

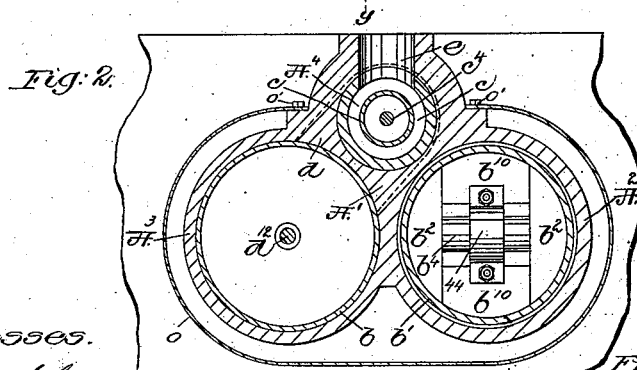
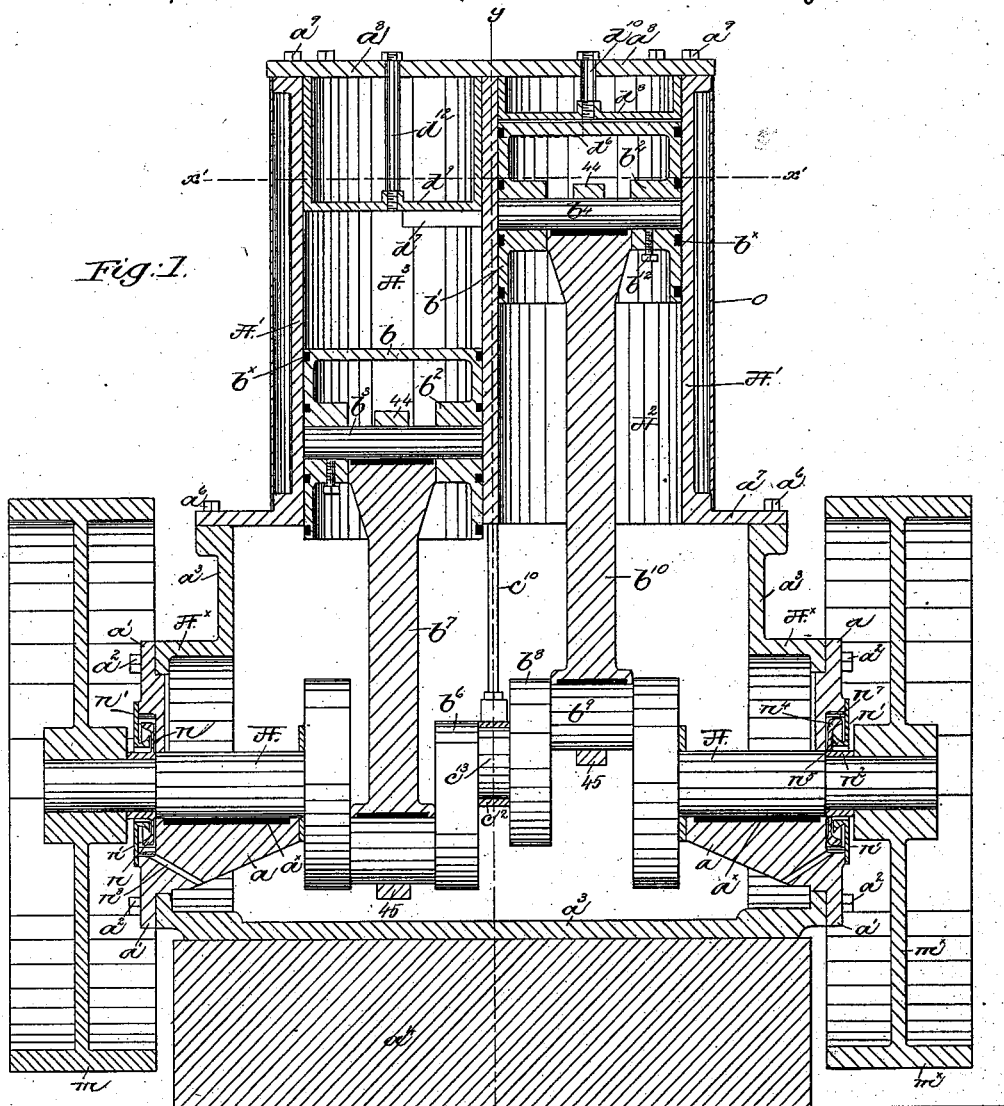
(No Model.)

