

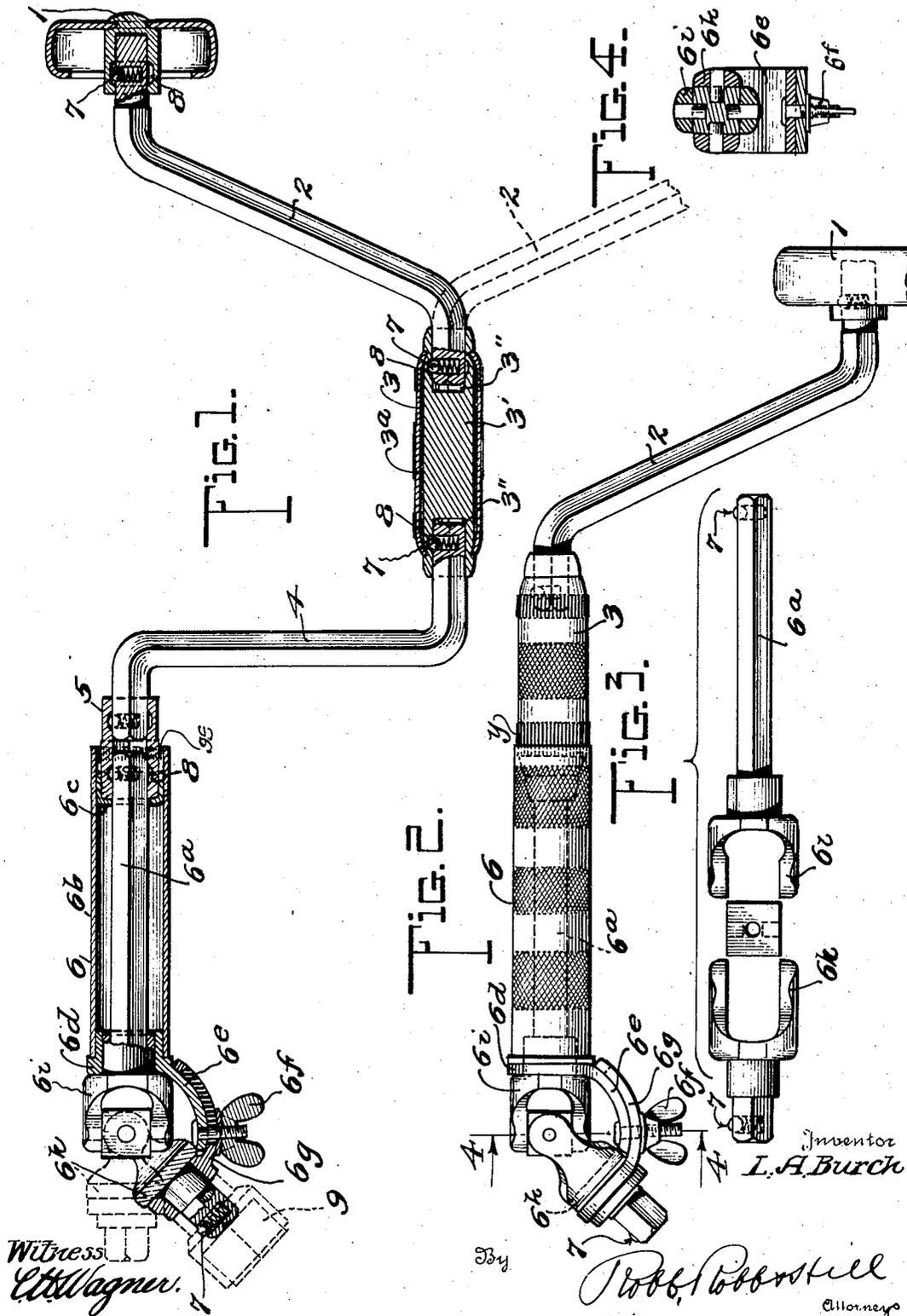
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L. A. BURCH
COMBINATION TOOL

Filed Dec. 7, 1922

2 Sheets-Sheet 1



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May 12, 1925.

