W. H. H. SISUM.

Steam Drop-Presses.

No. 162,200. Patented April 20, 1875.

Fig: 1.

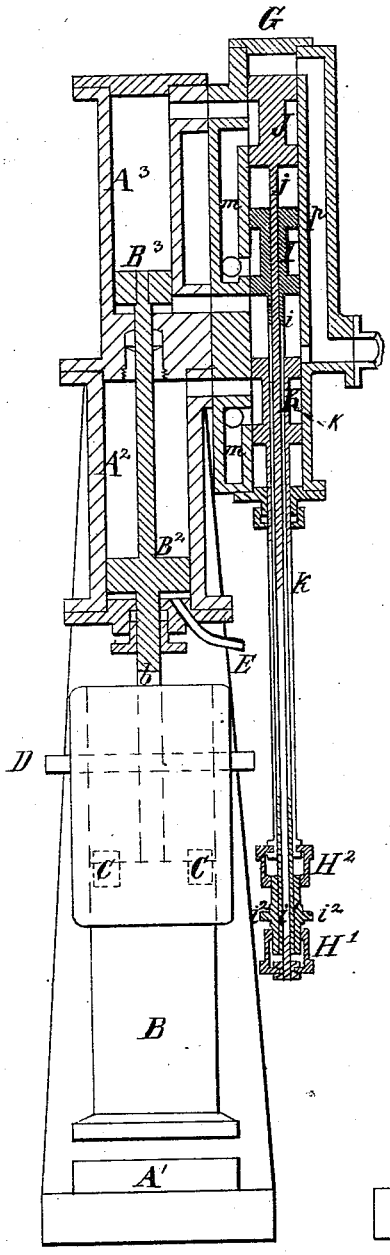
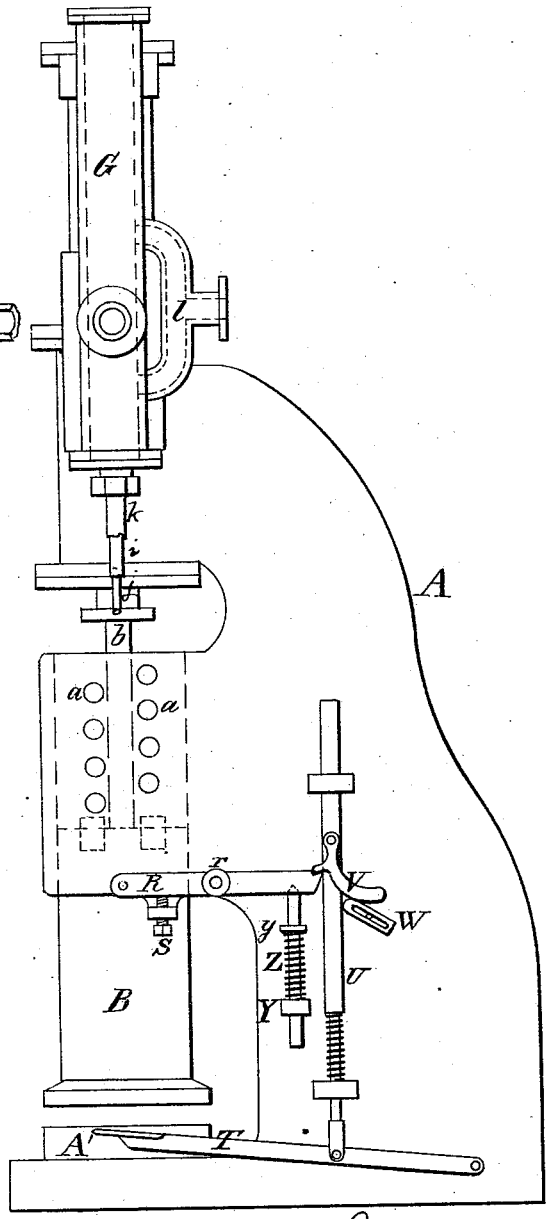


Fig: 2.



Witnesses:

M. C. Dey.

M. A. Van Nanmee.

Inventor: W. H. H. Sisum,

by his attorneys T. D. Stetson

UNITED STATES PATENT OFFICE.

WILLIAM H. H. SISUM, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN STEAM DROP-PRESSES.

Specification forming part of Letters Patent No. **162,200**, dated April 20, 1875; application filed July 23, 1874.

To all whom it may concern:

Be is known that I, WILLIAM H. H. SISUM, of Newark, Essex County, New Jersey, have invented certain Improvements relating to Steam Drop-Presses, of which the following is a specification:

By my invention I am able to vary the height of the lift, the time required for its ascent, and the force applied to increase the blow within wide limits, while maintaining the conditions required for a drop-press. I can also employ the same devices to effect repeated blows in the manner of a hammer, if desired. It is very favorably adapted for small apparatus for dental and jewelry work.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a vertical section through the steam portion of the apparatus, and a front elevation of the dies and the framing of the machine. Fig. 2 is a side elevation of the whole.

Similar letters of reference indicate like parts in both figures.

