

(No Model.)

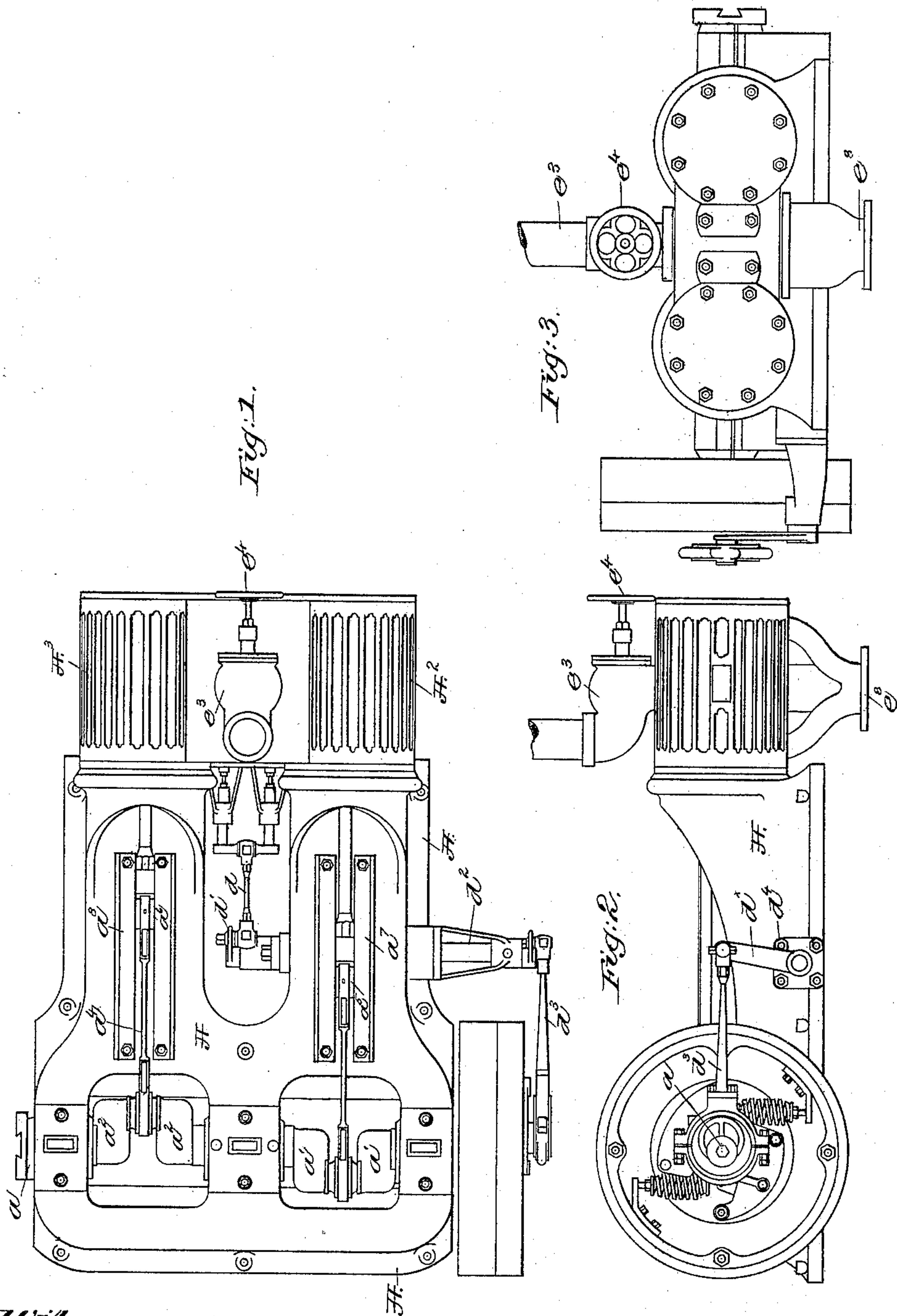
2 Sheets—Sheet 1.

P. ARMINGTON.

STEAM ENGINE.

No. 378,643.

Patented Feb. 28, 1888.



Witnesses.

And. S. Green af.

And L. Emery

Inventor.

Pardon Armington
by Crosby & Gregory.
Atty's.

(No Model.)

