No. 709,949. Patented Se . 30, 1902.

P. H. WHITE.

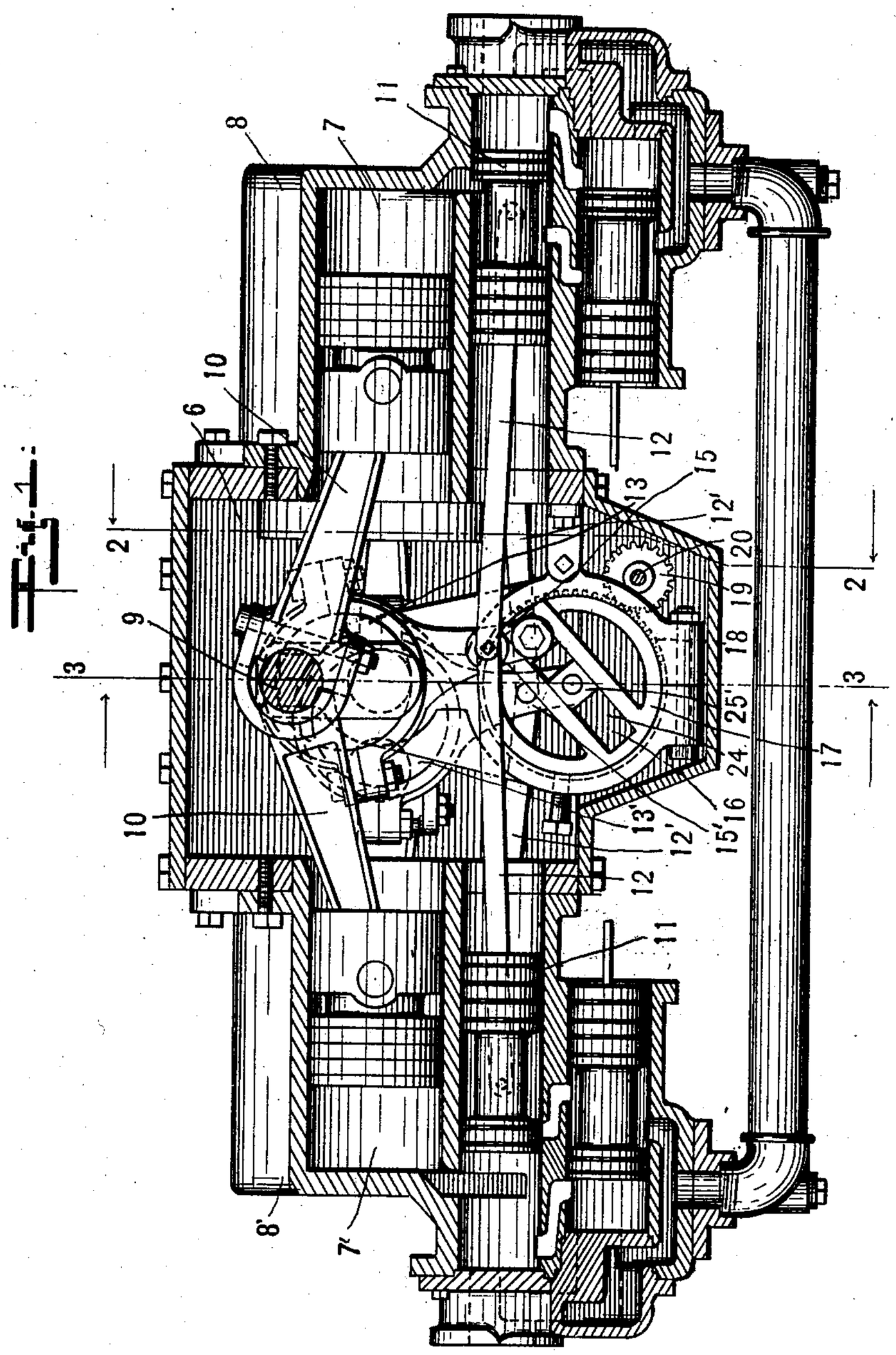
VALVE GEAR.

(Application filed Oct. 3, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses
Frank A. Fahle
Bertha M. Ballard

Inventor
Paul H. White
By
Arthur M. Hood
Attorney

No. 709,949. Patented Sept. 30, 1902.

P. H. WHITE.

VALVE GEAR.

