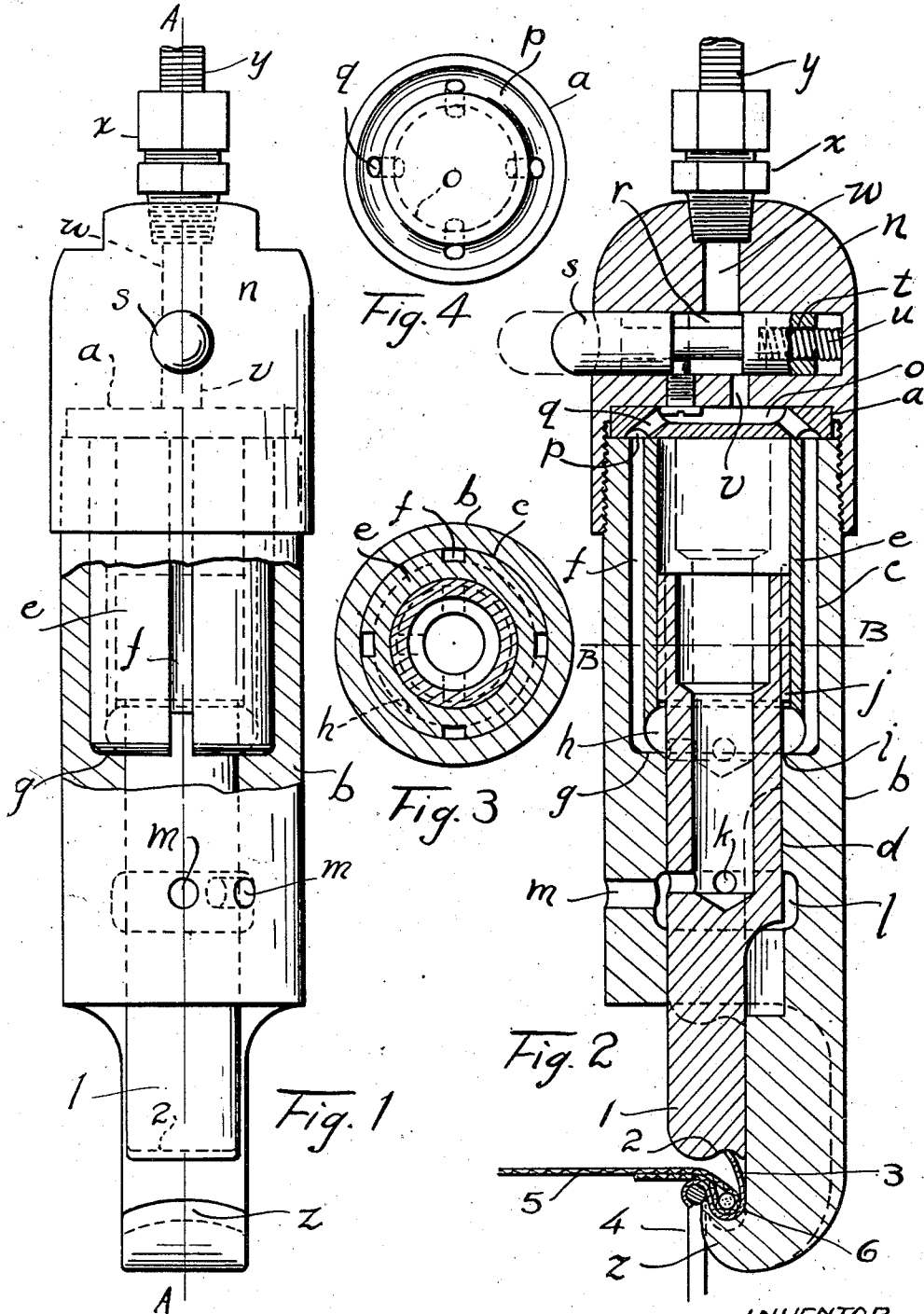


M. B. FETCHER
PNEUMATIC TOOL.
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1,258,206.

Patented Mar. 5, 1918.



