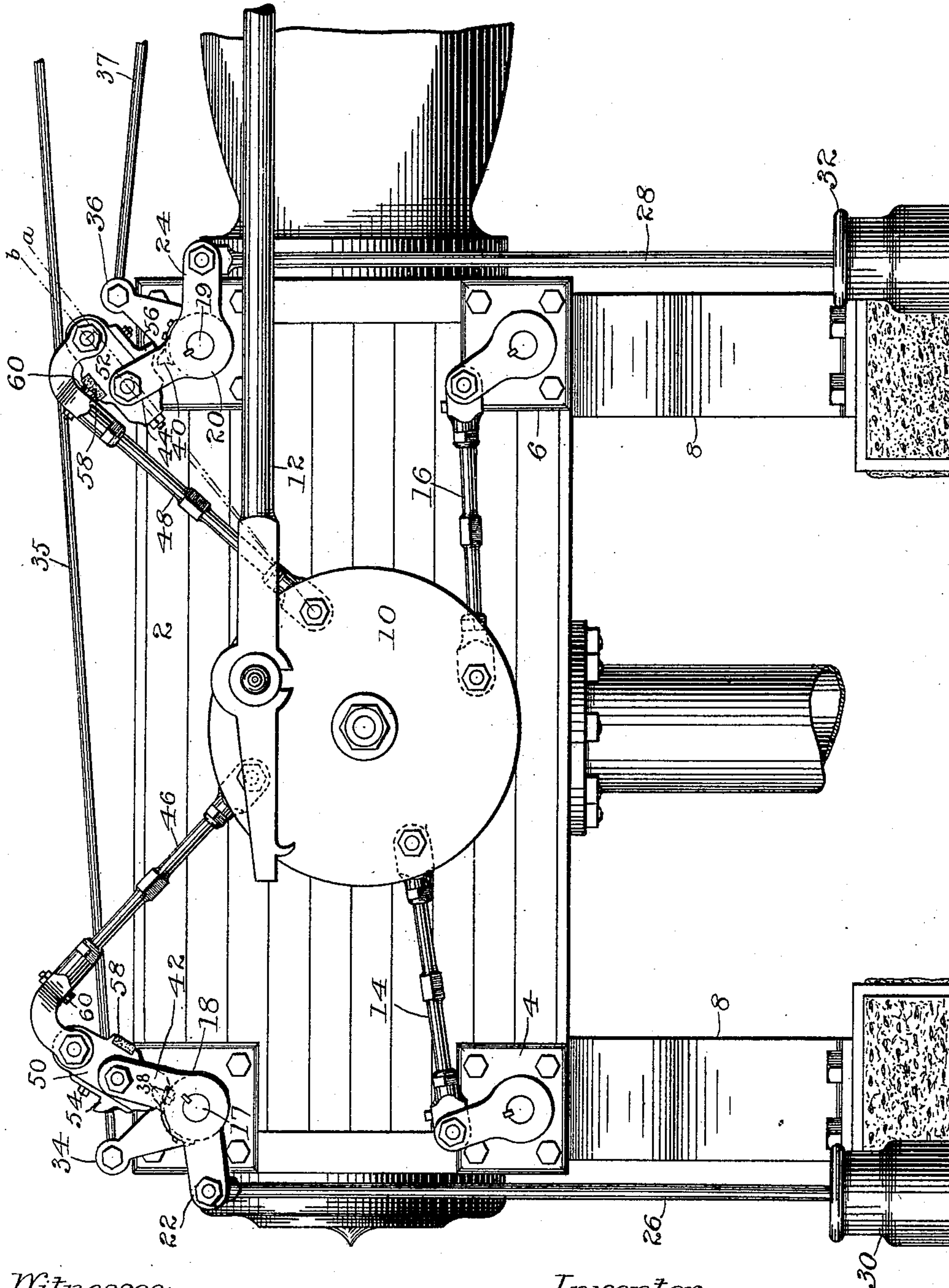


(No Model.)

