

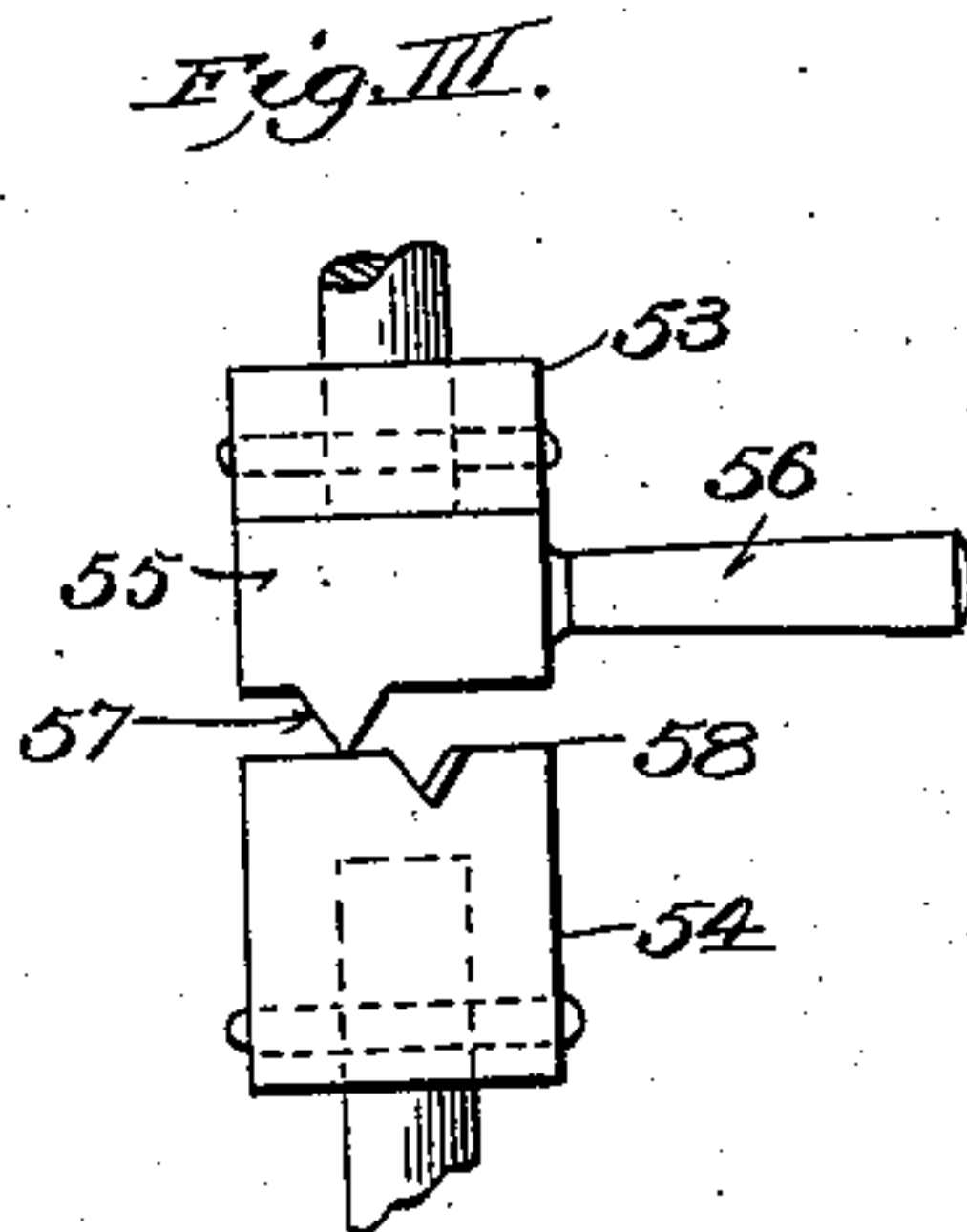
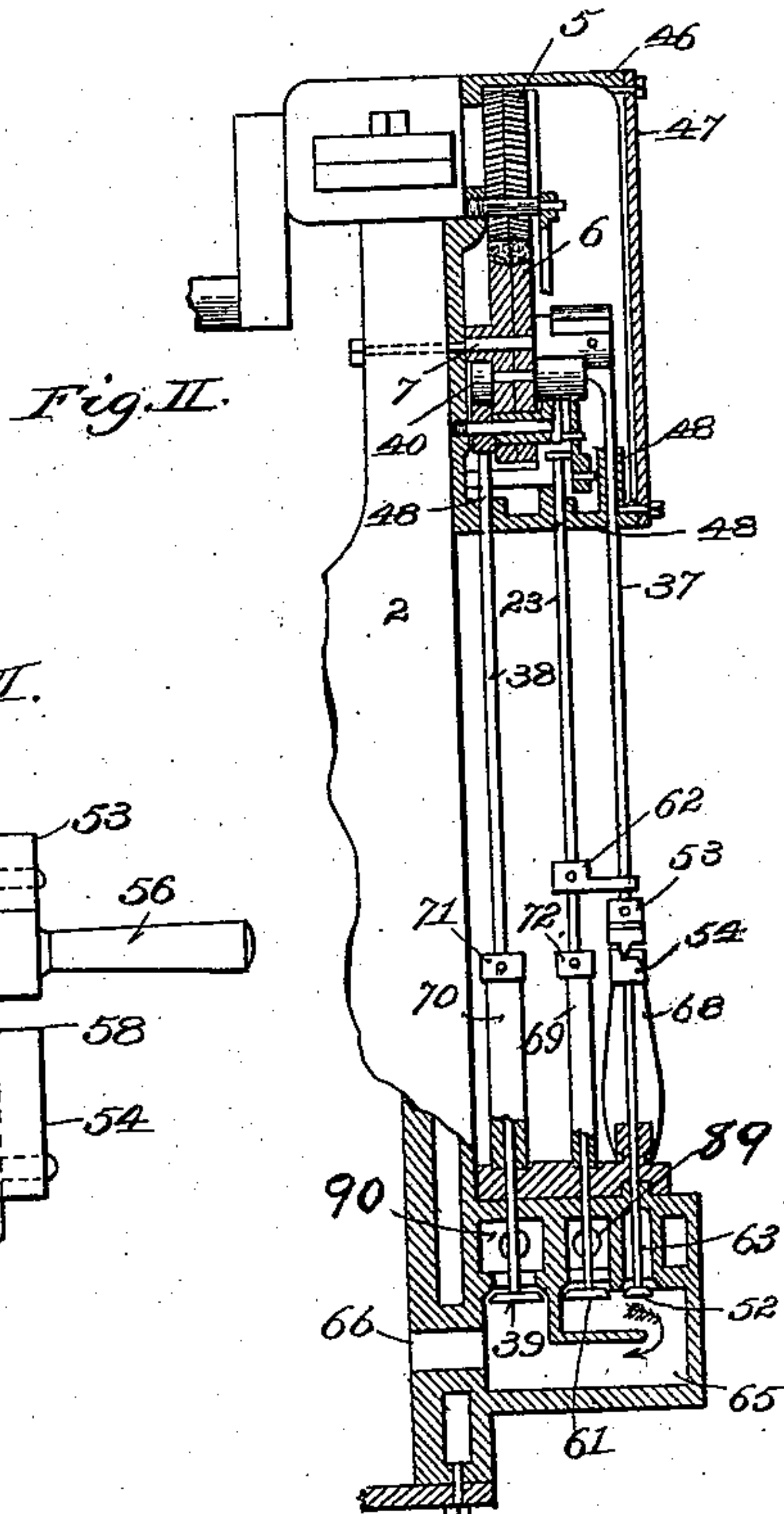
