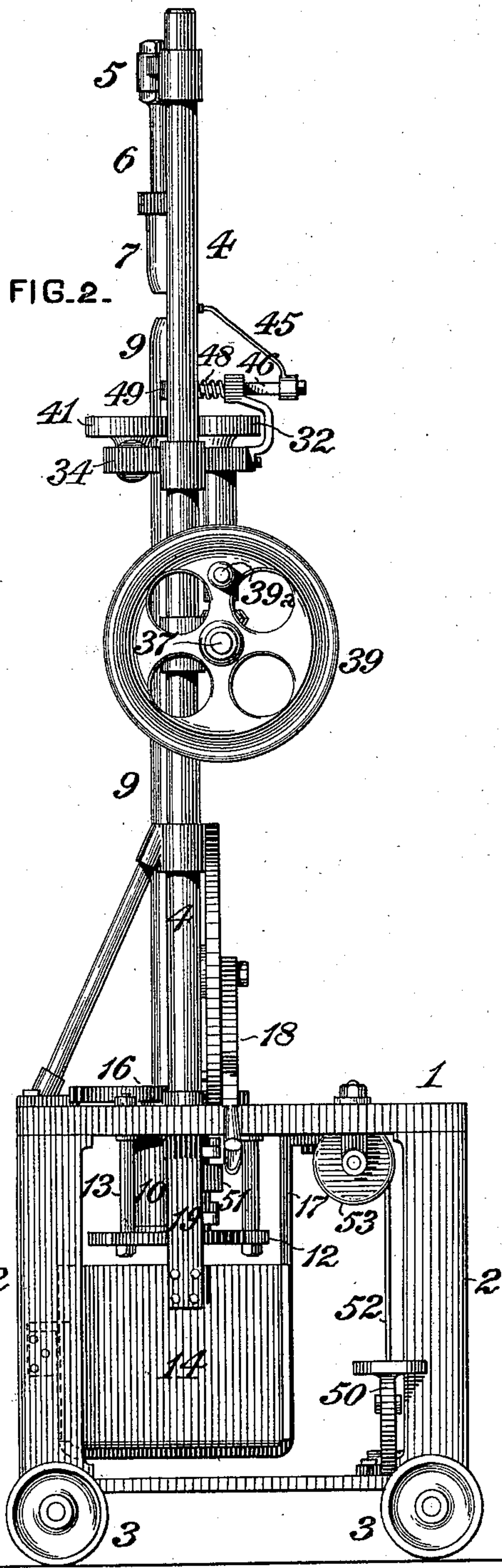


2 Sheets—Sheet 1.

Patented Mar. 31, 1896.



