

1,015,732.

A. G. GRICE.
PERCUSSIVE TOOL.
APPLICATION FILED OCT. 5, 1909.

Patented Jan. 23, 1912.

2 SHEETS—SHEET 1.

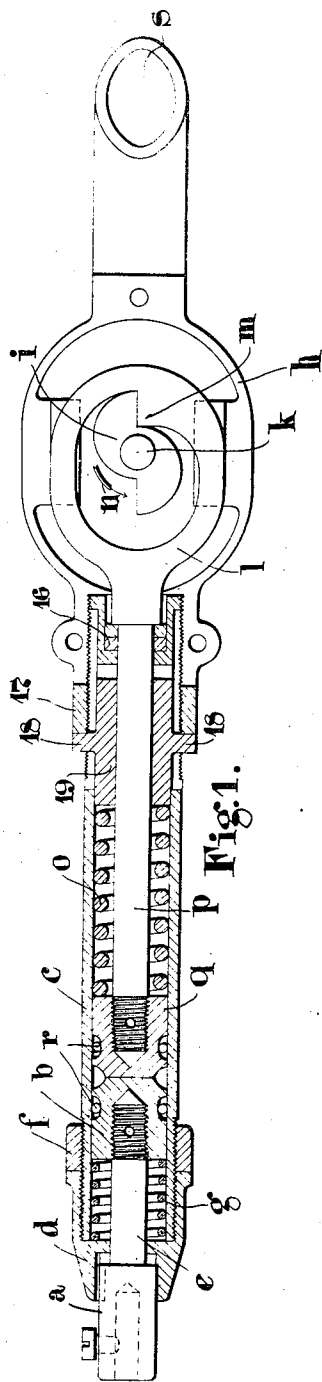


Fig. 1.

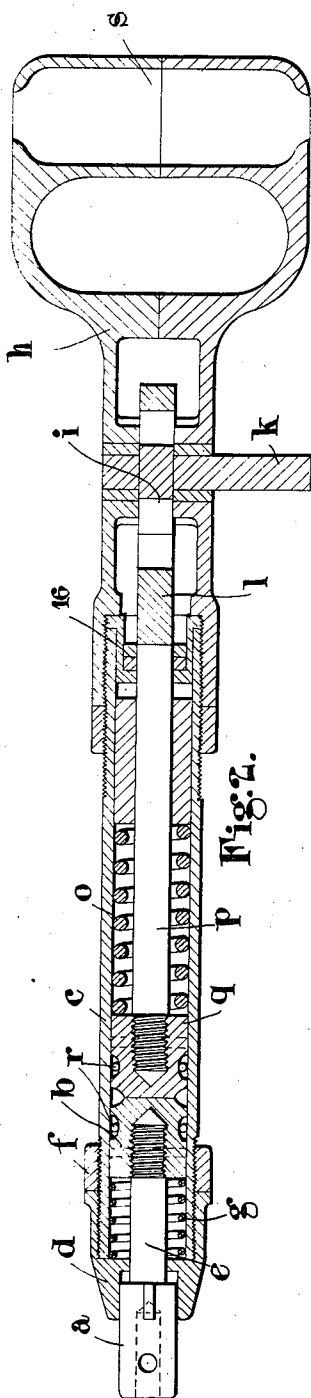


Fig. 2.

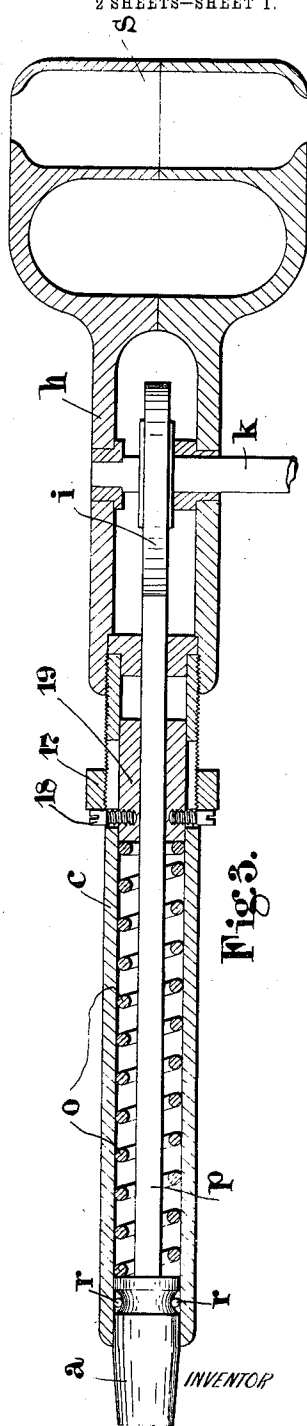


Fig. 3.

