

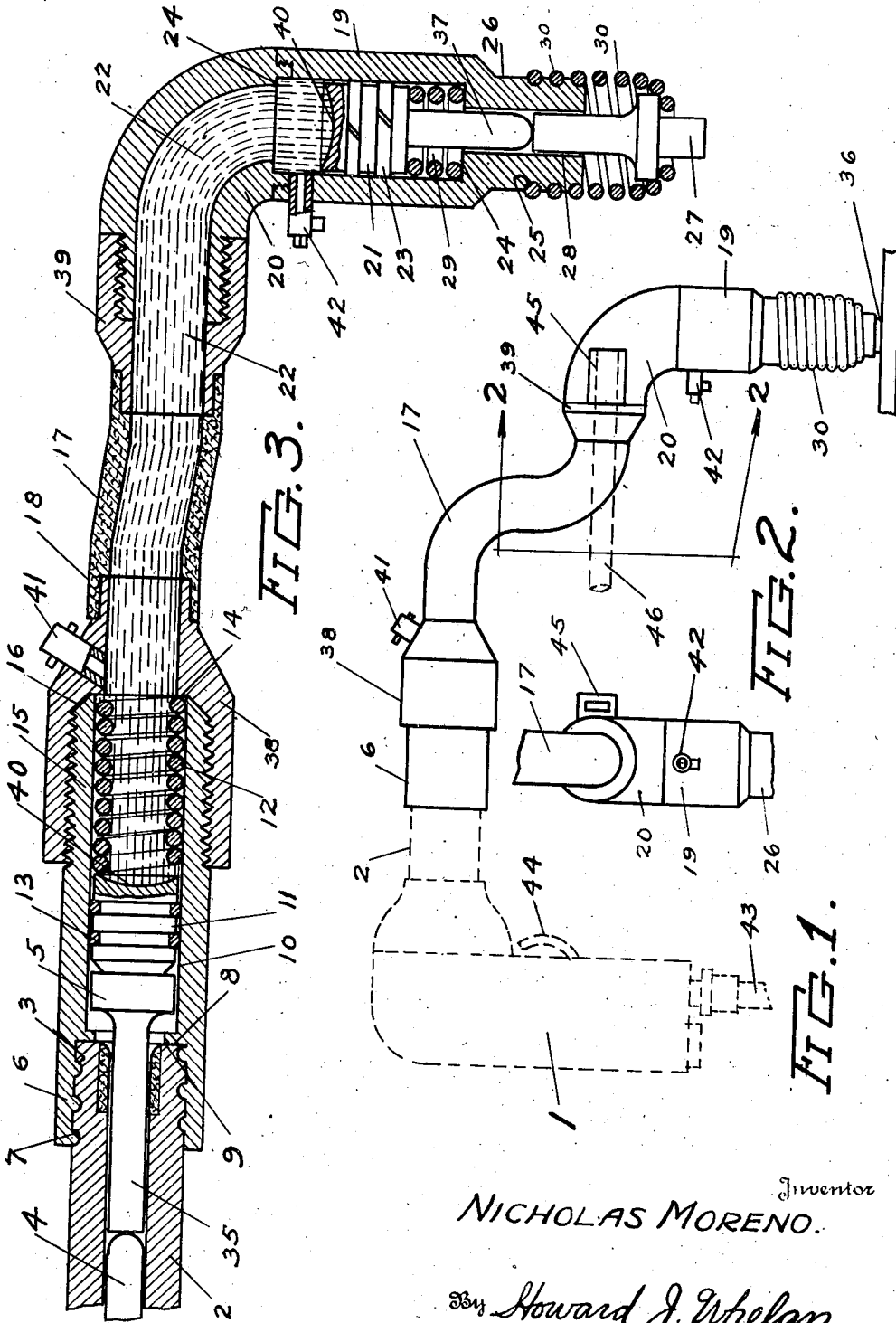
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MULTIPLE ANGLE HYDRAULIC RIVETING ATTACHMENT

