Sept. 4, 1923. 1,467,262

P. BARKER

PNEUMATICALLY OPERATED CUTTING TOOL

Filed May 16, 1922

Fig. 1.

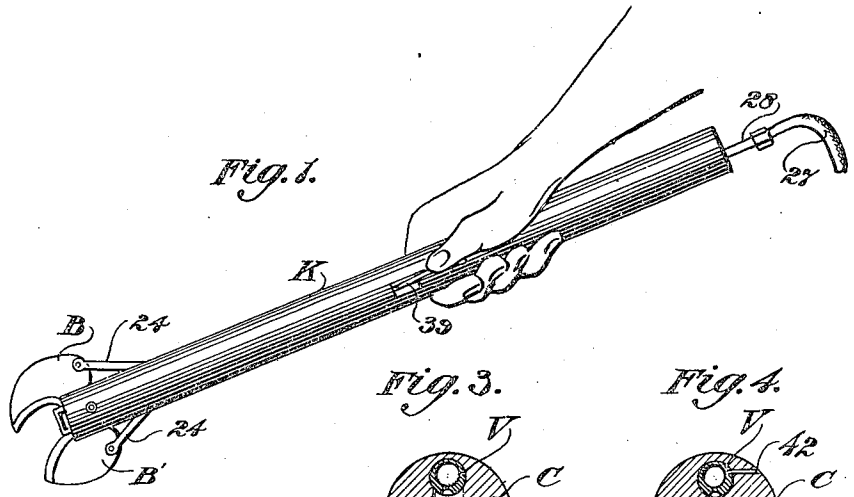


Fig. 3.

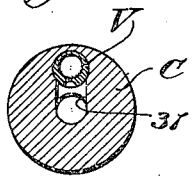


Fig. 4.

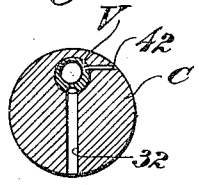


Fig. 2.

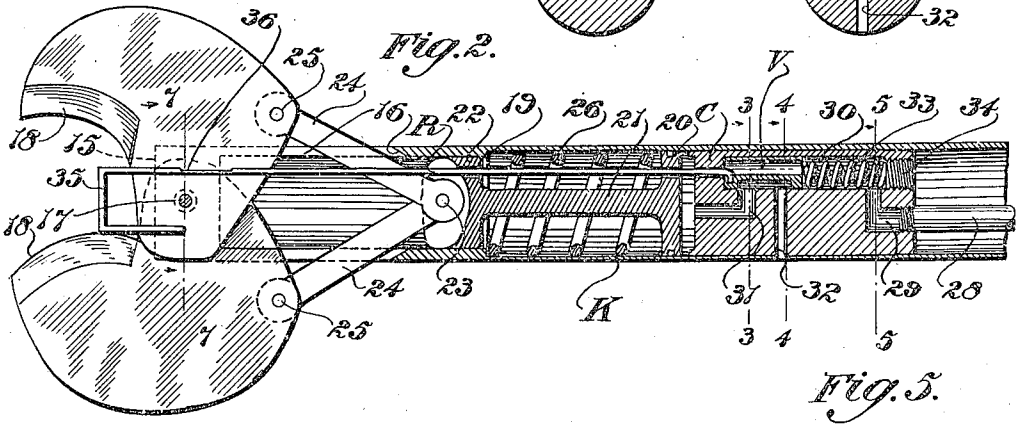


Fig. 5.

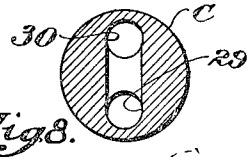


Fig. 6.

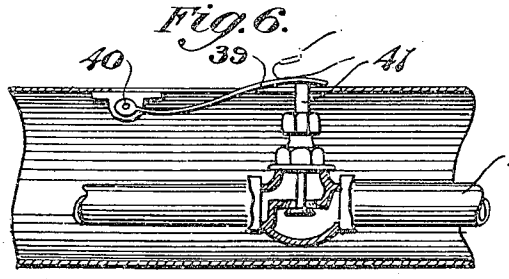


Fig. 8.

