Sept. 8, 1931. J. ZILLIOX 1,822,428

WRENCH

Filed April 14, 1930

Fig. 1.

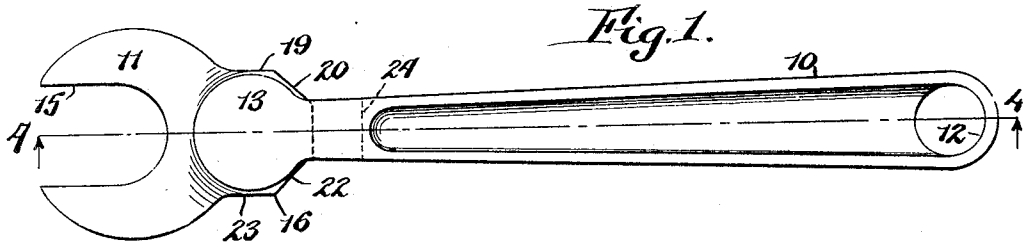


Fig. 2.

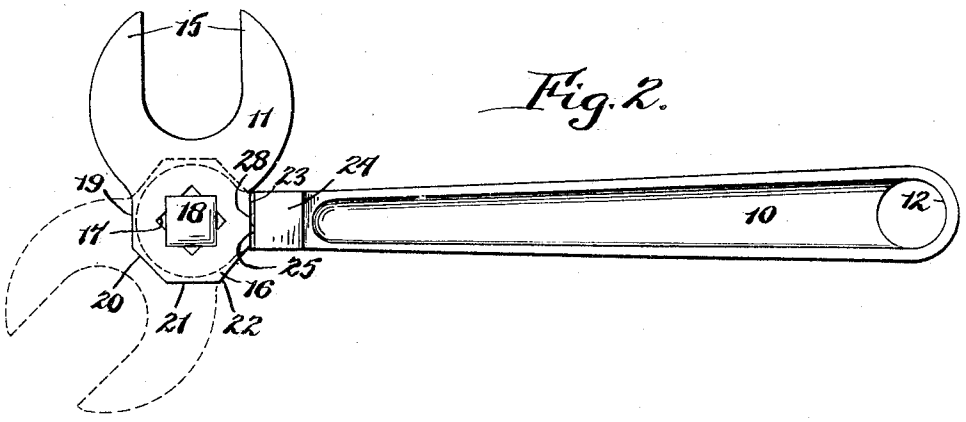


Fig. 3.

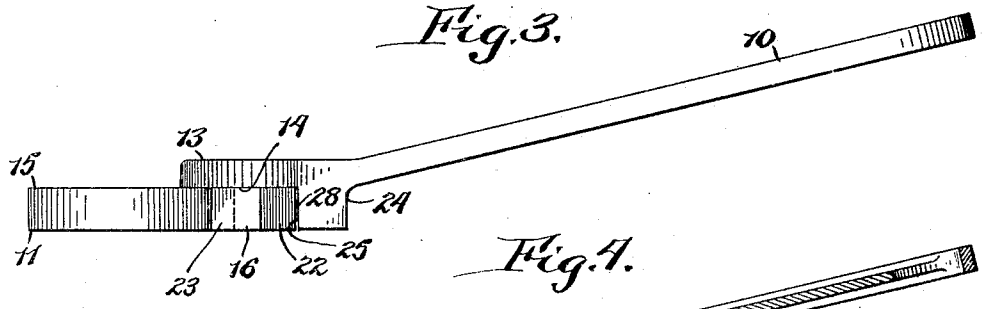
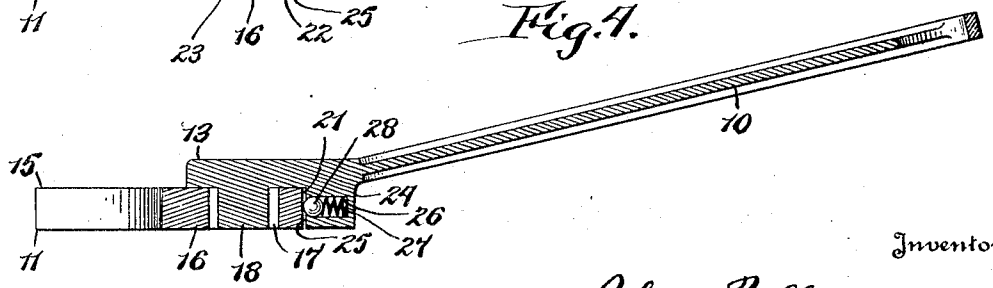


Fig. 4.



