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PATENTED JAN. 24, 1905.

C. JACOBSON.

REGULATING MECHANISM FOR ENGINES.

APPLICATION FILED APR. 17, 1901. RENEWED JULY 15, 1904.

3 SHEETS—SHEET 1.

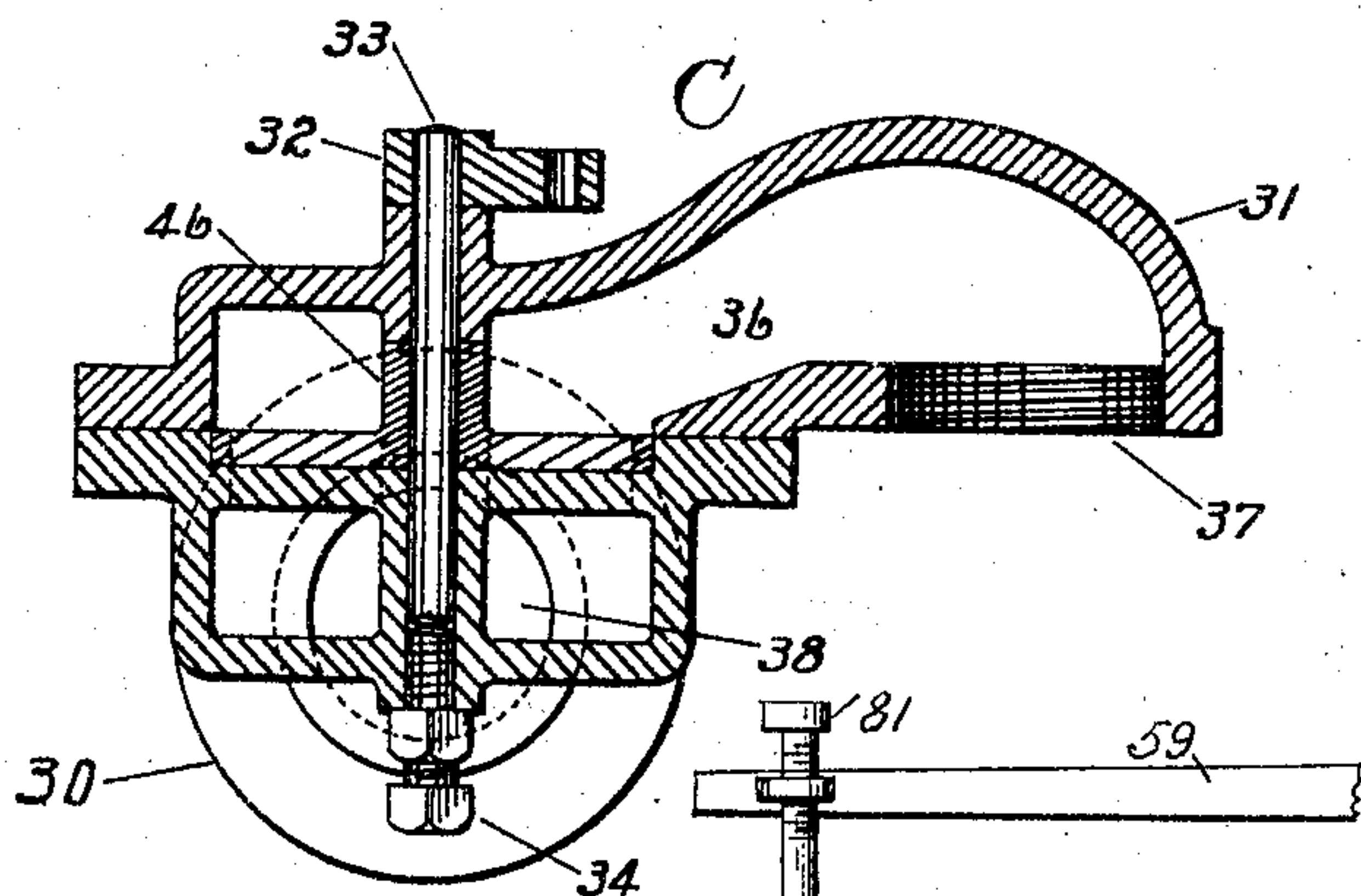


FIG. 3.

