

No. 668,789.

Patented Feb. 26, 1901.

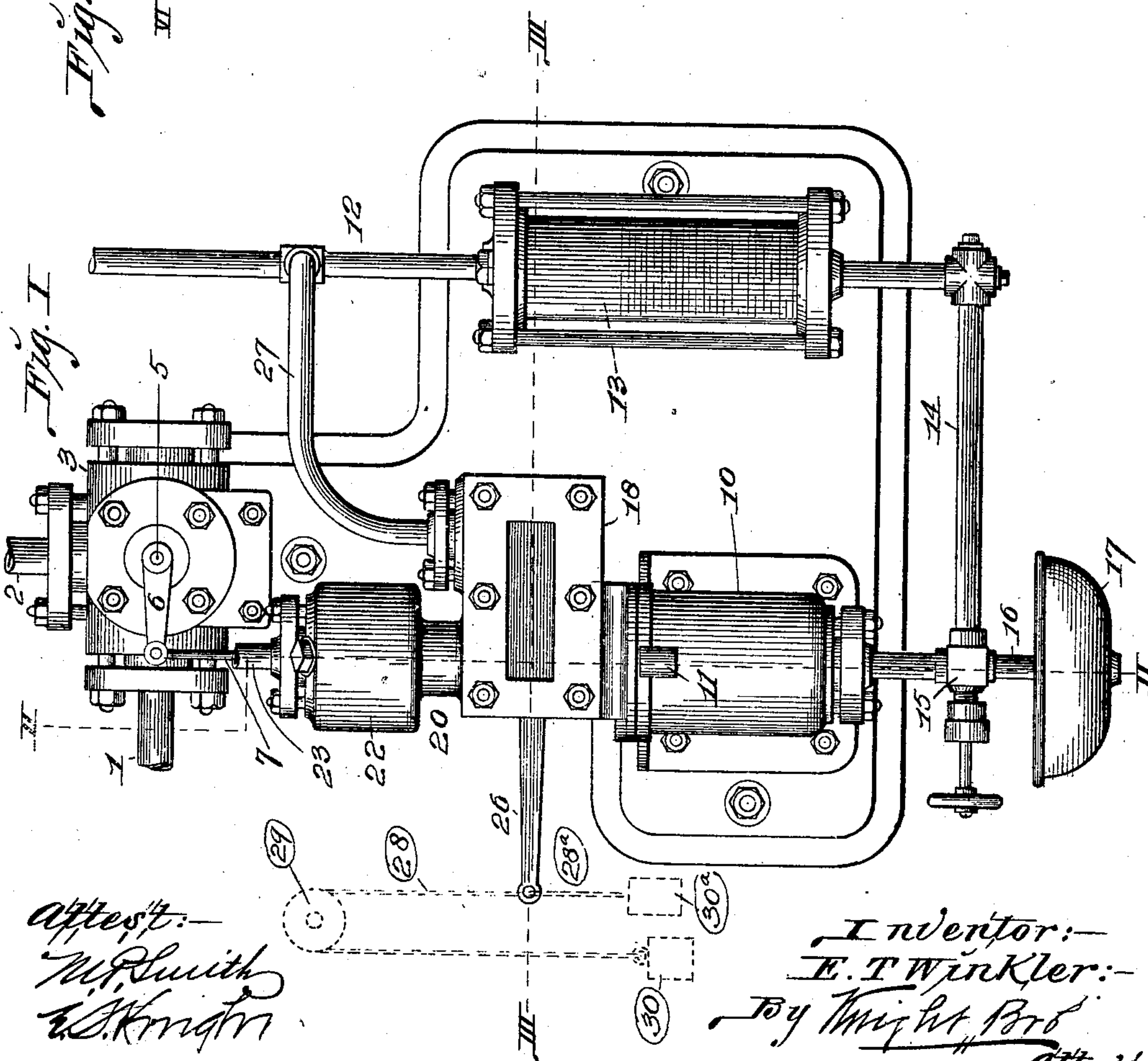
