G. L. SWABB.

STEAM ENGINE.

APPLICATION FILED APR. 22, 1915.

**1,176,788.**

Patented Mar. 28, 1916.

2 SHEETS—SHEET 1.

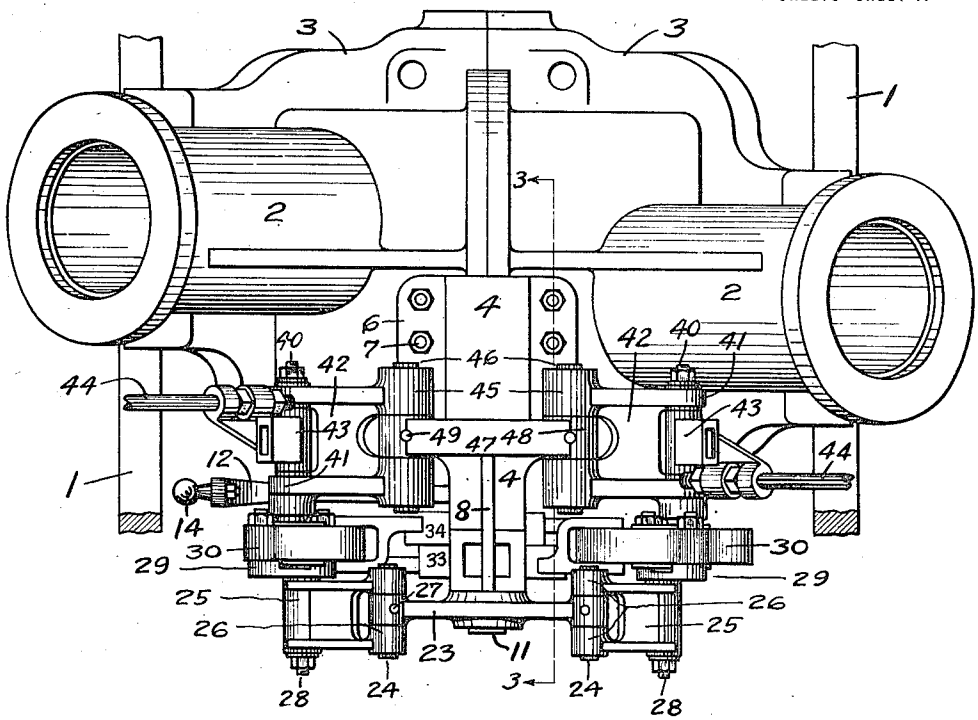

Fig. 1.