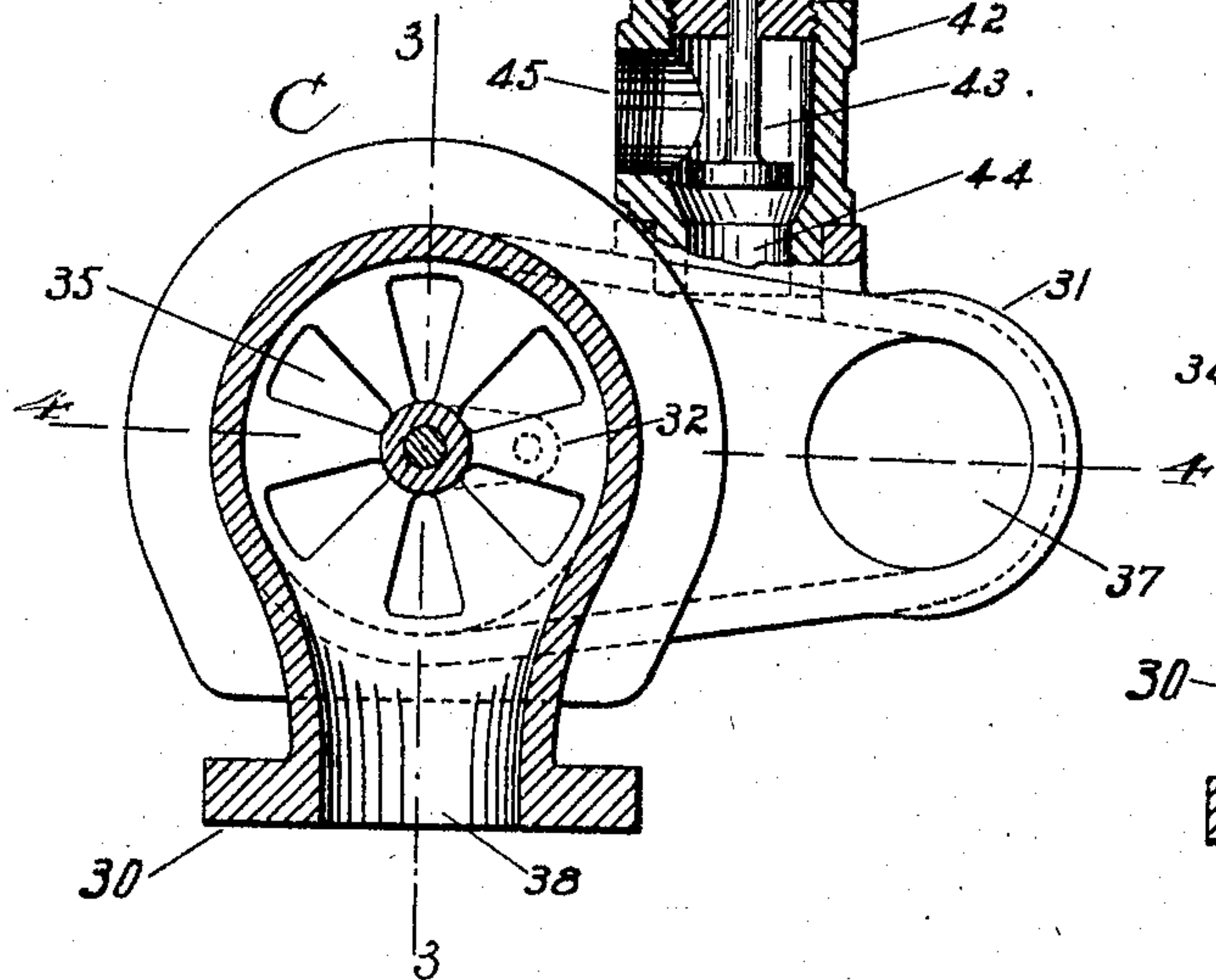


FIG. 1.

