April 26, 1955 A. D. ALLEN 2,706,922

HYDRAULICALLY OPERATED SLIDABLE JAW WRENCH

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Fig. 1

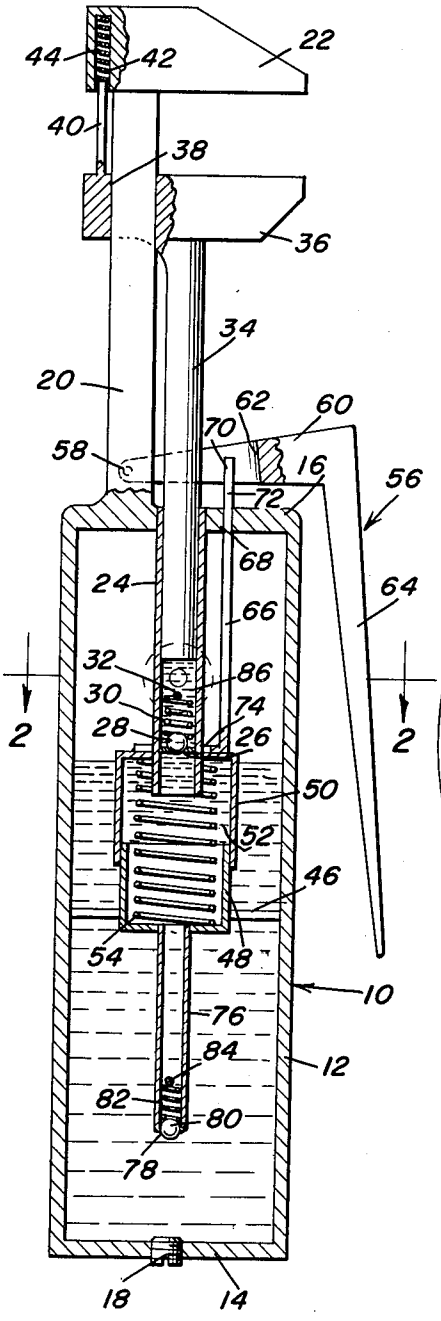
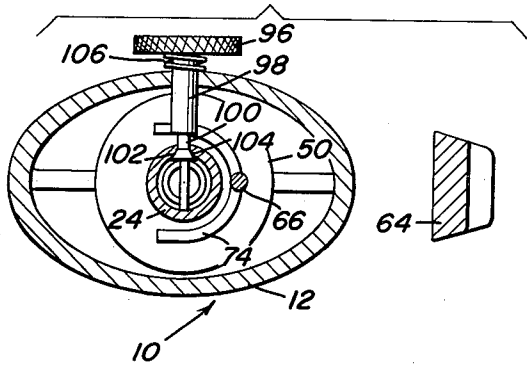


Fig. 2



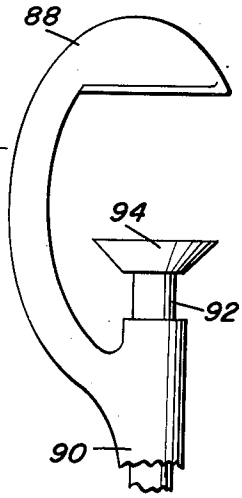
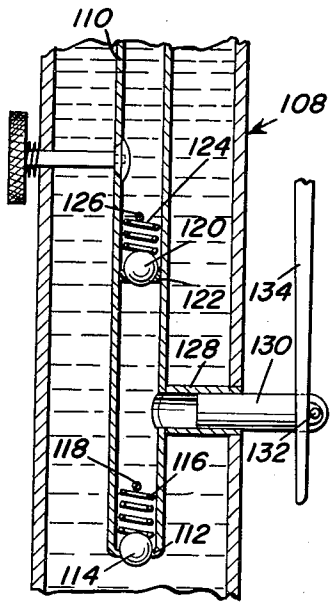


Fig. 3

Fig. 4



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HYDRAULICALLY OPERATED SLIDABLE JAW WRENCH

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5 Claims. (Cl. 81—85)

This invention relates generally to tool mechanisms, and pertains more particularly to an improved form of wrench.

