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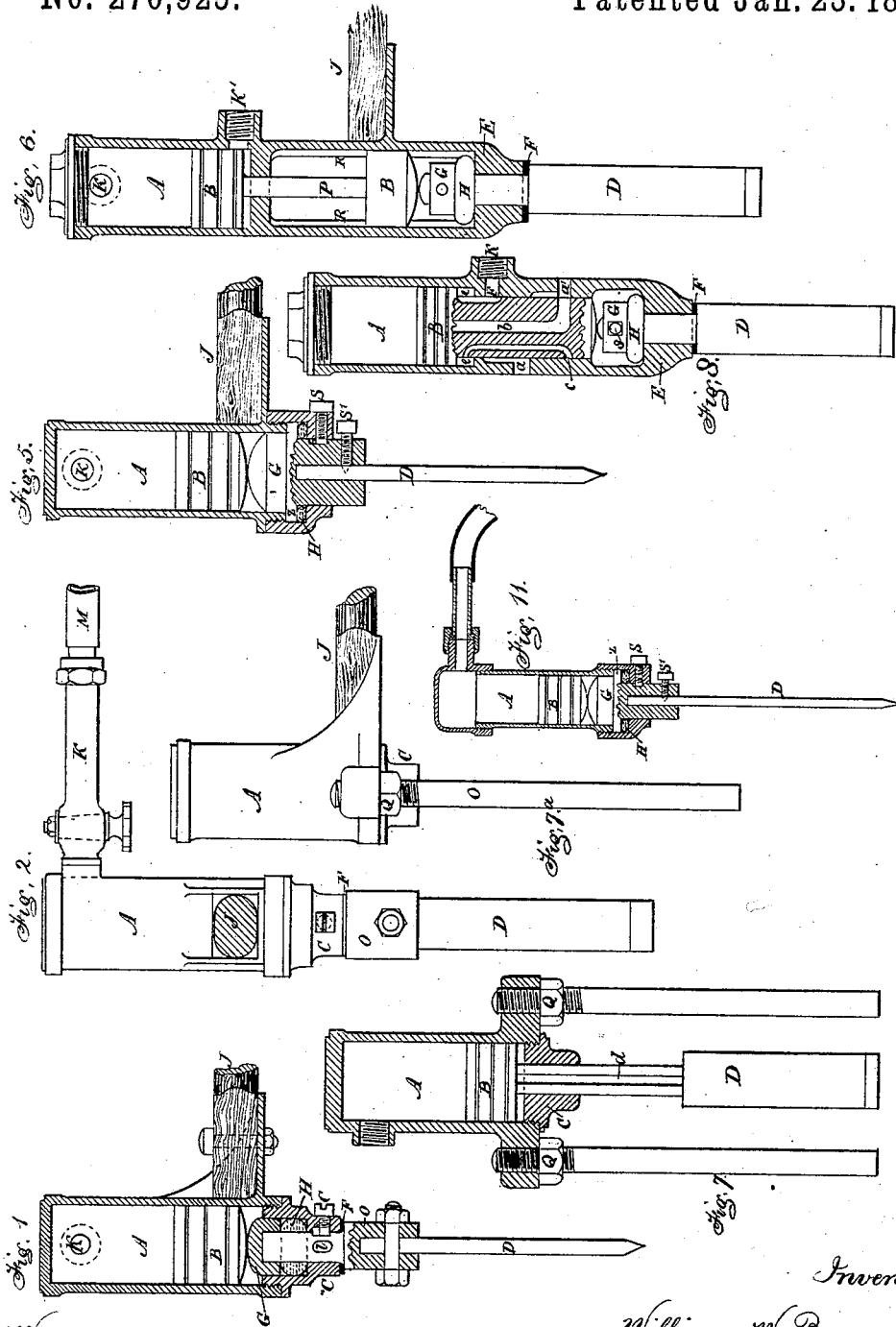
2 Sheets—Sheet 1.

W. W. BEAUMONT & J. WELMAN.

APPARATUS FOR CUTTING STONE.

No. 270,925.

Patented Jan. 23. 1883.



