

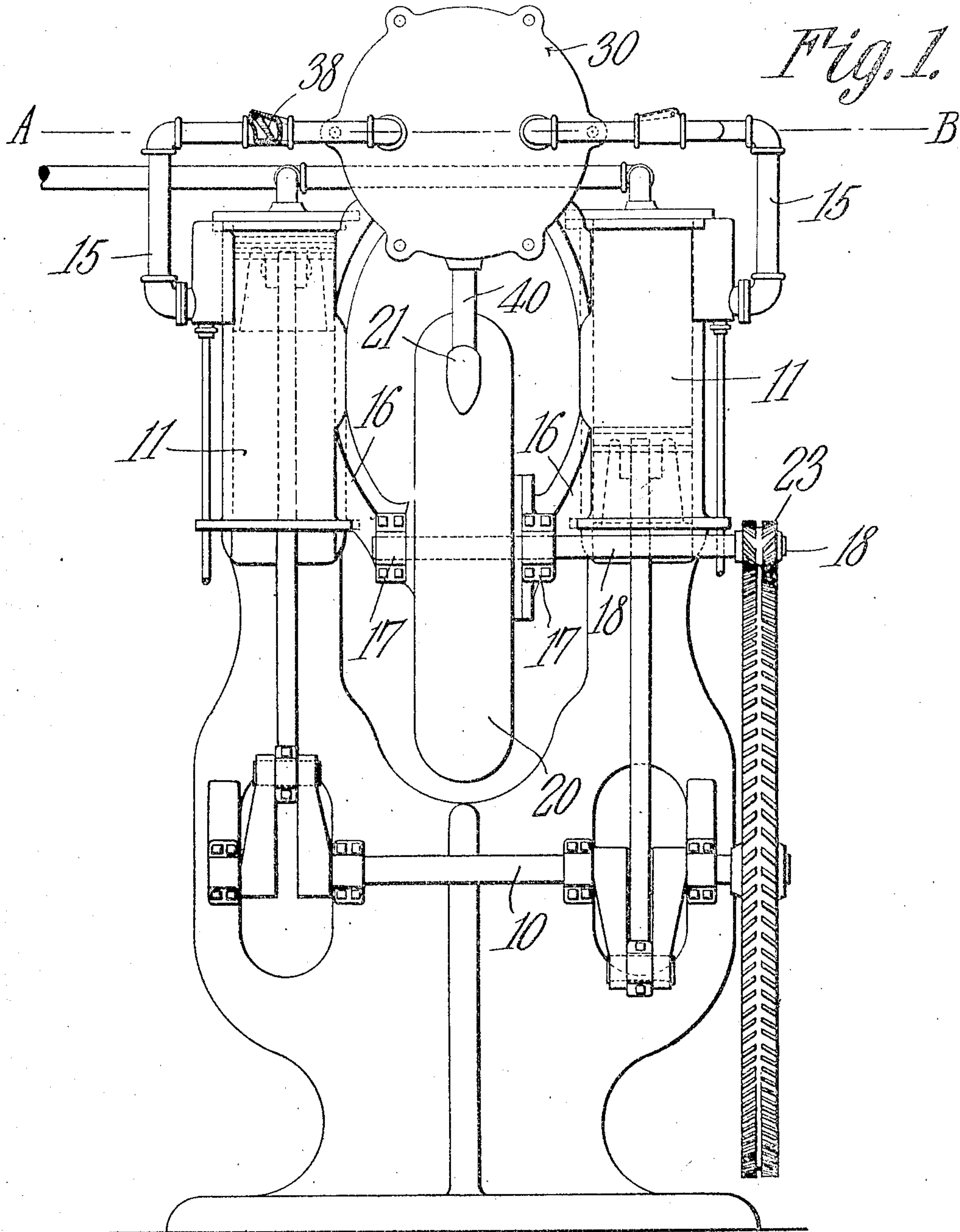
No. 887,345.

PATENTED MAY 12, 1908

H. A. & J. C. PRESCOTT.
INTERNAL COMBUSTION ENGINE.

APPLICATION FILED APR. 29, 1907.