(Application filed Oct. 3, 1901.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

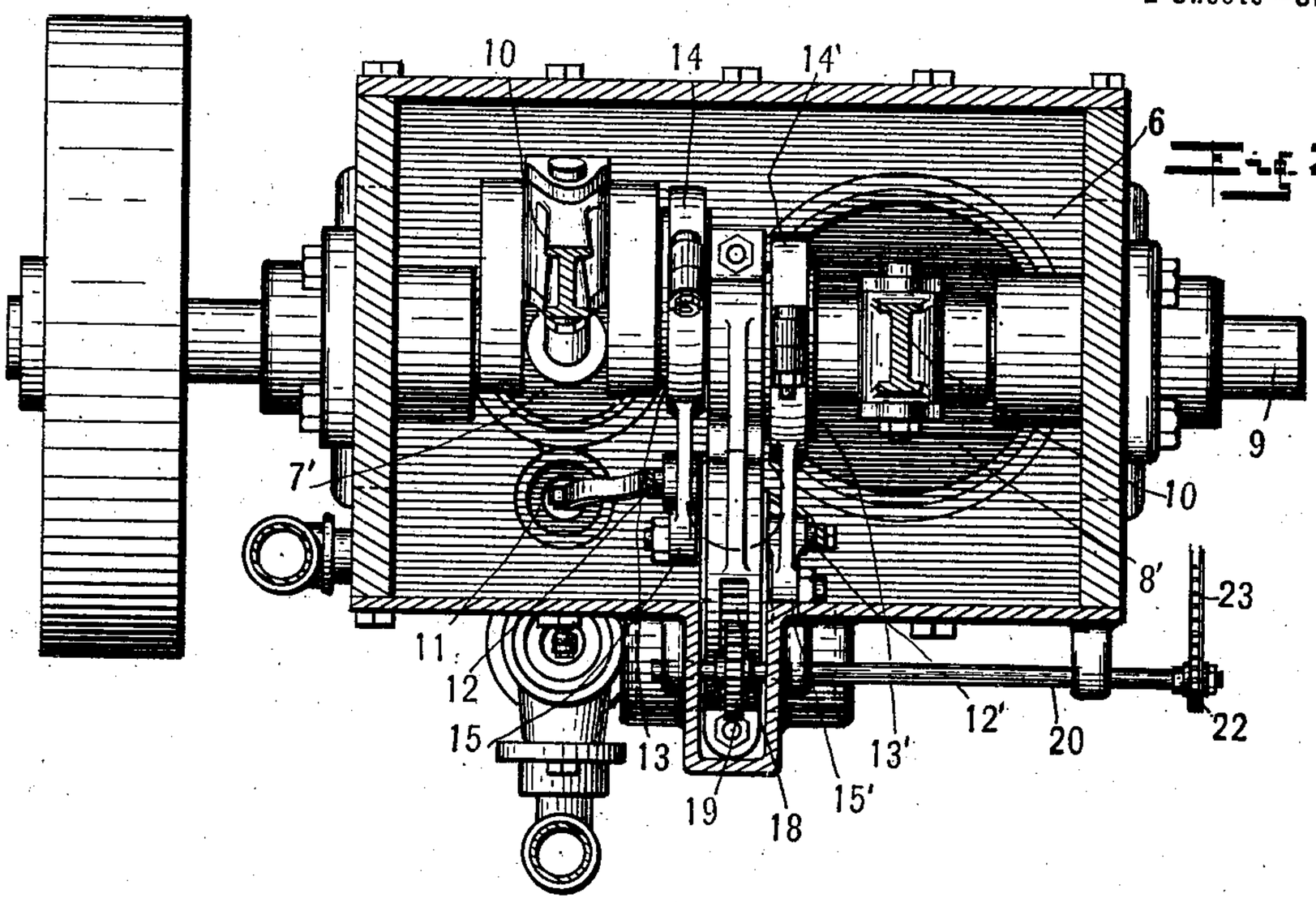
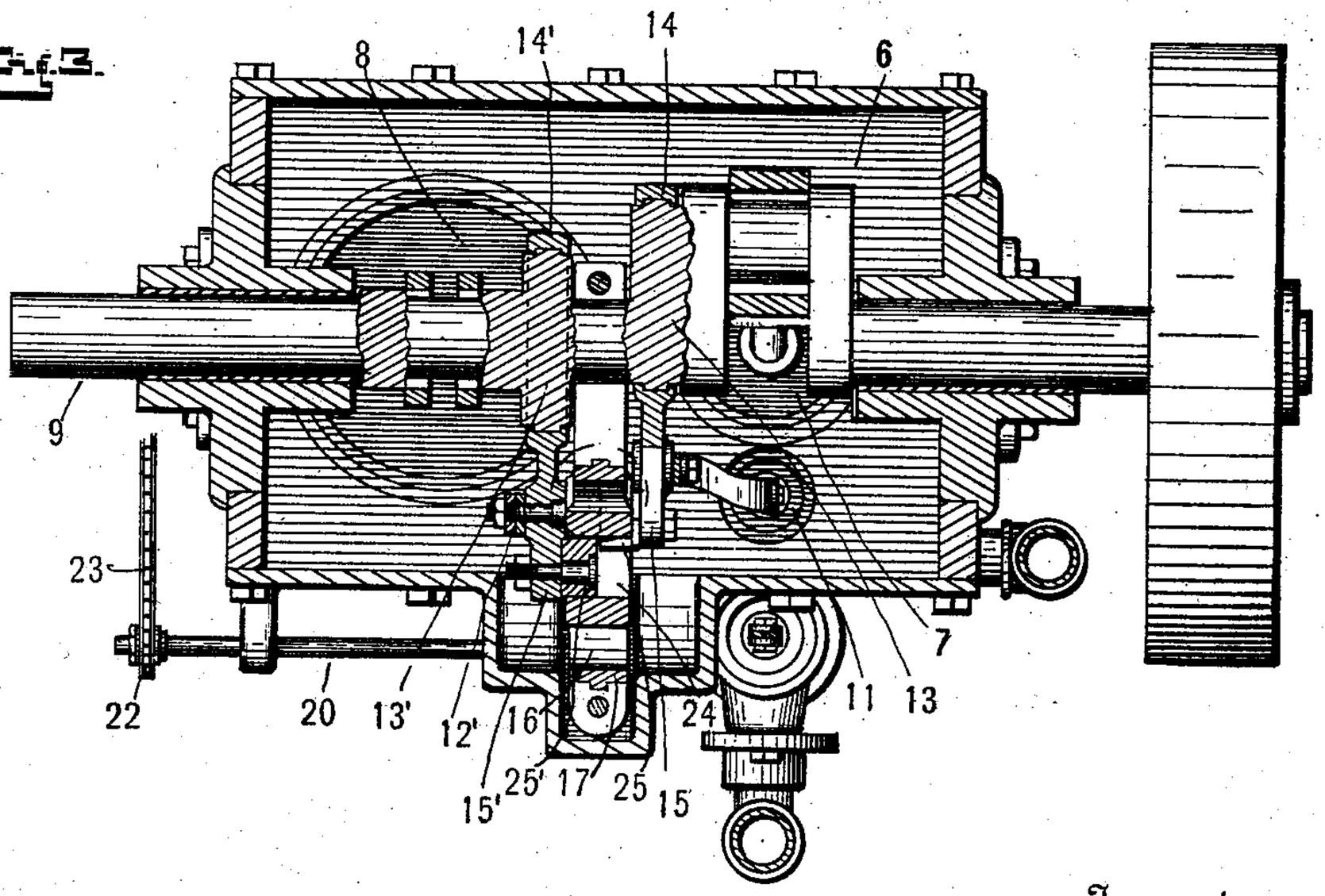