INVENTOR
Martin B. Fletcher
BY Raymond A. Parker
ATTORNEY

UNITED STATES PATENT OFFICE.

MARTIN B. FETTER, OF DETROIT, MICHIGAN, ASSIGNOR TO LEONARD A. YOUNG, OF HIGHLAND PARK, MICHIGAN.

PNEUMATIC TOOL.

1,258,206.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MARTIN B. FETTER, citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Pneumatic Tools, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to a pneumatic tool for pinching together the flanges of a channel strip. It has in view the clamping of the flanges of a channel border strip used on a spring cushion for automobile seats. One of such border strips as can be advantageously operated upon by this tool is shown in the patent to Leonard A. Young, #1,058,285. These border strips for seat cushion springs are provided with one or more channels. One channel may be used to clamp the bottom coils of the helical springs and one channel may be used to clamp the bottom edge of the upholstering skirt fitted over the spring cushion. Heretofore this work has been done by the use of a pair of pliers operated wholly by hand, and it has been extremely slow and tiresome work.

The tool of this application is intended to do the work of the hand pliers in a much more expeditious and satisfactory way.

In the drawings,—

Figure 1 is an elevation of the tool partly broken away.

Fig. 2 is a longitudinal section taken on the line A—A of Fig. 1.

Fig. 3 is a cross section taken on the line B—B of Fig. 2.

Fig. 4 is an elevation of the disk designated *a* in Fig. 2.

The tool comprises a cylinder *b* having a chamber *c* of large diameter and a chamber *d* of small diameter. Into the chamber of larger diameter a bushing *e* having four longitudinally-extended grooves *f* is closely fitted. This bushing fits against the shoulder *g* formed between the two chambers of the cylinder and at this end of the bushing the grooves in the periphery of the bushing communicate with the interior of the chamber by reason of merging into the interiorly cut annular groove *h* in the inside at the end of the bushing.

The end of the bushing does not quite fill up the shoulder *g* and consequently leaves a ledge *i* which serves as a stop for the head *j* of the piston, which as seen in the drawings, is constructed of two diameters, one portion to fit in substantially air-tight relation within the bushing *e* and the other to fit in substantially air-tight relation within the chamber of smaller diameter *d*. This piston is provided with a hollow interior closed at its outer end. Near the closed end of the hollow interior one, or more ports *k* connect with the interior of the piston. In the outer position of the piston shown in Fig. 2, these ports open into the annular chamber *l* which is an enlargement of the chamber *d* near the outer end of the cylinder, and this annular chamber *l* communicates with the atmosphere through the ports *m*.

At the inner end of the cylinder *b* the air distributing disk *a* is held in place by the cap *n* that screws over this inner end of the cylinder as shown in Fig. 2. This air distributing disk is recessed as at *o* on the outside, and is provided with an annular groove *p* on the inside. The passage-ways *q* lead from the recess *o* to the annular groove *p*, and this annular groove is located over the ends of the longitudinal grooves *f* of the bushing *e*.

The cap *n* is provided with an opening *r* extending from one side transversely and diametrically almost but not clear through the opposite side of the cap, which at its top is constructed of solid material. This cylindrical opening forms a valve chamber in which reciprocates the air-control valve *s* in the form of a cylinder of considerably reduced diameter at its mid portion. The inner end of this cylinder is provided with a recess *t* in which engages the coil spring *u* which abuts against the end of

the valve chamber and the end of the recess in the end of the valve. This spring normally tends to keep the valve projected and closed as shown by the dotted lines in Fig.

2. In this projected position the inner end of the valve covers a port *v* leading from the valve chamber to the inside of the cap and communicating with the recess *o* in the distributing disk. It also closes the passage-way *w* leading axially from the outer end of the cap into the valve chamber. The outer end of this passage-way *w* has a tapered thread into which screws the nipple *x* connecting with the air line *y*.

