

(No Model.)

2 Sheets—Sheet 1.

J. RIDDELL.
VALVE GEAR.

No. 478,022.

Patented June 28, 1892.

Fig. II.

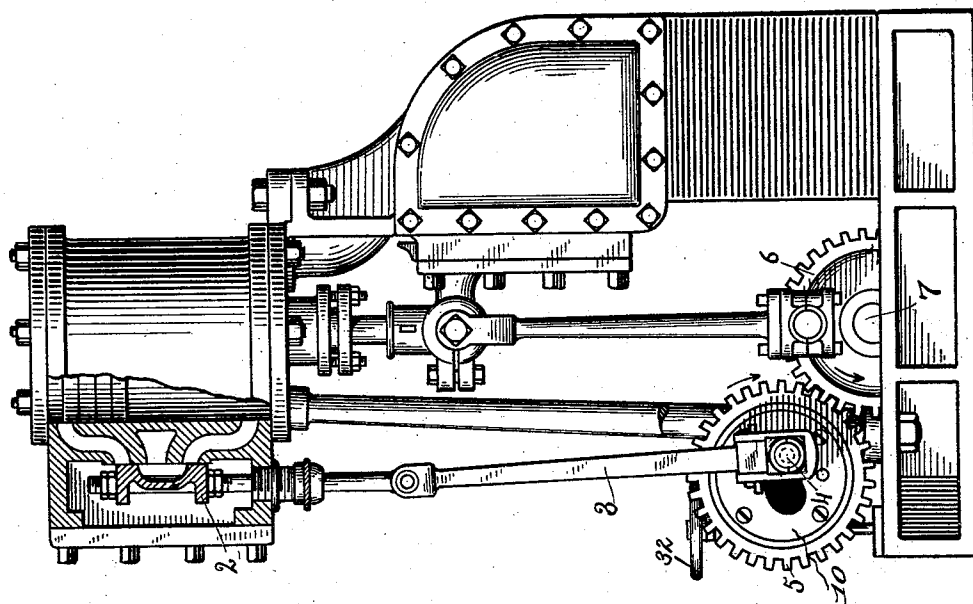
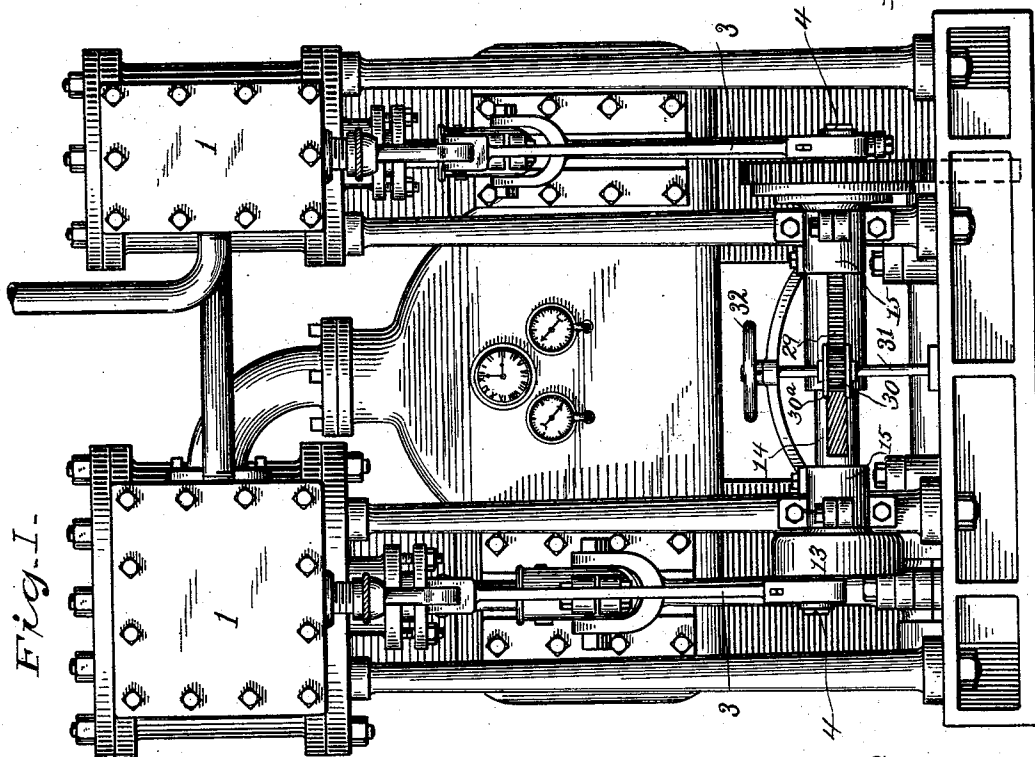


