

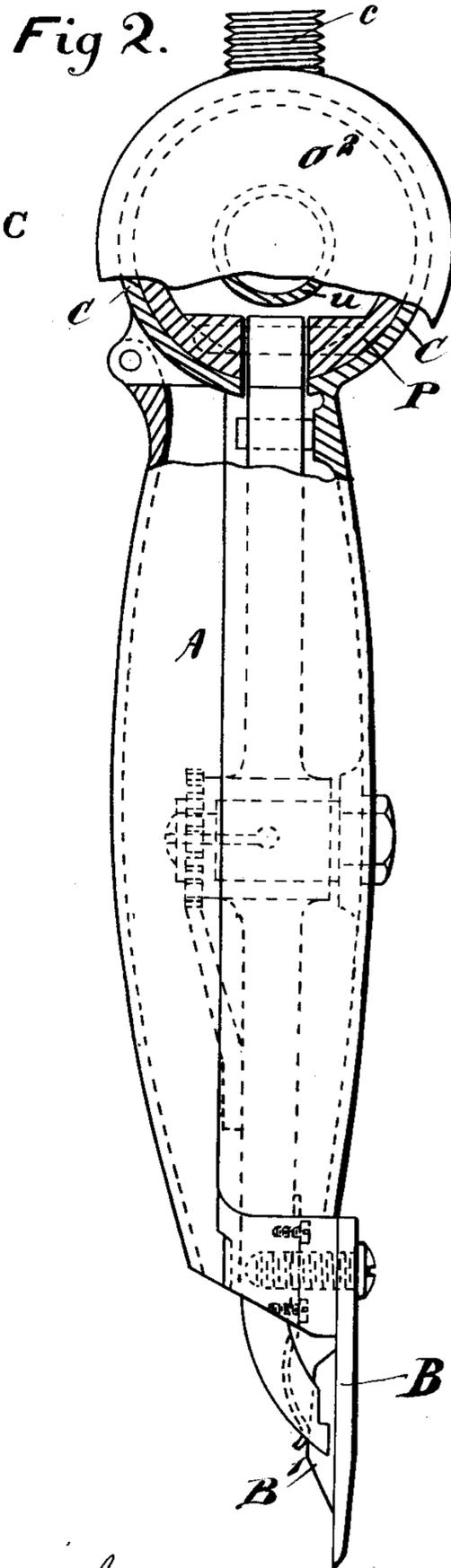
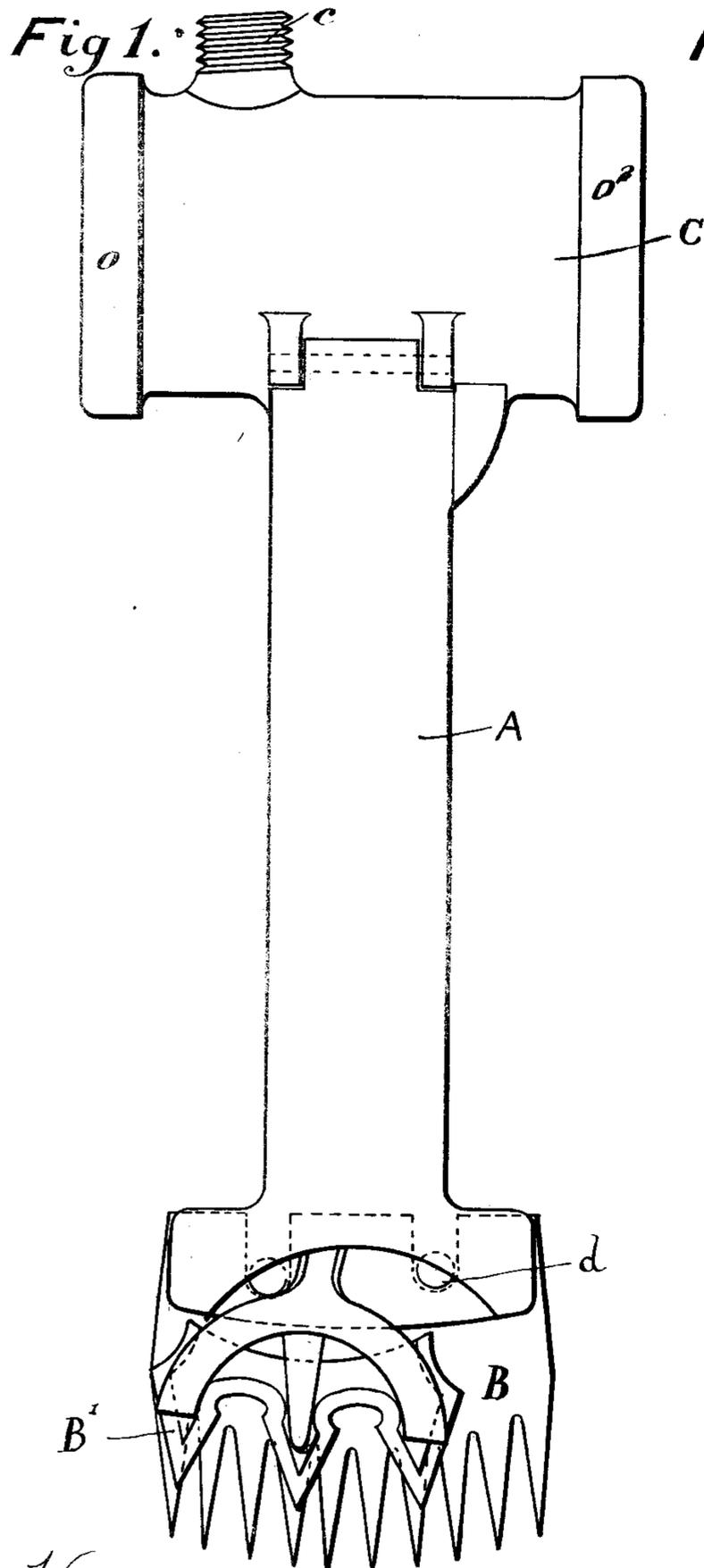
(No Model.)

