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PATENTED NOV. 13, 1906.

H. LENTZ.

VALVE OPERATING MECHANISM FOR STEAM ENGINES.

APPLICATION FILED NOV. 17, 1905.

Fig. 1

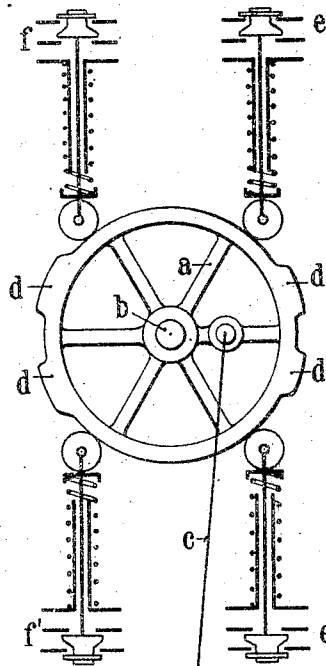


Fig. 2

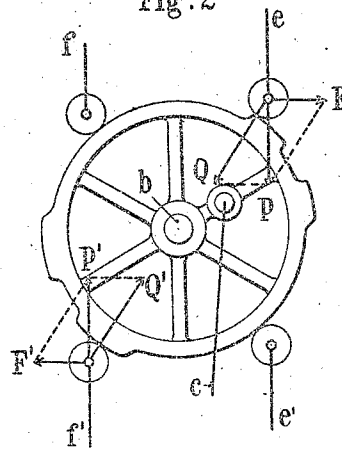
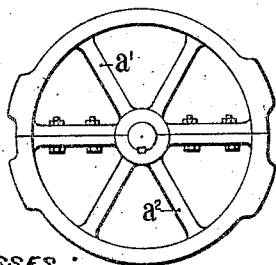


Fig. 3



WITNESSES :

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HUGO LENTZ, OF BERLIN, GERMANY.

VALVE-OPERATING MECHANISM FOR STEAM-ENGINES.

No. 835,963.

Specification of Letters Patent.

Patented Nov. 13, 1906.

Application filed November 17, 1905. Serial No. 287,830.

To all whom it may concern:

Be it known that I, HUGO LENTZ, a subject of the Emperor of Germany, and a resident of Berlin, Germany, have invented certain new and useful Improvements in Valve-Operating Mechanism for Steam-Engines and the Like, of which the following is a specification.

The present invention relates to a simple valve-motion (puppet-valve gear) to be employed principally for high-speed or reversible power-engines—such, for instance, as steam-engines.

Reversible engines—such, for instance, as marine engines—are generally provided with slide-valves or piston-valves driven by articulated link mechanism, such as Stephenson link-motion, &c. Owing to the great pressure caused by the weight of the slides and the valve-faces caused by the steam-pressure on the former, and which is increased by the frequently occurring bending of the slide caused by the expansion of the material of unequal thickness by higher steam temperatures, great resistance is caused to the driving mechanism, which requires the employment of a large amount of material in the construction of the individual parts. There is also caused a considerable amount of wear, and consequently much insecurity of working. At the same time these disadvantages render difficult the control for regulating and reversing, whereby special reversing-engines are required for large engines. The steam distribution also is not exact.

The present invention aims to lighten the work of the valve-motion of reversible engines, such as marine engines, and to secure their management by employing a wheel instead of one or more connecting-rods. This wheel, being caused to rock by the driving mechanism, will move as directly as possible the valves of the cylinder by its specially-shaped rim. This invention also renders possible the reversing by hand, thereby obviating the necessity for a special-reversing-engine. The invention is characterized by a rocking wheel which moves directly all the inlet and outlet valves of the cylinder by means of its curved cams.

In the accompanying drawings, Figure 1 is a front view of the mechanism. Fig. 2 is a diagrammatical view of the mechanism. Fig. 3 is a modified form of the cam.

In Fig. 1, f, f' are the exhaust-valves, and e, e' are the inlet-valves, of the engine. The valves are provided with rods s , which are provided on their ends with rollers r . The perfect closing of the valves is insured by the spring t . a is the wheel, which is provided on its rim with curved cams d . The wheel a rocks on the axle b and is driven by the driving mechanism c , which can of course be replaced by any equivalent mechanism, as will be easily understood by all persons skilled in the art. By the rocking of the wheel the curved cams d will alternately move the rollers r , which latter will at the same time raise the valves. The curved valves are so constructed as to gently raise the valves from their seats and afterward to quickly open them. They also act to close the valves quickly on the rocking of the wheel a in the reverse direction and finally to set them gently on their seats without any shock or blow.

In Fig. 2 are indicated the forces P, P' of the valves. As the valve-rods s and also the rollers r move in straight lines and the rollers r at the same time are pressed against the cams d , the forces P and P' are divided into the composing forces F and Q , F' and Q' . The forces F and F' are neutralized by the straight sliding motion and exert no action upon the wheel a . The forces Q and Q' are also almost completely neutralized, as represented in Fig. 3, because the axle b of the wheel a , which received in other constructions the sum of the two forces Q and Q' , has in this case such forces either completely neutralized or only receives the small difference of the forces Q and Q' . This fact is an extraordinary advantage, the good working of the distribution depending upon the good condition of the axle-bearing.

It is also seen by Figs. 2 and 3 that for the driving mechanism c the following advantages are obtained: First, the forces and axle-pressure Q and Q' are mutually neutralized, and the driving mechanism thus needs less power to operate it; second, the number of the individual parts of the steam-distribution apparatus are considerably reduced by the employment of a single wheel for all the four valves of the cylinder.

The wheel a may also consist of several individual pieces which are rigidly fixed together, as shown in Fig. 3.

Having now particularly described and

ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A valve-motion for steam-engines comprising a rocking controlling-wheel, having curved cams on its periphery valve-stems arranged by pairs on the same line and in opposite directions to each other, friction-rollers at their ends pressed on the periphery of the wheel at four points diametrically opposed by pairs for the purpose of relieving any pressure on the axis of the wheel, and means for rocking the wheel.

2. The valve-motion for high-speed steam-engine comprising rocking and controlling wheel having curved cams on its periphery, valve-stems arranged by pairs on the same line in opposite directions, friction-rollers at their ends, pressed on the periphery of the wheel at four points diametrically opposed by pairs and a link attached to a wheel and a

movable part of the engine for rocking the wheel.

3. A valve-motion for steam-engine comprising rocking cam or wheel formed of two parts rigidly fixed together and keyed on a common axle, each segment having curved cams on its periphery, valve-stems arranged by pairs on the same line in opposite directions, friction-rollers at their ends pressed on the periphery of the wheel at four points diametrically opposed by pairs and a link attached to the wheel and a movable part of the engine for rocking the wheel.

In testimony of which I have hereunto placed my hand in the presence of two witnesses.

HUGO LENTZ.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.