F. C. H. STRASBURGER.

FILLING MACHINE.

APPLICATION FILED MAR. 9, 1908.

991,664.

Patented May 9, 1911.

5 SHEETS—SHEET 1.

Fig. 1

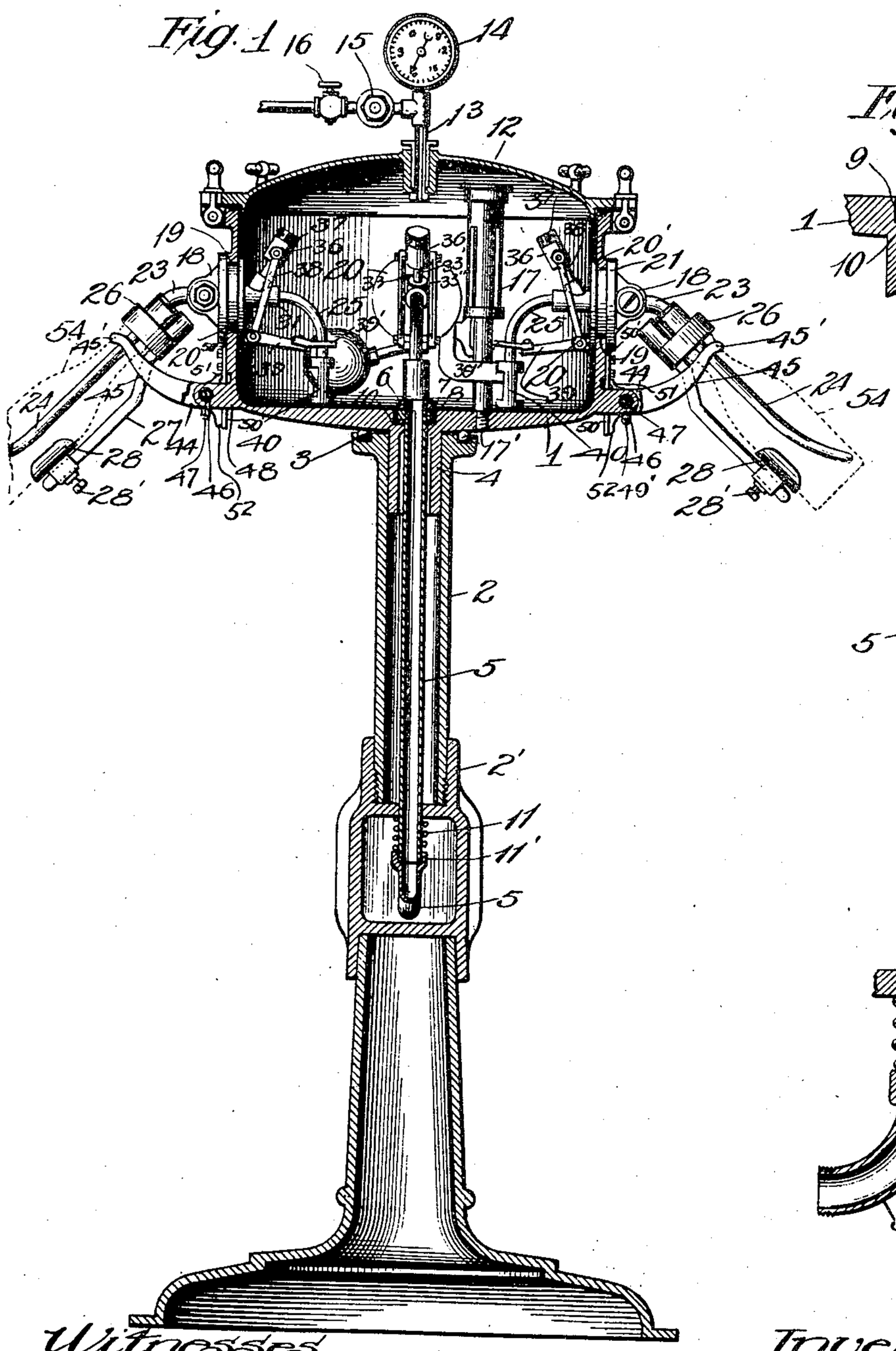
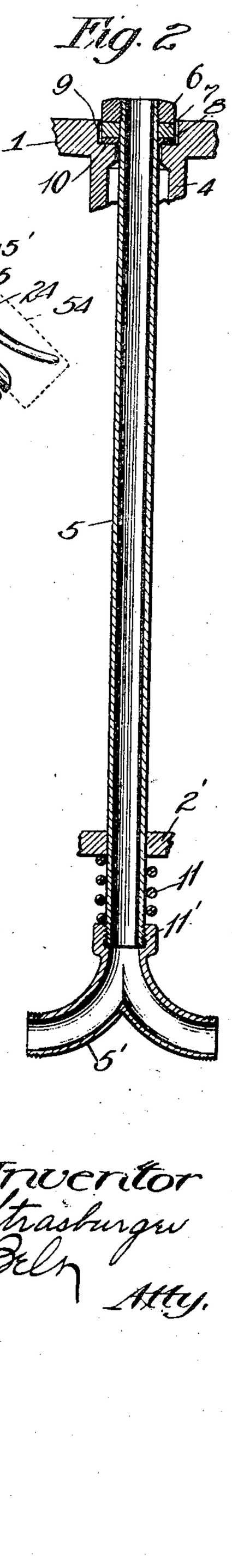


Fig. 2



Witnesses

Harry R. L. White

M. A. Riddle

Inventor

F. C. H. Strasburger

By Wm. F. Beln

Atty.