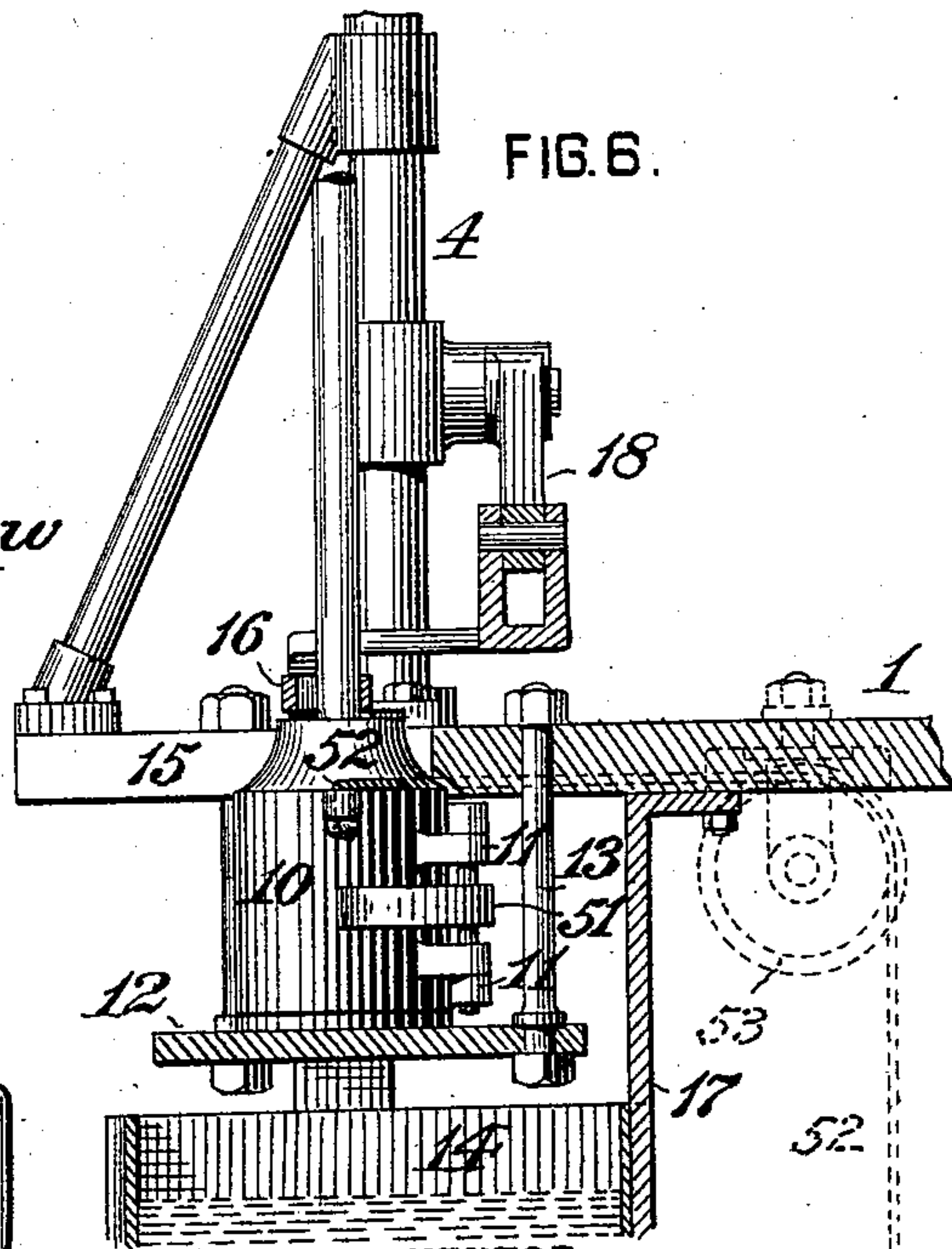
