2 Sheets--Sheet 1.

G. G. LOBDELL.

Oscillating-Engine.

No. 160,447. Patented March 2, 1875.

FIG. 1.

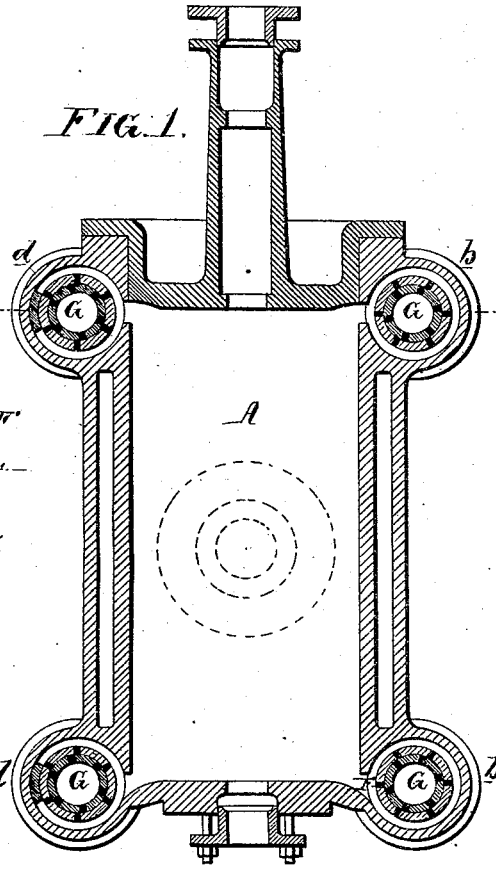


FIG. 3.

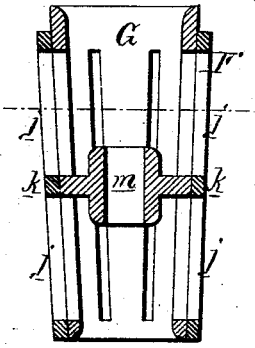


FIG. 4.

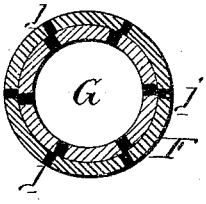


FIG. 5.

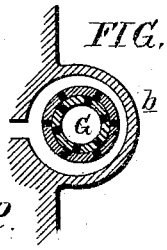
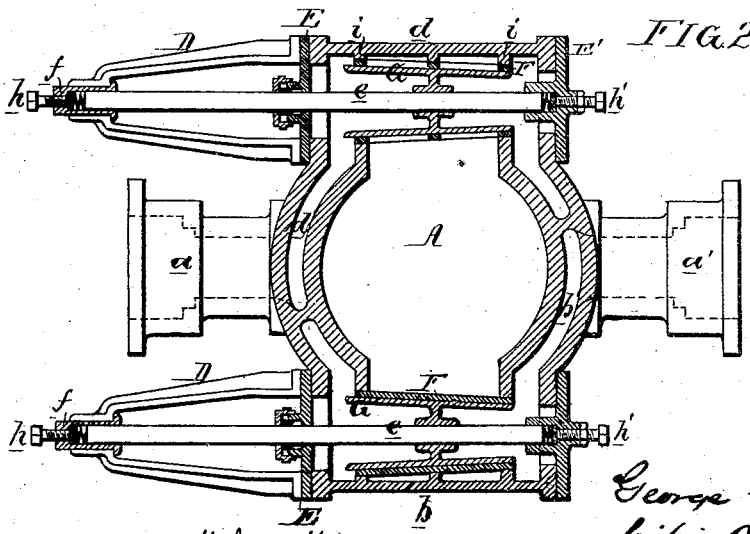


FIG. 2.



