

No. 735,483.

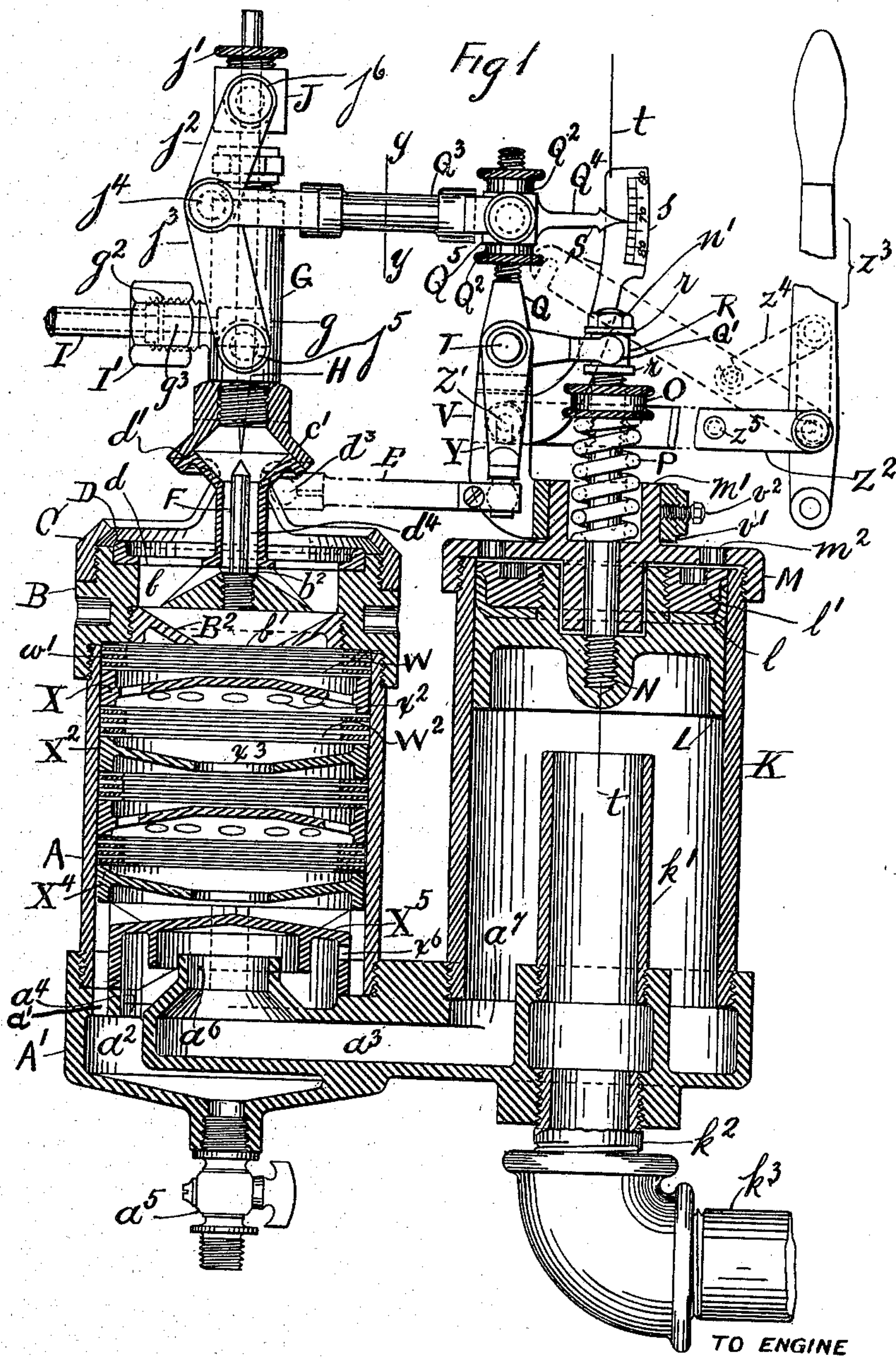
PATENTED AUG. 4, 1903.

G. C. ESKHOLME.
HYDROCARBON MIXER AND REGULATOR FOR ENGINES.

APPLICATION FILED JUNE 8, 1901.

NO MODEL.

3 SHEETS—SHEET 1.



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George Charles Eskholme
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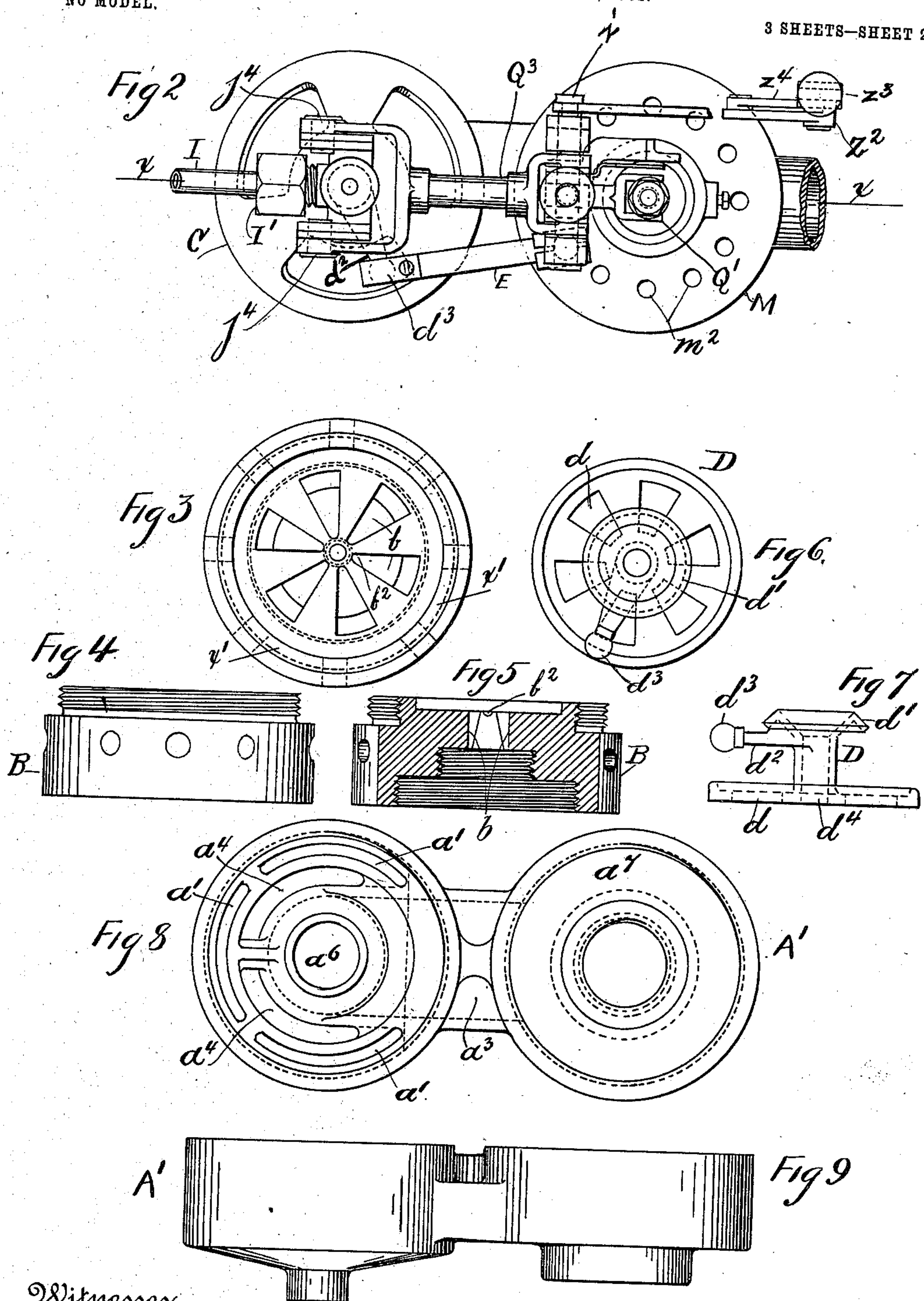
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HYDROCARBON MIXER AND REGULATOR FOR ENGINES.

