July 3, 1951 S. M. AKINS 2,558,897

BOOSTER SOCKET WRENCH

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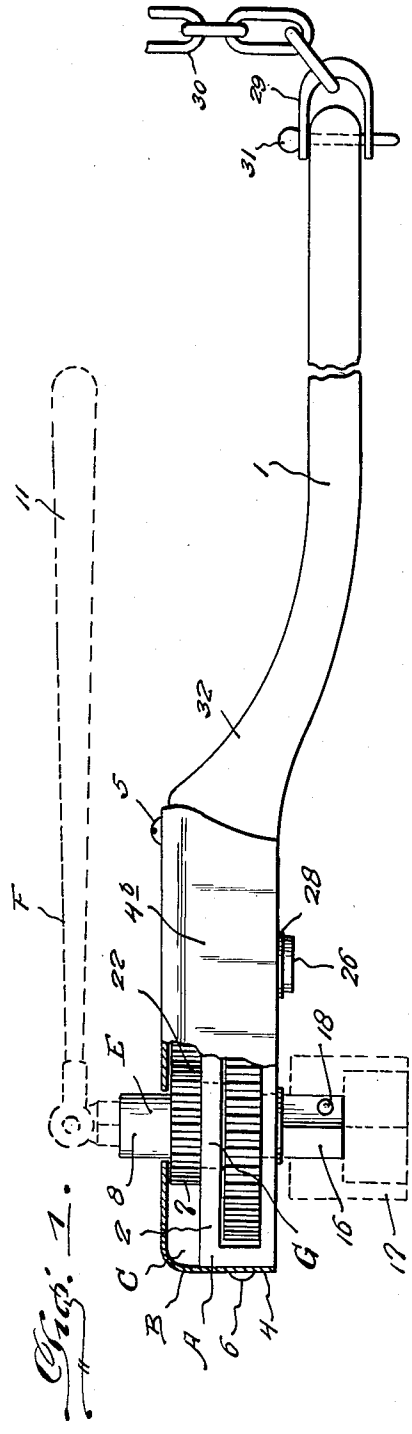


Fig. 1.

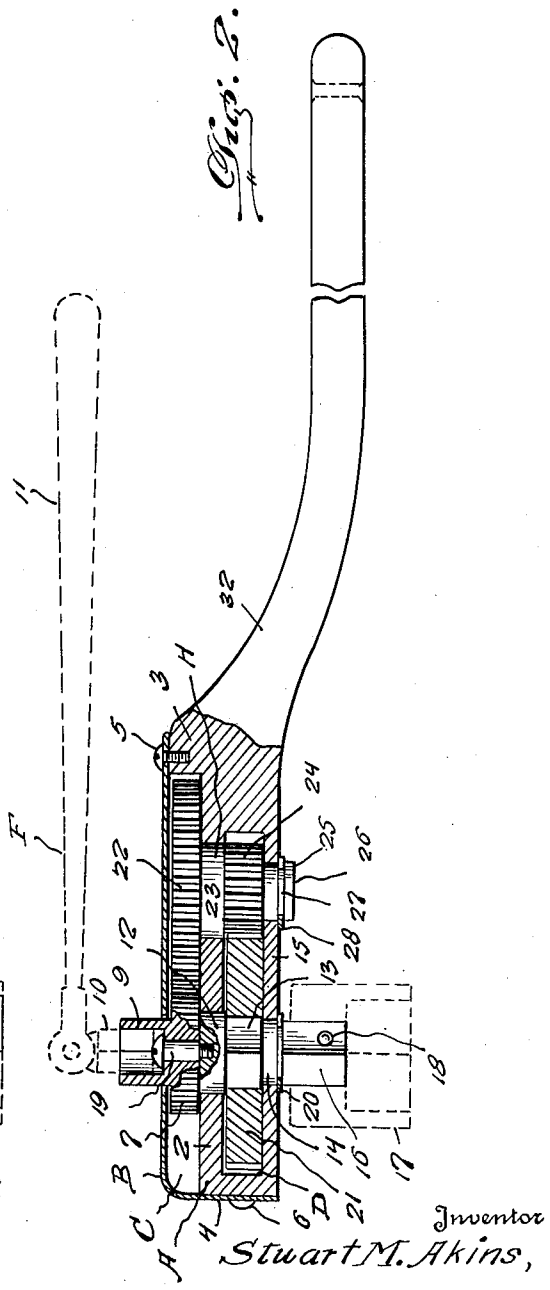


Fig. 2.

