(No Model.)

F. E. SICKELS.

VALVE FOR STEAM ENGINES.

No. 424,581. Patented Apr. 1, 1890.

Fig. 1.

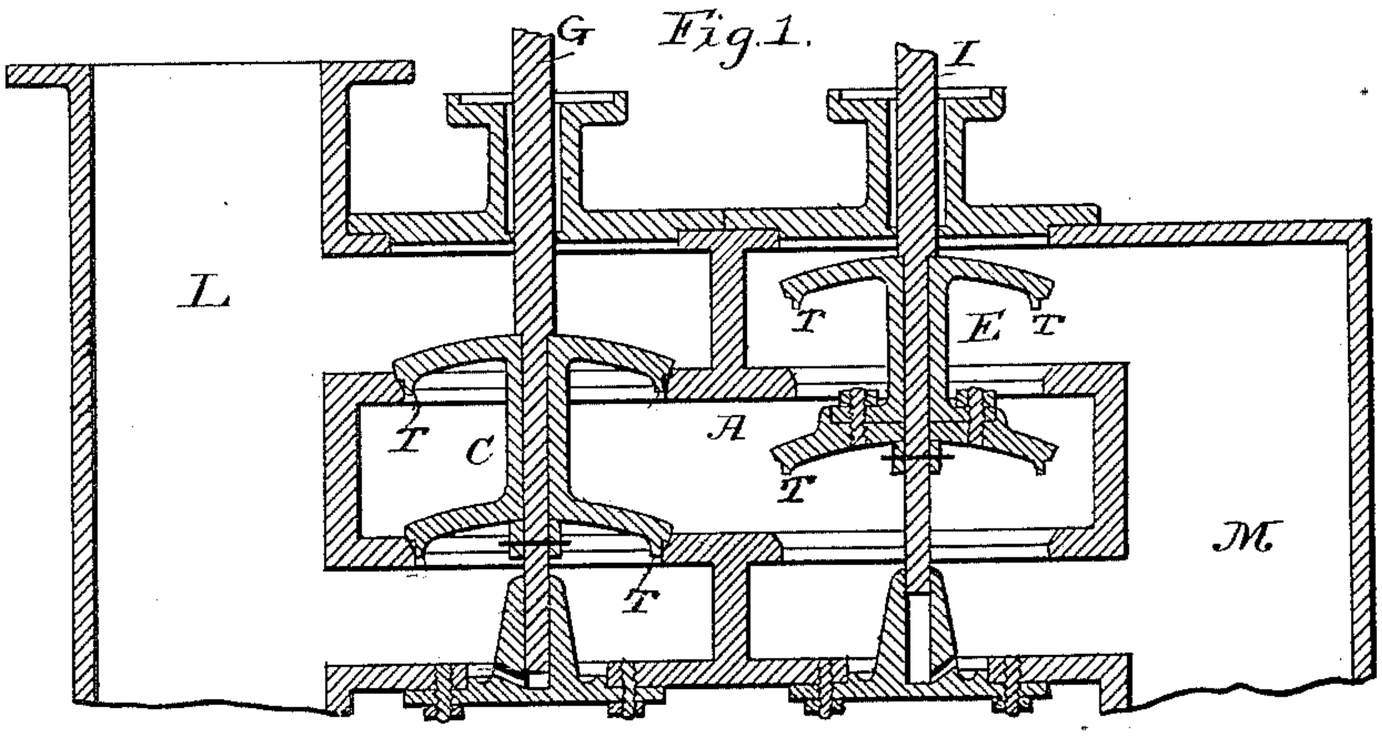


Fig. 4.

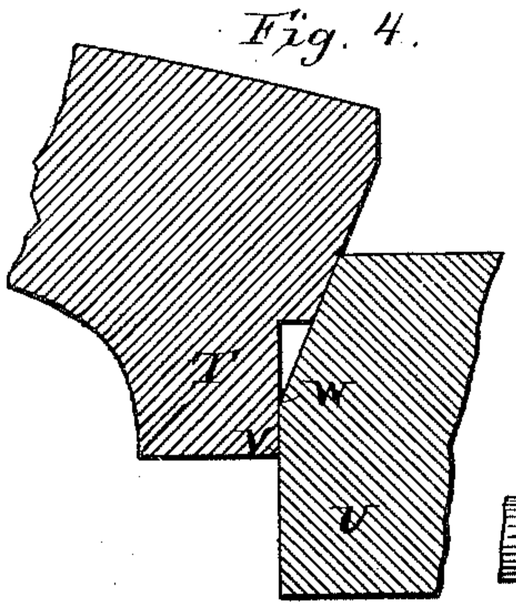


Fig. 3.