E. C. FLAGG.
RELEASING VALVE GEAR.

No. 463,383.

Patented Nov. 17, 1891.



Witnesses:-

L. L. Baldwin.

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UNITED STATES PATENT OFFICE.

ELLIS C. FLAGG, OF ST. PAUL, MINNESOTA, ASSIGNOR TO THE SCRIBNER
LIBBEY COMPANY, OF SAME PLACE.

RELEASING VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 463,383, dated November 17, 1891.

Application filed June 13, 1891. Serial No. 396,107. (No model.)

To all whom it may concern:

Be it known that I, ELLIS C. FLAGG, of St. Paul, Ramsey county, Minnesota, have invented certain Improvements in Releasing Valve-Gears, of which the following is a specification.

My invention relates to improvements in releasing attachments for the valve-gear of stationary engines; and it consists in the improved construction hereinafter described, and particularly pointed out in the claims.

The figure in the accompanying drawing, forming part of this specification, shows the valve-gear in side elevation with my improved attachment applied thereto.

In the drawing, 2 represents the cylinder, 4 and 6 the exhaust-valve boxes, and 8 the frame or support for the engine.

10 is the wrist-plate, of ordinary construction, pivoted to the cylinder and actuated by means of the eccentric reach-rod 12, and operating the valve 4 and 6 by means of the reach-rods 14 and 16.

Mounted upon the pivot-pins 17 and 19, which are connected to the inlet-valves, are the bell-crank levers 18 and 20, to the outer arms 22 and 24 of which are connected the rods 26 and 28, carrying pistons in the dash-pots 30 and 32. Pivoted upon the pins 17 and 19 are the arms 34 and 36, which are respectively connected by means of the rods 35 and 37 to the opposite ends of the governor-lever of ordinary type, whereby the action of the governor serves to move the rods oppositely, and thus to rock the arms 34 and 36 in opposite directions with the fluctuations of the governor. These arms are provided with the spurs or stops 38 and 40, which stand between them and the bell-crank levers 18 and 20. The inwardly-extending arms 42 and 44 of the levers 18 and 20 are connected to the wrist-plate by means of the reach-rods 46 and 48 and the short intermediate links or bars 50 and 52, pivoted to each. The outer end of each of the rods 46 and 48, which are longer than the distance between their pivots on the wrist-plate and the lever-arms by approximately the length of the links, is given a downward bend or hook, so that when at the limit of its forward movement its point of connection with the intermediate link is beneath

a right line connecting the centers of the pivots of the rod, as indicated by the dot-and-dash line *a*.

The position of the parts shown in the drawing is such that when the reverse movement of the wrist-plate has commenced, the pivotal points of the reach-rod and lever-arm and link being in line (see line *b*) and the mechanism at the point of being released, the limit of angular difference between the lines *a* and *b* is determined and automatically adjusted by means of the stops 38 and 40, as rocked or turned by the governor-rods, upon which impinge the shoulders or stops 54 and 56 of the intermediate links.

In order to lessen the noise and wear of parts, I prefer to place upon the upper face of the links cushions or pads 58, upon which strike the shoulders 60 of the reach-rods 46 and 48, thus deadening the shock or sound of the blow. Any desired form of dash or vacuum pot may be employed as preferred.

In operation, as the wrist-plate is turned by the eccentric reach-rod the rods 46 and 48 are operated oppositely, one being thrust forward and the other drawn back. With the forward thrust the intermediate link is carried forward until its stop 56 strikes the stop 40, while the other link stands approximately in a vertical position. With the reverse movement of the wrist-plate the rod 48 is pulled back, and as the line through the centers of its pivots passes below the pivot on the arm 44 the link 52 thrusts the arm 44 downward with the first movement of the rod, thus turning the bell-crank lever 20 upon its pivot and lifting the piston carried by the rod 28 in the dash-pot 32. With the continued movement of the rod, the pivot in the arm 44 of the bell-crank lever passes below the line through the centers of the pivots of the rod, when the link instantly turns on its pivot into the position shown by the link 50, thus releasing the bell-crank lever and allowing the piston to fall in the dash-pot.

