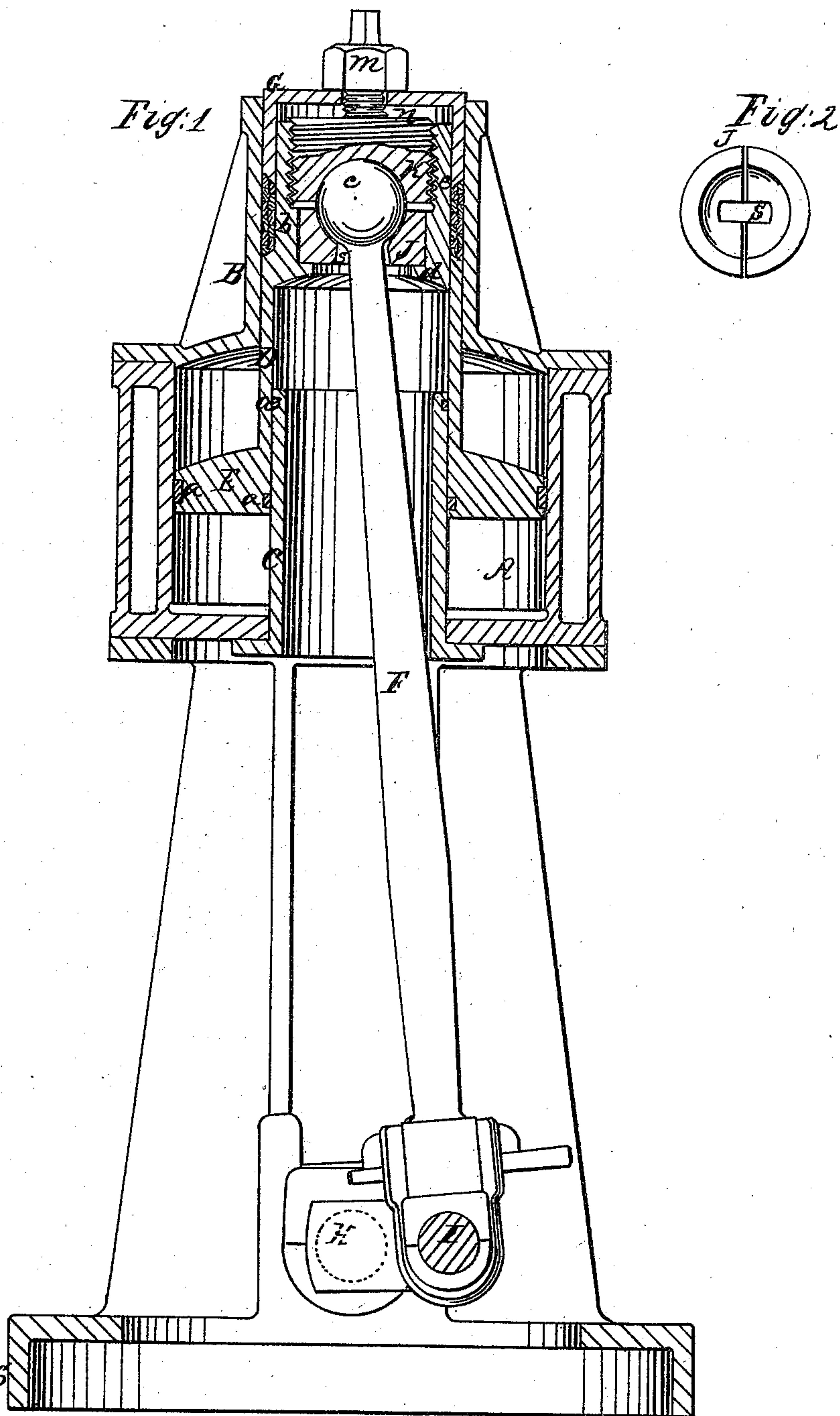


J. B. Root.

Steam Engine.

N^o 97,231.

Patented Nov 23, 1869.



Witnesses

*Frederick Haynes
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JOHN B. ROOT, OF NEW YORK, N. Y.

Letters Patent No. 97,231, dated November 23, 1869; antedated November 12, 1869.