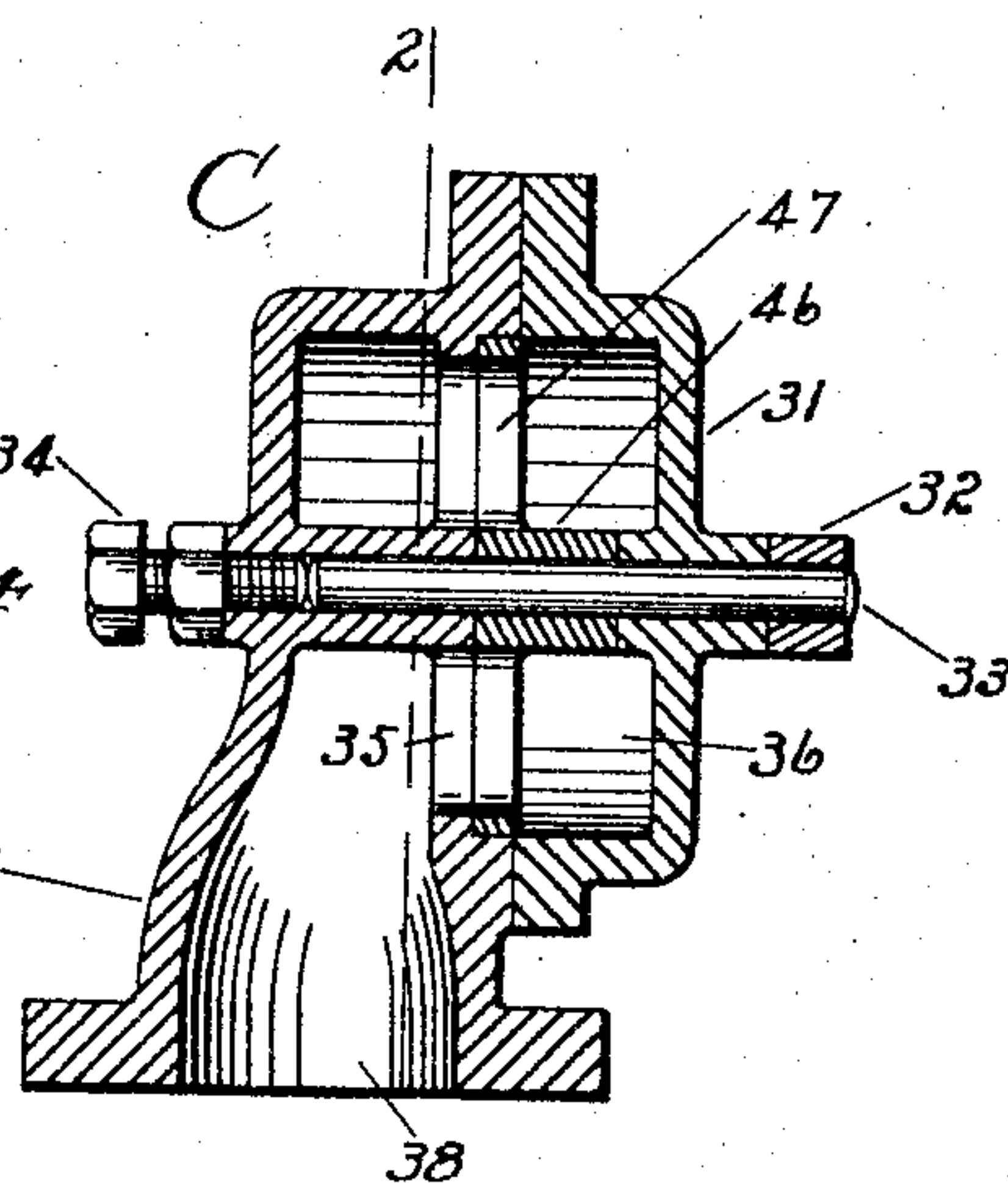


FIG. 2.

