

Nov. 16, 1954

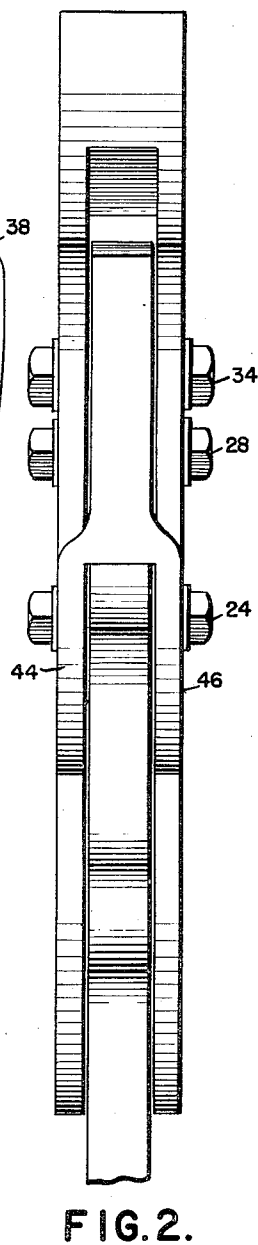
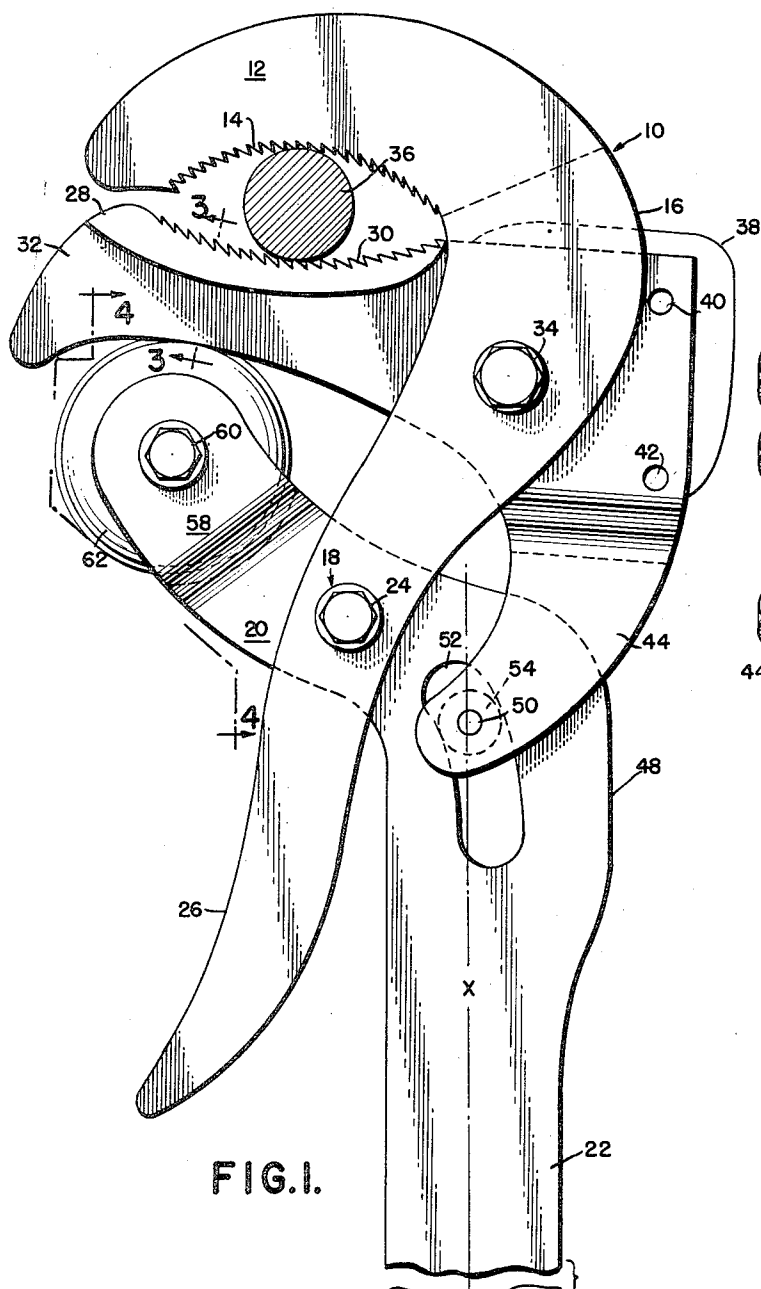
O. S. MEREDITH