Witnesses

Charles Smith  
J. Kaib

Inventors

William W. Beaumont  
James Welman

per Lemuel W. Ferrell  
*(Signature)*

att'y

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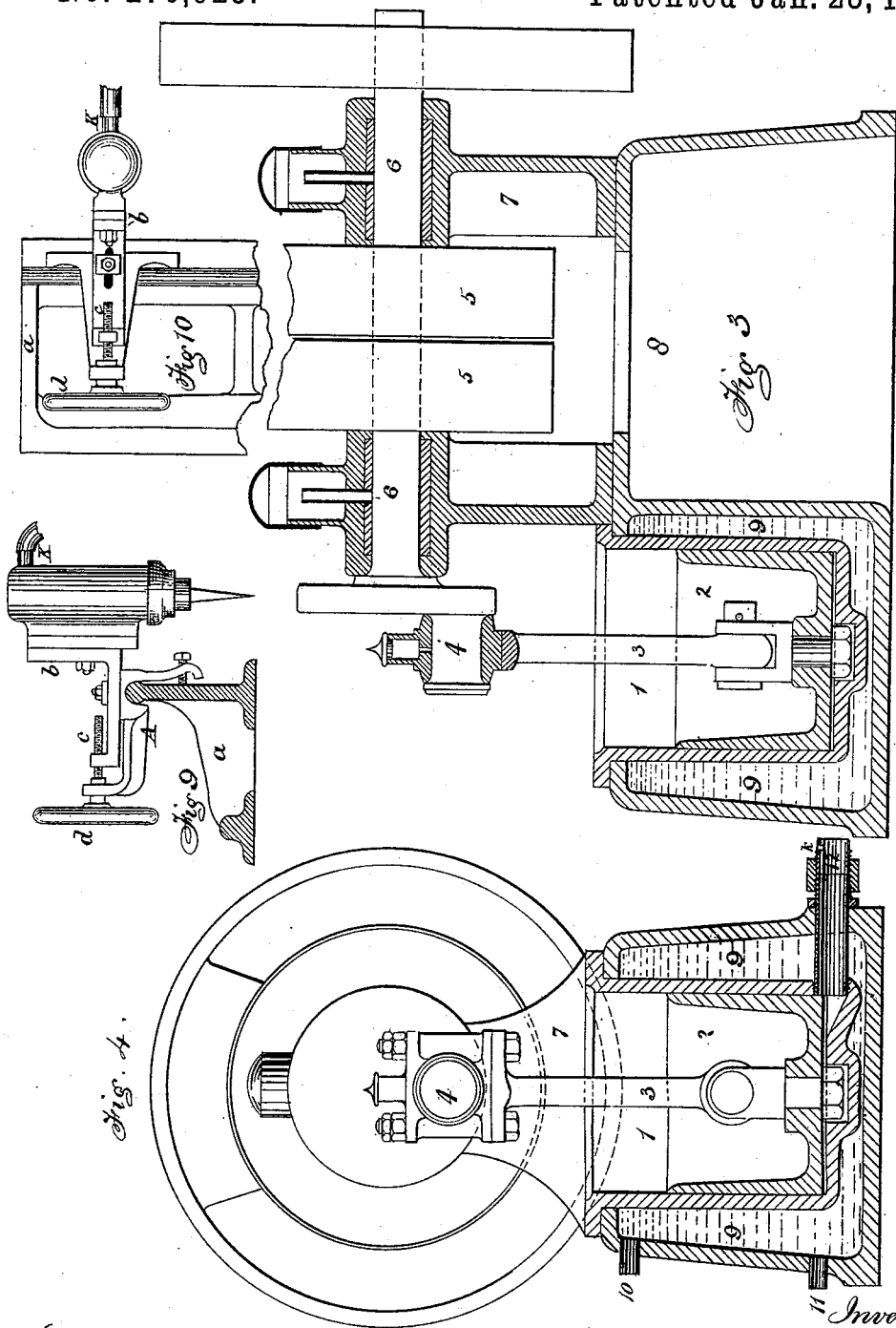
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# UNITED STATES PATENT OFFICE.