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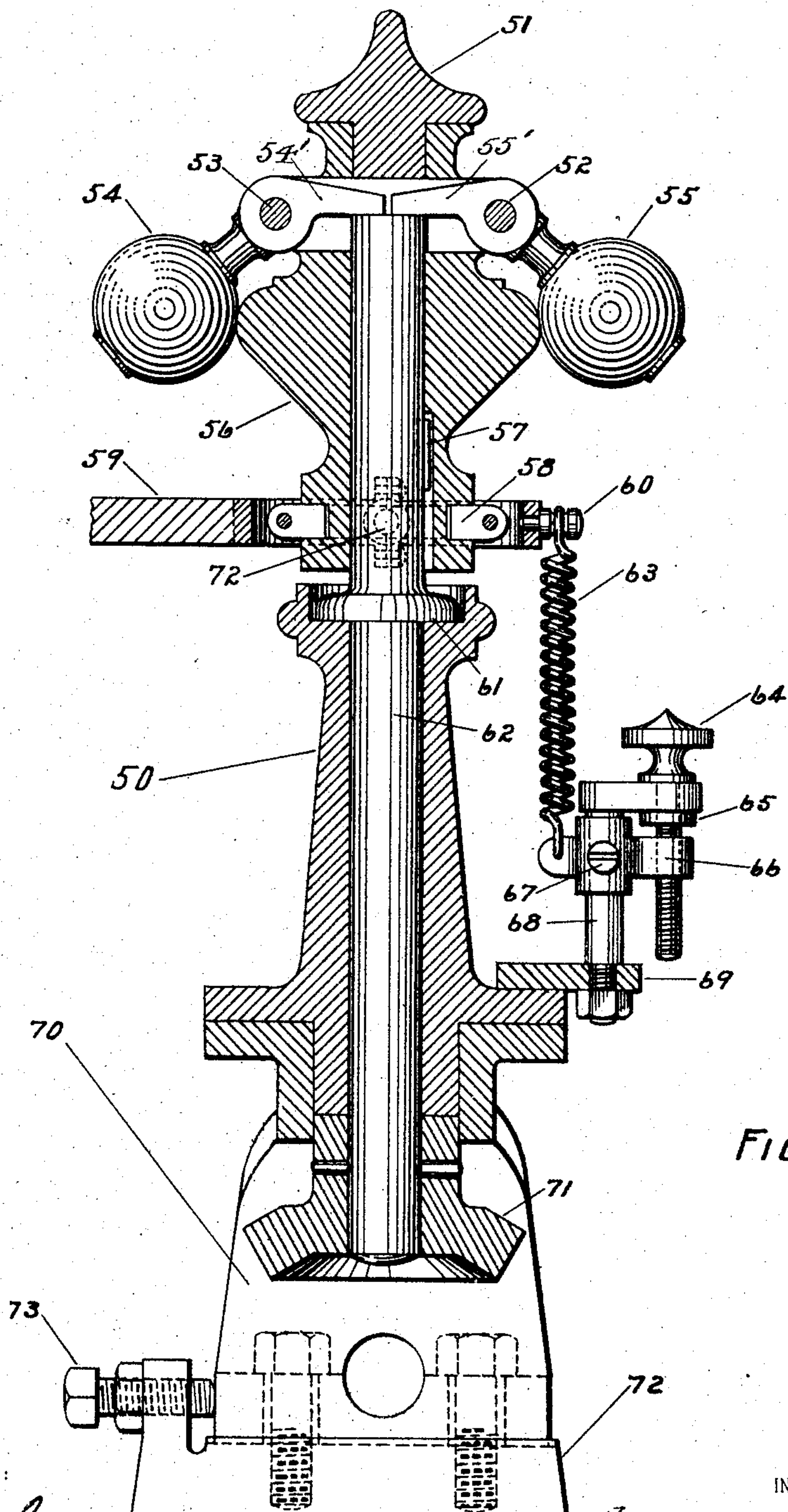


FIG. 4.

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3 SHEETS—SHEET 3.

