

(No Model.)

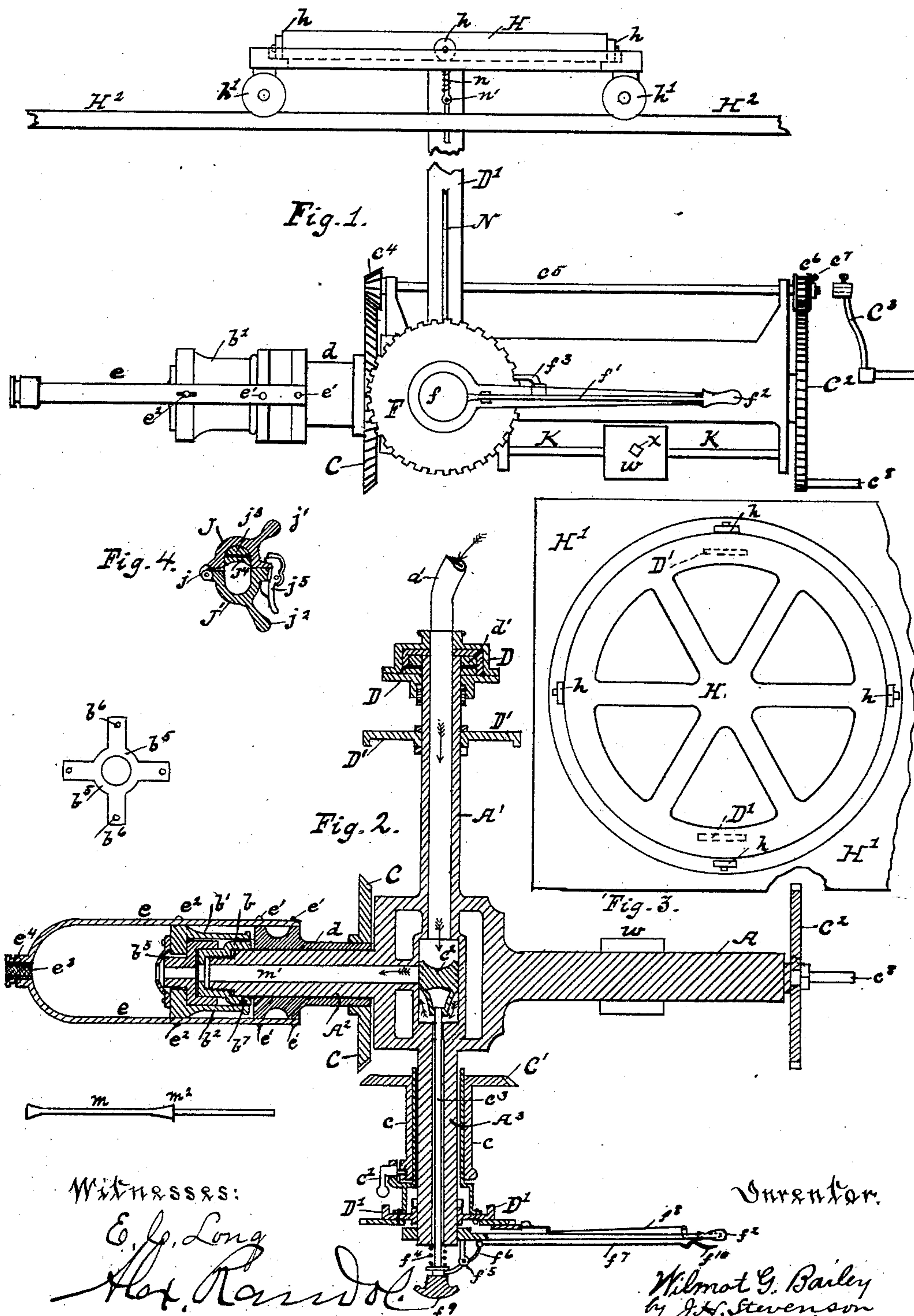
2 Sheets—Sheet 1.