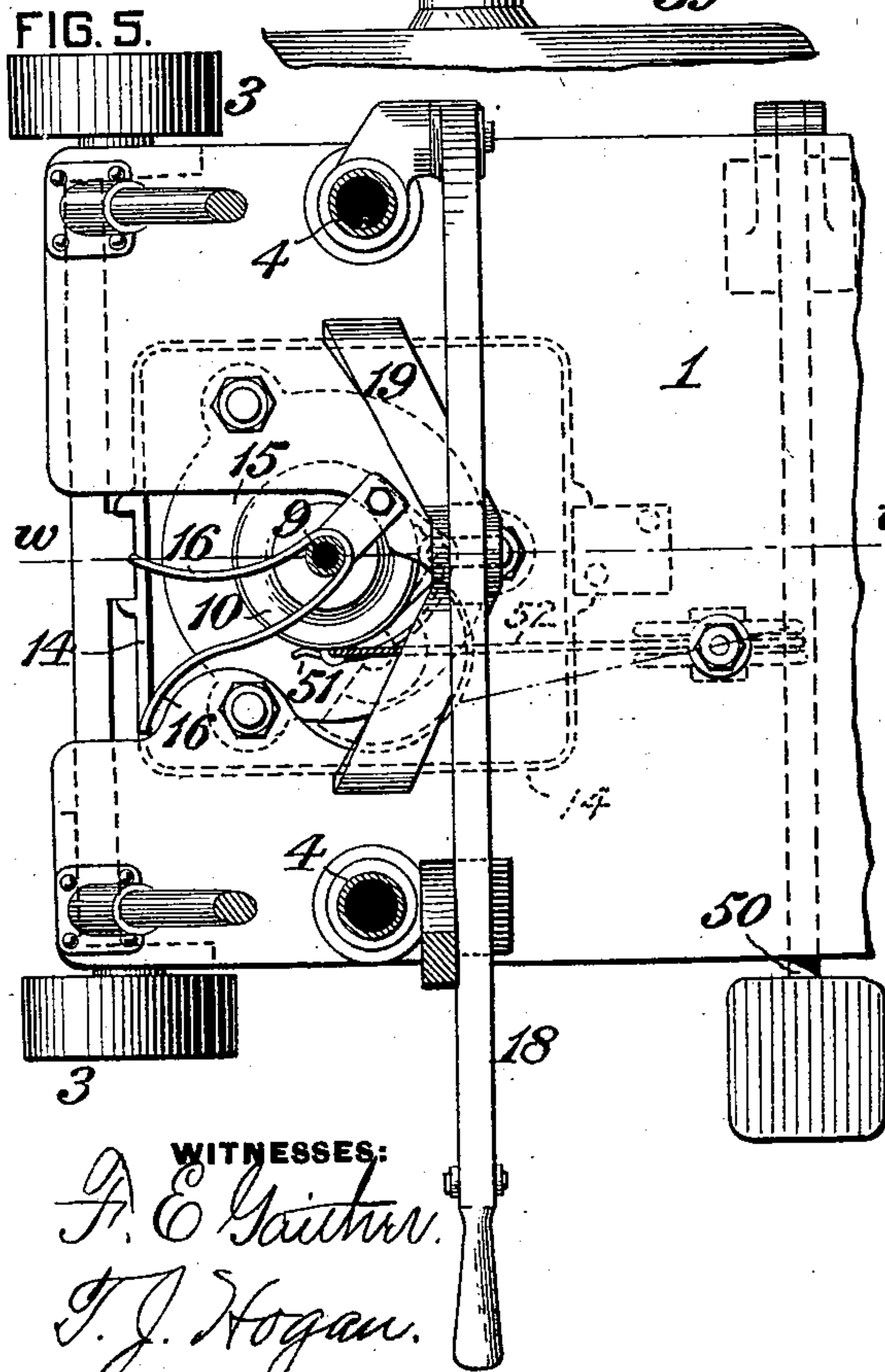
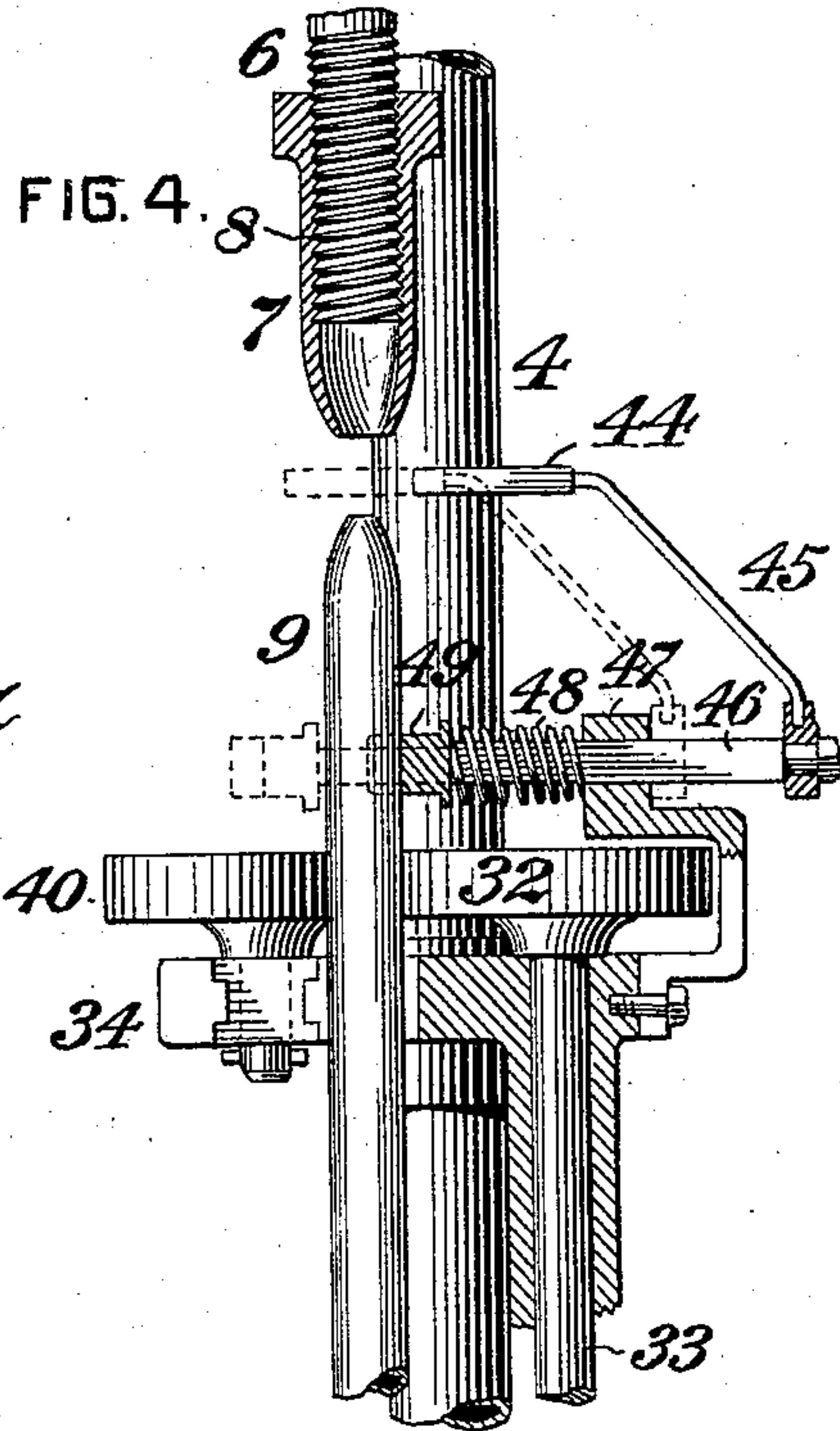
