No. 759,953. PATENTED MAY 17, 1904.

D. V. BAGWELL.

ROTARY EXPLOSIVE ENGINE.

APPLICATION FILED SEPT. 28, 1903.

NO MODEL.

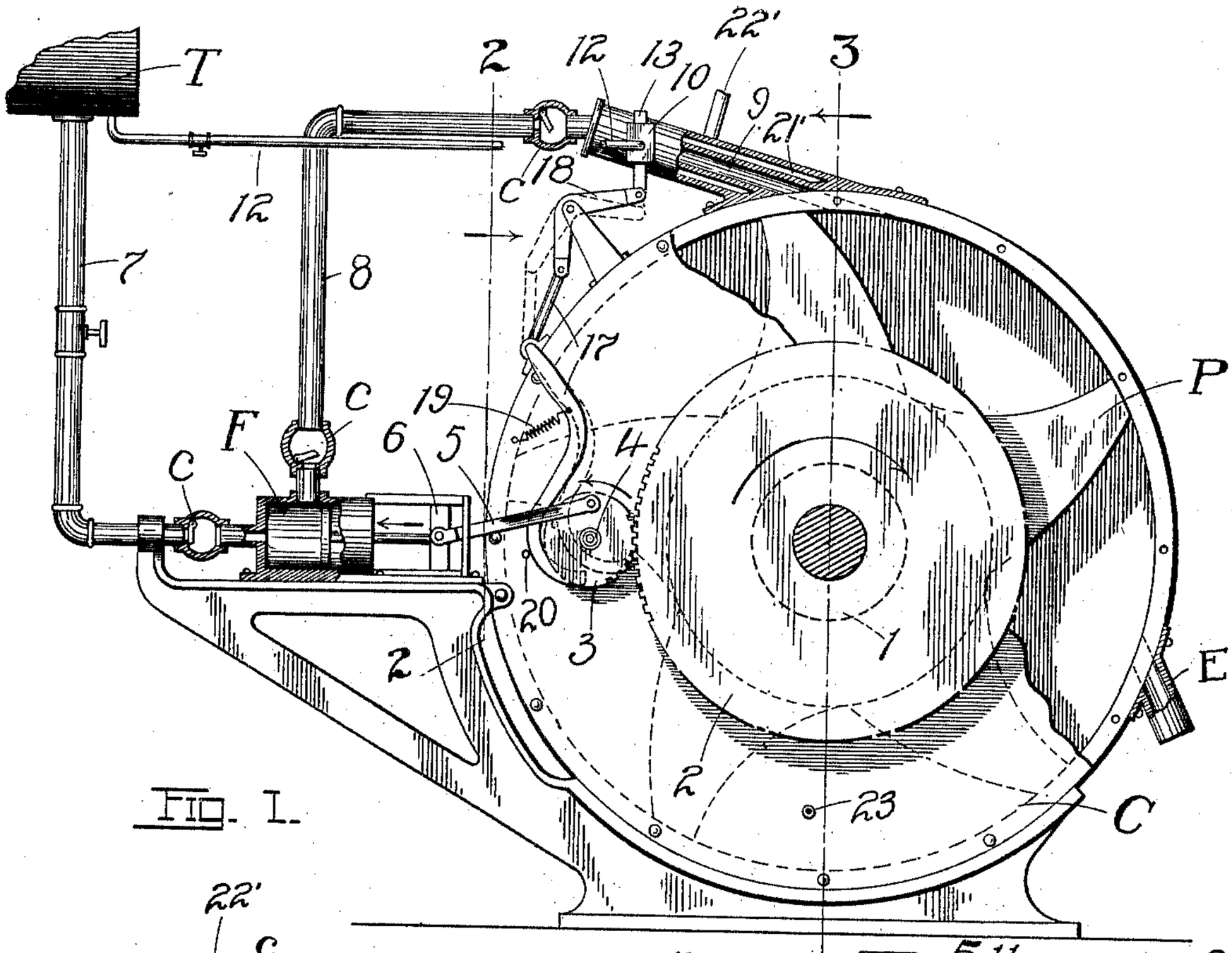

FIG. 1.