APPLICATION FILED JUNE 8, 1901.

NO MODEL.

3 SHEETS—SHEET 2.



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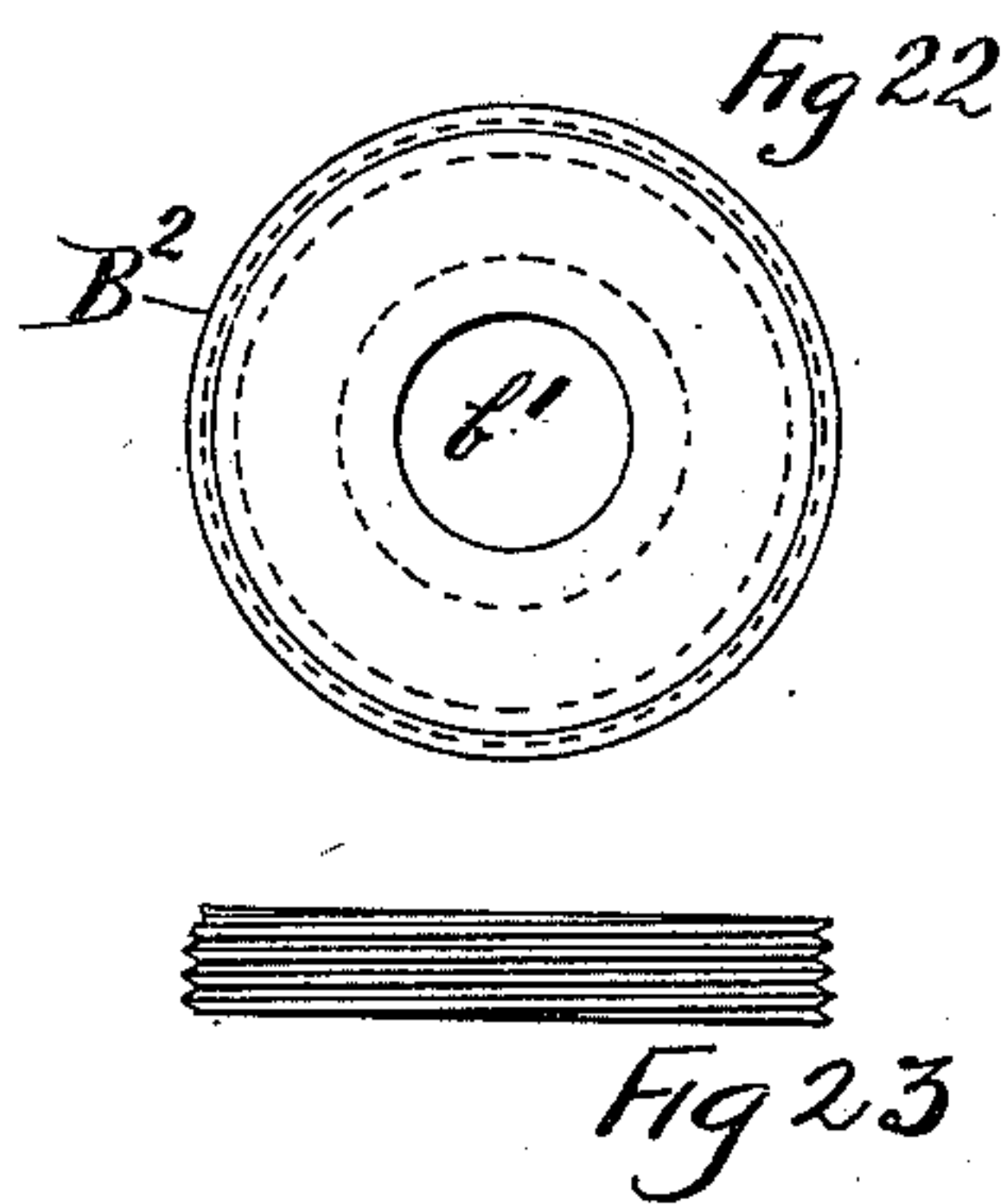
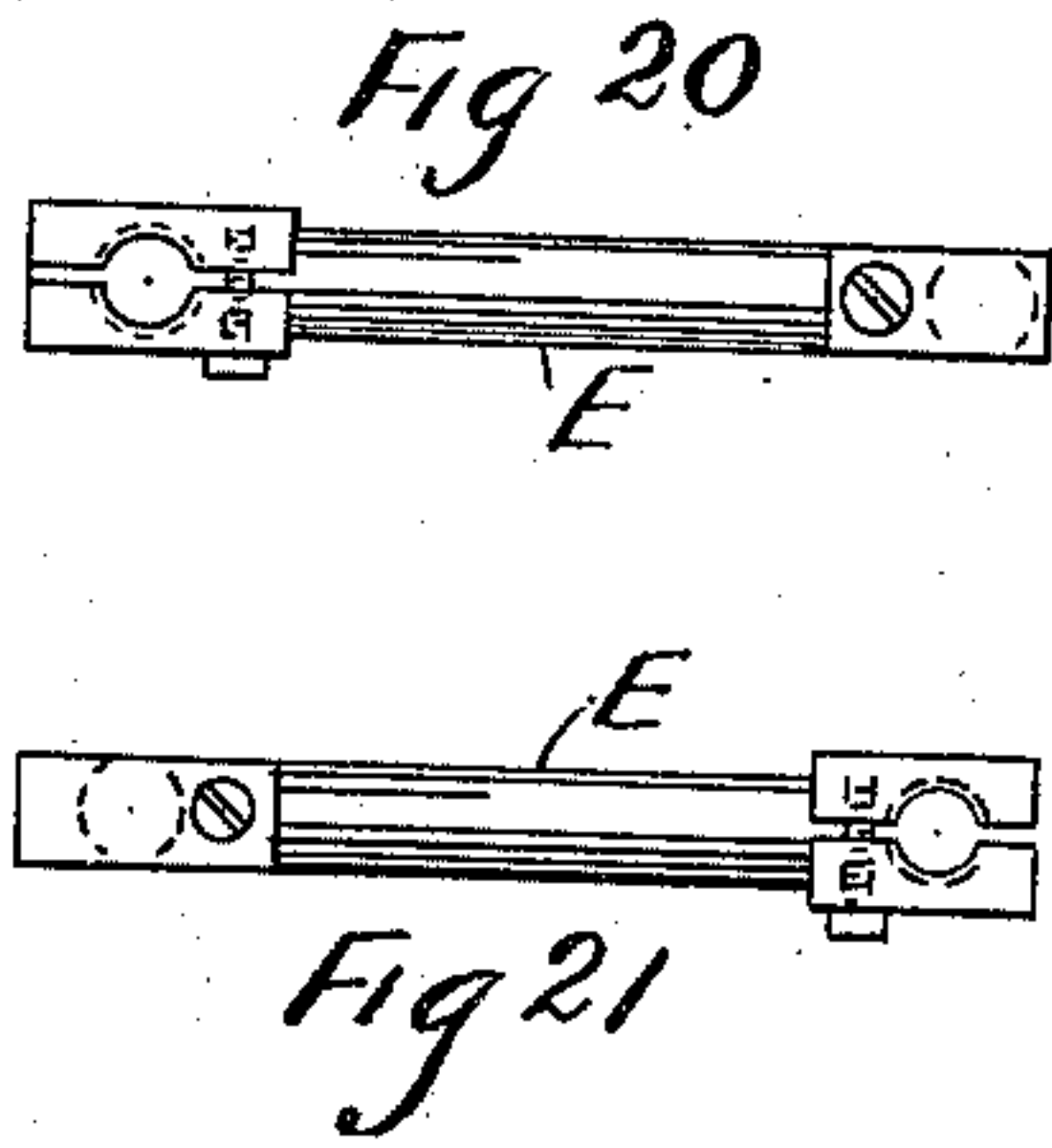
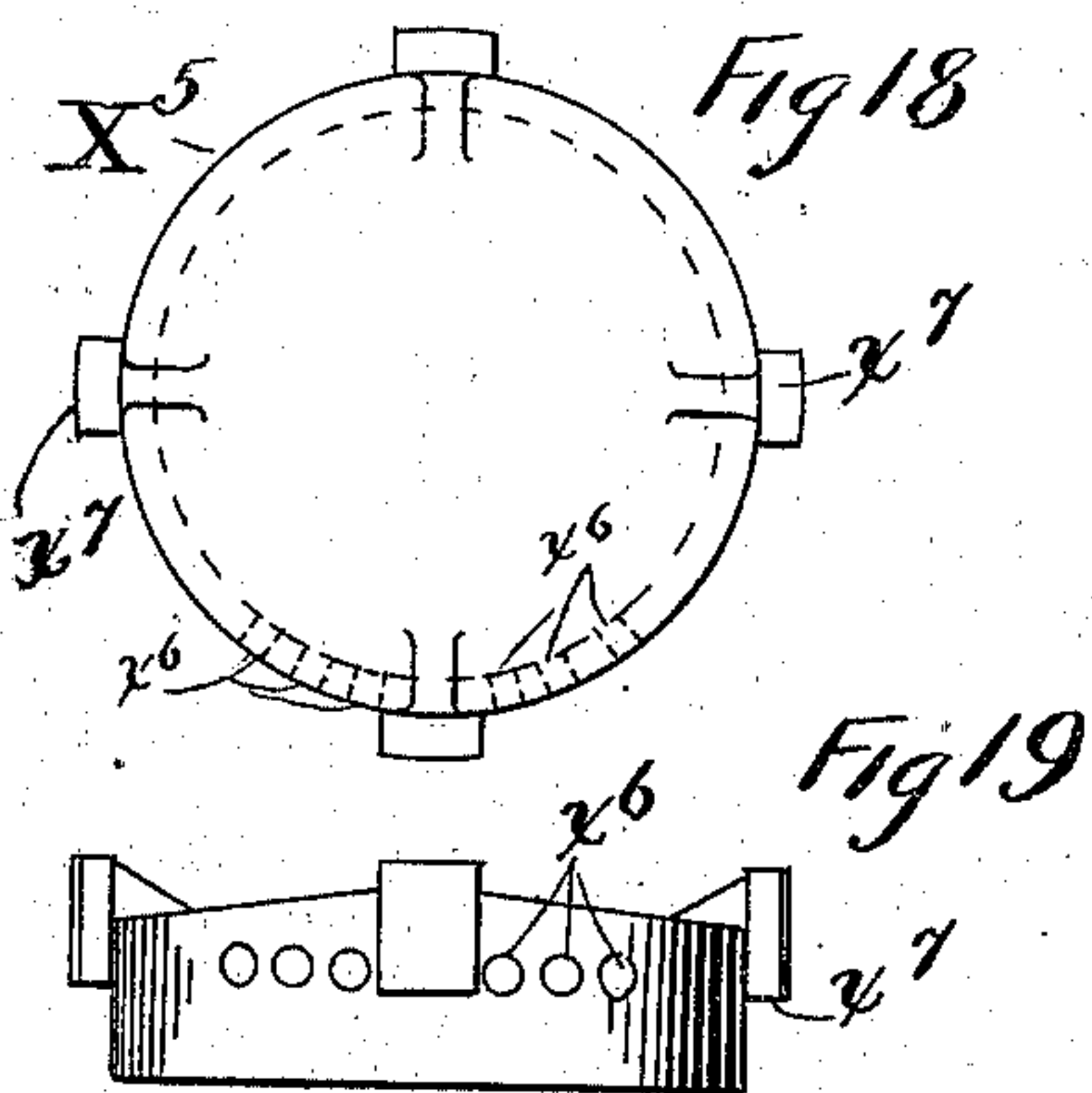
