

(No Model.)

2 Sheets—Sheet 1.

F. M. GARLAND.
STEAM ENGINE.

No. 448,917.

Patented Mar. 24, 1891.

Fig. 1

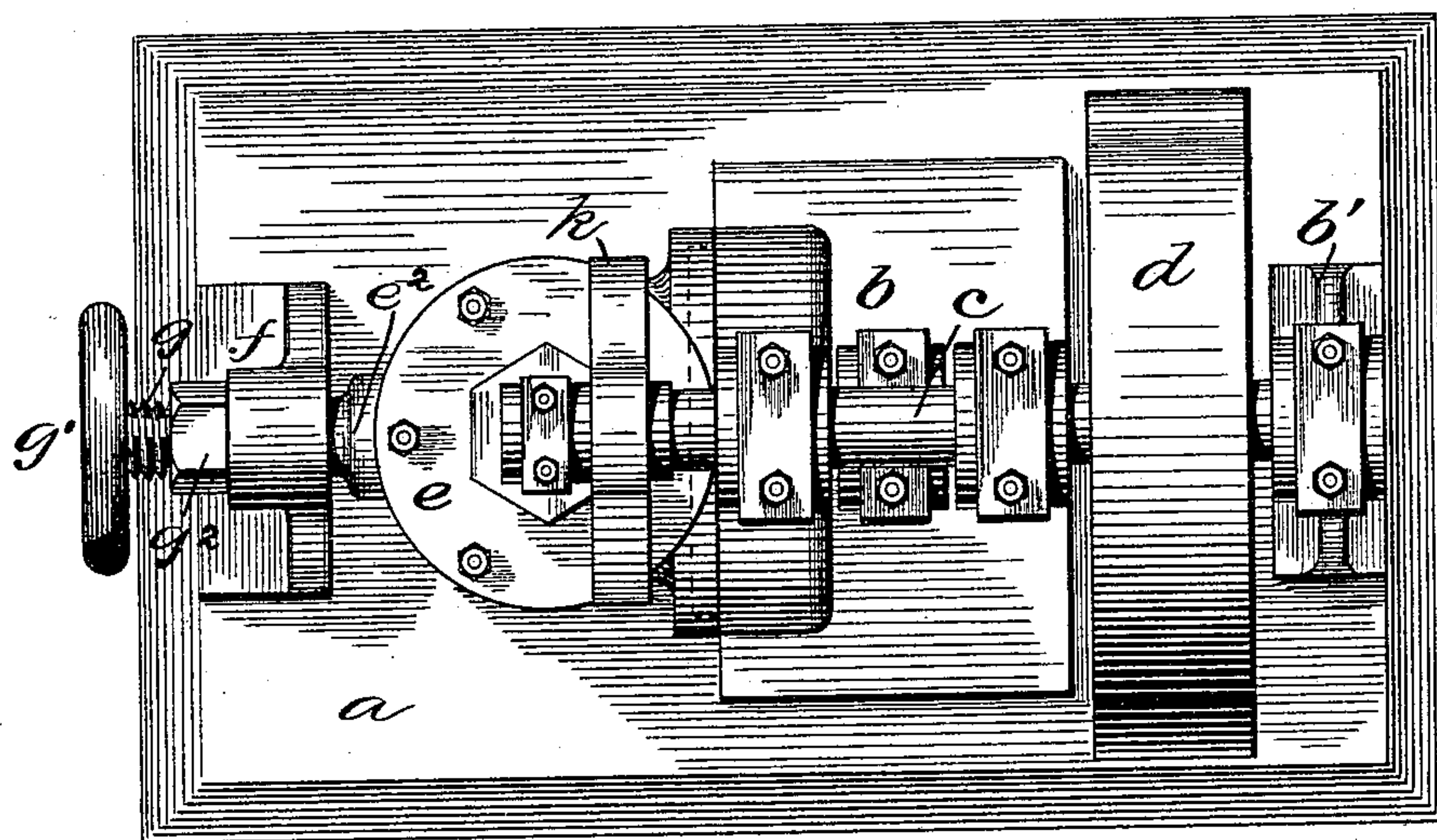
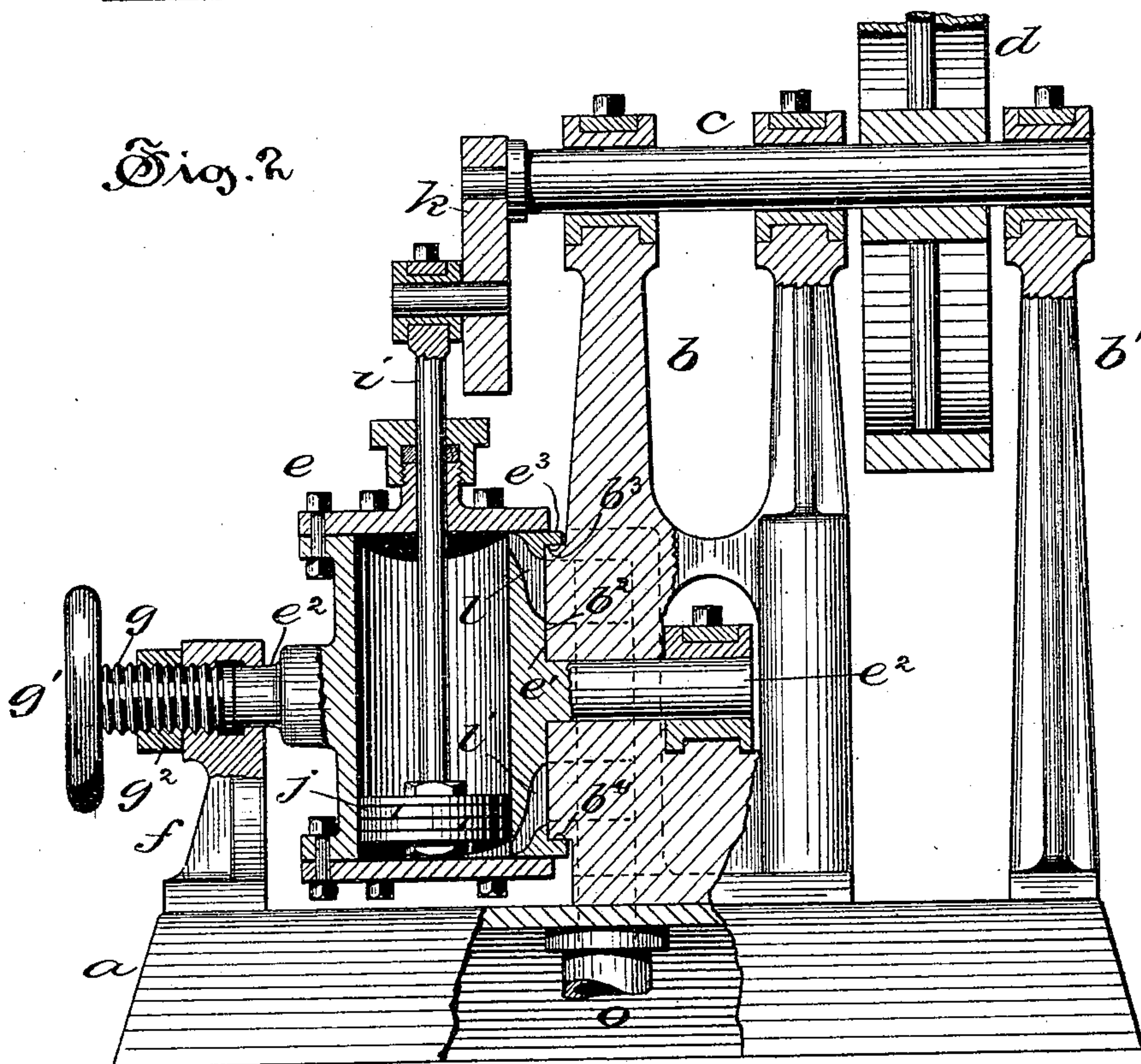


