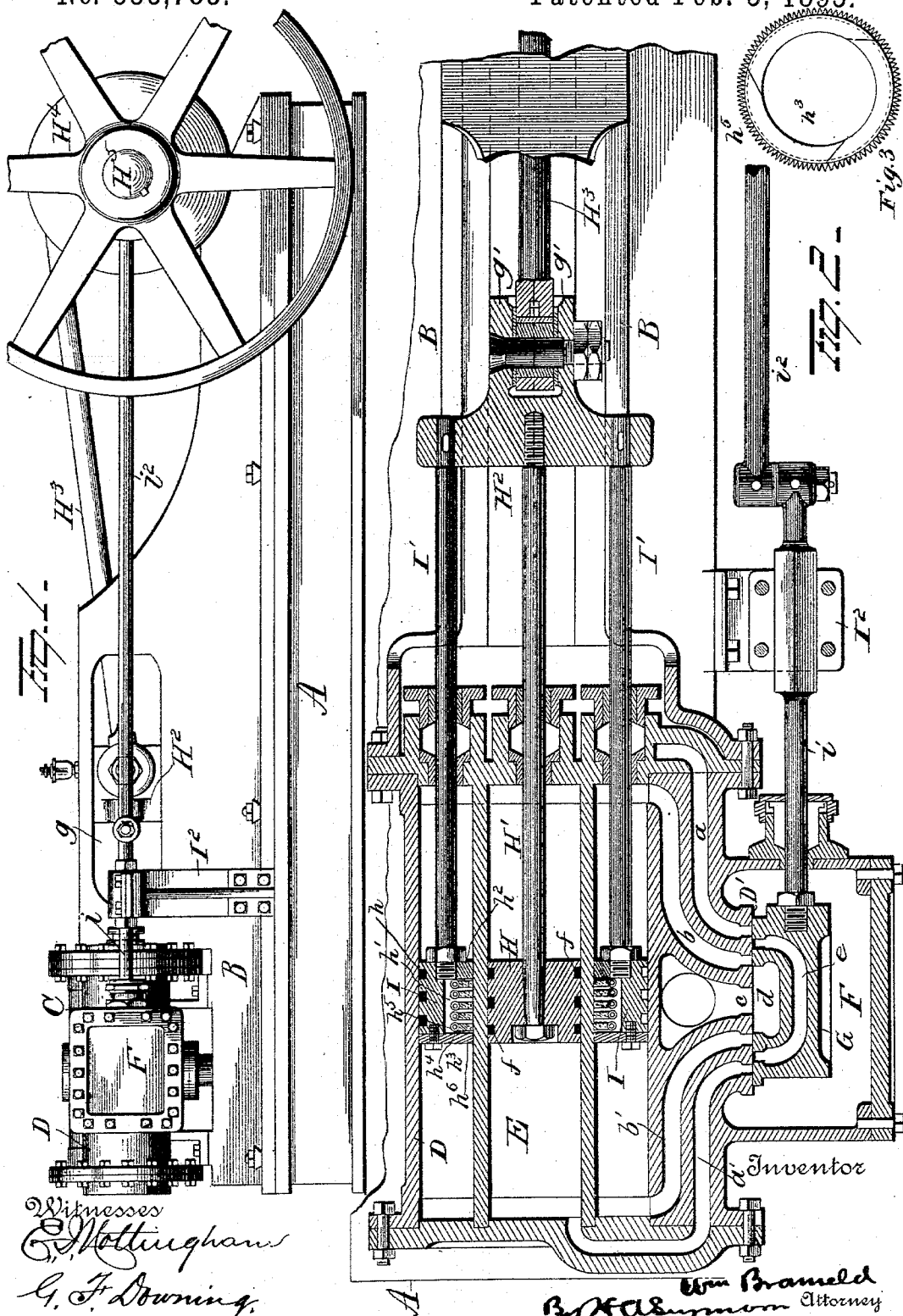


(No Model.)

W. BRAMELD.
STEAM ENGINE.

No. 533,783.

Patented Feb. 5, 1895.



UNITED STATES PATENT OFFICE.

WILLIAM BRAMELD, OF PATERSON, NEW JERSEY.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 533,783, dated February 5, 1895.

Application filed April 5, 1892. Renewed July 24, 1894. Serial No. 518,435. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BRAMELD, of Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in steam engines and more particularly to compound engines,—the object of the invention being to produce a compound engine which will be very economical in the use of steam and yet produce the desired results.

A further object is to produce a compound steam engine which shall be simple in construction, cheap to manufacture and effectual in the performance of its functions.

A further object is to produce a simple compound engine which shall be equally adaptable for use as locomotive engines, marine engines, stationary engines, steam pumps and in fact all kinds of engines in which the piston has a reciprocating movement.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings: Figure 1 is a side elevation of my improved engine. Fig. 2 is a horizontal sectional view of the engine, the engine bed and driven devices being shown in plan. Fig. 3 is a view of one of the sectional packing rings showing the spring encircling it.

A represents an engine bed having uprights or standards B,—on which latter the engine C is located.