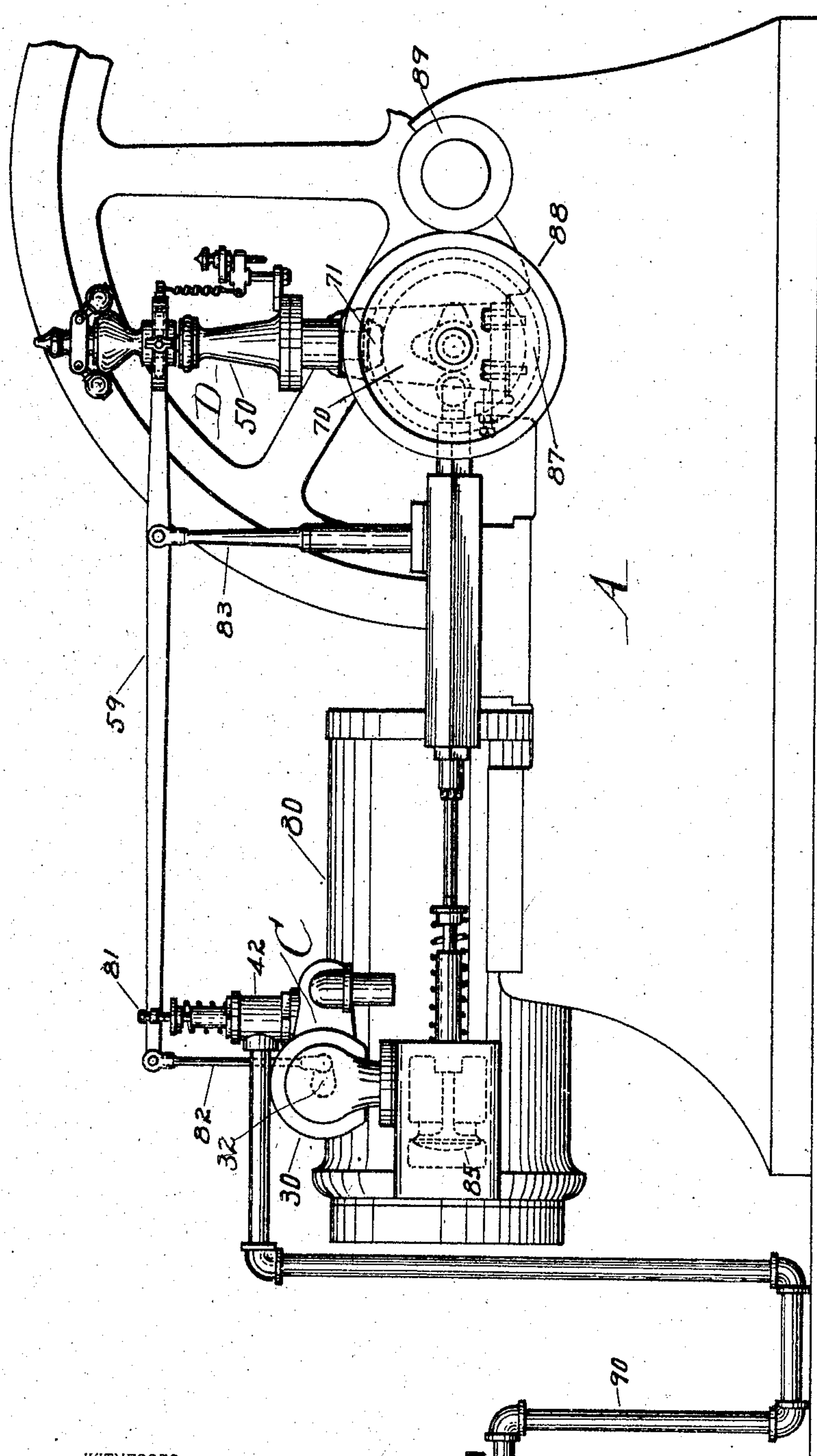