W. G. BAILEY.

MECHANICAL GLASS BLOWER.

No. 360,552.

Patented Apr. 5, 1887.



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2 Sheets—Sheet 2.

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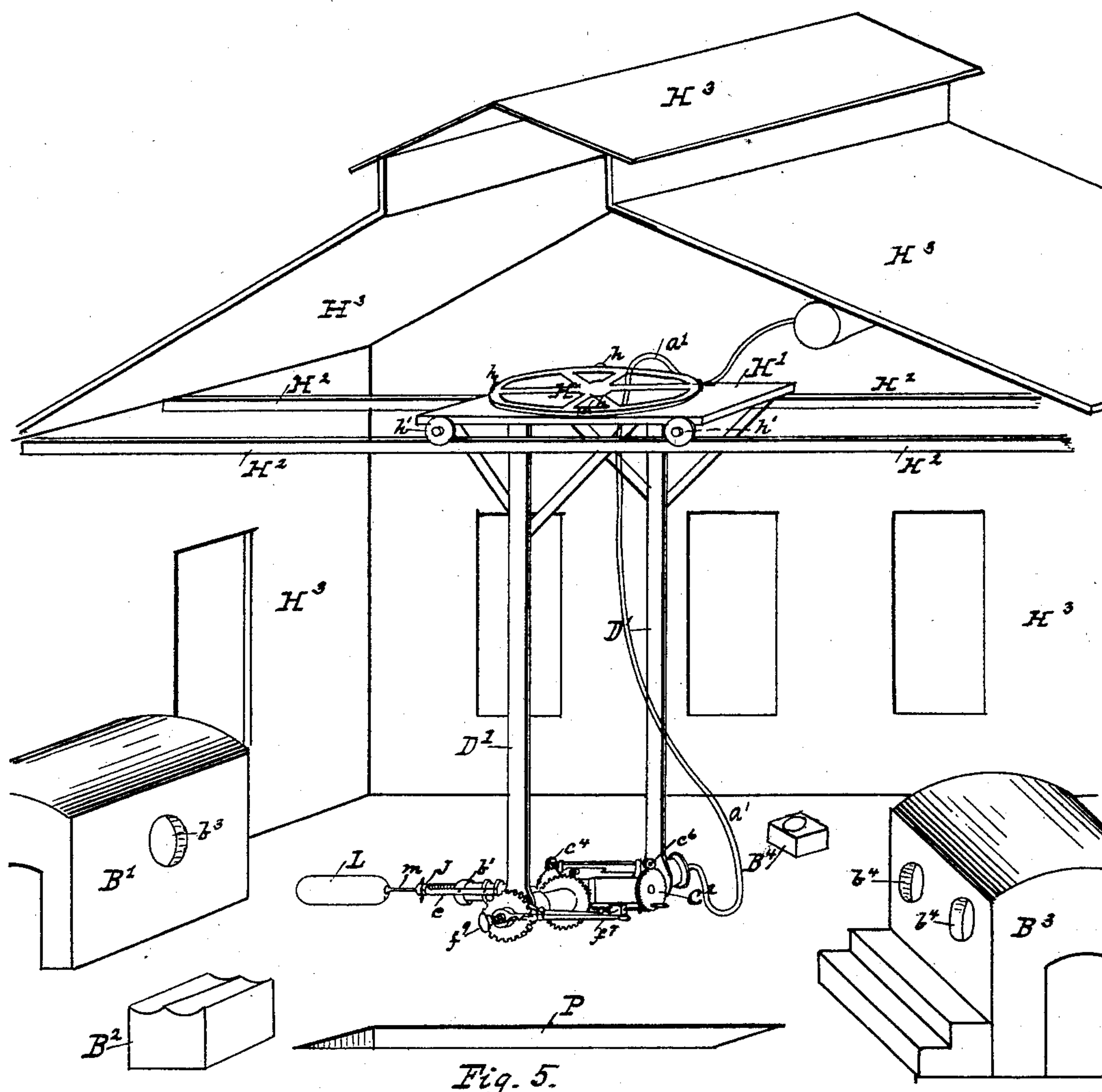


Fig. 5.