Fig. I.



Witnesses

H. A. Lamb

E. V. Sumner

Inventor

John Riddell

By *Wm. H. Wright*

Attorneys

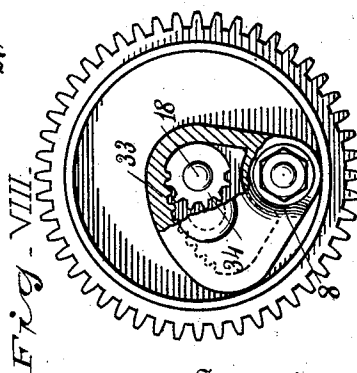
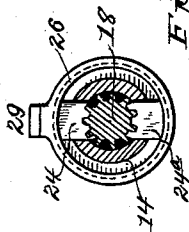
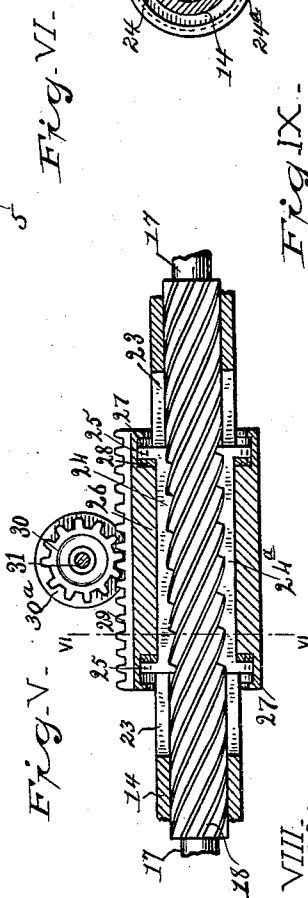
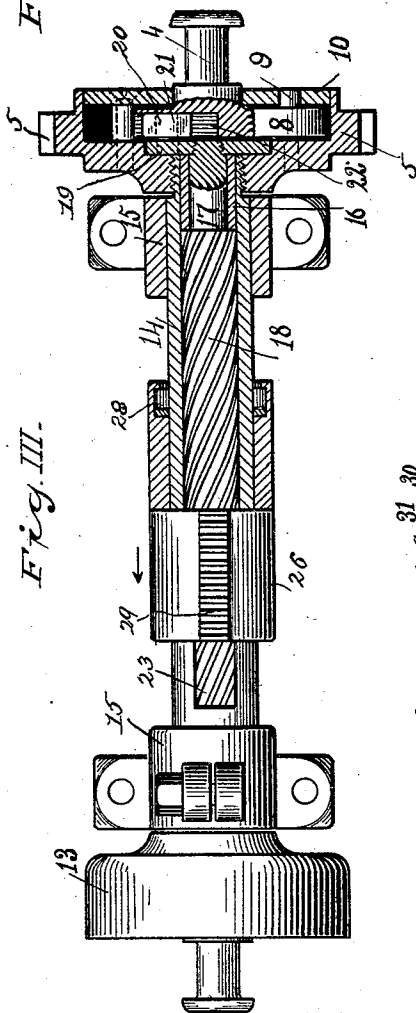
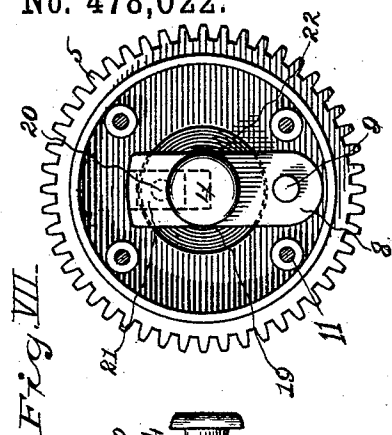
(No Model.)