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Fig. 5.

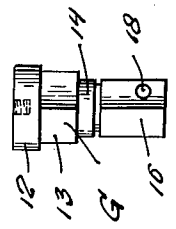


Fig. 6.

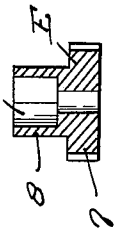


Fig. 3.

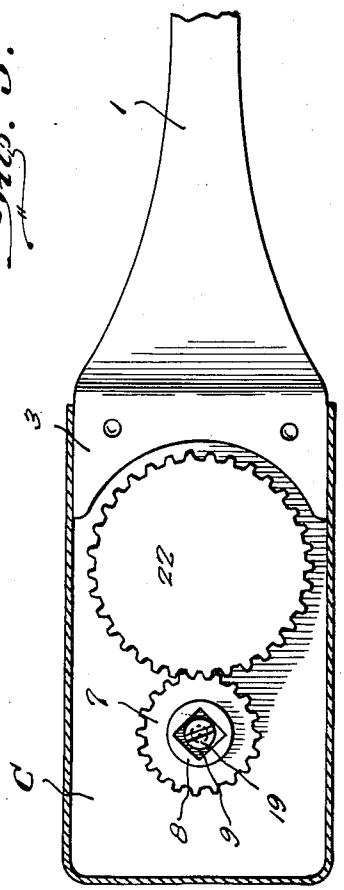
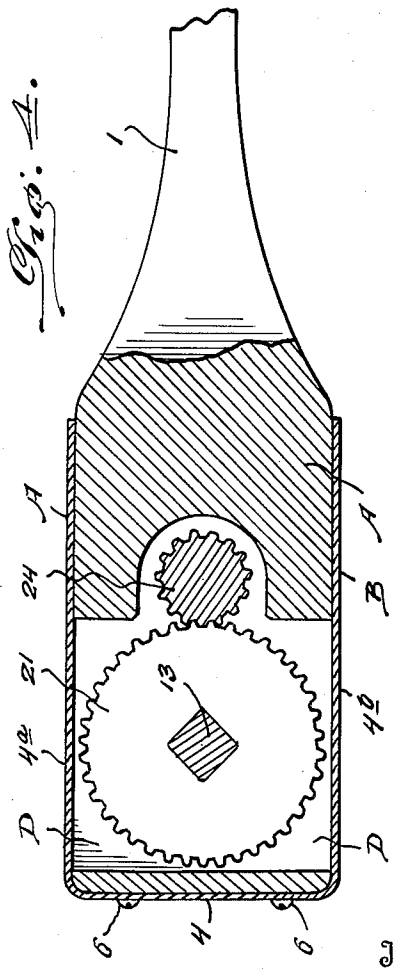


Fig. 4.



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BOOSTER SOCKET WRENCH

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Application March 7, 1947, Serial No. 733,101

1 Claim. (Cl. 81—57)

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This invention relates to a wrench but more particularly and specifically to a socket wrench having associated therewith a gearing which enables great force or pressure to be applied, with ease, for loosening or tightening nuts and bolts.

The primary object of the invention is the provision of an improved wrench of the socket type.

Another object of the invention is the provision of a wrench of the type described in which a novel and highly efficient gear arrangement is provided through which the tightening and loosening of nuts and bolts is greatly facilitated.

Another and still further object of the invention is the provision of an improved wrench of the character described for operation upon nuts and bolts which are so placed or positioned as to be difficult to reach and operate upon.

Still a further object of the invention is the provision of a wrench of the character described which is simple of construction, comparatively cheap of manufacture, and highly durable and efficient in operation.

Other objects and novel features of construction and improved results of the invention will appear from the following description when read in the light of the accompanying drawings.

Although reference in the description is made to a "socket" wrench it is to be reocgnized that a nut or bolt head engaging element other than a socket can be provided without departing from the inventive concept and that specific uses of the invention other than those specifically described can be made but would still follow within the inventive concept.

In the drawings:

Fig. 1 is a view in side elevation of the wrench, a portion of the cover being broken away.

Fig. 2 is a vertical sectional view.

Fig. 3 is a top plan view with the cover in horizontal section.

Fig. 4 is a horizontal sectional view.

Fig. 5 is a detail view of the driving shaft below the pinion.

Fig. 6 is a vertical sectional view through the driving pinion.

