(No Model.)

J. PLAYER.

CONCENTRIC COMPOUND ENGINE.

No. 499,589. Patented June 13, 1893.

FIG. 2.

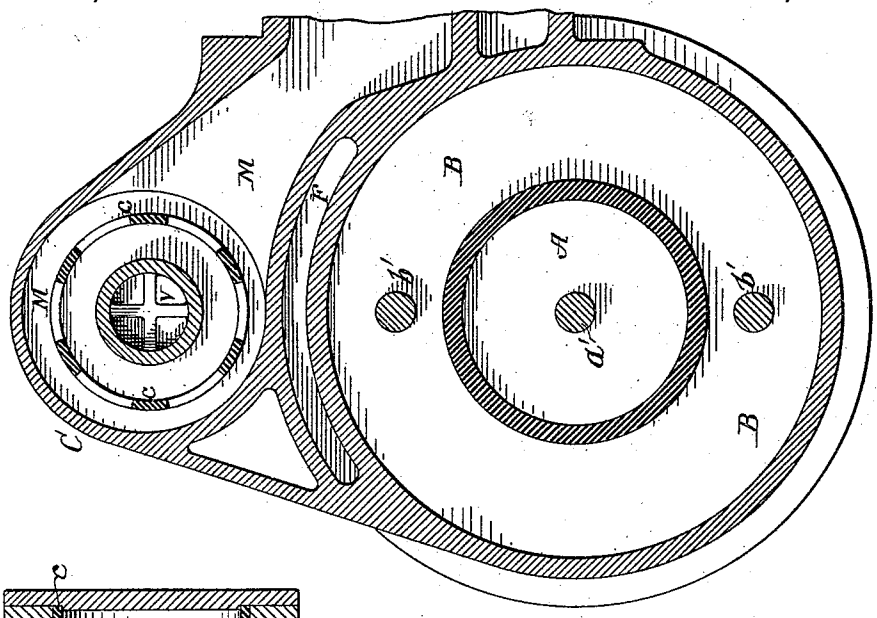
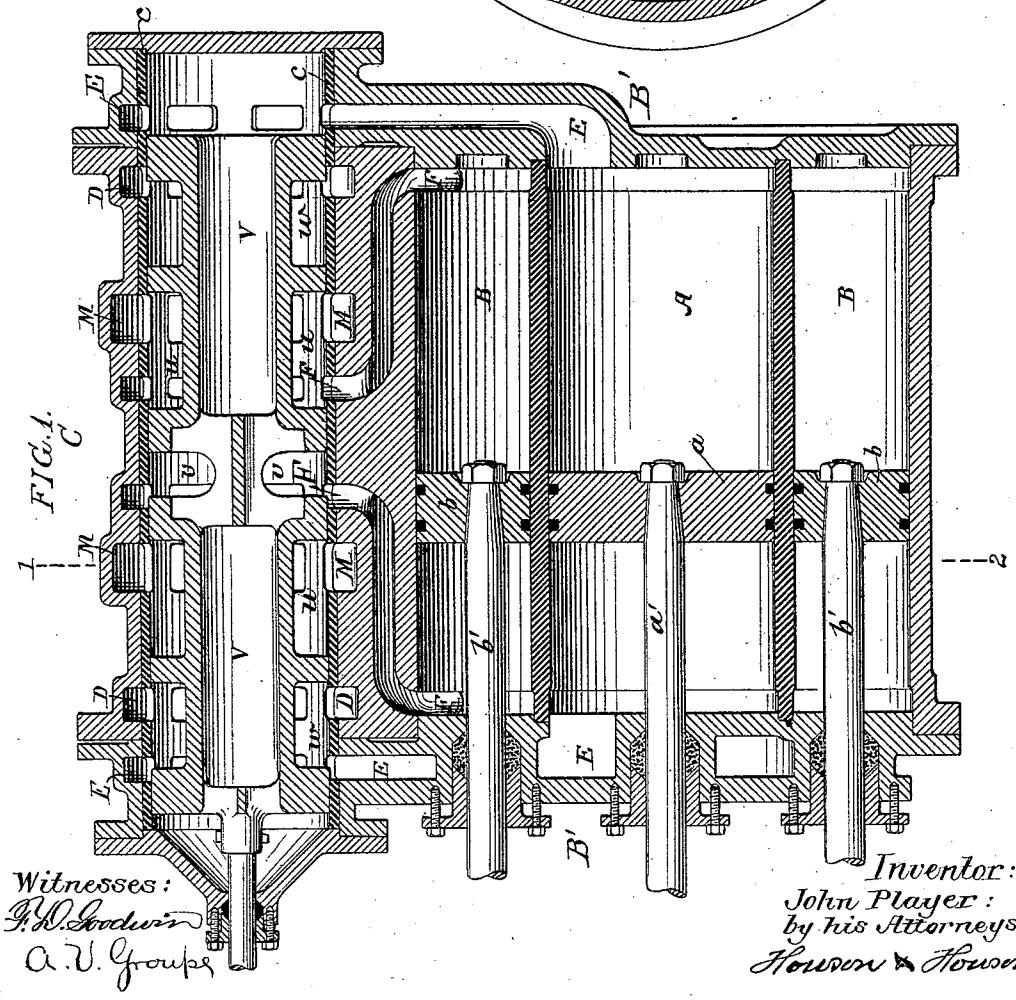