WITNESSES

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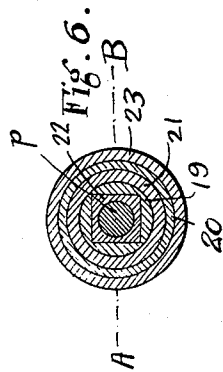
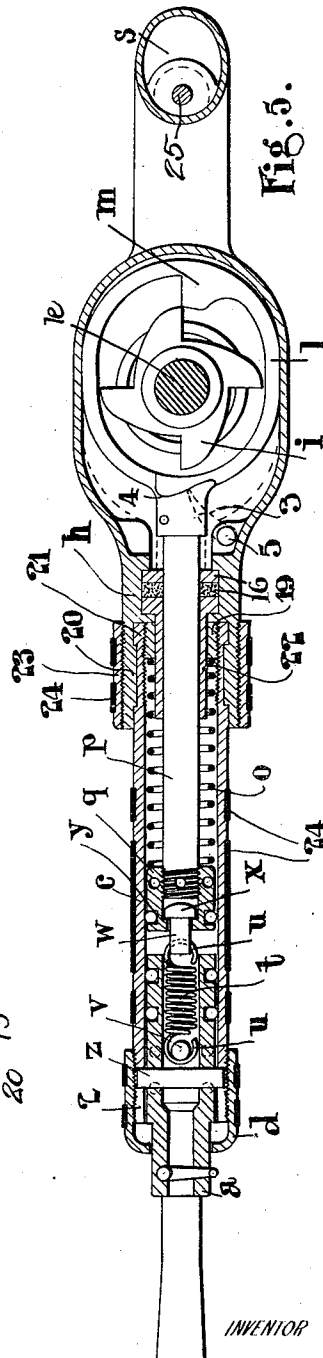
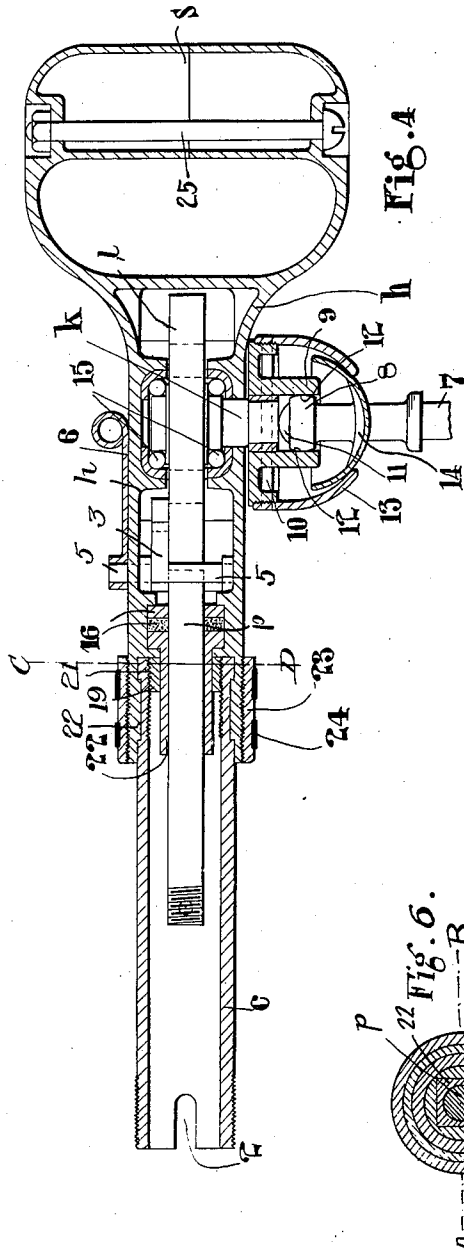
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UNITED STATES PATENT OFFICE.

ARTHUR GEORGE GRICE, OF CARNOUSTIE, SCOTLAND.

PERCUSSIVE TOOL.

1,015,732.

Specification of Letters Patent.

Patented Jan. 23, 1912.

Application filed October 5, 1909. Serial No. 521,137.

To all whom it may concern:

Be it known that I, ARTHUR GEORGE GRICE, a subject of the King of Great Britain and Ireland, and residing at Carnoustie, in the county of Forfar, Scotland, have invented certain new and useful Improvements in Percussive Tools, of which the following is a specification.

This invention relates to percussive tools, the object being to produce a tool of this type which is economical to manufacture and is simple and efficient in construction and action, and is particularly suitable for dressing stone although it may be used for other purposes.