WITNESSES, Hubert Howson, Harry Smith

George G. Lobdell by his Attys. Howson and Sons

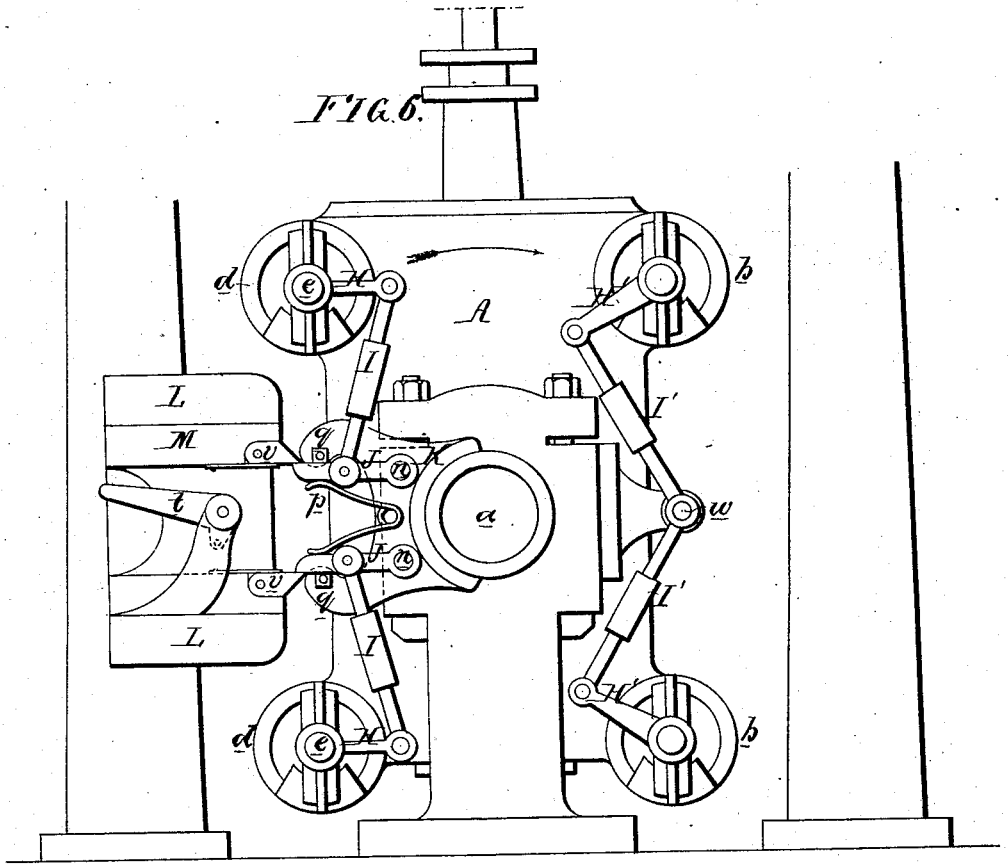
2 Sheets--Sheet 2.

G. G. LOBDELL.

Oscillating-Engine.

No. 160,447. Patented March 2, 1875.

FIG. 6.



WITNESSES, Hubert Howson
Harry Smith

George G. Lobdell
by his Attys.
Howson and Son

UNITED STATES PATENT OFFICE.

GEORGE G. LOBDELL, OF WILMINGTON, DELAWARE.

IMPROVEMENT IN OSCILLATING ENGINES.

Specification forming part of Letters Patent No. **160,447**, dated March 2, 1875; application filed August 6, 1873.

To all whom it may concern:

Be it known that I, GEORGE G. LOBDELL, of Wilmington, New Castle county, State of Delaware, have invented certain Improvements in Steam-Engines, of which the following is a specification:

The object of my invention is to so apply circular and vibrating valves to the valve-chests of steam-engines that both the perfect tightness and easy working of the valves are insured. My invention also relates to mechanism for operating the said valves in vibrating engines.

In Sheet 1 I have illustrated my improved valves as applied to the cylinder of a vibrating engine; but it should be understood that it is equally applicable to fixed cylinders.

Figure 1, Sheet 1, is a vertical section of the cylinder with the improved valves; Fig. 2, a sectional plan on the line 1 2; and Figs. 3 and 4, a longitudinal and transverse section of one of the valves and its seat, drawn to an enlarged scale.

A is a steam-cylinder, having the tubular trunnions *a a'*, common to other vibrating cylinders, and two exhaust steam-chests, *b b*, and two steam-chests, *d d*. The cylinder is incased throughout its whole length by a jacket, the space between which and the said cylinder is separated by a partition into two passages, one for the conveyance of live steam from one trunnion to the steam-chests, and the other for directing the exhaust steam to the other trunnion, as will be readily understood by reference to the sectional plan view, Fig. 2.

It will be evident that this plan of devoting the space within the jacket surrounding a cylinder partly to a steam-passage, and partly to a passage for exhaust steam, is applicable to fixed cylinders, and that the plan serves to maintain the interior of the cylinders at the desired high temperature.