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MULTIPLE ANGLE HYDRAULIC RIVETING
ATTACHMENT

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5 Claims. (Cl. 125—34)

This invention refers to tools and more particularly to those belonging to the riveting and chiseling branches of mechanical equipment. The object of this invention is to provide a tool applicator attachable to a tool gun, that will hold a hammer, chisel or other tool and apply the forces necessary for its work. Another object is to provide an applicator of this type that can be used in narrow and hard-to-get-at locations for riveting, chiseling and similar work with as high a degree of efficiency and convenience as can be obtained with conventional tools in accessible and convenient positions. A further object is to provide considerable flexibility to the structure of the applicator, to permit it to be bent and turned around readily to suit all the requirements met with in practical operation. Still another object is to have the construction relatively light and portable, free from complicated or accumulative mechanism; economical to operate; inexpensive to keep in repair, and simple to inspect, assemble and disassemble.

Other objects will become apparent as the invention is more fully set forth.

The tool guns conventionally employed for riveting and the like, in airplane and mechanical construction hold the tool close to the main holder or tool head and require direct application to the article part or machine acted upon. Where the rivet or part is at the end of a narrow passage or is inconvenient to reach, an extending rod is frequently used for the tool to strike on and hit the rivet indirectly. This is partly successful, when the rivet is in a direct line with the operating axis of the tool. When the rivet is located at a turn that cannot be properly reached even by the extension, then the difficulties arise and any riveting done is on a make-shift style. The rivets are partly riveted, with the heads half sheared off and otherwise mutilated, which frequently require additional labor and effort to make them passable. This may require the removal and replacement of a rivet several times, and involves time, trouble and expense and enlarges the rivet hole to such an extent that a larger rivet must be used to fill up the hole. This invention can apply the tool at practically every angle or at a distance from the gun proper and will do its work effectively. The structure of this applicator consists of an attachment for the tool head of a tool gun, having a flexible carrier or tube filled with fluid and piston members at each end arranged to transmit the impulses of force applied thereto. The use of a liquid or fluid enables the impulses or

blows to be transmitted with little loss of power; avoids the use of mechanism, and permits the device to be bent and turned to any angle, without loss of efficiency, to conform with any usual requirements involved in riveting or chiseling, etc. at a distance or at an angle to the main tool gun.

In the drawing which illustrates an example of this invention:

Figure 1 represents a side elevation of an applicator embodying this invention, attached to a conventional air riveting hammer.

Figure 2 is an elevation view of the invention shown in Figure 1, and taken along line 2—2 thereof, to show the general outline of the tool head, flexible hose and tool head holding attachment, and

Figure 3 represents a longitudinal section through an applicator attached to a conventional tool head of an air riveting hammer or gun shown in Figure 1.

Similar reference characters refer to similar parts throughout the drawing.

In the construction shown, 1 represents a conventional pneumatic hammer gun used for riveting, with its tool head 2 adapted for holding the various hammers, chisels and other tools customarily used with it. The tool head 2 has external peripheral surface grooves 3 adjacent the end for a retaining spring 30 which is coiled thereon and keeps the tools employed from being thrown out of the head during the operation of the hammer gun. The head 2 has an oscillating power transmitting plunger 4 reciprocating within it which contacts a hammer 5 a short distance in front of same. The retaining spring 30 is removed when the applicator is to be attached. The applicator is then attached by screwing its cylinder sleeve 6 over the tool head 2 and having its internal screw-threads 7 engaged in the grooves 3 where the retaining spring was originally connected to. This sleeve is screwed on until its internal ledge 8 strikes the end face 9 of the tool head and both are held rigidly together. The sleeve is internally ground at 10 to provide a suitable surface for its piston 11 to reciprocate in. This piston is in contact with the hammer head 5 of the gun and is operated thereby. An internal coil spring 12 in the cylinder tensions against the piston 11 and keeps it in contact with the hammer 5 which forces it out, at each blow when operated by the motive power used to operate the gun.