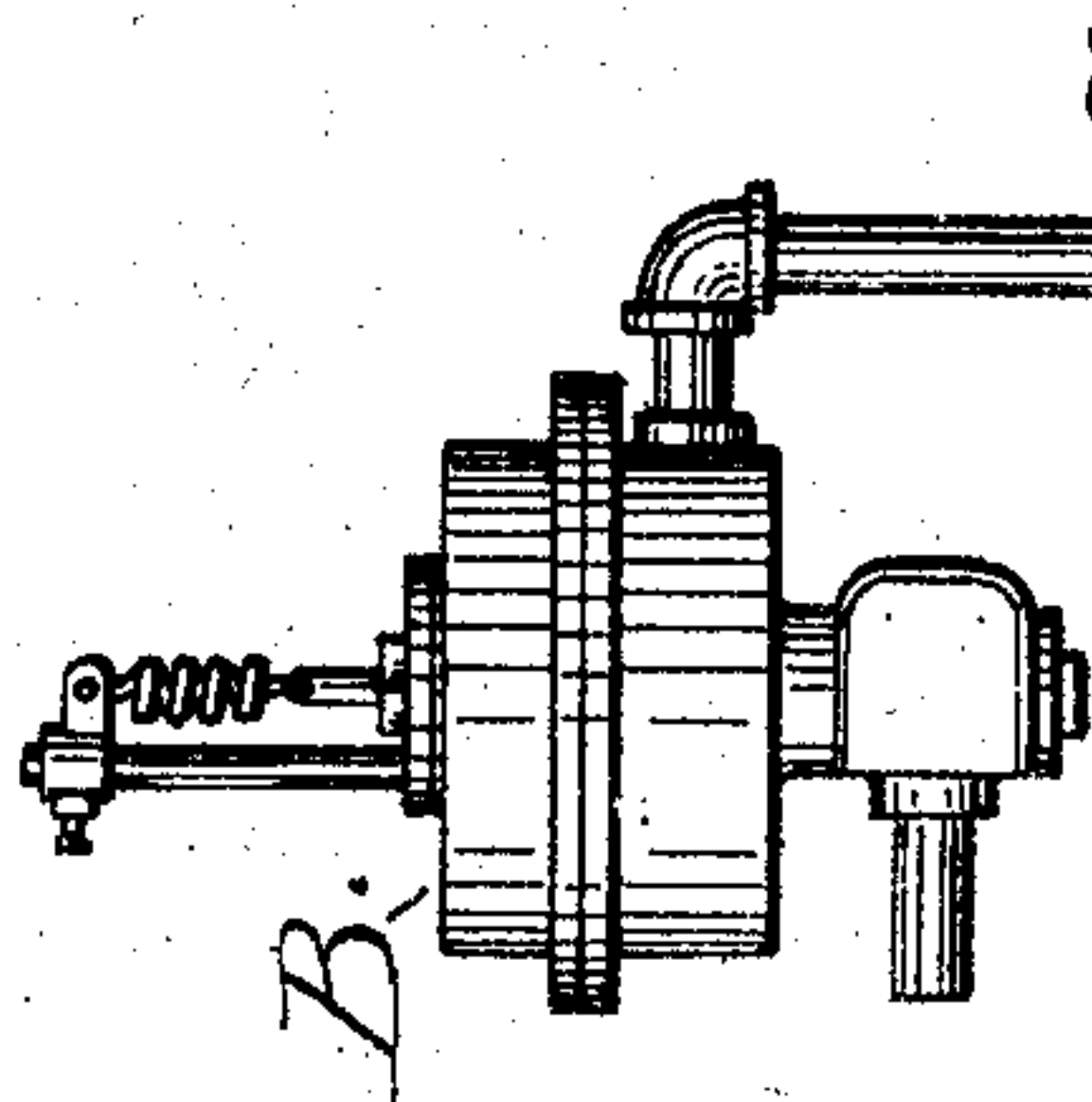