Describing the improved wrench in detail with reference to the accompanying drawings, A is a plate or head having an extending handle like portion 1. The plate A is provided with an open-sided interior chamber D. The top 2 of the plate, adjacent the handle, is provided with a shoulder 3. A cover B extends over the top of the plate and has a depending front end 4 and sides 4*a* and 4*b*. Screws 5 secure the cover top to the shoulder 3 of the plate and screws 6 secure the cover to

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the front end face of the plate. This construction forms a chamber C at the top of the plate. The side walls of the cover form side closures for the interior chamber D.

A driving pinion E embodies a gear 7 disposed in the chamber C and an upwardly extending circular collar 8 which passes through and is freely rotatable in the cover top. This collar is hollow and at its external end is squared to form a reception socket 9 for the squared socket 10 of a socket wrench F.

Manipulation of the socket wrench by its handle 11 will cause rotation of the driving pinion.

A shaft G has an upper end 12 rotatable in the plate top 2 and within the chamber D a squared portion 13 below which is a round bearing portion 14 rotatable in the plate bottom 15. The lower external end of the shaft is squared, as at 16, and is adapted to fit and carry a socket wrench 17 which is detachably secured in place by a spring-actuated ball 18.

The pinion E is secured to the upper end of the shaft G by a screw 19 and immediately below the plate bottom 15 the shaft is provided with a resilient keeper ring 20.

A gear 21 is provided and has a square opening in which the square portion of the shaft G is disposed.

A second shaft H has at its upper end a gear 22 which is in the chamber C and meshes with the drive pinion gear 7. A bearing like portion 23 of this shaft is rotatable in the plate top 2. A second gear 24 of this shaft is in the chamber D and meshes with the gear 21. A second bearing like portion 25 of the shaft is rotatable in the plate bottom 15. The lower external end 26 of the shaft is provided with a groove 27 having therein a resilient keeper ring 28.

A shackle 29, having an extending chain 30, is detachably received to the handle 1 by a pin 31.

Because of the removable cover F, the readily detachable pinion E, and the readily removable keeper rings 20 and 28 the device can be quickly and easily assembled or disassembled and parts can be conveniently replaced or repaired should this prove necessary.

The purpose of the invention is to provide what might well be called a "booster" for a socket wrench because the invention in practice permits great force to be easily applied to the socket wrench for heavy work, that is where a strong force must be applied in loosening or tightening bolts or nuts, and provides this force even where the working space is limited.

In operation, the wrench socket 17 is applied

to a nut and the pinion E is rotated by rotation of the operating handle 11. This results in turning the plate A which will continue its rotation until its handle 1 engages a fixed part of the equipment or device being worked on. When this contact occurs the plate rotation stops and the wrench socket is then rotated by the pinion gear 7 through the gears 22, 24 and 21. The gear 21 rotates the shaft G which carries the wrench socket 17 and great force can and is applied to this socket without the application of any great effort being applied to the operating handle 11.

Should the conditions be such that there is no abutment for the plate handle 1 then the plate is anchored against rotation by attaching the chain 30 to a convenient fixed object.

Attention is directed to the curve or off-set 32 in the plate handle 1. The amount of this off-set will be determined by placing the strain resulting from the wrench socket 17 on a level plane with the handle portion 1 of the device.

A desirable feature of the device is that the pressure being exerted can be measured by means of a torque wrench handle and a chart figured for the gear ratio. This chart will serve as a guide in the use of the wrench.

This booster will permit the use of a much smaller socket wrench F than would be the case if the power were applied to the wrench socket 17 directly by the wrench F.

What I claim is:

A booster socket wrench comprising a handle, a head positioned adjacent one end of said handle and secured thereto, a first shaft extending transversely through said head and rotatably supported therein, one end of said shaft projecting out of said head and being of multi-

sided configuration for attachment of a socket wrench thereto, a pinion positioned adjacent the end remote from said projecting end of said shaft and mounted for rotation about said shaft as an axis, a second shaft extending transversely through said head and spaced from said first shaft and rotatably mounted in said head, a first gear mounted on said second shaft for rotation therewith and in meshing engagement with said pinion, a second pinion arranged in side by side spaced relation with respect to said first gear and mounted on said second shaft for rotation therewith, a second gear arranged in side by side spaced relation with respect to said first pinion mounted on said first shaft for rotation therewith, and in meshing engagement with said second pinion, and a socket positioned exteriorly and transversely of said head and having one end fixedly secured to said first pinion and adapted to drivingly engage the squared socket of a socket wrench.

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