The piston is preferably constructed as indicated with a cup-shaped end 40 to centralize it

in its travel in the cylinder and is provided with rings 13 to keep it liquid tight. The spring 12 is held in the internal portion of the sleeve through the use of a ridge 14 and connection 15. The sleeve is tapered at 16 and is restricted in size to conform with the diameter of the piston 11. A flexible tubing 17 is attached to the exterior peripheral surface 18 of the sleeve connector 38 in any suitable manner, that keeps it liquid tight. The flexible tubing is made as long as suitable for its employment. The other end of the tubing is attached to a sleeve connector 39 which connects with tool holder 19 which is formed with a right angle bend 20 to portray its use for angular riveting. It has a piston 21 within it that is operated from the liquid 22 filling the tubing 17 and the sleeves between the pistons. The piston 21 has rings 23 to make it fluid tight and its structure is preferably as indicated in the drawing. A ridge 24 in the sleeve keeps the piston in its proper position in the cylinder even should some of the liquid leak out. The internal surface of the sleeve 19 is adapted for holding a coil spring 29 which keeps the piston under tension against the fluid in the device. The external end portion 26 of the sleeve 19 is arranged with peripheral surface grooves 25 similar to those provided at 3 on the gun, and for the same purpose. The spring 30 of the gun is removed from the tool head 2 and placed on the sleeve end 26 to hold any tool 27 employed in each case, in the mouth portion 28 of the tool holder 19. This is done similarly to the manner in which the tools are held in the conventional tool head. The tool 27 fits within the sleeve head 19 and is actuated similarly to its conventional manner by the piston 21. The spring 30 keeps the tool 27 used in contact with the hammer portion 37 of the piston 21, which is held in the mouth portion 28 arranged in this tool holder sleeve, as indicated.

The chamfer end of the piston 11 contacts the hammer 5, its extension member 35 projects into the tool head 2 and is oscillated back and forth by the power transmitter 4. The piston 21 is provided at one of its ends with a hammer portion 37 which transmits oscillating power to the rivet set 27 which acts on the rivet head 36.

In the operation of the device the fluid 22 is placed in the device under pressure through the use of a filler valve connection 41 and the trapped air is released through relief valve 42. The spring 30 is then removed from the tool head 2 of a riveting gun 1 and the rivet set removed, the cylinder sleeve 6 is then screwed tightly on the tool head 2 and the rivet set is placed in the end of the angular tool holder 19 and the retaining spring 30 screwed into place thereon.

The motive power 43 is then attached to the riveting gun 1 and the trigger 44 operated, this causes the gun to operate in the usual manner. The power transmitter 4 oscillates back and forth, striking the extension member 35 of the hammer 5 which in turn operates the piston 11. The piston 11 transmits its force to the liquid 22 which in turn transmits its force to the secondary piston 21 and through its hammer portion 37 actuates the rivet set 27 in the mouth portion 28 of the sleeve 19 and does the work of riveting or operating a chisel, etc. It may be seen that the tool may be used to contact parts or rivets that are placed at points that are hard as to access or at difficult angles with as much efficiency as if the ordinary straight rivet hammer or gun had

been used. The angular tool holder 19 is also provided with an attachment 45 into which a screw-driver or bar 46 may be inserted to hold the riveting attachment against the rivet in places heretofore inaccessible. The liquid through its flexibility, non-compressibility and relative lightness (as compared with suitable metals), transmits the full power from the gun to the parts to be worked on. The device can be bent readily to meet any particular requirements at an instant, because of the flexibility of the tubing.