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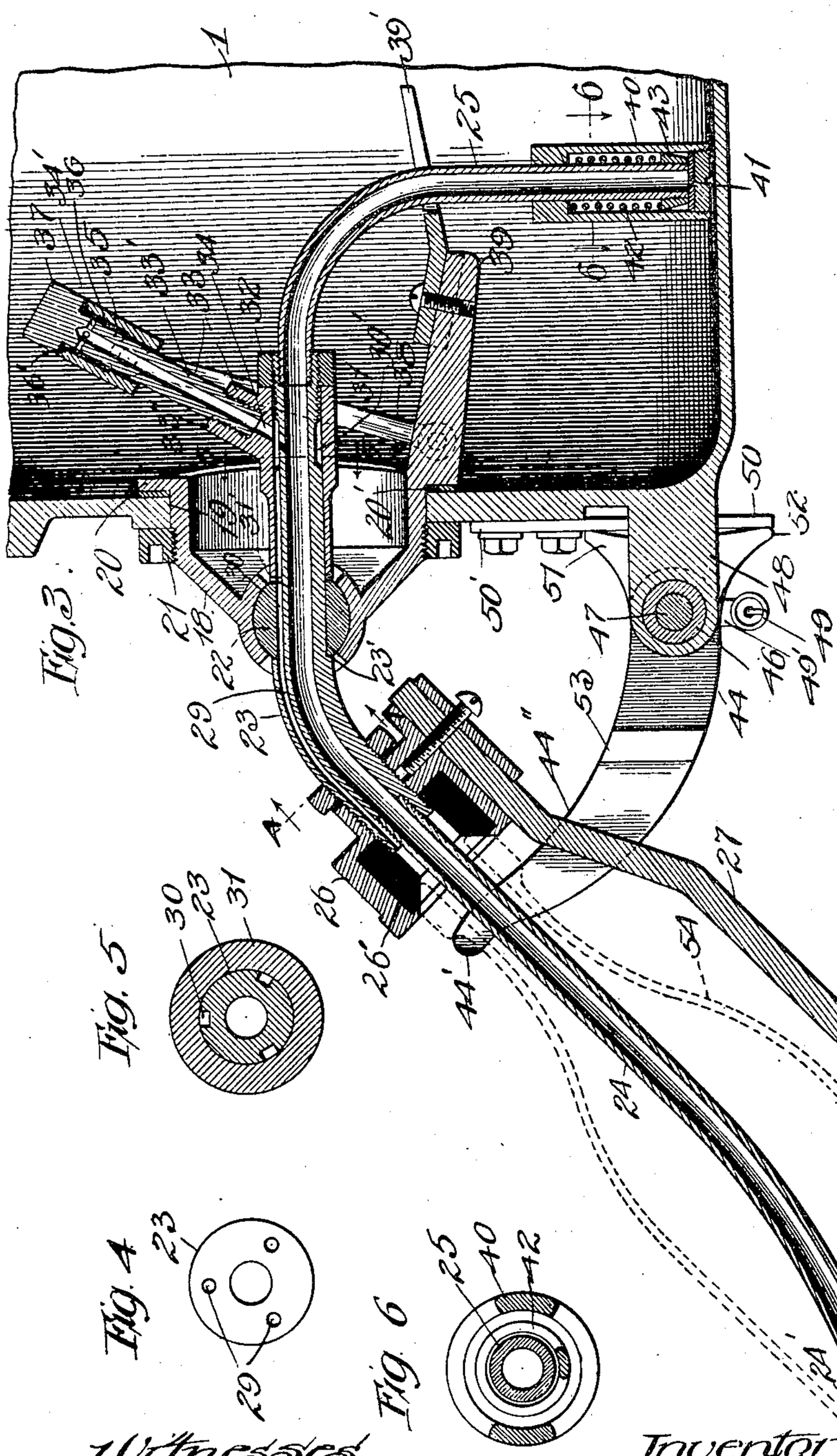

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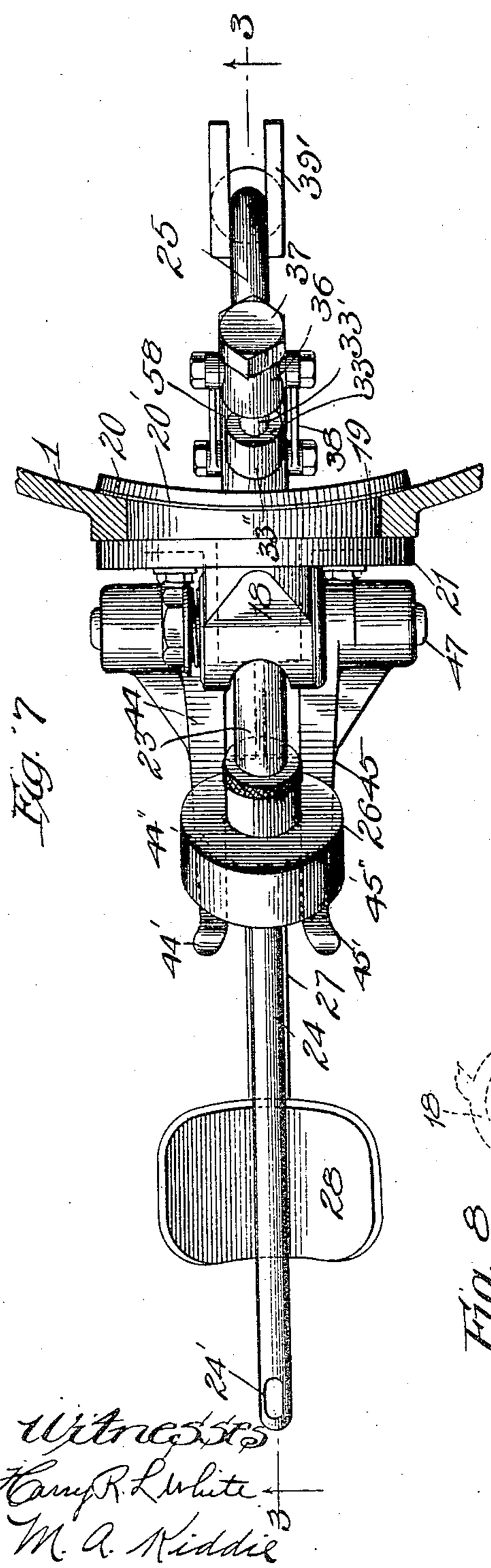

Fig. 7.

