C. W. & J. P. WILLARD.

STEAM TRIP HAMMER.

No. 15,539. Patented Aug. 12, 1856.

Fig. 1

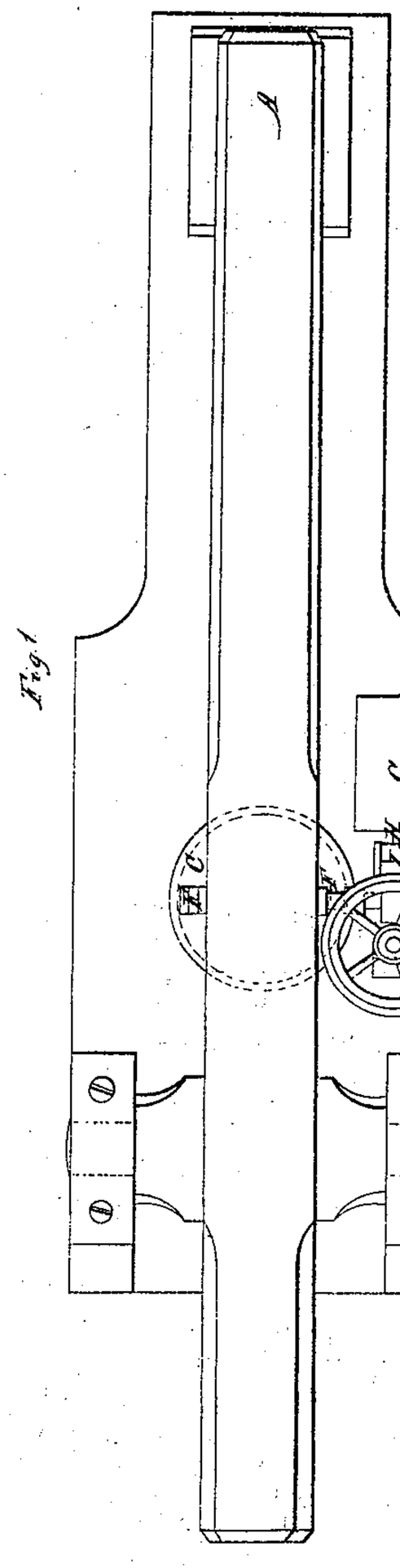


Fig. 2

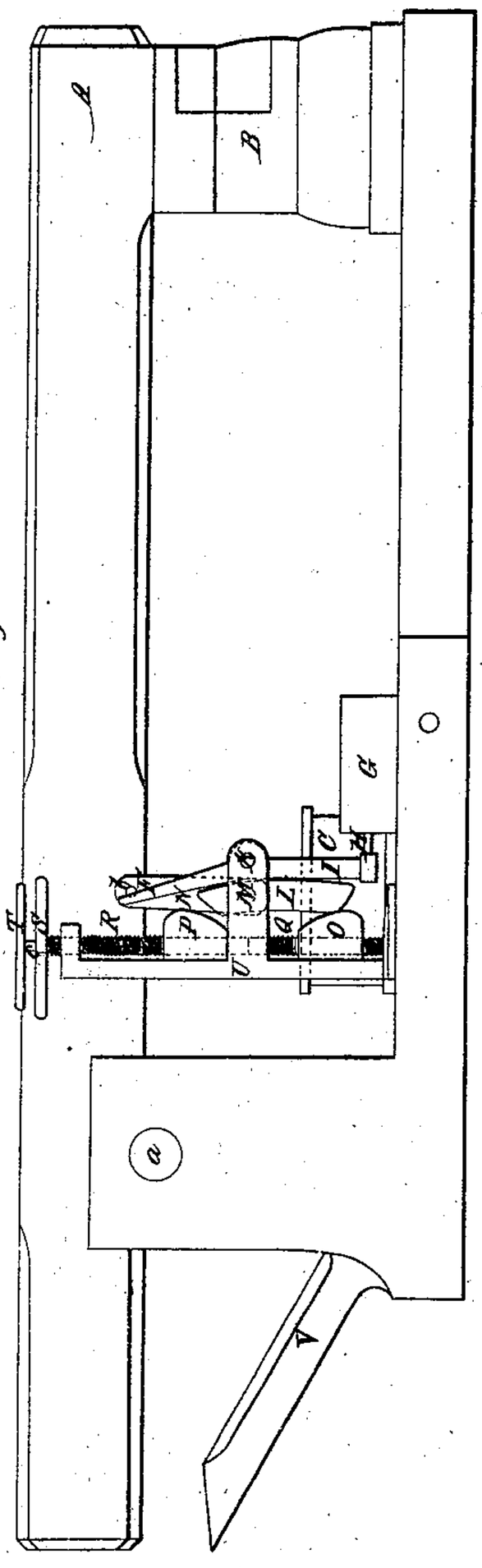


Fig. 3.