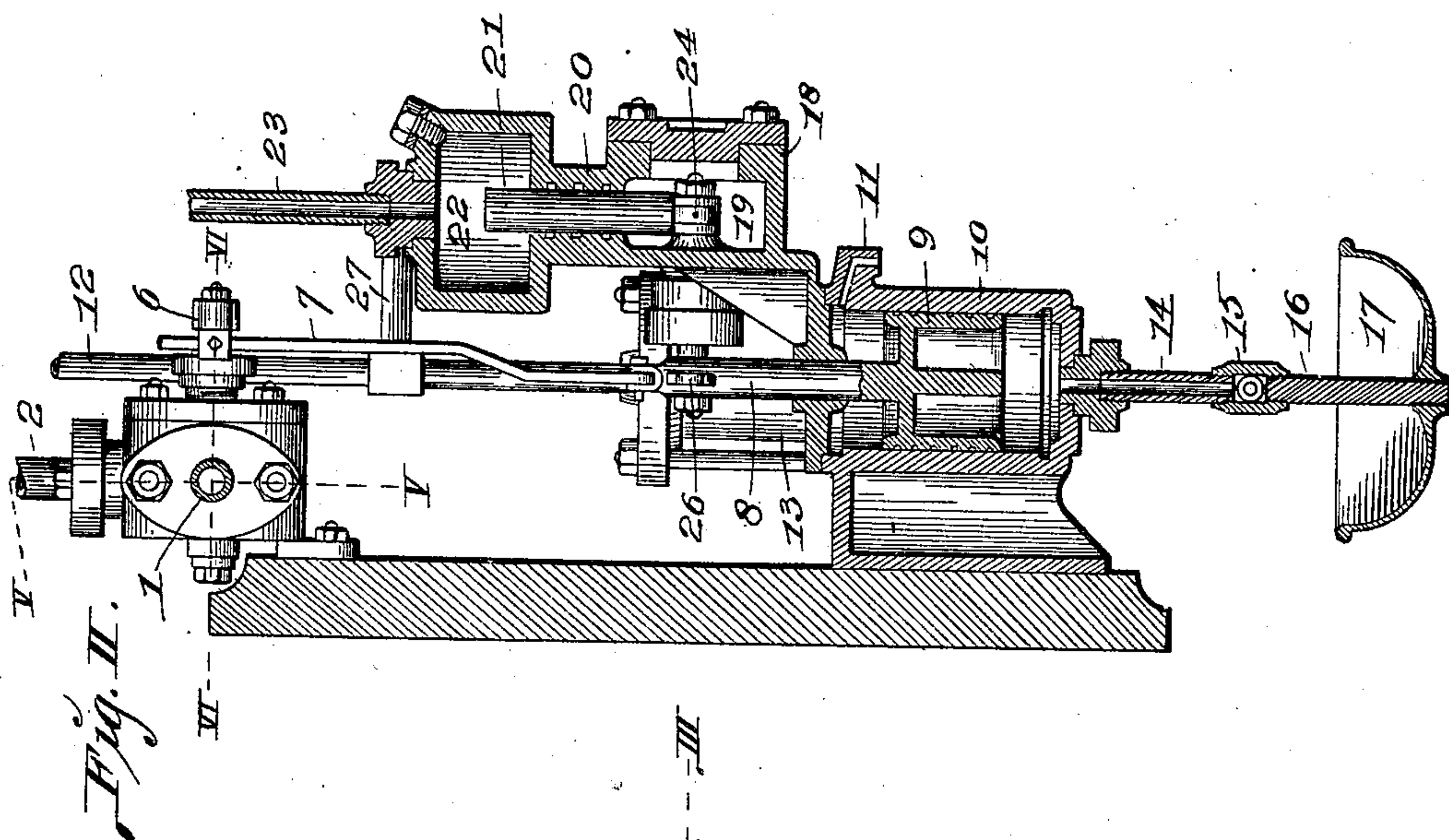
E. T. WINKLER.