2 Sheets—Sheet 1.

J. FLETCHER & F. & H. HUGGINS.
COMPRESSED AIR ENGINE FOR ANIMAL SHEARS.

No. 547,718.

Patented Oct. 8, 1895.



Witnesses
James Miller
Albert Edward Allen

Inventors
Joseph Fletcher, Henry Huggins and Frederick Huggins.
by George Henry Rayner.
their Attorney.

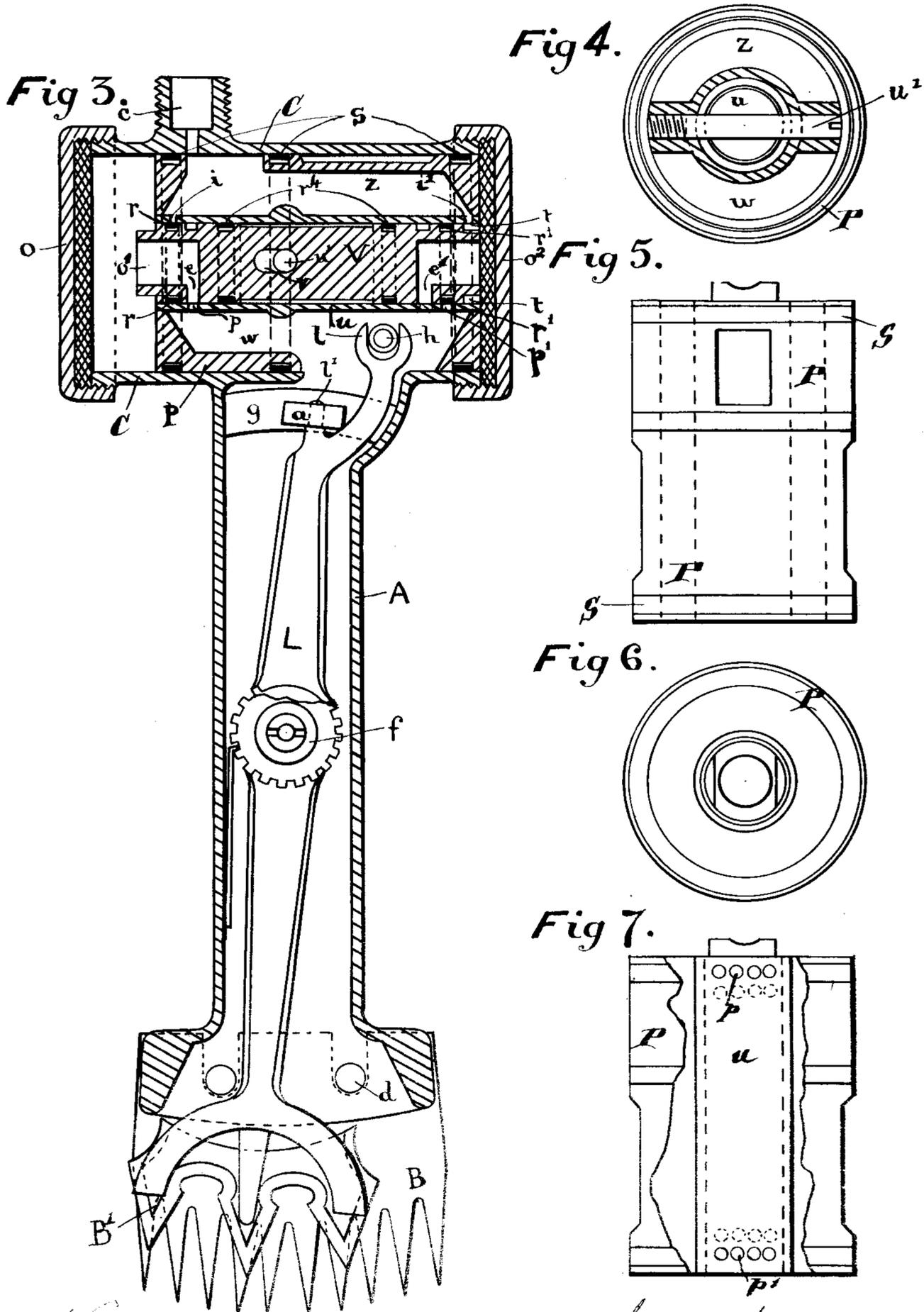
(No Model.)

