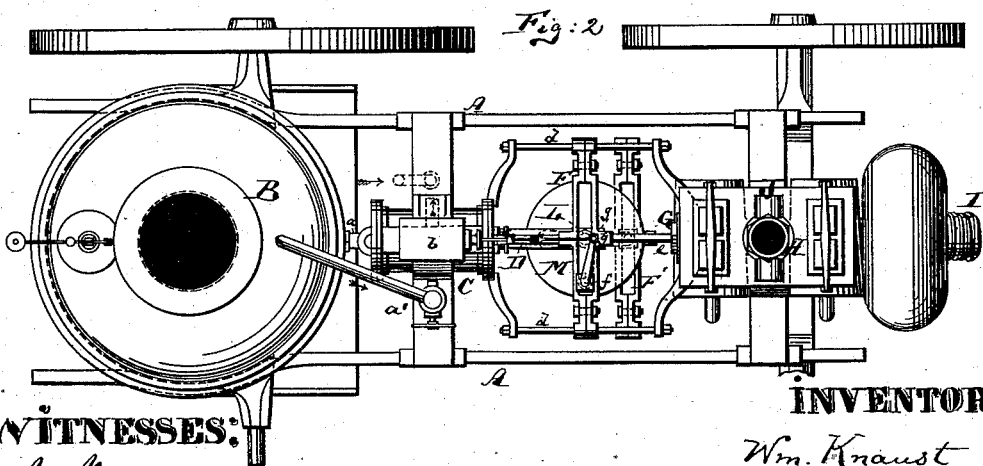
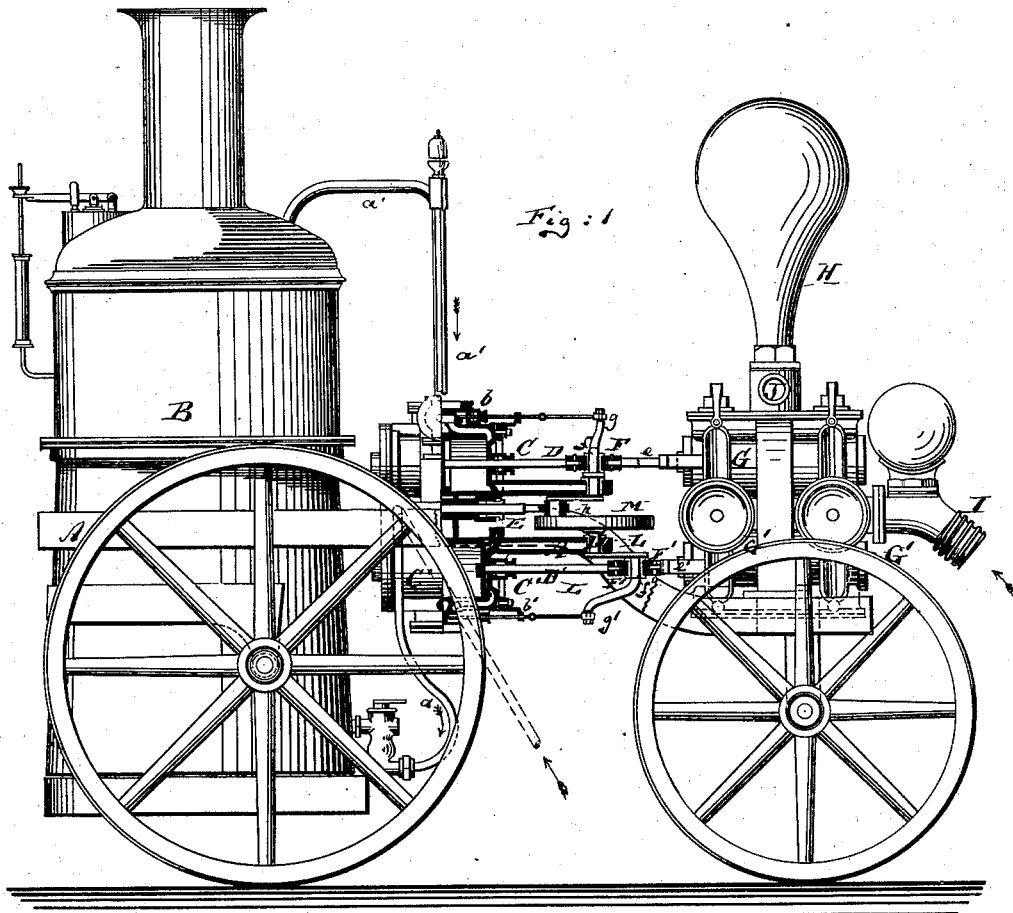


W. KNAUST.
 Steam Fire-Engine.

No. 164,843.

