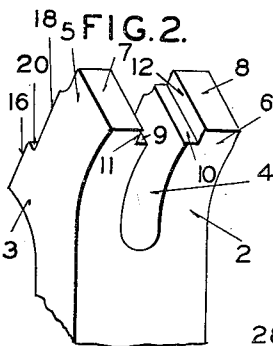
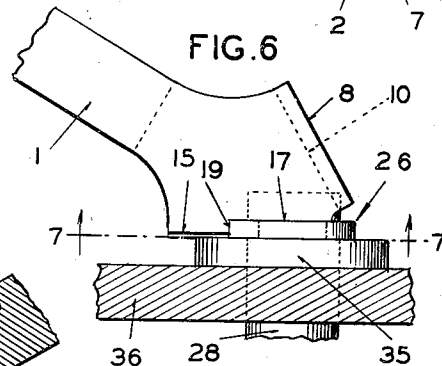
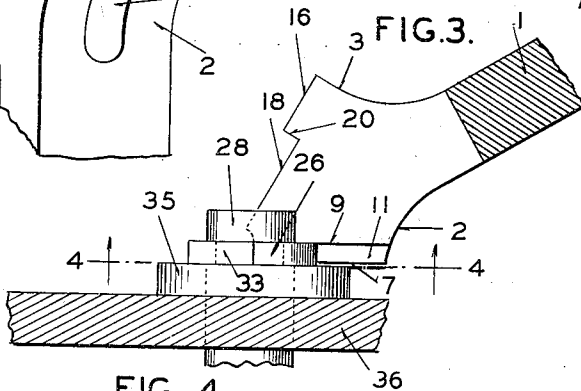
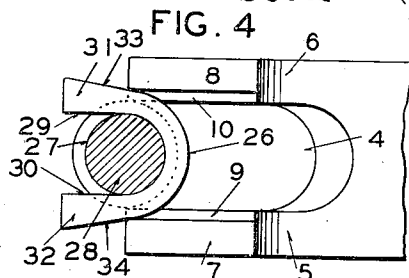
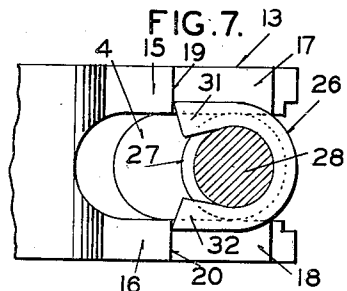
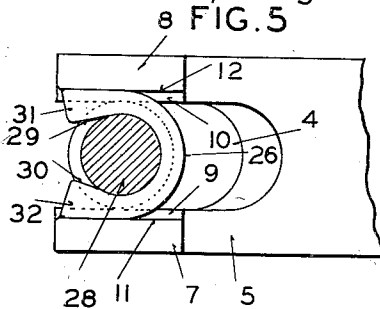
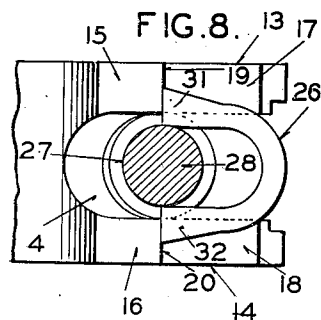


S. SCHNELL

TOOL FOR WASHERS



BY

E. C. Huffman

ATTORNEY

UNITED STATES PATENT OFFICE

2,272,355

TOOL FOR WASHERS

Steve Schnell, Overland, Mo., assignor to Wagner Electric Corporation, St. Louis, Mo., a corporation of Delaware

Application May 31, 1940, Serial No. 338,143

2 Claims. (Cl. 81—3)

My invention relates to tools and more particularly to tools for clamping locking washers on a pin, shaft or other member, and for removing same.

One of the objects of my invention is to produce a tool which is so constructed that it can be employed for both assembling and removing a C type of locking washer.

Another object of my invention is to produce a tool which, when employed to clamp a C type of washer in operative position, will so act on the washer that it will cause it to be wrapped around the pin or shaft and at the same time prevent the washer from becoming "dished" or "warped."

Another object of my invention is to provide a special tool for clamping a particular type of C washer in operative position, said tool being simple in construction and efficient in operation.

Other objects of my invention will become apparent from the following description taken in connection with the accompanying drawing in which Figure 1 is a side view of the tool, the handle thereof being shown in section; Figure 2 is a perspective view of the working end of the tool; Figure 3 is a view showing the tool in position prior to its movement to perform the clamping operation on the C washer; Figure 4 is a view taken on the line 4—4 of Figure 3; Figure 5 is a view similar to Figure 4 but showing the position of the tool after the washer has been operated upon; Figure 6 is a view showing the position of the tool prior to removing the washer; Figure 7 is a view taken on the line 7—7 of Figure 6 and Figure 8 is a view similar to Figure 7 but showing the washer being removed by the tool.

Referring to the drawing in detail my improved tool comprises a rod 1 having a somewhat Y shaped end formed by portions 2 and 3 having a slot 4 therein. The portion 2 on the end of the tool is so constructed as to be employed in clamping a C type washer of special construction to a pin or shaft and the portion 3 is so constructed as to be employed for removing this washer from the pin or shaft.