AUTOMATIC REGULATOR FOR LIQUEFIED GAS EVAPORATING APPARATUS.

(Application filed Mar. 1, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. III.

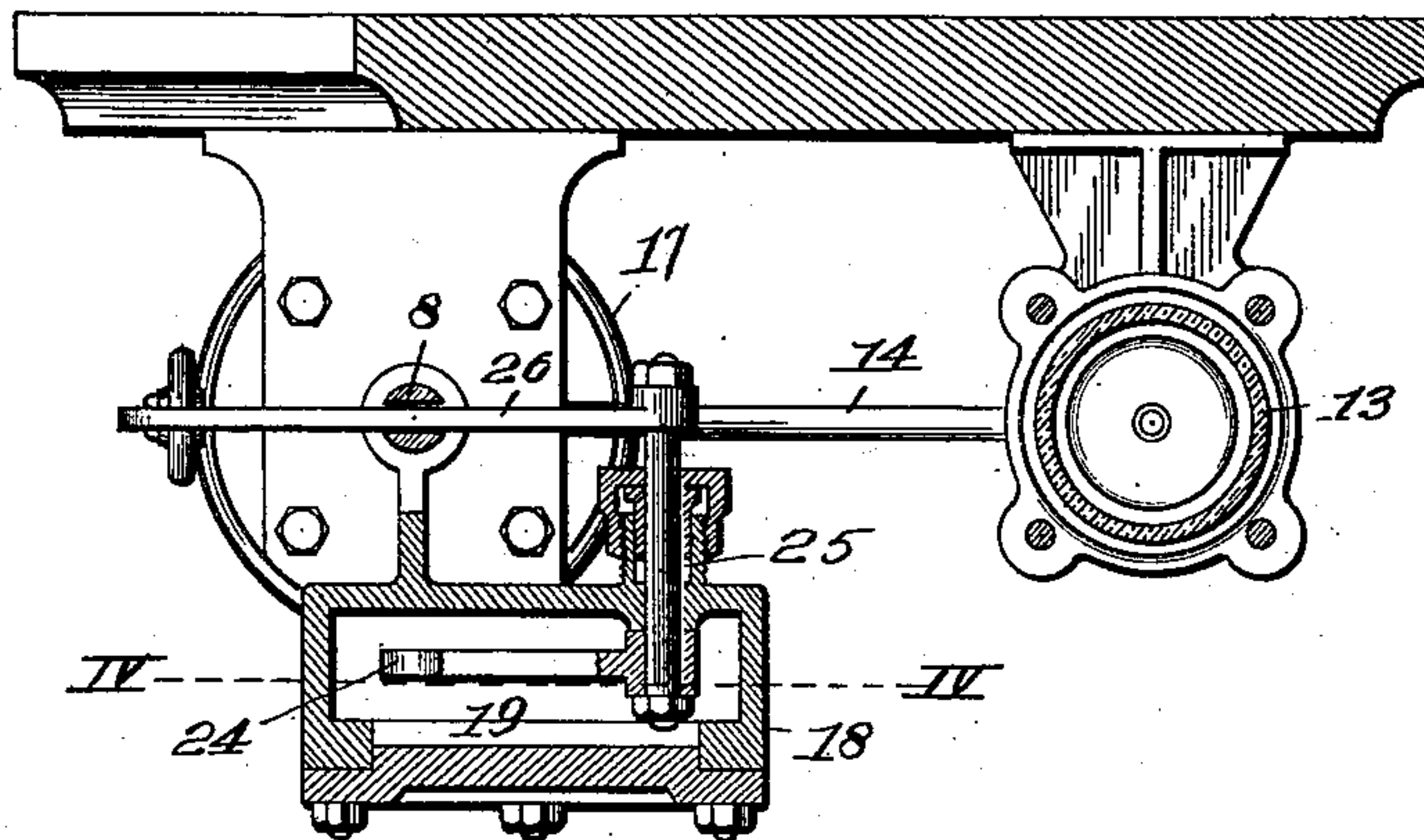


Fig. IV.

