

Sept. 8, 1925.

1,553,261

C. OVERLY

PNEUMATIC TOOL

Filed Jan. 29, 1921

2 Sheets-Sheet 1

FIG. 1.

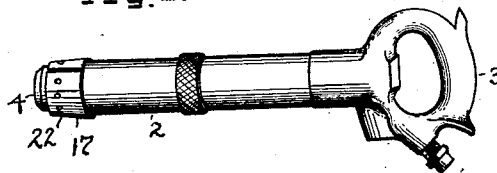


FIG. 2.

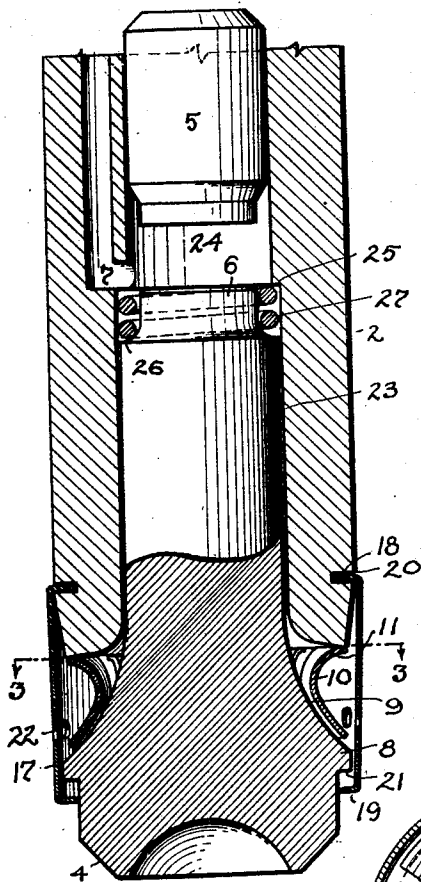


FIG. 4.

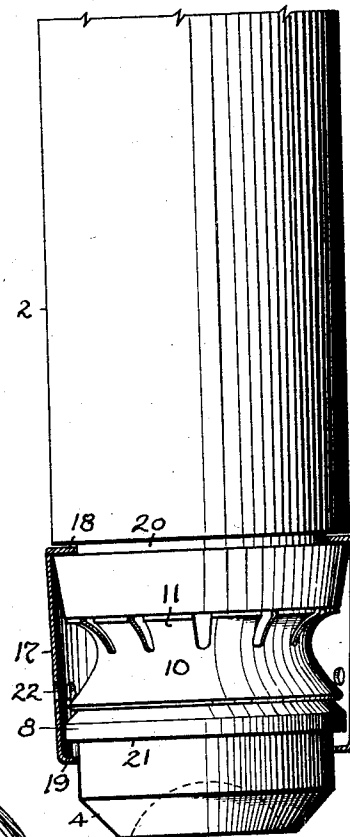
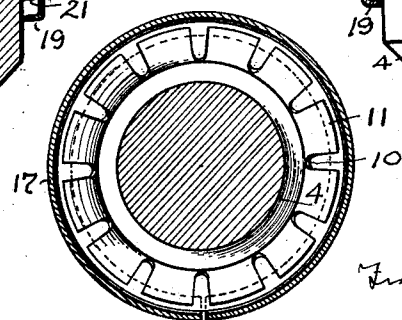


FIG. 3.



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FIG. 7.

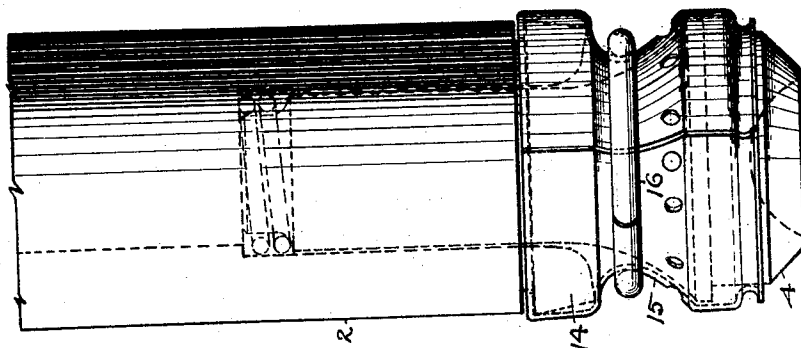


FIG. 6.