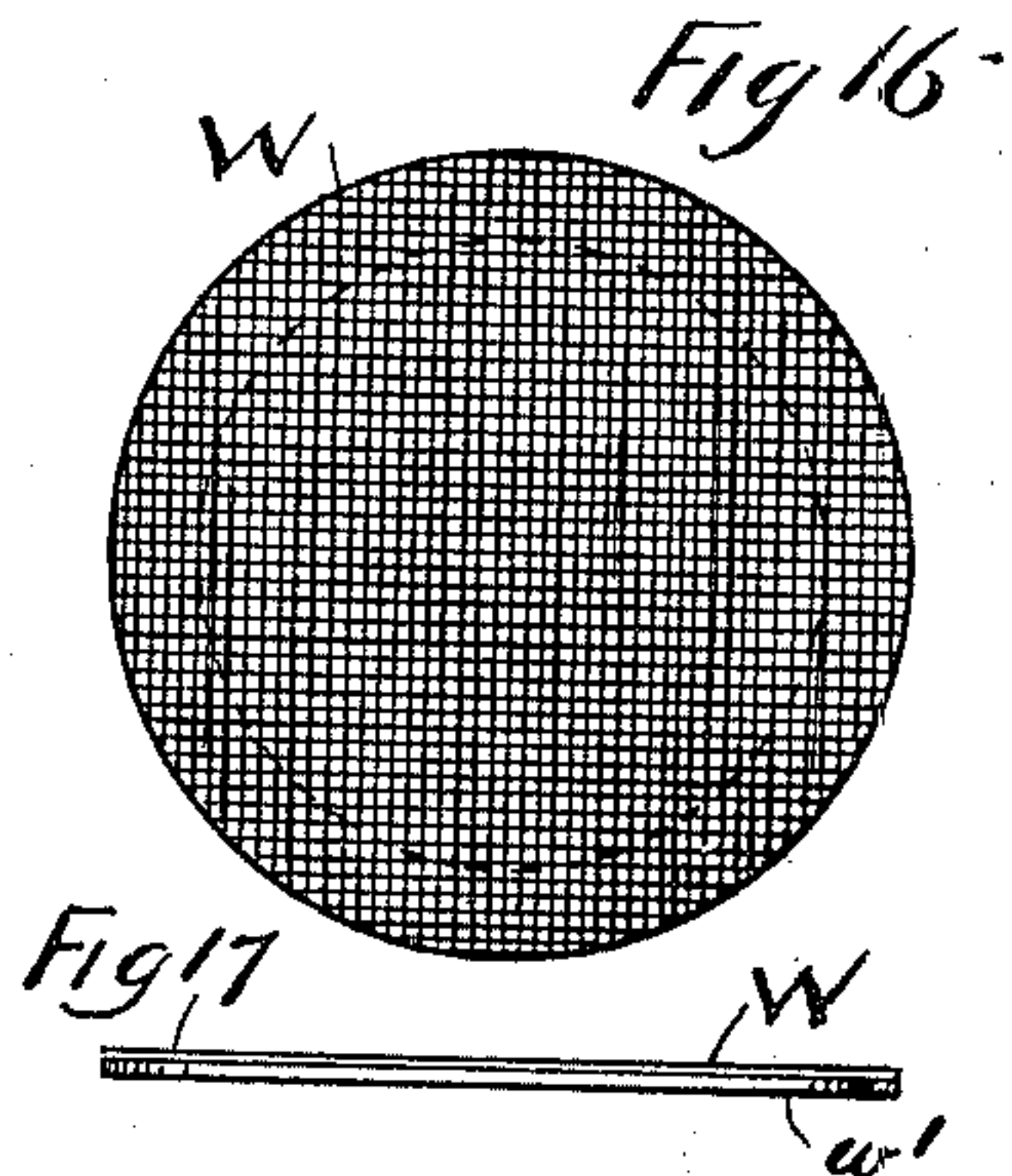
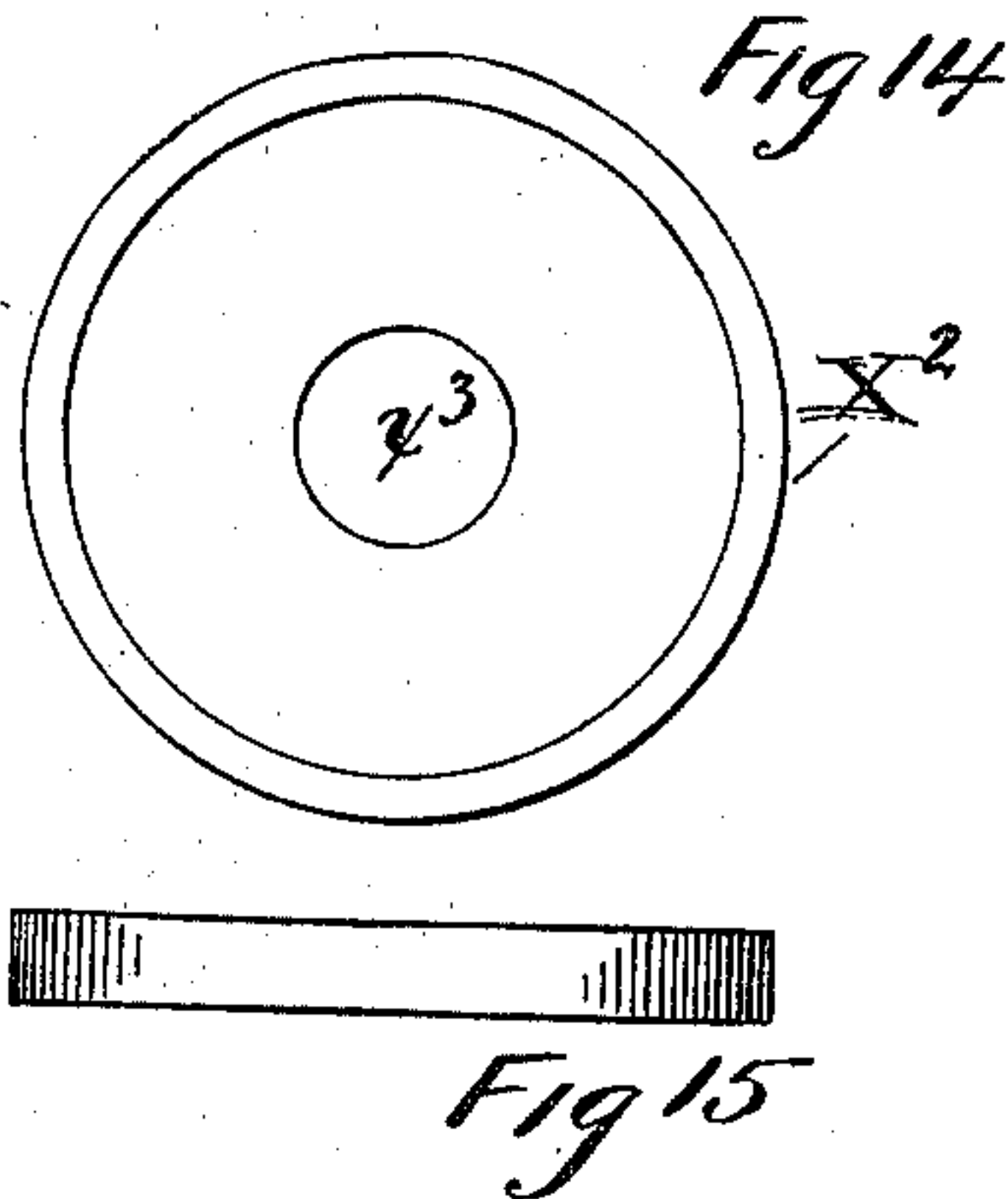