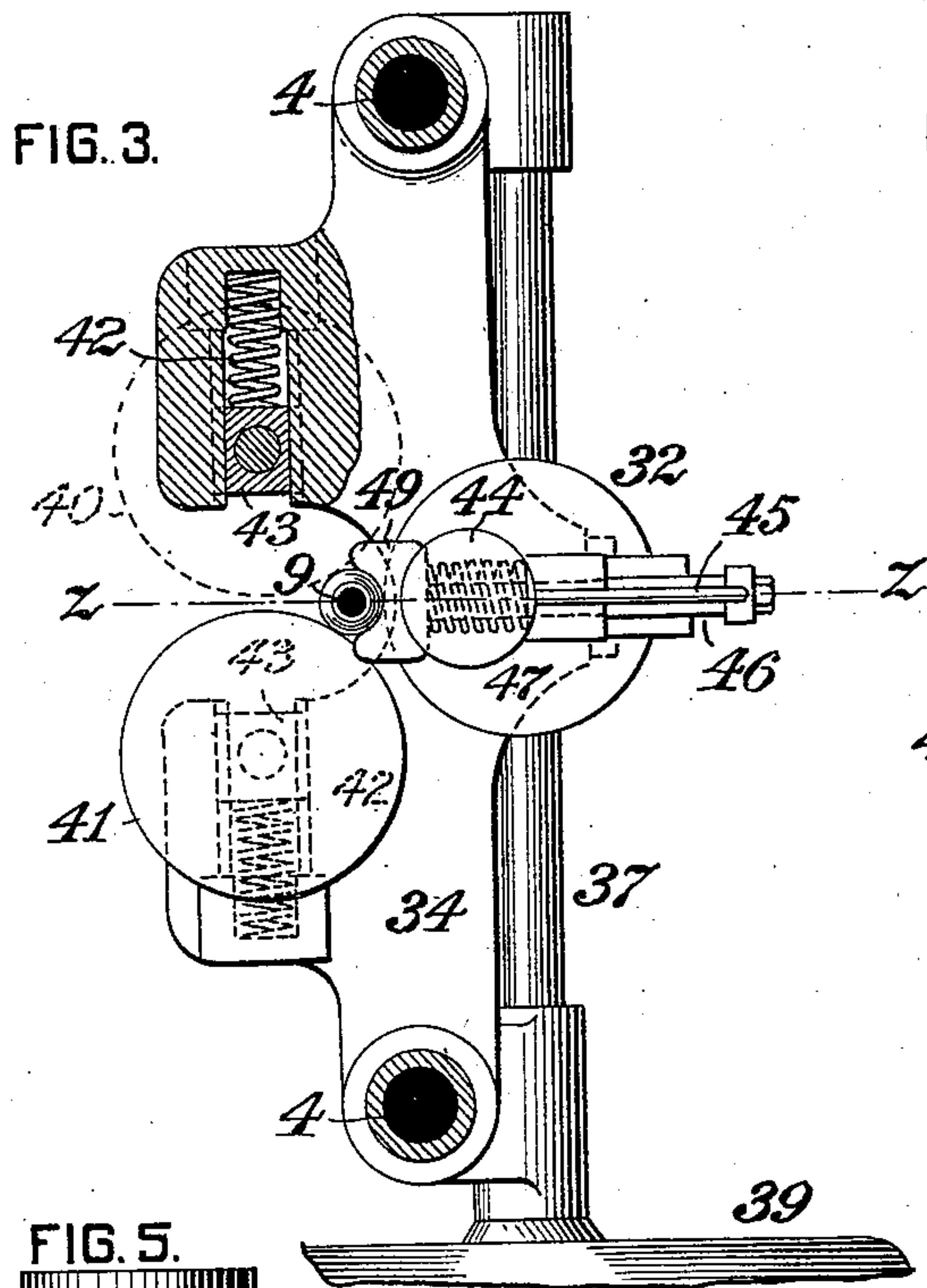
INVENTOR,

