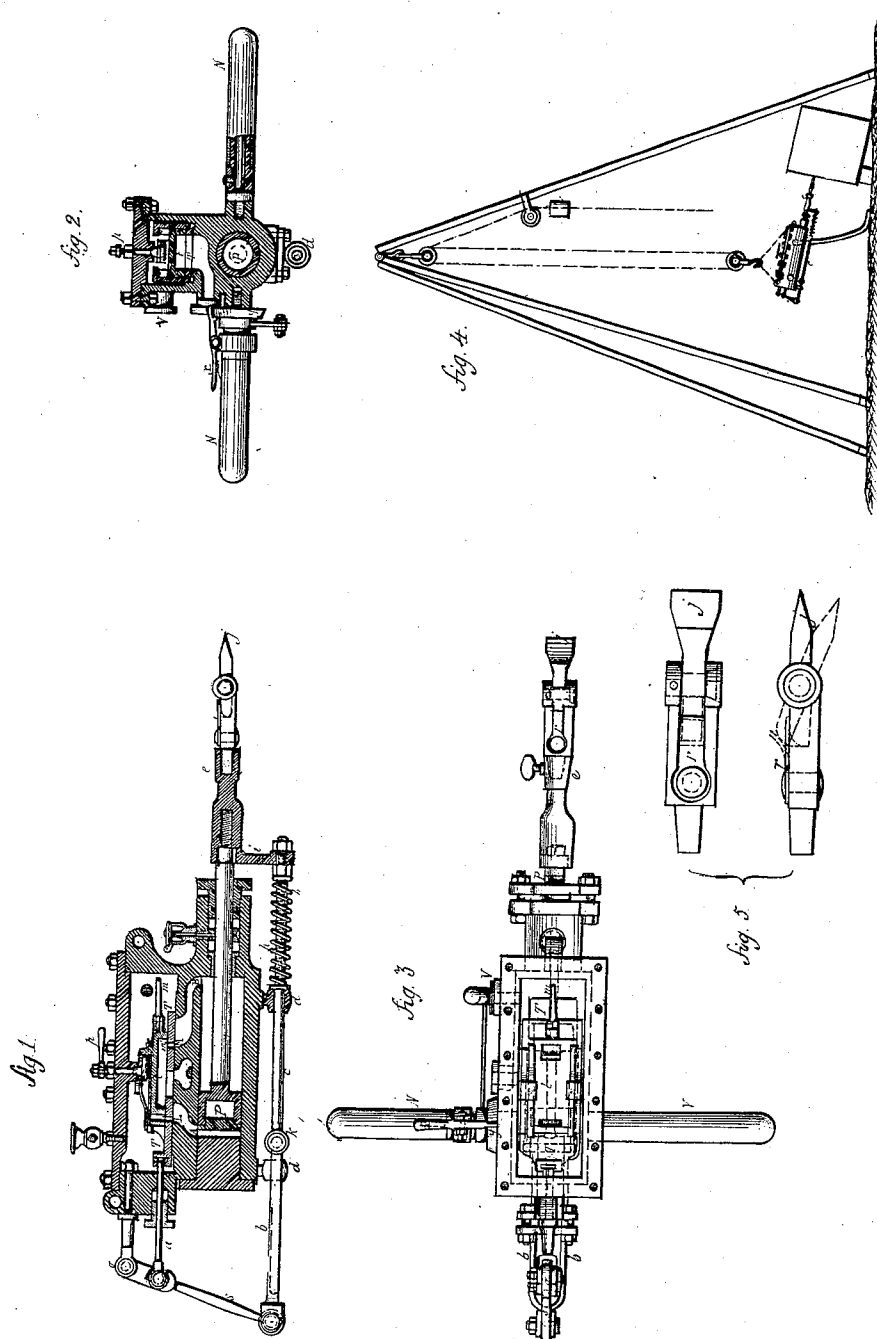


L. POCHET.
VALVE IN STEAM APPARATUS FOR DRESSING STONE.
No. 107,406. Patented Sept. 13, 1870.



Witnesses
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LEON POCHET, OF VENDOME, LOIR ET CHER, FRANCE.

Letters Patent No. 107,406, dated September 13, 1870.

IMPROVEMENT IN VALVES IN STEAM APPARATUS FOR DRESSING STONE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, LEON POCHET, of Vendome, Loir et Cher, France, engineer, have invented a certain new and useful Improvement in Valves in Steam Apparatus for Cutting or Dressing Stone; and I do hereby declare the following to be a true and exact description of the same, reference being had to the accompanying drawing; that is to say—

Figure 1 is a longitudinal section;

Figure 2, a transverse section;

Figure 3, a top view;

Figure 4, the machine, as in operation; and

Figure 5, a top and side view of the drill-holder, enlarged.

My invention, which has for its object the dressing of stone by mechanical means, consists of a machine having an arrangement of striking-tools, and weighing from thirty to one hundred kilograms, and even more, according to the force of the blow required; the said apparatus being worked either by steam or air, and suspended in such a way that the workman can direct the blows upon the stone without exerting his own strength, either to direct the apparatus or to support it.

The drawing joined to this description represents a dressing-machine.

A piston, P, works in a cylinder, A B. It is furnished, at one end, with a tool-holder, *e*. An arm, *i*, connects the piston-rod to a spindle, *c*, parallel to it, which slides in two supports, *d d*. A fork, *b*, jointed, at *k*, to the spindle *c*, is also jointed to a lever, *s*, having its fulcrum at *o*. By means of other joints the lever *s* works the rod *a* of the valve T. It results, from this arrangement, that the valve T works parallel to the piston P, its speed being reduced as required, and thus the piston regulates its own supply of steam or air.