A is an outer framing of cast-iron. The entire fixed work A may be in one casting, or in two or more pieces, the separate portions of which will be indicated, when necessary, by A^1, A^2, &c. A^1 is the bed which receives the blow. Above this is a portion of the framing, through which the head or hammer moves, and A^2 is a cylinder, which performs an important function. A^3 is another cylinder, of smaller diameter, in line with it. B is the head of the hammer or drop; it is connected by a piston-rod, *b*, to a large piston, B^2, which works in the large cylinder A^2, and also to a smaller piston, B^3, which works in the smaller cylinder A^3. The back of the drop-head B is equipped with springs or bumpers of vulcanized india-rubber, or other suitable material, as indicated by C C. The frame is formed with holes *a a*, arranged as shown, and adapted to allow a cross-bar, D, to be changed from one position to another, so as to stand at different levels, and arrest the ascent of the drop by receiving the impact through the springs C. When the bar D is in the lowermost of the holes *a* the drop B is allowed to rise but a little way at each lift, with a corresponding slight consumption of steam. When it is in the uppermost of the holes *a* the drop is allowed to attain its highest lift, and consequently to drop farther and produce a more forcible effect. A long smoothly-bored chamber, G, extending parallel to the piston-rod *b*, contains three piston-valves, I J K, each having an open belt or cavity around its waist, with a tight-fitting portion or piston above and below. Communication is maintained through the branched pipe *l* between a boiler (not represented) and spaces *m m*. Communication to the atmosphere is allowed from a space, *p*. The valves are adjustably connected. What I will term the principal valve is the middle one, I. This is connected by a sleeve, *i*, to a block, i^1, having trunnions i^2. These trunnions match in holes in the ends of a double lever, R, which turns on a fixed center, *r*.

The gravity of the valves and their connections, aided by an active spring, Z, tends to move the valve I downward in the cylinder G. An adjustable stop, S, limits the extent of this motion.

In the position in which the valve I is represented it allows a free exhaust of the steam from below the piston B^3, and a free descent of the drop. This condition is induced by the depression of the treadle T by the foot of the attendant; but it exists only for a moment. In pulling the rod U by the treadle T, the curved lever V is caused to strike the deflector W, thereby letting go of the lever R and setting free the valves, when their own weight, aided by the force of the spring Z—which acts under a nut or adjustable collar, *y*, on the slide Y—instantly depresses the valves and admits steam under the piston B^3 to raise it again.

The extent to which the valve I will sink, and consequently the amount of opening given for the admission of steam under the piston B^3, depends on the adjustment of the set-screw S. The steam holds the drop suspended until the treadle is again depressed.

When it is desired to strike a blow the attendant, by depressing the treadle T, raises the valve I into the position shown. This allows the steam under the piston B^3 to escape freely, and the drop falls; but by the time the

blow is struck the let-go mechanism R V W has lowered the valve, so that the drop is instantly picked up again, and raised more or less rapidly by the admission of steam under the piston B^3 before the drop can rebound.

The upper valve J is shown as adjusted to admit the steam at full pressure above the piston B^3, and hastening the descent of the drop. The adjustment is effected by turning the hollow nut H^1, which is threaded upon the lower end of the piece i^1, and gives motion through the swiveling head represented to the rod *j*, and thus to the valve J.

When it is desired to make the valve J of no effect, it is necessary simply to so turn the nut H^1 as to bring the valve J nearer to the valve I. Thus conditioned, the motion of the lever R, while sufficient to raise the valve J, and let out the steam from below the piston B^3, does not lift the valve J sufficiently high to admit steam above it.

The lower valve K is shown adjusted to also admit steam at full force to act above the large piston B^2. Thus adjusted, it exerts a powerful influence in increasing the effect of the blow. The valve K is connected by the sleeve *k* and the swiveling head at its lower end to a hollow nut, H^2, which is threaded upon the upper end of the piece i^1. By turning this nut the rod *k*, and with it the valve K, may be lowered relatively to the valve I, so as to be of no effect. When so conditioned, the valve I may be raised into the position represented, while the valve J is so far therefrom as to admit no steam above the piston B^2. When the valves J and K, or either of them, are adjusted so that they permit no admission of the steam to the passages controlled by them, it will be understood that said passages are preferably open to the exhaust, and that at each blow a portion of the steam in the exhaust-pipe, or in a reservoir connected therewith, is drawn back into the respective cavities to be immediately after expelled by the prompt rise of the drop and its connections.

A pipe, E, makes a free communication with the space below the lower piston B^2. It leads downward, and allows any water which may leak past the piston B^2 to flow out or to be expelled at each movement of the drop. Such pipe allows a free access of air or exhaust steam into the space, and forbids the existence of any pressure there under any conditions to force water down through the stuffing-box to fall upon the work.

Many modifications in form may be made by any good mechanic without entirely defeating the objects of the invention. Thus, for example, the valves J and K may, if preferred in any case, be worked in proper chambers alongside of, instead of in line with, the main valve I, and still be connected adjustably to the same impelling parts, and produce the same effect.

I claim as my invention—

1. The adjustable cross-bar or stop D, in combination with a steam-drop, and with devices for admitting steam under the piston and its free discharge, as herein specified.

2. The adjustable valve J, in combination with the valve I and suitable steam-passages, and with the piston B^3 and connected drop, as herein specified.

3. The adjustable valve K and piston B^2, in combination with the valve I, piston B^3, and suitable steam-passages and connected drop, as herein specified.

4. The combination of the three valves I J K, and their several adjustments, with the single operating-lever R, and with the two pistons B^2 B^3, and a drop, B, operated thereby, all substantially as and for the purposes herein specified.

In testimony whereof I have hereunto set my hand this 18th day of July, 1874, in the presence of two subscribing witnesses.

WM. H. H. SISUM.

Witnesses:

WM. C. DEY,

M. A. VAN NAMEE.