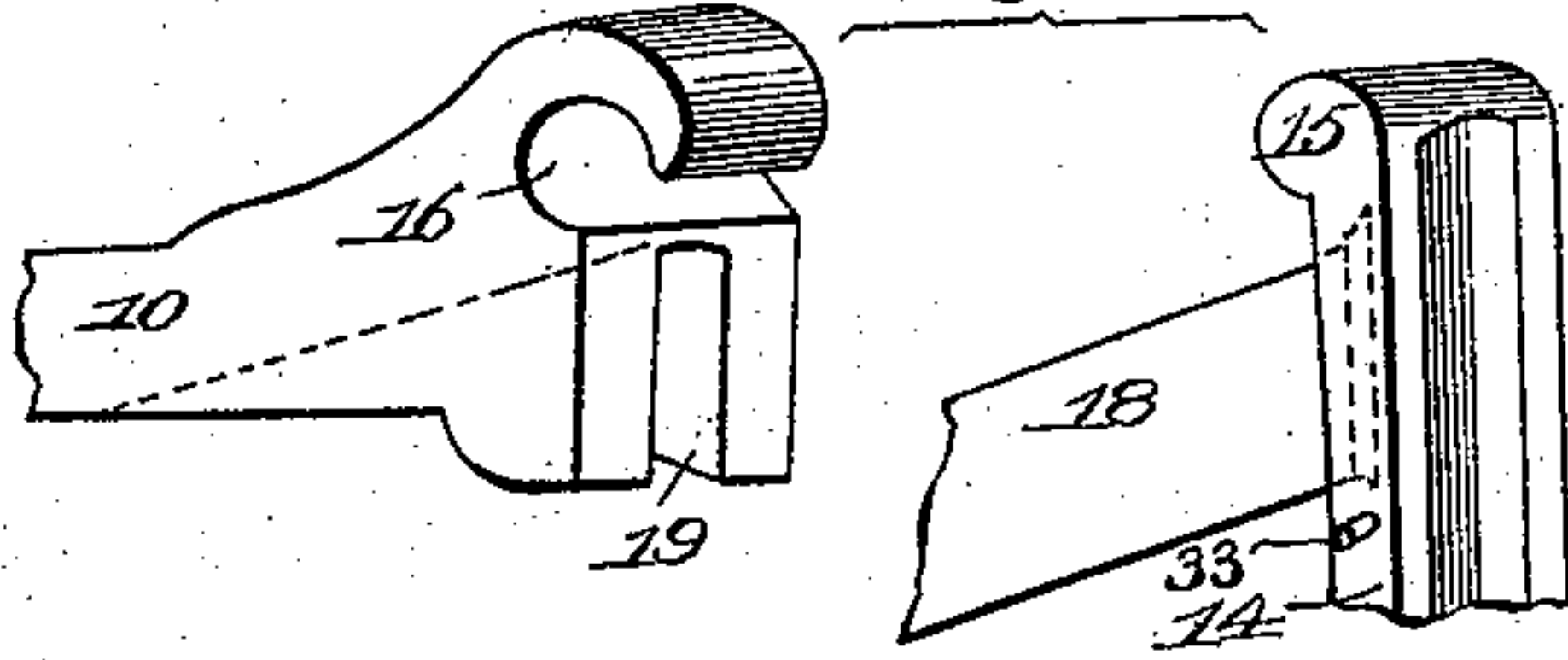
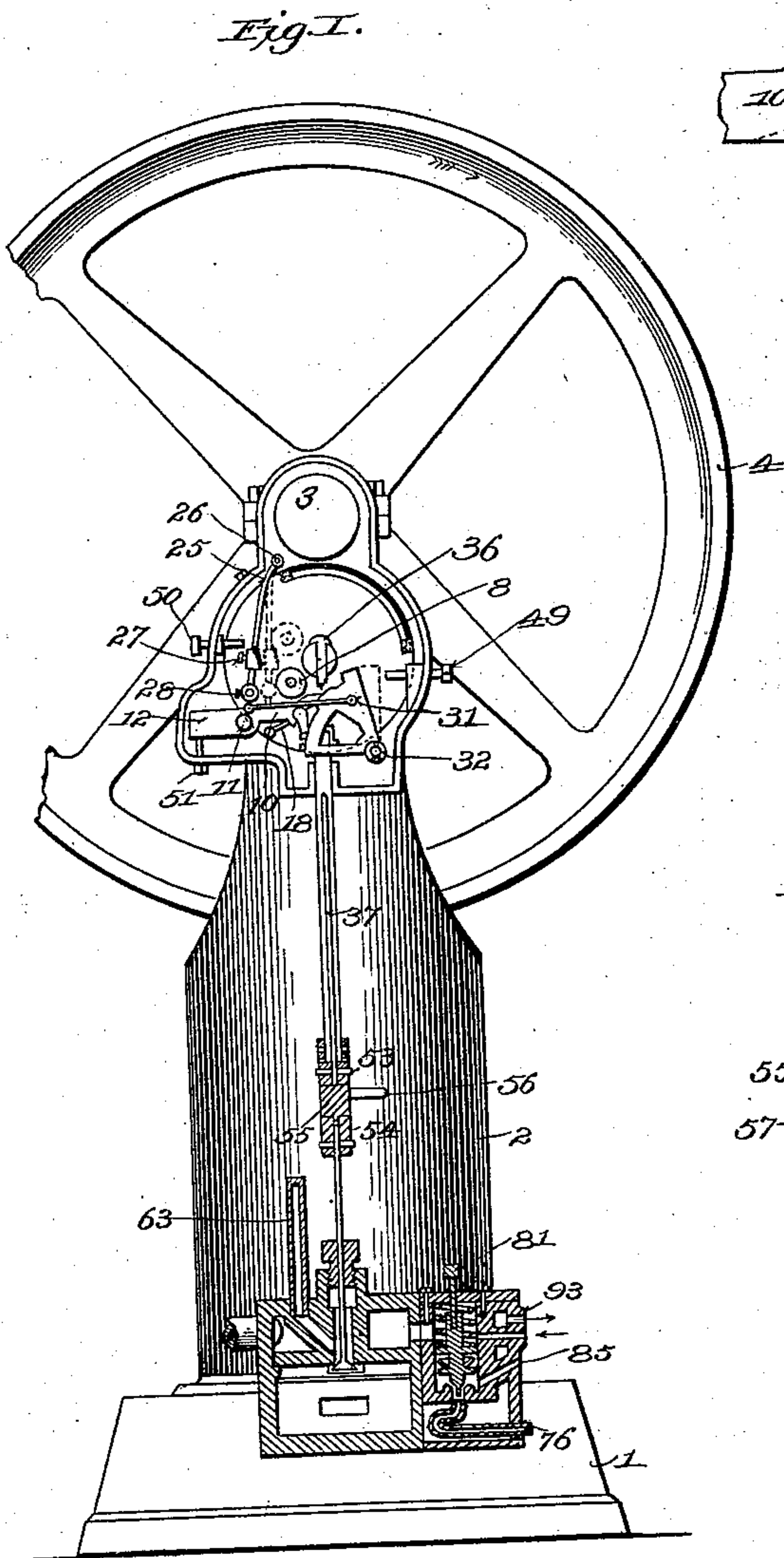
(No Model.)