WILLIAM WORBY BEAUMONT, OF CAMBERWELL, COUNTY OF SURREY, AND  
JAMES WELMAN, OF POOLE, COUNTY OF DORSET, ENGLAND.

## APPARATUS FOR CUTTING STONE.

SPECIFICATION forming part of Letters Patent No. 270,925, dated January 23, 1883.

Application filed June 14, 1882. (No model.) Patented in England June 16, 1881, No. 2,628.

*To all whom it may concern:*

Be it known that we, WILLIAM WORBY BEAUMONT and JAMES WELMAN, residing respectively at Camberwell, in the county of Surrey, and Poole, in the county of Dorset, both in England, engineers, have invented new and useful Improvements in Apparatus for Dressing and Cutting or Shaping Stone, Millstones, and Hard Substances, (for which we have obtained a patent in Great Britain, dated 16th June, 1881, No. 2,628,) of which the following is a specification.

This invention consists in improvements in apparatus for dressing and cutting or sharpening stone, millstones, and other hard substances.

According to this invention we use a cutting or dressing tool of suitable form for the purpose in view in each case, which tool is so held and arranged that a rapid vibratory motion may be imparted to it, which motion will produce the required effect of cutting or dressing the stone. To impart this motion we use a small tup or hammer, which imparts or gives to the before-mentioned tool a series of blows repeated with great rapidity. The tup may consist of a solid piston working in a small cylinder, through one lid or end of which projects the before-mentioned tool or holder for same. A cushioning appliance—such as india-rubber washers—rests on the lid or end, and between the lid or end of the cylinder and collars on the dressing-tool or tool-holder, to supply the necessary elasticity to provide for a vibratory motion of small range in the cutting-tool, or so that the inertia to be overcome by the tup in this form is that of the tool only, and not that of the cylinder also, as it would be if the tool were rigidly fixed to the cylinder. The piston or tup may be caused to reciprocate by compressed air, or it may be, for instance, by steam. We prefer to cause the space above the piston or tup in the cylinder before mentioned to communicate by means of a flexible pipe-connection with a cylinder in which works a piston moved rapidly by hand, or by machinery. As this piston rises and falls it will alternately reduce and augment the pressure in the before-mentioned cylinder containing the

tup and cause the tup to rise and fall at the same time, and so impart or give to the cutting or depressing tool the required series of blows; or the tool may be attached to a tup or piston part, and thus receive the necessary reciprocating movement. In order to control the action of the tool, we regulate the flow of the impelling-fluid by a cock or valve.

The tool or apparatus has a handle or part adapted for holding and directing the action on the surface as required, and may also rest on legs, casters, wheels, or other support, so as to glide or roll easily over the surface and relieve the guiding-hand of the weight.

In order that our said invention may be fully understood, we now proceed more particularly to describe the same, and for that purpose shall refer to the several figures on the sheets of drawings accompanying this specification.

In Figures 1, 2, 5, 6, 7, 7<sup>A</sup>, and 8 similar letters refer to similar parts.

Figs. 1 and 2 are sectional and external views, respectively, of the dressing or shaping apparatus as first above described. A is the cylinder, in which the piston-tup B reciprocates under the action of the alternately compressed and extended air admitted by the pipe K. D is the dressing, cutting, or shaping tool, which in this case is shown as a piece of flat steel held in the holder O by a bolt, S. The holder O fits freely in the cover C. At this part it is round, but is prevented from turning by the set-screw S, the point of which engages in the slot *t*, or the slot *t'*, according as the tool D is required to be set, as shown, or with its cutting-edge in the direction of the handle, part of which is shown at J. An india-rubber collar is placed at F and another at H, and the iron or steel cap-collar G is screwed onto the end of the holder-stem. The object of the collar H is to supply the necessary elasticity and to provide for a vibratory motion of small range. The object of the collar F is to prevent noise and injurious backlash in the return movement of the tool-holder and tool. K is the short piece of pipe, to which is attached a flexible hose-pipe, M, for connection with a pumper. (Shown at Figs. 3 and 4, and to be hereinafter described.) L is a cock, by which

air-communication is shut off or controlled. J is a part of a wood handle, attached to a projection cast on the cylinder, and which is made of suitable length for holding the apparatus.

