

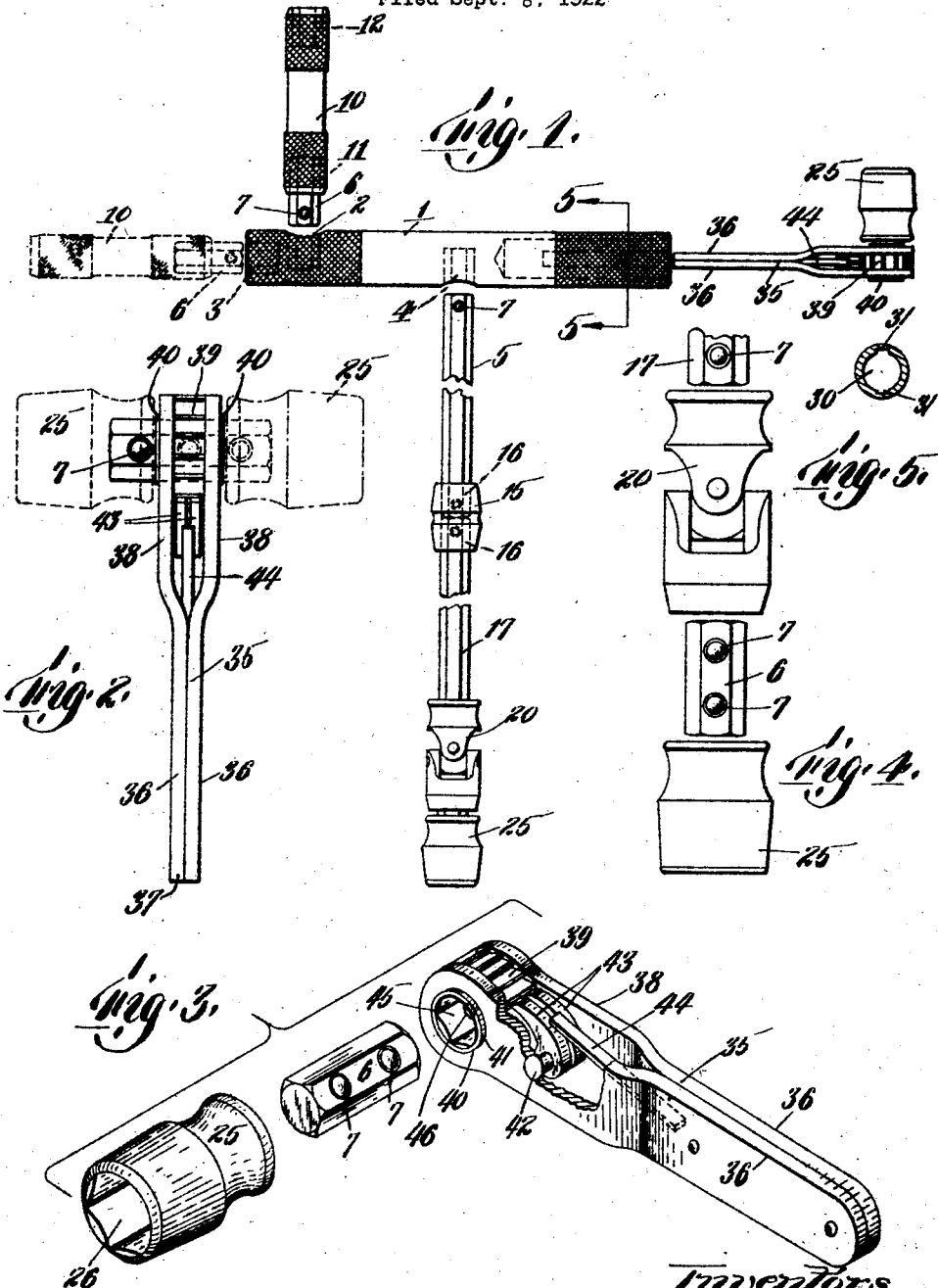
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T. A. BEMUS ET AL

WRENCH SET

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UNITED STATES PATENT OFFICE.