2 Sheets—Sheet 1.

G. J. WEBER.
GAS ENGINE.

Patented Feb. 19, 1895.

No. 534,354.



Witnesses:

Harry D. Rohrer.
Walter E. Allen.

Inventor

G. J. Weber.

By

Knight Bros
Atty.

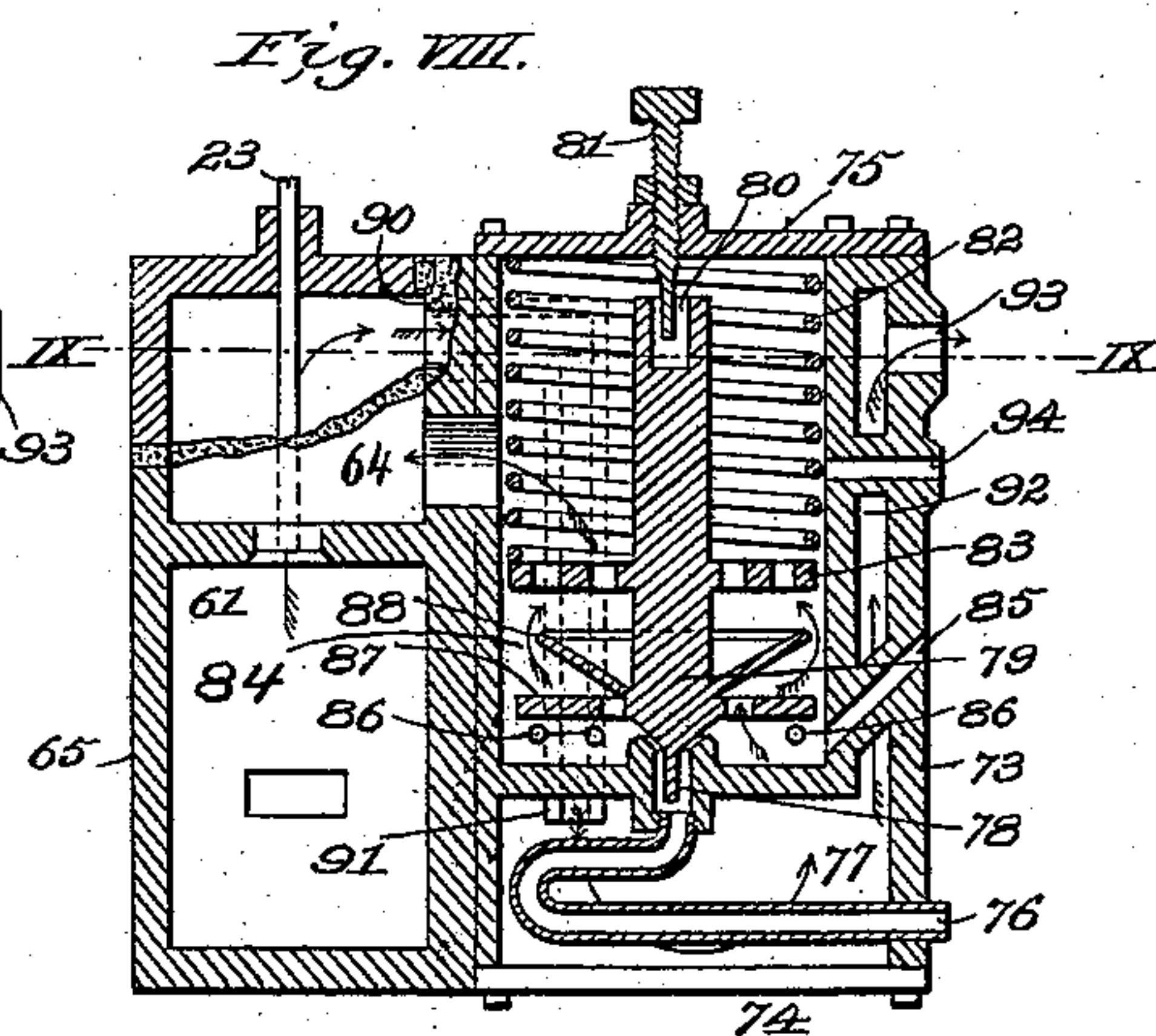
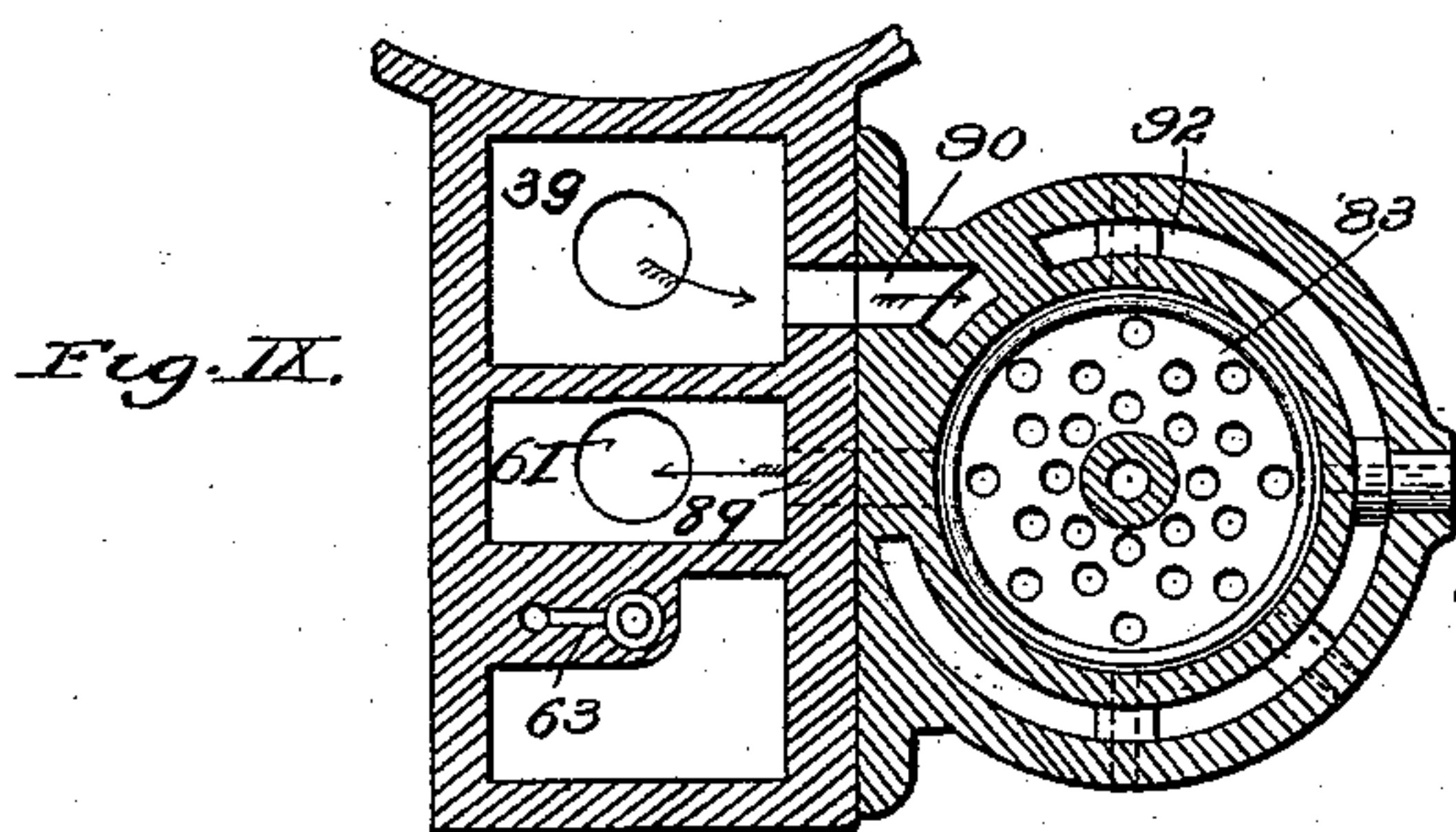
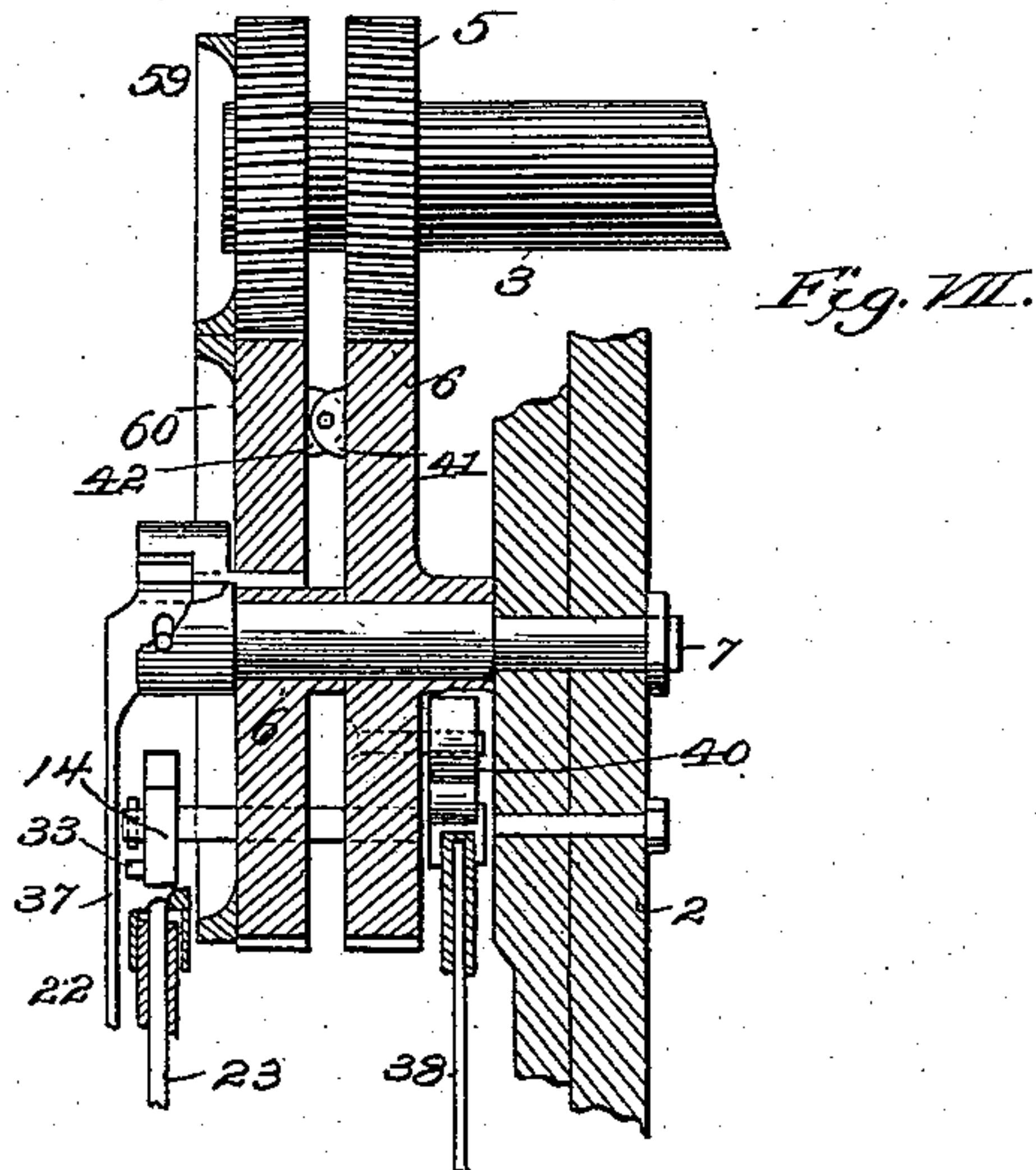