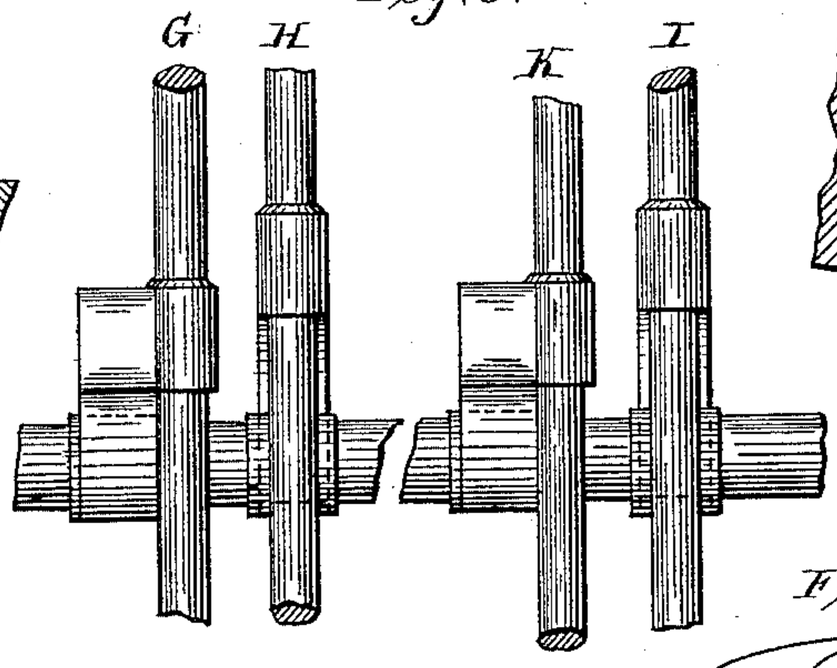


Fig. 5.

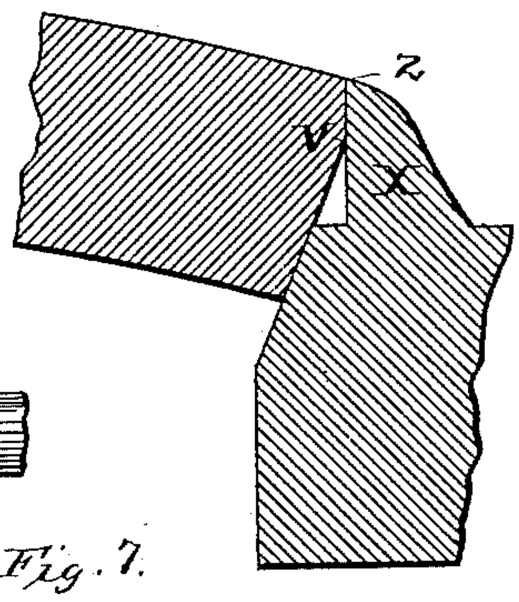


Fig. 6.

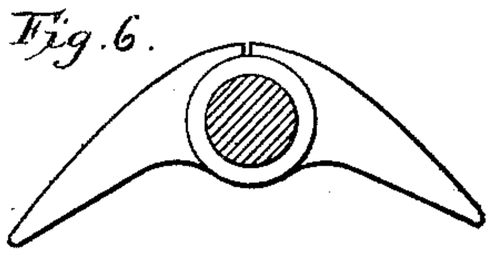


Fig. 7.