2 Sheets—Sheet 1.

F. C. MORTON.
STEAM ENGINE.

No. 382,547.

Patented May 8, 1888.



Witnesses.
Fred. S. Greenleaf
Thos. L. Emery.

Inventor.
Frederic C. Morton
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attys.

(No Model.)

2 Sheets—Sheet 2.

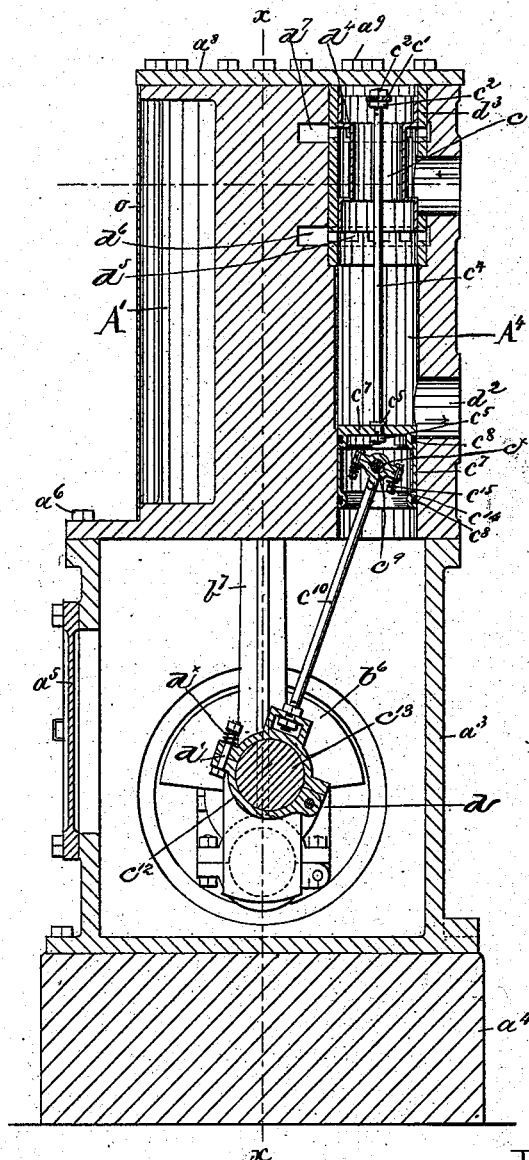
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Fig:3.



Witnesses.

Ans L. Emery.
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Inventor.

Frederic C. Morton.
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UNITED STATES PATENT OFFICE.

FREDERIC C. MORTON, OF CHELSEA, MASSACHUSETTS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 382,547, dated May 8, 1888.

Application filed November 15, 1886. Serial No. 218,854. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC C. MORTON, of Chelsea, county of Suffolk, and State of Massachusetts, 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 improve the construction of the same.

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

Figure 1 is a vertical longitudinal section of a steam-engine constructed in accordance with my invention, the section being taken on line $x x$, Fig. 3; Fig. 2, a transverse section of Figs. 1 and 3 on line $x' x'$; and Fig. 3, a vertical section of Fig. 1 on line $y y$, looking toward the left, the fly-wheel being omitted.

The main shaft A is supported in bearings a , provided with a lining, a^x , of Babbitt metal, the said bearings forming parts of covers a' , secured by bolts a^2 to a flange, A^x , on two opposite sides of an inclosing case or box, a^3 , which latter rests upon and is fastened to a base or foundation, a^4 , the said case or box containing oil or material to lubricate the crank-shaft and other parts of the engine, and having the usual door or cover, a^5 , by removing which entrance may be effected to the interior of the case or box, the main shaft having mounted upon it, as herein shown, two fly-wheels, $m m^x$. The box or case a^3 supports a one-piece metal casting, A' , cored, as shown in Fig. 2, to form two large or piston cylinders, $A^2 A^3$, and one small or piston-valve cylinder, A^4 , the said casting having a flange, a^7 , by which it is secured to the case or box a^3 by bolts a^6 . The casting A' is provided at its top with a suitable cap or head, a^8 , fastened thereto by bolts a^9 , and is open at its lower end to communicate with the interior of the case or box a^3 .