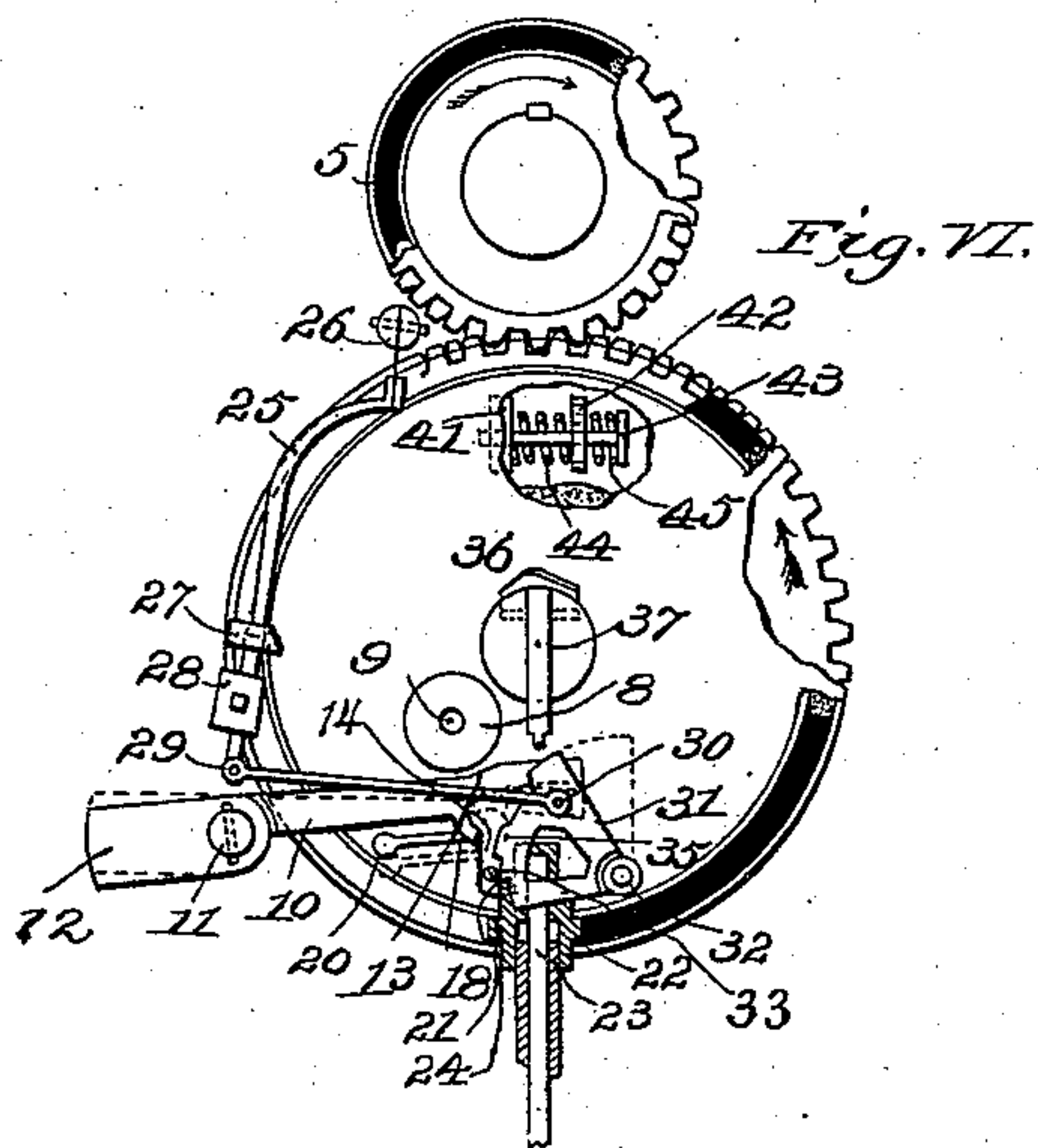
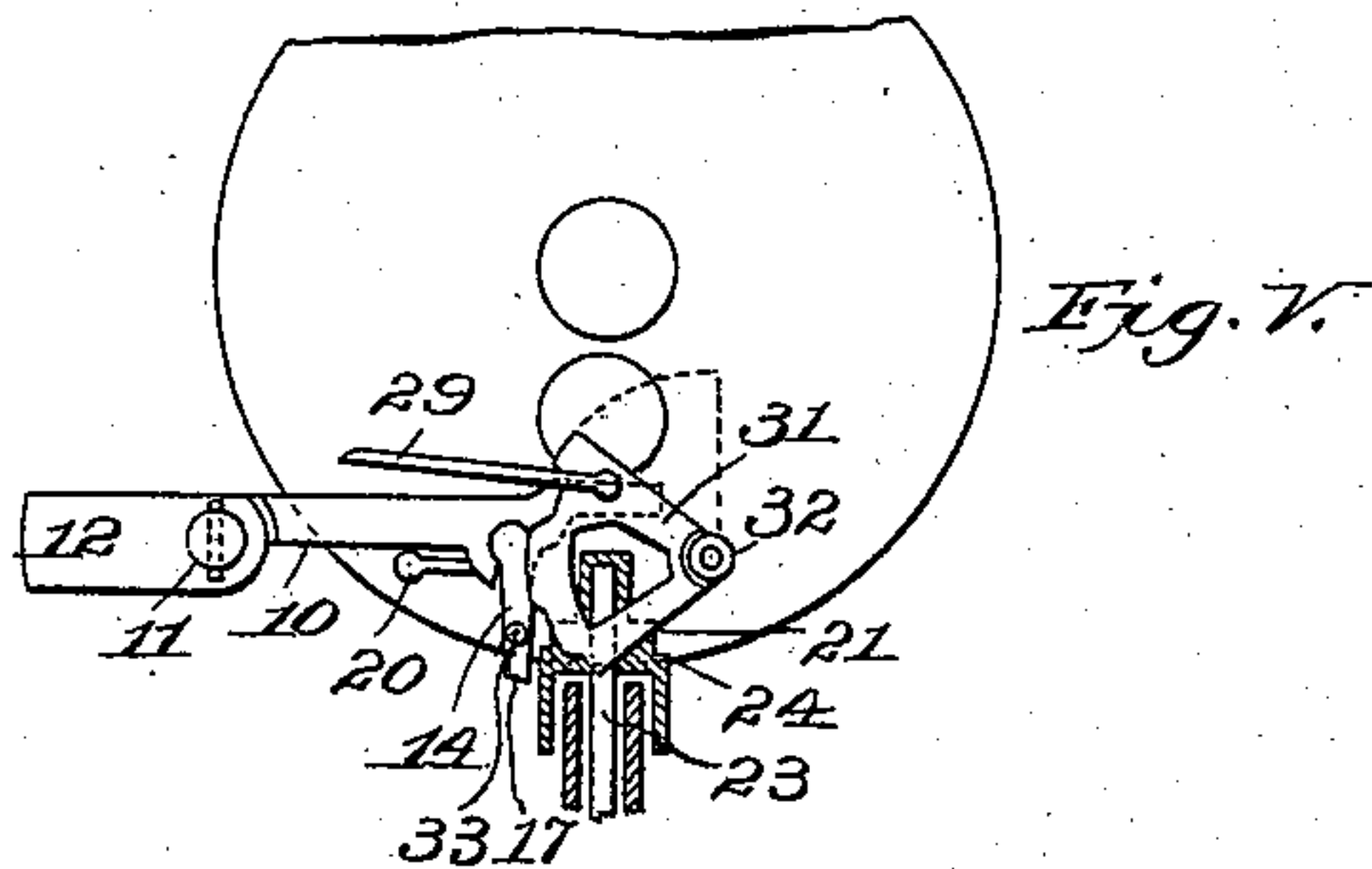
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UNITED STATES PATENT OFFICE.