Fig. 2



Witnesses:

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Inventor,

Frank M. Garland, by
Harry P. Williams,
att'y.

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Fig. 3

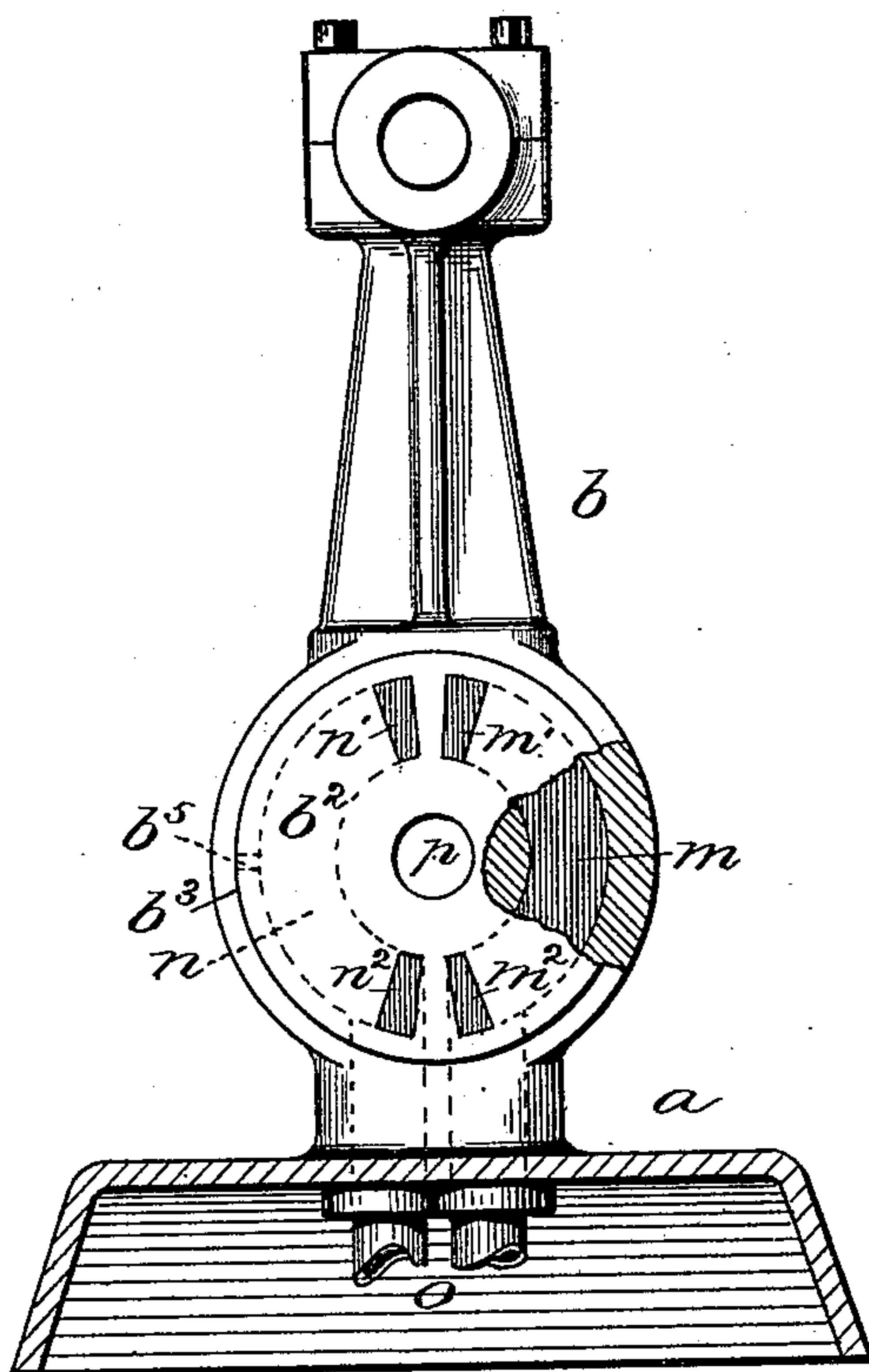
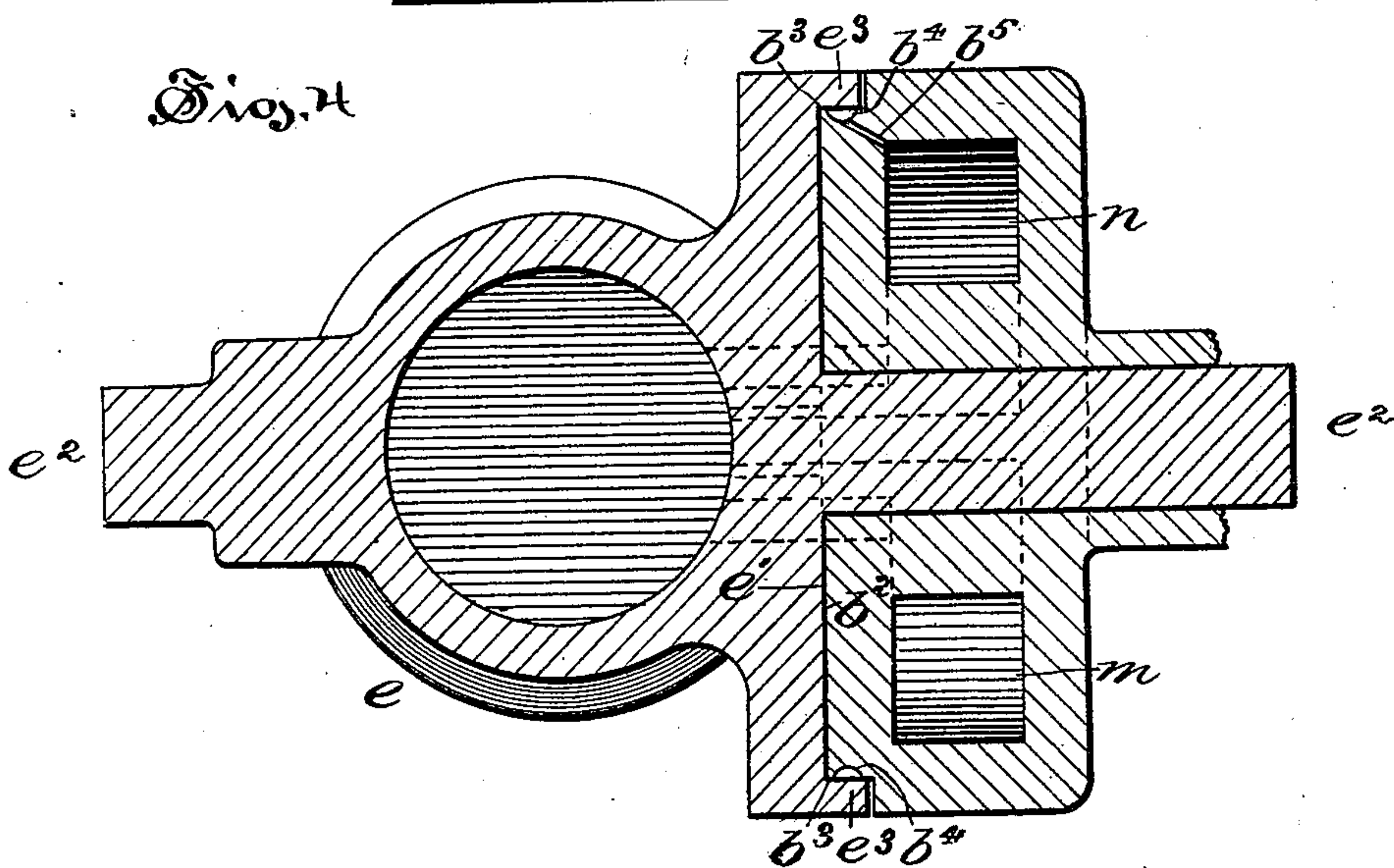