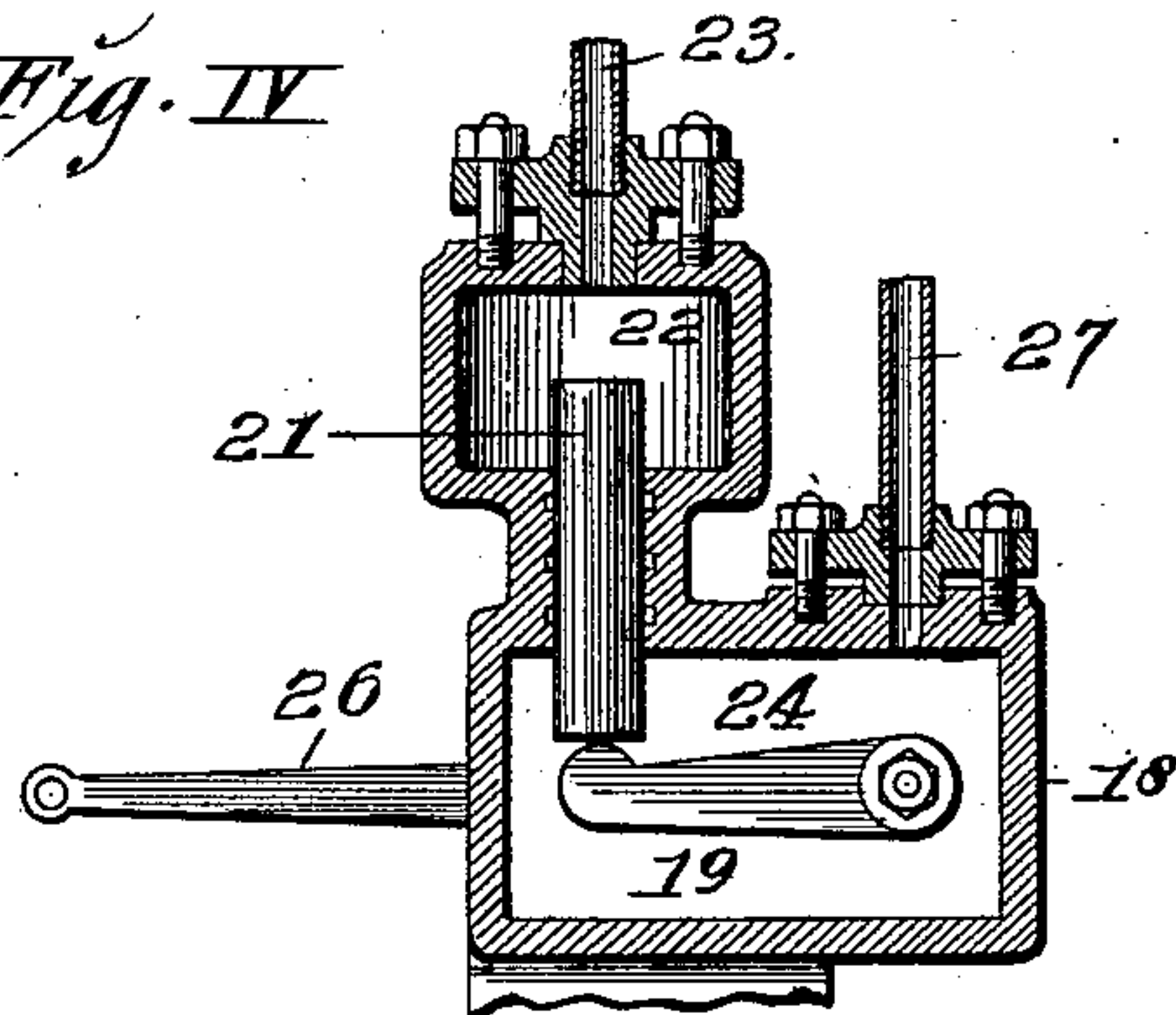


Fig. V.