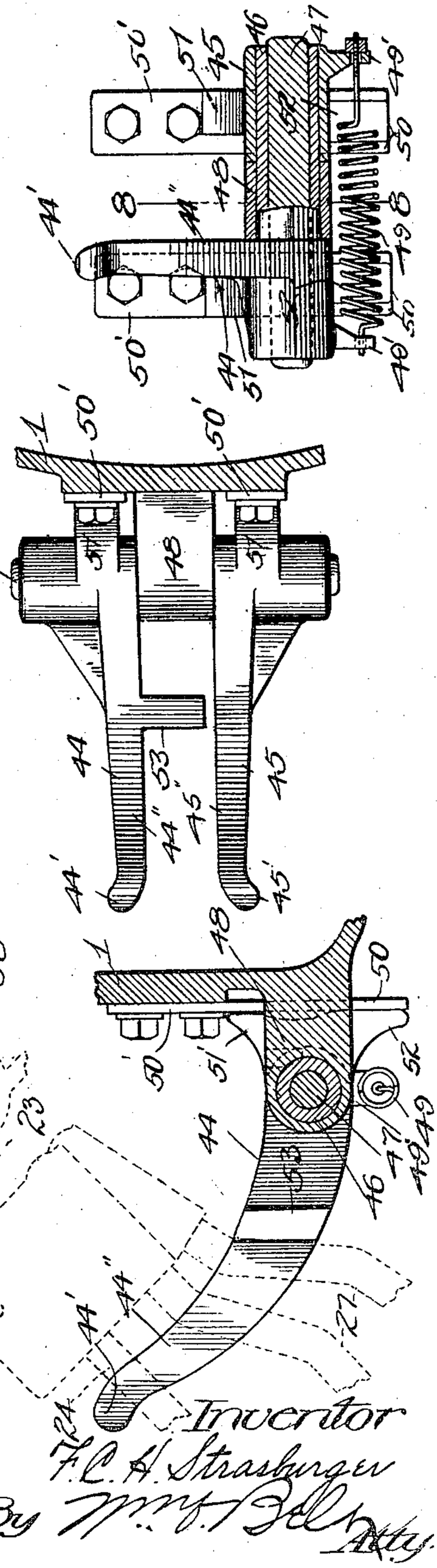

Fig. 10

Fig. 9

Fig. 8

Witnesses
Harry R. Lubite
M. A. Kiddie

Inventor
F. C. H. Strasburger
By Wm. O. Belt
Atty.

F. C. H. STRASBURGER.

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5 SHEETS—SHEET 4.

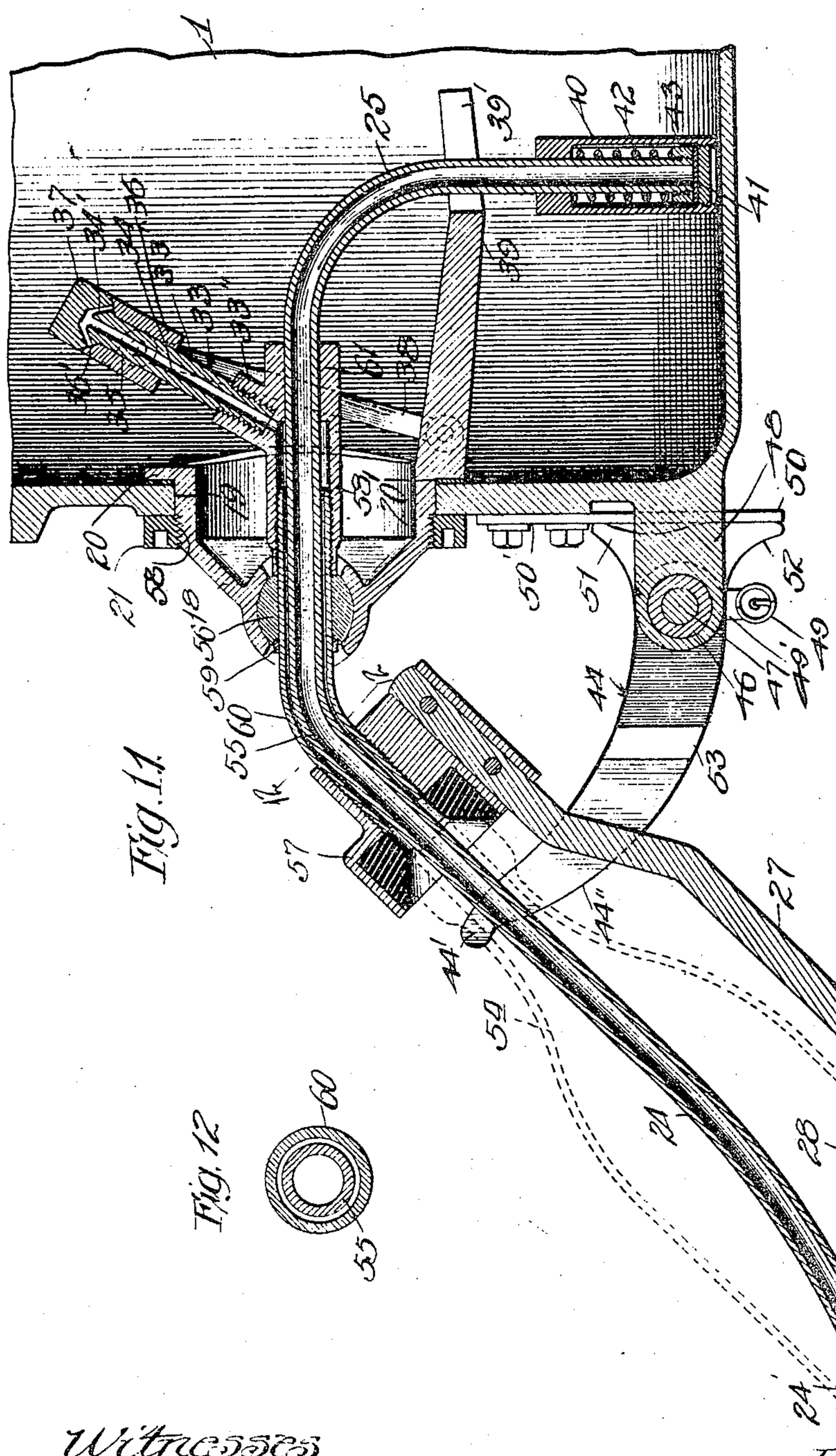

Fig. 11.

