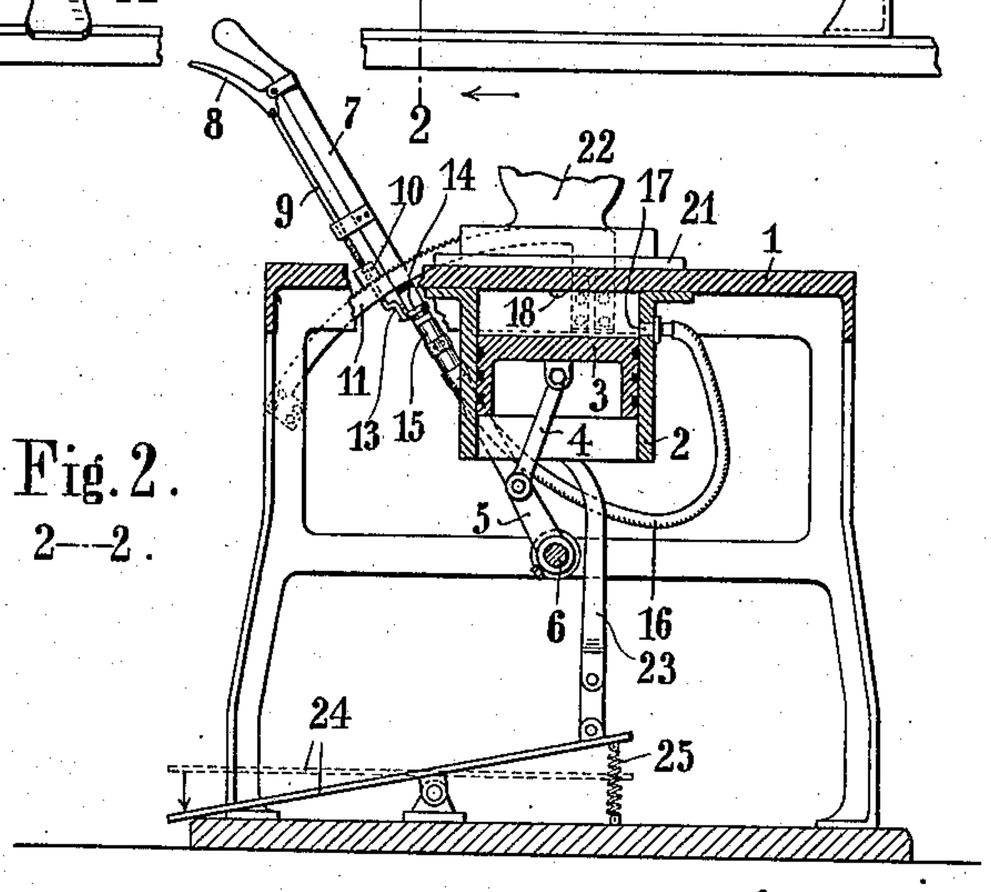

Fig. 2.

2—2.

Witnesses:
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UNITED STATES PATENT OFFICE.

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BOTTLE-BLOWING MACHINE.

No. 923,898. Specification of Letters Patent. Patented June 8, 1909.

Application filed July 2, 1908. Serial No. 441,656.

To all whom it may concern:

Be it known that I, ADOLF SCHILLER, citizen of the German Empire, and resident of Schöneberg, near Berlin, Germany, engineer, have invented certain new and useful Improvements in Bottle-Blowing Machines, of which the following is a specification.

My invention relates to bottle blowing machines and has for its object to construct the same in such manner that they may be worked successfully by hand. To that end the machine is provided with two hand compressors, one of which is preferably arranged below, and the other above, a mold table, so that the attendant can effect consecutively the preliminary blowing of the glass in a mold with the neck opening directed downward, and the finishing blowing in an upright mold in the same way in which the said operations were hitherto effected with machines with a separate compressor installation for supplying compressed air for blowing. The successful carrying out of hand work depends also on the fulfilment of a series of conditions which more particularly relate to the filling of the press and preliminary molds with glass, and to the preliminary blowing process.