IMPROVEMENT IN RECIPROCATING STEAM-ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN B. ROOT, of the city, county, and State of New York, have invented a new and useful Improvement in Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figure 1 represents a longitudinal sectional view of an engine constructed in accordance with my improvement, and

Figure 2, a section through the lower half box, in which the pitman works, at its attachment to the trunk of the engine.

My improvement relates to engines of a trunk-form or character; and

The invention consists—

First, in a novel and advantageous combination and arrangement of external and internal cylindrical guides to the trunk;

Secondly, in a ball-and-socket connection of the pitman with the trunk; and

Thirdly, in a certain adjustable connection of the follower to the outside packing of the trunk with the outer half socket to the ball-joint of the pitman; also, a peculiar construction of the inner half of the socket.

Referring to the accompanying drawing—

A is the engine-cylinder, fitted, at its one end, with a cylindrical cap and trunk-guide, B, arranged to project externally, and provided, at its opposite end, which lies nearest to the crank, with an internally-projecting cylindrical sleeve, C, that operates as a guide to the interior of the trunk D and piston E, while the cylindrical cap B serves to direct the trunk on the exterior.

This construction steadies the trunk at its opposite ends, and by the arrangement of the sleeve C, forms a direct guide to the piston.

It also dispenses with any protrusion of the trunk through the cylinder, on the crank-side of the latter, and admits of a short connecting-rod, F, being used with a small diameter of trunk.

The piston E and cylindrical sleeve or interior guide C may be fitted with ring-packings *a a a*, to prevent leakage, while the exterior of the trunk is made tight by packing *b*, which is forced up, as required, by a follower, G.

H is the main or driving-shaft, and

I the wrist-pin of the crank, by which said shaft is rotated through the connecting-rod F, that is arranged to play or vibrate through the piston, and connected at its opposite end to that of the crank, beyond the piston, by ball-and-socket joint, with the trunk D.

Thus, the rod F has a ball, *c*, turned on its end,

that connects with the trunk, which ball rests in a cupped ring, J, that bears against a shoulder, *d*, of the trunk, said cupped ring forming one half of the socket, the other half of which is composed of a cupped disk or half box, K, which is made to loosely fit a screw-thread, *e*, in the trunk, and by which it is adjusted to close upon the ball, but with such freedom, both as regards the play of the ball and of said cupped disk, as to secure an easy self-adjusting action of the ball-and-socket connection of the rod with the trunk.

By means of this ball-and-socket connection, a universal self-adjustment is secured to the rod, that not only provides for the swing of the rod in turning the crank, but also provides for lateral play, should the parts get out of line, thereby doing away with much friction, and reducing twist or strain of the trunk in its guide or guides.

The lower or inner half socket or box J, is made up in two parts, as represented in fig. 2, with the slot S, through which the pitman vibrates, made half in one division and half in the other division of said half box.

This slot S is of oblong form in the plane of the pitman's vibration, and the pitman, where it fits through said slot, made flat.

By this construction of the inner half box, the same may be fitted to its place around the ball *c* of the pitman, and an extended or broad bearing secured for the latter on opposite sides of the oblong slot.

The follower G is adjusted to force up the packing *b* by means of a nut, *m*, arranged to fit a screw-threaded pin or projection, *n*, on the cupped cap or half socket K.

By this connection of the follower with the loose and adjustable half socket, the packing *b* is made to give an elastic bearing to said half socket on the ball of the rod, by reason of its free fit in the screw-thread *e* of the trunk.

Any suitable valve and valve-gear may be used to give to the piston and its trunk their necessary reciprocating actions.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of the internally-projecting cylindrical sleeve C, operating as an interior guide to the piston E, and trunk D, with the cylinder A, and external trunk-guide B, at the opposite end of said cylinder, substantially as specified.

2. The connection of the pitman or rod F with the trunk D of the piston, by ball-and-socket joint, through a ball-formation, *c*, on the end of the rod, made to fit half or partial sockets J K, arranged within the trunk, and the one of which is made

loosely or freely adjustable therein, essentially as shown and described.

3. The combination, with the half socket K, arranged to loosely or freely fit a screw-thread, *e*, in the trunk, of the follower G, to the packing *b*, made adjustable by a nut, *m*, and screw-pin or projection *n* from said half socket as a bearing or base, substantially as specified.

4. The lower half box J, constructed and arranged as described, with an oblong slot, S, through it, for play of the pitman, essentially as herein set forth.

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Witnesses:

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