2 Sheets—Sheet 2.

J. RIDDELL.
VALVE GEAR.

No. 478,022.

Patented June 28, 1892.



Witnesses
H. A. Lamb,
J. J. Hummood.

Inventor
John Riddell
By Freight 45/18/5
Attorneys

UNITED STATES PATENT OFFICE.

JOHN RIDDELL, OF LYNN, ASSIGNOR OF ONE-HALF TO GUYON F. GREENWOOD, OF BOSTON, MASSACHUSETTS.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 478,022, dated June 28, 1892.

Application filed May 20, 1891. Serial No. 393,466. (No model.)

To all whom it may concern:

Be it known that I, JOHN RIDDELL, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented a new and useful Improvement in Valve-Gears, of which the following is a specification.

My invention relates to an improvement in valve-regulators for steam and other engines, whereby while the engine is in motion the valve-action can be increased, diminished, reversed, or suspended at will.

My invention is applicable to a single or compound engine of any type using slide-valves.

In the accompanying drawings I have shown the invention applied to an ordinary compound marine engine; but this is merely by way of illustration.

In said drawings, Figure I is a front, and Fig. II a side elevation, the latter partly in section, of an engine having my invention applied thereto. Fig. III is a view, partly in elevation and partly in axial section, of the reversing-gear. Fig. IV is an end view of the same. Fig. V is an axial sectional view of a part of the gear in a plane at right angles to the plane of section of Fig. III. Fig. VI is a transverse sectional view on the line VI VI, Fig. V, omitting the pinion. Fig. VII is a view similar to Fig. IV, but omitting the cap. Figs. VIII and IX represent in face view, partly broken away, and axial section a modification of the invention.

The engines I may be of the represented compound-marine or any other type. In the drawings I have shown the valve-controlling gear arranged to simultaneously act upon the slide-valves 2 of both engines. The valve-rod pitmen 3 3 are strapped to pins 4, from which they derive motion, and which are themselves, through the medium of my improved reversing and varying gear, driven by the gears 5 6 from main crank-shaft 7. The arrangement of the pin 4 and its controlling mechanism is such as to enable a partial shift of the pin to a position of greater or less eccentricity with corresponding valve-stroke, and such that this shift, being prolonged beyond the axis of disk rotation, causes re-

versal of valve with respect to the steam and exhaust ports, and, further, such that adjustment of the pin to a position coaxial with the disk brings the valve to rest and stops the engine.

In the form of my invention shown in Figs. III to VII the wrist-pin 4 is carried by an arm 8, pivoted by stud 9 eccentrically of a cap or disk 10, which is fixed by screws 11 to the gear 5, leaving between the disk and gear a chamber within which the arm 8 is free to oscillate. The disk 10 has an arcuate slot 12 (see Fig. IV) coincident with the center of the disk 10 and concentric with the pivot-stud 9, and through this slot the wrist-pin 4 projects. By adjusting the wrist-pin 4 from the center toward either end of the slot 12 the gear is reversed, while both the throw and lead of the valve pass through each gradation from zero to the full lead and throw. This adjustment is effected as follows: The gear-wheel 5 of one engine and the cap 13, which serves to cover and support the corresponding mechanism of the other engine, are fast to and carried by hollow shaft or sleeve 14, mounted in bearings 15, which are supported from the stationary frame of the engine in any suitable manner. Within each end of the hollow shaft 14 is a short sleeve 16, serving as a bearing for the trunnions 17 at each end of a worm-shaft 18. On its ends said shaft bears, screwed tightly down to fixed stops or shoulders, a disk or arm 19, which has an eccentric wrist-pin 20, bearing a block 21, which runs in a radial groove 22 in the arm 8. The hollow shaft or sleeve 14 has on diametrically-opposite sides longitudinal slots 23, in which is set a nut, whose two parts 24 24^a have each of them two flanges or toes 25 25.