3 SHEETS--SHEET 1.



WITNESSES:

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J. E. [Signature]

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By

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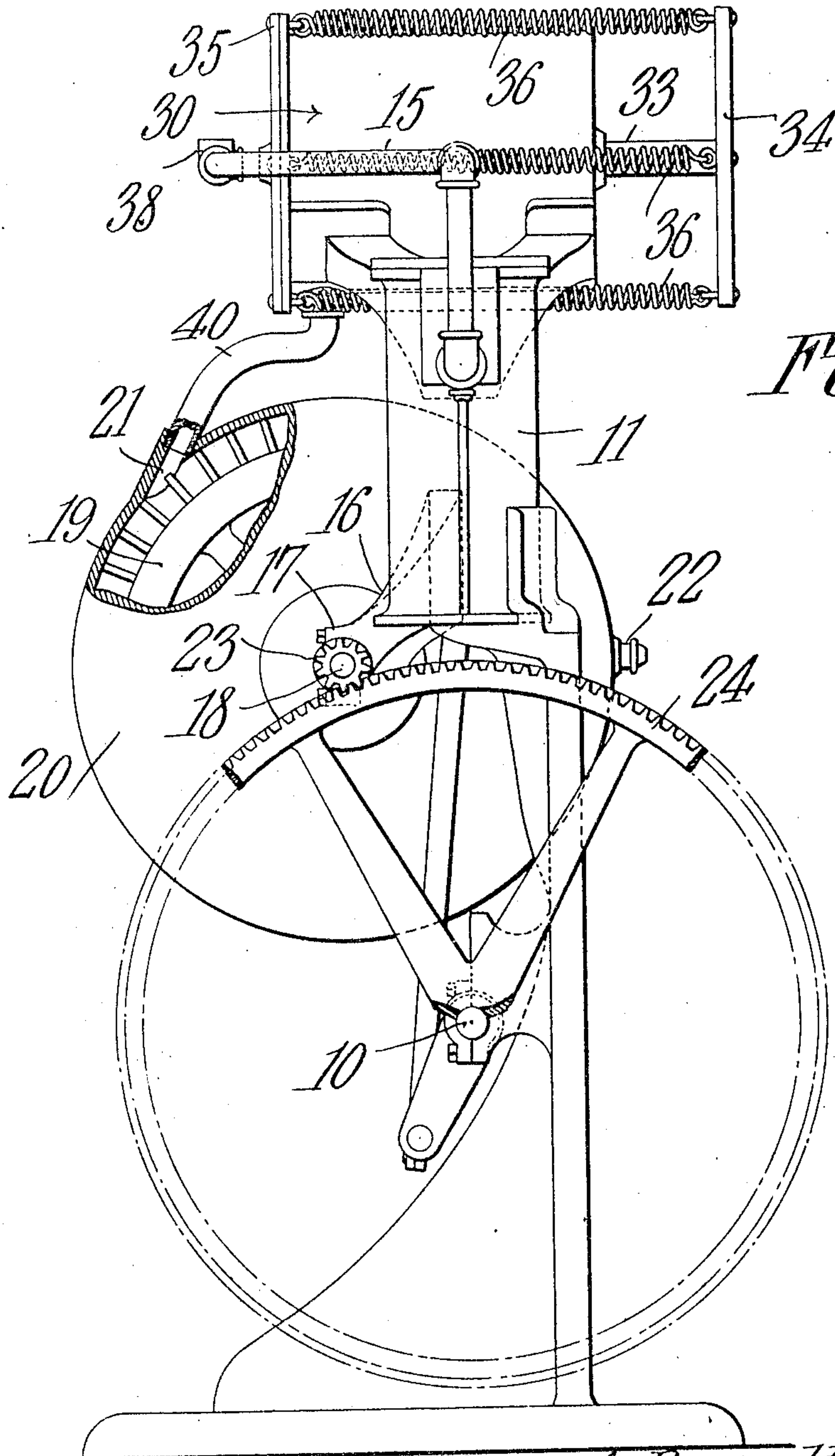
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3 SHEETS—SHEET 2.