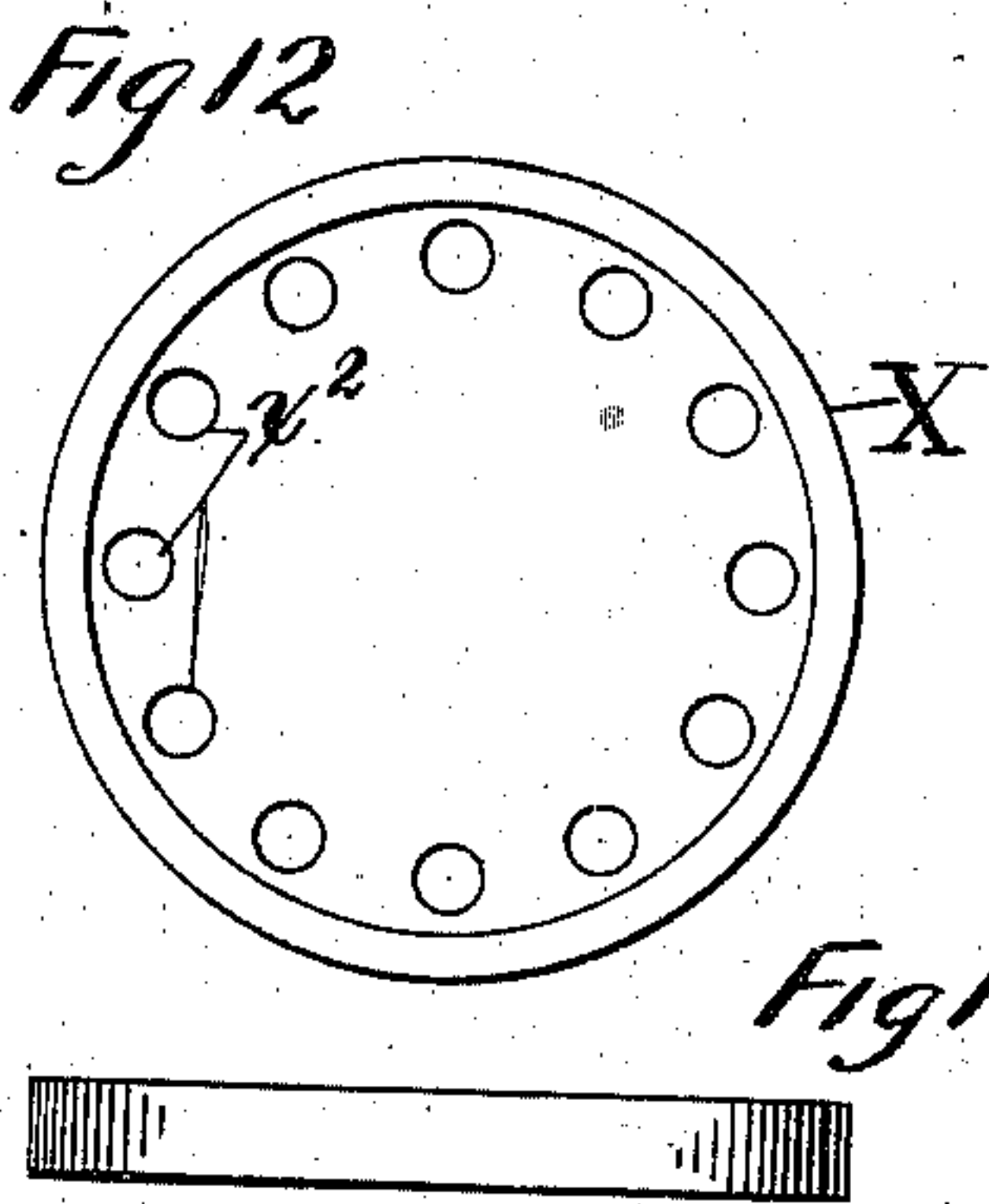
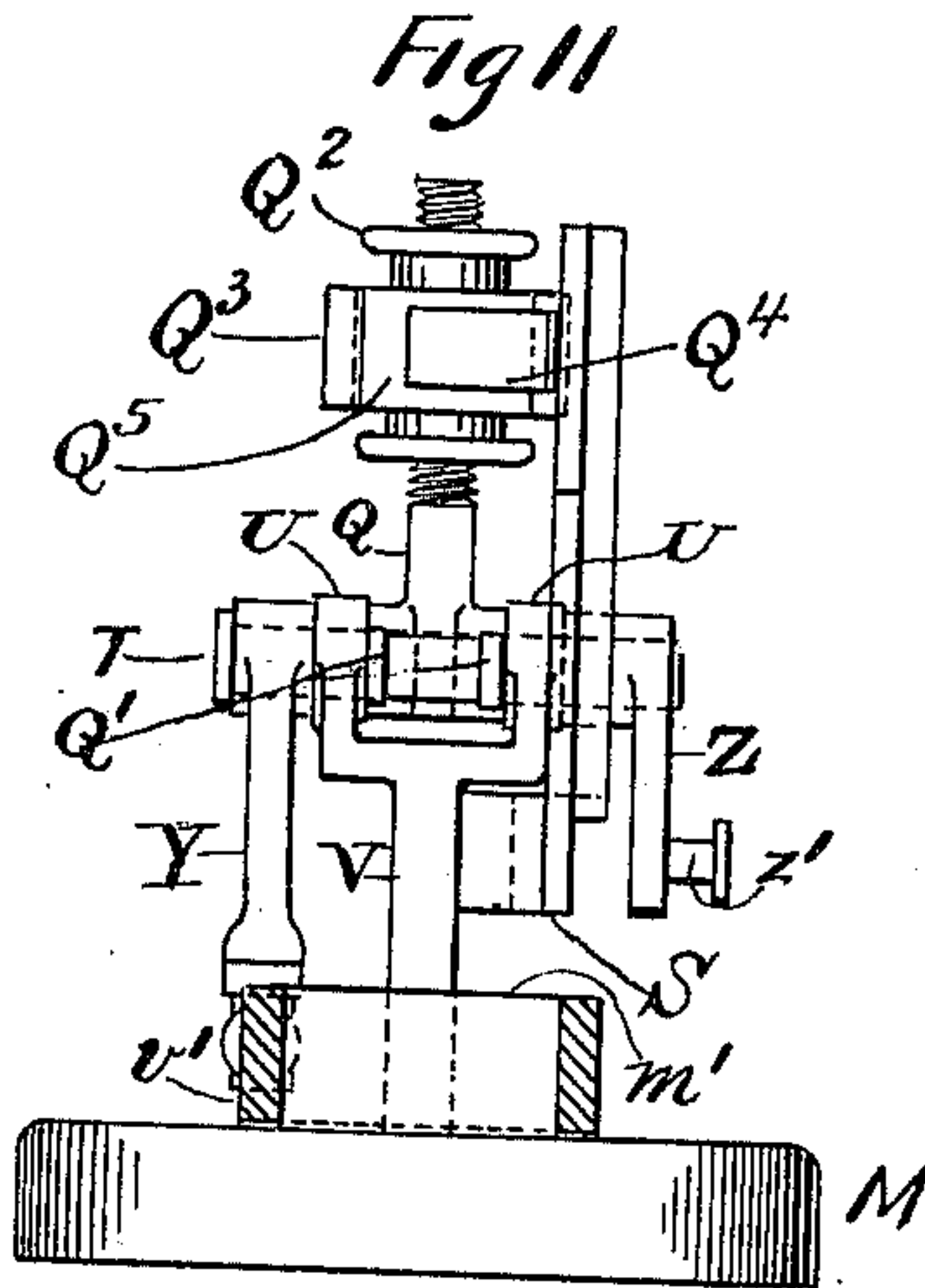
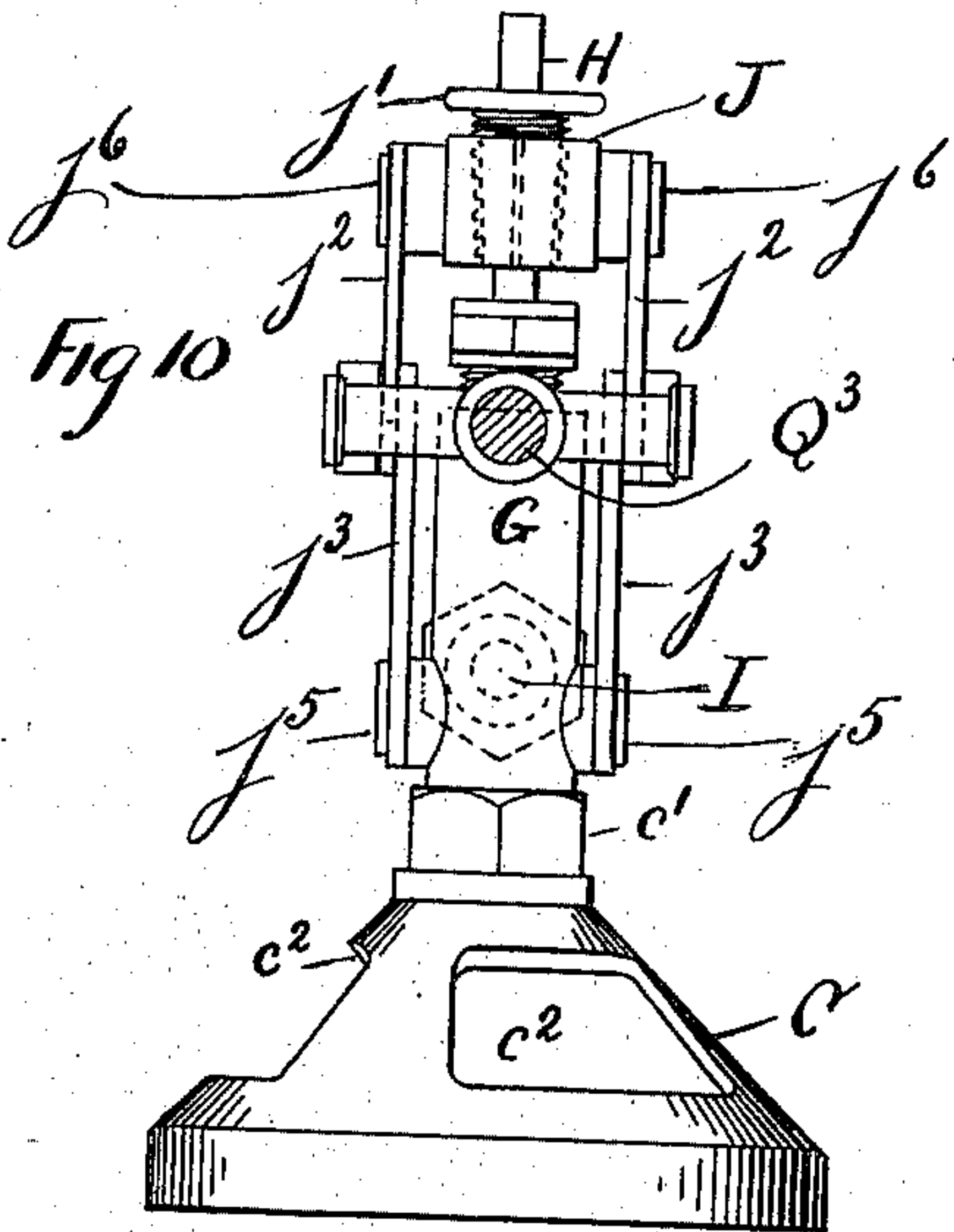
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NO MODEL.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