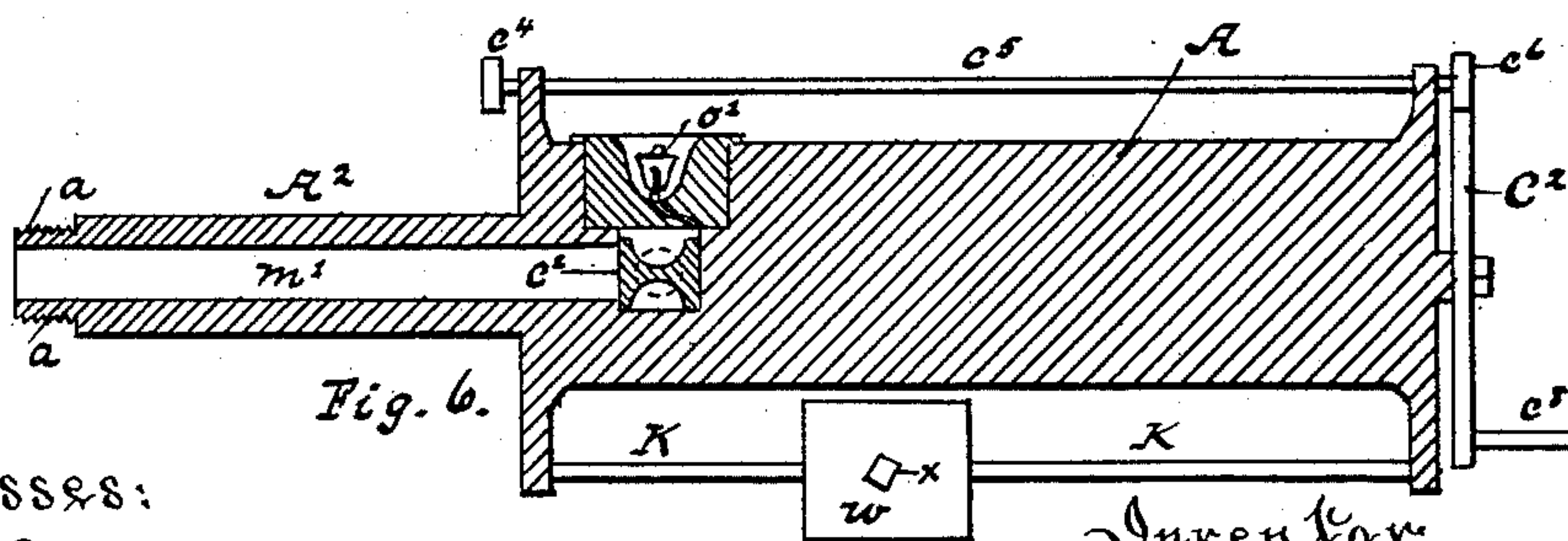


Fig. 6.

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# UNITED STATES PATENT OFFICE.

WILMOT G. BAILEY, OF BURGETTSTOWN, PENNSYLVANIA.

## MECHANICAL GLASS-BLOWER.

SPECIFICATION forming part of Letters Patent No. 360,552, dated April 5, 1887.

Application filed July 15, 1886. Serial No. 208,137. (No model.)

*To all whom it may concern:*

Be it known that I, WILMOT G. BAILEY, of Burgettstown, Washington county, Pennsylvania, have invented a new and useful Improvement in Mechanical Glass-Blowers, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

Similar letters of reference indicate corresponding parts.

