

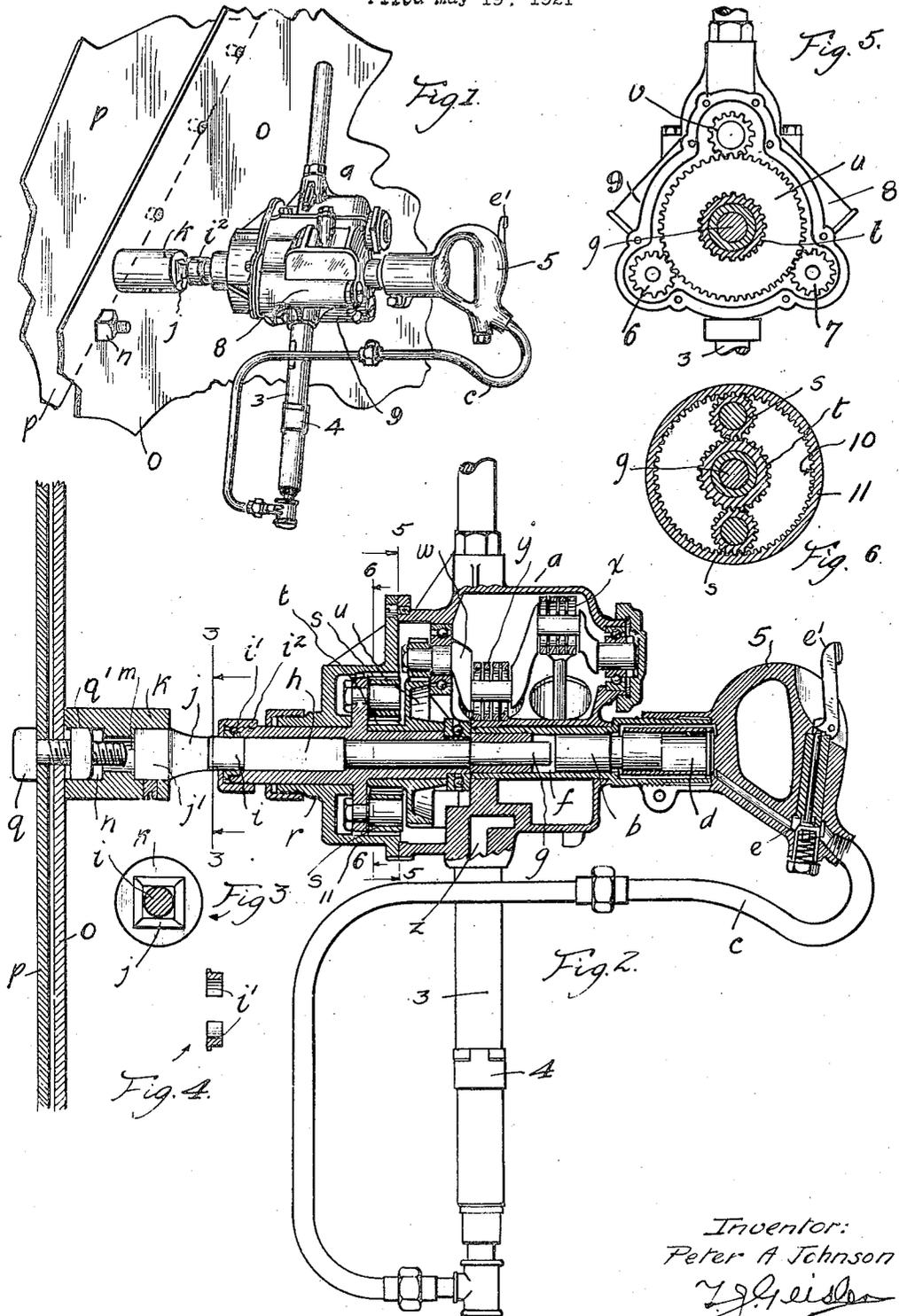
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SCREW BOLT NUT TIGHTENING MEANS

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UNITED STATES PATENT OFFICE.