Fig. 12.

Witnesses
Harry B. Durbin
F. A. Riddle

Inventor
F. C. H. Strasburger
By Wm. F. Bell
Atty.

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5 SHEETS—SHEET 5.

Fig. 13

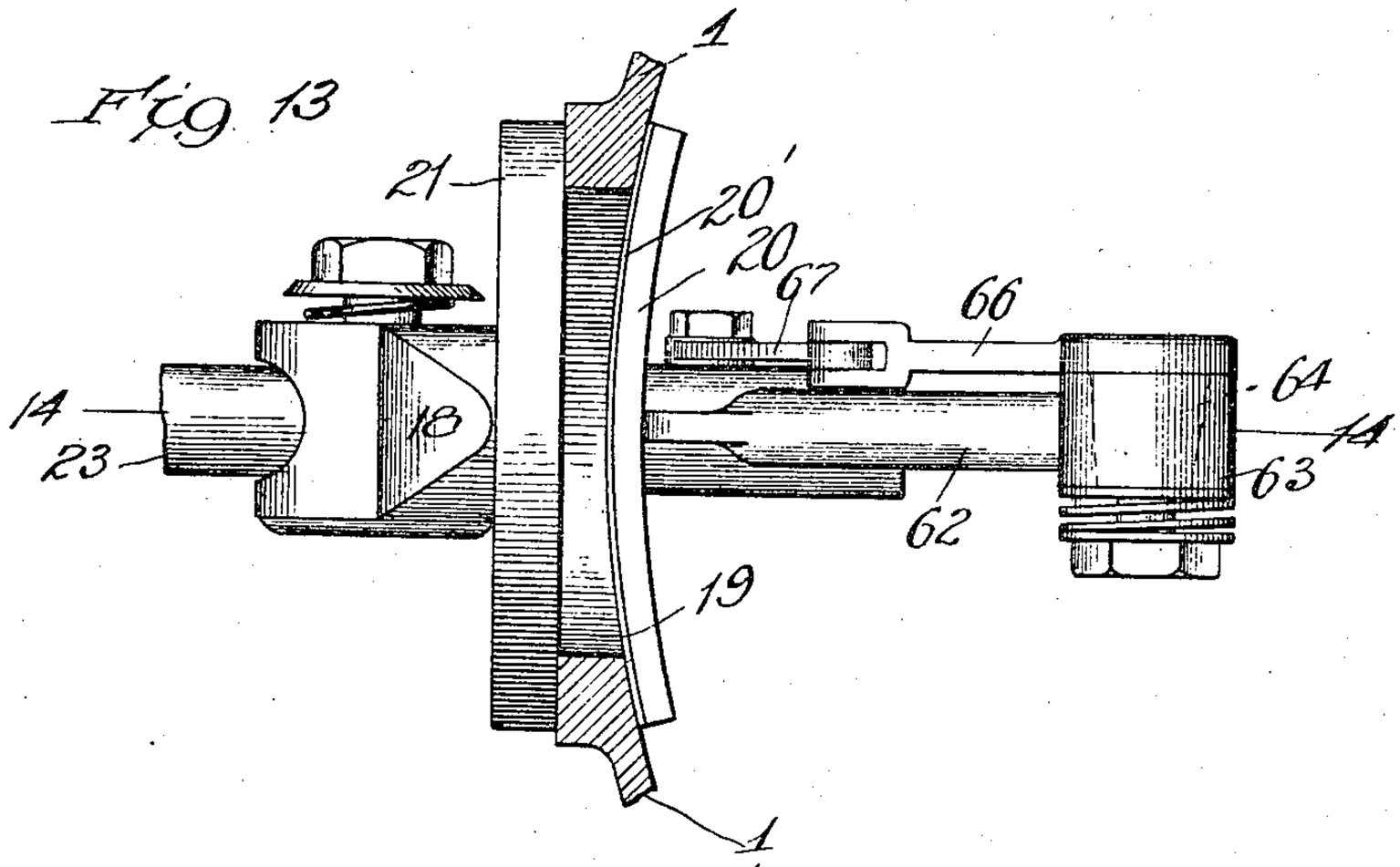
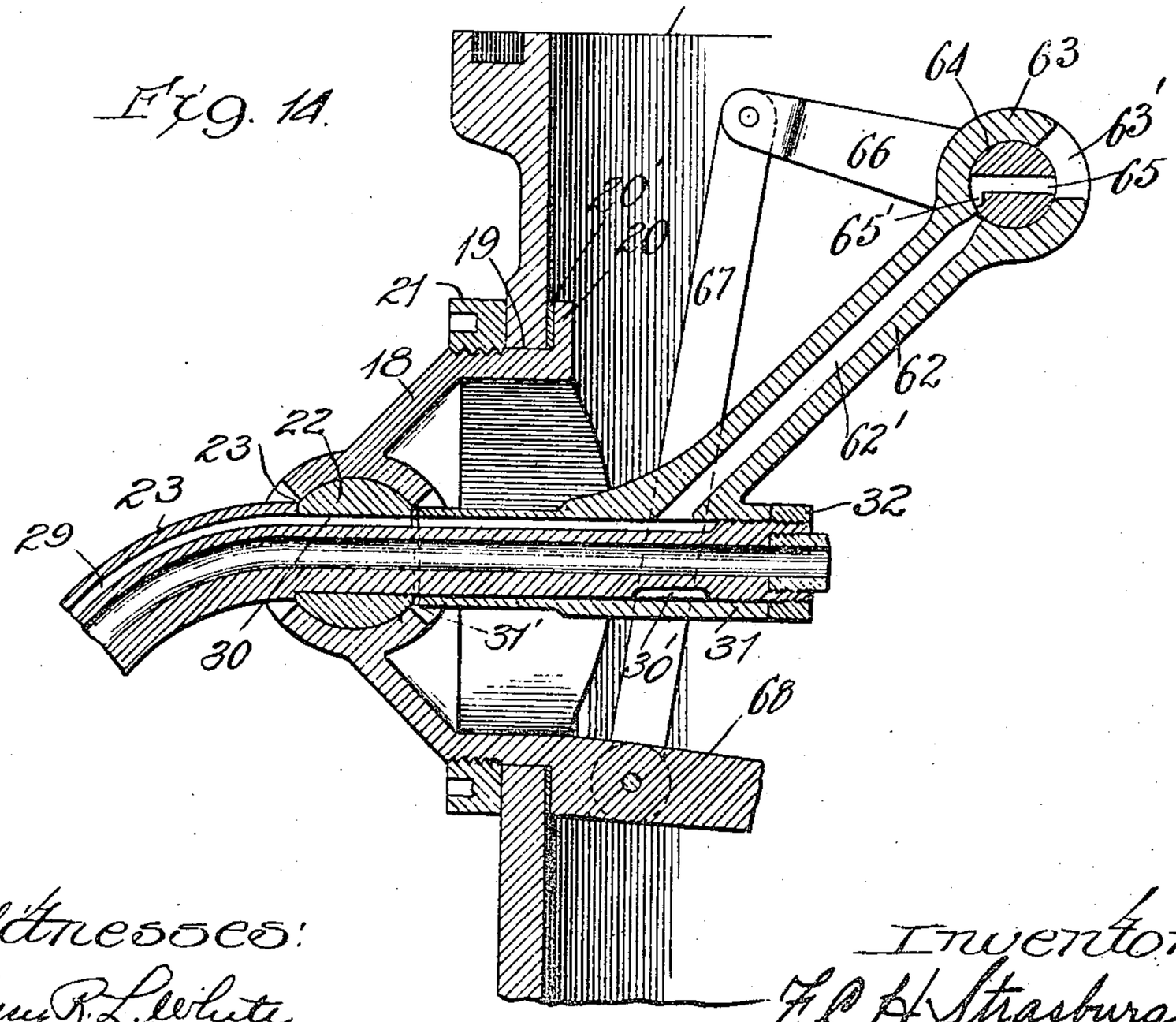