An extension of the outer end of the cylinder *b* forms a hook-like anvil *z* nicely calculated to fit around the outside of the channel. An extension of the piston forms an impact member 1 having a grooved impact face 2 adapted to catch and turn over the edge of the flange as shown in Fig. 2.

The work is shown in section in this figure. 3 designates a double channel strip or what is usually called an S strip now quite largely used as the border strip of an automobile seat cushion. This strip extends entirely around the bottom of the cushion. The manufacturer of the springs secures the helical springs which form the main supporting springs of the cushion to this border strip by means of pinching the inside-facing channel over the lower coils 4 of the helical springs. As already alluded to, this pinching has universally been done heretofore by the use of a pair of pliers. With my pneumatically operated tool, this operation can now be very much more rapidly done by the tool. The spring is shipped to the automobile manufacturer or trimmer with the outward-facing channel left open to receive the lower edge of the upholstering skirt 5. The upholstering has heretofore been placed upon the top of the springs and the upholstering skirt draped down over the sides of the spring and the lower corded edge 6 pinched into this open channel of the border strip by using a pair of pliers operated manually by the trimmer. This work may now be done with my tool by hooking the anvil over the back of the channel and allowing the impact member to strike and turn over the flange as shown in Fig. 2. This showing suffices to show how the inward-facing channel can be pinched over the lower coils of the helical springs, although perhaps for this work a slightly differently-shaped hook on the anvil could be used to accord with the slightly different shape of the channel, or in practice it might be found more convenient to hook the anvil over the outside flange of the channel and do the pinching by driving the inside flange and the spring against the outside flange.

With the anvil hooked over the upholstering channel the same may be easily slid along the channel, pinching down the entire channel as fast as the tool can be slid along the channel, for the piston will reciprocate a great many thousand times in a minute.

The operation of the tool is effected by pushing in the valve *s* which brings the reduced portion of the valve in the position shown in the full lines of Fig. 2, allowing the air passage-way *w* to communicate with the air port *v*, the air passing thence into the recess *o* of the distributing disk through the passage-ways *q* into the annular groove *p*, whence it is distributed through the longitudinal slots *f* of the bushing, passing out into the annular groove *h* in the inner inside end of the bushing. Here the compressed air strikes the shoulder on the piston head and lifts the piston from the position shown in the full lines of Fig. 2 to the position shown in the dotted lines. When the port *k* comes above the shoulder *i*, the air rushes into the hollow interior of the piston, immediately arrests its inward movement and thrusts it outward with great force by reason of the pressure area on the inside of the piston and on the inner end greatly exceeding the pressure area on the shoulder tending to thrust it inward. After the port *k* passes outward beyond the shoulder *i*, the air supply is, of course, cut off but the air continues to expand and drive the piston outward until the ports *k* reach the annular groove *l*, whereupon the air behind the piston is exhausted into the atmosphere through the passage-ways *m*. The pressure on the shoulder on the head of the piston then immediately causes the piston to drive inwardly again. These operations are repeated with great rapidity so that the impact member reciprocates a great many thousand times a minute.

What I claim is:

1. A pneumatic tool for closing channel strip, comprising a portable cylinder having an arm extended therefrom provided with a hooked portion, and a reciprocable piston in the cylinder provided with an impact member connected to move with the piston whereby the hooked portion may be moved longitudinally on one side of the channel strip and the reciprocating impact member on the other side to close the channel strip.

2. The method of closing the channel strip of a seat cushion for securing upholstering in place, comprising striking the channel strip on one side a multiplicity of sharp blows with a thrusting and retracting impact member at the relatively great speed attainable with a pneumatic tool, opposing the blows by an anvil on the opposite side

of the strip and relatively moving the impact member and anvil together longitudinally with respect to the channel strip.

3. The method of closing the channel strip of a seat cushion to secure upholstering in place, comprising striking the channel with an impact member reciprocating at the relatively great speed attainable with a

pneumatic tool and sliding the reciprocating impact member together with an opposed anvil on the opposite side of the channel longitudinally relative to the channel.

In testimony whereof, I sign this specification.

MARTIN B. FETCHER.