The cylinders $A^2 A^3$ are provided, respectively, with pistons $b b'$, preferably made hollow, as shown in Fig. 1, and recessed, as shown, to receive usual packing-rings, b^x . Each piston $b b'$ is provided on its inside with projections b^2 , to support the wrist-pins $b^3 b^4$, respect-

ively, the pin b^3 being joined to the crank-pin b^5 by the connecting-rod b^7 and the pin b^4 to the crank-pin b^9 by the connecting-rod b^{10} , the said wrist-pins being secured, as herein shown, by set-screws b^{12} . The connecting-rod b^{10} is longer than the connecting-rod b^7 , owing to the position of the port connecting the cylinders $A^2 A^3$ with the valve-cylinder A^4 , as will be described.

The cranks $b^6 b^8$ on the main shaft are set substantially opposite, so that when one piston, as b , is near the end of its downward stroke the piston b' will be at or near the end of its upward stroke.

The reciprocation of the pistons $b b'$ within their respective cylinders is controlled by a hollow piston-valve, c , (see Fig. 3,) reciprocating in the valve-cylinder A^4 , the said piston-valve being provided at its upper end with a cross-bar, c' , to which a threaded rod, c^2 , is secured, as shown, by nuts c^3 . The rod c^2 is extended through the piston-valve c , and is connected, as shown, by nuts c^5 to the cylindrical cross-head c^7 , provided with packing-rings c^8 .

The cross-head c^7 , herein shown as hollow, is provided with a central transverse rod or pin, c^9 , embraced by one end of an eccentric rod, c^{10} , and a cap, c^x , secured to said eccentric-rod by bolts c^{14} , each provided with a spring, c^{15} , the said rod being joined to an eccentric-strap, c^{12} , which embraces an eccentric, c^{13} , between the cranks $b^6 b^8$, (see Fig. 1,) the said eccentric-strap being made of two parts hinged at its rear end, as at d , and fastened at its front end by a bolt, d' . The bolt d' is encircled between its head and the eccentric-strap in a similar manner to the bolts c^{14} by a somewhat powerful spring, d^x , which takes up or compensates for the wear upon the eccentric and its strap, the said spring keeping the strap pressed together and so as to hug tightly its eccentric.

The hinging of the eccentric-strap facilitates speedy disengagement of the strap from its eccentric in case of repair or for other cause, the bolted end being opposite or nearer the door a^5 , as shown in Fig. 3.

The cross-head c^7 is placed in the cylinder A^4 , below the main exhaust-passage d^2 , (see Fig. 3,) to thereby prevent steam from enter-

ing the case or box a^3 . The cylinder A^4 , at its upper end, is made of somewhat larger diameter to receive a cylindrical shell or bushing, d^2 , in which the piston-valve c is reciprocated.

5 The shell or bushing d^2 , near its upper and lower ends, is provided with a circular row of openings, d^4 d^5 , the openings d^5 communicating with the inlet port or passage d^6 of the cylinder A^2 , (see dotted lines, Fig. 1,) while the
10 openings d^5 communicate with the inlet-passage d^7 of the cylinder A^3 , (see Figs. 1 and 3,) the said inlet-ports d^6 d^7 being short and substantially straight.

The space or clearance in the cylinders A^2
15 A^3 above the inlet-ports d^6 d^7 is taken up, as shown, by cylindrical caps or shells d^8 d^9 , fastened to the head a^5 by rods d^{10} d^{12} .

Steam is admitted to the valve cylinder or chest A^4 through the passage e , connected to
20 the outlet port or passage of the throttle-valve, (not herein shown,) but the action of which is controlled by a governor. (Not shown.) The said governor and throttle-valve may be of any usual or well-known construction and
25 such as commonly employed on steam-engines.

In operation steam from the cylinder A^2 is exhausted through the center of the piston-valve, and in other respects the operation of the pistons and valves being well-known further description of the action of the same is
30 deemed unnecessary.

Another feature of my invention is an oil-trap, to be described, which is located outside
35 the case or box a^3 at or near the ends of the crank-shaft, the said trap acting to catch any oil which may escape from the case or box a^3 by way of the crank-shaft and return the same to the said case or box.

The oil-trap referred to is composed of a revolving disk, n , and a fixed disk, n' , the revolving disk n having a hub, n^1 , fitted tightly upon the crank-shaft, the disk n being secured, as shown, by screws n^3 to the cover a' . The revolving disk n is provided at its outer periphery with an outwardly-projecting flange,
45 n^4 , having its outer and inner faces preferably inclined, as shown in Fig. 1. The fixed disk n' has at its inner periphery an inwardly-projecting flange, n^5 , which is extended toward
50 the disk n , so as to be overlapped by the flange n^4 , the outer face, 21, of the flange n^5 being curved or inclined, as shown in Fig. 1. The disk n' forms, with the cover a' , a pocket, n^6 , in which the disk n is revolved, and which
55 is connected at its lower end with the interior of the case or box a^3 by a passage, n^7 , formed in the bearing a .