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SCREW-BOLT-NUT-TIGHTENING MEANS.

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To all whom it may concern:

Be it known that I, PETER A. JOHNSON, a citizen of the United States, and a resident of the city of Portland, county of Multnomah, and State of Oregon, have invented a certain new and useful Improvement in Screw-Bolt-Nut-Tightening Means, of which the following is a specification.

The object of my invention is to provide simple power driven mechanical means for tightening firmly the nuts on screw bolts by which two plates, or other pieces are joined or drawn together, in order to bring the two pieces so united as closely together as possible.

A force must be applied for pressing the two or more pieces firmly against each other at the instant the nut of the bolt is rotated for tightening; and these operations must be repeated until the two or more pieces have been drawn together as closely as possible.

Heretofore it has been attempted to promote the tightening of the nut by striking the head of the screw bolt at the instant the nut was rotated, and in this way attempt to bring the plates or pieces to be bolted together, closer together at the instant the wrench was operated to rotate the nut. But obviously it was difficult to get synchronous action between the force driving the pieces together and the force rotating the nut; and in fact the blow on the head of the nut had the tendency to throw the wrench off.

My invention has for its object the providing of a device (preferably power driven) in which said forces are co-ordinated.

My invention consists of a power driven reciprocating hammer provided with a head actuating a device having a cavity adapted for receiving the projecting end of a screw bolt, and the nut of the latter; the head being adapted to engage the sides of the nut, and projecting below that face of the latter which will bear on one of the said two or more pieces; and the said head having an up and down sliding movement on the nut, so that it may strike a blow on the underlying piece, and thus force such piece against the other piece; and in combination with such re-

ciprocating hammer I provide means for partly rotating the latter at the instant of the blow, for tightening the nut.

Defining my invention in a more general way, it may be said to comprise the method of mechanically tightening the nut of a screw bolt uniting two pieces, consisting in forcing one piece firmly against the others by blows delivered against one piece, and turning up the nut on the bolt, at the instant of such blows.

An incidental feature and result of my invention is that the strain on the threads of the bolt and nut is relieved, since the pieces are forced together thru the medium of the impact of the hammer at the instant the nut is tightened, and the nut functions only to hold the pieces in that closeness into which they have been put by the force of the blow. In this way the threads of both bolt and nut are kept in a better shape to sustain the stress imposed upon them. My invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective elevation of my invention operated for bolting two plates together;

Fig. 2 shows a section of my machine, and also illustrates the manner of its operation;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a sectional detail of the divided ring or washer 5;

Fig. 5 is a section on the line 5—5 of Fig. 2; and

Fig. 6 is a section on the line 6—6 of Fig. 2.

My machine comprises a housing *a* in which is reciprocated a piston-hammer *b*, thru the medium of compressed air delivered thru a pipe *c*; the admission of air into the cylinder *d* being controlled by a valve *e* operated by a trigger *e'* mounted on the handle 5. In the housing *a* is mounted a barrel *f*, constituting an extension of the cylinder *d* of the piston-chamber *b*, and said extension *f* constitutes a bearing in which reciprocates and rotates the upper cylindrical end of the shank *g*. The latter has a pro-

jecting end *j* on which is removably fastened a head *k* by means of a set screw *l*. The extremity *j'* of the projecting shank end *j* is squared, or otherwise adapted to prevent the head *k* from turning thereon.

The longitudinal reciprocation of the shank *g* is limited by the part *i* which bears in a split collar *i'* held in place by a nut *i''*.

The head *k* mounted on the shank *g* is provided with a cavity *m* to receive the projecting end of the bolt, and a cavity *n* is adapted to receive the nut of the bolt. The cavity *n* is adapted to engage the sides of the nut, and is of a greater depth than the thickness of the nut, so that the head is permitted some up and down movement on the nut, as is required in order to permit the head *k* to strike the blows or taps on the overlying plate *o*, which is to be drawn firmly against the underlying plate *p*, by screw bolts and nuts, as *q* and *q'*.