2 Sheets—Sheet 2.

J. FLETCHER & F. & H. HUGGINS.
COMPRESSED AIR ENGINE FOR ANIMAL SHEARS.

No. 547,718.

Patented Oct. 8, 1895.



Witnesses
James Miller
Albert Edward Ellis

Inventors
Joseph Fletcher, Henry Huggins & Frederick Huggins
by George Henry Rayner
their attorney

UNITED STATES PATENT OFFICE.

JOSEPH FLETCHER, FREDERICK HUGGINS, AND HENRY HUGGINS, OF
BIRMINGHAM, ENGLAND.

COMPRESSED-AIR ENGINE FOR ANIMAL-SHEARS.

SPECIFICATION forming part of Letters Patent No. 547,718, dated October 8, 1895.

Application filed October 17, 1892. Serial No. 449,174. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH FLETCHER, engineer, of 111 Dolobran Road, Sparkbrook, Birmingham, and FREDERICK HUGGINS and HENRY HUGGINS, tube manufacturers, of the Britannia Tube Works, Glover Street, Birmingham, England, subjects of the Queen of Great Britain and Ireland, have invented an Improved Compressed-Air Engine for Working Shears and other Like Purposes, of which the following is a specification.

Our invention has for its object the adaptation of a compressed-air engine of improved construction to the working of shears, which has hitherto been effected by hand.

Our improved power-shears may be used for shearing cattle, sheep, horses, and other animals, and is also applicable for cutting the human hair. The motive power we prefer to use is compressed air, which may be obtained in various manners, but is preferably compressed in steel bottles for convenience of transport, these bottles being provided with a reducing-valve, so as to allow of the air being supplied to the engine at the required pressure. We may also use in the same engine hot air or steam as a motive power. In carrying our invention into practice we provide a T-shaped shell or casing consisting of a cylinder arranged horizontally on the top of a vertical tubular frame, terminated by a horizontal extension, within which the movable cutting-blade of the shears works upon a fixed blade attached at the back of the said extension, and provided, as usual, with long narrow teeth at its lower extremity, this movable blade being attached to the lower end of a lever fulcrumed on a suitable pivot within the tubular frame aforesaid, the upper end of which is forked and extends within the piston through an opening formed in the latter and in the cylinder. This forked end engages with a roller mounted on an axis fixed to the said piston.

In the cylinder or upper part of our improved power-shears the two solid ends or covers are screwed upon the edges of the body, a resilient packing, forming a joint and cushion combined, being interposed therebetween. Within the cylinder moves a piston of peculiar shape and hollow centrally to receive a

plunger-valve, furnished with suitable inlet and exhaust ports and corresponding packing-rings for closing or disclosing the ports formed in the piston and having a stroke limited by a pin passing through a slot formed through the plunger-valve and piston. The cylinder is provided at its upper part with a screw-threaded neck or inlet, whereby it may be connected by a suitable pipe to the reservoir containing the compressed air.

In the accompanying drawings, Figure 1 is an elevation of our improved power-shears. Fig. 2 is an end view, and Fig. 3 a vertical section, of the same. Fig. 4 is a central cross-section of the piston, and Figs. 5, 6, and 7 are detailed views of the same.