THOMAS A. BEMUS, OF NORTH EAST, PENNSYLVANIA, AND EUGENE F. BICKFORD AND
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WRENCH SET.

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To all whom it may concern:

Be it known that we, THOMAS A. BEMUS, a citizen of the United States, residing at North East, in the county of Erie and State of Pennsylvania, and EUGENE F. BICKFORD and FRANK T. COFFIN, both citizens of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, respectively, have invented new and useful Improvements in Wrench Sets, of which the following is a specification.

This invention relates to wrench sets of that type wherein socket members of various sizes to fit corresponding sizes of nut and bolt heads may be fitted interchangeably to supporting and actuating members capable of assembly in a variety of different relationships.

For this purpose the present invention provides socket members of various sizes, a universal joint member, a ratchet member, and handle members, each provided with sockets to interchangeably receive any of a plurality of connecting rod members, one of the handle members having a socket to receive the shank of the ratchet member. With these various parts a great variety of connections may be effected permitting ready access to be had to bolts and nuts inaccessible to ordinary tools.

For a more complete understanding of this invention, reference may be had to the accompanying drawings illustrating an embodiment thereof in which

Figure 1 is an elevation showing certain of the members arranged for assembly in various relations.

Figure 2 is an elevation of the ratchet member showing the manner by which its actuating direction of motion may be reversed.

Figure 3 is a perspective partly broken away of the ratchet member, a connecting rod and a socket member.

Figure 4 is an elevation of the universal joint as arranged for assembly with certain other members.

Figure 5 is a section on line 5-5 of Figure 1.

Referring to Figure 1 at 1 is shown a handle member having at one end polygonal, preferably hexagonal, sockets 2 and 3 therein and intermediate its length a socket 4. The sockets 2 and 4 extend into the handle member at right angles to its longitudinal

axis while the socket member 3 extends into one end in the axis, all the sockets being of the same shape and size. Arranged to fit into these sockets interchangeably are connecting bars such as shown at 5 and 6 which are preferably provided adjacent their ends with spring pressed balls 7 by which these rods may be held frictionally within the sockets but may be detached therefrom readily when desired. The rod 5 as shown is of considerable length, while the rod 6 is comparatively short. Rods of all required lengths and straight or angular, as may be desired, may be included with this set.

At 10 is shown another handle member having an axial socket in one end at 11 of the same shape and size as sockets 2, 3 and 4, arranged to fit the rods 5 and 6. The socket 11, as well as the other sockets for the reception of the connecting rods 5 and 6, are preferably hexagonal so that these sockets may fit over hexagonal nuts or bolt heads of the corresponding size. The opposite end of the handle 10 is shown as provided with a socket 12 preferably hexagonal and of a different size than the socket 11 so as to fit over nuts or bolt heads of a different size. The handle members 10 and 1 may, if desired, be assembled as indicated in full lines in Figure 1 with the handle 10 extending at right angles to the handle 1, or if desired, be placed in axial alinement with the member 1 in the position shown in dotted lines.

As shown the connecting element 5 may have placed on its outer end a coupling member 15 having at its opposite ends, sockets 16 identical with the sockets 2, 3, 4, and 11 so as to fit the ends of the various connecting rods. As shown a connecting rod 17 is engaged in the opposite end of the coupling 15 from the rod 5, which rod in turn engages a socket similar to the socket 16 in a universal joint member 20. This universal joint member may have a connecting bar such as the short connecting bar 6 placed therein, or it may if desired, be provided with an integral shank member corresponding in size and shape to such a connecting bar. At 25 is shown one of the socket members for engagement with a nut or bolt head. As many of these socket members as desired may be used having various sized sockets as 26 (Figure 3) in one end for engagement with the bolts or nut heads. The opposite end of each socket member has a socket fitting the

connection rods 5, 16, 17, etc. When the parts are thus assembled, as shown in full lines in Figure 1 with the handle 10 at right angles to the handle 1, a quick acting wrench with the handle 10 acting as a crank handle is provided. If the handle 10 is placed in alinement with the handle 1, it furnishes an extension by which an increased leverage for turning the bolt or nut may be effected.