The accompanying drawings illustrate several forms of percussive tool constructed according to the invention.

Figure 1 is a sectional plan, and Fig. 2 a sectional elevation illustrating one form of tool. Fig. 3 is a sectional elevation illustrating another form, while Figs. 4 and 5 are respectively a sectional elevation and sectional plan illustrating a further form, the latter being taken on the line A—B, Fig. 6, and the tool holder being omitted in Fig. 4 in order to illustrate certain details in its guide. Fig. 6 is a cross-sectional view taken on line C—D, Fig. 4.

In one form of the invention a tool holder *a* having a removable head *b* is adapted to slide in the end of a cylindrical guide *c*. The latter is provided with a socket *d* screwed upon its end and having a bore adapted to receive the neck *e* of the tool holder, the socket *d* being locked if desired by a screwed ring *f*. A spring *g* is interposed between the head *b* and the socket *d* for a purpose hereinafter referred to. The guide *c* is secured at the other end to a casing *h* which is made in two halves in order to facilitate the assembling of the mechanism contained within it, the two halves being held together by pins or screws in any convenient manner. Within the casing *h* is a rotary cam *i* which may have a single rise but is preferably provided with two rises as indicated in the drawings. The cam *i* is mounted upon or formed integrally with a spindle *k* which can be rapidly rotated in any convenient manner for instance by means of a flexible shaft. A ring-shaped member *l* surrounds the cam *i* and is provided with a projection *m* adapted to be engaged by the cam. The latter is rotated in a direction indicated by the arrow *n* and

the rises of the cam and the projection *m* are of such form that when the cam is rotated the member *l* is gradually moved in a direction away from the tool holder, but is then sharply released in order that the member *l* may be rapidly returned in a direction toward the tool holder by means of a spring. In the example shown this is effected by a spring *o* surrounding a rod *p* connected to the member *l* and fitted with a hammer *q* adapted to strike the head *b* of the tool holder. Leather washers *r* are provided to soften the impact of the member *l*. The spring *o*, may be adjusted by rotating a threaded ring *s* adapted to engage pins *t* on a bush *u*. The head *b* and the hammer *q* may be provided with anti-friction devices such as balls *v*. The casing *h* is preferably provided with a convenient handle *w*.

In operation a chisel or other tool is placed in the tool holder *a* and the handle *s* is grasped in the hand of the operator. The spindle *k* is rapidly rotated with the result that the cam *i* imparts a rapid vibratory motion to the hammer *q* which in turn imparts its force to the tool holder *a* and the chisel or other tool therein.

For some purposes it is desirable that the blow of the hammer upon the tool holder should be slightly cushioned, and it is for this purpose that the spring *g* is inserted between the head *b* of the tool holder and the socket *d*. It is to be understood, however, that this cushioning device may be omitted, and in one form of tool according to the invention the hammer *q* may also be omitted, the connecting rod *p* being directly connected to the tool holder *a* as indicated in Fig. 3, the action of this form of tool being similar to that first described, the only difference in construction and action being that the cushion is dispensed with and a chisel is directly vibrated by the cam.

In the preferred form of the invention as illustrated in Figs. 4 and 5 the hammer *q* acts upon the tool holder *a* in a similar manner to that described with reference to the form illustrated in Figs. 1 and 2, but a tension spring *t* is provided between the tool holder *a* and the hammer *q*. The spring may be conveniently formed with hooked ends *u* respectively engaging a pin *v* and a pin *w*, the latter having a head *x* engaging a shoulder *y* on the hammer *q*. The tool holder *a* is also provided with a cross pin *z*

adapted to slide in slots 2 in the end of the cylindrical casing *c*, this pin permitting longitudinal movement of the tool holder, but preventing rotation thereof.

- 5 The object of the spring *t* is to impart a certain degree of elasticity to the tool when the tool holder is struck by the hammer so as to avoid breakage of the stone or other material acted upon such as is liable to occur if the tool holder *a* is simply struck by the hammer and no provision is made to cushion this blow. This is of particular importance in the dressing of stone. While it is desirable to obtain this elasticity or to slightly cushion the blow it is also desirable that the device employed for this purpose should not lessen the effect of the hammer upon the tool when it first strikes the tool holder. By providing a spring such as *t* the hammer *q* is free to first strike the tool holder *a* without any impediment but after the latter has moved slightly in relation to its guide *c* and beyond the limit of outward movement of the hammer *q* the spring *t* is tensioned, thus cushioning the blow of the tool upon the stone or other material operated upon.

