Feb. 12, 1946. F. H. ROHR 2,394,808

WRENCH

Filed Feb. 9, 1944 2 Sheets-Sheet 1

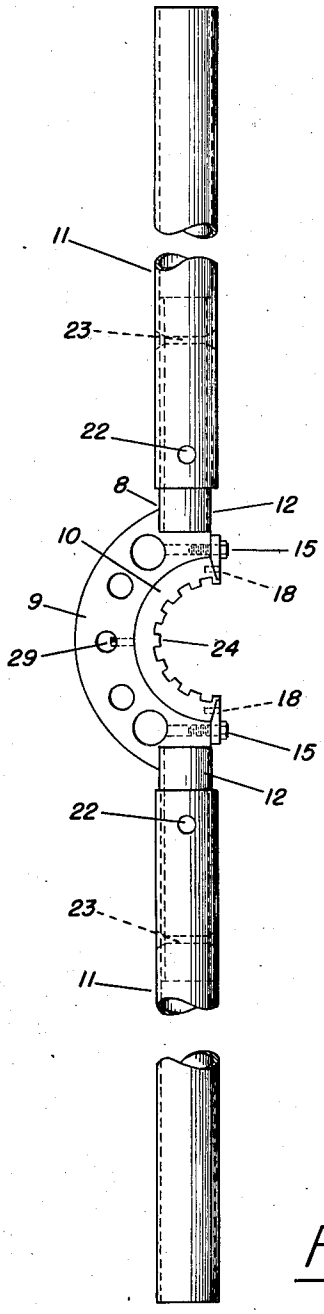


FIG. 1

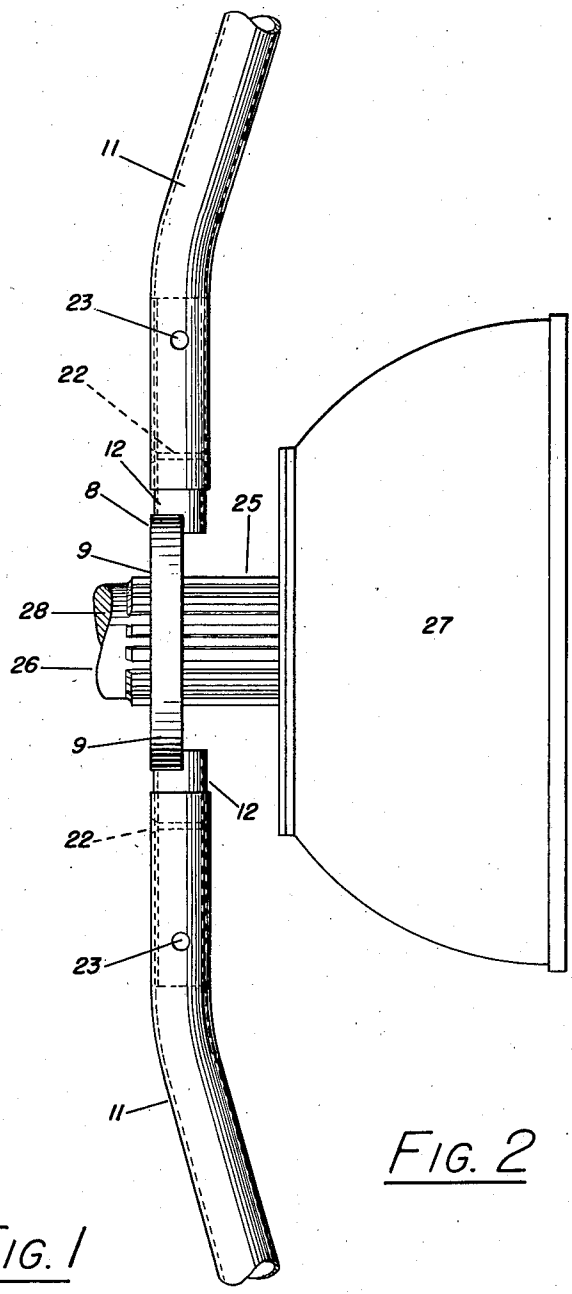


FIG. 2

INVENTOR
FREDERICK H. ROHR

BY Everett N. Curtis
ATTORNEY

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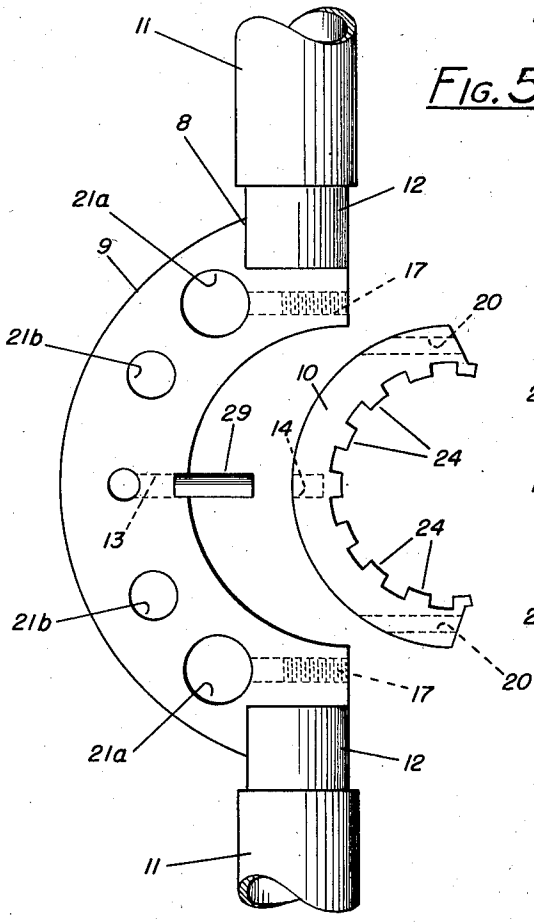


FIG. 3

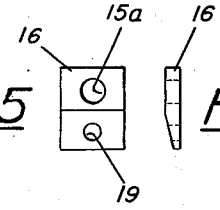


FIG. 5 FIG. 5a

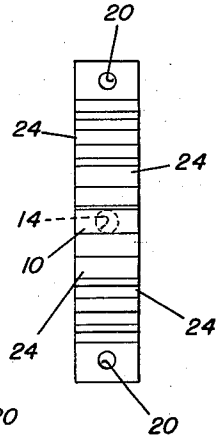


FIG. 4

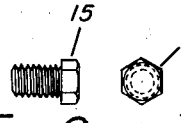


FIG. 6 FIG. 6a

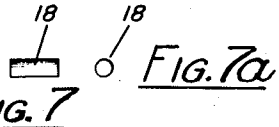


FIG. 7 FIG. 7a

INVENTOR
FREDERICK H. ROHR
BY Everett N. Curtis
ATTORNEY

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# UNITED STATES PATENT OFFICE

2,394,808

## WRENCH

Frederick H. Rohr, San Diego, Calif., assignor to Rohr Aircraft Corporation, Chula Vista, Calif., a corporation of California

Application February 9, 1944, Serial No. 521,688

3 Claims. (Cl. 81—90)

My invention relates to wrenches, particularly cranking bars employed for turning the shafts of engines or motors, and its objects are to permit great force to be applied to the object to be turned, with minimum wear thereon and without injury thereto; to lighten the construction of the jaws and handles of the wrench without impairing the strength thereof; and to allow the ready repair, replacement and assembly of the several parts. These and other important objects will appear from the drawings and as hereinafter set forth and described.

This application, insofar as this invention is concerned, includes most or substantially all of the disclosure as to said wrench presented in my earlier copending application Serial No. 487,862, filed May 21, 1943, and entitled "Tilting arcs," issued May 9, 1944, as U. S. Patent No. 2,348,309. Reference may be had to said copending application for details of construction which form no part of the present invention except as herein disclosed and claimed.

Attention is hereby directed to the drawings illustrating a preferred form of my invention in which similar numerals of designation refer to similar parts throughout the several views and in which—

