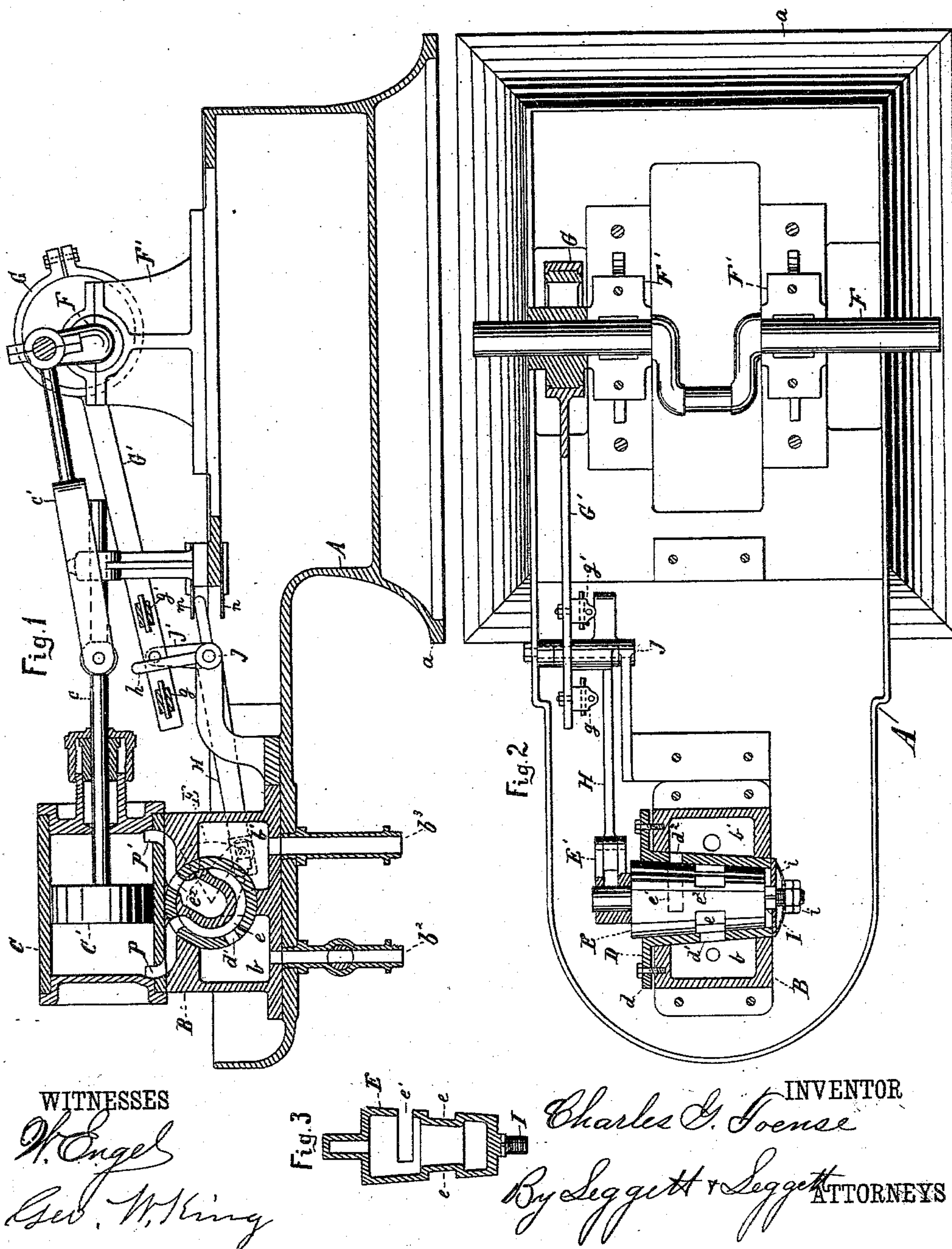


(No Model.)

C. G. TOENSE.  
OSCILLATING VALVE.

No. 301,408.

Patented July 1, 1884.





# UNITED STATES PATENT OFFICE.

CHARLES G. TOENSE, OF CLEVELAND, OHIO.

## OSCILLATING VALVE.

SPECIFICATION forming part of Letters Patent No. 301,408, dated July 1, 1884.

Application filed October 6, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES G. TOENSE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Oscillating Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in oscillating valves; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a vertical longitudinal section of my improved motor. Fig. 2 is a plan view with the cylinder and connecting-rod removed, and with portions in section. Fig. 3 is a longitudinal sectional view of the valve.

A represents a supporting-frame, terminating below in the bed-plate *a*. To this frame are attached the working parts of the motor.

B is a chest firmly attached to the said frame A, and supporting the cylinder C, that may be integral therewith. This chest is provided with the chambers *b* and *b'*, the former connected with the induction-pipe *b<sup>2</sup>*, and the latter is in open relation with the exhaust-pipe *b<sup>3</sup>*.

