

W. F. M. GOSS.
ENGINE.

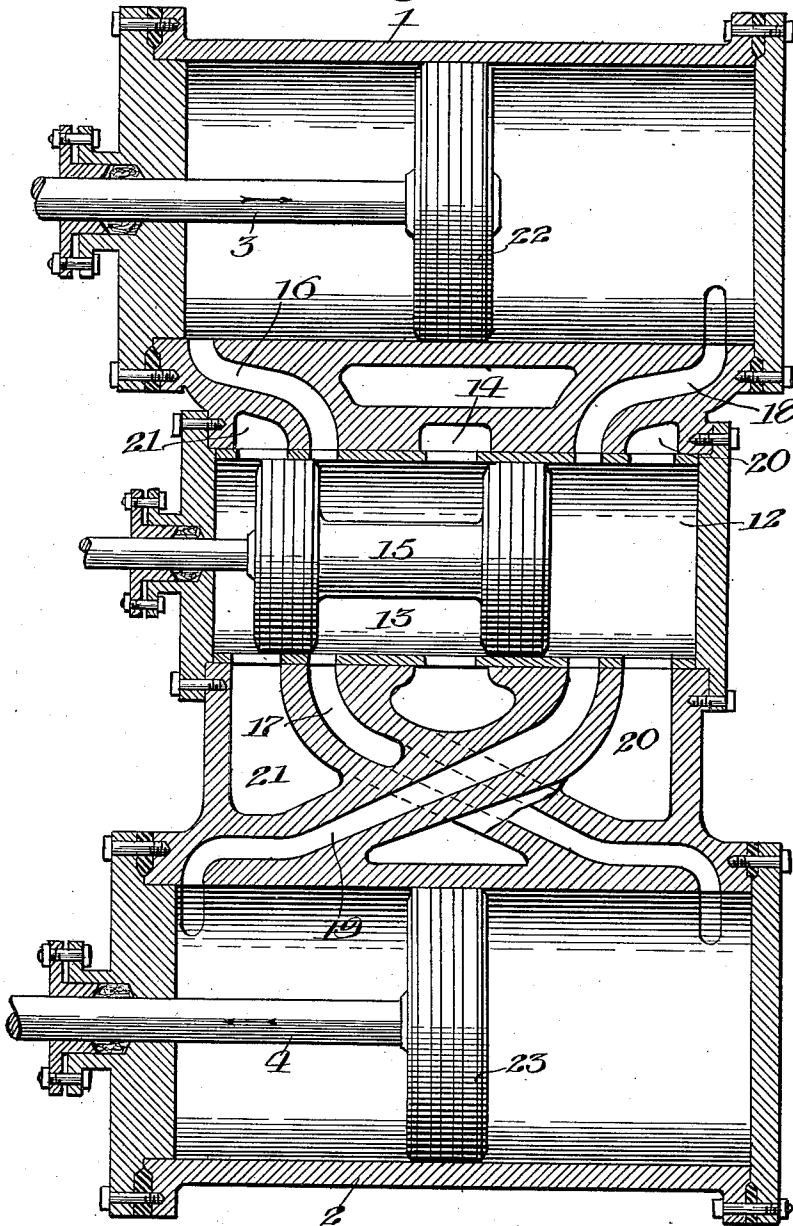
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1,015,016.

Patented Jan. 16, 1912.

2 SHEETS—SHEET 1.

Fig. 1.
7



Witnesses
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2 SHEETS—SHEET 2.

Fig. 2.