The end of the handle 1 opposite to the socket 3 is preferably bored out, as shown at 30 in Figure 5, and slots 31 are then broached therein for engagement with the shank of a ratchet member complementally constructed and shown at 35 in Figures 1, 2, and 3. This ratchet member may be composed of a pair of plates or strips 36 placed face to face at one end to form a shank portion 37 shaped to fit within the slots 31, the opposite ends of the plates 36 being spaced apart as shown at 38 to form a space for the reception of a ratchet wheel 39 having hubs 40 journaled in alined openings 41 in the spaced portions of the plates. Pivoted on a pin or rivet 42 spanning the spaced portions of the plates 36, are shown pawls 43 which engage the teeth of the ratchet wheel 39 to prevent rotation in one direction thereof. These pawls are urged into engagement with the teeth of the ratchet wheel by means of a leaf spring 44 bearing thereon at one end and seated at its other end in mating slots in adjacent faces of the plates 36 where they are in contact.

The ratchet wheel 39 is perforated to form an axially extending bore 45 polygonal in shape and fitting any one of the connecting rods or bars 5, 16, 17, etc. As shown in Figure 3 one of the short bars 6 is indicated as being assembled therewith. Substantially centrally of its length the bore 45 on each of the polygonal faces is provided with a notch or groove 46 within which either one of the spring balls 77 of the connecting rod 6 may engage to hold the connecting rod frictionally in position lengthwise in the bore. The connecting rod is slidable through the bore so that it may extend beyond either end of the ratchet wheel 39, as shown more particularly in Figure 2, so that a socket member 25 may be fixed thereto at either end of the ratchet wheel. This provides a construction by which the direction of positive rotation of the socket member may be reversed as required. For example, when the socket member 25 is placed on the left hand projecting end of the connecting rod as shown in full lines in Figure 2, the positive direction of rotation will be to the right, that is, to tighten a nut on a right hand threaded screw, or inwardly screw a right

hand threaded bolt. Should the connecting rod be pushed through the bore of the ratchet wheel to extend to the right, as shown in dotted lines in Figure 2, and the socket member 25 be fitted to this extension, the direction of positive rotation of the socket member will be such as to tighten a left hand threaded nut or bolt or loosen a right hand threaded nut or right hand threaded bolt. The shank of the ratchet member may be fitted either side up in the slots 31 so that the socket member carried thereby may face in the required direction relative to the handle member 1.

From the above description it will be evident that this invention provides a construction in which the socket members for engaging the nuts or bolt heads may be assembled with the handles, ratchet member, and universal joint member in a great variety of relationships only a few of which have been outlined above. With the great number of combinations permitted by this construction it is possible to reach nuts or bolts which might otherwise be inaccessible. This set is found to be particularly advantageous for use in connection with auto vehicles wherein the parts are necessarily compactly arranged and where the clearances for tools are often times necessarily small. It is of course evident that other tools besides socket wrenches might be used where occasion requires such tools having sockets to fit the connecting rods.

Having thus described an embodiment of this invention it should be evident that many changes and modifications might be made therein without departing from its spirit or scope as defined by the appended claim.

We claim:

In combination, a ratchet member comprising strips spaced apart at one end and close together at their opposite end to form a shank, a ratchet wheel between said spaced ends and having hubs journaled in alined openings therein, a pawl for preventing rotation in one direction of said ratchet wheel, said ratchet wheel having a polygonal opening therethrough for engagement with a tool carrying bar projectable at will in opposite directions therefrom to reverse the positive direction of rotation of a tool carried by said bar, and a handle having a slot to receive the shank of said member.

In testimony whereof we have affixed our signatures.

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