While but one form of the invention is indicated in the drawing, it is not desired to limit this application for patent to such particular construction or its specific use, as it is appreciated that other forms of construction could be used that would use the same principles and come within the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. An applicator for attachment to the tool head of a vibratory gun, comprising in combination, a hollow sleeve attachable to the tool head of the gun with its hammer projecting therein, a piston reciprocable in the sleeve with a cup shaped centralizing head and adapted to contact the said hammer and operate therewith, a coil spring member in contact with the piston and an internal portion of the sleeve so as to cooperate with the operation of the piston by the said hammer, a hollow sleeve connector adjustably attached to the said sleeve and adapted to keep the said member in position and adjustably tensioned, a flexible tubing attached to the connector, a holder arranged to contain a percussive tool in the end portion thereof attached to the said tubing, a piston in one end portion of the said holder arranged to reciprocate therein, a resilient member in the holder in contact with the piston and adapted to resiliently return it in one direction, and a liquid in the sleeve, connector, tubing and holder for transmitting percussive power from the hammer through the pistons to the said tool.

2. An applicator for attachment to the tool head of a vibratory gun, comprising in combination, a hollow sleeve attachable to the tool head of the gun, with its hammer projecting therein, a piston reciprocable in the sleeve with a cup shaped centralizing head and adapted to contact the said hammer and operate therewith, a coil spring member in contact with the piston and an internal portion of the sleeve so as to cooperate with the operation of the piston by the said hammer, a hollow sleeve connector adjustably attached to the said sleeve and adapted to keep the said member in position and adjustably tensioned, a flexible tubing attached to the connector, a holder arranged to contain a percussive tool in the end portion thereof attached to the said tubing, a piston in one end portion of the said holder arranged to reciprocate therein, a resilient member in the holder in contact with the piston and adapted to resiliently return it in one direction, and a liquid in the sleeve, connector, tubing and holder for transmitting percussive power from the hammer through the pistons to the said tool, and a coil spring member mountable on the periphery of the holder and projecting beyond same so as to engage the said tool and hold it in predetermined relation to the holder and piston.

3. An applicator for attachment to the tool head of a vibratory gun, comprising in combination, a sleeve attachable to the tool head of the

gun with its hammer projecting therein, a piston reciprocable in the sleeve and adapted to contact the said hammer and operate therewith, a spring member in contact with the piston and a portion of the sleeve so as to cooperate with the operation of the piston by the said hammer, a sleeve connector attached to the said sleeve and adapted to keep the said member in position and adjustably tensioned, a flexible tubing attached to the connector, a holder arranged to contain a tool in the end portion thereof attached to the said tubing, a piston in one end portion of the said holder arranged to reciprocate therein, a resilient member in the holder in contact with the piston and adapted to resiliently return it in one direction, and a liquid in the holder for transmitting percussive power from the hammer through the pistons to the said tool.

4. An applicator for attachment to the tool head of a vibratory gun, comprising in combination, a sleeve attachable to the tool head of the gun with its hammer projecting therein, a piston reciprocable in the sleeve and adapted to contact the said hammer and operate therewith, a spring member in contact with the piston and a portion of the sleeve so as to cooperate with the operation of the piston by the said hammer, a sleeve connector attached to the said sleeve and adapted to keep the said member in position and tensioned, a tubing attached to the connector, a holder arranged to contain a tool in the end

portion thereof attached to the said tubing, a piston in one end portion of the said holder arranged to reciprocate therein, a member in the holder in contact with the piston and adapted to return it in one direction, and a liquid in the holder for transmitting percussive power from the hammer through the pistons to the said tool.

5. An applicator for attachment to the tool head of a vibratory gun, comprising in combination, a sleeve attachable to the tool head of the gun with its hammer projecting therein, a piston reciprocable in the sleeve and adapted to contact the said hammer and operate therewith, a spring member in contact with the piston and a portion of the sleeve so as to cooperate with the operation of the piston by the said hammer, a sleeve connector attached to the said sleeve and adapted to keep the said member in position and tensioned, a tubing attached to the connector, a holder arranged to contain a tool in the end portion thereof attached to the said tubing, a piston in one end portion of the said holder arranged to reciprocate therein, a member in the holder in contact with the piston and adapted to return it in one direction, and a liquid in the holder for transmitting percussive power from the hammer through the pistons to the said tool, and a spring member mountable on the periphery of the holder so as to engage the said tool and hold it in predetermined relation to the holder.

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