GEORGE CHARLES ESKHOLME, OF BROOKLYN, NEW YORK.

HYDROCARBON MIXER AND REGULATOR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 735,483, dated August 4, 1903.

Application filed June 8, 1901. Serial No. 63,695. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CHARLES ESKHOLME, a citizen of the United States, and a resident of the borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Hydrocarbon Mixers and Regulators, of which the following is a specification.

My invention relates to means for automatically mixing and distributing charges of hydrocarbons and air for engines and the like.

The object of the invention is the production of automatic mixing and distributing regulators of simple construction which will maintain correct relations between the volumes of hydrocarbons and air, when applied to engines which run with variable speeds.

Figure 1 shows a partial vertical section of my automatic mixer and regulator on the line xx of Fig. 2. Fig. 2 represents a top plan view of the same. Fig. 3 is a plan view of the mixing-chamber with the hood and inlet-valve removed. Fig. 4 shows an elevation of Fig. 3. Fig. 5 is a section of Fig. 3 on the line $x'x'$. Fig. 6 represents a top plan view of the air-inlet valve. Fig. 7 shows an elevation of Fig. 6. Fig. 8 is a top plan view of the base connection. Fig. 9 represents an elevation of Fig. 8. Fig. 10 shows a partial section of Fig. 1 on the line yy . Fig. 11 is a partial section of Fig. 1 on the line tt . Fig. 12 represents a plan view of a deflector with numerous perforations. Fig. 13 is an elevation of Fig. 12. Fig. 14 shows a plan view of a deflector with a central opening. Fig. 15 is an elevation of Fig. 14. Fig. 16 represents a plan view of one of the wire screens with a supporting-ring. Fig. 17 shows an elevation of Fig. 16. Fig. 18 is a plan view of the bottom hood. Fig. 19 represents an elevation of Fig. 18. Fig. 20 shows a top view of a link. Fig. 21 is an elevation of Fig. 20. Fig. 22 represents a plan view of a deflecting-cone. Fig. 23 shows an elevation of Fig. 22.

The invention is shown to comprise the receptacle A with the valve-chamber B, on the top of which is secured the hood C. A valve D, with openings d , works over ports b in the valve-chamber B and extends to d' , where it makes a joint with the upper portion c' of the

hood C. From the valve D extends the arm d^2 , terminating in the ball d^3 , which makes a ball-and-socket joint with the link E. In the valve-chamber B is screwed the pin F, which extends up through the hollow vertical extension d^4 of the valve D. The ports b in the air-valve chamber B connect with the passages b^2 . The fuel-chamber G is screwed into the upper portion c' of the hood C which contains the openings c^2 , and this chamber carries the fuel-valve H and is cored at g to provide an annular chamber for the influx of the hydrocarbon. A threaded boss g^2 extends from G, against which is secured the fuel-supply pipe I by means of the nut I'. A central passage g^3 in the boss g^2 leads to the cavity g . A cross-head J is secured on the valve H with the split nut j' , which latter clamps the valve H, by means of which the position of the valve can be varied.

A cylinder is shown at K with its piston L, carrying the packing l , secured against the said piston with the follower-plate l' . The piston-rod N is screwed into the piston and extends through the bonnet M and its projecting barrel m' . The bonnet is pierced with holes m^2 . A collar O is screwed on the piston-rod N to adjust the action of the spring P between the said collar O and the bottom of the projecting barrel m' of the bonnet M. A forked bell-crank Q Q' fits between the collars r of the cross-head R, screwed on the piston-rod N, and is clamped in place by the jam-nut n' . The forked bell-crank Q Q' is carried on a shaft T, supported in bearings U, extending from a stand V with an annular base v' , which is fastened to the sleeve m' of the bonnet M by means of the screw v^2 . The levers Y Z and forked bell-crank Q Q' are fastened to the shaft T. The lever Y works the link E and the lever Z carries a pin z' , to which is hooked the detachable link Z^2 , the latter being worked by the handle-bar z^3 when the said link Z^2 is in operative position on the pin z' of the lever Z. When it is desired to disengage the link Z^2 from the pin z' , a secondary link z^4 , journaled to the handle-bar z^3 , engages a pin z^5 on the link z^2 . The link E by its movement turns the valve D, allowing more or less port-opening for air into the receptacle A. When the forked bell-crank Q Q' is moved by the piston

L, it transmits its motion to the toggle-links j^2 and j^3 , respectively journaled to the cross-head J and chamber H, by means of which the valve H is moved for the admission of the hydrocarbon. The cross-head Q^5 is adjustably clamped on the arm Q of the bell-crank $Q Q'$ with the jam-nuts Q^2 , and the movements of the said arm are transmitted through the said cross-head and the double-forked connecting-rod Q^3 to the pins j^4 , which latter connect the links $j^2 j^3$, the lower of said links being journaled to the fuel-valve chamber G with the pins j^5 and the upper to the cross-head J with the pins j^6 . From the cross-head Q^5 extends a pointer Q^4 , operating over an index s on the arm S, fastened to the stand V. The object of the pointer is to set the cross-head Q^5 in proper operative positions on the forked bell-crank $Q Q'$ to obtain the proper lift of the valve H with the toggle-joint connection for varying grades of hydrocarbons.

In the receptacle A and secured to the valve-chamber B there is a deflecting-cone B^2 with a central opening b' , under which are located a series of wire screens W with rings w' , which latter secure free passages through the said screens. The combination of rings and screens forms a vaporizer, and under the said vaporizer is located a deflector X, inclined outwardly from its center, with openings x^2 near the circumference thereof and beyond the central opening b' of the deflecting-cone B^2 . A second series of screens W^2 are situated below the deflector X, and under the said second series of screens is placed the deflector X^2 , inclined inwardly from its circumference, with a central opening x^3 . The four elements comprising the screens W, deflector X, screens W^2 , and deflector X^2 constitute a combination which can be multiplied a number of times, as shown in the drawings.

It will be noticed that all the elements in the receptacle between the valve-chamber and the base connection, with the exception of the rings and screens, only butt against each other and can be easily removed and cleaned.

Under the lowest deflector X^4 is placed a bottom hood X^5 with openings x^6 , the said hood resting upon the base connection A' . The hood X^5 contains lugs or ears x^7 , which constitute supports for the deflector X^4 , resting thereon.

The base connection A' supports the receptacle A and cylinder K and is tapped for the pipe k' and nipple k^2 , leading to piping k^3 , which latter extends to the exploding-chamber of the engine.

The base connection A' contains the openings a' , which connect with the chamber a^2 , from the top of which ports a^4 lead to the bottom of the hood X^5 . The bottom portion of the chamber a^2 constitutes a reservoir for collecting debris to be discharged by a petcock a^5 . A central longitudinal channel a^3 in the bottom connection A' runs from a cen-

tral opening a^6 to an annular channel a^7 , opening into the cylinder K.

To automatically operate the invention, the cross-heads J Q^5 R and collar O are properly adjusted, the link Z^2 thrown out of gear, and the hydrocarbon fed through the pipe I, whence it will run down the needle-valve H and on the pin F, from which it finds its way through the ports b of the valve-chamber B. Air enters through the ports d of the valve D, mixing with the hydrocarbon, and both travel down the receptacle A through the combinations of screens and deflectors, thereby vaporizing the charge and percolating through the holes x^6 of the lower hood X^5 and the openings a' of the base connection A' , after which the charge passes through the chamber a^2 in the bottom connection and reaches the opening a^6 , which leads to the channel a^3 , from whence the charge, by way of the annular opening a^7 , enters the cylinder K and is finally drawn into the piping $k^2 k^3$. The lower portion of the chamber a^2 collects the debris, which escapes by opening the cock a^5 . The piston of the hydrocarbon-engine (not shown) tends to pull down the piston L by virtue of internal suction and atmospheric pressure through the holes m^2 , which actuates the valves D and H, and this distance increases with the increased number of strokes of the engine, controlling thereby the volumes of air and hydrocarbons admitted to the receptacle A, and when the engine slows up the spring P pulls up the piston L and closes the valves D and H.