The engine comprises an outer or low pressure cylinder D and an inner or high pressure cylinder E, the head of each cylinder being provided with openings and stuffing boxes for the accommodation of piston rods as hereinafter explained.

A steam chest F is located at one side of the cylinder D and is provided with the usual opening and stuffing box for the accommodation of the valve rod. The outer cylinder D is made with a valve seat D' which pro-

jects within the steam chest F, and communicating with the steam chest through the valve seat are two ducts or passages *a, a'*, the passage or duct *a* communicating at its other end with the front end of the inner or high pressure cylinder E and the passage or duct *a'* communicating at its other end with the rear end of said high pressure cylinder.

Two ducts or passages *b, b'* communicate at their inner ends with the steam chest at points on the valve seat located inwardly from the ducts or passages *a, a'*,—the other or outer ends of said ducts or passages *b, b'*, communicating with the respective ends of the outer or low pressure cylinder D. The exhaust communicates with the valve chest at *c*. A valve G is located within the steam chest F and adapted to slide on the valve seat D', said valve being made with a recess *d* adapted to alternately connect the ducts or passages *b, b'* with the exhaust *c*, and with a passage *e*, for the purpose which will be explained farther on.

Located within the high pressure or inner cylinder E, is a piston H provided with a series of packing rings *f* on its periphery. Secured to the piston H is a piston rod H', which passes through the head of the cylinder and the packing boxes secured thereto, and is connected at its rear end with a block H²,—which box is adapted to have a sliding movement in ways *g* in the uprights or frame B. The block H² is provided with rearwardly projecting lugs *g'* between which one end of a pitman H³ is pivotally connected, the other end of said pitman being connected with eccentrics H⁴ carried by the main shaft H⁵.

Located in the outer or low pressure cylinder is a piston I. The piston I is provided on its periphery with packing rings *h*. A recess *h'* is made in the inner face of the piston I, said recess being of such length as to leave a portion *h²* about two inches wide adapted to bear against and slide on the exterior of the inner or high pressure cylinder E. Located within the recess *h'* and encircling the cylinder E, is a series of sectional rings *h³*, provided in their peripheries with grooves *h⁴*, in which grooves spiral springs *h⁵* are placed. A follower *h⁶* is secured to the rear end of the piston I, and adapted to close the recess *h'*.

From the construction and arrangement of

the piston I as above explained, it will be seen that said piston is provided with steam tight packings adapted to bear against the inner face of the cylinder D and the outer face of the cylinder E. The construction and arrangement of the inner packing devices being very elastic, there will be very little friction between the piston I and the cylinder E. Piston rods I' are secured to the piston I, preferably at diametrically opposite points, and project through the head of the cylinder E and the packing boxes secured thereto, being secured at their rear ends to the sliding block H², as most clearly shown in Fig. 2.

A valve rod i is secured to the valve G, and has a sliding bearing on a post or standard I²,—the rear end of said valve rod being connected with a pitman i², which latter is connected with an eccentric carried by the main shaft.

The engine being constructed and arranged as above set forth operates as follows: When the slide valve G is at the outer extremity of its throw steam will pass from the steam chest, through the duct or passage a, into the inner or high pressure cylinder E and act upon the piston H to drive it forward. At the same time the ducts a' and b will be connected by the passage e in the valve G, so that the partially spent steam in the forward end of the inner cylinder E will be permitted to pass through the ducts or passages a', b, and e, into the rear end of the outer or low pressure cylinder D and act upon the piston I. It will be seen therefore that when the valve G moves to the outer extremity of its throw, live steam will be admitted to the inner or high pressure cylinder and at the same time partially spent steam from the opposite side of the high pressure piston will be made to act upon the low pressure piston in the cylinder D. It will also be seen that when the valve G is at the outer extremity of its throw the spent steam in the outer end of the low pressure cylinder D will exhaust through the duct or port b' and recess d in the valve G. When the valve G is moved to the inner extremity of its throw the live steam will flow through

the passage a', the partially spent steam through the ducts or ports a, b' and e, and the exhaust will be through the port b.

By the construction and arrangement of the engine as above described a very simple and efficient engine will be produced for compounding the steam or using it twice, thus greatly economizing the use of steam with a very simple and cheap arrangement of apparatus.

The engine is adaptable for use for all purposes where a reciprocating movement of the piston is desired.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a high pressure cylinder a concentric low pressure cylinder, and a single valve for admitting steam to both, of an outer piston an inner piston, the former having a recessed inner face, sectional packing rings located within said recess, and bearing against the periphery of the inner cylinder and springs also located within said recess and bearing on the sectional rings, substantially as set forth.

2. The combination with a high pressure cylinder and a concentric low pressure cylinder and a single valve for admitting steam to both, of an outer piston and inner piston, the former having a recessed inner face, sectional packing rings located within said recess and bearing against the periphery of the inner cylinder, springs also located within said recess and bearing on the sectional rings, and two piston rods connected at their inner ends to the outer piston and a single piston rod connected to the inner cylinder the several rods being connected at their outer ends to a single block or sliding head, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM BRAMELD.

Witnesses:

GEORGE P. SCOTT,
CHARLES FLINT.