26 is a sleeve surrounding the hollow shaft 14 and having annular recesses 27 27 to receive the flanges 25 of the nut 24 24^a. Annular brasses 28 28 in said recesses, on both sides of the flanges 25 25, allow the latter to run freely, with little friction, in said recesses. A straight rack 29 on one side of said sleeve 26 and intermeshing with pinion 30, having shaft 31 and hand-wheel 32, (see Figs. I, II, and V,) enable the engineer to shift the said sleeve 26 longitudinally of the hollow shaft

14. The rotation of the sleeve is prevented by flanges 30^a on the pinion or on the rack, or in any other manner, as may be preferred. When the engine is running, and by consequence the gear 5 is driven from the main crank-shaft 7, wrist-pin 4 is revolved about the axis of the gear 5, and the hollow shaft 14, together with the worm-shaft 18, partake of the movement, and the nut 24 24^a runs, with the worm-shaft, freely in the sleeve 26. When said sleeve is moved longitudinally of the shaft whereon it is mounted—as, for example, to the left, as shown by the arrow in Fig. III—it carries with it the nut 24 24^a and causes a relative rotation of the worm-shaft 18, and consequently of the disk or arm 19, its wrist-pin 20, sliding block 21, and the pivoted arm 8, so shifting the wrist-pin 4 to the left, as shown by the arrow in Fig. IV. The contrary movement of the hand-wheel 32 shifts the wrist-pin 4 in opposite direction, and it will be readily perceived that this may be done whether the engine is at rest or in rapid movement, and that thereby the throw and the direction of the valve are both varied at any instant at pleasure.

An equivalent form of the invention is shown in Fig. VIII, wherein for the disk 19, wrist-pin 20, and sliding block 21 are substituted a segmental rack 33 on the oscillating arm 8, whose shape is changed correspondingly. This arm is oscillated by a segmental pinion 34 direct from the shaft 18.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of the valve-rod wrist-pin, driving-gear therefor, oscillating arm whereto said pin is fixed and which is mounted eccentrically on said driving-gear, and means for oscillating said arm in an arc which intersects the axis of said driving-gear, substantially as set forth.

2. The combination of the valve-rod wrist-pin, driving-gear therefor, an oscillating arm wherein said pin is fixed and which is mounted eccentrically on said driving-gear, and

means for oscillating said arm, substantially as set forth.

3. The combination, with driving-gear 5, of the oscillating arm, the wrist-pin 4 thereupon, shiftable to right or left to and from concentricity with said driving-gear, the worm-shaft 18, and the nut 24 on said worm-shaft having means of operation, substantially as described.

4. The combination of the oscillating arm 8 on driving-gear 5, the wrist-pin 4 on said arm, shiftable to and from the center of said driving-gear, the worm-shaft 18, the nut 24, the sleeve 26, and means for operating said sleeve, substantially as set forth.

5. The combination of worm-shaft 18, hollow shaft 14, having slots 23, nut 24 24^a, having flanges 25, and sleeve 26, having recesses wherein said flanges run, substantially as set forth.

6. The combination of wrist-pin 4, wheel 5, receiving motion from the main crank-shaft, arm 8, pivotally mounted on said wheel eccentric of its axis and carrying said wrist-pin, and means for oscillating said arm and wrist-pin, substantially as set forth.

7. The combination of the wrist-pin 4, wheel 5, receiving motion from main crank-shaft, hollow shaft 14, carrying said wheel, worm-shaft 18 within said hollow shaft, having operative connection with said wrist-pin, and hand-controlled nut 24 24^a for operating said worm-shaft, substantially as set forth.

8. The combination of wrist-pin 4, the wheel 5, receiving motion from the main crank-shaft, the pivoted arm 8, carrying said wrist-pin, the worm-shaft 18, having means of operation, substantially as described, the disk or arm 19, having wrist-pin 20, and the sliding block 21, adapted to engage with said arm 8, all substantially as and for the purposes set forth.

JNO. RIDDELL.

Witnesses:

EDWIN P. BUTTERFIELD,
WM. D. POOL.