My invention relates to a device for employing compressed air, together with adequate machinery, to perform the operation of blowing window-glass—a work now done by the operator employing air from his lungs through a blow-pipe, which he turns and swings to and fro while performing the operation.

In the accompanying drawings, Figure 1 is a side elevation of my device. Fig. 2 is a horizontal section of the lower part of Fig. 1. Fig. 3 is a top view of the upper part of Fig. 1. Fig. 4 is a vertical section of a clamp used at  $e^4$  to hold the blow-pipe. Fig. 5 is a perspective view of a building with my glass-blowing machinery in position for operation; and Fig. 6 is a vertical section and full length of the parts A and A<sup>2</sup>.

A, A', A<sup>2</sup>, and A<sup>3</sup> are in one piece, and in the form of a cross. The parts A' and A<sup>2</sup> are hollow, for air-passages, while the part A<sup>3</sup> is hollow, for a valve-rod, and the part A is solid.

B' is a blow-furnace with door  $b^3$ . B<sup>2</sup> is a rack for glass cylinders to rest on after being blown.

B<sup>3</sup> is a glass-furnace with pot-holes  $b^4$   $b^4$ .

B<sup>4</sup> is the shapening-block, hollow or concave on top for holding water, for a well-known purpose.

$b$  is a cap screwed on the end of A<sup>2</sup>, and is capable of adjustment of the journal  $d$  on the part A<sup>2</sup>, and thus adjusting the bevel-wheel C to a proper position.

$b'$  is a gum packing between the caps  $b$  and  $b^2$ . This cap  $b'$  is held tightly up against the gum packing  $b'$  by the stud-bolts  $e^2$ , through the slots in the arms  $e$ . (Seen in Fig. 1.)

$b^3$  is a metal cap, which is hollow in the center, and has the arms  $b^5$  to secure it by bolts to the cap  $b^2$ .

$b^7$  is a set-screw, and I use it to prevent the unscrewing of the cap  $b$ , which might be done without such a fastening.

C is a large bevel-wheel fixed rigidly to the journal  $d$ , so as to revolve with it. C' is also a large bevel-wheel, fixed to a journal,  $c$ , and revolves with the part A<sup>3</sup>.

$c'$  is a weighted lever, which, by a cam-movement, serves to throw the wheel C' into place in wheel C and also out of place, as required.

$c^2$  is a valve on the rod  $c^3$ .

$c^4$  is a small bevel-wheel on the shaft  $c^5$ .

$c^6$  is a small pinion-wheel at the other end of the shaft  $c^5$  from the wheel  $c^4$ .

C<sup>2</sup> is a power-wheel with cogs to operate the pinion-wheel  $c^4$ . This power-wheel C<sup>2</sup> has a handle,  $c^8$ .

N is an iron rod fastened to a pin,  $n'$ , which is used to secure the turn-table at any fixed or desired position. The pin  $n'$  passes up into the turn-table, and is held there by the spiral spring  $n$ .

$o$  is a lubricating-vessel.

D is a swivel-joint at the end of the part A', and has a packing,  $d'$ .

D' D' are angle-iron suspenders, in which the parts A' and A<sup>3</sup> rest. These irons D' are fastened to the turn-table H. There will be two of these irons D, and made strong enough to securely bear up the weight of my machine.

$e e$  are two iron arms, forming a support and guide for the blow-pipe  $m$ . These arms  $e e$  are rigidly fixed to the journal  $d$  by bolts at the points  $e' e'$ .

$e^3$  is the inside of the terminus  $e^4$  of the arms  $e e$ . This terminus of the arms will be in two sections, so as to be opened out more or less when the blow-pipe is being inserted. The checker-work inside of  $e^4$  is to create a friction that will prevent the pipe  $m$  from turning. To this part  $e^4$ , I fix a clamp, (see Fig. 4,) of which J is the upper half and J' the lower half, and these two parts are hinged at  $j$ .

$j'$  is a handle to J, and  $j^2$  a handle for J'.

