S. D. WILSON.

Steam-Hammers.

No. 168,439. Patented Oct. 5, 1875.

Fig. 1.

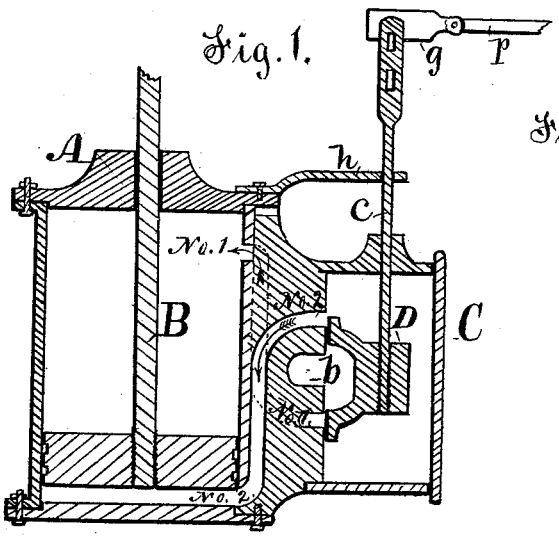


Fig. 2.

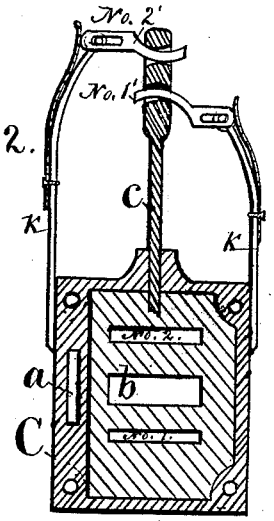
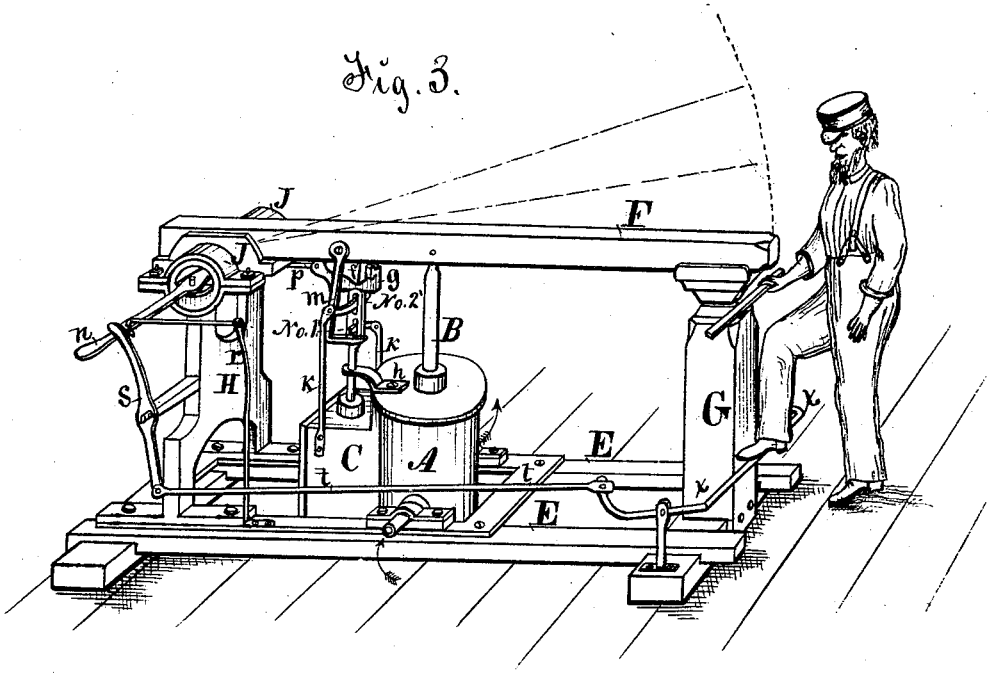


Fig. 3.



Witnesses.
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R. G. Orwig.

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UNITED STATES PATENT OFFICE.

STEPHEN D. WILSON, OF DES MOINES, IOWA, ASSIGNOR OF ONE-HALF HIS RIGHT TO WILLIAM STEIN, OF SAME PLACE.

IMPROVEMENT IN STEAM-HAMMERS.

Specification forming part of Letters Patent No. **168,439**, dated October 5, 1875; application filed March 6, 1875.

To all whom it may concern:

Be it known that I, STEPHEN D. WILSON, of Des Moines, in the county of Polk and State of Iowa, have invented an Improved Steam-Hammer, of which the following is a specification:

The object of my invention is to construct a steam-hammer in such a manner that it can be readily governed to strike at the precise point of time, and with the precise force required by the will of the operator. It consists in forming and combining a governing-cam carried by the helve, pivoted latches carried by a combined oscillating steam-chest and cylinder having cross-ports, and a pivoted crank, and a rock-shaft, in such a manner that the operator can readily adjust the governing-cam to control the hammer at will, all as hereinafter fully set forth.

Figure 1 of my drawing is a longitudinal central section of my combined oscillating cylinder and steam-chest, showing the manner of forming my cross-ports.

A is the cylinder. B is the piston-rod. C is the steam-chest. D is the slide-valve. Nos. 1 and 2 are my cross-ports, connecting the cylinder-chamber with the steam-chest. No. 1 port starts in the lower part of the steam-chest, and terminates in the upper portion of the cylinder. No. 2 port starts in the upper part of the chest, and terminates in the lower portion of the cylinder.