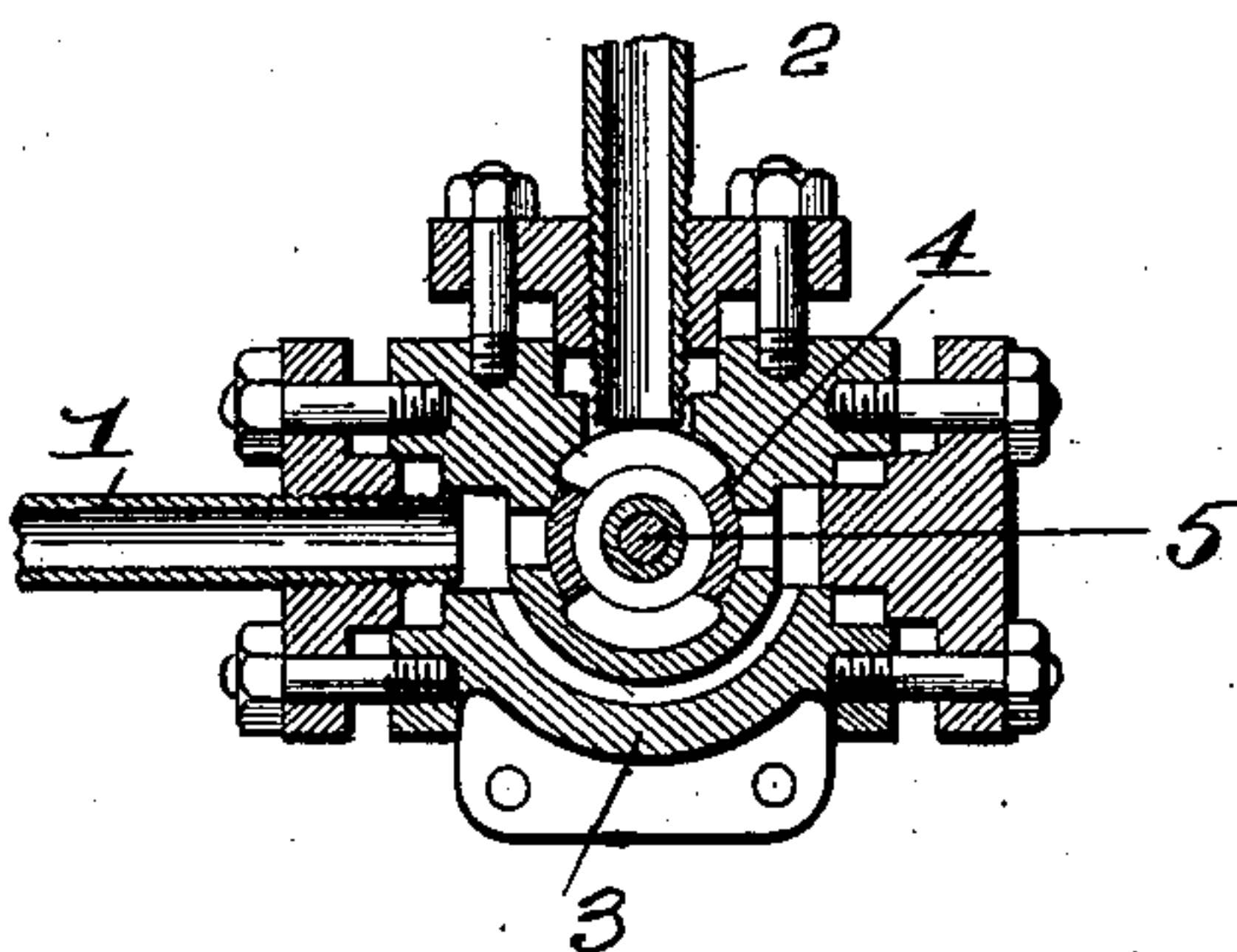