The legs 5 and 6 on the portion 2 formed by the slot 4 are provided with flat end surfaces 7 and 8 which lie in a plane at an angle to the axis of the rod, said angle being shown at 30 degrees. The inner sides of the ends of the legs 5 and 6 are provided with lands 9 and 10 and parallel walls 11 and 12, said lands lying in a plane parallel to the plane of the end surfaces 7 and 8.

The end portion 3 of the tool has the ends of its legs 13 and 14 formed by the slot 4 provided with flat surfaces 15 and 16 which lie in a plane

that is at an angle to the axis of the rod, said angle also being approximately 30 degrees. The legs are also provided with additional parallel flat surfaces 17 and 18 and shoulders 19 and 20.

5 The rod of the tool may be operated either manually or by power. A construction that may be employed for manual operation is shown in Figure 1 and comprises a handle 21 having a bore 22 in which the rod extends. The intermediate portion of the rod carries an integral shoulder 23 for cooperation with a slidable collar 24 threaded in the open end of the bore of the handle. The inner end of the rod in the bore has fixed thereto a collar 25 which acts as a stop for the collar 24. 10 The construction permits the operator to give to the rod a hammer blow in its longitudinal direction by moving the handle rearwardly relative to the rod and then bringing it forward with considerable speed. This will result in the collar 24 of the handle striking the shoulder 23 and driving the rod 1 forwardly. To increase the hammer blow effect the handle is made of heavy material.

The particular C type of washer 26 with which my improved tool is intended to cooperate comprises a flat U-shaped member, the base portion of which is semi-circular in shape to fit against the bottom of an annular groove 27 provided in a pin or shaft 28 on which the washer is to be clamped. The inner edges 29 and 30 of the legs 31 and 32 of the washer are parallel and so spaced apart as to receive the shaft at the groove. The outer edges 33 and 34 of the legs of the washer diverge in the direction of the ends of the legs thus making the ends of the legs wedge-shaped. 25

35 When my improved tool is employed to clamp the C type washer on the pin or shaft the washer is first positioned in the groove in the manner shown in Figures 3 and 4. The pin or shaft 28 may have mounted thereon the usual "take up" washer 35 which lies against the member 36 that is to be locked on the pin or shaft. The tool is first so positioned that the lands 9 and 10 will rest on the upper surfaces of the legs 32 and 31 respectively of the washer and the forward portion of the walls 11 and 12 will engage the rear edges of the diverging surfaces 34 and 33 respectively. If now the handle of the tool is pulled back and moved rapidly forward by one hand of the operator while the other hand grips the rod 1 to hold the tool in position, the end of the tool will be moved towards the ends of the legs of the washer. This will result in the walls 11 and 12 acting on the surfaces 34 and 33 and causing the ends of the legs to be deformed toward each other in the manner shown in Figure 5. Since the 40 45 50

space between the ends of the legs is now less than the diameter of the shaft at the groove the washer will be clamped in position. It is to be noted the movement of the tool is toward the ends of the legs during the clamping operation and this insures that the washer will be maintained in the groove during this operation.

The particular construction of the washer and the tool causes the washer to be wrapped around the shaft at the groove and as a result thereof the washer will snugly grip the bottom of the groove over nearly two thirds of its circumferential surface. The depth of the walls 11 and 12 is made slightly less than the thickness of the material from which the washer is stamped and because of this the lands 9 and 10 will at all times be in direct contact with the upper surfaces of the legs of the washer. Because of the angle relation of the lands and the axis of the rod 1 of the tool a pressure will be produced on the top surfaces of the washer at the same time that the tool is being forced forwardly to perform the clamping operation. This pressure will prevent the washer from becoming distorted or "dished" a condition which occurs when the old type of C washer has its legs clamped together by plyers or a like tool.

When it is desired to remove the washer, the surfaces 17 and 18 of portion 3 are positioned to rest on the legs of the washer with the shoulders 19 and 20 in engagement with the ends of said legs, the shaft or pin projecting into the slot 4. By now operating the handle of the tool to give a hammer blow to the rod 1, the washer will be forced off the pin or shaft, the bottom of the groove of the shaft causing the legs to spread apart and assure their original position. The pressure of the surfaces 17 and 18 on the top of the legs will tend to hold the washer flat during its removal from the shaft. Thus the washer is not damaged in any serious manner and can again be used if desired.

Being aware of the possibility of modification in the particular structure herein described without departing from the fundamental principles of my invention, I do not intend that its scope be limited as set forth by the appended claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A tool for clamping a flat locking washer of the C type comprising a longitudinal member having a slot forming legs, the inner sides of the legs adjacent their ends being provided with parallel walls for engaging side edges of the washer, each of said legs being provided on its inner side with a land adjacent and at a right angle to the wall thereof, said lands being spaced inwardly from the ends of the legs and lying in the same plane and said walls being of less depth than the thickness of the washer whereby said lands can have pressure engagement with the top surfaces of the portions of the washer, the side edges of which are engaged by the parallel walls.

2. A tool for clamping a locking washer of the C type to a pin or shaft and being provided with diverging outer edges on its legs, said tool comprising a member having a slot therein for receiving the pin or shaft and provided with parallel surfaces on the sides of the slot for acting on the diverging edges to force the legs toward each other when the tool is moved in a direction from the back of the washer toward the ends of the legs, said sides of the slot also being provided with lands lying in a single plane at an acute angle with the longitudinal axis of the member and adapted to engage the top surfaces of the legs of the washer and apply pressure thereto during movement of the tool.

STEVE SCHNELL.