The primary object of this invention is to provide an improved form of wrench having hydraulically operated gripping means for exerting an even pressure on a nut member, nipple or any member desired to be gripped by a wrench.

Another object of this invention is to provide an improved hydraulic wrench mechanism which incorporates improved and simplified operating means which is notable in its simplicity of construction and ease of manufacture.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a longitudinal section taken through one form of wrench constructed in accordance with this invention;

Figure 2 is a horizontal section taken substantially along the plane of section line 2—2 in Figure 1;

Figure 3 is an elevational view of a modified form of jaw construction; and

Figure 4 is a partial longitudinal section showing a modified form of hydraulic assembly.

Referring now more particularly to the drawings, reference numeral **10** indicates the handle of the wrench generally, which will be seen to consist of an elliptical body portion **12** having a closure plate **14** at one end and a closure plate **16** at its other end. The closure plate **14** is provided with a threaded aperture within which a plug member **18** is received by means of which the hollow interior of the handle may be filled with hydraulic fluid for the purpose which will be presently apparent.

Integrally formed with or otherwise suitably secured to the other end cap member **16** is a post member **20** which is formed with a fixed jaw member **22** at its outer free end, the post member extending parallel to the longitudinal axis of the handle member **10**. An elongated tubular member **24** is secured to the end plate **16** and projects therethrough to communicate exteriorly of the hollow interior of the handle, and the inner end of this tubular member is provided with a valve seat member **26** with which a ball type check valve member **28** cooperates under action of a coil spring **30** seated against the check valve member and against a transverse pin **32** secured to the tubular member diametrically thereof.

A plunger member **34** is slidably received in the tubular member **24** and is formed at its upper end with a movable jaw member **36** which includes an apertured portion **38** slidably receiving the post member **20** to prevent rotation of the movable jaw with relation to the fixed jaw **22** with which it cooperates to clamp a member therebetween. The movable jaw is provided with a finger member **40** projecting into a bore **42** in the fixed jaw member **22** within which a coil spring **44** is positioned such as to bear against the free end of the finger **40** to normally urge the jaws to a spread apart position for ease in receiving work therebetween.

Below the lower end or inner end of the tubular member **24** is a spider construction **46** which is secured to the handle body **12** and which rigidly supports a cup member **48** in spaced relation to the inner end of the elongated

tubular member **24** for cooperation with a second cup member **50** slidably received on the tubular member and interfitting with the first cup member **48**. As will be readily apparent, these two cup members are disposed in opposed relation to present a chamber **52** therebetween which is of variable volume. A coil spring member **54** is disposed within the cup members and seats thereagainst to normally urge the movable cup member **50** away from the stationary cup member **48**.

An operating handle, indicated generally by the reference character **56** is pivotally secured, as by a pin **58**, to the post **20** and includes the upper portion **60** which is bifurcated, as at **62**, to straddle the post **20**. The handle is of generally L-shaped configuration, and the operating portion **64** thereof overlies the handle body **12** and is adapted, when the wrench is gripped, for ease in manipulation. A link member **66** projects through an aperture **68** in the cap or wall **16** and has a reduced end portion **70** received between the bifurcated portion of the handle such as to provide shoulders, as at **72**, engageable by the handle whereby the link member is reciprocated in response to pivotal motion of the handle. The lower end of the link member **66** is provided with a laterally projecting horseshoe-shaped presser foot **74** rigidly secured to the closed end of the cup member **50** to impart reciprocatory motion thereto.