The filling of the press and the preliminary blowing mold with glass depends on a powerful suction exercised on the glass to be filled into the mold, which can be attained by means of a hand operated air compressor only when during the suction movement of the piston of the said compressor, no counter pressure on the pressure side of the piston has to be overcome, and when at the same time there is the possibility of stopping the movement of the piston as soon as the required suction has been exercised. The condition of the instantaneous stopping of the movement of the piston is necessary also for the preliminary blowing process, as a perfect product can be obtained only when the preliminary blowing process has been carried up to a definite point. The instantaneous stopping of the movement of the piston at the end of the preliminary blowing operation is preferably combined with automatic equalizing of the air-pressure in the cylinder on the one hand and with the atmosphere on the other hand.

A constructional form of the machine which fulfils the above mentioned conditions is shown by way of example in the accompanying drawing, in which—

Figure 1 is a partial vertical section through the machine, partly in elevation. Fig. 2 is a section on line 2—2 of Fig. 1, seen in the direction of the arrow shown in Fig. 1. Fig. 3 shows in side elevation the driving gear of the piston of the air compressor, seen in the direction of the arrow shown at the top of Fig. 1.

The bed plate of the machine is marked 1. To the bottom of the table or plate 1 is secured a cylinder 2 which is open at the end opposite to the table. In the cylinder 2 works a piston 3 which is connected by means of coupling parts 4, 5 to a shaft 6 supported in the machine frame and provided at one end with a hand lever 7. The hand lever 7 is provided with a catch 8 connected to a rod 9 having adjustably screwed on it a toothed member 10 capable of engaging with the teeth of a fixed toothed sector 11. The curved end of rod 9 is connected to a lever 12 pivoted at 13 to hand lever 7 and carrying a valve 14. Mounted on lever 7 is also a pipe 15 having its mouth below said valve 14 and connected by a flexible conduit 16 to an opening 17 in the lateral wall of the cylinder 2 at a certain distance from the lower face of the bed plate 1. 18 is a conduit leading from the cylinder 2 and connected by means of an opening 19 in the table 1 to the interior of the press and preliminary blowing mold. The press and preliminary blowing mold is provided with a neck 20 which can be introduced into fixed guides 21 on the table 1, and with a main part 22 which can be opened in the well known manner. 23 is a press mandrel pivotally connected to a pedal 24 and held by means of a spring 25 in the lowest position when not forced by the pressure on the lever 24 through the opening 19 of the table 1 into the hollow space of the neck 20. 26 is a column on the upper table plate on which is mounted the air compressor 27. The said air compressor 27 is provided at the lower end with an adjustable nozzle 28 and in the interior with the piston 29 to the rod 30 of which is connected a hand lever 31. 32 is the finishing mold arranged on the table 1. The shape of the neck of the said finishing mold is the same as that of the press and preliminary blowing mold, so that it is also marked with the reference numeral 20.

The operation of the machine is as follows: Before molten glass is introduced into the preliminary mold 12, the press mandrel 23 is forced into the hollow of the neck mold by depressing the pedal 24, whereupon the glass is introduced, the piston 3 in the cylinder 2 being at the same time caused to move downward by grasping the hand lever 7 with latch 8 and moving it, a suction being thus exercised through the conduit 18 on the glass which has been introduced. At the same time the mouth of conduit 15 is closed by the valve 14 operated by latch 8. This suction produced in cylinder 2 is sufficiently powerful as the cylinder space is completely open on the pressure side of the piston 3 so that no counter pressure is to be overcome. As soon as a sufficient suction of the glass introduced into the mold has taken place, the opening 17 is connected by releasing latch 8 to the atmosphere for an instant, so that the suction ceases. At the same time the mandrel 19 is moved down by releasing the pedal 24, so that it comes out from the mold neck 20. As soon as this has taken place, latch 8 is pressed again toward lever 7 and lever 7 moved back, and in that way the compression of the air in the cylinder 2 begins. Under the influence of the action of the compressed air in the cylinder 2, the glass contained in the mold 22 is subjected to a preliminary blowing. In order that the said blowing should take place with the formation of a hollow which gradually widens upward, and not merely with the formation of a simple longitudinal canal, it is necessary that the preliminary mold should have such a shape that the section curves of the mold in the longitudinal section of the same should represent approximately a straight line.