GEORGE J. WEBER, OF KANSAS CITY, MISSOURI.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 534,354, dated February 19, 1895.

Application filed January 15, 1894. Serial No. 496,940. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. WEBER, of Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Gas-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain new and useful improvements in gas engines and my invention consists in features of novelty hereinafter described and pointed out in the claims.

Figure I represents a side elevation of my improved gas engine. Fig. II represents a vertical section of a portion of my device, showing the valve rods and means for operating the same. Fig. III represents an enlarged detail view of my improvement for adjusting the length of the ignition rod. Fig. IV is an enlarged detail perspective view of the lever and pawl for operating the gas supply valve. Fig. V is an enlarged detail section of a device for operating the gas supply valve. Fig. VI is an enlarged detail view of the valve operating device and showing my improved governor in connection therewith. Fig. VII represents an enlarged detail vertical section of the valve operating device. Fig. VIII is an enlarged vertical section of the carburetor. Fig. IX is a transverse section taken on line IX, IX, Fig. VIII.

Referring to the drawings: 1 represents the base of my engine, and 2 the frame to which the various portions of the device are connected.

3 represents the main drive-shaft, and 4 the balance wheel mounted on the same. On one end of the drive-shaft is located a double staggered pinion 5, with its teeth extending at a different angle from that of the drive-shaft. The pinion 5, meshes into a gear-wheel 6, having its teeth, of course, constructed on the same principle as the teeth of the pinion 5; said gear-wheel also being double, similar to the pinion. The gear 6, is journaled at 7, to the frame 2. (See Figs. II, and VII.)

8 represents a roller journaled at 9, on the outer face of the gear-wheel 6, said roller revolving with said gear-wheel, and permitted

to revolve on its pinion 9. As the fly-wheel 4, travels in the direction shown by the arrow in Fig. I, the pinion 5, will be driven in the same direction, or in the direction shown by the arrow in Fig. VI which will cause the gear 6, to rotate in the direction shown by the arrow in Fig. VI. As the gear is thus rotated, the roller 8, traveling around with the same, comes in contact with the lever 10, pivoted at 11, to the frame 2, and having a weighted end 12. As the roller 8, strikes the lever 10, the inner end thereof is depressed, as shown in the dotted lines in Fig. VI; and as said lever is depressed, it forces down the rod attached to the gas admission valve and permits the gas to enter into the cylinder. The lever 10 is provided with a beveled shoulder 13, against which the roller 8 bears and gradually presses down said lever.

14 represents a pawl which is pivoted to the lever 10 by a head 15, (see Fig. IV) which passes into an opening 16 in said lever (see Fig. V), the pawl having a lower beveled end 17, and an arm 18, which fits into a slot in the lever 10, said arm having at its outer end a weight 20, for holding the pawl when in its normal position, into engagement with the gas operating valve rod. The lower beveled end of the pawl 14, engages, when in its normal position, a shoulder 21 on a thimble 22, which is attached to the upper end of the rod 23 to which the gas valve is secured.

24 represents an additional shoulder on said thimble with which the pawl 14, at times engages.

25 represents a pendulum, which may be pivoted at 26, to the frame 2, said pendulum having an adjustable beveled sliding block 27, located thereon, and also having an adjustable weight 28 located thereon. The lower end of the pendulum 25 is pivoted to one end of a rod 29, the other end of said rod being pivoted at 30 to a quadrant shaped wiper 31, said wiper being pivoted at 32 to the frame. As the roller 8 travels around with the gear 6 in order to depress the gas admitting valve rod, said roller will come in contact with the beveled block 27 on the pendulum 25, and throw the same outward to a certain degree, which is regulated by the momentum of said roller. As the pendulum 25

is thrown outward, the wiper 31 is drawn into engagement with the pin 33 on the pawl 14; and if the momentum is sufficiently strong the wiper 31 will be drawn against the pin 33 with sufficient force to throw the pawl out of engagement with the upper shoulder 21, on the thimble 22 thus not admitting so great a charge of gas into the cylinder, and the pawl will be allowed to press against the lower projection 24 on the thimble 22, thus opening the gas supply valve to a lesser degree, and admitting a smaller charge of gas. Should the velocity of the engine be sufficient to not require a new charge of gas on every revolution of the roller 8, the pendulum 25 will be struck with sufficient force to draw the wiper 31, down sufficiently far so that an enlargement 35 thereon, will come into engagement with the pin 33 and throw the pawl entirely out of engagement with the thimble 22, thus not opening the gas valve and not admitting any more gas until the velocity has been sufficiently decreased and a further charge of gas is demanded for the operation of the engine. As the roller 8 performs its circuit it comes in contact with a beveled head 36 located on the upper end of a rod 37 to which the valve which controls the ignition tube is secured.