D is a valve-seat, preferably detachable, and extending laterally, as shown, through the chest B, and secured thereto by means of the flange *d* and the bolts, as shown. If preferred, this seat may be made integral with the chest B. This valve-seat has an opening, *d'*, into the chamber *b*, and an opening, *d<sup>2</sup>*, into the chamber *b'*. The former admits the motive power by means of the groove *e* in the rock-ing valve E alternately into the two ends, respectively, of the cylinder C. The latter, *d<sup>2</sup>*, by means also of the opening *e'* in the valve, keeps the inside of the valve always in open relation with the chamber *b'* and the exhaust-pipe *b<sup>3</sup>*. The said groove *e* in the valve E extends partly around the valve, as shown in Fig. 1. Between the ends of the groove *e* is the opening *e<sup>2</sup>*, extending to the inside cavity in the valve. The relation of the parts and the operation of the valve are such that when one end of the groove *e* is in open relation with the port leading to one end of the cylin-

der the opening *e<sup>2</sup>* will always be in open relation with the opposite port, one position of the valve being shown in Figs. 1 and 2. As aforesaid, the opening *e'* is long enough on the circumference of the valve to be always in open relation with the exhaust-chamber *b'*. The small end of the valve has a stud, I, extending through the washer or plate *i*, and secured by the jam-nuts *i'*, by means of which the valve may be kept in its proper position with the valve-seat. Attached to the other end of the valve is the arm E', with a wrist that engages the end of the rod H, by means of which the valve is actuated.

In Fig. 1 is shown the rod H, and in dotted lines the arm E', in their lower position. The rod H is slotted longitudinally, so that the box that embraces the wrist of the arm E may have end-play. The rod H is fulcrumed on the rock-shaft J, but extends beyond the fulcrum, and engages at the extremity of its throw the cushions *m* and *n*, and has also an upright arm, *h*, attached, that is engaged and is actuated alternately by the adjustable lugs *g* and *g'*, that are attached to the eccentric-rod G' by bolts passing through slots on the rod G' and secured on the back side by nuts, as shown in Fig. 2. This rod G' is actuated by the eccentric G, and is at the opposite end pivotally attached to and guided by the rock-arm J'. C is the piston, *c* the piston-rod, and *c'* the connecting-rod.

F is the crank-shaft, and F' the pillow-blocks supporting the crank-shaft.

The operation of the device is as follows: The motive power—steam, water, or whatever it may be—is admitted through the pipe *b<sup>2</sup>* into the chamber *b*, and thence through the opening *d'* and the recess *e* in the valve, and in the position shown in Fig. 1, into the port P, leading to the left-hand end of the cylinder. At the same time steam, water, or other substance may pass through the port P' and into the valve at *e<sup>2</sup>*, and through opening *e'* in the valve and the opening *d<sup>2</sup>* in the valve-seat into the exhaust-chamber *b'*, and be discharged through the exhaust-pipe *b<sup>3</sup>*. As the piston is moved toward the right-hand end of the cylinder, and near the end of the stroke, by means of the position of the eccentric on the crank-shaft, and also of the eccentric-rod G', the lug *g* butts against the arm *h*, carrying it



to the right or causing the rod H and the end of the arm E' to be raised, and by means of which the valve is reversed, the top part turning to the left hand until the right-hand end of the recess *e* is brought in open relation with the port P' and the opening *e*<sup>2</sup> in open relation with the port P. Upon the return-stroke the stop *g*' engages the arm *h* and moves the valve again to the position shown. The cushion-stops *m* and *n*, by engaging the end of the rod H, prevent the valve from being moved too far.

What I claim is—

1. The combination, with a removable conical valve-seat provided with the openings *d*' and *d*<sup>2</sup>, communicating, respectively, with the chambers *b* and *b*', of the hollow conical valve provided with the recess *e*, the slot *e*', and the opening *e*<sup>2</sup>, substantially as set forth.

2. The hollow oscillating valve E, provided with the recess *e*, the slot *e*', and the opening *e*<sup>2</sup>, in combination with the valve-seat provided with the opening *d*' and *d*<sup>2</sup>, and the chambers *b* and *b*', substantially as set forth.

3. The combination, with an oscillating valve and the rod H, provided with the arm *h*, of the rock-shaft J, the eccentric-rod for moving the rock-shaft, the adjustable lugs *g* and *g*', and the cushion-stops *m* and *n*, all of the above parts adapted to operate as described.

In testimony whereof I sign this specification, in the presence of two witnesses, this 26th day of September, 1883.

CHARLES G. TOENSE.

Witnesses:

CHAS. H. DORER,  
ALBERT E. LYNCH.