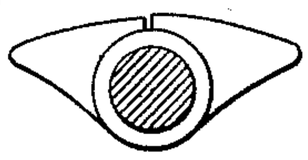
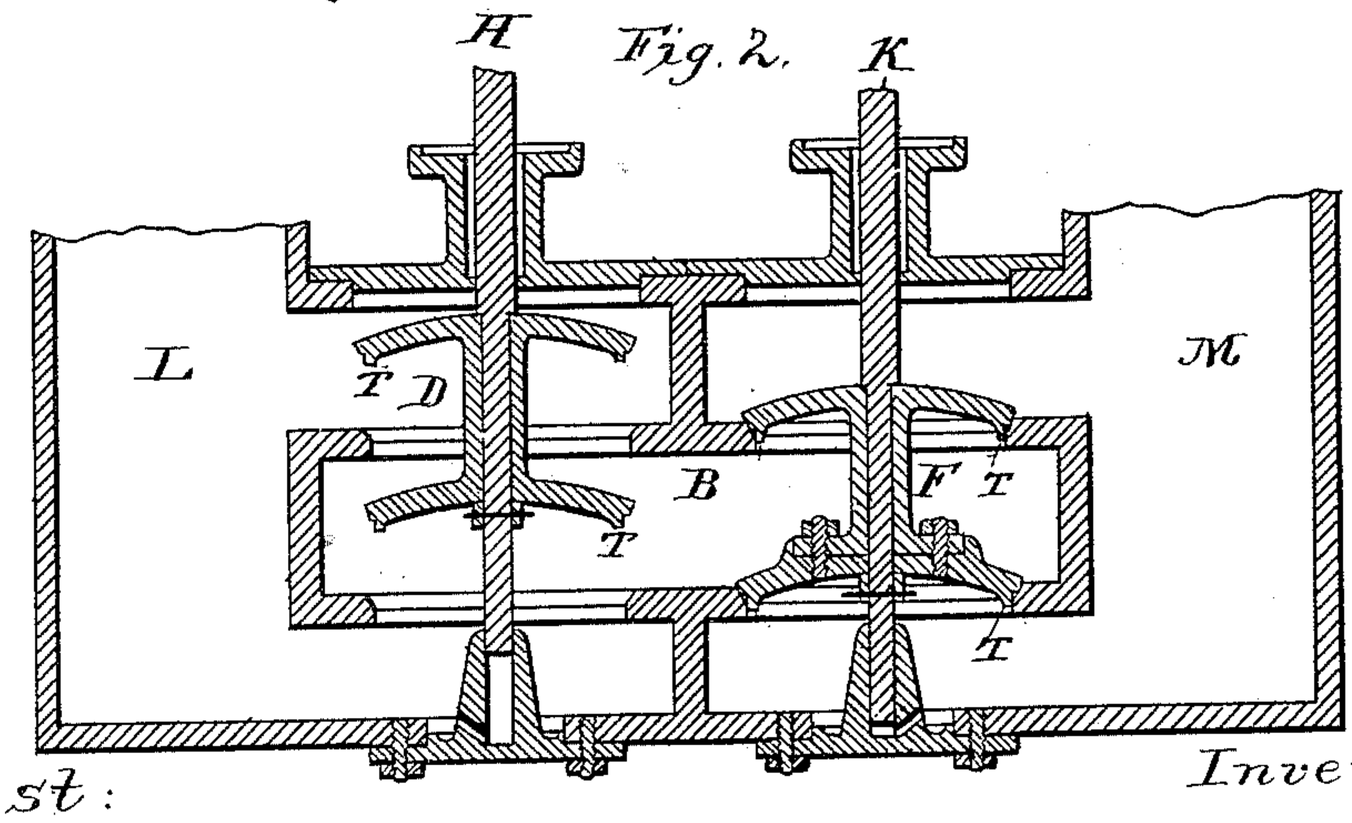


Fig. 2.



Attest:

Harry L. Amer. Jr

I. J. Masson

Inventor:

Frederick E. Sickels,

by E. E. Masson

Atty.

UNITED STATES PATENT OFFICE.

FREDERICK E. SICKELS, OF KANSAS CITY, MISSOURI.

VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 424,581, dated April 1, 1890.