Figure 1 is a side elevation of my improved wrench, the enclosed parts thereof being shown in dotted lines, and the handles thereof being shown broken, for purpose of better illustration;

Fig. 2 is an end elevation of said wrench, showing its application to the shaft of a motor, with the jaw of the wrench in engagement with the splined grooves of said shaft;

Fig. 3 is an enlarged view of the yoke and adjacent parts of the wrench shown in Fig. 1, showing the jaw detached therefrom;

Fig. 4 is a front elevation of the jaw shown in Fig. 3;

Fig. 5 is a plan view and 5*a* is a side elevation of one of the pair of the securing plates used for fastening the jaw in the hollow of the yoke;

Fig. 6 is a plan view and 6*a* is a side elevation of one of the pair of cap screws used for attaching said plates to said yoke, and

Fig. 7 is a plan and 7*a* is a side elevation of one of the pair of dowels employed to position said plates upon said yoke.

Referring to the drawings—my improved wrench is there shown in the form of the cranking bar 8, comprising the curved yoke 9, the jaw 10 detachably secured thereto, and hollow handles 11 removably affixed to the extensions 12 of said yoke; all of said parts being hard metal and of sturdy construction, except that the jaw 10 is preferably of softer metal, such as zinc, lead, brass, aluminum or similar material. As shown, the said jaw 10 is curved to fit the hollow of said yoke and is positioned therein by means of the dowel pin 20, the ends of which are shaped to engage with recesses 13 and 14 respectively in the walls of said yoke and insert. It is fastened to said yoke by cap screws 15, the shanks of which passing through openings 15*a* provided therefor in a pair of securing plates 16, engage with threaded openings 17 in the ends of said jaw; the said plates extending over the ends of both said yoke and jaw and serving firmly to connect the same. As a further means of preventing dislodgement of said jaw from the hollow of said yoke, I prefer to use a pair of dowels 18, which, engaging with openings 19 in said securing plates and openings 20 in the ends of said jaw, serve to prevent lateral displacement thereof and to secure the same more firmly in position.