Having described my invention, I desire to secure by United States Letters Patent and claim—

1. In a hydrocarbon mixer and regulator, the combination of a receptacle for vaporizing a hydrocarbon and a cylinder, a spring-held piston in the cylinder, a bell-crank moved by the piston, a fuel-valve chamber over the receptacle, a fuel-valve in the latter, toggle-links interposed between the fuel-valve and its chamber, a link transmitting motion between the bell-crank and toggle-links.

2. A hydrocarbon mixer and regulator comprising, a receptacle for vaporizing a hydrocarbon, screens and deflectors in the receptacle, a valve-chamber secured to the receptacle, ports piercing the said chamber, an air-valve working on the valve-chamber, and having a hollow vertical extension, a hood with openings capping the said chamber, a pin extending from the valve-chamber and into the air-valve extension, a fuel-chamber with a central port capping the hood, a fuel-valve working in the said fuel-chamber, an inlet-opening leading to the central port in the fuel-chamber, in combination with a cylinder, a piston working in the cylinder, and connections between the piston and the aforesaid valves, and a base connection, connecting the receptacle and the cylinder.

3. A hydrocarbon mixer and regulator, comprising a receptacle for vaporizing a hydrocar-

bon, and a cylinder, a connection between the receptacle and cylinder, vaporizers in the receptacle, an air-valve operating on inlet-openings for the receptacle, a fuel-valve chamber over the receptacle, a fuel-valve operating in the said chamber, toggle-links secured to the fuel-valve and its chamber, a spring-held piston in the cylinder, a forked bell-crank actuated by the said piston, an adjustable cross-head on the bell-crank, a link connecting the bell-crank and the toggle-links, a lever extending from the bell-crank, and a link connecting the said lever with the air-valve.

4. In a hydrocarbon mixer and regulator, the combination of a receptacle for vaporizing a hydrocarbon, a cylinder, a spring-held piston in the cylinder, a bonnet on the cylinder, a piston-rod extending from the piston through the bonnet, a collar on the piston-rod, a spring around the piston-rod and bearing between the said collar and bonnet, a stand above the bonnet, a bell-crank supported on the stand and moved by the said piston-rod, a pointer moving with the bell-crank, and an index extending from the said stand.

5. In a hydrocarbon mixer and regulator, the combination of a receptacle for vaporizing a hydrocarbon, a cylinder, a spring-held piston in the cylinder, a bonnet on the cylinder, a piston-rod extending from the piston through the bonnet, a collar on the piston-rod, a spring around the piston-rod and bearing between the said collar and bonnet, a stand above the bonnet, a bell-crank supported on the stand and connected with piston-rod, and means to move the bell-crank and piston by hand.

6. A hydrocarbon mixer and regulator comprising, a receptacle for vaporizing a hydrocarbon, screens and deflectors in the receptacle, a cylinder, a piston working in the cylinder, a channeled connection between the receptacle and the cylinder, an air-valve chamber secured to the receptacle, an air-valve in the said chamber, a hood with openings over the air-valve, a fuel-valve chamber secured to the top of the said hood, a fuel-valve in the said chamber, an adjustable cross-head on the fuel-valve, toggle-links connecting the adjustable cross-head and the fuel-valve chamber, a cylinder, a piston actuating in the cylinder, an oscillating shaft, a bell-crank secured to the said shaft, a link extending from the toggle-links to the said bell-crank, a lever on the shaft, a link connecting said lever and the air-valve.

7. A hydrocarbon mixer and regulator comprising, a receptacle for vaporizing a hydrocarbon, screens and deflectors in the receptacle, a cylinder, a bonnet on the cylinder, holes in the bonnet, a piston working in the cylinder, a base connection with a channel connecting the receptacle and the cylinder, a valve-chamber secured to the receptacle, a valve operating in the said valve-chamber, a hood with openings secured to the valve-

chamber, a pin projecting from the valve-chamber into a hollow vertical extension in the valve in said valve-chamber, a fuel-valve chamber on the hood, a needle-valve operating in said fuel-valve chamber, a fuel-supply passage leading into the central port of the fuel-valve chamber, a cross-head on the needle-valve, toggle-links connecting the said cross-head and the fuel-valve chamber, a collar on the piston-rod of the piston, a spring actuating between said collar and the bonnet of the cylinder, a stand secured to the said bonnet, a shaft oscillating in journals of the said stand, a forked bell-crank secured to the shaft, a cross-head on the piston-rod the bell-crank actuating therewith, a link extending from the toggles, a leg of the bell-crank actuating said link; a lever secured to the bell-crank shaft, a link secured to the said lever and extending to an arm projecting from the air-valve.

8. A hydrocarbon mixer and regulator comprising a receptacle A for vaporizing a hydrocarbon, a cylinder K, a piston L in the said cylinder, a base connection A' with channel a^3 , between the receptacle A' and the cylinder K, an air-valve chamber B secured to the receptacle, an air-valve D over ports b in the said valve-chamber, a hood C on top of the valve-chamber B and the fuel-valve chamber G over the said hood, a fuel-valve H in the fuel-chamber G, a pin F in the valve D, an adjustable cross-head J clamped to the valve H, toggle-links j^2, j^3 connecting the cross-head J and the fuel-valve chamber G, a bonnet M with holes m^2 on the cylinder K, a stand V extending from the bonnet M, a shaft T supported in bearings on said stand, a forked bell-crank Q Q' fastened to the shaft T, a piston-rod N extending through the bonnet M, a collar O on the piston-rod, a spring P between the collar O and the bonnet M, a cross-head R on the rod N, the forked end of bell-crank Q Q' fitting between collars r of the cross-head R, an adjustable cross-head Q⁵ on the bell-crank Q Q', a forked link Q³ connecting the bell-crank and the toggle-links, a pointer Q⁴ secured to the cross-head Q⁵, an arm S with index s for the pointer Q⁴, piping k', k^2, k^3 connecting with the inside of cylinder K, a lever Y on the shaft T, a link E connecting the said shaft and an arm d^2 extending from the valve D, a deflecting-cone B² secured to the valve-chamber B, screens W with rings w' , &c., deflectors X X², &c., and the bottom hood X⁵ in the receptacle, a base connection A', with openings a', a^4 , and a^6 , and channels a^2 and a^3 , leading from the receptacle to the cylinder K.

Signed at New York, in the county of New York and State of New York, this 25th day of May, A. D. 1901.

GEORGE CHARLES ESKHOLME.

Witnesses:

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WALTER B. PIERSON.