2 Sheets—Sheet 2.

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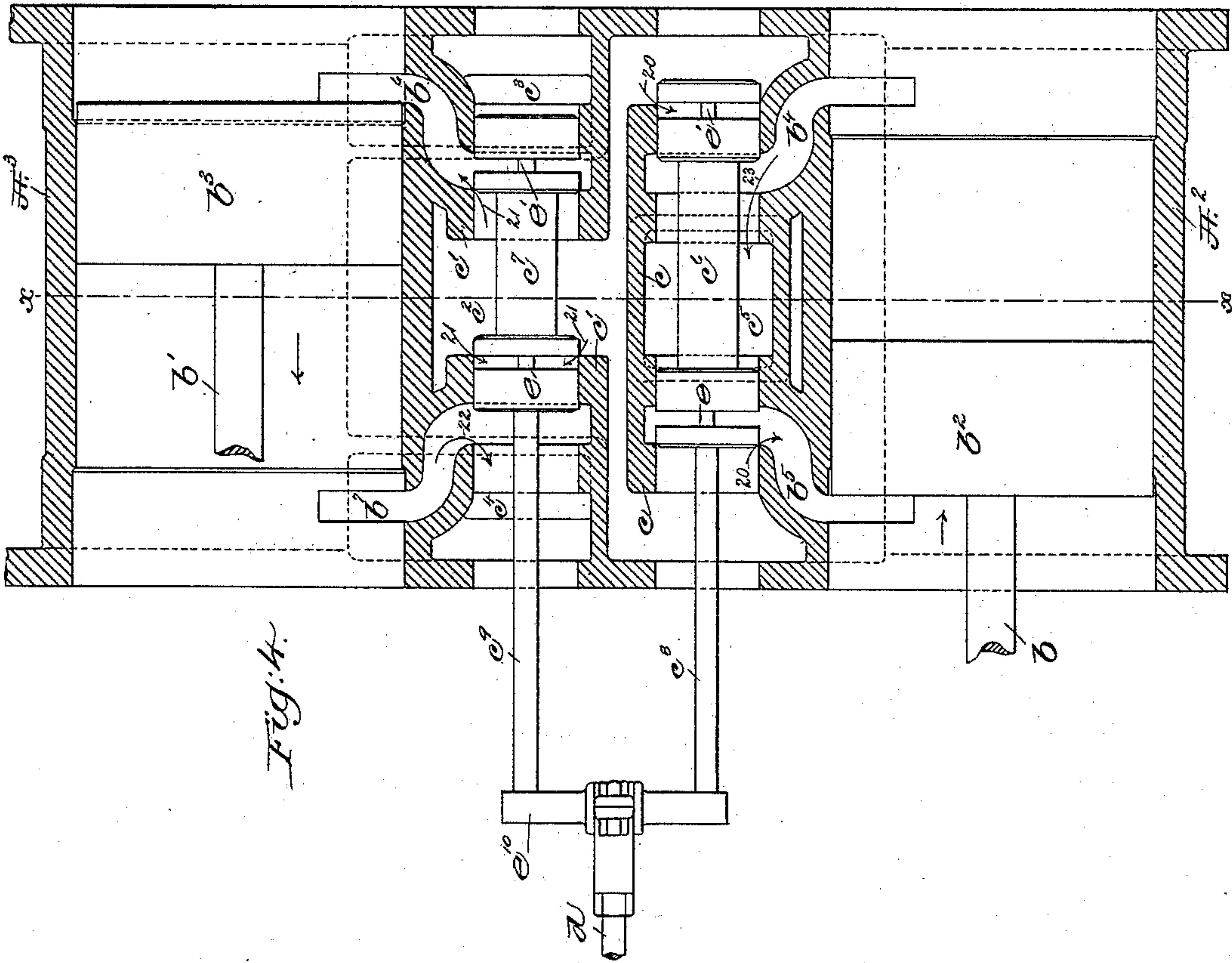


Fig. 4.