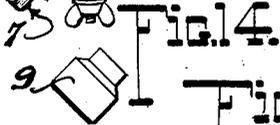
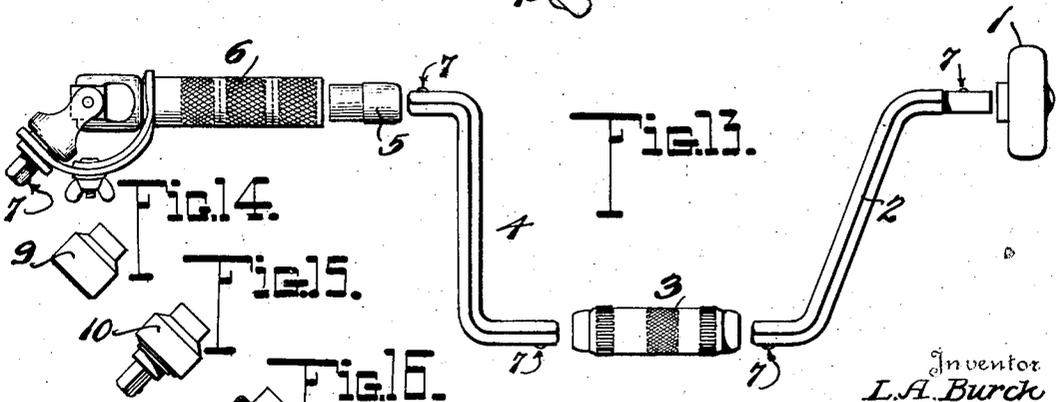
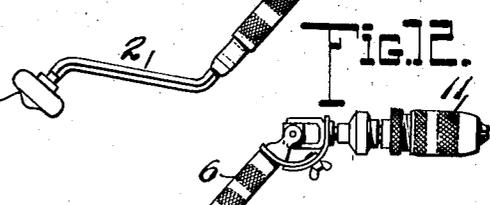
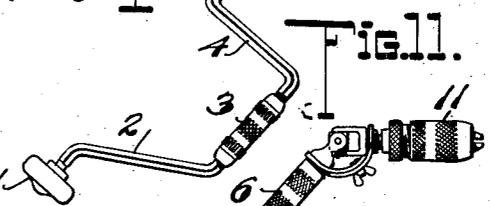
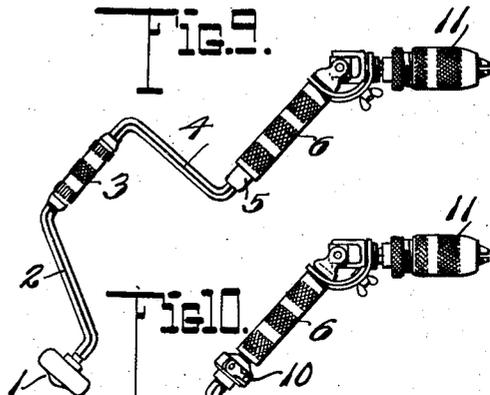
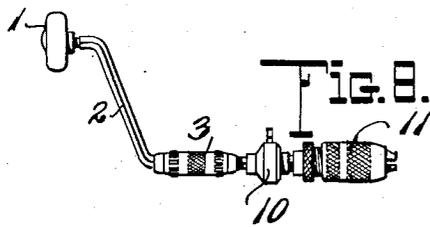
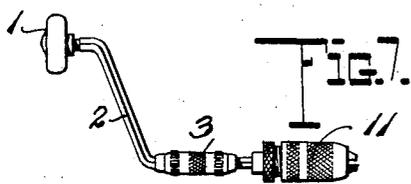
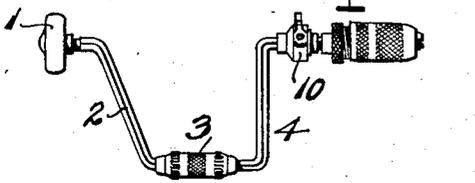
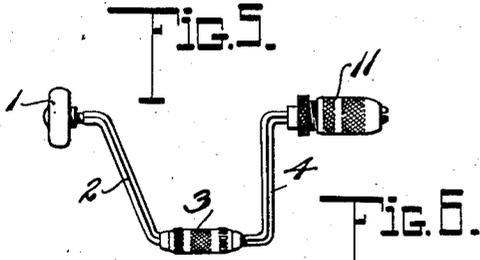
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L. A. BURCH

COMBINATION TOOL

Filed Dec. 7, 1922

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

LAWRENCE A. BURCH, OF JAMESTOWN, NEW YORK.