Fig. 14.



Witnesses:
Harry R. Lewis
M. A. Riddle

Inventor:
F. C. H. Strasburger
By Wm. F. Belk Atty

UNITED STATES PATENT OFFICE.

FRANK C. H. STRASBURGER, OF CHICAGO, ILLINOIS, ASSIGNOR TO BOTTLERS MACHINERY MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

FILLING-MACHINE.

991,664. Specification of Letters Patent. Patented May 9, 1911.

Application filed March 9, 1908. Serial No. 419,876.

To all whom it may concern:

Be it known that I, FRANK C. H. STRASBURGER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Filling-Machines, of which the following is a specification.

This invention relates to bottle filling machines adapted to be operated by hand and its object is to provide a machine of simple construction adapted to be operated rapidly and to fill the bottles without the loss of gas and without producing foam.

A further object of the invention is to provide a siphon filling machine in which the filling operation is conducted under a pressure on the liquid to prevent the escape of gas. And further objects of the invention are to automatically seal the bottle as it is moved to filling position; to automatically establish communication between the bottle and the liquid tank to enable an equalization of pressure in the bottle and tank; and to automatically open the liquid valve as the bottle is carried to its filling position.

The invention has other objects in view which will appear fully hereafter in the detail description of the embodiment of the invention illustrated in the accompanying drawings in which—

Figure 1 is a sectional elevation of a machine embodying my invention. Fig. 2 is an enlarged sectional elevation of the liquid inlet pipe. Fig. 3 is a detail enlarged sectional view on the line 3—3 of Fig. 6 showing a bottle in broken lines. Figs. 4, 5 and 6 are sectional views on the lines 4—4, 5—5 and 6—6, respectively, of Fig. 3. Fig. 7 is a top plan view of one of the filling mechanisms, a portion of the tank appearing in section. Fig. 8 is a sectional view on the line 8—8 of Fig. 10, the position of the head being indicated in broken lines. Fig. 9 is a plan view of the bottle clamp, a portion of the tank appearing in section. Fig. 10 is a front view of the bottle clamp, shown partly in section on the line 10—10 of Fig. 9. Fig. 11 is a view like Fig. 3 but showing a modified construction. Fig. 12 is a sectional view on the line 12—12 of Fig. 11. Fig. 13 is a top plan view, partly in section, showing a modified form of device for operating the air valve. Fig. 14 is a sectional elevation of this modification on the line 14—14 of Fig. 13.

Referring to the drawings, 1 designates a liquid tank which is mounted to revolve on a hollow pedestal or stand 2 of any suitable construction. The pedestal is provided with a ball bearing 3 on which the tank rests and the tank has a hollow boss 4 projecting downward from its bottom to fit in the upper end of the pedestal. The liquid inlet pipe 5 is arranged in the pedestal and is provided at its lower end with one or more branches 5′ to which a hose leading from the liquid supply is connected. This liquid pipe 5 extends up through the boss 4 into the tank 1 and a nut 6 is screwed on its upper end. A collar 7 and a washer 8 are arranged on the liquid pipe beneath the nut 6 and in a recess 9 in the bottom of the tank upon an annular shoulder 10 at the top of the boss 4 (Fig. 2). A spring 11 is arranged on the liquid pipe between a fixed part 2′ of the pedestal and a shoulder 11′ on the pipe, and this spring by expansion pulls down on the upper end of the liquid pipe and holds the nut 6, collar 7 and washer 8 tightly together with the washer bearing on the shoulder 10 to prevent the escape of liquid from the tank, but at the same time permitting the tank to revolve on the liquid pipe.