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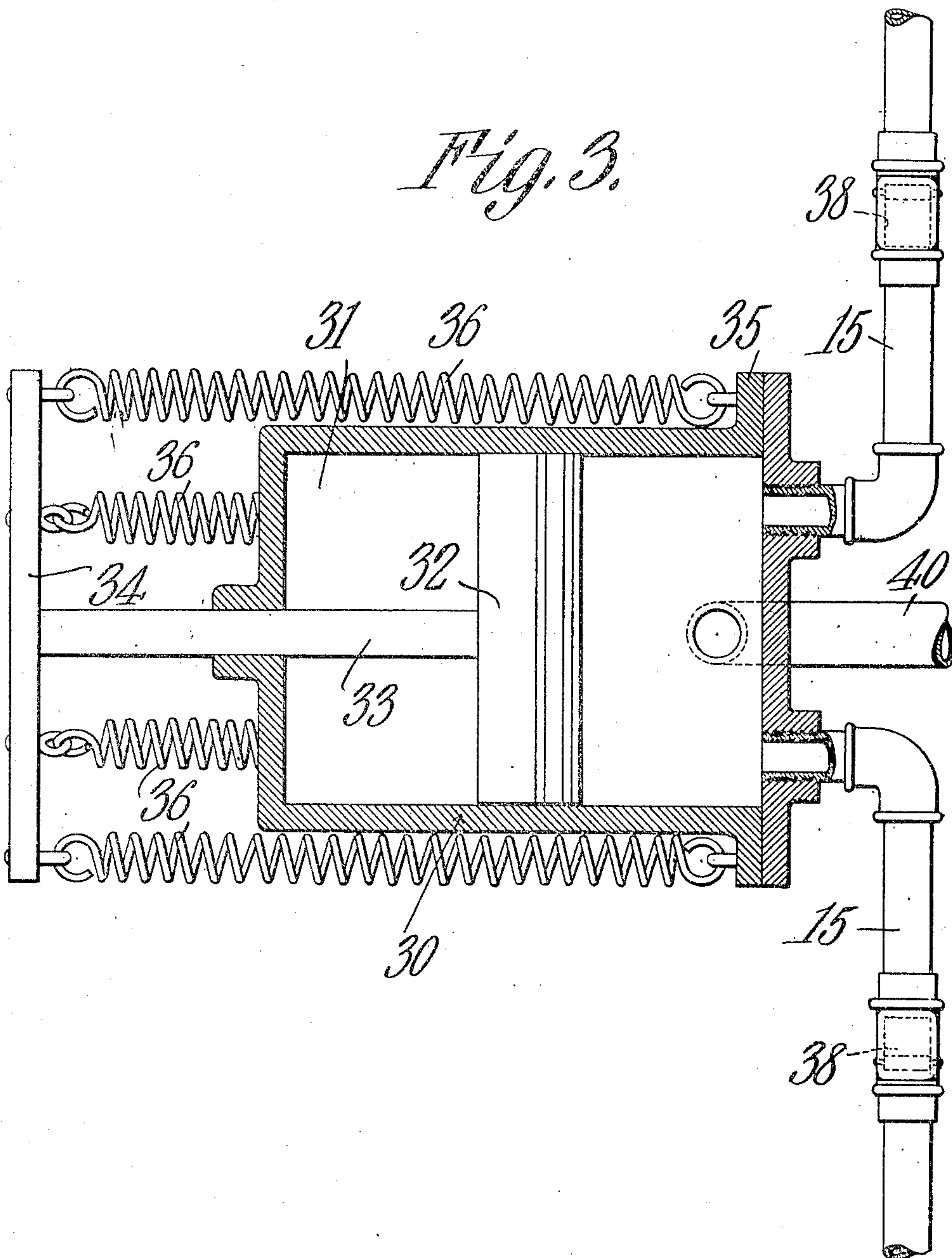
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

HENRY A. PRESCOTT AND JAMES C. PRESCOTT, OF GERMANTOWN, PENNSYLVANIA,
ASSIGNORS OF ONE-TENTH TO RAMSDEN SMIRTHWAITE, OF GERMANTOWN, PENN-
SYLVANIA.

INTERNAL-COMBUSTION ENGINE.

No. 887,345.

Specification of Letters Patent.

Patented May 12, 1903.

Application filed April 29, 1907. Serial No. 370,344.

To all whom it may concern:

Be it known that we, HENRY A. PRESCOTT and JAMES C. PRESCOTT, citizens of the United States, residing at Germantown, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Internal-Combustion Engine, of which the following is a specification.

This invention relates to internal combustion engines, and has for its principal object to provide an engine in which both the explosive and expansive forces of the gases are fully utilized.

A further object of the invention is to provide an internal combustion engine in which one or more ordinary gas engines are coupled to a crank shaft while the exhaust from such engines is employed for the purpose of operating an impact motor or turbine engine which is geared to the same crank shaft, the gearing being so proportioned that the turbine wheel is allowed to run at the high speed considered essential to bring the full efficiency of the engine into play.

A still further object of the invention is to provide a device of this class in which a receiver is employed between the cylinders of the primary engine or engines and the turbine to receive the intermittent exhaust, and to discharge through the turbine a continuous stream of gas under uniform, or approximately uniform pressure.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a front elevation of an internal combustion engine constructed and arranged in accordance with the invention, one of the check valves being shown in section. Fig. 2 is a side elevation of the same, partly in section. Fig. 3 is a sectional plan view of the exhaust receiver and equalizer on the line A—B of Fig. 1.