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F. ALTENBAUGH.
APPARATUS FOR BLOWING GLASS.

No. 557,298.

Patented Mar. 31, 1896.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK ALTENBAUGH, OF TIFFIN, OHIO, ASSIGNOR TO THE UNITED STATES GLASS COMPANY, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR BLOWING GLASS.

SPECIFICATION forming part of Letters Patent No. 557,298, dated March 31, 1896.

Application filed November 22, 1895. Serial No. 569,762. (No model.)

To all whom it may concern:

Be it known that I, FRANK ALTENBAUGH, a citizen of the United States, residing at Tiffin, in the county of Seneca and State of Ohio, have
5 invented or discovered a certain new and useful Improvement in Apparatus for Blowing Glass, of which improvement the following is a specification.

My invention relates to the manufacture of
10 hollow articles of glassware in what are ordinarily known as "paste molds," and its object is to economize time, labor, and expense in such manufacture by the provision of simple and effective means whereby the article may
15 be blown to desired form with speed, accuracy, and perfection of finish without employing the mouth-blowing process by an operator, which has heretofore ordinarily been practiced.

20 To this end my invention, generally stated, consists in certain novel devices and combinations for adjusting, holding, and rotating a blowpipe and regulating the admission of air through the same from a source of air under pressure to a gathering of glass in a mold.

25 The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a front view in elevation of a glass-blowing
30 apparatus, illustrating an application of my invention; Fig. 2, a side view in elevation of the same; Figs. 3 and 5, horizontal sections, on an enlarged scale, at the lines *xx* and *yy*, respectively, of Fig. 1; Fig. 4, a partial vertical section, on the same scale, at the line *zz*
35 of Fig. 3; and Fig. 6, a similar section at the line *ww* of Fig. 5.