5 The pipe K may also be used as a handle for steadying the apparatus.

Figs. 3 and 4 are longitudinal and transverse vertical sections of one form of a machine, which we have called a "pumper," suitable for  
 10 alternately augmenting and reducing the pressure as required for operating the apparatus. In Fig. 3, 1 is the cylinder, in which the piston 2 reciprocates by means of the connecting-rod 3, attached to the crank-pin 4, which is  
 15 driven by a belt on one of the pulleys 5, one of which is fixed and the other loose on the shaft 6, or which may in some cases be worked by a winch fixed to one end of the crank or fly-wheel shaft, or to a secondary shaft geared thereto,  
 20 so as to obtain the required speed for the pumper-piston and tup. The crank-shaft revolves in bearings on the top of the supports 7, which are fixed to a bed-plate, 8, or to the top of a vessel, 9, which contains water and  
 25 forms a water envelope or jacket for keeping the cylinder cool. The vessel 9 forms part of the bed-plate 8, and may be extended in capacity by making the whole bed-plate a tank. Water is supplied to and runs from the vessel  
 30 9 through pipes, (indicated at the holes 10 11.) The water is not needed where the work is frequently interrupted. We have also found that if we provide the pipe or hose near the pumper with a small hole, *k*, (which may be  
 35 fitted with a regulating-cock,) then a water-jacket is generally not needed, because the air in the pipe is then constantly or gradually changed. When the piston 2 rises it draws the air from the cylinder A of the dressing apparatus shown in Figs. 1 and 2, and from the  
 40 pipe M, connecting this and the pumper at 12, and raises the tup B in the dresser-cylinder. When the piston 2, Figs. 3 and 4, descends the air is driven back from the cylinder 1, Figs. 3 and 4, through the connecting-pipe, attached at 12, into the cylinder A of the dressing apparatus, and the tup in the dresser-cylinder is  
 45 driven down and gives a sharp blow on the top of the cap-collar C, by which the blow is transmitted to the tool D. The crank-shaft 6, Figs. 3 and 4, is driven at as many revolutions per unit of time as it is desired that the tup in the cylinder of the dressing apparatus or the tool thereof shall make strokes in the same  
 50 space of time. This also applies to the modification shown in Figs. 4, 5, 6, 7, and 7<sup>A</sup>. This machine we show as one form of apparatus or pumper suitable for the purpose of working our apparatus; but we do not claim this, *per se*, as new. Moreover, for some purposes we may use a treadle instead of the winch-handle  
 55 above mentioned.

In the modification of the dressing or shaping apparatus shown at Fig. 5 the tool D is  
 65 held in a holder, which is an extension of the cap-collar G, (shown in Fig. 1,) the holder O of Fig. 1 and the cap G being in this modifica-

tion made all in one piece. The india-rubber cushion-collar H is placed under the collar, Z, which is formed on the holder G. An india-rubber collar may also, if desired, be placed  
 70 above this collar for the same purpose as the washer F in Figs. 1 and 2. The tool is fixed in the holder G by the set-screw S'.

In the modification of the dressing apparatus shown in Fig. 6 the tup B is united to a  
 75 piston, T, by a rod, P, the tup being circular and guided between correspondingly-formed guides, R, which project from the cylinder A and carry the boss E, in which the upper part  
 80 of the tool D fits freely. The short piece of metallic pipe inserted in the side of the cylinder A may be screwed into a hole at K or K'. The collar G' is fixed on the top of the tool D by the set-screw S, an india-rubber collar, H,  
 85 being placed beneath, as shown.

In the modifications shown at Figs. 7 and 7<sup>A</sup> the upper end of the tool D is fixed into the  
 90 piston D and slides freely in the cover C, the tool being prevented from rotating in the cover by a pin or pins or screws inserted therein, and taking into one or more grooves—such as  
 95 *d*—shown in the upper part or stem of the tool. The tool D in this case rises and falls with the piston T. A cushion of elastic material may be placed on the bottom of the cylinder A to prevent the piston from striking direct onto  
 100 the cover. The legs *o* are adjustable by means of the screwed ends thereof in the lugs or flange at the bottom of the cylinder, and by the nuts  
 105 for fixing them in position.

