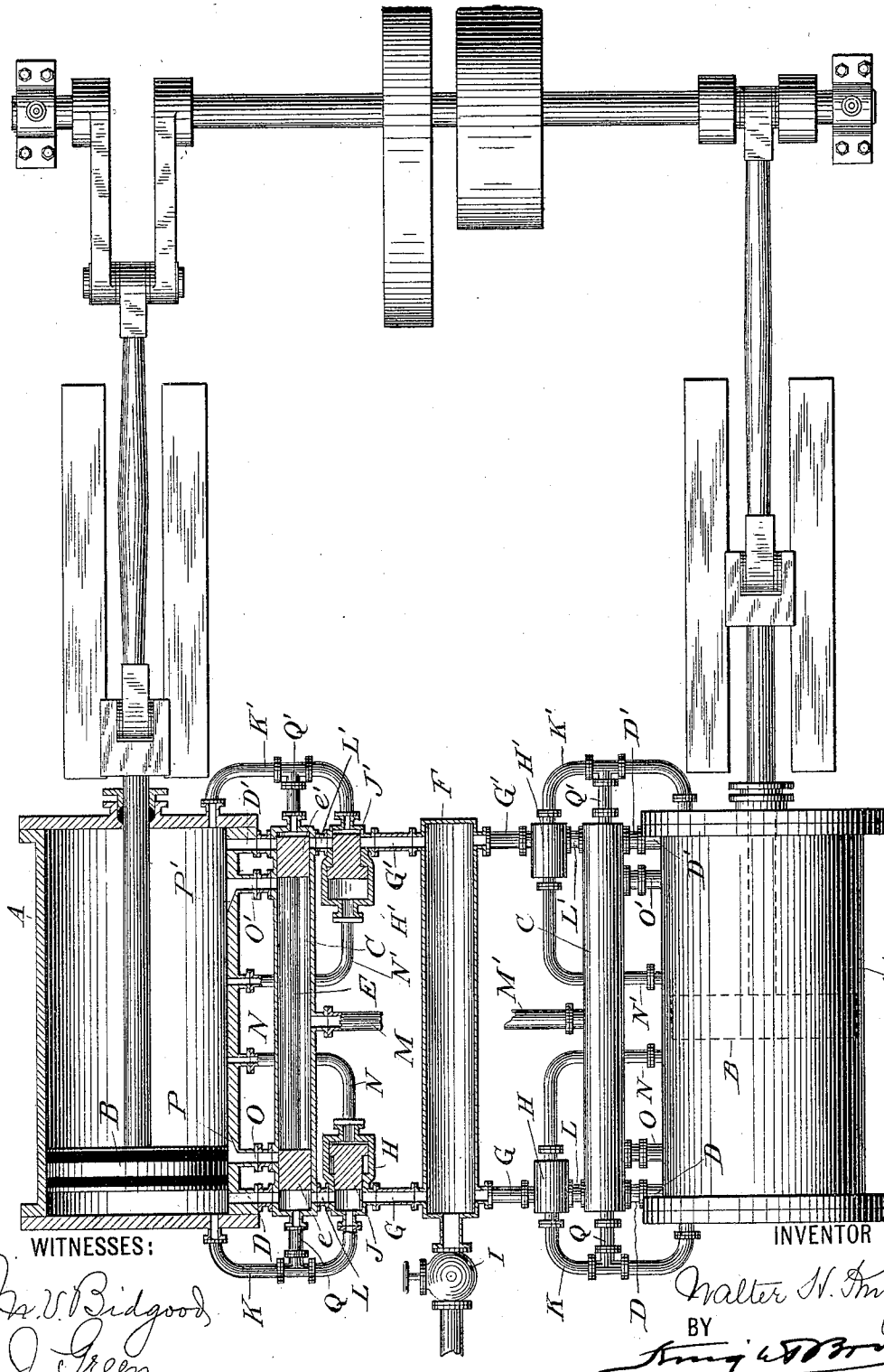
(No Model.)

W. H. KNIGHT.

FLUID PRESSURE MOTOR.

No. 589,355. Patented Aug. 31, 1897.



WITNESSES:

Jas. V. Bidgood

J. Green

INVENTOR

Walter N. Knight

BY

Knight Bros

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WALTER H. KNIGHT, OF NEW BRIGHTON, NEW YORK.

FLUID-PRESSURE MOTOR.

SPECIFICATION forming part of Letters Patent No. 589,355, dated August 31, 1897.

Application filed May 7, 1896. Serial No. 590,612. (No model.)