Fig. 3.



Witnesses
Frank A. Falk
Bertha M. Ballard

Inventor
Paul H. White
By
Arthur M. Hood
Attorney

UNITED STATES PATENT OFFICE.

PAUL H. WHITE, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO WHITE STEAM WAGON COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 709,949, dated September 30, 1902.

Application filed October 3, 1901. Serial No. 77,375. (No model.)

To all whom it may concern:

Be it known that I, PAUL H. WHITE, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Valve-Gear, of which the following is a specification.

My invention relates to an improvement in reversing valve-gears for steam or other engines.

The object of my invention is to produce a simple and easily-constructed reversing valve-gear especially designed for use in connection with two pairs of single-acting engines. It is to be understood, however, that the gear is by no means limited to use with such peculiar type of engine.

The accompanying drawings illustrate my invention as applied to an engine consisting of two pairs of high and low pressure single-acting cylinders.

Figure 1 is an axial section through the high-pressure cylinders. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a section on line 3 3 of Fig. 1.

In the drawings, 6 indicates a box-like body, to opposite sides of which are secured two high-pressure cylinders 7 and 7′. Secured to the same sides of the body 6 are two low-pressure cylinders 8 and 8′, and mounted in the body between the two pairs of cylinders and at right angles thereto is a crank-shaft 9. Mounted in each cylinder is a suitable piston, which is connected to the crank-shaft by a suitable connecting-rod 10. The engine thus formed is in the construction shown single-acting in each cylinder, and the entrance of steam therein is controlled by a series of valves 11, the high-pressure valves being provided with connecting-links 12. The peculiar construction of this engine forms the subject-matter of my application Serial No. 77,376.