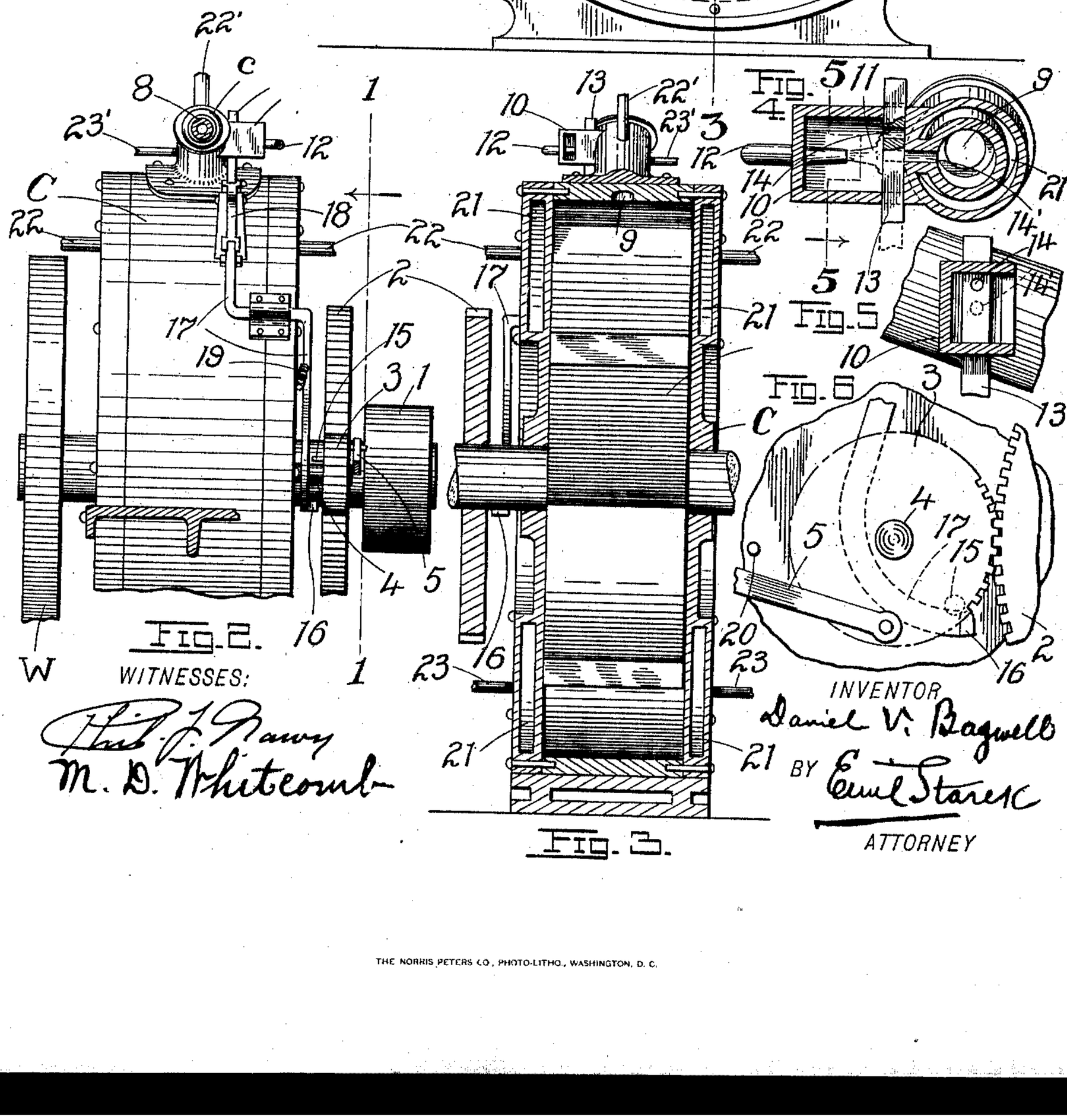

FIG. 2.

FIG. 3.

WITNESSES:

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No. 759,953. Patented May 17, 1904.

UNITED STATES PATENT OFFICE.

DANIEL V. BAGWELL, OF ST. LOUIS, MISSOURI.

ROTARY EXPLOSIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 759,953, dated May 17, 1904.

Application filed September 28, 1903. Serial No. 174,920. (No model.)

To all whom it may concern:

Be it known that I, DANIEL V. BAGWELL, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Rotary Explosive-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in rotary explosive-engines; and it consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claim.

In the drawings, Figure 1 is a longitudinal vertical section on line 1 1 of Fig. 2. Fig. 2 is a transverse vertical section on line 2 2 of Fig. 1. Fig. 3 is a transverse vertical section on line 3 3 of Fig. 1. Fig. 4 is a sectional detail of the pilot-flame chamber and explosion-chamber, the latter being in cross-section. Fig. 5 is a section on line 5 5 of Fig. 4; and Fig. 6 is an enlarged face view of the pinion and tripping-pin carried thereby, showing the relative positions of the pin and the free end of the lever tripped thereby as the pin is passing off the terminal lug of said lever.