FIG. 5

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UNITED STATES PATENT OFFICE.

CHARLES JACOBSON, OF WARREN, PENNSYLVANIA.

REGULATING MECHANISM FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 780,718, dated January 24, 1905.

Application filed April 17, 1901. Renewed July 15, 1904. Serial No. 216,691.

To all whom it may concern:

Be it known that I, CHARLES JACOBSON, a citizen of the United States, residing at Warren, in the county of Warren and State of Pennsylvania, have invented new and useful Improvements in Regulating Mechanism for Engines, of which the following is a specification.

My invention relates to mechanism and devices for regulating gas, air, and steam engines; and the invention consists of the parts and the arrangements, constructions, and combinations of parts, substantially as hereinafter described and claimed.

The essential object of the present invention is to control the speed of the engine in a uniform and reliable manner by varying the charge of gas, air, or steam admitted to the engine, substantially as I will hereinafter point out.

In the accompanying drawings, in which similar reference letters and numerals indicate like parts throughout the several views, Figure 1 is a sectional view of the throttling mechanism on the line 2 2 of Fig. 2. Fig. 2 is a sectional view of the same on the line 3 3 of Fig. 1. Fig. 3 is a sectional view on the line 4 4 of Fig. 1. Fig. 4 is a vertical sectional view of the centrifugal governor for controlling the throttling mechanism of Figs. 1, 2, and 3. Fig. 5 is a general view of an engine, showing the relative arrangement of regulator, throttling mechanism, and governor.

In Fig. 5 the engine A illustrated is of a well-known gas-engine type and need not be illustrated or described in detail. It is mounted upon an appropriate frame or bed and has the cylinder 80, in which a piston will operate, as usual. In this figure is shown the regulator B and its connection with the throttling mechanism C and the governor D and connections for operating the said throttling mechanism.

The regulator B may be of any suitable type, but is preferably of the character shown, described, and claimed in another application filed by me July 1, 1902, Serial No. 114,003.

The gas after leaving the regulator enters the pipe 90 and by this pipe is conducted to the throttling mechanism C, which mechanism

is shown in detail in Figs. 1, 2, and 3 and to which I will now refer.

The throttling-valve consists of a body or casing 30, having a passage 38 and openings 35. It also has a cover or cap 31, with a passage-way 36, in which the gas and air mix, the air being supplied through a passage or opening 37 and the gas entering through an opening or passage 44, leading from a gas-chamber 42, mounted on the cover or cap 31 and supplied with gas through an inlet 45, the gas entering chamber 42 through the inlet 45, which connects with pipe 90, and passing from this chamber to the mixing-chamber 36 through the outlet 44.

Within the chamber 42 is mounted a spring-pressed valve 43, which operates in the discharge-passage 44 to control the quantity of gas allowed to flow through this passage. This control is effected by increasing or diminishing the area of the inlet end of the passage 44 by moving the valve 43 toward or away from said inlet. When not in action, the valve 43 is held open by means of the spring 40, the tension of which is regulated by a collar or nut 39.

Controlling the aforesaid openings 35 is an oscillating valve 46, axially mounted on the arbor 33 and having openings corresponding with the said openings 35 in the casing 30 of the throttling-valve, said arbor having fixed to its outer end a lever 32, by which the valve 46 is actuated. This valve lies close against the wall of the casing 30 in which the openings 35 are made, and the friction of the valve against this wall, due to the pressure of air and gas in the mixing-chamber 36, is overcome by means of a set-screw 34, adapted to bear against the opposite end of the arbor, and thereby exert an endwise pressure on the arbor to counteract the opposing air and gas pressure in the chamber 36.

The valves 43 and 46 are so adjusted relative to each other that they both stand fully open at the same time and close at the same time, and because of this fact and the arrangement and construction of parts substantially as shown and described it will be seen that the charge of gas or fluid coming from the regulator through the pipe 90 and entering

the gas-chamber 42 through the inlet 45 and escaping through the passage 44 comes in contact in the mixing-chamber 36 with the charge of air entering this chamber at 37, and the charge of combined air and gas then passes through the openings 47 in the valve 46 and the corresponding openings 35 in the casing 30 and through the passage 38 to the cylinder 80, Fig. 5, of the engine. The quantity of the mixed vapor thus admitted to the engine from the throttling mechanism is controlled by a governor D, Figs. 4 and 5, and connections operating the valve 46 through the medium of the lever 32. When the engine runs above normal speed, the governor acts on this lever 32 and closes the valve 46. The gas-valve is at the same time closed, thereby cutting off a proportionate supply of gas.