Formed integral with, secured to, or otherwise driven by crank-shaft 9 are two eccentrics 13 and 13′, upon which are mounted eccentric-straps 14 and 14′, respectively, the said straps being provided with substantially radial arms 15 and 15′, respectively, hereinafter termed "eccentric-arms." Arranged adjacent the crank-shaft is a circular track or support 16, in which is revolubly mounted a circular plate 17, provided upon its periphery with a series of gear-teeth 18, which are adapted to mesh with a pinion 19, carried by a shaft 20. Shaft 20 may be provided with a suitable sprocket-wheel 22, so that it may be rotated from a distance by means of a chain 23. Plate 17 is provided with a diametrical slot 24, within which are mounted two slide-blocks 25 and 25′, the said blocks being in length each a little less than half the thickness of the plate 17 in order that they may both lie in the slot 24 in such manner that each may pass the other. The free end of eccentric-arm 15 is pivotally attached to the slide-block 25, and the free end of the eccentric-arm 15′ is pivotally attached to the slide-block 25′. The two links 12 are pivotally connected to the eccentric-arm 15 at a point between the center of the eccentric and the end of the arm, and the two links 12′ are similarly connected to the eccentric-arm 15′. The points of cut-off and the direction of motion of the crank-shaft may be regulated by a rotation of plate 17 in the circular guide 16 by means of a pinion 19, such rotation changing the angle of the slot 24 with relation to the crank-shaft, and thus varying the direction of the eccentric-arms and the links 12 and 12′ connected thereto.

I claim as my invention—

1. In a valve-gear, the combination of a pair of eccentrics, a pair of straps and eccentric-arms mounted on said eccentrics, a pair of valves, intermediate connections between each valve and one of the eccentric-arms, means for engaging and guiding each of said eccentric-arms, and means for shifting said guiding means so as to simultaneously and coextensively affect both of the eccentric-arms.

2. The combination of two pairs of cylinders, a pair of eccentrics, an eccentric-arm carried by each eccentric, intermediate driving connections between said cylinders and the eccentrics, a valve for each cylinder, intermediate connections between the valves of one pair of cylinders and one of the eccentric-arms, intermediate connections between the valves of the other pair of cylinders and the

other eccentric-arm, means for engaging and guiding both eccentric-arms, and means for shifting said engaging and guiding means so as to simultaneously and coextensively affect both eccentric-arms.

3. In a valve-gear, the combination of a pair of eccentrics, a pair of eccentric-arms mounted upon said eccentrics, a slide-block carried by each of said eccentric-arms, a pair of valves, a pair of links connecting said valves to said eccentric-arms, a circular plate having a single guide-slot adapted to receive both of the slide-blocks, means for supporting said plate, and means for rotating said plate in its support.

4. In a valve-gear, the combination of a pair of eccentrics, a pair of eccentric-arms mounted upon said eccentrics, a circular plate provided with means for engaging and guiding both of said eccentric-arms, a support for said plate, means for rotating said plate in its support, a pair of valves, and intermediate connections between each valve and an eccentric-arm.

5. The combination with a pair of high-pressure cylinders and a pair of low-pressure cylinders, of a pair of eccentrics, intermediate driving connections between said cylinders and the eccentrics, an eccentric-arm carried by each of said eccentrics, a pair of valves for the high-pressure cylinders, intermediate connections between the said pair of valves and one of the eccentric-arms, a pair of valves for the low-pressure cylinders, intermediate connections between said pair of valves and the other eccentric-arm, a circular plate provided with means for engaging and guiding both eccentric-arms, a support for said plate, and means for rotating said plate in its support.

6. The combination with two pairs of cylinders, of a pair of eccentrics, an eccentric-arm carried by each eccentric, intermediate driving connections between said cylinders and the eccentrics, a valve for each cylinder, intermediate connections between the valves of one pair of cylinders and one of the eccentric-arms, intermediate connections between the valves of the other pair of cylinders and the other eccentric-arm, a circular plate provided with means for engaging and guiding both eccentric-arms, a support for said plate, and means for rotating said plate in its support.

7. In a valve-gear, the combination of an eccentric, an eccentric-arm mounted thereon, a valve, intermediate connections between said arm and valve, a circular plate, means carried by said plate for engaging and guiding the eccentric-arm, a fixed support for the plate, a series of gear-teeth carried by said plate, and a rotatable pinion arranged to engage said gear-teeth, for the purpose set forth.

PAUL H. WHITE.

Witnesses:
ARTHUR M. HOOD,
BERTHA M. BALLARD.