COMBINATION TOOL

Application filed December 7, 1922. Serial No. 605,457.

To all whom it may concern:

Be it known that I, LAWRENCE A. BURCH, a citizen of the United States, residing at Jamestown, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Combination Tools, of which the following is a specification.

The present invention relates to improvements in tools and in particular to that type in which the operating member is made up of separable sections capable of adjustment with respect to each other or assembly into different forms to take care of variations in the work which is to be done with the implement and the accessibility of the objects operated upon.

One of the primary objects in view is the provision of a combination tool embodying quickly detachable securing means whereby the sections of the tool may be easily and quickly removed, extended, modified as to form, or reduced in size to enable the most compact arrangement when not in use.

It is further an important feature of my invention to provide an implement of such component parts as will make it universal in its adaptations and the character of work which it will perform.

With the above and other objects in view, the invention consists in certain combinations and arrangements of the parts as will more fully appear as the description proceeds, the novel features thereof being pointed out in the appended claims.

In the drawings:

Figure 1 is a side elevation, with parts in section, of an embodiment of this invention including a universal joint unit, with a brace form of operating handle and showing in dotted lines a modified arrangement of the end handle section for changing leverage.

Figure 2 is a side elevation of the implement with one of the angle sections omitted.

Figure 3 is a detail view of the actuating elements of the universal joint section or unit.

Figure 4 is a sectional view on the line 4-4 of Figure 2, showing more clearly the joint.

Figures 5 to 12, inclusive, are elevation views of different adaptations of the tool, both as regards form and attachments.

Figure 13 is a view in elevation of one of the forms of this implement showing the detachable units separated, one from the other.

Figures 14, 15 and 16 are detail views of the socket, ratchet and chuck attachments, respectively, used in connection with this device.

Corresponding and like parts are referred to in the following description and indicated in all of the views of the drawings, by like reference characters.

The implement which is the subject matter of this invention is especially useful in the field of automotive engineering for the purpose of imparting rotation to nuts, screws, drill bits, or the like, and where very often great difficulty is experienced by mechanics in working, due to inaccessibility of parts or the points of attack,

I will first refer to the form of device which is clearly shown in Figures 1 and 3 to be composed of the knob unit 1, the angle handle section 2, the grip section 3, the right angle section 4, the coupling 5, and the universal joint section 6. Each of the sections 2 and 4 have male ends within which are seated spring actuated balls 7 designed to be received in the annular grooves 8 of the female ends of the parts 1, 3 and 5. The sections 2 and 4, furthermore, are hexagonal, or otherwise poly-sided or splined and the socket ends in which these are inserted correspond in shape so that it is possible to arrange one section at a different angle to another. One end of such tool is formed circular so that the knob 1 may rotate thereon as usual in this class of tools. In the assembled implement of Figure 1, the operating handle is in the form of a brace, but should this form not provide sufficient leverage it is an easy matter to shift the section 2 into the position shown in dotted lines, thereby very materially increasing the leverage obtainable.

It will, of course, be understood that to assemble these component parts, it is only necessary to slip the ends thereof one into the other, thus depressing the ball members which spring into the grooves referred to and interlock the parts against accidental displacement but readily permit the parts to be separated by merely pulling them apart.

Referring to the individual parts, the grip section 3 is composed of a body or core 3' containing the end socket 3'' and a freely rotatable sleeve 3^a which is secured on the core by crimping in the ends to seat within suitable grooves, as clearly shown in the drawings.

The coupling member 5 becomes necessary where any two male ends are contiguously arranged. That is to say, this part may receive the operating tool itself, for example, a screw driver bit (not shown) or the shank part of the tool attachments which are disclosed in the several figures of the drawings.