The oil escaping from the case or box a^3 by the crank-shaft is received in the pocket n^6 ,
60 from whence it passes through the passage n^7 into the said case or box, it being prevented from passing out of the pocket by way of the shaft by means of the disks n n' , the oil accumulating upon the flange of the revolving disk
65 and being thrown therefrom by the revolution of the said disk. As the oil is thrown from the flange n^4 , it strikes the sides of the pocket,

from which it may drop again upon the flange n^5 , the said oil finding its way around the flange n^5 to the bottom of the pocket. It will
70 thus be seen that any oil which gets beyond the flange n^4 is caught by the flange n^5 , the outer face, 21, of which is so inclined or curved as to prevent the said oil from getting between the said flange and the hub n^1 , and thereby es-
75 caping.

The piston-cylinders A^2 A^3 of the one-piece metal casting A' will preferably be covered with a sheet-metal casing, o , secured thereto
80 by screws o' , (see Fig. 2,) the space formed between the said casing and the casting A' when filled with mineral wool, asbestos, or it may be air or other non-heat conducting material, preventing radiation of heat from the
85 piston-cylinders.

By employing the projecting flange A^x on the case a^3 , and the inwardly-projecting uncovered bearings a , I am enabled to bring the fly-wheel close to or overlapping one of the
90 said bearings of the crank-shaft, the uncovered or exposed bearings permitting free and complete lubrication of the crank-shaft.

It is evident one of the covers a' may be cast integral with the case a^3 ; but I prefer to employ two covers.
95

I do not desire to limit the use of my improved governor and oil-trap to the particular engine herein shown, as they are capable of being applied to engines of other construction.
100

I claim—

1. In a steam-engine, the main shaft A , having cranks set substantially opposite and located in a case or box, a^3 , the one-piece metal casting A' , cored to form the valve-cylinder A^4 , and piston-cylinders A^2 A^3 , pistons in said
105 cylinders, and a connecting-rod for each piston, combined with the eccentric-rod c^{10} , having an eccentric-strap pivoted at one end and a spring to keep the parts of the said strap together, substantially as described.
110

2. In a steam-engine, the main shaft A , having cranks set substantially opposite and located in a case or box, a^3 , the one-piece metal casting A' , cored to form the valve-cylinder A^4 and piston-cylinders A^2 A^3 , pistons in the cylinders A^2 A^3 , connected to the main shaft, the piston-valve c , the cross-head c' , connected thereto and having the rod or pin c'' , combined with the eccentric-rod c^{10} and eccentric c^{11} , and with the cap c^x , and a spring to keep the cap
120 in contact with the rod or pin c'' to compensate for wear, as and for the purpose specified.

3. In a steam-engine, the main shaft A , having cranks set substantially opposite and located in a case or box, a^3 , having the flange A^x , and covers a' , secured thereto and provided with inwardly-projecting bearings a , each uncovered on its top, combined with the fly-wheel overlapping the cover a' , as-and for the purpose specified.
130

4. In a steam-engine, a main shaft, a case to contain oil or other lubricant, and the cover a' , secured thereto and to the bearing a , combined with the flanged disk n , secured to and revolv-

ing with the main shaft, and with the flanged disk n' , secured to the cover and forming an oil-trap with the disk n , substantially as described.

5 5. In a steam-engine, a main shaft, a case to contain oil or other lubricant, and the cover a' , secured thereto and to the bearing a , provided with the passage n^3 , combined with the flanged disk n , secured to and revolving with the main
10 shaft, and with the flanged disk n' , secured to the cover and forming an oil-trap with the disk n to return the oil into the said case, substantially as described.

6. In a steam-engine, a main shaft, a case to

contain oil or other lubricant, and the cover a' , 15 secured thereto, combined with the flanged disk n , secured to and revolving with the main shaft, and with the flanged disk n' , secured to the cover and forming an oil-trap with the disk n , substantially as described. 20

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

FREDERIC C. MORTON.

Witnesses:

BERNICE J. NOYES,
JAS. H. CHURCHILL.