38 represents a rod to the lower end of which is secured a valve 39, which controls the exhaust port of the engine, said rod and valve being operated by a roller 40 on the inner face of the gear-wheel 6, said roller operating a lever constructed similar to the lever 10 which operates the gas valve.

41, 42 represent lugs on the gear 6, one on each gear, through which passes a pin 43, on which pin are located coil springs 44, 45; the object of said springs being to prevent backlash in said gears.

46 represents a casing surrounding the gear, having a removable face 47 which may be removed in order to inspect the gear. This casing may be partially filled with oil, so that as the gears are operated the oil will be thrown up and over said gears and the other operating devices, and the latter thus be thoroughly lubricated at all times.

Where the ignition rod, gas supply valve rod, and exhaust valve rod pass into the lower portion of the casing, I have shown tubes 48, extending upward in said casing for the purpose of preventing the oil from passing out around said rods, the thimble 22 upon the rod 23 telescoping with the tube in which said rod operates serving also for this purpose.

49 represents a set screw for limiting the backward movement of the wiper 31.

50 represents a set screw for limiting the forward movement of the pendulum 25; and 51 represents a set screw for limiting the downward movement of the weighted end of the lever 10. The rod 37, to which the valve 52 which controls the ignition tube is secured is made in two parts, said parts being secured

to collars 53, 54, between which is a movable collar 55, having a handle 56, and a projection 57, on the lower side of the collar with a V-shaped space 58, in the collar 54, into which said projection may pass when it is desired to shorten the rod 37, thus not opening the valve 52, and allowing the gas to be fired as quickly as it would be otherwise, which is necessary at times when starting the engine. When it is desired to lengthen said rod in order to fire the charge of gas more quickly, the collar 55, is turned by the handle 56, the projection 57, being forced out of the V-shaped opening 58, up onto the lower collar 54, thus lengthening the rod, as shown in Fig. III.

59, 60, represent smooth faced disks, located on the pinion 5, and gear 6, which bear against each other and thus relieve the strain to some extent on said gears and their journals, as they are sometimes subject to greater strain than at other times while the engine is in operation, said disks also lessening the noise of the gear.

61 represents the gas supply valve, located on the lower end of the rod 23, said rod having an arm 62 adjustably secured thereon which may be set so as to come in contact with the collar 53, on the ignition rod 37, so that as a supply of gas is being taken into the cylinder, said arm will depress said rod 37, thus opening the valve controlling the ignition tube and allow any burned products of combustion contained therein to pass out.

63 represents the ignition tube; 89, the port through which the gas enters, which then passes to the valve 61 into the chamber 65, and from thence through a port 66, into the cylinder, where it is fired.

90 represents the port through which the exhaust is discharged past the exhaust valve 39, when the same has been opened by its operating device.

68 represents flat springs on the ignition rod 37, 69 flat springs on the gas supply rod 23, and 70 flat springs on the exhaust valve rod 38, said springs being fixed at their lower ends and having their upper ends secured to adjustable collars 54, 72, and 71, by which the springs may be adjusted, in order to hold the respective valves situated on the lower end of said rods in a closed position while in their normal condition.

73 represents the frame of the carburetor which is attached to the walls of the chamber 65, said carburetor having a removable bottom 74, and a removable top 75, by which access may be had thereto.

76 represents a tube through which the gasoline or coal-oil is admitted.

77 represents a chamber in which the tube is located, said tube discharging into an opening 78, controlled by a valve 79, the stem of said valve having an opening 80 at its upper end into which the set-screw 81 extends, said set-screw forming a guide and limiting the upward movement of said valve. The valve

79, is held closed by a coil spring 82 surrounding the stem of said valve and pressing against the disk 83 thereon.

The gasoline or oil enters into the carburetor from the tube 76, through the opening 78, into a chamber 84 where it is carbureted by mixing with the air which passes in through an opening 85, in the wall of the carburetor and through the holes 86 in the same, the gas then passing through openings in a disk 87, located on the lower end of the valve 79, said gas then being deflected by the funnel shaped portion 88 and then passing through openings in the disk 83, thence through a port 89 and then into the cylinder through the gas valve 61, where it is fired. Said valve 79 is lifted by the pressure of the air coming in through the openings 85 and the holes 86 in the wall of the carburetor, in its effort to enter and fill the vacuum formed in the main cylinder at the beginning of the out stroke of the piston, and remains open until the out stroke is nearly completed or until the gas valve 61 is closed. The products of combustion pass out from the cylinder at the proper time, past an exhaust valve 39, through a port 90 into a tube 91, located in the carburetor, said exhaust passing around the supply tube 76, and heating the same in its outward passage, thence up through a space 92, in the wall of the carburetor, and thence out through a port 93 to be conveyed to any desired point.

94 represents a port leading direct into the body of the carburetor, through which air may be admitted at times when the gas contained therein is too dense and requires more air to be thoroughly carbureted.

I have described my device in connection with the vertical engine, but by making certain mechanical changes the same may be used with a horizontal engine.

I claim as my invention—

1. In a gas engine, the combination of the frame 2, a valve operating rod, with a weighted lever pivoted to said frame, suitable gearing supported by said frame, a pawl, a rocking head 15 on the pawl, a rocking bearing 16 on the lever providing a rocking engagement with the pawl, said pawl engaging when in its normal position with the valve operating rod, a roller on said gearing, a beveled shoulder on said lever with which said roller comes in contact for depressing said lever, and thus operating the valves of said engine; substantially as described and for the purpose set forth.

2. In a gas engine, the combination of a suitable frame, a lever pivoted to the same, suitable gearing on said engine, a pawl on said lever a weighted arm on said pawl, a beveled end on said pawl, a gas supply valve having a suitable rod attached thereto, a thimble on the upper end of said rod, and projections on said thimble with which the pawl engages, being normally held in engagement therewith by said weighted end and means for de-

pressing the lever and the pawl, in order to open the valve; substantially as set forth.

3. In a gas engine, the combination of a suitable frame, a lever pivoted to said frame, a pawl on said lever, having a weight in connection therewith, a gas valve, a rod attached to said valve, a thimble on the upper end of said rod, having suitable projections with which said pawl on the lever engages and held in engagement while in its normal position by said weight, and a roller on the gearing of said engine, and a beveled shoulder on said lever with which said roller comes in contact for depressing the said lever, substantially as described.

4. In a gas engine, the combination of a suitable frame, a lever pivoted thereto, said lever having a pawl pivoted thereon, a gas supply valve, a rod secured to said valve, a thimble on the upper end of said rod, having suitable projections thereon with which the pawl on the lever engages, and a roller journaled on the gearing of said engine for depressing said lever and thus operating the gas supply valve; substantially as described and for the purpose set forth.