The lid 12 of the tank is secured thereon in an air tight manner by suitable fastening devices. The air tube 13 enters the tank through the lid and is provided with a pressure gage 14, a pressure regulator 15 and a stop cock 16.

A float valve 17 is arranged in the tank and it has an outlet opening 17′ in the bottom of the tank to permit the escape of gas from the tank when the liquid in the tank falls below a predetermined level. I may use any form of valve suitable for this purpose but I have shown in the drawings the valve covered by my Patent No. 883,254 dated March 31, 1908. As this valve forms no part of the present invention it will not be necessary to enter into a detail description thereof. The purpose of this valve is simply to maintain the liquid at a predetermined level by allowing the escape of gas from the tank, when the liquid in the tank falls below the predetermined level, to permit the liquid to flow into the tank from the supply.

The tank is preferably circular in form and is provided with a plurality of filling mechanisms supported in its side and spaced apart in convenient position. Each filling

mechanism comprises a casing 18 which is arranged in an opening 19 in the side of the tank and has an annular flange 20 at its inner end to engage the inner face of the side of the tank, there being, preferably, a washer 20′ located between said flange and the tank, as shown in Fig. 3, to form a tight joint.

A clamping ring 21 screw-threaded on a threaded portion of the casing secures the casing to the side of the tank. A rotatably movable plug 22 is arranged to rock in the casing 18 and is bored transversely to receive the tubular plug section 23 of the filling tube which is bent in angular form. (Fig. 3). This plug section of the filling tube carries a nozzle section 24 at its outer front end to enter the bottle, and a valve section 25 at its rear end within the tank, and the bores of the three sections form a continuous and uninterrupted passage for the liquid. I prefer to make the filling tube in sections as described for convenience in the manufacture and assembling of parts, for strength at the rock plug, and to facilitate cleansing and repairs. The filling tube projects downwardly and outwardly from the tank and is preferably closed at its lower end and provided with a discharge opening 24′ on its upper side at or adjacent to its lower outer end. A sealing head 26 is carried on the outer end of the plug section 23 and is provided with a rubber seat 26′ to receive the mouth of the bottle. A supporting arm 27 is connected to the sealing head and it carries a bottle rest 28 adjustable longitudinally of the arm and secured in position by a set screw 28′. The plug section 23 of the filling tube has a shoulder 23′ which abuts against the plug 22 and this section has one or more longitudinal bores 29 forming an air passage from the sealing head to the plug and there connecting with grooves 30 cut in the inner face of the plug section and forming a continuation of the air passage. Grooves 30 are disposed longitudinally of the plug section 23 so as to register with the bores 29. Communication is established between the various bores 29 through an annular groove 30′ connecting the ends of the grooves 29′.

A tubular air valve member 31 is secured on the plug section 23 within the tank by a nut 32 screw-threaded on the rear end of the plug section. By adjusting nut 32 the shoulder 23′ and the front end 31′ of the air valve member are clamped tightly against the plug to form air tight joints, and washers may be used in said joints if found desirable. The air valve member has an upwardly inclined branch 33 provided with a bore 34 which communicates with the groove 30′ and forms a continuation of the air passage. Communication is established between the liquid tube in the plug section 23 and the air valve through an opening disposed in alinement with the tube 33′, as shown in Fig. 3. This opening permits the gas to enter the bottle through the liquid tube as well as through the bores, so that the pressure in the tank and in the bottle will be equalized more quickly than it otherwise would be if the bores were depended upon solely for the passage of the gas.

An air valve adapted to be automatically operated as the filling tube is moved to filling position is provided in the air passage and this valve is preferably made as illustrated in Fig. 3. The branch 33, in this construction, comprises, for convenience, a tube 33′ which is screw-threaded in a tubular boss 33″ and is provided with a head 35 and one or more lateral ports 34′ beneath the head. A sleeve or collar 36 is arranged on the tube 33′ and it has a seat 36′ at its upper end for the head 37. Links 38 are pivotally connected to the sleeve 36 and to a fixed point, preferably an arm 39, on the casing within the tank. When the nozzle end of the filling tube is swung downward the inner end will be swung upward and the air valve will be unseated to establish communication between the tank and the bottle.

A liquid valve is arranged at the inner end of the filling tube and this valve is shown in the form of a skeleton sleeve 40 (Fig. 6) provided in its lower end with a valve disk 41 to engage the inner end of the filling tube and normally held seated by a spring 42 inclosed within the sleeve and operating between the upper end of the sleeve and a collar 43 at the inner end of the filling tube. The spring normally holds the valve seated against the inner end of the filling tube but when the parts are swung at the rock plug the upper end of the sleeve 40 will engage the bifurcated end 39′ of the arm 30 and the valve will be unseated to permit the liquid in the tank to flow through the filling tube into the bottle.

The bottle is clamped against the sealing head by engagement with a pair of curved clamping arms 44, 45, (Figs. 8–10) which are pivotally supported on the tank below the casing 18. In the construction shown in the drawings one of the arms 44 is bored and also provided with a laterally extending sleeve 46 to receive a shaft 47 and the other arm, 45, is mounted on the sleeve 46. An ear 48 on the tank is bored to receive the sleeve 46 and the arms are located on opposite sides of this ear and are connected by a spring 49 attached to lugs 49′ on the arms (Fig. 10). Thus the arms are capable of a pivotal movement and also a movement toward and from each other. Spring plates 50 (Fig. 8) are fastened to the tank and are engaged by the upper lugs 51 and the lower lugs 52 on the arms. The lug 51 engages the

spring plate adjacent to its fast end 50′ and limits the upward movement of the clamping arm. The lug 52 engages the spring plate near its lower free end and yieldingly retards the tendency of the clamping arm to swing downward under the pressure of the bottle, as hereafter described. A stop 53 on one arm, as 44, limits the downward or inward swinging movement of the bottle and the filling tube to filling position.