Patented June 22, 1875.



WITNESSES:
J. Moraga.
O. Weidner.

INVENTOR
Wm. Knaust
 by his attorney
Art. Briesen

UNITED STATES PATENT OFFICE

WILLIAM KNAUST, OF VIENNA, AUSTRIA.

IMPROVEMENT IN STEAM FIRE-ENGINES.

Specification forming part of Letters Patent No. **164,843**, dated June 22, 1875; application filed June 9, 1875.

To all whom it may concern :

Be it known that I, WILLIAM KNAUST, of Vienna, Austria, have invented a new and Improved Steam Fire-Engine, of which the following is a specification :

Figure 1 is a side elevation, partly in section, of my improved steam fire-engine. Fig. 2 is a top view of the same.

Similar letters of reference indicate corresponding parts in all the figures.

The principal object of this invention is to so apply the operating-shaft of a steam fire-engine that it may be conveniently lubricated from one side of the engine.

The invention has reference to that class of fire-engines which have fly-wheels on their crank-shafts.

As heretofore arranged, the vertical fly-wheel on the horizontal crank-shaft constituted a barrier between the opposite sides of the engine, and the engineer was obliged to run from one side of the engine to the other whenever he wanted to lubricate said crank-shaft.

My invention consists in the combination of a vertical crank-shaft, carrying a horizontal fly-wheel, with the piston-rods of the steam and pump cylinders, as hereinafter more fully described.

The letter A represents the frame of my improved steam fire-engine. The same is mounted on wheels, as shown. B is the boiler, supported in one end of the frame A, and provided with the feed-pipe *a*, and with the steam-pipe *a'*, leading to the steam-cylinders C and C'. These horizontal cylinders are arranged vertically, one above the other. *b* and *b'* are the steam-chests of the cylinders C and C', respectively, the chest *b* being situated on top of the cylinder C, and the chest *b'* below the cylinder C'. D and D' are the horizontal piston-rods of the cylinders C and C', respectively. E is the feed-pump, placed preferably between the cylinders C and C', to feed water through the pipe *a* into the boiler B. The piston-rods D D' are respectively connected to slotted cross-heads F F', which run in parallel guides *d d*, that are secured to both

sides of the engine-frame, as shown. G G' are the two pump-cylinders, which are arranged in line with the steam-cylinders C C', so that their piston-rods *e* and *e'* connect with the opposite sides of the cross-heads F F', respectively, as shown. H is the air-chamber, I the water-supply pipe, and J the water-discharge, of the pump mechanism. L is the crank-shaft, carrying the fly-wheel M, and arranged with its cranks in the slots of the cross-heads F F', for equalizing the motion of the pistons, overcoming the dead-centers, and imparting motion to the valve mechanism and to the feed-pump.

This crank-shaft, which has heretofore been horizontally arranged between cylinders that are on the same horizontal plane, is by me placed vertically, as clearly shown in the drawing, thereby rendering the fly-wheel M horizontal.

The shaft L is supported in suitable part of the frame A; its cranks *f f'* enter the slots of the cross-heads F and F', respectively; its terminal cranks *g* and *g'* serve, respectively, to move the slide valves of the steam-chests *b* and *b'*, and its crank *h* imparts motion to the plunger of the feed-pump E.

As already stated, the main advantage of having a vertical crank-shaft and a horizontal fly-wheel in engines of this class is, that all the bearings and parts of said shaft to be lubricated can be reached from one side of the engine, thus saving to the engineer the labor of running from one side to the other—a matter of great inconvenience, especially under the excitement of a conflagration.

Another advantage of my arrangement is that the cross-heads F F' can be placed horizontally, and well balanced, thus relieving the stuffing-boxes of the strain usually exerted by vertical cross-heads.

By arranging the feed-pump E between the steam-cylinders C C', I equalize, as nearly as possible, the strain and labor at opposite ends of the engine, as otherwise the strain is greater on the side of the pump cylinders G G'. I also avoid the consequent oscillations.

I claim as my invention—
In combination with the steam-cylinders C C', and with the pump-cylinders G G', which are placed in a vertical plane, and with the feed-pump E placed between the steam-cylinders, the vertical crank-shaft L, carrying the horizontal fly-wheel M, substantially as herein shown and described, and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of April, 1875.

WM. KNAUST.

Witnesses:

JOSEF BODE,
C. BACH.