$j^3$  is a rubber packing or spring, and  $j^4$  a steel cap.

$j^5$  is a fastener of the two sections J and J', and is held fast by a spring when the upper and lower parts, as aforesaid, are brought together, to firmly hold the blow-pipe  $m$  in place.

K is a shaft on which a balance-weight,  $w$ , is moved.  $x$  is a set-screw to hold this weight at such place as is desired. The weight  $w$  is intended as a means of balancing the glass



that may be on the blow-pipe, thus making it easier on the operator to manipulate my machine.

F is a large cog-wheel fixed rigidly to an angle-iron suspender, D', and serves to lock the machine at any desired angle. On the outside of this wheel F, on the part A<sup>3</sup>, I fix a lever, f', at f, (see Fig. 5,) having a handle, f<sup>3</sup>. By this means a revolving movement can be given to the blow-pipe as the lever f' is rigidly fixed to the part A<sup>3</sup> a complete cycle can be given, if necessary, in the blowing process to the glass being blown, and this revolving motion can be checked at any angle, and there held by means of the pawl f<sup>3</sup>, operated by the lever f<sup>3</sup>.

f<sup>9</sup> is a handle at the end of the valve-rod c<sup>3</sup>. f<sup>4</sup> is a spiral spring. f<sup>7</sup> is a rod with a fulcrum attachment, f<sup>6</sup>, at f<sup>5</sup>, and has a handle, f<sup>10</sup>. By means of this handle, the rod c<sup>3</sup> and valve c<sup>2</sup> are operated. As this valve is made concave on top and bottom the compressed air will be on either side thereof, rendering the movement of the valve an easy work.

H is the turn-table, moving on the carrying-wheels h h. This turn-table is placed on a car, H', and the latter moves on a track, H<sup>2</sup> H<sup>2</sup>. (See Fig. 5.)

H<sup>3</sup> H<sup>3</sup> are the outlines of a glass-house structure.

L represents a glass cylinder blown out and still on the blow-pipe m. The hose a' may be made to pass directly overhead and above the machine or blower, and there connect with an air-receiver.

A device to regulate the pressure of air, of which there are many kinds, can be used for my glass-blower. The blow-pipe m has a cone-shaped collar to aid in holding the pipe in place and prevent a slipping out when the glass ball is being swung around.

Having thus referred to the several parts of my invention, I will now describe the working of the same. To turn the glass-blower around horizontally, the pin n' is pulled out of place, and this unlocks the turn-table H. The operator can then turn the same at will, one way or the other, part or all the way around. In Fig. 5 the glass-blower is presented toward the blow-furnace B'; but when the glass was first manipulated the blower was presented (facing) toward the glass-furnace B<sup>3</sup>, and this turn was effected, as above described. When glass has been gathered on the end of the pipe m, the latter is put into place through the parts e<sup>4</sup> and b<sup>5</sup>, the end of the pipe projecting through the rubber packing b', thus making it air-tight, and on into the chamber m', until the collar m<sup>2</sup> is just inside of or through e<sup>4</sup>, and then the clamp J J' is securely closed, tightly gripping the pipe m. This body of glass is then put onto the block B<sup>4</sup>, where it goes through the preliminary forming process, well understood by glass-blowers who work it by hand. To do this part of the work, the