I claim—

1. In a device of the class described, the combination, with the lever mounted on the inlet-valve pivot, of the dash-pot piston connected to one arm of said lever, and a knuckle-jointed connection between the other arm of

said lever and the wrist-plate, whereby when thrust forward by the rocking of the wrist-plate said connection is doubled upon itself and the line of draft with a reverse movement
5 of the wrist-plate is below the point of connection with the lever-arm, substantially as and for the purposes set forth.

2. In a device of the class described, the combination, with the bell-crank lever mounted on the inlet-valve pivot, the dash-pot piston-rod connected to the lower arm of said lever, the reach-rod pivoted to the wrist-plate and longer than the distance between its pivot and the upper arm of the lever, and an intermediate link pivoted to said lever-arm and to
15 said reach-rod, adapted to be doubled back upon said rod with its forward thrust and to permit the end of the rod to drop below a right line passing through the pivot upon the wrist-plate and the pivot of said link upon said arm, substantially as and for the purposes set forth.
20

3. In a device of the class described, the combination, with the bell-crank lever mounted upon the valve-pivot, having its downward-
25 ly-extending arm connected to the dash-pot piston, of a knuckle-jointed connection between its outwardly-extending arm and the wrist-plate, comprising a reach-rod of greater length than the distance between the lever
30 and the point of connection with the wrist-plate, and a short link connecting the outer end of the rod with the lever, whereby when the reach-rod is at the limit of its forward movement as actuated by the wrist-plate a
35 right line through the centers of the pivots of the reach-rod is below the connection of said link with said lever-arm, substantially as and for the purposes set forth.

4. In a device of the class described, the
40 combination, with the dash-pot, its piston, the bell-crank lever connected to said piston, and the wrist-plate, of the reach-rod pivoted to said wrist-plate and extending beyond the upper arm of said bell-crank lever, the intermediate link connecting the outer end of said
45 reach-rod with said lever-arm, and an adjustable stop actuated by the governor-rod, limiting the downward movement of the outer end

of the reach-rod, substantially as and for the purposes set forth. 50

5. In a device of the class described, the combination, with the dash-pot piston-rod, its actuating-crank, and the wrist-plate, of the reach-rod pivoted to said wrist-plate, and a
55 knuckle-joint connection between said reach-rod and said crank, adapted to be doubled back with the thrust of the reach-rod and to drop below a right line passing through the points of connection of the members of the joint with the crank and the wrist-plate, 60
whereby with the first reverse movement of the reach-rod a thrust is given to the crank to operate said piston, substantially as and for the purposes set forth.

6. In a device of the class described, the
65 combination, with the wrist-plate and the dash-pot piston-rod, of the bell-crank lever actuating said rod, the reach-rod pivoted to said wrist-plate, the link pivoted to the outer end of said reach-rod and to said bell-crank
70 lever, said reach-rod and link forming the members of a knuckle-joint adapted to be doubled back by the thrust of the rod, and an adjustable stop actuated by the governor-rod, limiting the angle of closing of said joint, sub- 75
stantially as and for the purposes set forth.

7. In a device of the class described, the combination, with the wrist-plate, the dash-
80 pot piston-rod, and its actuating bell-crank lever, of the reach-rod pivoted to the wrist-plate and extending beyond said bell-crank lever and having a downward bend at its outer end, a link connecting said outer end with said bell-crank lever and forming with
85 said rod a knuckle-joint, an adjustable stop actuated by the governor-rod, limiting the downward or closing movement of said joint, and an elastic cushion between the two mem-
90 bers of said joint, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand this 9th day of June, 1891.

ELLIS C. FLAGG.

In presence of—

T. D. MERWIN,
A. MAE WELCH.