Within the housing *a* are provided means for rotating the shank *g* by the same power as drives the piston-hammer *b*. Such means consist of a sleeve *r* adapted to fit on the squared part *h* of the shank *g*. The sleeve *r* functions as a spindle, and in order that it may be rotated it is provided with pinions *s, s*, which engage with the internal teeth 10 of the housing part 11, and also engage with a pinion *t*, an integral part of the loose gear *u*, with which meshes a pinion *v* carried by the crank-arm *w*, which is rotated thru the medium of air-operated motors, the pistons of which are connected with the crank-shaft *w* as shown at *x* and *y* in Fig. 2. The pinions 6 and 7 shown in Fig. 5 are carried by the rotatory valves contained in the valves housing 8 and 9 shown in Fig. 1.

The latter devices may be of a construction similar to that employed in pneumatic drills.

z represents the intake port connected by a pipe 3 with a source of air-compressing means; and the passage of the air thru the pipe 3 is controlled by a suitable valve which is operated by the rotation of the sleeve 4 on the pipe 3; the rotation of the sleeve 4 in one direction opening the valve ports for admitting the air to operate the pistons, and thus rotating the crank-shaft *w*, and the rotation of the sleeve 4 in the opposite direction closing such ports; thus enabling the operator to control the rotation of the shank *g* in correspondence with the requirements of the work being done.

The valve operated by the sleeve 4, and the ports admitting air to the motor, may furthermore be so arranged and adapted that in one position of the sleeve the motor will be reversed.

Since a suggestion of this detail of construction is sufficient for any mechanic, further drawing and description are deemed unnecessary.

The construction and purpose of parts not above specifically described will be understood from the accompanying drawings.

The particular construction and arrangement of the parts not essential to the operation of my invention are unimportant. The device shown by the drawings has been actually built as shown, and upon thorough test was found imminently practical and efficient.

It is to be noted that the shank *h* of my device or piece similarly constructed, provided with nut engaging means which are equivalent of the head *k*, constitutes an operable tool by itself, and could be used by applying thereon a socket wrench, or like suitable tool, whereby the shank *h* could be rotated while being tapped with a hammer by hand; but for practical, expeditious, efficient work my device as above described would have to be used.

I claim:

1. In a device of the character described the combination of a power driven reciprocating hammer, a device actuated by the hammer, said device having a head adapted to be slidingly engaged with the nut on a screw-bolt and in one position projecting beyond the bearing face of the nut, thereby to strike a blow on the piece on which said nut bears, and power driven means for rotating said device, the rotating means being adapted to permit the movement of said device by the impact of said hammer.

2. In a device of the character described the combination of a power driven reciprocating hammer, a device actuated by the hammer, said device having a head having a cavity adapted to receive the end of a screw bolt and to slidingly engage the nut on the latter, said cavity being of greater depth than the width of the nut so that in one position the head will project beyond the bearing face of the nut, thereby to strike a blow on the piece on which the nut bears, and power driven means for rotating said device, the rotating means being adapted to permit the movement of said device by the impact of said hammer.

3. In a device of the character described the combination of a power driven reciprocating hammer, a device actuated by the hammer, said device having a detachable head adapted to be slidingly engaged with the nut on a screw-bolt and in one position projecting beyond the bearing face of the nut, thereby to strike a blow on the piece on which said nut bears, and power driven means for rotating said device, the rotating means being adapted to permit the movement of said device by the impact of said hammer.

4. In a device of the character described the combination of, a power driven reciprocating hammer, said device having a de-

tachable head having a cavity adapted to receive the end of a screw-bolt and to slidingly engage the nut on the latter, said cavity being of greater depth than the width of the nut so that in one position the head will project beyond the bearing face of the nut, thereby to strike a blow on the piece on which the nut bears, and power driven means for rotating said device, the rotating means being adapted to permit the movement of said device by the impact of said hammer. 10

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