glass ball has to be turned or rolled around and around or from side to side. This I can do by my blowing-machine. The operator does this by turning the wheel C<sup>2</sup>. Taking hold of the handle, c<sup>8</sup> he turns the wheel C, thus operating the shaft c<sup>5</sup> through the medium of the pinion-wheel c<sup>6</sup>. This turns the small bevel-wheel c<sup>4</sup>, and as this works in the large wheel C the motion aforesaid is given to the glass, and here the operator can turn his glass at will. As an equivalent for the wheel C<sup>2</sup>, the crank C<sup>3</sup> may be used on the end of the shaft c<sup>5</sup>, first removing the pinion-wheel c<sup>6</sup> and the set-screw c<sup>7</sup>. Through this movement the glass can be turned at will during the entire blowing process, in the same manner or to the same effect as a glass-blower can do it by the old way. The actual blowing is done by means of the compressed air being admitted to the chamber m' from the valve (c<sup>2</sup>) chamber. When it is desired to admit air to the glass ball to "blow" it, the valve c<sup>2</sup> is pushed inward, the pressure being put to the valve-rod c<sup>3</sup>. When the valve is pushed in far enough, the air rushes in, as indicated by the arrow-points, to the chamber m', when it passes into the blow-pipe m and hence onto the glass ball or cylinder. The operator governs the air-pressure by manipulating the handle f<sup>7</sup>, as before stated. Thus little or much air can be admitted at will. While this blowing is going on, the glass cylinder L has to be swung to and fro, as is done by hand-blowing. Such a movement I accomplish by turning the parts A<sup>3</sup> and A' on their axis, thus revolving the other sections A<sup>2</sup>, and A, into and out of the pit P. This revolving can be done again and again, as long or as rapidly as may be needed, till the cylinder of glass has been fully formed. During this process of blowing it will be necessary to reheat the ball or cylinder L, and this I provide for by placing my turn-table H on a carriage, H', to run on a track, H<sup>2</sup> H<sup>2</sup>. By this means I can run the glass ball or cylinder L into the blow-furnace B', as will readily be seen by reference to Fig. 5, and when the cylinder is properly heated the carriage is reversed or run back. When fully blown, the cylinder is laid on the rack B<sup>2</sup>.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The carriage H', having thereon the turn-table H, revolving on wheels, substantially as described, and for the purpose set forth.

2. The carriage H', having the turn-table H, revolving on wheels, and the lock-rod N, pin n', and spring n, substantially as described and shown.

3. In a glass-blower, the parts A, A', A<sup>2</sup>, and A<sup>3</sup>, being in one piece in the form of a cross, the parts A' and A<sup>2</sup> being hollow, to form air-passages, and the part A<sup>3</sup> being hollow, for a valve-rod, substantially as described and shown.

4. In a glass-blower, the parts A' and A<sup>3</sup>,



in combination with the irons D' and the turn-table H, substantially as described and shown.

5 In a glass-blower, the valve  $c^2$ , rod  $c^3$ , spring  $f^4$ , and lever  $f^7$ , substantially as described and shown.

6 In a glass-blower, the wheel F, rigidly fixed to the iron D', to serve as a lock, together with the pawl  $f^7$ , and an operating-lever for  
10 directing and controlling a revolving motion, substantially as described and shown.

7 In a glass-blower, the wheels C C<sup>2</sup> c<sup>4</sup> c<sup>6</sup> and the shaft c<sup>5</sup>, substantially as described.

8 In a glass-blower, the wheels C C<sup>2</sup> c<sup>4</sup> c<sup>6</sup>  
15 and shaft c<sup>5</sup>, in combination with the journal d and arms e e, substantially as described and shown.

9 The combination, with the fixed bevel-wheel C, of the movable bevel-wheel C' and the  
20 weighted cam-lever c', whereby the parts are

thrown in and out of gear, substantially as described, and for the purposes set forth.

10 In a glass-blowing machine, the combination of the solid arm A, provided with a side rod running parallel therewith, said side rod 25 being fixed to lateral arms on the arm A, and the adjustable weight w, movable on said rod and the set-screw, substantially as described, and for the purposes set forth.

11 The combination of the journal d, arms 30 e e, caps b b<sup>2</sup>, and packing b', with the part A<sup>2</sup>, substantially as described and shown.

In testimony that I claim the foregoing as my invention I hereto set my hand in presence of two witnesses.

WILMOT G. BAILEY.

Witnesses:

E. C. LONG,

GEO. S. McKEE.