The yoke 9, while sturdy in character, is preferably lightened in weight by having openings 21*a* and 21*b* made therein in such manner as not materially to diminish the strength thereof. To each end of said yoke is welded a hollow metallic extension 12, shaped to engage with the bore of one of the hollow handles 11, and affixed thereto by pins 22 and 23 extending through the walls thereof. The said handles, if desired, could be made solid, with sockets provided to receive the ends of extensions 12, but preferably are made hollow to secure lightness of construction, without loss of strength and for ease in handling are each made with a slight bend as shown in the drawings. The jaw 10 is provided with the teeth 24 shaped to engage with the usual splined area 25 encircling a conventional motor shaft 26, such as shown in the conventional form of motor 27 shown in Fig. 2. As is obvious, the form and arrangement of the teeth 24, or contact surface of the jaw 10, may be modified to suit the form and arrangement of the splines or grooves on the motor shaft, or to suit the application of the wrench to the object to be turned.

To install my improved wrench 8 in operative position, it is necessary first to engage the opening of the jaw 10 with the smooth reduced portion 28 of the shaft 26 immediately adjacent to the splined area 25 (see Fig. 2) and then by moving said jaw longitudinally toward the motor 27 to interlock the teeth 24 with the grooves of the splined area 25, at which time the workman, by grasping handles 11, can rotate the said shaft 26 to the degree desired. To remove said wrench

8 out of engagement with said shaft 26, this operation obviously may be accomplished by sliding the wrench outwardly and off said splines, and by lifting the wrench out of position. By reason of the soft metal of which said jaw 10 is composed, much greater turning pressure may be exerted on the splines of the shaft 26 without injury, than if the said jaw were of harder material; and such softer jaws although tending to wear out more rapidly and requiring more adequate means of positioning and attachment to the wrench than if made of harder material, nevertheless have the great advantage of being cheaply made in quantities from a permanent mold or die and being easily replaceable.

While I have described my improved wrench with particular reference to its use as a cranking bar for turning the shafts of motors or other engines, I do not desire so to limit its scope of use, since as is obvious such wrench could be applied to other objects to be turned by conforming the shape of the jaw so that proper engagement could be made with such objects. By reason of the fact that such jaw is replaceable, its contacting surface could be made in a variety of forms so as to permit it being employed extensively in the art in many instances where the turning action of a wrench was required. Being usually made of softer metal than that heretofore employed, and readily replaced, the life of the wrench is greatly extended, and at the same time the wear upon the object to be turned is greatly reduced from wear heretofore necessarily experienced in the use of wrenches commonly used in the art. Also through the use of the soft metal jaw, much greater turning force can be applied to the work, without injury, than has been the case where hard metals have been used.

My invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment, as above set forth, is therefore to be considered in all respects as illustrative and not restrictive, the scope of my invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What I claim and desire to secure by Letters Patent is:

1. In a cranking bar for turning a splined motor shaft, the combination of a hard metallic yoke having a hollow therein, handles fastened to the ends of said yoke, a replaceable jaw of soft metal seated within the hollow of said yoke and provided with teeth shaped to register and to make engaging contact with the splines of said shaft, attachment plates and means associated therewith for removably securing the ends of said jaw to the ends of said yoke and while so secured of preventing both lateral and longitudinal movement of said jaw within said yoke.

2. In a cranking bar for turning a splined motor shaft, the combination of a hard metallic yoke having a curved hollow therein, a pair of bent hollow handles removably fastened to the ends of said yoke, a replaceable jaw of soft metal formed to fit and to be seated within the hollow of said yoke and provided with teeth shaped to register and to make engaging contact with the splines of said shaft, a pair of attachment plates and means associated therewith for removably securing the ends of said jaw to the ends of said yoke and while so secured of preventing both lateral and longitudinal movement of said jaw within said yoke.

3. In a cranking bar for turning a splined motor shaft, the combination of a hard metallic yoke having a curved hollow therein, a pair of bent hollow handles removably fastened to the ends of said yoke, a replaceable jaw of soft metal formed to fit and to be seated within the hollow of said yoke and provided with teeth shaped to register and to make engaging contact with the splines of said shaft, and a pair of removable attachment plates secured by cap screws to the ends of said jaw and prevented from longitudinal and lateral movement by dowel pins engaging both said jaw and plates.

FREDERICK H. ROHR.