Instead of the arrangement shown at Figs. 7 and 7<sup>A</sup>, the apparatus may be attached to a  
 110 light frame, which may be laid, for instance, upon a millstone, the attachment being similar in form to a small compound sliding rest of a lathe, so that the apparatus may be made to move backward and forward and cut small  
 115 grooves at set but adjustable distances apart, as in the fine dressing of a millstone. Fig. 9 shows one such arrangement in side elevation, and Fig. 10 in plan. *a* is the bed for the slide-rest *b*, to which the cylinder A is fixed. C is a screw, and *d* a hand-wheel thereon for giving  
 120 the required feed after each traverse along the bed *a*.

In the modification shown in Fig. 8 compressed air is admitted at K, and by the port  
 125 *b'* enters the annular space *ee* and drives the tup B upward. When the tup has reached the upper part of the cylinder A the port *c'* reaches the port *a* and the air is exhausted from the space *ee*. At the same time the port *b* reaches the entrance of the air at K, and the air passes through *b* and enters the upper part of the  
 130 cylinder A, and acting on the top of the piston B drives it down, when it strikes the top of the tool D. The port *b'* is again open for the admission of air to the space *ee*, and the port *b* is open to *a'* for exhausting the air from the top  
 135 of the piston-tup B. The cycle of operations is repeated and the tup reciprocates in accordance with the quantity and pressure of air admitted at K, as controlled by a cock in a pipe

at K, as shown in Figs. 1 and 2. In Fig. 1 the cock L is shown with an ordinary taper plug; but other forms may be employed for regulating or stopping the entrance and withdrawal of air.

Another modification of the apparatus as it may be used for carving or chasing stone and other hard substances—such as metals and some kinds of wood—consists in dispensing with the handle J, or the projection to which it is fastened, and taking hold of the cylinder itself, which in this case would be small, in the same manner as a pencil or pen is held. This modification is shown at Fig. 11, which in other respects is of a construction similar to that shown at Fig. 5.

In all the arrangements shown the cutting-tool is made to fit in the lower part of the cylinder, or the cylinder-cover or tool-holder connected therewith, so that the tool may have its cutting-edge either in the direction of the length of the handle or transversely thereto, and instead of the cutting-tool a tool for calking or other purposes requiring repeated blows may be inserted in the holder.

In the Figs. 1, 2, 5, 6, 7<sup>A</sup>, and 8 one form of tool only is shown; but tools of other forms may be used to suit the different kinds of work which may be required to be done.

At V, Fig. 2, a union-nut is shown; but the flexible pipe M may be put direct onto the pipe K without intervention of this union.

In place of the cover cast with the upper part of the cylinder, as shown at Figs. 1, 2, 5, 7, and 7<sup>A</sup>, the cover as shown at Figs. 6 and 8 may be used in all cases.

We claim as our invention—

1. The combination, with the stone-dressing chisel and a holder in which the same is removably secured, of the cap-collar G upon the inner end of the tool-holder, the cylinder and its head through which the tool-holder passes,

an elastic collar, H, between the cap-collar G and the cylinder-head, the piston-tup B, within the cylinder A, and means for actuating the same by fluid-pressure, substantially as specified.

2. The combination, with the stone-dressing chisel and a holder in which the same is removably secured, of the cap-collar G upon the inner end of the tool-holder, the cylinder and its head through which the tool-holder passes, an elastic collar, H, between the cap-collar G and the cylinder-head, the handle J and rubber cap F, the piston-tup B, within the cylinder A, and means for actuating the same by fluid-pressure, substantially as specified.

3. The combination, with the stone-dressing chisel D and the holder to which it is removably attached, of the cylinder A, piston-tup B, and standard *o*, connected with the cylinder A, and means, substantially as specified, for operating the piston-tup B by fluid-pressure, substantially as set forth.

4. In an apparatus for dressing stone, the combination, with the cylinder A, handle J, and stone-dressing chisel D, of a piston-tup, B, containing fluid induction and exhaust passages, a cap-collar, G, elastic collar H, and rubber collar F, substantially as and for the purposes set forth.

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