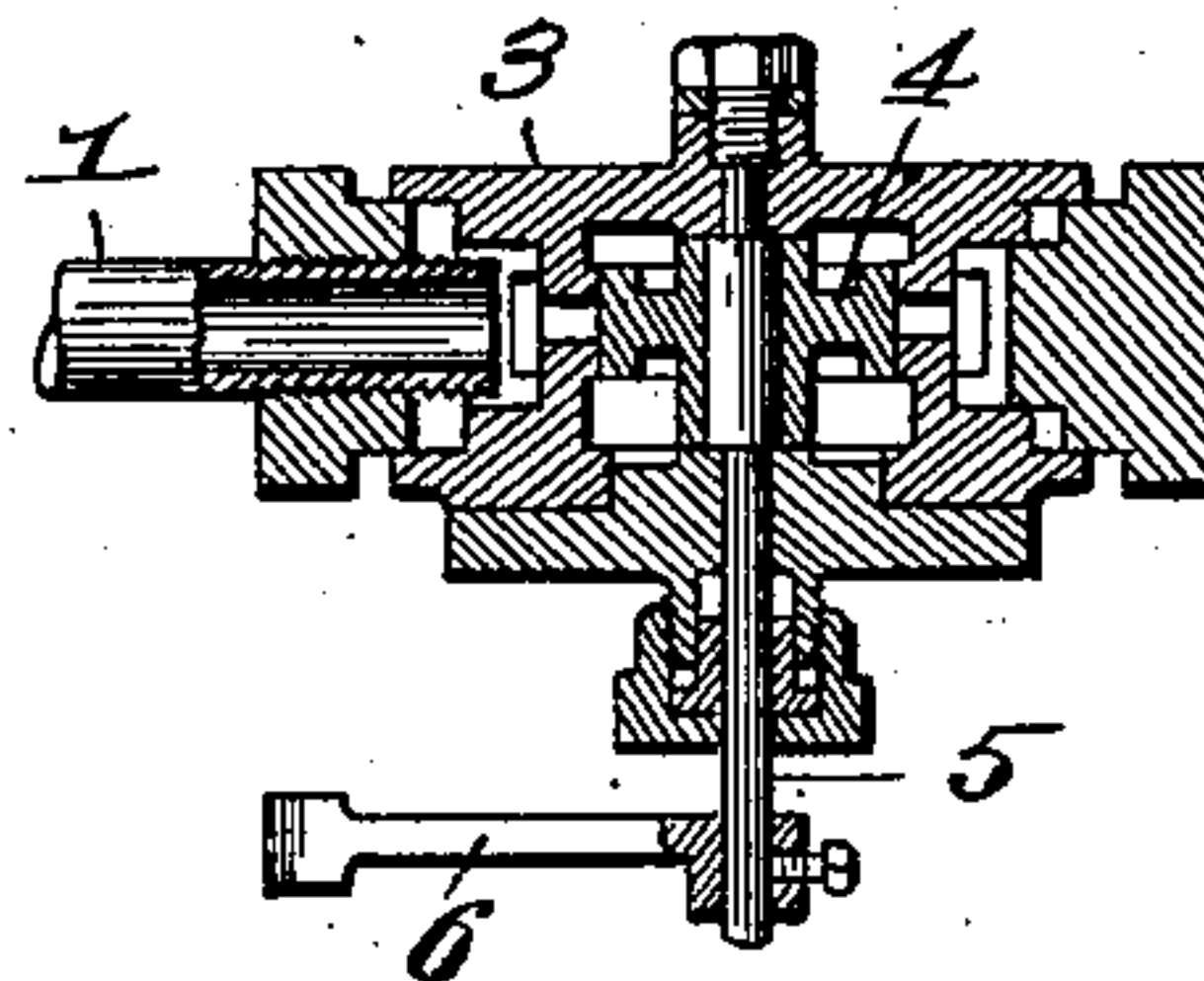