In the practice of my invention I provide a table or frame 1, supported on legs or stand-
40 ards 2, which are preferably mounted on rollers 3, so as to enable the apparatus to be conveniently moved from place to place in the factory. Vertical posts or standards 4 are secured at their lower ends to the table 1 and
45 support at or near their upper ends a bracket or frame 5, which receives and holds an air-supply pipe 6, leading from a reservoir, blower, or other suitable source of air under pressure. The air-supply pipe 6 terminates in a dis-
50 charge section or nozzle 7, which is connected adjustably to the supply-pipe, so that the dis-

tance of its discharge-opening from the inlet end of the blowpipe may be varied as required, the adjustable connection being effected, in the instance shown, by means of a screw-
55 thread 8 on the supply-pipe, which engages a corresponding internal thread on the discharge-nozzle.

The mold 10 is of the ordinary two-part construction, its sections being connected by
60 hinges 11, and is supported upon a plate 12, which is suspended below the table 1 of the machine by bolts 13. A recess or opening 15 is formed in the table, through which the top of the mold projects and through which the
65 blowpipe 9 is entered to be inserted with the attached gathering of glass into the mold. A curved guide 16, having flaring sides and fixed to the table above the mold, serves to direct the blowpipe when entered into axial coinci-
70 dence with the mold.

The blowpipe 9 is, when in position for blowing the article, supported at its lower end in and by the mold 10 and at its upper end by friction wheels or rollers 32, 40, and 41, jour-
75 naled in a frame or bracket 34, fixed to the standards 4 below the discharge-section 7 of the supply-pipe, the blowpipe being in line axially with the air-supply pipe 6 and mold 10. Rotation is also imparted to the blow-
80 pipe during the blowing operation through the rollers 32, 40, and 41, as presently to be described. In such constructions as have heretofore been proposed in which air is to be mechanically supplied to a mold—that is
85 to say, supplied from a source of air under pressure instead of being blown by the mouth of the operator—it has, so far as my knowledge and information extend, been prescribed that the blowpipe should make a close joint
90 with the air-supply pipe. A joint of this character is found to be difficult to make and maintain under the conditions of operation, and, moreover, if the blowpipe and air-supply pipe are connected by a tight joint some means for
95 regulating the degree of blast-pressure applied to the glass in the mold will be desirable in many cases, and probably in some absolutely essential.

I have found that by dispensing with a
100 joint between the blowpipe and air-supply pipe and interposing a free space open to the

atmosphere between their adjacent ends the objections above indicated are wholly obviated, and that the proper degree of pressure may, without a special regulating device, be imparted to the glass in the mold during the blowing operation. This is due to the fact that, as has been fully demonstrated in practice, after sufficient air has been passed through the blowpipe into the mold to force the glass against its inner surfaces and hold it thereto any excess of air-pressure is relieved by escaping into the atmosphere at the open space between the air-supply pipe and the blowpipe. I therefore preferably employ a construction, substantially as shown in the drawings, in which there is no joint between the blowpipe and air-supply pipe, and make the blowpipe 9 of such length that when in operative position, with the supply-pipe open for the supply of air, there shall be a free space, open to the atmosphere, between its upper or inlet end and the adjacent or outlet end of the discharge-section 7 of the air-supply pipe.

To prevent ingress of air to the blowpipe during the intervals between the successive blowing operations, I provide a movable intercepting device, which is preferably, as shown, a deflecting-plate 44, which during such intervals is interposed and held between the discharge-section and blowpipe, as indicated in dotted lines in Fig. 4, so as to deflect the air-current issuing from the former away from the inlet of the blowpipe. The plate 44 is fixed upon an arm 45, secured to a bar 46, which is fitted to slide, at right angles to the axial line of the discharge-section and blowpipe, in a guide 47, fixed to the frame 34. A bearing-plate 49, against which the blowpipe 9 abuts when being moved into and while in operative position, is secured to the bar 46, and a spring 48 is interposed between the bearing-plate 49 and the fixed guide 47. The spring 47 holds the deflecting-plate and bearing-plate normally in the positions indicated in dotted lines in Fig. 4, and the blowpipe, when inserted in operative position, bears against the plate 49 and holds the deflecting-plate entirely clear of the air-current issuing from the discharge-section, so as to permit its unobstructed ingress to the blowpipe.