Through each chest passes a spindle, *e*, the outer end of which is adapted to a socket, *f*, fitted to a bracket, D, attached to the cover E of the chest, a spiral spring contained in the socket being caused to bear against the end of the spindle by a set-screw, H, and the opposite end of the spindle fitting into a socket in the rear cover E of the chest, which has a set-screw, *h'*, for causing a spring to bear against this end of the spindle. The valve-seat F, best observed in Figs. 3 and 4, consists of a tapering circular sleeve, fitted tightly into annular ribs *i*, within and forming part of the chest, the seat having a number of oblong slots, *j j*, in two sets, separated from each other by an annular rib, *k*, there being in the present instance six slots in each set, as shown in Fig. 4. To the seat is fitted the tapering valve G, having a central hub, *m*, for attachment to the spindle *e*, the valve having slots corresponding with those of the sleeve.

The manner in which these valves, by their vibratory movement, admit the steam from one trunnion to the cylinder, and exhaust it from the latter through the other trunnion to the condenser, will be readily understood. I prefer to place the valve and its seat eccentrically in the chest, as shown in the detached view, Fig. 5, so that the passage around the seat for the steam will be commensurate with its volume.

It is essential to the proper working of these valves that they should have considerable taper, as shown in Fig. 3, and that provision should be made for accurate adjustment. This is secured by the set-screws *h* and *h'*, acting on the opposite ends of the valve-spindle through elastic mediums, which will prevent the valve from becoming either too tight or too loose in its seat, and will insure freedom of movement, as I have found by practical tests.

The manner of operating the valves is illustrated by Fig. 6, Sheet 2, in connection with an oscillating engine. The spindle *e* of the steam-valve in each chest *d* is furnished with an arm, H, which is connected by a rod, I, to an arm, J, the two arms J J being hung by pins *n n* to a bracket, K, secured to one of the trunnions *a*, and a spring, *p*, tending to force each arm J against a stop, *q*, on the said bracket. To guides L L on the frame-work of the engine is adapted a horizontal slide, M, which is under the control of the governor of the engine, the governor-rod being connected to the long arm *t* of a bell-crank lever hung to a projection on the guide L, and the short arm of the lever having a pin entering the slide M. To this slide are hung two steel-pointed dogs, *v v*, each dog being acted on by

a spring, which tends to maintain it in contact with a shoulder or stop on the slide.

If we suppose the cylinder to be moving in the direction of the arrow, Fig. 6, the upper arm J will be retained by the upper dog *v* for a length of time depending upon the distance of the end of the dog from the outer end of the arm, and as this distance depends upon the governor, the valve for admitting steam to the upper portion of the cylinder will remain open for a length of time commensurate with the speed and requirements of the engine. The moment the arm J is released from the dog, it will be elevated by the spring *p*, and the valve will be closed.

When the cylinder moves in a direction contrary to that pointed out by the arrow, the same operation of the lower arm J and lower valve will take place, while the rounded end of the upper arm, acting on the beveled end of the upper dog, will depress and finally pass the latter preparatory to a repetition of the above-described movements, when the cylinder again moves on its trunnions in the direction of the arrow.

It will be seen without further description that, as the cylinder vibrates, the steam-valves are opened alternately, the time of opening being always the same, but the time of closing in accordance with the speed and requirements of the engine.

The arm H of the exhaust-valves within the chests *b b*, are connected by rods I′ to a fixed pin, *w*, on the frame of the engine, so that the opening and closing of these valves will be uniform, and in accordance with the demand for a free and uninterrupted disposal of the exhaust steam.

I claim as my invention—

1. The combination of the circular slotted valve G and its spindle *e*, with a set-screw, *h*, at each end of the spindle, and an elastic medium interposed between each screw and the spindle, all substantially as and for the purpose described.

2. A steam-engine cylinder provided with a jacket, the space between which and the said cylinder is separated by a partition into two passages, one for the live steam and the other for the exhaust steam, as set forth.

3. The combination of tne arms H H, secured to the spindles of the steam-valves, the spring-arms J J, hung to a bracket on the cylinder's trunnion, and the connecting-rods I I, with the spring-dogs *i*.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE G. LOBDELL.

Witnesses:

H. HOWSON,

HARRY SMITH.