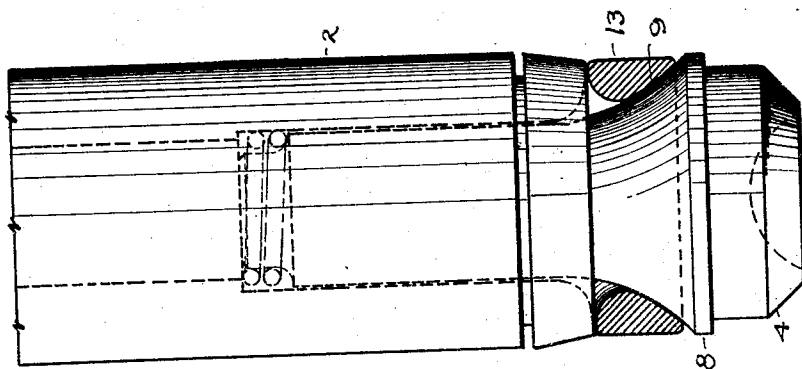
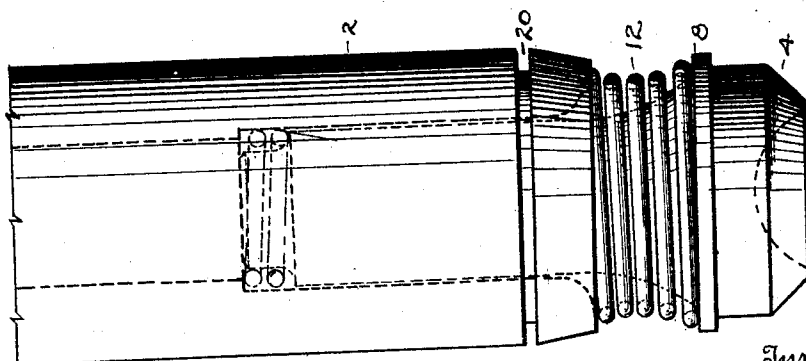


FIG. 5.



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UNITED STATES PATENT OFFICE.

CHARLES OVERLY, OF CLEVELAND, OHIO.

PNEUMATIC TOOL.

Application filed January 29, 1921. Serial No. 440,888.

To all whom it may concern:

Be it known that I, CHARLES OVERLY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Pneumatic Tools, of which the following is a specification.

My invention pertains to pneumatic tools, especially riveting tools, and the general objects of the invention are; first, to protect and prolong the life of the hammer or rivet set in such tools; second, to relieve the operator of recoil; and third, to keep the rivet set cool. To elucidate further, in a pneumatic riveting tool wherein the piston has a long stroke and reciprocates rapidly, it is a common experience to have the rivet set crystallize and break at the neck or point of union of its shank and enlarged head because this enlarged head and the extremity of the cylinder or barrel constantly strike each other opposite the neck under the reaction or recoil which takes place subsequent to the piston striking the rivet set, and the shock and recoil is also transmitted to the operator holding the tool. To obviate such troubles and disadvantages I have provided means to absorb the shock and recoil of the rivet set and cylinder, and I also utilize the air that passes or leaks from the cylinder to cool off the rivet set while it is in operation.

In the drawings accompanying this application, Fig. 1 is a small or reduced side view of a pneumatic riveting tool embodying my invention. Fig. 2 is an enlarged sectional view of a portion of the cylinder showing the rivet set and its retainer and shock-absorbing means associated therewith. Fig. 3 is a cross section on line 3—3, of Fig. 2. Fig. 4 is a side view of the parts shown in Fig. 2, excepting the retainer sleeve which is shown in section. Figs. 5, 6 and 7 illustrate several modified forms of the invention.