In the manufacture of articles of glassware, such as tumblers, &c., which require to be well finished in order to be marketable, the glass must be rotated in the mold in order to prevent the formation of a ridge or seam at the parting of the mold, as well as to prevent the adhesion of the glass to the walls thereof. In ordinary practice the portion of glass or "gathering" which is to be blown is brought from the furnace to the glass-blower by a boy, and the glass-blower blows it to the desired shape in the mold with his mouth and rotates the blowpipe with his hands during the operation. By the employment of my present invention this work of the glass-blower is dis-

pensed with, the glass being blown by pressure from the air-supply pipe 6, while the blowpipe 9 is mechanically rotated in the mold by mechanism of the following general character.

In the preferred construction, which is shown in the drawings, the blowpipe 9 is rotated continuously in the same direction during the blowing operation; but such continuous rotation in one direction is not an essential of my invention, as the same result would be attained without departure from the spirit of my invention by rotating the blowpipe alternately in opposite directions. In the instance shown rotation is imparted to the blowpipe by a friction wheel or roller 32 on a vertical shaft 33, journaled in a bearing on the frame 34, and carrying on its lower end a bevel-pinion 35, which meshes with a corresponding pinion 36 on a driving-shaft 37, journaled in bearings on the standards 4 and carrying an operating crank-wheel 39 provided with a handle or crank-pin 39^a. The blowpipe is held in operative contact with the wheel 32 by idle-wheels 40 41, the boxes or bearings of which are fitted in the frame 34 and are subject to the tension of springs 42, by which the idle-wheels 40 and 41 are pressed up to a proper bearing on the blowpipe.

The mold 10 is opened and closed, as required for the insertion of the gathering and the removal of the finished article, by a treadle 50, connected with its movable section, and by a spring 51 bearing thereon, respectively. The treadle 50 is journaled to one of the legs 2 of the frame of the machine, and is connected by a cord or chain 52, passing around a guide-sheave 53, with the movable section of the mold. The spring 51 is connected at one end to the fixed section of the mold and its free end bears against the movable section. By downward pressure upon the treadle 50 the mold is opened to receive the blowpipe and gathering, as indicated in dotted lines in Fig. 5, and upon the release of pressure from the treadle the spring 51 closes the mold.

For moistening and cooling the mold a water-tank 14 is suspended from the table 1, below the mold, by a hanger or stirrup 17, and is elevated, as from time to time required, to immerse the mold, when open, in the water in the tank, by a hand-lever 18. The lever 18 is pivoted to one of the standards 4 and is coupled to a bail or strap 19, the lower ends of which are secured to the sides of the tank 14, the rectilinear movement of which, while being raised and lowered, is insured by shoulders on its sides, which fit against the sides of the fixed hanger 17. By moving the hand-lever 18 into the position shown in dotted lines in Fig. 1, while the mold is open, the tank 14 will be raised to such a height that the mold will be immersed in the water in the tank and will be properly moistened and cooled thereby, after which the tank is lowered to normal position and the mold is in readiness for another blowing operation.

In the operation of the apparatus the gathering-boy or any other attendant places the gathering of glass on the end of the blowpipe 9, opens the mold by pressing on the treadle 50, and enters the lower end of the blowpipe into the mold, the blowpipe being guided and centered by the guide 16. He then releases the treadle 50 and the spring 51 closes the mold. By the pressure of the blowpipe on the bearing-plate 49 it is brought into proper relation to the discharge-section 7 of the air-supply pipe 6, and the deflecting-plate 44 is moved to one side of the discharge-section 7, upon which the air-current therefrom passes into the blowpipe and mold. The blowpipe is then rotated by means of the crank-pin 39^a, while the glass is being blown by the air admitted to the mold from the air-supply pipe 6. When the article is finished, the mold is opened, the blowpipe and finished article removed, the mold cooled and moistened if required, and the operations repeated in regular course.

It will be obvious that other means for imparting movement about its axis to the blowpipe, differing specifically from those shown and described, may be substituted therefor in the apparatus with the same result and without departure from the spirit and operative principle of my invention, and I do not therefore limit myself to such specific structural details of the apparatus.