The object of my invention is to construct a rotary explosive-engine which will be compact, simple in construction, develop a high efficiency, contain a minimum number of parts, and possess further and other advantages better apparent from a detailed description of the invention, which is follows:

Referring to the drawings, C represents a casing or cylinder within which revolves the rotary piston P, comprising in the present instance five radial blades which are impelled onward by the exploding gas. The shaft of the piston on one side of the cylinder carries a fly-wheel W and on the opposite side a belt-pulley 1, adjacent to which is located a gear-wheel 2, meshing with a pinion 3, which is supported on a shaft 4, carried by the cylinder-wall. Coupled to the outer face of the pinion is one end of a connecting-rod 5, whose opposite end is secured to a cross-head 6, which actuates the piston of a force-pump F. Leading to one end of the pump-cylinder is the gasolene-supply pipe 7, which takes its supply from a suitable hydrocarbon-tank T. Likewise leading from the pump-cylinder is a discharge-pipe 8, the several pipes being provided with suitable check-valves *c c c* to properly control the influx and efflux of the liquid.

Disposed tangentially to the periphery of the cylinder C is a water-cooled explosion-chamber 9, provided with a lighting or pilot chamber 10, the pilot-flame 11 burning permanently within said pilot-chamber from the end of the pipe 12, leading to the tank. Adapted to reciprocate within the pilot-chamber, along the wall separating it from the explosion-chamber 9, is a plate or valve 13, which is provided with an opening 14, adapted at the proper moment to register with a corresponding opening 14′, formed in said division-wall, Fig. 4, when the flame shoots through the alined openings into the chamber 9, thereby exploding the gas within said chamber and driving the blades of the piston P before it. The valve 13 is operated directly from the pinion 3 by the following mechanism: The inner face of the pinion carries a tripping-pin 15, which with every revolution engages or strikes an outwardly-deflected lug 16, formed at the lower end of the long arm of the bent lever 17, pivoted to the cylinder-wall, the end of the short arm of said lever being pivotally coupled to the adjacent end of one arm of a bell-crank lever 18, whose opposite arm is in pivotal connection with the lower end of the valve 13. The pin 15 and the lug 16 rotating about different centers, it follows that eventually the pin will slip off the lug, Fig. 6, allowing the lever 17 to return to its normal position under the action of the retracting-spring 19, the lever being limited in its return movement by a pin 20. Thus with every tripping of the lever 17 by the pin 15 the valve 13 is depressed, bringing the openings 14 14′ into alinement and permitting the explosion to take place in the manner indicated. The relative diameters of the gear-wheel 2 and pinion 3 are as five to one, so that for one revolution of the shaft of the piston P the pinion 3 rotates five times—that is to say, it forces the hydrocarbon five times into the explosion-

chamber—that being the number of blades which must receive the impact of the explosion for a single revolution of the shaft. The cylinder C is provided with a water-jacket 21, to which water is supplied and from which it is discharged by pipes 22 23, respectively. The water-jacket 21′ about the explosion-chamber is likewise connected to supply and discharge pipes 22′ 23′, respectively. The parts are so adjusted that the retraction of the valve 13 to bring the ports 14 14′ into alinement takes place just as the pin 15 is about to slip off the lug 16 of the tilting lever 17, whereupon at the moment of the explosion the spring 19 may retract the parts, so as to cut off communication between the pilot, flame and explosion chamber as the explosion takes place. In this way the pilot is not extinguished and a permanent operation of the engine is assured.

It is of course apparent that I need not limit myself to the precise details herein set forth, as these may in a measure be departed from without in any wise affecting the nature or spirit of my invention.

E represents the exhaust for the engine.

Having described my invention, what I claim is—

In an explosive-engine, a suitable cylinder, a rotatable piston therefor, an explosion-chamber, a gear-wheel on the piston-shaft, a pinion engaging said gear-wheel, a lever in proximity to the pinion, a lug at the end of one arm of said lever, a tripping-pin on the pinion adapted to engage said lug and trip the lever in one direction, a bell-crank pivoted beyond the lever and having one member in pivotal connection with the opposite arm thereof, a pilot-flame chamber, a supply-tank, a pipe leading therefrom to the pilot-chamber for supplying hydrocarbon thereto, a reciprocating valve operating in said chamber and having one end coöperatively connected to the opposite member of the bell-crank, and a spring for retracting the lever, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL V. BAGWELL.

Witnesses:

EMIL STAREK,

MARY D. WHITCOMB.