2,694,331

POWER GRIP PIPE WRENCH

Filed June 29, 1953

2 Sheets-Sheet 1



INVENTOR
Orville S. Meredith

BY *Hyman J. Liddy*
Arthur A. Nathanson
ATTORNEY

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2 Sheets-Sheet 2

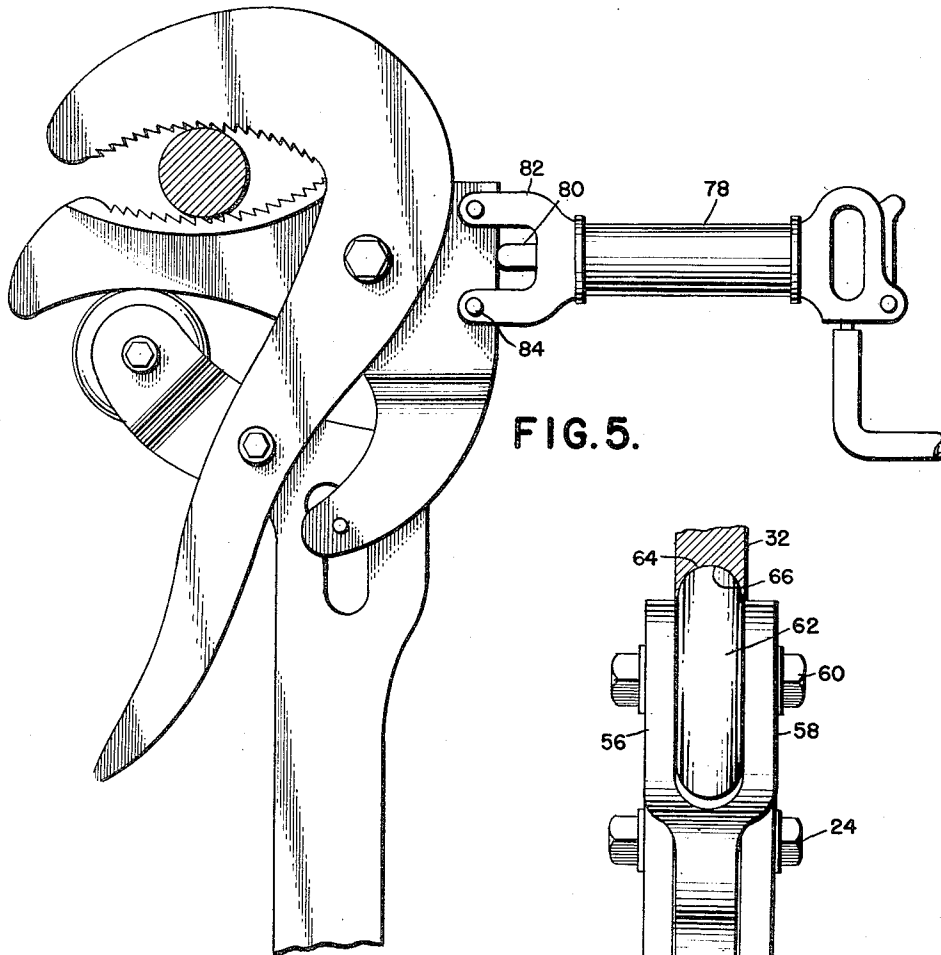


FIG. 5.

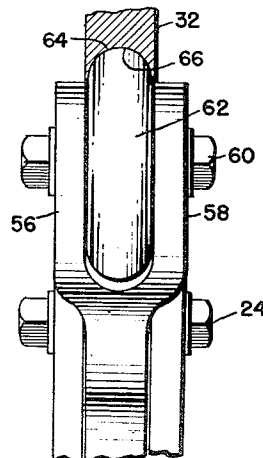


FIG. 4.

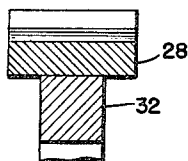


FIG. 3.

INVENTOR
Orville S. Meredith

BY *Sylvester J. Libby*
Arthur L. Nathanson
ATTORNEY

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2,694,331

POWER GRIP PIPE WRENCH

Orville S. Meredith, Skidmore, Tex.