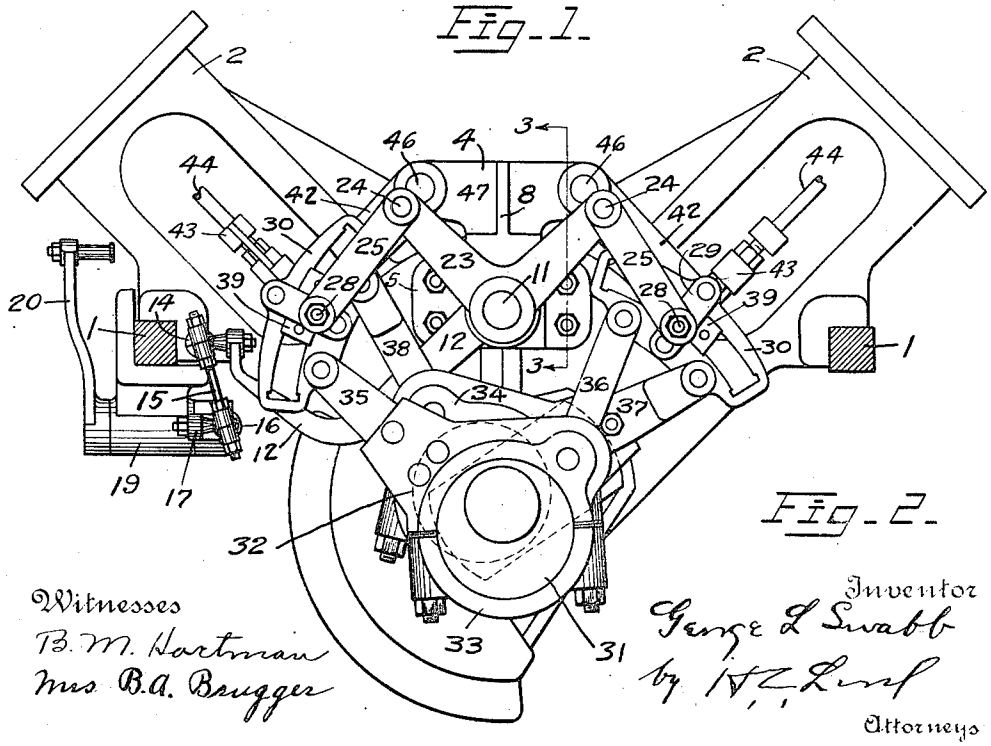

Fig. 2.

Witnesses

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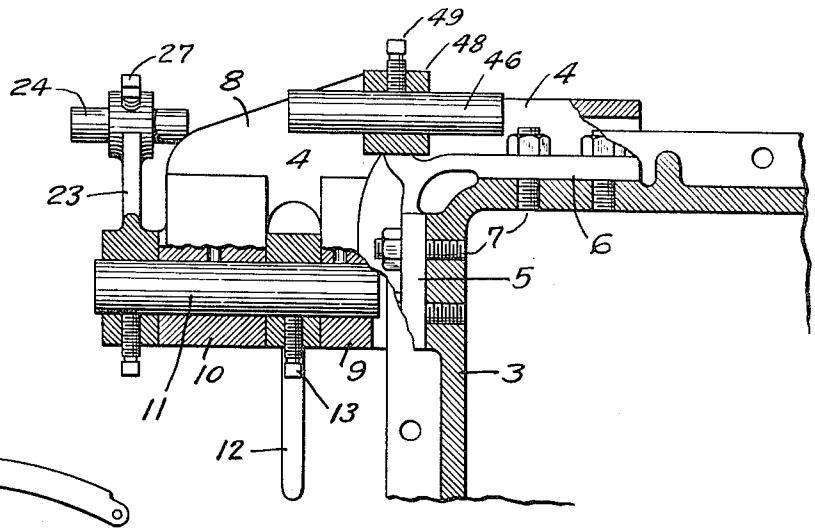
Fig. 3.