The closed or lower end of the cup member **48** is provided with an inlet conduit member **76** having a neck down portion **78** at its free end to provide a seat for the ball valve member **80** urged into engagement therewith by the coil spring **82** bearing against a pin **84** projecting transversely through and secured to the inlet conduit **76**. By this construction, it will be readily apparent that the pivotal motion of the handle **56** will impart reciprocation to the movable cup member **50** to force hydraulic fluid disposed within the hollow interior of the handle **10** up into the chamber **86** between the ball check valve member **28** and the lower end of the plunger **34** which will urge the movable jaw member **36** towards the fixed jaw member **22** to clamp work therebetween.

Referring now more particularly to Figure 3, a modified form of jaw construction is shown wherein the fixed jaw member is indicated by the reference character **88** and will be seen to have a lower boss portion **90** for rigid securement to the handle assembly and which is provided with a longitudinal bore for receiving the plunger **92** which terminates in the movable jaw member **94**. This arrangement is particularly adapted for more rugged and heavier duty.

For the purpose of releasing the pressure within the chamber **86** to permit disengagement of the jaw members from the work, a release button **96** is provided. This button includes a shank portion **98** slidably received in the handle body **12** and provided at its free end with a reduced end portion **100** terminating in an enlarged tapered head **102** cooperating with a conical seat **104** in the tube **24** such that the spring **106** disposed between the button **98** and the handle body **12** will normally close the valve opening. However, upon depression of the valve button **96**, the pressure within the chamber **86** will be released.

Referring now more particularly to Figure 4 wherein a modified form of construction is shown, the handle assembly is indicated generally by the reference character **108** and is generally similar to the construction previously described in connection with Figure 1. However, the tube **110** corresponds to the tube **24** and is provided at its inner end with a neck down portion **112** for cooperation with the ball check valve member **114** and associated spring **116** engaging its pin **118**. A second ball check valve member **120** is provided in spaced relation to the ball check valve **114**, and the second ball check valve cooperates with a seat member **122** rigidly secured to the tube **110** under action of the spring **124** bearing against the pin **126**. A cylinder **128** is rigidly secured between the handle member and the tube, and communicates with the latter between the two ball check valve members previously described. A piston **130** is reciprocable within the cylinder and is pivotally secured, as at **132**, to the handle **134**. Any suitable means may

be provided for limiting the outward movement of the piston.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A hydraulic wrench comprising a hollow handle member, a stationary jaw secured to said handle member and spaced from one end thereof, an elongated tube secured within said handle member and communicating exteriorly thereof at said one end, a plunger slidably received in said tube, a jaw fixed to the outer end of said plunger for movement toward and away from said stationary jaw, a lever pivoted to said handle member and overlying the same, a check valve at the inner end of said tube, and pump means connected to said lever for introducing fluid within said handle member into said tube.

2. A hydraulic wrench comprising a hollow handle member, a stationary jaw secured to said handle member and spaced from one end thereof, an elongated tube secured within said handle member and communicating exteriorly thereof at said one end, a plunger slidably received in said tube, a jaw fixed to the outer end of said plunger for movement toward and away from said stationary jaw, a lever pivoted to said handle member and overlying the same, a check valve at the inner end of said tube, pump means connected to said lever for introducing fluid within said handle member into said tube, and means on said movable jaw engaging said stationary jaw for normally urging the two jaws apart.

3. The combination of claim 1 wherein a cup member is secured within said handle member with its open end facing said tube, a second cup member slidable on said tube and received on the open end of the first cup member, a link secured to said second cup member projecting outwardly of said handle member and pivotally secured to said lever, a spring within said cup member normally urging them apart, and an inlet tube secured to said first cup member communicating with the chamber in said handle member and having a check valve therein to control the flow of fluid therethrough.

4. The combination of claim 1 wherein said tube is provided with a second check valve in spaced relation to the first mentioned check valve, a cylinder secured to said handle member and having one of its ends projecting therethrough, said cylinder having its other end secured to and communicating with said tube between the first and second check valves, and a piston slidable in said cylinder and connected to said lever for operation thereby.

5. The combination of claim 1 wherein a pressure release button is carried by said handle member for relieving pressure within said tube.

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