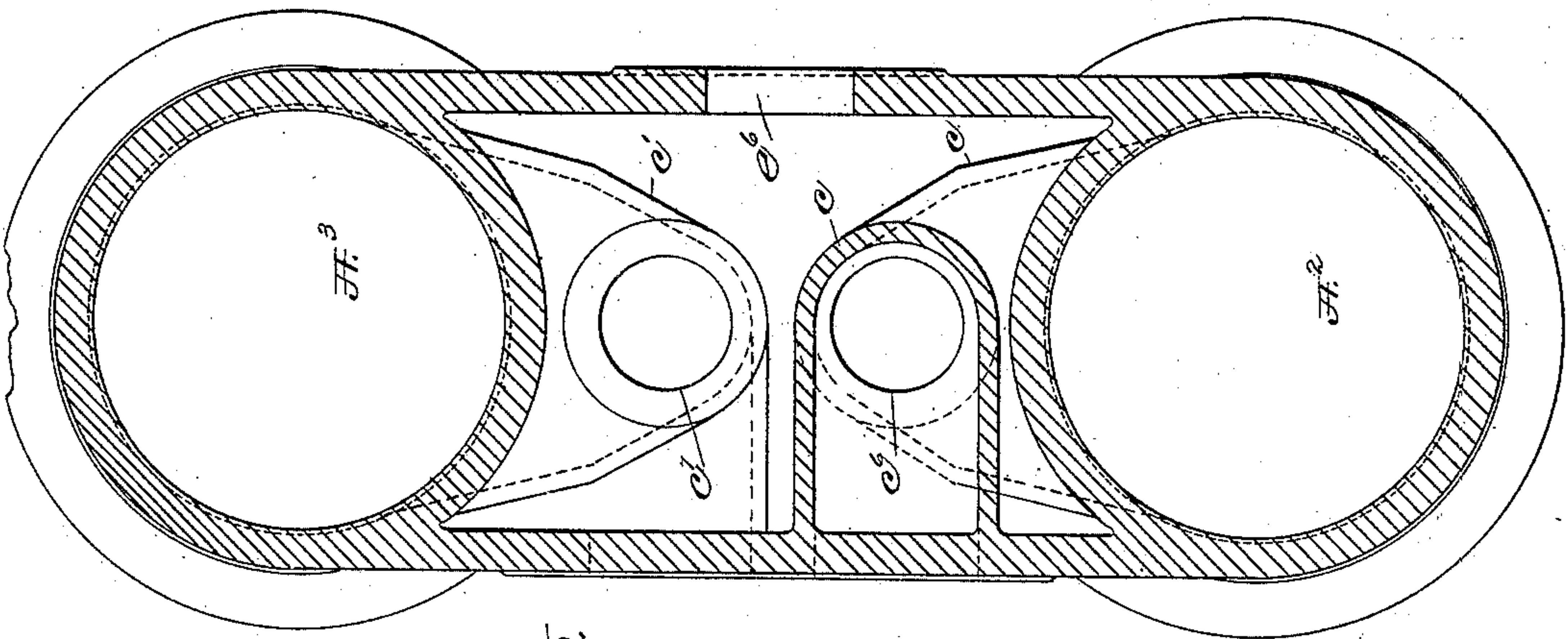


Fig. 5.

Witnesses.

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UNITED STATES PATENT OFFICE.

PARDON ARMINGTON, OF PROVIDENCE, RHODE ISLAND.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 378,643, dated February 28, 1888.

Application filed May 13, 1887. Serial No. 238,088. (No model.)

To all whom it may concern:

Be it known that I, PARDON ARMINGTON, of Providence, county of Providence, and State of Rhode Island, have invented an Improvement in Steam-Engines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to steam-engines, and has for its object to produce a small, compact, and efficient engine, which is especially designed, among other things, to be used on board ships for running dynamo-machines.

It has been a long-sought-for desideratum to provide an engine of a given horse-power—such, for instance, as a hundred horse-power—which shall be considerably smaller than engines as now constructed having the same horse-power, so that a considerable saving in space may be effected. This is especially true when applied to ships, whereon space is an important factor.

In accordance with my invention I have constructed an engine—say of one hundred horse-power—in which a main shaft is provided with two cranks set substantially opposite, the said cranks having joined to them connecting rods and pistons reciprocating in cylinders between which is located a valve-chest containing two independent valve chambers or cylinders, in which are reciprocated two independent valves—one for each cylinder—my improved engine being herein shown as a horizontal engine. The valves referred to are arranged within their chambers, as will be described, so that they admit steam to their respective cylinders simultaneously, thus producing two independent steam-engines—say of fifty horse-power each—the said independent valves being controlled by a single governor of any type, such as now commonly used, or it may be an eccentric.

The particular features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 is a plan or top view of a horizontal engine constructed in accordance with my invention; Fig. 2, a side view of the same, the steam-inlet pipe being shown broken off; Fig. 3, an end view of Figs. 1 and 2; Figs. 4 and 5,

sectional views, on an enlarged scale, of the engine-cylinders and the valve-chest between them.

The bed or base A, designed to rest upon the floor or a suitable foundation laid thereon, has ported or otherwise secured to it two cylinders, A^2 A^3 , and a valve-chest, A^4 , preferably located between the said cylinders, the said valve-chest and cylinders being preferably cast in one piece. The base A supports in suitable bearings a main shaft, a , provided with cranks a^1 a^2 , set substantially opposite, the said cranks having joined to them connecting-rods a^3 a^4 , respectively, secured to cross-heads a^5 a^6 , reciprocating in guides a^7 a^8 , fastened to the base A. The cross-heads a^5 a^6 have connected to them the piston-rods b b' of pistons b^2 b^3 , (see Fig. 4,) reciprocating in the cylinders A^2 A^3 , respectively.