To all whom it may concern:

Be it known that I, WALTER H. KNIGHT, a citizen of the United States, residing at New Brighton, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Fluid-Pressure Motors, of which the following is a specification.

My invention is particularly applicable to fluid-pressure engines in which the main valve and cut-off valves are operated by fluid-pressure, but my improvements may be applied to other forms of fluid-pressure engines.

My invention consists in arranging the exhaust-ports at such points and of such size that they will be opened by the piston to allow the exhaust of the expanding working fluid at or just before the completion of each stroke of the piston and before the commencement of the return stroke. By this means the rapidity of action and efficiency of the engine are greatly increased for the reason that the surplus in pressure of the working fluid behind the piston is relieved and reduced to atmospheric pressure before the piston begins its return stroke.

I will describe my improvements more particularly in connection with the accompanying drawing, which represents a plan view of a fluid-pressure engine embodying my invention, part being in section to show the internal arrangement of the valves and ports.

A A are the cylinders, and B B are the pistons.

C C are the main-valve chambers, communicating with the cylinders A A through fluid-supply ports D D′, located adjacent to the ends of the cylinders.

E is the main valve, comprising the cylindrical heads *e e′*, working in the casing C and united by a rod.

F is the fluid-pressure chest, communicating through ports G G′ with the cut-off-valve casings H H′ and adapted to receive fluid under pressure through the throttle-valve I. The cut-off-valve casings H H′ communicate with the ends of the cylinders through ports K K′, and with the main-valve casing through ports L L′.

J J′ are the cylindrical cut-off valves, working in casings H H′ and having differential pressure-faces, the larger face in each case being presented toward the port N or N′, presently to be referred to. The ends of the main-valve casings C also communicate with the ports K K′ through ports Q Q′. The casings C C communicate with exhaust-ports M M′, through which the cylinders exhaust.

N N′ are ports leading from the cylinders A to the casings H H′ on the opposite sides of the cut-off valves from ports K K′.

O O′ are exhaust-ports leading from the cylinders to the main-valve casings C C. The exhaust-ports are formed with depressions or recesses P P′, extending inwardly toward the center of the cylinder from the exhaust-ports and becoming gradually smaller or tapering toward the center of the cylinder.

The operation may be briefly described as follows: At the left-hand side of the sheet the parts are shown in the position they assume just as the piston B is starting on its return stroke, the cylinder A taking compressed air or other fluid through the main supply-ports G, D, and K from the chest F. The piston moves to the right under the action of the live air or other fluid until it passes the port N, when the live air will pass through port N to valve-casing H and shift the cut-off valve J, which cuts off the supply of fluid to the cylinder. The piston then continues its stroke under the action of the expansion of the fluid which is confined in the cylinder, the cylinder exhausting in front of the piston during the stroke through the exhaust-port O′, casing C, and exhaust M. When the piston passes the exhaust-port O′, the air confined between the piston and the end of the cylinder will be compressed for acting, through port K′, upon the main-valve head *e′* and cut-off valve J′ for shifting them. Before the compression has gone far enough to effect the shifting of the valves, however, the piston will pass over and uncover the depression or recess P′ and allow the expanding working fluid behind the piston to bleed out or exhaust into the exhaust-port O′ and escape through pipe M. Just as soon as this has been accomplished the compression in the end of the cylinder will have increased sufficiently to actuate the valves, when the operations will be repeated at the other end of the cylinder.

Having thus described my invention, the following is what I desire to claim:

1. A fluid-pressure engine having supply and exhaust ports, and main and cut-off valves, with depressions or extensions forming continuations of the exhaust-ports in the cylinder for bleeding the expanding working fluid from the cylinder into the exhaust when uncovered by the piston at or near the end of its stroke, as set forth.

2. In a fluid-pressure engine, the combination of the cylinder having supply and exhaust ports adjacent to its opposite ends, depressions or recesses extending from the exhaust-ports toward the center of the cylinder and the piston adapted to uncover the depressions or recesses just before or at the completion of each stroke for the purpose of bleeding the expanding working fluid from behind the piston before it starts on its return stroke, as set forth.

3. In a fluid-pressure engine, the combination of the cylinder having supply and exhaust ports adjacent to its opposite ends, tapering depressions or recesses extending from the exhaust-ports and tapering toward the center of the cylinder, and the piston adapted to uncover the depressions or recesses just before or at the completion of each stroke for the purpose of bleeding the expanding working fluid from behind the piston before it starts on its return stroke, as set forth.

WALTER H. KNIGHT.

Witnesses:
HARRY E. KNIGHT,
M. V. BIDGOOD.