Fig. VI.



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UNITED STATES PATENT OFFICE.

EHREGOTT T. WINKLER, OF KANSAS CITY, MISSOURI, ASSIGNOR TO THE
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AUTOMATIC REGULATOR FOR LIQUEFIED-GAS-EVAPORATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 668,789, dated February 26, 1901.

Application filed March 1, 1900. Serial No. 6,918. (No model.)

To all whom it may concern:

Be it known that I, EHREGOTT T. WINKLER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Automatic Regulators for Liquefied-Gas-Evaporating Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a regulator for governing the controlling-valve of liquefied-gas apparatus, such as refrigerating and ice machines.

The object of the invention is to produce a regulator in the use of which the controlling-valve may be efficiently governed to cause the machine to operate continuously to the best advantage without the necessity of manual manipulation and consequent loss of time and power. To construct such a device that will operate to the best advantage it is essential that proper varying proportions between the evaporation and condenser pressures be provided, so that such pressures effect the balancing of the controlling-valve; and, briefly stated, my invention consists in a construction wherein a plunger and piston of varying dimensions are utilized, against one of which the condenser-pressure is brought to bear, while the other receives pressure from the evaporator of the apparatus.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a front elevation of my improved regulator. Fig. II is a vertical sectional view taken on the line II II, Fig. I. Fig. III is a view, partly in plan and partly in horizontal section, taken on the line III III, Fig. I. Fig. IV is a detail vertical sectional view taken on the line IV IV, Fig. III. Fig. V is a detail sectional view taken through the controlling-valve on the line V V, Fig. II. Fig. VI is a cross-sectional view through the controlling-valve, taken on the line VI VI, Fig. II.

1 designates a pipe having communication with the condenser, and 2 is a pipe having communication with the evaporator of the apparatus to which the regulator is applied.

These pipes 1 and 2 are connected to and lead into a controlling-valve housing 3, containing a controlling-valve 4 on a shaft 5. The valve and housing may be of the construction shown in Figs. V and VI or of any other desirable form, as no invention *per se* is herein claimed for them.

Fixed to the end of the shaft 5, exterior of the controlling-valve housing, is a crank-arm 6.

7 is a pitman pivotally connected at one end to the crank-arm 6 and pivotally connected at the other end to a piston-rod 8, that carries a piston 9, located in a cylinder 10. The cylinder 10 is provided with a vent 11 at the upper end thereof (see Fig. II) for the free escape of air from the upper end of the cylinder and the discharge of leakage of oil from underneath the piston 9.

12 designates an evaporation-pressure-conveying pipe leading from a connection to the evaporator of the apparatus to which the regulator is applied. This pipe 12 leads into an oil-reservoir 13.

14 is an oil-pipe leading from the lower end of the oil-reservoir 13 to the lower end of the cylinder 10. The pipe 14 contains a cut-off valve 15 and has connected to it a solid stem 16, that supports a drip-cup 17 for receiving the drip of oil from the vent 11.

18 designates a housing mounted on the cylinder 10 and projecting therefrom, said housing containing a chamber 19. Surmounting the housing 18 is a plunger-head 20, containing a plunger 21. The plunger 21 is adapted to operate in the head 20 and extend into a chamber 22 above said head that is supplied with pressure medium from a condenser-pressure-conveying pipe 23, that is connected to and has communication with the condenser of the apparatus to which the regulator is applied. The diameter of the plunger 21 is materially less than the diameter of the piston 9, so that such parts have proportionately varying pressure-receiving surfaces against which the condenser-pressure and evaporation-pressure are exerted. The lower end of the plunger 21 rests upon a rocking arm 24 within the housing 18, that is mounted on a rocking shaft 25, that extends through the wall of the housing to the exterior thereof.