Similar numerals of reference are employed to indicate corresponding parts

throughout the several figures of the drawings.

In the present embodiment of the invention, two ordinary four-cycle engines are coupled to a crank shaft 10, these engines each including a cylinder 11, and the usual piston and connecting rods. Each cylinder is further provided with suitable means for the supply of explosive charges and with an exhaust pipe 15 through which the exploded gases discharge after the working stroke.

The two cylinders 11 are slightly spaced from each other, and on the rear of each cylinder is placed a bracket 16, and the two brackets carry bearings 17 for the support of a shaft 18 on which is mounted a turbine wheel or disk 19, the latter being inclosed within a suitable casing 20 which is secured to the cylinders 11. The turbine casing has an inlet port 21 and a suitable discharge port 22. It is well understood that the efficiency of turbine engines is not developed unless the engines are allowed to run at very high speed, and to permit this and at the same time transmit the energy to the main crank shaft 10, the turbine shaft is provided with a very small pinion 23 which intermeshes with a large gear 24 secured to the crank shaft 10. In connecting these two shafts, Hookes gearing is used, the teeth being inclined approximately at an angle of forty-five degrees and the teeth at the center of the faces of the gears are slightly spaced from each other for convenience in manufacture. These gears serve to keep the turbine wheel from wobbling and insure smooth, even running, all back-lash being prevented.

In order to secure uniform operation of the turbine, an equalizer 30 is arranged between the cylinders 11 and the inlet port 21 of the turbine. This equalizer comprises a cylinder 31 in which is arranged a piston 32 that is carried by a rod 33 extending through one of the cylinder heads and provided at its outer end with a spider 34. The arms of the spider are connected to the base 35 of the cylinder by means of a plurality of tension springs 36, so that the piston is constantly urged toward the end of the cylinder. The exhaust pipes 15 which lead into the cylinder 31 are provided with check valves 38 that open in the direction of the cylinder, and as the exhaust gases are forced from the cylinders 11 they will pass through these pipes to the cyl-

inder 31, the check valve being open, and then as the suction stroke of the main piston commences, the check valve will be closed and the charge will be retained within the
5 cylinder 31. The cylinder 31 receives the intermittent discharges and forces the same through a pipe 40 to the inlet port 21 of the turbine, the stream of gas which enters the turbine being at practically uniform pres-
10 sure, and being constant, as distinguished from the intermittent supply to the cylinder.

There is naturally some loss of energy in forcing the products of combustion from the primary cylinders into the receiver, but in
15 actual practice based on close observation and tests of a working engine constructed in accordance with the invention, it is found that this loss of energy is more than counter-
balanced by the energy which is transmitted
20 from the turbine to the crank shaft. Aside from this the turbine will act in a measure as a fly wheel or balance wheel for the gas engine, and will tend to make the latter run more smoothly than it otherwise would,
25 owing to the fact that there is constant power exerted on the crank shaft.

We claim:—

1. In apparatus of the class described, an
internal combustion engine including a frame,
30 a crank shaft journaled therein, cylinders supported by the frame and having exhaust ports, pistons arranged in said cylinders and connected to the crank shaft, brackets extending from the cylinders, a shaft mounted
35 in bearings on said brackets, a rotary impact motor on the shaft, a pinion on the motor

shaft, a gear carried by the crank shaft and intermeshing with the pinion, an equalizing chamber supported by the cylinders and to
which the exhaust ports of said cylinders are
40 connected, check valves arranged in the exhaust pipes for preventing the back flow of the products of combustion, and a discharge pipe leading from the equalizing chamber to the impact motor, the equalizing chamber
45 serving to receive the intermittent discharge or exhaust from the cylinder and to supply a constant stream of fluid under practically uniform pressure to the impact motor.

2. In apparatus of the class described, an
50 internal combustion engine including a crank shaft, a high speed rotary impact engine, gearing connections between the shafts of the two engines, the gearing being proportioned to allow the rotary engine to revolve at much
55 greater speed than the crank shaft, an equalizing chamber connected to the inlet port of the rotary impact motor and arranged to supply thereto a constant stream of oper-
ating fluid under practically uniform pres-
60 sure, and means for connecting the exhaust of the internal combustion engine to said chamber, the latter receiving the exhaust products of combustion intermittently.

In testimony that we claim the foregoing
65 as our own, we have hereto affixed our signatures in the presence of two witnesses.

HENRY A. PRESCOTT.
JAMES C. PRESCOTT.

Witnesses:

JAMES F. COURTNEY,
HERMAN E. FISCHER.