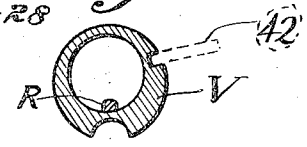
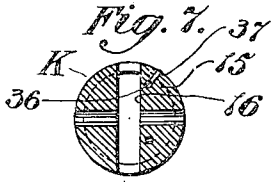


Fig. 7.



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by Hazard and Miller
Attys.

Patented Sept. 4, 1923. 1,467,262

UNITED STATES PATENT OFFICE.

PHILIP BARKER, OF KOHALA, TERRITORY OF HAWAII.

PNEUMATICALLY-OPERATED CUTTING TOOL.

Application filed May 16, 1922. Serial No. 561,273.

To all whom it may concern:

Be it known that I, PHILIP BARKER, a British subject, residing at Kohala, Territory of Hawaii, have invented new and useful Improvements in Pneumatically-Operated Cutting Tools, of which the following is a specification.

My invention relates generally to cutting tools which are pneumatically operated, and more particularly to tools for cutting sugar cane and the like.

A purpose of my invention is the provision of a pneumatically operated cutting tool of extremely simple, durable, and efficient construction, and which operates to effect movement of the cutting blades only when the material to be cut is in cutting position between the blades. Furthermore, my invention provides a tool in which the supply of air to the tool can be controlled independently of the means for actuating the blades when the material to be cut is in cutting position between the blades.

I will describe one form of cutting tool embodying my invention and will then point out the novel features thereof in claims.

In the accompanying drawings,

Figure 1 is a view showing in perspective one form of cutting tool embodying my invention.

Figure 2 is a longitudinal sectional view of the tool shown in Figure 1.

Figures 3, 4 and 5 are transverse sectional views taken on the lines 3—3, 4—4 and 5—5, respectively, of Figure 2 with the casing omitted.

Figure 6 is a fragmentary view partly in section showing the manually controlled means for supplying air to the tube.

Figure 7 is a vertical sectional view taken on the line 7—7 of Figure 2.

Fig. 8 is a transverse section through the valve V which is shown as demounted from its casing.

Similar reference characters refer to similar parts in each of the several views.

Referring specifically to the drawings my invention in its present embodiment comprises a tubular casing designated at K and having one end formed with a head 15, such head and the minor portion of the casing being slotted as indicated at 16 for the accommodation of blades B and B′ pivotally mounted upon a bolt or rivet 17 extending through the head in the manner clearly shown in Figure 2. The blades B and B′ are provided with cutting edges 18, one of the cutting edges being of convex form while the other is of concave form, and adapted when in cutting position to lie in over-lapped relation to each other, as will be understood. A casting C is secured within the casing K, and between this casting and a shoulder 19 formed interiorly of the casing, is interposed a piston 20 provided with a rod 21 on the free end of which is formed a crosshead 22. A pivot pin 23 extends through the crosshead 22 and serves to pivotally connect the ends of a pair of links 24. The opposite ends of the links 24 are pivotally connected as at 25 to the blades B and B′, the links thus serving to effect movement of the blades to cutting or non-cutting positions according as the piston 20 is moved to one extreme position or the other within the casing K. The piston 20 is normally urged to its rearward extreme position by means of a coiled expansible frame 26 surrounding the rod 21 and interposed between the piston 20 and the shoulder 19.

The piston 20 is adapted to be moved to its forward extreme position and against the action of the spring 26 by means of compressed air or other suitable fluid which is interposed into the casing through a flexible pipe 27 connected to a short section of rigid pipe 28 extending into the rear end of the casing as is clearly shown in Fig. 2. The inner end of the pipe 28 is threadedly connected to the casting C and communicates with an L-shaped duct 29 formed in the casting and in turn communicating with a valve chamber 30 also formed in the casting. The valve of the chamber 20 is adapted to communicate with that portion of the casing K upon which the piston 20 is mounted through a duct 31. The passage of air from the duct 29 to the duct 31 is controlled by a valve V having a central bore and recessed lower side as clearly shown in Figures 3 and 4, and slidably fitted within the chamber 30 to close or open the duct 31 according as it occupies one extreme position or the other. To prevent rotation of the valve a pin 42 is arranged within the casting so as to engage the valve in the manner clearly shown in Figure 4. In its forward extreme position as shown in Figure 2, the lower recess of the valve serves to effect