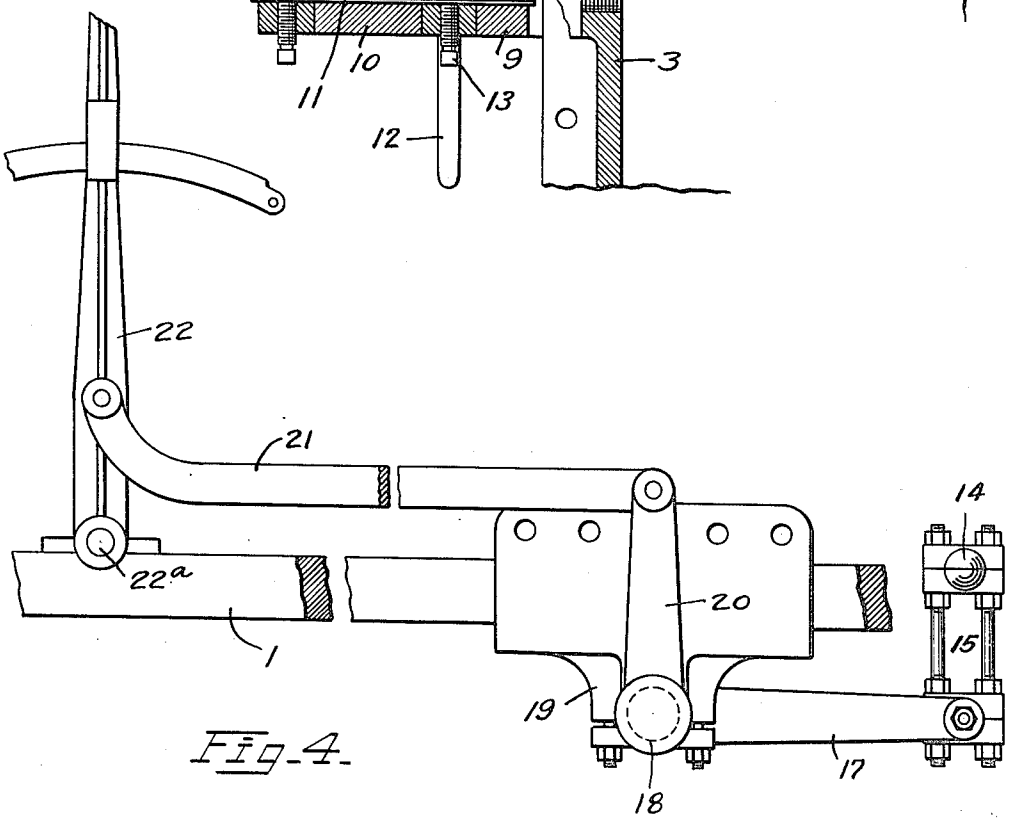




Fig. 4.

Witnesses

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# UNITED STATES PATENT OFFICE.

GEORGE L. SWABB, OF ERIE, PENNSYLVANIA, ASSIGNOR TO HEISLER LOCOMOTIVE WORKS, OF ERIE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## STEAM-ENGINE.

1,176,788. Specification of Letters Patent. Patented Mar. 28, 1916.

Application filed April 22, 1915. Serial No. 23,054.

*To all whom it may concern:*

Be it known that I, GEORGE L. SWABB, a citizen of the United States, and residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Steam-Engines, of which the following is a specification.

This invention relates to steam engines and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

More particularly the invention relates to steam engines used with what is commonly known as geared or logging locomotives. With some of these locomotives and to which this engine is adapted the engine shaft extends longitudinally and centrally of the locomotive and the engine cylinders are set at a right angle to each other and operate on a common crank, the engines being ordinarily set at 45° from a vertical position and extend each side of the locomotive boiler. With engines of this type the mounting and the carrying of the valve have presented some difficulty and the purpose of this invention is to improve the valve gear and its mounting.

The invention is illustrated in the accompanying drawings as follows:—

Figure 1 shows a plan view of the engine, Fig. 2 a side elevation of the engine. Fig. 3 a section on the line 3—3 in Figs. 1 and 2. Fig. 4 an elevation of the controlling levers.

1 marks the engine supports which in this instance are the side frames of a locomotive, and 2 the engine cylinders. These are carried by a frame 3 formed in two halves bolted together, the separation being on a vertical plane through the center. The cylinders themselves form a part of the frame. The valve gear is mounted on a frame 4. This frame has the vertical and horizontal securing plates 5 and 6 respectively which extend over the joint in the main frame of the engine and are secured to the main frame of the engine by studs or bolts 7. The frame 4 has the forwardly extending portion 8 from which depend the bearings 9 and 10 for the operating rod 11. The operating lever 12 is fixed on the rod 11 between the bearings 9 and 10 by means of set screws 13. The lever is provided at its end with a ball 14 on which a link 15 is jointed, the opposite end of the link operating on a ball 16 carried by a lever 17. The lever 17 is carried by a rock shaft 18 (see dotted lines Fig. 4), the rock shaft being journaled in a bearing 19 supported by the frame 1. The rock lever 20 extends upwardly from the shaft 18 and is connected by a link 21 with the controlling lever as 22 of the locomotive. The lever 22 is journaled on the pin $22^a$ and the pin $22^a$ is secured on the frame 1.

The tumbling lever 23 is fixed on the end of the operating rod 11. Pins 24 extend through the arms of the tumbling lever 23 and the link hangers 25 are journaled on these pins, the hangers having the forked ends 26 so that a double bearing is provided for each link hanger. The pins 24 are fixed in the tumbling levers by means of the set screws 27. Pins 28 extend through the swinging ends of the link hangers 25 and into the straps 29, these straps being secured to the links 30. Eccentrics 31 and 32 are fixed on the engine shaft $3^a$. They are provided with the straps 33 and 34 respectively and are connected to the links by the rods 35, 36, 37 and 38, the eccentrics operating the links in the common and well-known manner. The link blocks 39 are slidingly mounted in the links as is usual. Pins 40 extend into these blocks and through the forked ends 41 of the valve rod rocker arms 42. The valve rod bearings 43 are arranged on the pins 40 between the sides of the forked ends 41. Valve rods 44 are secured to these bearings. The valve rod rocker arms 42 have the forked ends 45 which are journaled on the pins 46. The pins 46 are fixed in arms 48 by means of set screws 49. The arms 48 extend from a post 47 on the frame 4.