Our improved power-shears consist of a horizontal cylinder C, forming an integral part of a tubular frame A and mounted on the top of the latter, the lower extremity of which is enlarged, as shown, and forms a casing wherein moves the movable blade B' as it works upon the fixed blade B, secured at the back of the enlarged part of the frame A and furnished at its lower end with long pointed teeth, as clearly shown in Figs. 1 and 3. The blade B' forms the lower end of the lever L, fulcrumed at *f* upon an axis secured to the tubular frame A. The upper end *l* of this lever is forked to engage with the roller *h*, mounted on a pin secured to the piston P. The lever L is further provided with a projection *l'*, forming an axis for the roller *a*, which moves upon a curved path *g*, extending across the tubular frame A, Fig. 3.

The cylinder C, forming the upper part of our improved power-shears, is screw-threaded at each end to receive the covers *o o'*, inside of which is arranged a packing of leather, india-rubber, or other flexible material, so as to form a cushion at each end of the cylinder, for the purpose hereinafter set forth. The cylinder C has a screw-threaded neck or inlet *c*, whereby it may be connected to any suitable supply of compressed air. Within the cylinder C moves the piston P, tightened by the packing-rings *s* and having a central cylindrical opening *u*, Fig. 4, wherein the plunger-valve V is located, and is allowed a travel limited by the pin *u'*, extending across the piston through the slot *v*, formed in the

center of the said valve. The piston is divided into two chambers, an air-chamber *z* at the top communicating with the inlet *c* and an exhaust-chamber *w* at the bottom communicating with the tubular frame A, and hence with the atmosphere. The plunger-valve V is provided with admission-ports *i* and *i'* and with exhaust-ports *e e'*, the latter being placed in communication with the exhaust-chamber *w* through the ports *p p'*, formed in the inner tubular part of the piston P, these last ports being successively closed by the packing-rings *r r'* of the valve V, which also close successively the admission-ports *i i'* above mentioned. *r¹* are ordinary packing-rings used for tightening purposes. The piston occupying the position shown in Fig. 3 and the neck or inlet *c* being connected to the supply of compressed air, air will enter the chamber *z*, pass through the port *i'*, and enter the annular opening formed at *t* between the reduced end of the plunger-valve V and the inner cylindrical surface of the piston P, thus passing under the same and impelling it on its forward stroke until it reaches the end of the cylinder; but before this occurs the end *o'* of the valve *v* abuts against the cushion in front of the cover *o* and admits air, forming an air-cushion to the air-chamber, and is pushed back thereby a distance determined by the travel of the slot *v* against the pin *u'*, thus disclosing the admission-port *i* and closing the port *i'* by means of the ring *r²*, while at the same time opening a communication between the exhaust-ports *e' and p'*, allowing the exhaust-air to escape into the atmosphere. A reversal of the above-mentioned cycle of operations will take place during the backward stroke, the port *i* being closed by the ring *r²* and the exhaust *e* placed in communication with the port *p*, while the port *i'* is opened and the exhaust-port *p'* is closed by the ring *r¹*.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In power shears the combination with a cylinder fitted on the upper end of the shears, a hollow piston in the said cylinder divided into pressure and exhaust chambers at opposite sides, and provided with admission and exhaust ports, and a central passage, of a plunger valve in the said passage with ports corresponding to those of the piston, and lim-

ited in its motion in the passage by a pin and slot, the valve being a little longer than the piston, and reversed by abutting against the ends of the cylinder at the termination of each stroke, substantially as set forth.

2. In power shears the combination with a cylinder on the end of the shears, and a hollow piston, divided into pressure and exhaust chambers at opposite sides, having admission and exhaust ports, and a central passage, of a plunger valve with reduced ends in the said passage projecting at the end from the face of the piston, admission and exhaust ports in the valve communicating at the side with the ports of the piston, and opening through the ends of the valve to both ends of the cylinder, and a slot in the center of the plunger through which a pin fixed to the piston passes, the valve being reversed at the end of each stroke by abutting against the end of the cylinder, substantially as and for the purposes specified.

3. In power shears the combination of a tubular case having a fixed blade at the end, an oscillating blade pivoted within the said case, having its upper end forked, and a small friction roller supporting the upper end of the said blade, and moving on a curved path with a cylinder on the upper end of said case, a hollow piston provided with admission and exhaust ports, a pin engaging with the forked end of the oscillating blade, and a central passage and a plunger valve in the said passage having ports which can register with those of the piston, limited in its motion by a pin and slot substantially as described and shown, and for the purposes specified.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

Signed at London, this 25th day of April, 1892, by JOSEPH FLETCHER.

JOSEPH FLETCHER.

In presence of—

JAMES MILLER,
ALBERT EDWARD ELLEN.

Signed at Birmingham, this 25th day of April, 1892, by FREDERICK HUGGINS and HENRY HUGGINS.

FREDERICK HUGGINS.
HENRY HUGGINS.

In presence of—

WILLIAM H. BARACLOUGH,
EDGAR A. PHILLIPS.