FIG. 1.



Witnesses:
F. W. Godwin
A. V. Groupe

Inventor:
John Player:
by his Attorneys
Howson & Howson

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

UNITED STATES PATENT OFFICE.

JOHN PLAYER, OF DUNKIRK, NEW YORK, ASSIGNOR TO THE BROOKS LOCOMOTIVE WORKS, OF SAME PLACE.

CONCENTRIC COMPOUND ENGINE.

SPECIFICATION forming part of Letters Patent No. 499,589, dated June 13, 1893.

Application filed August 19, 1892. Serial No. 443,518. (No model.)

To all whom it may concern:

Be it known that I, JOHN PLAYER, a resident of Dunkirk, Chautauqua county, New York, have invented a certain Concentric Compound Engine, of which the following is a specification.

The object of my invention is to construct a concentric compound engine in such a manner that the valve structure will be comparatively simple. This object I attain in the following manner, reference being had to the accompanying drawings, in which—

Figure 1, is a sectional view through the cylinders and valve; and Fig. 2, is a transverse sectional view on the line 1—2, Fig. 1.

A is the high pressure cylinder and B is the low pressure cylinder, the cylinder A being within the cylinder B and supported by its heads B′ B′ in the manner shown clearly in Fig. 1. The header A has a piston *a* connected to a piston rod *a′* passing through a stuffing box in one of the heads in the cylinder and the cylinder B has an annular piston *b* provided with two piston rods *b′*, which pass through stuffing boxes in one of the heads; these piston rods are connected to the operating mechanism of the engine in any suitable manner, the connections forming no part of my present invention. In the present instance mounted directly above the cylinder B is a valve chest C containing a single valve V for governing the admission of steam to and from both cylinders; this valve chest is formed in the main casting of the cylinder B and also in the heads B′, as clearly shown in Fig. 1; this valve chest has a bushing *c* made in one piece and extending throughout the entire length of the chest passing into the cylinder heads. Thus a true face is insured for the valve to work upon. The ports F F which communicate with the low pressure cylinder are in each side of the center of the valve chest; the final exhaust ports M M are adjacent and exterior thereto, while the ports E E communicating with the high pressure cylinder are at each end of the valve chest and are formed in the heads B′.

The steam admission ports D D are adjacent to the high pressure ports E and are formed within the body of the main cylinder casting so that the passage from the live steam inlet ports D to the high pressure cylinder is very short while the passage for the exhaust steam from the low pressure cylinder to the exhaust passages M is also comparatively short.