Application filed October 5, 1888. Serial No. 287,273. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK E. SICKELS, a citizen of the United States of America, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in the Construction and Operation of Steam and Exhaust Valves on Upright Steam-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to upright steam-engines having balance puppet-valves, with a separate lifting-rod and toes to work each valve; and it consists in the combination of two lifting-rods and two steam-valves and valve-seats, with projections on the valves or seats to prevent the passage of steam until after the steam-valves have been lifted some distance away from their valve-seats, and thus obtain a rapid admission of steam, and yet cause the valve to be seated quietly by curving the working-surfaces of the toes so as to elevate each valve as required to produce a smooth and quick working engine on the centers of motion, while obtaining a rapid admission and cut-off of the steam; and it also consists in the combination of two lifting-rods and two exhaust-valves and valve-seats, with projections on the valves or seats to prevent the passage of steam until after the exhaust-valves have been lifted some distance away from their valve-seats, so as to obtain a rapid exhaust-opening, and yet seat the valves quietly, by working each of the valves with separate toes projecting and curved so as to work each exhaust lifting-rod and exhaust-valve slowly at starting and stopping of the valve-motion.

In the accompanying drawings, Figure 1 represents a vertical section through the upper steam-chests and balance-valves of a vertical steam-engine constructed in accordance with my invention. Fig. 2 is a vertical section through the lower steam-chests and balance-valves of said vertical steam-engine. Fig. 3 represents a back view of the rock-shafts, the toes on the rock-shafts, and the feet on the lifting-rods to work the balance-valves. Fig. 4 represents a vertical section of a part of one valve and its seat on a large scale. Fig. 5 represents a vertical section of a modification of a part of one of the valves and its seat. Fig. 6 is a side view of the toes for working the steam-valves. Fig. 7 is a side view of the toes for working the exhaust-valves.

In said drawings, A, Fig. 1, is the upper steam-chest.

C is the upper steam-valve, shown closed and down on its seat.

E is the upper exhaust-valve, shown fully raised and wide open.

B, Fig. 2, is the lower steam-chest.

D is the lower steam-valve, shown fully raised.

F is the lower exhaust-valve, shown closed and down upon its seat.

G in Figs. 1 and 3 is a lifting-rod connected to the upper steam-valve.

H in Figs. 2 and 3 is a lifting-rod connected to the lower steam-valve.

I in Figs. 1 and 3 is a lifting-rod connected to the upper exhaust-valve.

K in Figs. 2 and 3 is a lifting-rod connected to the lower exhaust-valve.

The upper steam-chest is provided with a pipe L to conduct steam therein, and the lower steam-chest is provided with a pipe M for the passage of the exhaust from said chest.

The valves C D E F are provided with annular projections T on the lower side thereof. Each of said projections has its periphery vertical and adapted to extend into and substantially fit the cylindrical portion U of the valve-seat and hold back the steam until the conical portion of the valve has been lifted high enough to bring the bottom V of the projection T above the lower end W of the conical valve-seat. The same result is obtained by the construction shown in Fig. 5, the valve being therein provided, also, with a cylindrical portion and a conical portion, and the valve-seat with a cylindrical portion or projection X and a conical portion to receive the corresponding parts of the valve. Said projection also holds back the steam until the top edge V of the conical portion is raised above the top Z of said projection X and the conical edge of the valve is raised some distance above its seat. The distance that the valve is lifted from its seat before the escape of steam depends upon the height of the cylindrical portion of the valve or seat. By this construction any desirable relative mo-

tion of the valve can be obtained, according to the speed of the engine during the admission of steam and its exhaust through the valve-openings, and said motion can be made so as to obtain the power of the steam. An independent adjustment is thus secured for the motion of each valve by the length of the projections in each case, according to the requirements of the engine to which this construction may be attached, as I have found it by practice in working steam-engines at different rates of speed and with different loads on the engine.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of steam lifting-rods and means to elevate them with two steam-valves having a portion of their periphery cylindrical and a portion conical, and seats having one portion cylindrical and the other conical, the conical portion of the valve being arranged to leave its seat first, substantially as and for the purpose described.

2. The combination of two steam-exhaust lifting-rods and means to elevate them with two exhaust-valves having a portion of their periphery cylindrical and a portion conical, and seats of corresponding form, the conical portion of the valve being arranged to leave its seat first, substantially as and for the purpose described.

3. The combination of lifting-rods and means to elevate them with steam and exhaust valves having a portion of their periphery cylindrical and a portion conical, and seats of corresponding form, the conical portion of the valves being arranged to leave its seat before its cylindrical portion, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK E. SICKELS.

Witnesses:
E. R. GILL,
OLA A. LUCAS.