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ADJUSTABLE SPANNERS
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Fig. 1

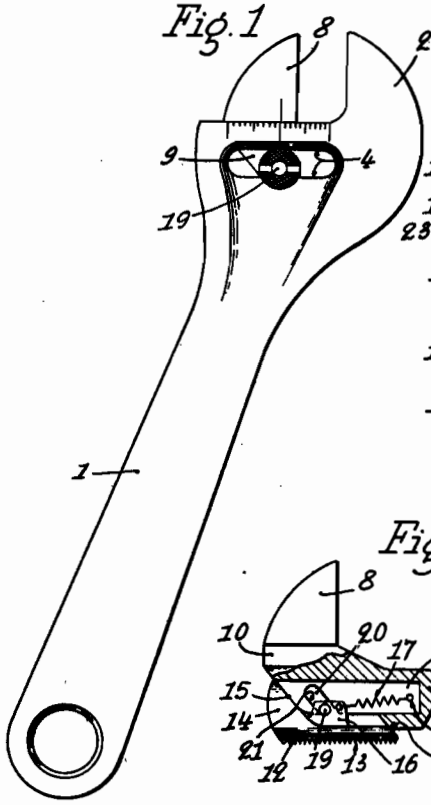



Fig. 2

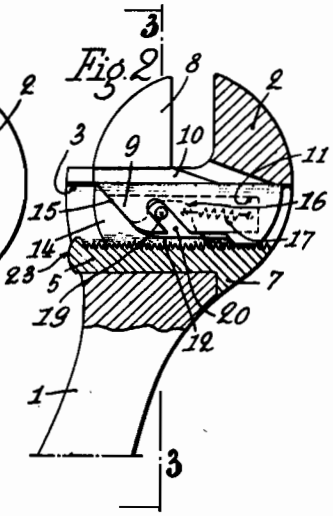



Fig. 3

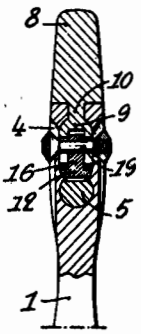



Fig. 4




Fig. 5


Fig. 6

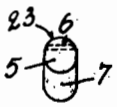



Fig. 7

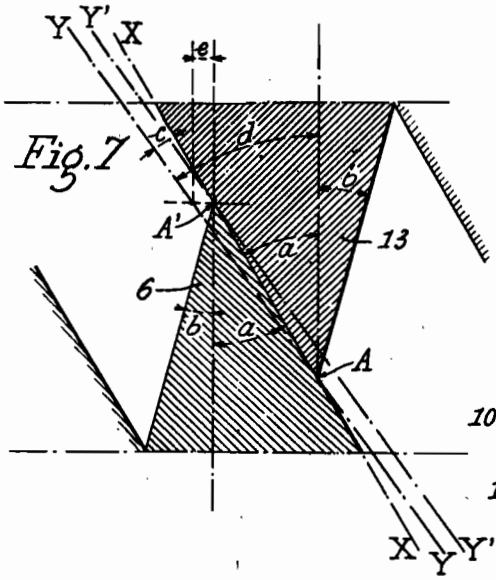
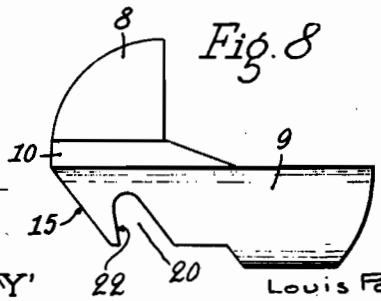



Fig. 8

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# ALIEN PROPERTY CUSTODIAN

## ADJUSTABLE SPANNERS

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The invention has for object an adjustable spanner of great rigidity, easy to manipulate and of simple, light and economical construction. It is particularly intended to replace the usual adjustable spanners in which, on account of the effects of the various amounts of play increased by wear and added to each other, the spanner opens slightly when an important stress is exerted, and to obtain a rigidity as great as that obtained with unadjustable flat spanners.

The adjustable spanner according to the invention comprises a shank provided with a stationary jaw and with a rack disposed at right angles to the clamping face of said jaw, a movable jaw guided on said shank in a direction parallel to said rack and having a clamping face adapted to cooperate with the clamping face of the stationary jaw and provided with two inclines parallel to each other and facing the same side of said movable jaw, a sliding shoe disposed in said movable jaw and provided with teeth adapted to engage said rack and with two inclines parallel to each other, facing the same side of said shoe and adapted to cooperate respectively with the two inclines of the movable jaw, and a spring connected at one end with said shoe and at the other end with said movable jaw and adapted to maintain the inclines of said shoe in contact with the inclines of said movable jaw and to urge the teeth of said shoe towards said rack.

Other features of the invention will appear from the following description, with reference to the accompanying drawing, which shows, by way of example, a preferred embodiment of the invention and in which:

Fig. 1 is a side view of the spanner;

Fig. 2 is a similar view, with parts broken away, of the movable jaw and of its shoe.

Fig. 3 is a section according to line 3—3 of Fig. 2.

Fig. 4 shows the movable jaw and its shoe separated from the spanner.

Fig. 5 is a side view of the rack.

Fig. 6 is an end view thereof.