On the outer end of the rocking shaft 25 is a rocking lever 26, that passes loosely through the piston-rod 8 of the piston 9.

27 designates a branch pipe leading from the evaporation-pressure pipe 12 to the housing 18, providing communication between said evaporation-pressure pipe and the chamber 19 within said housing. By the introduction of this branch pipe the evaporation-pressure is conveyed from the pipe 12 into the chamber 19 to exert its force against the lower end of the plunger 21 for the purpose of assisting in balancing said plunger and to carry oil-leakage from the chamber 22 to the oil-reservoir 13.

The plunger 21, against which the condenser-pressure is exerted from the pipe 23, being, as stated, of materially less diameter than the piston 9, against which the evaporation-pressure is exerted from the evaporation-pressure pipe 12, the greater pressure from the condenser is overcome by the evaporation-pressure pressing against the larger piston 9, so that the movement of the controlling-valve 4 is balanced by the connection between the plunger and piston, consisting of the rocking arm 24, against which the plunger bears, the rocking lever 26, mounted in connection with said rocking arm, and the connection between the lever 26 and the piston-rod 8, the latter of which is connected to the valve by the pitman 7. The balance or equalization created between the condenser-pressure plunger 21 and evaporation-pressure-actuated piston 9 is therefore communicated to the pitman 7 to control said pitman and as a consequence to actuate the controlling-valve 4, so that it will be regulated automatically according to any increase or decrease in either the condenser-pressure or evaporation-pressure during the operating of the apparatus to which the regulator is applied.

In the class of apparatus to which my regulator is applied there is sometimes required a higher or lower pressure than ordinarily, and for the purpose of producing such higher or lower pressure I may apply to the rocking lever 26 a cord 28, passing over a pulley 29 and supplied with a weight 30, (see dotted lines, Fig. I,) in which instance the weight exerts an upward pull upon the rocking lever, or where a downward pull is desired the cord 28

is connected to the rocking lever, to which is suspended a weight 30^a. It is obvious that where one of the weights is used the other is necessarily omitted or else additional weight applied to the one from which service is desired.

I claim as my invention—

1. In a regulator of the class described, the combination with a controlling-valve of a cylinder, a piston located in said cylinder, means of connection between the piston and said controlling-valve, an oil-reservoir, a pipe providing communication between said cylinder and said reservoir, an evaporation-pipe connected to said reservoir, a chamber, a condenser-pressure pipe leading to said chamber, a plunger entering said chamber, and means connecting the plunger-piston and controlling-valve.

2. In a regulator of the class described, the combination with a controlling-valve of a cylinder, a piston located in said cylinder, means of connection between said piston and said controlling-valve, an oil-reservoir, a pipe providing communication between said cylinder and said reservoir, an evaporation-pipe connected to said reservoir, a chamber, a condenser-pressure pipe leading to said chamber, a plunger entering said chamber, a rocking arm on which said plunger rests, and a rocking lever arranged in connection with said rocking arm and having engagement with the connecting means between said valve and said piston, substantially as described.

3. In a regulator of the class described, the combination with a controlling-valve, of a cylinder, a piston located in said cylinder, means of connection between said piston and said valve, a pipe leading to said cylinder through which pressure from the evaporator may be exerted, a housing, a pipe leading to said housing from the evaporator-pressure pipe, a condenser-pressure pipe, a chamber in which said condenser-pressure pipe communicates, a plunger located between said housing and chamber, and means of engagement between said plunger and said valve and piston connecting means, substantially as described.

EHREGOTT T. WINKLER.

In presence of—

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MARVIN SCUDDER.