Application June 29, 1953, Serial No. 364,574

3 Claims. (Cl. 81—91)

This invention relates to pipe wrenches, and particularly to pipe wrenches adapted to break the joints of well drill stems.

In drilling very deep wells, such as oil wells, it is necessary to assemble the drill in sections. This is usually done by threading sections together. In the drilling operation the drill is rotated in a direction such that the threaded sections tend to tighten; as a result difficulty has been experienced in disassembling the sections.

In this work much valuable time is lost in the methods now used. At the present time drillers use a conventional type pipe wrench with straight jaws on the hardened steel drill stems which are usually $4\frac{1}{2}$ inches in diameter; a sledge hammer is used to jar and loosen the joints which have twisted tight. Present day drillers have a lot of trouble with the regular type wrench slipping. Obviously a straight jaw wrench tends to slip easily on a hard steel drill stem.

Power driven wrenches suitable for use in oil well drilling are known. However such wrenches are costly, are easily put out of adjustment, subject to frequent breakdown, and are heavy and difficult to handle. It is accordingly an object of this invention to provide a relatively inexpensive simple, light and easy to use wrench having power means for use in "breaking" drill stems. The present invention has means for utilizing a pneumatic hammer which will be superior to use of a sledge hammer. Also a chain, wire or rope can be hooked to a portion of the wrench and can be connected to a winch for the purpose of obtaining power operation. Another important consideration in wrenches is the desirability for quick and easy opening and closing of the jaws. Stiff wrenches or those which are otherwise difficult to operate slow down the drilling operations. Therefore a further object of this invention is the provision of a wrench for well drilling which is easy to operate.

Also an object of this invention is to provide a manually operable wrench which will securely grip objects such as drill stems.

As mentioned previously drillers often complain of the fact that present wrenches tend to slip. It is yet another object of this invention to prevent slipping by providing a simple wrench having power operating means which function to tighten the jaws of the wrench as power is applied.

These and other objects and advantages will be apparent from the following description of the present invention and the accompanying drawings, in which:

Figure 1 is a side elevation of the wrench illustrative of this invention showing a means for connecting the wrench to a winch.

Figure 2 shows a rear elevation of a portion of the wrench shown in Fig. 1.

Figure 3 shows a sectional view of a portion of the wrench taken along the line 3—3 of Fig. 1.

Figure 4 shows a partial front elevational view taken along the line 4—4 of Fig. 1.

Figure 5 shows a side elevational view of a wrench having a pneumatic hammer associated therewith.

Similar reference characters represent similar parts in the several figures.

In the embodiments of the invention which have been chosen for purposes of illustration in Figure 1, there is shown in side elevation a wrench 10. This wrench comprises an upper jaw 12 provided with teeth 14 and forming a part of a solid upper jaw member 16. Jaw member 16 has downwardly depending fork elements 17 and 18

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which are pivotally connected as at 18 to a bent portion 20 of a handle 22 by a bolt 24. Jaw member 16 has an extension 26 which may be used as a handle to facilitate opening of jaw 12 when a wrenching operation is completed.

A lower jaw 28 also provided with teeth, 30, is secured on lower jaw member 32. Jaw member 32 is pivotally connected by bolt 34 to jaw member 16. The two jaws are oppositely curved, as illustrated, and are shown gripping a pipe drill 36, shown in section. The diameter of these pipe drills is usually $4\frac{1}{2}$ inches. At its rearmost portion lower jaw member 32 is provided with a substantially enlarged portion 38. Portion 38 has two laterally extending openings 40 and 42 adjacent its rear edge for a purpose hereinafter described.

Lower jaw member 32 also has its lower end bifurcated to form legs 44 and 46 which receive enlarged section 48 of handle 22. Legs 44 and 46 are pierced, in lateral alignment to receive a pin 50. Handle 22 has a curved slot or a guideway 52 formed therein in which roller 54 is positioned. Roller 54 is rotatably mounted on pin 50 and has a diameter slightly less than the distance laterally across guideway 52 to permit free rolling movement. Guideway 52 curves upwardly and to the left as viewed in Fig. 1.