Fig. 4



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UNITED STATES PATENT OFFICE.

FRANK. M. GARLAND, OF NEW HAVEN, CONNECTICUT.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 448,917, dated March 24, 1891.

Application filed August 1, 1890. Serial No. 360,653. (No model.)

To all whom it may concern:

Be it known that I, FRANK. M. GARLAND, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Steam-Engines, of which the following is a full, clear, and exact specification.

The invention relates to the class of oscillating steam-engines; and the object is to provide a simple engine of this class which is so constructed that the parts can be readily adjusted to the proper degree to run without leakage, with less friction, and consequently be more durable, efficient, and easily controlled than prior similar engines.

To this end the invention consists in details of the construction of the cylinder, its bearings, and port-faces as more particularly hereinafter described, and pointed out in the claim.

Referring to the accompanying drawings, Figure 1 is a top view of the engine. Fig. 2 is a central vertical sectional view. Fig. 3 is a side elevation of one of the standards, showing the port-face, and ports. Fig. 4 is an enlarged horizontal section of the cylinder, its bearings, the port-faces, and the base of one of the standards which contains the live and exhaust steam chambers.

In the views, the letter *a* indicates the bed from which rise standards *b b'*, that are provided with journal-boxes for a shaft *c* that bears a pulley *d*. The cylinder *e* is supported, with its circular plane port-face *e'* against a similar face *b²* formed on one side of the standard *b* by integral trunnions *e²*, one being held in a journal-box in the base of the standard *b* and the other in a support *f*, secured to the bed. A part of the opening through this support *f* is smooth to provide a suitable bearing for the trunnion, and a part provided with a thread into which is screwed a threaded spindle *g*, that can be rotated by a handle *g'* and locked in position by a clamp-nut *g²*. This spindle bears directly against the end of the trunnion, so as to hold the cylinder with its port-face firmly and tightly against the face *b²* in the base of the standard on the bed. When any wear occurs between the faces which causes a leak, a slight turn of the spindle by means of the handle closes the

faces together and stops the leakage, and by this simple means a proper adjustment of the pressure between the faces can at any time be quickly obtained, so that there need be neither leakage nor undue friction between the moving parts.

The circular port-face *e'* on the cylinder is provided with an outwardly-projecting annular flange *e³*, which closely fits a circular shoulder *b³*, formed by cutting down or grooving the edge of the face *b²* on the standard, and when the faces are properly adjusted any steam which might possibly escape between them is held by the shoulders formed by the interlocking of these parts, so that no leakage to the atmosphere can occur. A small groove *b⁴* is formed around the shoulder *b³*, and from this groove a small opening *b⁵* is made to the exhaust-chamber to provide an outlet for any steam which might possibly escape between the faces and around the shoulder, so that it will pass to the exhaust and not escape to the atmosphere around the engine and wear away the shoulder and flange. This construction permits the running of the engine with hard metal bearing against hard metal without the interposition of washers to prevent leakage, which greatly reduces the friction and increases the efficiency of the engine. The piston-rod *i* passes from the piston *j* through a gland on one head and is connected to a crank-plate *k* on the shaft *c*.

The port-face of the cylinder is provided with two ports *l l'*, which alternately admit live steam to each end of the cylinder from the steam-chamber *m* through the ports *m' m²*, and permit it to escape at the opposite end into the exhaust-chamber *n* through the ports *n' n²*. The exhaust and live steam chambers are formed in the base of the standard *b* back of the face *b²*, one on each side of and partially encircling the bearing *p*, formed in the standard between the chambers for the inner trunnion of the cylinder, and suitable connections *o* are made to these chambers through the bed for the admission and escape of steam. As the cylinder oscillates, its ports travel from one inlet and outlet port to the other inlet and outlet port, so as to drive the piston from end to end of the cylinder, which reciprocation rotates the shaft and pulley.

The engine as thus constructed is very

cheap and simple, does not leak, has no soft frictional faces which wear and require replacing, and does not require a continued supply of lubricant from a complicated lubricating apparatus. The readiness of adjustment of the faces to each other insures a reduction of friction, and thereby an increased efficiency, while no vapor can possibly escape around the port-faces and rust out the wearing parts of the engine.

I claim as my invention—

In an oscillating engine, in combination, a bed supporting standards bearing a shaft with a pulley and crank, one of said standards being provided with exhaust and live steam

chambers and a port-face having a circular shoulder provided with a groove having an opening into the exhaust-chamber, a cylinder with a port-face having an annular flange fitting and projecting over the shoulder on the standard, supported by integral trunnions one passing through and held by the standard and the other passing into a threaded support bearing a screw-spindle, and a piston connected with the crank, substantially as specified.

FRANK. M. GARLAND.

Witnesses:

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HARRY R. WILLIAMS.