5. In a gas engine, the combination of a suitable frame, a lever pivoted to the same, a pawl pivoted to said lever, a gas supply valve, a rod secured to said valve, a thimble on the upper end of said rod, suitable projections on said thimble, with which the pawl on said lever engages, and a wiper 31, for throwing the pawl out of engagement with the projections on said thimble, and thus preventing the opening of the gas valve; substantially as described.

6. In a gas engine, the combination of a suitable frame, a lever pivoted to the same, suitable gearing on said engine, means in connection with said gearing for depressing said lever, a pawl on said lever for engaging a gas supply valve rod, a wiper for disengaging said pawl, said wiper having suitable projections on its face, whereby when it is depressed to a greater or less degree, said pawl will be thrown out of engagement with the gas supply valve rod at a sooner or later time, according to the speed of the engine; substantially as set forth.

7. In a gas engine, the combination of a frame, a lever pivoted to the same, a pawl on said lever, a gas supply valve, a rod secured to said valve, a thimble on the upper end of said rod, suitable projections on said thimble, with which the pawl pivoted to said lever engages, a roller on the gearing of said engine for depressing said lever, a pendulum governor suitably supported by said frame, a wiper for throwing the pawl out of engagement with the projections on the thimble and a rod for connecting the said governor with the said wiper, said roller on the gearing coming in contact with said pendulum governor and causing the wiper to throw the pawl out of engagement with the thimble; substantially as described.

8. In a gas engine, the combination of a suitable frame, a lever pivoted to the same, a gas supply valve, a rod on said valve, a thimble on said rod, having suitable projections, a pawl pivoted to said lever engaging said projections, a roller on the gearing of said engine for depressing said lever, and pawl, a pendulum governor, a sliding beveled block on said governor, with which said roller comes in contact, a wiper for throwing the pawl out of engagement with said thimble, and a rod for connecting the governor with the said wiper; substantially as described and for the purpose set forth.

9. In a gas engine, the combination of a suitable frame, a lever 10, pivoted to the same, having a weighted end 12, and a beveled portion 13, suitable gearing on said engine a roller 8, journaled to said gearing, a pawl 14, pivoted to said lever, an arm 18 on the pawl, a weighted end 20 on said arm, a gas supply valve, a rod 23, attached to said valve, a thimble 22, on the upper end of said rod having projections 21, 24, with which said pawl 14 engages, a quadrant shaped wiper 31, having a projection 35, on its face, a pendulum governor rod 25, having an adjustable block 27, and an adjustable weight 28, and a rod 29 for connecting said pendulum with the wiper 31; substantially as described and for the purpose set forth.

10. In a gas engine, the combination of a suitable frame, gearing supported on the frame, a roller 8 journaled on the gearing, an ignition valve, a valve rod connected with said ignition valve, a beveled portion on the upper end of said rod, a gas supply valve, a valve rod connected with said valve, a weighted lever pivoted on the frame, bearing on the upper end of said rod, a beveled shoulder on said lever, said roller 8 engaging said beveled portion of said ignition valve rod, and the beveled shoulder of said lever and thus depressing and opening said valves; substantially as described.

11. In a gas engine, the combination of a main cylinder with a carburetor connected therewith, said carburetor consisting of a chamber 77 a mixing chamber 84 having openings for the admission of air thereto, and a valve as shown and described in the mixing chamber, said valve remaining open during the stroke of the piston for the admission of the material for combustion and spraying the same to be acted upon by the incoming air.

12. In a gas engine the combination with the casing 46 adapted to be partially filled with lubricating material, and a frame to which said casing is secured, of gearing mounted on the frame, a gas supply cylinder and a carburetor connected therewith, having suitable valves, valve rods connected with the valves, and means carried on the gearing for operating said valve rods, said gearing and said valve operating mechanism being all enclosed within said casing, said gearing dip-

ping into said lubricating material contained in the casing and in its revolution carrying the same up and distributing it over the parts to lubricate the same, substantially as shown and described.

13. In a gas engine, the combination of an ignition valve 52, rod 37, in connection therewith for depressing said valve, a spring for holding said valve in its closed position, said rod 37, being divided at a suitable point, collars 54, 53, on different portions of said rod, a collar 55, having a handle 56, and a projection 57, whereby, when said handle is rotated, the projection may ride up on the face of the collar 54 or may be so turned as to drop into a V-shaped opening 58, in said collar 54, in order either to lengthen or shorten said rod 37; substantially as set forth.

14. In a gas engine, the combination of a suitable cylinder, a carburetor having connection therewith, said carburetor having a pipe 76, for supplying gasoline or coal-oil to the same, air passages 85, 86, opening into the carburetor a valve as shown and described therein, and a port 89, through which the gas passes on its way to the cylinder; substantially as described and for the purpose set forth.

15. In a gas engine, the combination of a suitable cylinder, a carburetor in connection therewith, said carburetor having chambers 77, 84, a supply tube 76, a valve 79 as shown and described located in the chamber 84, a spring for holding said valve in its closed position, and means for adjusting the lift of said valve; substantially as set forth.

16. In a gas engine, the combination of a suitable cylinder, a carburetor having connection therewith, said carburetor having a supply tube 76, a valve 79, disks 83, 87, on said valve, having openings for the passage of gas, and a funnel-shaped projection 88, on said valve for deflecting the gas; substantially as described and for the purpose set forth.

17. In a gas engine, the combination of a suitable cylinder, a carburetor connected therewith, said carburetor having a supply tube 76, a suitable valve in the carburetor operated by the passage of air into the same, a tube 91, through which the products of combustion are discharged around the supply tube 76, openings 92, surrounding a shell of the carburetor, and a port 93 through which the products of combustion are discharged; substantially as set forth.

18. In a gas engine, the combination of a suitable frame, gearing supported on the frame, a roller journaled on the gearing, a pendulum governor pivoted on the frame, a block on the pendulum with which the roller on the gearing comes in contact to cause the pendulum to vibrate, and a wiper pivoted on the frame and a rod connecting the wiper with the pendulum whereby said wiper is operated by the vibrations of the pendulum caused by the contact of the roller on the gearing with

the block on the pendulum substantially as set forth.

19. In a gas engine the combination of suitable valves, rods secured to said valves for
5 operating the same, a casing inclosing the upper ends of said rods and in which oil may be placed, tubes surrounding the upper ends of said rods to prevent the oil from passing out

around said rods, and a thimble fitting over the upper end of one of said tubes and rods to prevent the passage of the oil between said tube and rod, substantially as set forth.

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Witnesses:

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