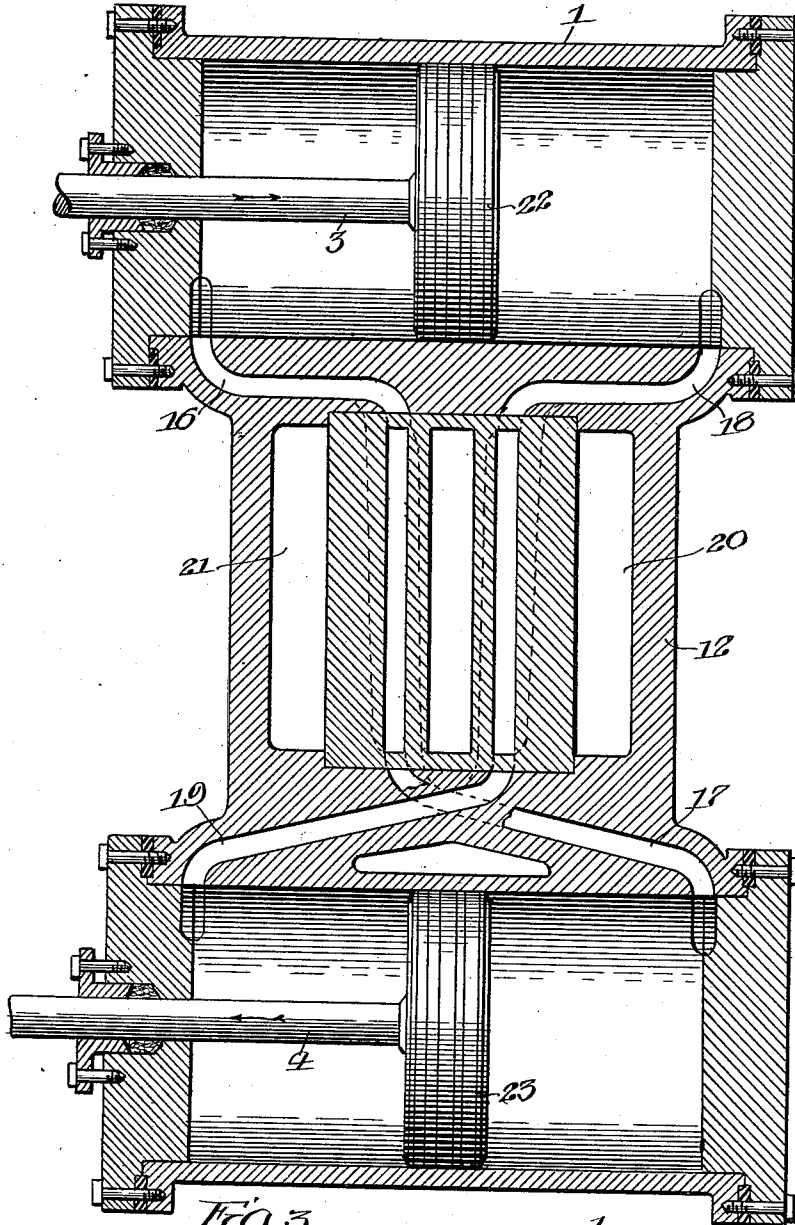
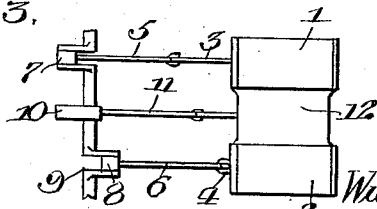


Fig. 3.



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UNITED STATES PATENT OFFICE.

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ENGINE.

1,015,016.

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To all whom it may concern:

Be it known that I, WILLIAM F. M. GOSS, a citizen of the United States, residing at Urbana, in the county of Champaign and State of Illinois, have invented a certain new and useful Improvement in Engines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to engines and is more particularly designed for the purpose of balancing or partially balancing stationary engines, locomotives, or other similar prime movers, and to this end provides an arrangement of valves and ports which bring about this result.

My invention is applicable alike to simple as well as compound engines, but in these application papers I illustrate only the adaptation of my invention to two forms of simple engines. The application of the invention to compound engines will be from the description given herein obvious to those skilled in the art.

In my present invention I secure the balancing effect without the use of the multiplicity of parts mentioned, but provide a single steam chest and so arrange the ports of this steam chest, by having some of them crossed or otherwise suitably arranged, that the two cylinders exert a driving force upon the shaft, through the agency of cranks displaced 180 degrees or thereabout that a good balance or at least partial balance is obtained.

I will describe my invention more in detail by reference to the accompanying drawings, illustrating various embodiments thereof, in which:

Figure 1 sets forth a multiple cylinder engine constructed in accordance with my invention, using a piston valve, and; Fig. 2 sets forth my invention when used in connection with a slide valve. Fig. 3 diagrammatically illustrates the arrangement of the cranks and eccentrics with respect to the cylinders.

Referring more particularly to Fig. 3, I show two cylinders 1 and 2 respectively having piston rods 3 and 4 and connecting rods 5 and 6 actuating cranks displaced 180 degrees with respect to the driven shaft 9. An eccentric 10 actuates the valve rod 11 entering the valve chest 12 to direct the course of the steam. It will be seen that I

use but one valve stem 11 to actuate the valve of the two cylinders 1 and 2 in the improved form which I employ, as shown more in detail in Figs. 1 and 2, where two embodiments which my invention may take are set forth.