The cylinder A^2 is provided at its opposite ends, as shown in Fig. 4, with ports b^4 b^5 and the cylinder A^3 with ports b^6 b^7 .

The valve-chest A^4 between the cylinders A^2 A^3 contains within it two independent valve chambers or cylinders, c c' , the valve-cylinder c' being shown as divided at its center to form a steam-inlet port, c^2 , and provided at its opposite ends with exhaust-ports c^3 c^4 . The valve-cylinder c is shown with its exhaust-port c^5 at the center and steam-inlet ports at its ends.

The valve-cylinders c c' contain, as herein shown, valve-pistons c^6 c^7 , having their valve stems or rods c^8 c^9 extended beyond the valve-chest and connected to a cross-bar, c^{10} , to which is secured one end of a link, d , the other end of said link being connected, as shown, to a rocker-arm, d' , (see Fig. 1,) on a shaft, d^2 , having bearings in the base A^x and extended to one side of the engine, where it is provided, as shown, with a rocker-arm, d^x , (see Fig. 1,) which is connected to an eccentric-rod, d^3 , of an eccentric, d^4 , on the main shaft a , the said eccentric forming part of a governor substantially such as shown and described in my United States Patent No. 247,527, granted to me September 27, 1881; but instead of the governor shown I may employ any other well-known type of governor, such as now commonly used.

The valves c^6 c^7 herein shown are substan-

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tially such as shown in my United States Patent No. 244,160, dated July 12, 1881, the said valves having near their opposite ends annular openings $e e'$, connected to one another by a longitudinal passage or passages through the middle portion of the valve.

Steam is admitted to the valve-chest through the pipe e^3 , provided with a throttle-valve adapted to be operated, as shown, by the wheel e^4 , the said pipe communicating with the port or opening e^6 in the valve-chest. (See Fig. 5.)

In the operation of my improved engine, as shown in the drawings, the piston b^2 is about to commence its upstroke while the piston b^3 is about to begin its downstroke. It will be noticed that both pistons are acted upon by live steam at the same time, although moving in opposite directions. This result is effected by arranging the steam inlet and exhaust ports of the valve-cylinders as described.

Referring to Fig. 4, it will be seen that live steam is being admitted into the port b^5 , leading to the engine-cylinder A^2 , from both ends of the valve e^6 at the same time, as indicated by arrows 20, while the steam in the engine-cylinder A^2 is permitted to exhaust through the port b^4 into the exhaust-port c^5 of the valve-chest c , as indicated by arrow 23. Live steam is being admitted to the engine-cylinder A^3 from both ends of the valve e^7 , as indicated by arrows 21, while the steam in the cylinder A^3 is permitted to pass through the port b^7 into the exhaust, as indicated by arrow 22. The exhaust-ports $c^3 c^4$ of the valve-cylinder c' and the exhaust-port c^5 of the valve cylinder c communicate with a common exhaust, e^8 . (See Figs. 2 and 3.)

It will be seen that my improved engine is composed of two independent double-acting engines, each of a given capacity—for instance, fifty horse-power—the said engines being coupled together, as described, to produce an engine of double the capacity—that is, of one hundred horse-power.

My improved engine—say of one hundred horse-power—is small and compact, and occupies but little more space than an engine of but fifty horse-power, so that it may be used, among other things, for running dynamo-machines on board ships, where heretofore the objection to the use of dynamos has been the great space required for the engine and dynamo.

With an engine constructed as above described the dynamo may be placed, if desired, alongside the engine and coupled to it in any suitable manner, thus requiring but a substantially small room.

I claim—

1. In a steam-engine, two engine-cylinders, two valve chambers or cylinders communicating therewith, one of said valve-cylinders having a steam-inlet port at its ends and an exhaust-port near its center, the other valve-cylinder having an exhaust-port at its ends and a steam-inlet near its center, and a valve in each cylinder, combined with a governor operatively connected to the said valves to operate them, substantially as described.

2. In a steam-engine, two engine-cylinders, $A^2 A^3$, two valve-cylinders intermediate of and communicating with the said engine-cylinders, one of said valve-cylinders having a steam-inlet port at its ends and an exhaust-port near its center, the other valve-cylinder having an exhaust-port at its ends and a steam-inlet near its center, and a piston-valve in each cylinder, combined with a governor operatively connected to the said piston-valves, to operate them substantially as described.

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

PARDON ARMINGTON.

Witnesses:

J. H. CHURCHILL,
B. DEWAR.