Inventor

John Zilliox

By Popp and Powers

Attorneys

Patented Sept. 8, 1931

1,822,428

UNITED STATES PATENT OFFICE

JOHN ZILLIOX, OF ORCHARD PARK, NEW YORK

WRENCH

Application filed April 14, 1930. Serial No. 444,020.

This invention relates to a wrench and more particularly to an open end machine end wrench in which a plurality of open end machine wrench heads having different sized jaws are employed in connection with the same handle thereby decreasing the cost of a set of such wrenches as well as permitting of a compact and convenient nesting of the same in a kit.

The present invention is an improvement on the wrench shown in my Patent Number 1,764,379 dated June 17, 1930, for improvements in wrenches.

One of the objects of this invention is to provide such a handle and open end machine wrench heads therefor in which the heads can be quickly applied to or removed from the handle and when so applied are securely held to the handle and operate reliably to permit the desired pressure to be applied to the objects gripped.

A still further aim is to provide such an open end machine wrench which is simple and inexpensive and in which all of the more expensive manufacturing operations are performed on the handle since only one handle is used in connection with a large number of heads.

Another aim is to provide an open end machine wrench of this character in which the wrench head can be held in different positions relative to the handle thereby permitting of its use in places where an open end machine wrench having a head set at a fixed angle could not be employed, and in which such adjustment of the angularity of the head can be effected expeditiously and will be reliably held.

Another object is to provide such a wrench in which the head is provided with a hole receiving a stem provided on the handle and in which means are provided both between the stem and the hole and between the exterior of the wrench head and the handle for preventing turning of the handle relative to the head when the head is fitted to the handle in any one of a plurality of positions. By providing such exterior means for holding the head against turning in addition to the stem, a much stronger wrench is provided and the danger of having the head twist free of the stem is reduced.

Other objects are to provide such an open end machine wrench which is compact, light, and strong, thereby permitting of its convenient use by the mechanic.

In the accompanying drawings:

Figure 1 is a top plan view of a wrench embodying my invention.

Figure 2 is a bottom plan view of the same.

Figure 3 is a side elevation thereof.

Figure 4 is a longitudinal section taken on line 4—4, Fig. 1.

Similar reference numerals refer to like parts in each of the several views.

In its general organization the wrench embodying my invention comprises a handle having a tapered end in which a parallel sided square stem projects perpendicularly outward and a removable open end machine wrench head having a regular eight-pointed star shaped opening extending therethrough, the stem being adapted to be fitted into the star-shaped opening in different positions thereby permitting said head to be held in a number of positions relative to the handle. In addition to this the rear end or shank of the wrench head is of polygonal form having five faces which are adapted to be arranged against a shoulder formed on the handle in each of the several positions of the head. By this last means the strain upon the parts is borne jointly by the stem and by the shoulder on the handle and hence there is little danger of the connection between the head and the handle giving under an excessive strain.

The wrench is composed of a handle 10 to one side and at one end of which the open end machine wrench head 11 is applied. The wrench handle 10 can be of any suitable construction and is preferably hollowed out on its opposite sides for lightness and is provided with a hole or opening 12 at one end so that it can be hung up when not in use.

The opposite end 13 of the wrench is formed to provide a flat face 14 on its under side which face is engaged by the upper flat face of the open end machine wrench head 11. This face 14 is preferably set at an an-

gle to the handle so that the head is held at a similar angle for convenience in manipulating the wrench.

The wrench head 11 comprises a pair of jaws 15 and a shank or neck 16 which is provided with a polygonal or star-shaped opening or recess 17. This opening extends through the neck 16 and receives a square stem 18 which stem projects downwardly from the flat face 14 of the handle. The stem is preferably made integral with the handle. The opening 17 in the wrench head which receives the stem 18 is made in the form of an eight-pointed star, the points of the star being right angular in shape, and being so disposed that the stem 18 can be fitted into the handle in successive angular positions relative to the handle. Thus the head can be arranged at right angles to the handle by engagement of the stem with the corresponding corners or points of the star-shaped opening; it can be arranged at a 90 angle to the steam as indicated by full lines in Fig. 2; or it can be arranged lengthwise of the handle as indicated in Fig. 1. By this means any desired adjustment of the wrench head relative to the handle can be obtained by simply placing the head over the stem 18 in the desired position and pressing the stem into the opening so as to effect a firm engagement between the head and the stem.

