C. W. Willard,

Steam Hammer.

No. 49,462. Patented Aug. 15, 1865.

Fig. 2.

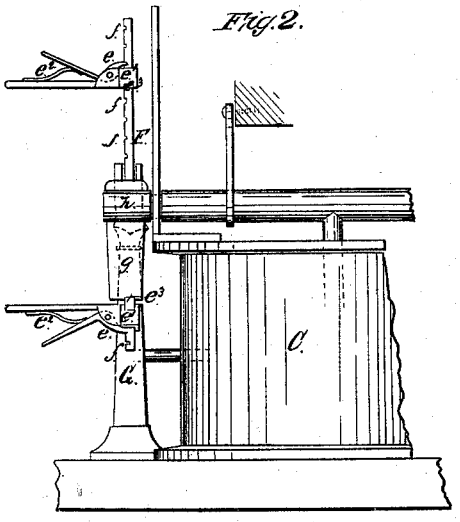
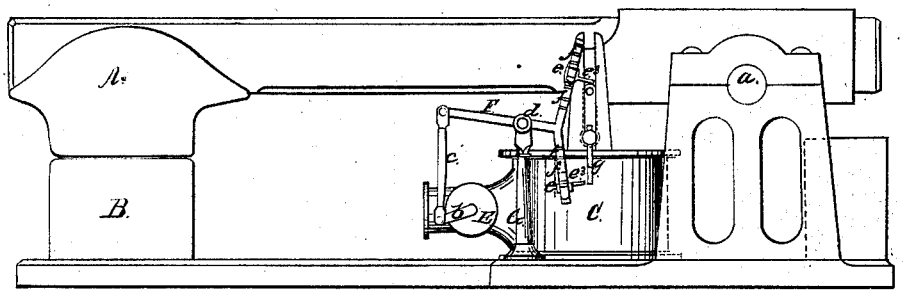


Fig. 1.



Witnesses:
Wm. Treurn
Thos. Fussell

Inventor:
C. W. Willard
per Munn & Co
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES W. WILLARD, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN VALVE-GEAR FOR STEAM-HAMMERS.

Specification forming part of Letters Patent No. **49,462**, dated August 15, 1865.

To all whom it may concern:

Be it known that I, CHARLES W. WILLARD, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Steam-Hammers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a side elevation of this invention. Fig. 2 is an end view of the valve-gear on a larger scale than the previous figure.

Similar letters of reference indicate like parts.

This invention consists in the employment or use of a T-shaped lever, which connects with a crank on the valve-stem, and which carries two adjustable dogs, in combination with a tappet attached to the cross-head of the steam-engine, which imparts motion to a hammer in such a manner that by the action of the tappet on the dogs the steam is changed at the desired points, and by adjusting said dogs on the shanks of the T-shaped lever the stroke of the hammer can be regulated.

A represents a hammer, which is hung on trunnions *a*, and acts on an anvil, B, in the ordinary manner. The hammer is tilted by the action of a piston which is fitted in an ordinary steam-cylinder, C, and the rod of which acts on the hammer.

The steam in the cylinder C is changed by the action of an oscillating valve which is fitted into a valve-chest, E. The stem of this valve carries a crank, *b*, which connects by a rod, *c*, with a T-shaped lever, F, as shown in Fig. 1 of the drawings. Said lever has its fulcrum on a pivot, *d*, in a standard, G, and two of its shanks carry dogs *e*, which are so constructed that they can be readily adjusted up or down. In order to effect this purpose the shanks of the lever F are provided with a series of notches, *f*, and the dogs *e* are mounted in boxes e', which slide up and down on the shanks of the levers. Springs e^2 throw the points of the dogs in contact with the shanks of the lever, and cause the same to drop into the notches *f* and to retain the slide in the desired position.

By a slight pressure on the tails of the dogs their points can be liberated from the notches *f* and the slides can be adjusted up or down, as may be desired. From the sides of said slides project lips e^3, and a tappet, *g*, secured to the cross-head *h* of the steam cylinder, by coming in contact with said tappet, serves to tilt the T-shaped lever in one direction or in the other, and the valve is changed.

It is obvious that the stroke of the hammer, which depends upon the motion allowed to the steam-piston, depends entirely upon the position of the dogs *e*. If these dogs are moved closer together the stroke of the hammer is shortened. If the dogs are moved farther apart the stroke of the hammer is lengthened.

It will also be easily understood that by these means the blow of the hammer can be partially checked if the lower dog is so placed that the piston is not allowed to descend far enough to allow the hammer to strike with its full force upon the anvil. The dogs can be changed instantaneously, and the operator has thus complete control over the motion of the hammer and the force of its blows.

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

The T-shaped lever F and adjustable dogs *e*, in combination with the steam-valve, cylinder, and hammer, all constructed and operating substantially in the manner and for the purpose set forth.

CHAS. W. WILLARD.

Witnesses:
JOHN P. PYNCHON,
CHARLES L. BABCOCK.