Fig. 2 is a transverse sectional view, showing the position of the cross-ports Nos. 1 and 2 relative to the induction-port *a* outside of the slide-valve, and eduction-port *b* under the slide-valve D carried by the valve-stem *c*. Fig. 3 is a perspective view, illustrating the construction and operation of my complete invention.

d represents one of the hollow trunnions rigidly connected with the combined cylinder A and steam-chest D. The trunnions *d* have their bearings attached to a suitable frame or base, E E. F is the helve or beam carrying the hammer, the piston-rod B, and my adjustable governing-cam. G is a post or anvil block. *f* is a cam-bearer, rigidly secured to the under side of beam F. It has an inclined groove to form a bearing for the adjustable cam. *g* is my adjustable cam sliding in the inclined groove of the cam-bearer *f*. *h* is a bearing, rigidly secured to the cylinder A for the valve-stem *c* carrying the sliding valve D, operated in the steam-chest C. Nos. 1′ and 2′ are movable latches pivoted to suitable supports *k k* carried by the steam-chest C. These pivoted latches extend through slots formed in the valve-stem *c*, and serve in raising and lowering the stem *c* and its valve D to alternately open and close the Nos. 1 and 2 cross-ports to operate the piston in the cylinder A. *m* is a rigid hook, carried by the beam F to engage the No. 1′ latch, and thereby lift the valve-stem *c*. H represents a frame secured to the base E to support the oscillating beam F. J is one of the hollow trunnions rigidly secured to the rear end of the beam F, and rests upon bearings mounted upon the frame H. *n* is a lever, pivoted in the hollow trunnion J. *p* is a rod, connecting the inside end of the lever *n* with the rear end of the adjustable cam *g* sliding in the inclined groove of the cam-bearer *f*. *r* is a spring, attached to the base E, and linked to the outer end of the pivoted lever *n* to draw on the rod *p*, which operates the sliding governing-cam *g*. *s* is a crank-lever, pivoted to an arm extending from the frame H. *t t* is a pitman, connecting the lower end of the lever *s* with a rock shaft or treadle, *x x*, mounted upon the front end of the frame or base E.

In the practical operation of my invention, the steam enters the steam-chest C through the hollow trunnion *d*, and escapes through the corresponding trunnion on the opposite side of the cylinder A. When the hammer is in its normal position resting on the anvil, the No. 1 port is closed and the No. 2 port partly open. To start the hammer, allow steam to enter the chest, and it will pass into the cylinder A through the partly-open port No. 2 and lift the piston, and, by means of the rod B, elevate the beam F carrying the hook *m*. The hook *m* will engage the No. 1 latch in the valve-stem *c*, and thereby elevate the stem *c* and its sliding valve, and open the port No. 1 and close port No. 2. The steam passing through port No. 1 will enter the cylinder above the piston and press down the piston,

and in its descent it carries along the beam F and its hammer to strike a blow upon the anvil. The piston-rod B and valve-stem *c* are thus made to move up and down simultaneously with the hammer, and the combined cylinder A and steam-chest C oscillate sufficiently to accommodate themselves to the various angles assumed by the oscillating beam F while striking.

To control the hammer to strike at the precise point of time required, and with the amount of force desired, adjust the governing-cam *g* by means of the pivoted lever *n* and its connections. By pressing on the treadle *x x*, or direct on the end of the lever *n*, the cam *g* will be forced forward and downward through the inclined groove of its bearer *f* to engage the No. 2′ latch in the valve-stem *c*, and thereby press down the valve-stem *c*, and diminish or cut off the volumes of steam pressing alternately through the cross-ports Nos. 1 and 2. The length of the stroke of the valve-stem *c* and the amount of steam-force applied can be thus readily governed. The governing-cam *g* can be instantly adjusted at the will of the operator to arrest the stroke of the hammer and to hold it in an elevated, vibrating, or poised position.

When the spring *r* is allowed to hold the cam *g* in its elevated and normal position, the full force of the steam will be applied, and the hammer will be worked to its full capacity; but when the cam *g* is adjusted to shorten the length of the stroke of the valve-stem *c*, the ports Nos. 1 and 2 will be alternately opened and closed in such rapid succession that the piston will play in the center of the cylinder, and the hammer will not reach the anvil in its vibrations, and will be practically inoperative. The governing-cam *g*, readily and instantly adjustable by the will of the operator, exerts a sympathetic influence, and its touch upon No. 2′ latch is sufficient to completely control the action of the hammer.

I claim as my invention—

1. In a steam-hammer, the pivoted latches Nos. 1 and 2, in combination with the valve-stem *c* and the hook *m* and cam *g* carried by the beam F, substantially as and for the purposes shown and described.

2. The combination of the cam *g*, rod *p*, pivoted lever *n*, spring *r*, crank-lever *s*, pitman *t t*, and treadle *x x*, substantially as and for the purposes shown and described.

3. The combined oscillating cylinder and crank A C, having cross-ports Nos. 1 and 2, and carrying-latches Nos. 1′ and 2′, and valve D having slotted stem *c*, the beam F carrying the cam *g* and hook *m*, the hollow trunnions J inclosing the pivoted lever *n*, and the cam-adjusting and governing devices *m p n s r t x*, when arranged and combined substantially as and for the purposes set forth.

STEPHEN D. WILSON.

Witnesses:
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