The pneumatic riveting tools in general use comprise a cylinder or barrel 2 having a handle 3 fixed at one end and a separate hammer or rivet set 4 extending from its opposite end. A floating piston 5 reciprocates very rapidly within the cylinder upon admitting compressed air, and the piston in each working stroke strikes the inner reduced end 6 of rivet set 4 which in turn transmits the impact to the work in hand. The return stroke of the piston is effected by admitting air through a port 7 near the inner

end of the rivet set, and because there is always a slight play between the end of the cylinder and the head of the rivet set the air pressure forces the rivet set outwardly away from the end of the cylinder. In exhausting the air through port 7 the pressure is instantly relieved on the rivet set and the end of the cylinder strikes the enlarged head 8 of the rivet set with a shock which in time crystallizes and breaks the neck opposite the reentrant angle or fillet where the stem or shank joins abruptly with head 8.

To overcome this ill effect, I form the rivet set with a neck 9 of sweeping curvature and without sharp reentrant angles and interpose a shock-absorbing member between the end of cylinder 2 and head 8 of the rivet set. As shown in the drawings the radius of curvature of neck 9 is approximately the same as the diameter of the stem or shank of the rivet set. In Figs. 2 to 4, this shock-absorbing member consists of a sheet-metal collar or ring 10 of less diameter than cylinder 2 and flared and rounded at its opposite ends, the lower or outer end being made to conform to the curved portion of the rivet set and the upper or inner end being slotted or divided at intervals to provide curved spring tongues 11 adapted to bear against the extremity of cylinder 2. In Fig. 5, I show a coiled spring 12 interposed between head 8 and cylinder 2. In Fig. 6 a solid ring 13 is loosely sleeved upon the rivet set between head 8 and cylinder 2. In Fig. 7, I provide a sectional retaining spring sleeve 14 having an annular portion 15 of reduced diameter adapted to occupy the space between head 8 and the end of cylinder 2, and a split spring ring 16 encircles the sections of this sleeve to hold the said parts together. In Figs. 1 to 4, inclusive I employ a retainer in the form of a split spring sleeve 17 having inturned flanges 18 and 19 which extend into an annular groove 20 and beneath an annular shoulder 21 in cylinder 2 and head 8, respectively. Sleeve 17 is perforated or provided with openings 22 in its side to permit a free escape of the air which leaks from the cylinder around the shank of the rivet set. This escaping air acts to cool the rivet set while in operation.

The bore or opening 23 in the outer portion of the cylinder is of larger diameter than the piston chamber 24, which provides an annular shoulder or seat 25 where the bore and chamber meet, and the inner end of

the rivet set shank is reduced to provide an annular shoulder or seat 26 opposite shoulder or seat 25. A short coiled spring 27 confined between said shoulders serves as an
5 additional shock-absorber and protects the striking point of the set.

As used herein the terms hammer and rivet set are synonymous, and it should be understood that the head or hammering end
10 may have many different forms, and that different shaped hammers or rivet sets are substituted one for the other for different kinds of work. Thus, some of the heads are short and others elongated and extended,
15 and the hammering ends may be formed with or without cavities, and the cavities shaped to any given work. To permit such substitution the retainer or spring sleeve is a detachable part of the tool, and when the
20 parts are assembled there is a slight play between the hammer or rivet set and the retainer sleeve.

What I claim is:

1. A pneumatic tool or instrument, comprising a cylinder, a separate hammer having a reduced shank mounted within one end
25 of said cylinder and a curved neck having a

radius of curvature approximately the same as the diameter of said shank, a shock-absorber associated with said cylinder and
30 hammer seated upon said curved neck, and a retaining sleeve for said hammer having air openings.

2. A pneumatic tool or instrument, comprising a cylinder having a piston therein, a
35 rivet set having a supporting shank with a curved neck of approximately the same radius as the diameter of said shank and without reentrant angles, and a shock-absorbing ring sleeved upon said neck opposite the end
40 of said cylinder.

3. A pneumatic tool or instrument, comprising a rivet set having an enlarged head and a reduced shank and a curved neck uniting said head and shank, the relative size of
45 the radius of curvature being approximately the same as the diameter of said shank, in combination with a shock absorbing and protecting device sleeved upon said curved
50 neck.

Signed at Cleveland, in the county of Cuyahoga, and State of Ohio, this 25th day of January, 1921.

CHARLES OVERLY.