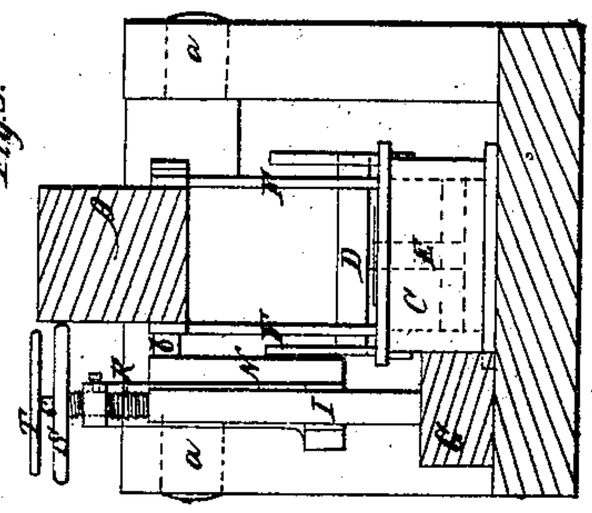
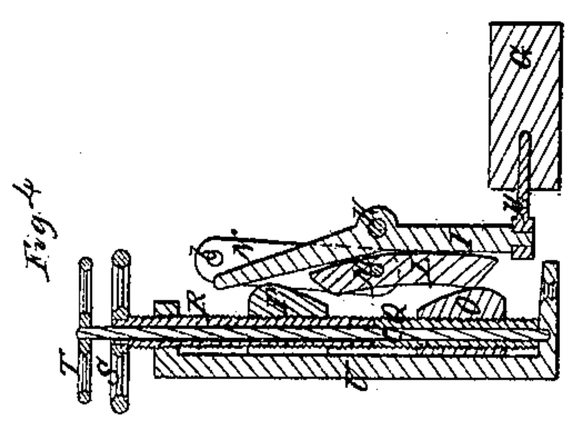


Fig. 4



UNITED STATES PATENT OFFICE.

CHARLES W. WILLARD AND JOHN P. WILLARD, OF DORCHESTER, MASSACHUSETTS.

VALVE-GEAR FOR STEAM-HAMMERS.

Specification of Letters Patent No. 15,539, dated August 12, 1856.

To all whom it may concern:

Be it known that we, CHARLES W. WILLARD and JOHN P. WILLARD, of Dorchester, in the county of Norfolk and State of Massachusetts, have invented an Improved Valve Mechanism for a Steam Trip-Hammer; and we do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, of which—

Figure 1, exhibits a top view of a trip hammer with our invention applied to the valve rod of the valve chest of its steam engine. Fig. 2, is a side elevation of the same. Fig. 3 is a transverse section taken through the shank of the trip hammer and in front of the valve chest. Fig. 4, is a vertical section of the operating cams, screws and actuator to be hereinafter described.

The object or purposes of our improvement or invention is to operate the valve of the steam chest and cause the stroke of the hammer to be varied as circumstances may require.

In the said drawings, A, denotes a trip hammer which is supported so as to turn vertically on journals in the ordinary way and toward and away from an anvil B, one of said journals being seen at, *a*, in Fig. 2. The said hammer is to be elevated and depressed by the action of a steam cylinder C, the cross head D, of whose piston rod E, is connected to the shank of the hammer by connecting rods or pitmen F, F, arranged as shown in Fig. 3.

G, exhibits the valve chest of the said steam cylinder, it being arranged with respect to the cylinder as shown in the drawings and is to be connected with it and the boiler by steam passages in the usual way. The valve rod of said chest is shown at, H, and is intended to play horizontally. Said valve rod is jointed to or extends through the lower end of a bent rocker lever, I, which is formed and arranged as shown in Figs. 1, and 4, and turns on a fulcrum at K. In connection with the said rocker lever, I, we employ what we term the actuator, L, it being a curved piece of metal shaped as seen in Fig. 4, and made to turn on a pin or stud, M, projecting from the shank of the trip hammer. The said actuator operates in connection with two cams, O, P, which are arranged respectively on vertical screws Q, R, that are supported in position so as to be capable of having only a horizontal rotary motion imparted to them by power applied to their hand wheels S, T. The screws, Q, R, screw into their respective cams. We would remark that the shaft, *c*, of the lower screw, Q, extends up through and turns freely in the screw R, the said screws and the rocker lever I being supported by a standard U. The two cams, O, P, are to be constructed alike in form, and arranged so as to stand in opposite directions as shown in Figs. 2, and 4. By means of the screws of said cams the elevations of the cams or their vertical positions with respect to the rocker lever may be adjusted as circumstances may require.

During the reciprocating movements of the trip hammer, the actuator, L, will be raised and depressed and alternately brought in contact with the adjacent inclined faces of the cams, O, P, and by said cams will be forced against the bent lever so as to impart to it, a reciprocating movement such as will operate or move the valve rod horizontally forward and backward. The extent of such reciprocating movement will be increased as the cams are caused to approach one another and decreased as their distance from one another is increased. The stroke of the hammer or its elevation above the anvil will depend upon the extent of motion of the valve rod as will be understood by persons skilled in the operation of steam trip hammers. By elevating the upper cam so high, that when the tail of the trip hammer shall strike against its stop, V, the actuator L, may not impinge against said cam so as to be caused by it to impart any movement to the rocker lever the operation of the steam engine will be arrested and the hammer maintained at its greatest elevation.

By our invention the stroke of the ham-

mer can be arrested or varied at pleasure, and there is no such liability of injuring the steam chest or other parts of the engine as frequently exists when the valve rod is directly connected to the hammer.

What we claim as our invention is—

The combination of the bent rocker lever, I, the actuator, L, and the two adjustable cams O, P, the whole being applied together, and to the valve rod and trip hammer substantially in the manner and for the purpose as hereinabove specified.

In testimony whereof we have hereunto set our signatures this nineteenth day of June A. D. 1856.

CHAS. W. WILLARD.
JOHN P. WILLARD.

Witnesses:
F. P. HALE, Jr.,
R. H. EDDY.