Referring now more particularly to Fig. 1, the cylinders 1 and 2 receive their steam from the common steam chest 13 which is preferably supplied with steam from the compartment 14, under the control of the piston valve 15. Assuming the engine to be operating as indicated by arrows upon the piston rods 3 and 4, steam is flowing from the steam chest 13 through the port 16, to the live side of cylinder 1 and through the steam port 17 to the live side of the cylinder 2. At the same time port 18 is exhausting from the exhaust side of the cylinder 1, and port 19 is exhausting from the exhaust side of cylinder 2. The exhaust steam flows into the passages 20 and 21 from which it can be suitably withdrawn. After the pistons 22 and 23 have completed their movement in one direction, the ports, of course, change their function alternately to steam supplying port and exhausting ports. It might here be noted that the Figs. 1 and 2 are more or less diagrammatic but it is believed fully illustrate the invention.

It is apparent from what has gone before that the cylinder 1 is supplied by ports 16 and 18, but cylinder 2 is supplied through the agency of cross ports of steam passages, or one exhaust chamber and one supply chamber under the control of a single valve serves to accommodate both of the cylinders 1 and 2. In this design it is to be noted that since the valve registers with both the direct and corresponding crossed ports at the same time, the clearance volume for each cylinder is the same;—that the clearance volume of the combined cylinders may be but little, if any, in excess of the combined cylinder volume in the case of tandem valves, the variation one way or the other depending, of course, upon the detail design of the particular cylinders compared;—that since the combined volume of the two cylinders will be practically the same as the volume of a single cylinder of equal power, the cross-sectional area of a single port to either one of the pair of cylinders will be about one-half that of one port to a single cylinder in the usual design. That the additional clearance of the combined cylinders over that of a

single cylinder is practically that due to an increased length of a single port in the case of a single cylinder (or of the two crossed ports in the case of the balanced engine) for a length about equal to the cylinder length, which statement is general since any shortening of the direct ports, by extending the length of the valve chamber or the reverse will cause a corresponding lengthening or shortening of the crossed ports, and that the design is entirely applicable to any cylinders arranged in this way, irrespective of relative cylinder diameters. In Fig. 2 I show the same principle applied to a slide valve engine, using corresponding numerals to designate corresponding parts.

From the foregoing it will be apparent that my invention is applicable to a great variety of engines and can be variously applied to many different uses and I therefore wish it understood that I am not limiting myself to the specific embodiments herein illustrated and described, but

I broadly claim as new and desire to secure by Letters Patent the following:—

1. A double cylinder single valve engine, having a simple-type valve, provided with two port controlling members, and a single set of non-communicating passages between the valve chest and each cylinder, and exhaust and supply ports, all controlled by said two port controlling members of said valve.

2. A double cylinder single valve engine, having a single set of ports from the valve chamber to each cylinder, and also having a simple-type valve having two heads arranged to control both the steam supply and exhaust for both of said cylinders.

3. A double cylinder single valve engine, having passages between the valve chest and said cylinders, and also having exhaust ports at both ends of the valve chest, and a valve having two heads which control both the admission and exhaust for said cylinders.

4. An engine of the type described, having passages between the valve chest and the cylinders, there being two passages between each cylinder and the valve chest, which said passages connect opposite ends of the cylinders with the valve chest, said engine also having a supply inlet at the middle of the valve chest and exhaust outlets at the opposite ends of said chest, and a valve having a central chamber serving to connect the supply inlet with said cylinder passages, and having heads forming said central chamber, which heads serve to open and close the cylinder passages to the adjacent or associated exhaust outlets.

5. An engine of the type described, having two passages between the valve chest and each cylinder, and also having the valve chest provided with a supply port located between the valve chest ports of said cylinder passages, and also provided with outlet or exhaust ports between said cylinder passage ports and the ends of the valve chest, and a valve for controlling said passages, the same port closing members of the valve controlling both supply and exhaust of the cylinders.

6. An engine of the type described, having a valve with two port closing members, and also having passages between the steam chest and cylinders, and inlet and outlet ports constructed and arranged so that one of said port closing portions of said valve controls both the supply and exhaust for one end of each cylinder, and the other of said port closing portions controls both the supply and exhaust for the other ends of said cylinders.

In witness whereof, I hereunto subscribe my name this second day of April A. D. 1910.

WILLIAM FREEMAN MYRICK GOSS.

Witnesses:

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F. D. CRAWSHAW.