The valve V is a cylinder valve, hollow and open at both ends and having passages at the center which communicate with the annular space *v* which, as the valve is moved, communicates first with one port F of the low pressure cylinder and then with the other port F, as it will be understood that the high pressure exhaust steam enters the valve chest at the ends and as the valve is hollow and open at both ends this high pressure exhaust steam passes into the valve and out through the opening and annular space *v*. Thus the valve is balanced by high pressure exhaust steam. At each end of the valve are annular grooves *w* which form communication between the steam inlet passages D and the ports E while between these annular grooves and the space *v* are annular grooves *u* which form communications between the exhaust passages and the ports of the low pressure cylinder. When the valve is in the position shown in Fig. 1, live steam is admitted to the forward portion of the cylinder A and the exhaust steam from the rear portion of the cylinder passes into the valve chest through the valve to the passage *v* and through the port F to the forward portion of the low pressure cylinder and the steam at the rear portion of the low pressure cylinder passes through the port F, through grooves *u* to the exhaust passage M, the exhaust steam from the high pressure cylinder filling the valve chamber and counterbalancing the valve. When the valve is moved in the opposite direction steam is admitted to the rear of the piston in the high pressure cylinder and the exhaust steam from the high pressure cylinder is admitted at the back of the piston of the low pressure cylinder and the steam in said cylinder is exhausted through the passage M.

A tight fit and alignment is insured between the valve and the cylinder and its heads owing to the fact that the bushing in which the valve moves is supported by the heads B′ as well as the main cylinder casting.

I claim as my invention—

1. The combination in a cylinder structure for a compound locomotive or other engine having concentric cylinders, of a casting containing the low pressure cylinder, its saddle and steam chest, its induction and eduction ports and passages in the center and final exhaust ports and passages adjacent and exterior thereto, and the admission ports and passages for the high pressure cylinder at its extremities, with the castings forming the heads of the high and low pressure cylinders containing the induction and eduction ports for the high pressure cylinder.

2. The combination in a cylinder structure for a compound locomotive or other engine having concentric cylinders, of a casting containing the low pressure, cylinder, its saddle and steam chest, its induction and eduction ports and passages in the center and final exhaust ports and passages adjacent and exterior thereto, and the admission ports and passages for the high pressure cylinder at its extremities, with the castings forming the heads of the high and low pressure cylinders containing the induction and eduction ports for the high pressure cylinder and arranged to support the sleeve forming said high pressure cylinder.

3. The combination in a compound locomotive or other engine having concentric cylinders, of a structure containing the low pressure induction and eduction ports at its center and final exhaust ports and passages adjacent and exterior thereto and the live steam admission ports for the high pressure cylinder beyond the exhaust ports and having at its extremities the induction and eduction ports for the high pressure cylinder, with an annular valve working in a chest provided with a bushing extending into the heads of the chest, said valve having at its extremities internal cut off edges and cavities for admitting live steam to the high pressure cylinder, and exhausting steam therefrom by its external edges, and having a passage therethrough permitting the pressure of the high pressure exhaust steam to act equally on both ends of said valve and forming a conduit for said steam to the low pressure cylinder, said valve having passages at its center permitting the high pressure exhaust steam to enter the low pressure cylinder by its internal cut off edges, and exhausting steam therefrom by its cut off edges and cavities which are adjacent to the high pressure steam admission cavities and exterior to the low pressure admission cavity.

4. The combination in a valve structure for compound locomotive or other engines having concentric cylinders of an annular valve working in a chest provided with a bushing extending into the heads of the chest, said valve having its admission cavities at its extremities and its final exhaust cavities adjacent and interior thereto, its high pressure exhaust edges at its extremities and its low pressure admission passages and cavity in the center, with a casting containing the induction and eduction ports and final exhaust ports for the low, pressure cylinder and the admission ports for the high pressure cylinder, and having attached to its extremities castings containing the induction and eduction ports for the high pressure cylinder.

5. The combination of a piston valve for compound engines having external admission cavities for the high pressure cylinder and external exhaust cavities for the low pressure cylinder, and having a passage therethrough connecting the two ends of said valve with a passage at its center communicating with the admission cavity for the lower pressure cylinder.

6. The combination in a concentric cylinder compound engine of the cylinder casting containing the high and low pressure cylinders and valve casing, the heads containing the passages to the high pressure cylinder, with a single bushing extending through the valve chamber in the main cylinder casting and into the two heads, insuring a true face for the valve to work upon, substantially as specified.

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

JOHN PLAYER.

Witnesses:
JAMES F. HAGEN,
HENRY HOWSON.