The construction and arrangement of parts hereinbefore described is one which I have found well adapted for embodying my invention in a machine for filling beer and the operation thereof is as follows: The lid having been secured on the tank and the liquid pipe and the air pipe being connected to the source of supply the required pressure is first established in the tank and then the beer is forced into the tank against the pressure therein. A bottle 54, shown in broken lines in Fig. 3, is pushed up on the filling tube against the sealing head and rested against the rest 28. The outer ends 44′, 45′, of the clamping arms (Fig. 9) are flared or turned outwardly to permit the bottle to be engaged with the sealing head as just described. Then downward pressure is applied on the bottle to swing the filling tube and the parts connected therewith at the rock plug. This movement will rock the plug and swing the bottle downward and toward the pedestal and the shoulder 54′ on the bottle will engage the upper faces 44″, 45″ of the clamping arms which are curved eccentrically from the rock plug as a center to form cams on which the shoulder travels to force the mouth of the bottle tightly against the seat 26′ in the sealing head. As the bottle begins its downward movement and is fairly seated the air valve is opened to permit an equalization of pressure in the bottle and the tank before the filling valve is opened; and by the time the bottle has reached filling position against the stop 53 the filling valve is opened to permit the beer to flow into the bottle. The tank is then swung on the pedestal and a bottle applied to the next filling tube and so on until the first bottle comes around to the operator. By this time the first bottle is filled and the operator removes it from the machine and replaces it with an empty bottle in the manner heretofore described. The pressure applied on the bottle to move it downward is directed against the rest 28 and in swinging the bottle upward the operator grasps the bottle and the rest or the supporting arm 27 so that there is no liability of breaking the bottle at the neck. The spring 49 permits the clamping arms to yield laterally during the swinging movement of the bottle and enables these arms to automatically adjust themselves to inequalities in the bottles. The spring plate 50, as previously described, yieldingly limits the downward swinging movement of the clamping arms and also enables said arms to automatically adjust themselves to inequalities in the bottles. When the bottle has been filled and is swung upward to removal position the beer valve and the air valve are automatically closed.

In the construction shown in Figs. 1–10 the air passage is formed partly by bores and grooves in the filling tube and I have found this to be a very satisfactory method of construction, particularly for the reason that it makes the tube stronger just in front of the rock plug where the greatest strain occurs. This construction also has other advantages from a manufacturing standpoint which it is not necessary to refer to in more detail. In Figs. 11 and 12 I have shown another construction in which an air tube 55 projects through the rock plug 56 and carries on its outer end a sealing head 57 and on its inner end a valve member 58. The air tube has a collar 59 rigid therewith to engage the front of the plug and the end 58′ of the member 58 is clamped against the rear of the plug when said member is screwed on to the air tube 55. The filling tube 60 is supported in the rear end 61 of the member 58, the latter forming a continuation of the air tube 55. In this construction the air passage is located between the tubes 55 and 60, these tubes being independent of each other and bent in a similar manner to fit one within the other with sufficient space therebetween to permit the passage of air in the desired manner. In this construction the air passage extends from the sealing head alongside of the liquid passage, but separate therefrom, to the air valve within the tank just the same as shown in the construction of Fig. 3 but with the difference, as heretofore mentioned, that it is formed by the space between two tubes one arranged within the other instead of by boring and grooving a single tube, as shown in Fig. 3. These two constructions are, it is believed, the substantial equivalent one for the other but from a practical standpoint the construction shown in Fig. 3 is to be preferred. In other respects than those specifically described the construction of Figs. 11 and 12 is substantially the same as that of Fig. 3.

In Figs. 13 and 14 I have shown an air valve of a somewhat different construction from that shown in the other figures of the drawings. Referring to these figures, the branch air tube 62 is provided with a valve casing 63 having an enlarged port 63′. A valve plug 64 is arranged in the casing 63 and it has a transverse port 65 which is enlarged at one end 65′. An arm 66 is fastened to the valve plug and is connected by a link 67 to a fixed part 68 on the valve casing 18. It will be readily understood that when the filling tube is swung downward, as heretofore,

described, the link 67, pulling on arm 66, will turn the valve plug until the port 65 registers with the air passage 62′ to establish communication between the link and the bottle, and that when the filling tube is moved upward to normal position, the valve plug will be turned backward to close the port 65, as shown in Fig. 14. The enlargement 65′ of the port 65 is provided so that the air valve will open communication between the tank and bottle before the liquid valve is opened. This valve can be used with the construction shown in Fig. 3 or with that shown in Fig. 11.

The invention is simple in construction and provides a hand machine for filling liquids which can be easily operated and at considerable speed. The machine is particularly adapted for filling liquids charged with gas, such as beer, and it maintains a pressure on the beer in the tank to prevent the escape of gas from the beer and provides for equalizing the pressure in the bottle and the tank before the beer begins to flow. The filling tube and the parts connected therewith are all supported in the rock plug in the casing 18 and they can be easily removed for cleansing or repair and replaced.

What I claim and desire to secure by Letters Patent is:

1. In a bottle filling machine, the combination of a closed tank, air and liquid connections to the tank, a casing in the side of the tank, a rotatably movable plug arranged to rock in said casing, a filling tube mounted in said plug to swing in the side of the tank, said tube being provided with longitudinally extending bores for the passage of gas therethrough, said bores communicating with the interior of the tank above the level of the liquid therein, a valve for controlling the passage of gas through said bores, and means for operating said valve to permit the equalization of pressure in the tank and in the bottle to be filled before the flow of the liquid thereinto commences.

2. In a bottle filling machine, the combination of a closed tank, air and liquid connections to the tank, a casing in the side of the tank, a rotatably movable plug arranged to rock in said casing, a filling tube mounted in said plug, a sealing head on said filling tube, an air passage extending from the sealing head through the plug into the tank, an air valve member mounted on the filling tube within the tank and having a passage forming a continuation of said air passage, a rotatable air valve on said member, and a connection between said air valve and a fixed part within the tank for opening said valve when the filling tube is swung.