An essential feature of my invention consists in the combination, with a mold and an air-supply pipe, of a blowpipe which, as shown and described, is unconnected with the air-supply pipe and is separated therefrom by a free space, thereby obviating the necessity for the close joint heretofore employed.

In the manufacture of articles of the class of those for the formation of which my improvement is more particularly designed it is necessary that there shall be relative movement about an axis between the blowpipe and mold, and in the instance exemplified movement about its axis is imparted to the blowpipe while the mold is held stationary. It will, however, be apparent to those skilled in the art that the feature above specified may be embodied, without variation of operative principle, if movement about its axis be imparted to the mold instead of to the blowpipe, and I therefore include as the mechanical equivalent of the construction herein described and shown an apparatus in which, while preserving the same relation of the blowpipe and air-supply pipe, the conditions of rest and movement of the blowpipe and mold are reversed in the blowing operation—that is to say, the blowpipe is held stationary and movement about its axis is imparted to the mold.

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

1. In an apparatus for blowing glass, the combination, substantially as set forth, of an open air-supply pipe, a mold, and a blowpipe

in line axially with the mold, and having its inlet end separated by a free space, which is open to the atmosphere, from the air-supply pipe.

2. In an apparatus for blowing glass, the combination, substantially as set forth, of an air-supply pipe, a mold, a blowpipe in line axially with the mold, and having its inlet end separated by a free space, which is open to the atmosphere, from the air-inlet pipe, and a movable intercepting device for preventing access of air to the blowpipe except when in operative position.

3. In an apparatus for blowing glass, the combination, substantially as set forth, of an open air-supply pipe, a mold, a blowpipe in line axially with the air-supply pipe and mold, and having its inlet end separated by a free space, which is open to the atmosphere, from the air-supply pipe, and means for imparting axial movement to the blowpipe.

4. In an apparatus for blowing glass, the combination, substantially as set forth, of an air-supply pipe, a mold, a blowpipe which is insertible in the mold, and which, in operative position, is in line axially with the air-supply pipe and mold, and has its inlet end separated by a free space from the air-supply pipe, a movable intercepting device for preventing access of air from the air-supply pipe to the blowpipe except when the latter is in operative position, and means for imparting axial movement to the blowpipe.

5. In an apparatus for blowing glass, the combination, substantially as set forth, of a supporting table or frame, standards fixed thereto, an air-supply pipe supported on said standards, a blowpipe in line axially with, but separated longitudinally from, said air-supply pipe, a mold supported on the frame in line axially with the air-supply pipe and blowpipe, and mechanism supported on the standards for imparting axial movement to the blowpipe.

6. In an apparatus for blowing glass, the combination, substantially as set forth, of a frame, a mold supported thereon, an air-supply pipe supported on the frame in line axially with the mold, a blowpipe which is insertible in the mold, and which, in operative position, has its inlet end separated by a free space from the air-supply pipe, friction wheels or rollers which support the blowpipe in line axially with the air-supply pipe, and mechanism for imparting rotation to the blowpipe through one of said friction-wheels.

7. In an apparatus for blowing glass, the combination, substantially as set forth, of a frame, a mold supported thereon, an air-supply pipe supported on the frame in line axially with the mold, a blowpipe which is insertible in the mold, and which, in operative position, has its inlet end separated by a free space from the air-supply pipe, friction wheels or rollers, one or more of which are mounted in a yielding bearing, and which are adapted to support the blowpipe in line axially with

the air-supply pipe, and mechanism for imparting rotation to the blowpipe through one of said friction-wheels.

8. In an apparatus for blowing glass, the
5 combination, substantially as set forth, of a frame, a mold supported thereon, an air-supply pipe supported on the frame in line axially with the mold, an insertible and removable blowpipe, a guide for effecting the in-
10 section of the blowpipe in line axially with

the mold, and friction-rollers supporting the opposite end of the blowpipe in line axially with the supply-pipe.

In testimony whereof I have hereunto set my hand.

FRANK ALTENBAUGH.

Witnesses:

E. A. BREWER,

CHARLES HAINER.