- The spring *o* is adjusted by rotating the guide *c* within the sleeve 20 of the casing *h*, so that its threaded end 21 causes a threaded bush 19 to move axially on a squared gland 22 clearly shown in Fig. 6. To enable the end of the guide *c* to be inserted in the sleeve 20, the latter as well as the casing *h* is formed in two parts, held together by the ring 23, and the bolt 25, and to facilitate turning the guide *c* and outer connecting ring 23 are provided with leather knurled or other surfaces 24. In the last example described the cam *i* is provided with four rises, but obviously the number of these rises may be varied as desired.

- In order that the operator may readily control the action of the tool a pawl 3 is adapted to be moved into and out of engagement with an inclined projection 4 on the member *l* in order that the latter may be moved backwardly so as to withdraw its projection *m* from engagement with the cam *i* when the tool is not required to operate. The pawl 3 is conveniently mounted upon a spindle 5 fitted with a lever 6 conveniently arranged for manipulation by the operator.

- The cam spindle *k* may be rotated by a flexible shaft 7 terminating in a head 8 of square or other angular section fitting within a correspondingly recessed socket 9 secured by a pin 10 to the spindle *k*. The head 8 is provided with a rounded projection 11 adapted to bear against the end of the spindle *k* and the head is also rounded as indicated at 12 in order that it may be moved into various positions in relation to the axis of the spindle *k* and yet efficiently drive the latter. This arrangement permits

of adjustment of the shaft in relation to the spindle in one plane while the pin 10 permits of oscillation or adjustment in another plane at right angles thereto. Hemispherical covers 13, 14, are preferably fitted upon the socket 9 and the shaft 7 respectively. The spindle *k* is preferably mounted in ball bearings 15.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A percussive tool comprising in combination, a reciprocating tool holder, a guide therefor, a casing secured thereto, a rotary cam within said casing, a member in engagement therewith said cam being adapted to intermittently move the member in a direction away from the tool holder and then to release it suddenly, a spring for returning said member in a direction toward the tool holder, a hammer connected to said member and adapted on the return movement of the latter to strike the tool holder and a tension spring secured to the tool holder and to the hammer, substantially as and for the purpose hereinbefore set forth.

2. A percussive tool comprising in combination, a reciprocating tool holder, a cylindrical guide therefor, a casing secured to said guide and having a handle, a cam within said casing having a plurality of rises, a spindle for said cam, a ring-shaped member surrounding said cam and having a projection adapted to be engaged thereby, a hammer, a rod connecting said hammer and the aforesaid member, a return spring for said hammer and a tension spring connecting said hammer and the aforesaid tool holder, substantially as and for the purpose hereinbefore set forth.

3. A percussive tool comprising in combination, a reciprocating tool holder, a cylindrical guide therefor, a casing secured to said guide and having a handle, a cam within said casing having a plurality of rises, a spindle for said cam, ball bearings for said spindle, a ring-shaped member surrounding said cam and having a projection adapted to be engaged thereby, a hammer within the aforesaid guide, anti-friction devices upon the aforesaid tool holder and upon the hammer, a rod connecting the hammer and the aforesaid member, a return spring surrounding said rod, a tension spring connecting the hammer and the tool holder and means for preventing rotation of the tool holder, substantially as and for the purposes hereinbefore set forth.

4. A percussive tool comprising in combination, a reciprocating tool holder, a cylindrical guide therefor, a casing secured to said guide and having a handle, a cam within said casing having a plurality of rises, a spindle for said cam, a ring-shaped member surrounding said cam and having a

projection adapted to be engaged thereby, a hammer, a rod connecting said hammer and the aforesaid member, a return spring surrounding said rod, a tension spring connecting said hammer and the aforesaid tool holder, a pawl adapted to engage the aforesaid member and a lever for enabling the operator to oscillate said pawl for the purpose of temporarily disengaging said member from the cam, substantially as hereinbefore set forth.

5. A percussive tool comprising in combination, a reciprocating tool holder, a cylindrical guide therefor, a casing secured to said guide and having a handle, a cam within said casing having a plurality of rises, a spindle for said cam, a ring shaped member surrounding said cam and having a pro-

jection adapted to be engaged thereby, a hammer, a rod connecting said hammer 20 and the aforesaid member, a return spring surrounding said rod, means for adjusting said return spring, a tension spring connecting said hammer and the aforesaid tool holder, a pawl adapted to engage the aforesaid member and a lever for enabling the operator to oscillate said pawl for the purpose of temporarily disengaging said member from the cam, substantially as hereinbefore set forth. 25 30

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

ARTHUR GEORGE GRICE.

Witnesses:

R. WESTACOTT,

P. A. OUTHWAITE.