3. In a bottle filling machine, the combination of a closed tank, air and liquid connections to the tank, a rotatably movable plug mounted to rock in the casing, a filling tube mounted in said plug, a sealing head on said filling tube, an air passage extending from the sealing head through the filling tube alongside of the liquid passage therein into the tank, an air valve member supported on the filling tube within the tank and having an air passage forming a continuation of the air passage in the filling tube, and an automatically operated valve located in said air passage above the normal level of the liquid in the tank.

4. In a bottle filling machine, the combination of a closed tank, air and liquid connections to the tank, a casing in the side of the tank, a rotatably movable plug arranged to rock in the casing, a filling tube mounted in said plug, a sealing head on said filling tube, a shoulder on the filling tube to engage the front of the plug, an air valve member on the filling tube within the tank, a nut screw-threaded on said filling tube to pull said shoulder and force said member against the plug, an air passage extending from the sealing head into the tank, an air valve for said passage, and a liquid valve for said filling tube.

5. In a bottle filling machine, the combination of a closed tank, air and liquid connections to the tank, a casing in the side of the tank, a rotatably movable plug arranged to rock in said casing, a filling tube mounted in said plug, a sealing head on said filling tube, an air valve member mounted on the filling tube within the tank and provided with a valved air passage, said filling tube having a bore extending from the sealing head to the plug, and a groove extending from said bore to the passage in said member to form a continuous air passage.

6. In a bottle filling machine, the combination of a closed tank, a liquid connection to the tank, a casing in the side of the tank, a rotatably movable plug arranged to rock in said casing, a filling tube supported in said plug, a valve disk within the tank at the inner end of said filling tube, a spring-pressed sleeve carrying said valve disk, and a fixed part within the tank above the sleeve adapted to be engaged by said sleeve to move the same and open the valve as the filling tube is swung.

7. In a bottle filling machine, the combination of a closed tank, air and liquid connections to the tank, a casing in the side of the tank, a rotatably movable plug arranged to rock in said casing, a filling tube supported in said plug, a sealing head on said filling tube, an air valve member on said filling tube within the tank and having an air passage therein, an air passage from the sealing head to the air passage in said member and both forming one continuous passage, an air valve on said member, a connection between said valve and a fixed part within the tank above the sleeve to open

the valve when the filling tube begins its movement to filling position, a valve disk within the tank at the inner end of the filling tube, and a spring-pressed skeleton sleeve carrying said valve disk and adapted to engage said fixed part within the tank when the filling tube is swung to filling position to unseat said valve disk.

8. In a bottle filling machine, the combination of a closed tank, air and liquid connections to the tank, and a filling mechanism in the side of the tank, said mechanism comprising a rotatably movable plug arranged to rock in the casing, a siphon filling tube supported in said plug and extending transversely therethrough, a sealing head on the filling tube, there being an air passage extending from the sealing head into the tank, a liquid valve at the inner end of the filling tube adapted to be opened as the bottle is moved to filling position, an air valve within the tank at the inner end of the air passage, and means connected with the tank and said air valve for opening said air valve before the liquid valve is opened.

9. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, and a pair of clamping arms having cam surfaces adapted to be engaged by a shoulder on the bottle to clamp the mouth of the bottle against the sealing head as the bottle is swung to filling position.

10. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, a pair of arms pivotally mounted on the tank and having cam surfaces to engage a shoulder on the bottle and clamp the mouth of the bottle against the sealing head as the bottle is swung to filling position, and yielding means for controlling the pivotal movement of said arms.

11. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, and clamping arms mounted on the tank and adapted to be engaged by a shoulder on the bottle, the faces of the clamping arms which engage said shoulder being curved eccentrically from the pivotal point of the filling tube as a center to force the mouth of the bottle tightly against the sealing head as the bottle is swung to filling position.

12. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, and means for clamping the bottle against said sealing head, said means comprising a pair of yieldingly supported clamping arms having cam surfaces to be engaged by a shoulder on the bottle as the bottle is swung to filling position.

13. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, and means for clamping the bottle against said sealing head, said means comprising a pair of yieldingly connected clamping arms having cam surfaces to be engaged by a shoulder on the bottle as the bottle is swung to filling position.

14. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, and means for clamping the bottle against said sealing head, said means comprising a pair of clamping arms yieldingly supported on the tank and yieldingly connected and having cam surfaces to be engaged by a shoulder on the bottle as the bottle is swung to filling position.

15. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, means for clamping the bottle against said sealing head, said means comprising a pair of clamping arms pivotally supported on the tank and having cam surfaces adapted to engage a shoulder on the bottle as the bottle is swung to filling position, and means for yieldingly limiting the swinging movement of said clamping arms.

16. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, and means for clamping the bottle against said sealing head, said means comprising a pair of laterally movable clamping arms pivotally mounted on the tank and having cam surfaces adapted to be engaged by a shoulder on the bottle as the bottle is swung to filling position.

17. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, means for clamping the bottle against said sealing head, said means comprising a pair of clamping arms pivotally mounted on the tank independently of each other and having cam surfaces adapted to be engaged by a shoulder on the bottle as the bottle is swung to filling position, and a spring connecting said clamping arms.

18. In a bottle filling machine, the combination of a liquid tank, a liquid connection to the tank, a filling tube mounted to swing in the side of the tank, a sealing head on said filling tube, means for clamping the

bottle against said sealing head, said means comprising a pair of clamping arms pivotally mounted on the tank and yieldingly connected and having cam surfaces adapted to be engaged by a shoulder on the bottle as the bottle is moved to filling position, and yielding means for limiting the swinging movement of said clamping arms.

19. In a bottle filling machine, the combination of a hollow pedestal, a liquid tank revolubly mounted on the pedestal, a liquid supply pipe in the pedestal and projecting into the tank through the bottom thereof, means on the upper end of said supply pipe for holding said pipe in the tank, a shoulder on the pipe, and a spring on the liquid pipe arranged to operate between said shoulder and a fixed part of the pedestal to exert a constant downward pull on the pipe.

FRANK C. H. STRASBURGER.

Witnesses:
PAUL L. SCHMECHEL,
M. A. KIDDIE.