The roller guideway is curved to provide opening and closing movement of the jaws upon movement of handle 26 relative to handle 22. The roller and guideway lie to the left or inwardly of openings 40 and 42 and below pivot point 18 as viewed in Fig. 1. In other words, considering the handle 22 to have a longitudinal axis X extending medially through the main portion thereof, and that the jaws extend laterally outwardly to one side thereof, it is seen that the pivotal connection between handle 22 and upper jaw 12 lies at the same side of axis X as the jaws, and that enlarged portion 38 projects laterally outwardly on the opposite side of axis X. Also guideway 52 and roller pin 50 lie substantially in alignment with axis X, at least they are closer thereto than either pivotal connection 18 or openings 40 or 42 as well as being below pivotal connection 18.

At its upper outer end, handle 22 is forked as at 56—58. Bolt 60 is fastened in fork legs 56—58, and pressure exerting roller member 62 is rotatably mounted on the bolt. As shown in Fig. 4 lower jaw member 32 has a curved track 64, and roller 62 has a convex outer surface 66 in engagement therewith. Roller 62 and thus handle 22 exerts pressure against jaw member 32 during closing operation thereof and the curved trackway insures that such pressure will be exerted directly upward, as viewed in Figs. 1 and 4. Pressure exerted through handle 22 is applied substantially directly in alignment with the place of gripping contact between jaw 28 and drill stem 36 but slightly outwardly thereof with respect to axis X. Thus strain is not transmitted through jaw member 32 during normal operation and the "gripping" characteristics of the wrench are increased.

Figure 1 also illustrates a U-shaped clip 68 attached by pin 70 to handle 22. Hook 72 is connected by cable 74 to winch 76. Thus the wrench can be power operated to initiate disengagement of drill sections. The pivotal connections, as described above, are placed so that pressure applied to the handle when an object is engaged within the jaws will tend to tighten the grip of the wrench.

Figure 5 illustrates the manner of applying a shock to the drill stems by power means. Air hammer 78 of any suitable type having a plunger or striking head 80 is provided with a fork shaped member 82. Member 82 can be attached to the hammer housing by any suitable means. Each of the legs of member 82 has a pin 84 engageable in openings 40 or 42 respectively. The forked legs are equally spaced laterally of head 80. The shock load is delivered substantially in alignment with pivot pin 34 and in view of the positioning of holes 40 and 42 with respect to the pivotal connections and axis X, as described above, the shocks tend to tighten the grip of the wrench as well as loosen the drill section.

While I have shown and described a preferred form of my invention, it will be understood that variations in details of form may be made without departure from the invention as defined in the appended claims.

I claim:

1. A wrench comprising a handle having a generally longitudinal central axis extending through a portion thereof, said portion terminating at one end with an offset second portion of said handle extending outwardly to one side of said axis, means forming a roller guideway in said handle, said guideway being substantially in alignment with said axis, a roller pivotally mounted in said second portion and having a convex outer perimeter, an outer jaw member having a jaw for engaging an object and pivotally connected to said second portion, an inner jaw member having a jaw pivotally connected to said outer jaw member and having a jaw facing the first mentioned jaw, said inner jaw member having a concavely curved track engageable with said roller so as to seat a portion of the convex perimeter of said roller therein a second roller pivotally connected to said inner jaw member and seated in said guideway so as to be movable therein, and a portion of said inner jaw member projecting outwardly of said axis on a side opposite said one side of said axis, means for connecting said last named portion to a device for delivering impacts to said wrench against said last named portion and laterally of said axis.

2. A wrench comprising a handle, an outer jaw pivotally connected to said handle, an inner jaw pivotally connected to said outer jaw, said handle having an outwardly extending portion underlying said inner jaw, a roller rotatably mounted on said outwardly extending portion, a track on said inner jaw, said roller being seated in said track in rolling engagement therewith and being adapted to exert pressure on said inner jaw upon movement of said handle with respect to said jaws, a roller

guideway formed in said handle, and a roller pivotally connected to said inner jaw and seated in guided engagement in said guideway.

3. A wrench comprising a handle, an outer jaw pivotally connected to said handle, an inner jaw pivotally connected to said outer jaw, a roller guideway formed in said handle, a roller pivotally connected to said inner jaw and seated in guided engagement in said guideway, and means forming spaced openings in said inner jaw, a forked member having spaced legs in engagement with said inner jaw by means of said spaced openings and connected to an impact hammer with the striking head of said hammer being positioned to strike said inner jaw intermediate the legs of said fork.

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