During the preliminary blowing, care must be taken that the blowing process is interrupted at a given moment. This is effected by taking care that the air pressure within the cylinder 2 is equalized with the pressure of the atmosphere at the proper moment, and that the movement of the piston is simultaneously stopped. Both these effects are secured by releasing latch 8. When doing so, member 10 comes into engagement with the teeth of fixed sector 11 and the lowering of rod 9 produces a lifting of valve 14, so that on releasing latch 8 lever 7 is stopped at once and valve 14 simultaneously opened. For the arrangement and for the operation of valve 14 hereinbefore described it is merely essential that the suction or the compression during the preliminary blowing should be suddenly interrupted at the proper moment by connecting the cylinder space with the atmosphere. Whether this is effected by catch 8 or by some other member is immaterial, and it is also immaterial from which place the valve is operated.

As soon as the preliminary blowing process has been completed, the mold 22 is opened, and the mold neck 20 with the preliminarily blown glass mass is withdrawn from the guides 21 and introduced in the well known manner in an inverted position into the finishing mold 32. After the finishing mold has been closed, the compressor nozzle 28 is screwed down, so that it comes to rest firmly on the collar, and the complete blowing of the glass article is effected by operating the hand lever 31. The nozzle 28 is then again loosened, the mold 32 opened, and the finished article which remains in the neck mold 20, removed. The neck mold can then be opened and again used in the press- and preliminary blowing- mold.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In a bottle blowing machine means adapted to suck molten glass introduced into a preliminary mold around a neck-core and for preliminarily blowing it in said mold, said means comprising a hand actuated air tension producer or compressor for drawing the glass into the preliminary mold and for preliminarily blowing the glass mass in said mold, said hand compressor being provided with independently operated valves means for suddenly qualizing the pressure between the interior of the compressor and the atmosphere.

2. In a bottle blowing machine means adapted to suck molten glass introduced into a preliminary mold around a neck-core and for preliminarily blowing it in said mold, said means comprising a cylinder with hand operated piston for drawing the glass into the preliminary mold and for preliminarily blowing the glass mass in said mold, said cylinder being open at one end and provided with independently operated valves means for suddenly equalizing the pressure between the interior of the compressor and the atmosphere.

3. In a bottle blowing machine means adapted to suck molten glass introduced into a preliminary mold around a neck-core and for preliminarily blowing it in said mold, said means comprising a hand actuated air tension producer or compressor for drawing the glass into the preliminary mold and for preliminarily blowing the glass mass in said mold, said hand compressor being provided with independently operated valves means for suddenly equalizing the pressure between the interior of the compressor and the atmosphere and for fixing its driving member in any position.

4. In a bottle blowing machine means adapted to suck molten glass introduced into a preliminary mold around a neck-core and for preliminarily blowing it in said mold, said means comprising a hand actuated air ten-

sion producer or compressor for drawing the glass into the preliminary mold and for preliminary blowing the glass mass in said mold, said hand compressor being provided with interconnected means for suddenly equalizing the pressure between the interior of the compressor and the atmosphere and for fixing its driving member in any position.

5. In a bottle blowing machine means adapted to suck molten glass introduced into a preliminary mold around a neck-core and for preliminarily blowing it in said mold, said means comprising a hand actuated air tension producer or compressor for drawing the glass into the preliminary mold and for preliminarily blowing the glass mass in said mold, said hand compressor being provided with interconnected means for suddenly equalizing the pressure between the interior of the compressor and the atmosphere and for fixing its driving member in any position.

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

ADOLF SCHILLER.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.