As before stated, the valves 43 and 46 are controlled by a governor, and a form of governor I have found useful for my purpose is illustrated in Figs. 5 and 6, wherein a base or column 50 is shown mounted on a bracket 70. The governor includes a shaft 62, having a flange or collar 61, by which the shaft is appropriately supported on the base or column 50. The shaft is provided with a feather 57, which engages a groove or way formed in the body or slidable member 56 of the governor, said body or member being on that portion of the shaft which extends above the collar or flange 61, and the governor weights or balls 54 55 are fulcrumed to this body or member 56 at the points 52 53, and the inner ends of the arms 54' 55', which carry the balls, are adapted to engage the upper end of the shaft, as indicated in Fig. 4. The body or member 56 is circumferentially grooved, and a split collar 58 is loosely fitted in this groove and is fastened to the yoke end of a lever or walking-beam 59 by means of two pins 72. A stud 68 rises from the base portion of the column 50, and a sleeve 66 is movably mounted on said stud, said sleeve being moved up and down on the stud by means of a screw 64, whereby the tension of a spring 63, connected, respectively, with the sleeve and the lever 59, is adjusted by hand and the speed at which the engine acts is regulated while the engine is in operation. The lower end of the shaft 62 has fixed to it a bevel-pinion 71, which is designed to mesh with a bevel-gear 87, Fig. 5, fastened to a gear 88, meshing with and driven by a pinion 89 on the crank-shaft of the engine. From this description of the governing devices it will be understood that when the shaft 62 is revolved by the running of the engine the centrifugal force imparted to the balls 54 55 tends to throw them outward away from the shaft, and they will then more nearly approach a horizontal line drawn through the axis of the fulcrums 52 53 as the speed of the engine increases and will thus raise the rotatable sliding member 56 and its attached end of the lever or walking-beam 59.

Referring again to Figs. 4 and 5, it will be obvious that when the speed of the engine exceeds the point where the centrifugal force generated in the weights or balls overcomes the tension of the spring 63 the weights or balls will at the same time raise and elevate the governor body or member 56, as the arms 54' 55', which carry the balls, rest directly on top of the shaft 62, and when the body or member 56 is thus elevated its sliding movement is transmitted to the short arm of the walking-beam 59, fulcrumed on a post or standard 83, and the opposite end or long arm of this beam will be depressed, and through the medium of a link or connection 82 and the lever 32 and the stem of the valve 43 and set-screw 81, said screw passing through a threaded base and having its end to bear upon the top of the rod 43, as shown in Fig. 1, said beam will operate the valves 46 and 43 of the throttling mechanism and shut off the fuel charge of gas and air. The aforesaid gears 87 and 88 and the pinion 71 are supported on a bracket 70, which is slidably mounted on a stand 72, forming a part of the engine-bed and provided with an adjusting-screw 73 for adjusting the bracket 70 with reference to the engine crank-shaft for the purpose of properly meshing the gear 88 and the pinion 89. This adjustment does not, however, disturb the proper meshing of the pinion 71 and gear 87, as these are both mounted on the bracket 70 and move with it.

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

1. In a regulating mechanism for gas-engines, the combination with a regulator and a balanced valve connected therewith and controlling the gas-passage therethrough, of a throttling mechanism consisting of a valve-casing, having a passage 38, an oscillating valve therein, a cover or cap 31 fitting the casing and extending longitudinally beyond the same, and provided with an air passage and inlet thereto, a vertical extension of the cap, having a gas-chamber 42 to which the outlet from the regulator connects, a valve in said gas-chamber and controlling the passage therethrough, a stem projecting from the valve and a spring acting upon said stem to hold the valve normally open, a governing mechanism including a fulcrumed walking-beam and means connecting one end of the same with the said oscillating valve, and an adjustable contact between the walking-beam and the stem of the gas-controlling valve.

2. In a regulating mechanism for gas-engines, the combination with a gas-regulator, a gas and air supply mechanism, a throttling mechanism and a governing mechanism including a fulcrumed walking-beam and connection therefrom for controlling the gas admission and the throttling mechanism, and a movable member of the governor to which the

said beam is connected, of a fixed stud 68, a sleeve slidably mounted thereon, a spring connecting the sleeve with the short arm of the walking-beam, and an adjusting-screw mounted on the stud and engaging a threaded opening in the sleeve whereby the speed of the engine may be regulated by hand while the engine is in operation.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES JACOBSON.

Witnesses:

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LEML. F. BALL.