Fig. 7 is a diagram showing the profile of the teeth and the slope of the incline, and

Fig. 8 shows a modification of the movable jaw.

Referring to the drawing, 1 designates the shank of the spanner ending in a fixed jaw 2 disposed above a slideway 3 open at the top by a narrow slot, and in one of the sides of which is formed an aperture 4. At the bottom of the slide-way is forcibly fitted a rod made of hard steel 5 (Fig. 5) in which is cut a set of rack teeth 6 and which is provided at its end with a lateral heel-piece 7, engaging in a notch formed in the shank of the spanner so as to resist to the stresses tending to move the rack in the direction for opening the movable jaw 8.

The movable jaw 8 is guided by a slide-block 9 in the slide-way 3, the jaw and the slide-block being connected by a narrow portion 10 moving in the narrow slot above mentioned. The slide-block is hollowed at 11 to receive a sliding shoe 12, having, on its lower face, teeth 13 complementary to the teeth 6 of the rack 5. The shoe 12 is provided with a nose 14 limited towards the interior by an incline 15, cooperating with an incline of the same slope formed on the outer face of the slide-block 9. A second incline 15a of the shoe 12, parallel to the incline 15, cooperates with an incline having the same slope at the lower part of the movable jaw 8. The shoe 12 is moreover provided with a central lug 16, guided in the recess 11 of the slide-block 9 and connected by a spring 17 to a fixed spindle 18 of said slide-block, said spring maintaining the inclines in contact with each other.

Through the lug 16 passes a bolt 19 having a milled head and nut engaging in two inclined slots 20, formed in the opposite walls of the recess 11, the edges of the slots 20 being parallel to the incline 15.

As shown in Fig. 7, the slope $a$ of the faces of the teeth 6 and 13, which are in contact according to the direction XX when the movable jaw 8 tends to move in the direction for opening the spanner, is smaller than the slope $d$ of the inclines 15 and 15a, the direction of which is indicated at Y—Y. In practice, the angle $a$ is advantageously equal to 30° and the angle $d$ to 35°, that is to say a difference $c$ of about 5°.

The slope $b$ of the faces of teeth 6 and 13 which are in contact when the movable jaw 8 tends to move in the direction for closing the spanner is smaller, and equal for instance, to 15°.

In normal position, the shoe 12 is urged downwardly (Fig. 4) by the spring 17, owing to the slope $d$ of the inclines 15 and 15a in contact, so that teeth 13 are engaged in teeth 6.

Any displacement of the movable jaw in the direction for opening the spanner is impossible, as the inclines 15 and 15a of the slide-block exert on those of shoe 12 a pressure tending to push said shoe 12 against rack 5, and teeth 13 cannot pass over teeth 6 owing to the difference $c$ of the slope between the inclines 15 and 15a and the faces in contact of the teeth. In order that a

tooth 13 should be able to pass over a tooth 6, it would be necessary, in fact, that the point A of the tooth should come to A' (Fig. 7), that is to say that the side of tooth 13 should recede from Y—Y to Y'—Y' according to a distance *e*. Now, this backward movement of shoe 12 is impossible since, by hypothesis, the jaw 8 tends to open and press on the shoe 12 towards the left of the drawing. The wedging effect of the shoe 12 by means of the inclines of the slide-block 9 thereby imparts considerable rigidity to the spanner, comparable to that of an unadjustable flat spanner.

To open the spanner, the shoe 12 must be lifted by means of the milled heads of bolt 19, by causing the inclines 15 and 15ª to slide on each other until teeth 13 disengage from teeth 6. A flange 23 formed on rod 5 at the opposite end to that of the heel-piece 7 serves as abutment for the shoe 12 to limit the displacement of the movable jaw 8 in the direction for opening the spanner.

To close the spanner, the same operation can be effected, that is to say, use can be made of bolt 19, or the movable jaw 8 can be pushed or struck in the closing direction. In this movement, the edge 21 of slot 20 acts as a cam under bolt 19 which it lifts. This method for closing the spanner is convenient in certain cases, since the operator, holding the spanner in his hand, can, with a finger of the same hand, push the movable jaw 8 to open position determined by the dimension of the nut to be tightened.

If, on the contrary, it is desired to operate the spanner in both directions only by manipulating the milled heads of bolt 19, one of the sides of slot 20 can be cut down to replace cam 21 by a vertical face 22. In this case a pressure exerted on the movable jaw 8 in the closing direction has no lifting effect on shoe 12 and, as the slope *b* is small, teeth 13 can pass over teeth 6 towards the right only provided the shoe 12 is positively lifted by means of bolt 19.

It will be noted that, when the teeth 6 and 13 occupy a certain relative position, in the displacement of the movable jaw 8 for closing the spanner, said jaw recedes slightly, to a distance equal to *e* (Fig. 7) owing to the fact that the point of tooth 13 passes from A' to A. This backward movement must be of small amplitude and limits the choice of the height of the teeth and of the angle *c* to a small value. The main advantage offered by the spanner according to the invention is of avoiding all play, even after a long period of use owing to the inclines 15 and 15ª which are set towards the same side of the member carrying them, so that the wear on one incline is compensated by the wear on the other incline, constantly maintaining said inclines in contact.

Of course, the invention is not limited to the embodiment illustrated and described which has only been chosen by way of example.

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