communication between the duct 31 and an exhaust port 32 thereby allowing the exhaust of air in the rear of the piston 20. The valve is normally urged to this position by means of a coiled expansible spring 33 arranged within the chamber 30 and insertable therein through an opening normally closed by a screw plug 34. In the other extreme position of the valve V, which is between the port 32 and the duct 29, the bore of the valve allows the passage of air from the duct 29 through the chamber 30 and into the duct 31. From the latter the air impinges upon the piston 20 to force the latter forwardly against the tension of the spring 26, thereby actuating the links 24 to swing the blades B and B' to cutting position.

To provide means for admitting air to the piston 20 when the tool is in active engagement with the material to be cut, such as a stalk of sugar cane, I provide a valve actuating rod R. As shown in Figure 2, this rod is slidably fitted in suitable openings formed in the head 15, crosshead 22, piston 20, casting C, with its rear end fixedly secured to the valve V so that when moved longitudinally the rod will effect a corresponding movement of the valve. The forward end of the rod is provided with an L shaped extension 35, the parallel portion of which is slidably fitted within the head 15. This extension 35 provides a surface against which the stalk of sugar cane or other material to be cut is adapted to repose so that when the tool is moved forwardly against the stalk, rearward movement of the rod is effected in moving the valve V to open position. To prevent accidental displacement of the rod from the casing, a portion designated at 36 is flattened, and engaging this flattened portion is a pin 37 mounted in the head 15 and cooperating with the latter to limit the longitudinal movement of the rod.

As a precaution should the tool fail to operate as intended, and to control the supply of air to the chamber 30, I interpose in the pipe 28 a valve 38 which is normally closed under the action of the air but which is adapted to be held in open position by the operator pressing downwardly on a lever 39 pivoted at 40 and engaging the stem 41 of the valve. The valve 39 extends through a suitable slot formed in the casing K and is adapted to be readily pressed by the operator while manipulating the tool so as to allow the supply of air to the casting C. It will be clear that as soon as pressure upon the lever is removed, the valve will automatically move to closed position, thus discontinuing the supply of air to the casting.

Although I have herein shown and described only one form of cutting tool embodying my invention, it is to be understood that various changes and modifications may be made herein without departing from the spirit of the invention and the spirit and scope of the appended claims.

What I claim is:

1. A cutting tool of the character described comprising a pair of cutting blades mounted to occupy cutting and non-cutting positions, means for urging the blades to non-cutting position, fluid operated means for moving the blades to cutting position, a valve for controlling the last means, and a push rod operatively connected to the valve and having a bar arranged adjacent the blades to be engaged by the material to be cut for moving the valve to open position.

2. A cutting tool of the character described comprising a pair of blades mounted to occupy cutting and non-cutting positions, a piston operatively connected to the blades for moving the latter to either of their positions, a spring normally urging the piston to a position in which the blades are in non-cutting position, means for supplying fluid to the piston to effect operation of the latter against the action of said spring to move the blades to cutting position, and means disposed between the blades for starting the valve.

3. A cutting tool of the character described comprising a pair of blades mounted to occupy cutting and non-cutting positions, a piston operatively connected to the blades for moving the latter to either of their positions, a spring normally urging the piston to a position in which the blades are in non-cutting position, a valve for controlling the supply of fluid to the piston to effect actuation of the latter against the action of said spring, and means independent of the blades and adapted for engagement with the material to be cut for moving the valve to open position to allow the supply of air to said piston.

4. A cutting tool of the character described comprising a casing slotted at one end, blades mounted for swinging movement within said slot, a piston movable within the casing, links operatively connecting the piston with said blades, a spring for urging the piston to one extreme position, a casting within the casing having ducts formed therein, a valve chamber communicating with the ducts, means for supplying air under pressure through one of the ducts and to said chamber, a valve movable within the chamber to control all of said ducts, a spring for normally urging the valve to one extreme position, and a rod connected to the valve and having one end thereof disposed adjacent the blades for the purpose described.

In testimony whereof I have signed my name to this specification.

PHILIP BARKER.