It will be observed that the valve gear is mounted on the frame 4 and can be entirely assembled on this frame and then put in place by securing the frame 4 to the engine frame. It will also be observed that the link hangers, valve rod supports, and operating rod have double bearings so that they are readily carried notwithstanding the severe shock and jar to which they are subjected.

What I claim as new is:—

1. In a steam engine, the combination of an engine frame; two engine cylinders carried by the frame set at right angles to each other and 45° from a vertical plane;

a common engine shaft; a valve gear comprising an operating lever; an operating rod; a tumbling lever; link hangers; links; link blocks; valve rods; and valve rod rocker arms; and a valve gear frame on which the valve gear is mounted detachably secured to the engine frame..

2. In a steam engine, the combination of an engine frame; two engine cylinders carried by the frame set at right angles to each other and 45° from a vertical plane; a common engine shaft; a valve gear comprising an operating lever; an operating rod; a tumbling lever; link hangers; links; link blocks; valve rods; and valve rod rocker arms; and a valve gear frame on which the valve gear is mounted detachably secured to the frame, said valve gear frame comprising double bearings for the operating rod, the operating lever being secured to the operating rod between said bearings.

3. In a steam engine, the combination of an engine frame; two engine cylinders carried by the frame set at right angles to each other and 45° from a vertical plane; a common engine shaft; a valve gear comprising an operating lever; an operating rod; a tumbling lever; link hangers having forked ends forming a double bearing on the tumbling lever; links carried by the link hangers; link blocks; valve rods; and valve rod rocker arms; and a valve gear frame on which the valve gear is mounted detachably secured to the engine frame.

4. In a steam engine, the combination of an engine frame; two engine cylinders carried by the frame set at right angles to each other and 45° from a vertical plane; a common engine shaft; a valve gear comprising an operating lever; an operating rod; a tumbling lever; link hangers; links; link blocks; valve rods; valve rod rocker arms, said valve rod rocker arms having forked ends; and valve rod bearings arranged between the free forked end, said forked end being pivotally connected with the link block; and a valve gear frame on which the valve gear is mounted detachably secured to the engine frame, said valve gear frame having a post and pins extending therefrom through the forked ends of the valve rod rocker arms forming a double bearing for said rocker arms.

5. In a steam engine, the combination of an engine frame; two engine cylinders carried by the frame set at right angles to each other and 45° from a vertical plane; a common engine shaft; a valve gear comprising an operating lever; an operating rod; a tumbling lever; link hangers; links; link blocks; valve rods; and valve rod rocker arms; and a valve gear frame on which the valve gear is detachably secured to the engine frame, said valve gear frame having two bearings for the operating rod in which the operating rod is journaled, the operating lever being arranged between said bearings and the tumbling lever arranged without said bearings.

6. In a steam engine, the combination of an engine frame; two engine cylinders carried by the frame set at right angles to each other and 45° from a vertical plane; a common engine shaft; a valve gear comprising an operating lever; an operating rod on which the lever is mounted; a tumbling lever fixed on the operating rod; link hangers having a forked end forming double bearings with the tumbling lever; links to which the link hangers are secured; link blocks in the links; a valve rod; valve rod bearings on the valve rod; and valve rod rocker arms having forked ends, the valve rod bearings being arranged in one forked end and the link blocks being pivotally secured thereon; and a valve gear frame on which the valve gear is detachably secured to the engine frame, said valve gear frame having two bearings in which the operating rod is journaled, the operating lever being arranged between the bearings; arms extending from the frame; and carrying pins extending through the forked ends of the valve rod rocker arms forming double bearings for said rocker arms.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GEORGE L. SWABB.

Witnesses:
H. R. JEFFS,
D. E. SHREVE.