Without the provision of additional means to hold the head at the angles at which the head is place over the stem, there would be some danger of the wrench head twisting free of the stem 18 when an excessive pressure is applied to the wrench. Thus the engagement between the stem 18 and the star-shaped opening 17 is at the points or corners of the stem 8 and an excessive pressure on the wrench might twist these corners or points off. To avoid this the shank 16 of the open end machine wrench head is made of polygonal form having five faces 19, 20, 21, 22 and 23, each of these faces being arranged at a 135° angle to the adjacent face or faces. Adjacent the stem 18 and on the same side of the wrench handle 10 a shoulder or ridge 24 is formed to project from the wrench handle. This shoulder is formed to provide a flat perpendicular face 25 which faces the stem 18.

With this arrangement it is apparent that in each of the positions in which the wrench head may be placed upon the square stem 18, one of the faces 19, 20, 21, 22 or 23 will engage the perpendicular face 25 of the shoulder or ridge 24. It is therefore apparent that the wrench is held against turning both by the stem 18 and by the ridge or shoulder 24 and that therefore a heavy pressure can be exerted upon the wrench without danger of breaking the same or having the wrench head twist free of the wrench handle. In order to insure the proper connection between the head and the handle, friction means are provided between the ridge or shoulder 24 and the corresponding face of the wrench head which it engages which means resist the removal of the head and thereby reduce the danger of the head becoming loose accidentally from the handle. For this purpose a hole 26 is drilled into the shoulder or ridge 24 from the perpendicular face 25 thereof and in this hole is arranged a small spring 27 which bears at one end against a ball 28. The ball and spring are retained in the hole 26 by peening over the opposite edges of the opening 26 or in any other well known and usual manner. The spring loaded ball 28 is arranged at the center of the face 25 and bears against one of the faces 19, 20, 21, 22 or 23 in any of the adjusted positions of the wrench head when the wrench head is applied to the handle. By this means the ball exerts a uniform frictional resistance against the accidental displacement of the wrench head in all of its adjusted positions.

It will be noted from the foregoing descriptions in connection with the drawings that the joint between the head and the handle is very close to the jaw of the head, whereby the latter can be made very small and this not only permits of packing the wrench in a small space for convenience in storage and equipment but also enables the wrench to be used to advantage when working in very close quarters. This wrench therefore contains all of the advantages inherent in an ordinary solid open end machine wrench with the added advantage of an adjustable head that can be placed at different angles relative to the handle whereby the wrench can be employed for work which is difficult of access.

As a whole this invention is very simple in construction, it is compact, light and durable, the wrench head is easily applied to the handle and can be adjusted to any desired angle, the wrench and more particularly the wrench heads can also be produced at very low cost thereby permitting of marketing this wrench at little more than the cost of an integral wrench which does not posssess the features of ready adjustability of the present invention. By providing an open end machine wrench head having a star-shaped opening and by providing a handle having projections engaging both the opening and the exterior of the wrench in all adjusted positions, the wrench head is held against turning at two places and the danger of the connection between the wrench head and the handle breaking under severe strains is very materially reduced.

I claim as my invention:

A wrench comprising a handle having a laterally projecting shoulder at one side and at one end, said shoulder being formed to

provide a perpendicular flat face facing the end of said handle, a square stem projecting outwardly from said handle in the same direction as said shoulder and arranged between said shoulder and the end of said handle and a wrench head having jaws and a shank, said shank being provided with a star-shaped opening formed of two superposed square openings, each being the size of said stem whereby said star-shaped opening receives said stem in different angular positions of said head relative to said handle and said head is held in the selected angular position thereby and said shank also being provided with five exterior faces arranged at a 135° angle to one another, one of said faces on said shank engaging the perpendicular face on said shoulder in each selected angular position of said head and additionally holding said head in the selected angular position.

In testimony whereof I hereby affix my signature.

JOHN ZILLIOX.