The universal joint section 6 is composed of a shank 6^a surrounded by a sleeve 6^b which is secured to a fixed bushing 6^c at one end and a bushing 6^d at the other end formed integrally with the clamp extension 6^e carrying a cooperating clamp extension 6^f loosely mounted on a universal joint element 6^h. This element 6^h is connected in turn to a cooperating joint element 6ⁱ having the shank 6^a extending therefrom. The coupling 5 is rotatable within the bushing 6^c and removable therefrom when the parts are assembled as in Figure 2.

A socket member of conventional form, designated 9, may be mounted on the end, as shown in dotted lines in Figure 1 where the tool is desired to be used in connection with the screwing or unscrewing of bolts and nuts, and the operating angle of the joint may be adjusted at will according to the position which is required for the tool to best perform the actuating function.

It will, of course, be understood that the separable parts of this implement hereinbefore described are designed primarily to form a part of a mechanic's kit of tools or accessories and in Figures 15 and 16 I have illustrated two very useful attachments which go to make the equipment most complete.

The first of these attachments designated 10, is a simple ratchet attachment by means of which partial rotation of the operating tool or handle are made effective, the attachment not being herein more specifically set forth inasmuch as it forms the subject matter of my co-pending application for improvements in ratchet attachments for tools, filed of even date herewith.

The second of these important attachments 11, shown in Figure 16, is a chuck attachment, and as with regard to the attachment 10, no specific description of this element is embodied herein as this forms the subject matter of my co-pending application for improvements in chuck attachments for tools, filed of even date herewith.

Referring to Figures 5 to 12, it will be observed that in Figure 5 the tool is in the form of a brace carrying as its operating

member the chuck attachment 11. Figure 6 is the same except that the ratchet attachment 10 is introduced between the handle and the chuck. Figure 7 constitutes the tool formation of Figure 5 with the right angle section of the handle omitted and Figure 8 is the same embodiment with the ratchet attachment 10 embodied therein between the grip piece and the chuck attachment. Figure 9 is a further adaptation in which the combination tool includes a universal joint section and the chuck section. Figure 10 differs merely in the inclusion of the ratchet attachment between the operating handle and the universal joint section. Figure 11 depicts the tool combination of Figure 9 with the right angle handle section omitted, while Figure 12 incorporates in this arrangement the ratchet attachment 10.

In reference to the arrangement shown in Figure 2, the coupling 5 is removed and the grip section 3 is directly inserted into the end of the sleeve of the universal joint section 6. I preferably broach straight knurls immediately within the socket end of the sleeve 6^b, as shown at *x* in Figure 1, and corresponding knurls *y* on the sleeve 3^a of the grip piece interlock therewith so as to rigidly connect the two sleeves together. This in effect prolongs the handle or grip portion of the tool when arranged as in Figure 2.

It will be quite apparent from the foregoing description that the combination tool herein described is capable of taking care of a large variety of functions requiring the rotation of the implement for performing the work. It is comprehended that other attachments may be employed not herein specifically set forth and, therefore, it is within the purview of this invention to modify the arrangements without departing from the spirit of said invention and within the scope of the claims hereto appended.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A tool of the class described comprising a detachable shank section provided with an angular male end, a handle rotatably mounted upon the other end of said section, a coupling section having sockets at its opposite ends into either of which said male end is interchangeably disposed, a second shank section provided with an angular male end to fit the sockets of the coupling section, a grip piece rotatably mounted upon said coupling section, and a tool carrier constructed to be detachably interlocked with one end of said second shank section or with an end of the coupling section.

2. A wrench device comprising shank

sections, a coupling section adapted to interchangeably receive the shank sections for disposal in different angular relations, a gripping section having sockets to receive
5 the shank sections and provided with a peripheral interlocking face, a member to engage the article to be turned, and a universal joint unit adapted to be arranged
10 between the shank sections and the member for engaging the article to be turned and formed with a socket to receive the end of the coupling section and also adapted to interlock with said peripheral face of the gripping section.
15 3. A combination tool of the class de-

scribed comprising a grip section having a freely rotating sleeve thereon having straight knurls broached thereon, an attachment for engaging the object to be operated and comprising a sleeve in which the knurled
20 end of the grip section engages, said sleeve being interiorly correspondingly knurled whereby the two sleeves are interlocked together, and handle means adapted to be connected to the other end of the grip sec-
25 tion.

In testimony whereof I affix my signature.

LAWRENCE A. BURCH.