The valve T carries a regulating-valve, *t*, which it actuates by its own movement, by reason of the two valves being pressed together by two steel springs, but the travel of the regulating-valve is limited at the right by the spindle *m*, which strikes against the side of the valve-chest, and, at the left, by the elliptical cam *n*, which is regulated by the handle *p*. When the regulating-valve has struck either of its stops, the main valve finishes its travel alone, until it returns in the contrary direction. The travel of the valves produces the following results:

First period, the piston P, starting from its normal position, as in fig. 1, the exhaust is at B, full pressure at A, which acts during half the travel of the piston. At the middle of the stroke the induction ceases at A, and commences at B; the exhaust ceases at B, and commences at A. During this first period the speed of the piston commences at zero, and attains a maximum speed. Thus the central point of the free stroke of the piston always corresponds to the maximum speed.

Second period, from the central point the steam retards the speed of the piston, instead of increasing it, until the speed is neutralized, and the piston stops. But, if the tool has struck the stone before the end of its stroke, the piston returns, under pressure of the vapor acting at B. At whatever point the stone is struck the piston returns. This second period may be called the useful part of the stroke.

Third period, the speed of the piston on its return increases as long as the steam acts at B. If the elliptical cam *n* is placed at its greatest eccentricity, the induction at B and the exhaust at A continue until the piston passes the middle of its stroke.

Fourth period, at this moment the change takes place; the exhaust commences at B, and the supply at A. Under the reaction of the steam at A the piston moves slower, and ends by stopping altogether at its starting point, to act as previously described.

Thus, by means of the concordant action of the slides *L m* of the regulating-valve with the ports L M of the valve, there can be no pressure at A until there is exhaust at B, and *vice versa*.

During the forward stroke the change always takes place in the middle of the stroke of the piston. During the return stroke the change takes place at any point before the return of the piston to its starting point, according to the position of the elliptical cam *n*, which is set to regulate the force of the blows by decreasing the amount of eccentricity in proportion as the blows require to be increased, and *vice versa*.

In certain cases, especially in machines of small size, it is possible to reduce the two valves to one, in which case the change of distribution always takes place in the center of the stroke, and the quantity of steam introduced alone regulates the stroke.

The apparatus is suspended from a tripod by a small differential drum or pulley, balanced by a counterweight. It is, therefore, free to move in any direction, (see fig. 4.) The workman simply holds the apparatus by two handles, N N, of wood or elastic material, and it is by means of these handles that he directs the tool upon the desired point of the stone.

The incline of the machine is regulated by the arrangement of the chain which connects it to the pulley. It is necessary to reduce to one-tenth, at least, the proportion of the sizes of the piston and the cylinder, so as to lessen the vibrations of the handles.

The blows are strong in proportion as the pressure is exerted upon the handles, to hold the apparatus against the stone. The steam enters the machine through a tube of India rubber fixed on the mounting V, by means of a cock. This latter is more or less opened by a movement of the left handle, N, transmitted to the cock by means of a lever and crank, (see figs. 2 and 3.)

The handle can be kept in any position by means of a spring pawl, *x*, that is fixed by the thumb in one of the teeth of the ratchet-wheel *y*. The handle *p* of

the cam may be fixed in any desired position by means of a lever turning upon a notched disk, as in Breguet's telegraphic apparatus.

It will be understood that the cam *n*, and the openings through which the steam passes, regulate the force of the blows, and the pressure of the hands upon the handles *N N* complete this operation.

The resistances of the piston are eased by the spring *h*, upon the spindle *e*, and bearing against the fixed support *d*, during the forward stroke, and, during the back stroke, the piston *P* forces back the valves, and compresses the spring.

The apparatus is placed in position before the stone by a proper arrangement of the tripod. Once placed it can be raised or lowered by the workman, one of the wheels of the differential pulley being eased by a balance-weight. The dressing is done in superposed horizontal zones, and the tools employed are similar to hand-tools, especially those cutting-tools having from four, nine, sixteen, &c., teeth.

The chipping of the edges of the stone is done by an ordinary chisel, or a jointed chisel, *j*, having a spring, *r*, shown in fig. 5.

To dress the edges the stone is placed in a horizontal position. The course of the chisel is limited by an arrangement of two right-angled straight-edges, fixed on the stone by two screws at each end. The vertical straight-edge limits the cutting upon the horizontal face, and the horizontal straight-edge upon the vertical face. When one stone is finished the workman proceeds to

dress another stone, for which purpose the feet of the tripod are rearranged.

The machine may be worked either by compressed air or by steam. For compressed air a motor, an air-compressor, a reservoir, a main pipe, and India-rubber branch pipes are required. For steam, a boiler, a main pipe, and metallic branch pipes are required, and, near to each instrument, an India-rubber tube, of only a few yards' length. A stone-dressing yard will comprise many machines.

These machines can be used according to their strength, either to rough dress or to chisel stone. By varying the dimensions according to the work to be done, they can be used to dress millstones, to drill holes in mines, to get stones from quarries, and, indeed, it can be applied under any circumstances to strike rapid blows directed by hand. If necessary I can place the machine in fixed frames, moving horizontally and vertically, the said frame moving on wheels.

I claim—

In combination with the slide-valve *T*, the regulating-valve *t*, cam *n*, and rod *m*, substantially as set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

L. POCHET.

Witnesses:

C. LAFOND,
J. U. ZUST.