ADJUSTING MEANS FOR A SLIDABLE INNER JAW WRENCH

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The invention relates to a hand tool with mutually shiftable jaws for coarse and fine adjustment of the jaw spacing. It is particularly applicable to wrenches.

Wrenches are known which consist of a flat handle piece provided on one flat side with a set of inclined teeth and with a jaw at one end, and of a sleeve element shiftable on this handle piece, which it surrounds, and carrying the other jaw, this sleeve element having a fine adjustment means engaging the inclined teeth on the handle piece of the tool. The known fine adjustment means are mostly so constructed that they comprise a worm wheel engaging in the inclined teeth and arranged with its axis extending in the longitudinal direction of the handle piece of the wrench. Such wrenches are not very easy to manipulate because, in order to operate the worm at least two fingers of one hand are required. It must also be possible to disengage the worm wheel to carry out a coarse adjustment. This construction presents a certain amount of difficulty and is mostly objectionable from the point of view of manipulation.

The invention is characterized in that a slidable bar, shiftable by hand, is provided as the fine adjusting means on the sleeve element of the tool and carries a set of inclined teeth corresponding with the teeth on the handle piece and is guided at an angle to the set of teeth on the handle piece. The slidable bar is so constructed that for coarse adjustment of the sleeve element it can be tilted in relation to the flat surface of the handle piece and can thus be brought out of engagement with the teeth on the handle piece. The slidable bar is preferably spring-loaded and held in engagement with the set of teeth by a spring so that the tilting or upward movement of the slidable bar must be effected against the force exerted by this spring.

The invention is illustrated by way of example in the accompanying drawing in which:

Fig. 1 is a side elevation of the tool;
Fig. 2 is an end view with the slidable bar in section;
Fig. 3 is a side view on a larger scale showing the sleeve-like tool piece, partly in section to show the spring arrangement;
Fig. 4 is a cross-section of the sliding bar and
Fig. 5 is a perspective view of the detail of the slidable bar.

The references employed in the figures of the drawing designate the following parts: 1 is the handle of the wrench which is of flat rectangular cross-section and 2 is a set of inclined teeth. The wrench handle 1 terminates on one end in a jaw 6 forming one jaw of the wrench. The wrench handle 1 is surrounded by a sleeve element 3 which is shiftable and has a second jaw 7 to cooperate with jaw 6. A slidable bar 4 is provided in the sleeve element 3 and is guided at an angle to the set of teeth 2, Fig. 1. This slidable bar 4 can easily be manipulated and shifted by the actuating surfaces 14 and 15 by means of the thumb or index finger. The slidable bar 4 carries on its side facing the wrench handle 1, a set of teeth extending parallel to the set of teeth 2. Therefore if the slidable bar 4 is pushed in its sliding direction, the sleeve element 3 is shifted in longitudinal direction relative to the handle because the direction in which the bar 4 is shiftable is not parallel to the direction of the inclined set of teeth. The slidable bar 4 is shiftable in the sleeve element 3 so that its teeth can be brought out of engagement with the set of inclined teeth 2 and the sleeve element can be shifted on the handle for coarse adjustment.

A wire spring 8 bent in U-shape acts against the edge of the slidable bar 4 and holds it in engagement with the teeth. The set of teeth is illustrated in the attached drawing and a series of teeth with tooth channels steep on one side and flat on the other, so that for shifting the sleeve element 3 in the direction for closing the jaws of the wrench it is only necessary to exert a force in the direction of the wrench handle from left to right, Fig. 1, which the slidable bar 4 automatically disengages sliding over the teeth on the wrench handle. The jaw opening of the wrench defined by the jaws 6 and 7 preferably extends at a slight angle to the horizontal relatively to the jaw faces, the sliding direction of the bar 4 forming an acute angle with the jaw aperture.

On the side of the wrench handle 1 opposite the jaws a scale 9, Fig. 1, is provided which in conjunction with the slightly flattened end edge 10 of the sleeve element 3 can be used as a reading scale. In order to ensure a correct adjustment of the element 3 relatively to the handle 1 of the wrench a pressure spring 11 and a pressure pin 12 are provided in a suitable bore in the element 3 and which bears against the side face of the handle 1. 13 designates the hole usually provided in a wrench to enable the wrench to be hung on a tool panel or board. The form of construction of the wrench according to the invention is illustrated in the accompanying drawing is only taken by way of example for explaining the fundamental idea of the invention.

The slidable bar 4 is provided with a groove 16 which has a width equal to the rail 17 which borders the window-like aperture 18 provided in the sleeve-like wrench element 3. The groove 16 and rail 17 enable the slidable bar to be tilted or swing only when they are in register, which is the case in the initial position of the fine adjustment range of the wrench. If the slidable bar 4 is shifted further it can no longer swing up because the rail acts as a lock opposing the swinging movement so that a coarse adjustment cannot be effected.

The fine adjustment of the wrench is about half the width of a tooth. The part 19 of the sleeve-like wrench element 3 located below the slide bar 4 is preferably knurled so as to enable the coarse adjustment to be carried out more easily. The spring 8 is preferably a wire spring and engages in a V-groove in the slidable bar 4 in such a manner that, when its groove 16 is in register with the rail 17, the bar cannot be pressed into engagement with the set of teeth 2 by the spring 8.

For the purpose of making a fine measurement, the slidable bar 4 may carry a mark 4a which cooperates with a scale 3b provided on the frame of the window 18 in the sleeve-like element 3. The mark 4a then enables a fine reading to be taken, for example in tenths of the unit of the scale, in a similar manner to that rendered possible with a scale.

1 claim:

1. A hand tool with coarse and fine adjustment of the jaws, comprising a handle member having an inclined set of teeth extending across a flat side thereof, a jaw formed on one end of said handle member, a sleeve element surrounding the handle member and shiftable in the longitudinal direction thereon, said sleeve element having a jaw formed thereon cooperating with the aforementioned jaw on the handle member to form the relatively movable jaws of the tool, a fine adjusting means
comprising a slidable bar shiftable in said sleeve element at an angle to the set of teeth on said handle member, said bar having a set of teeth thereon inclined to correspond with the set of teeth on the handle member, a spring in said sleeve element to urge the two sets of teeth in engagement with each other, said bar being provided with a groove extending crosswise with respect to the bar and parallel to a rail provided lengthwise on the sleeve element for insertion into each other, so as to allow a lifting of the bar and disengagement of the set of teeth for a coarse adjustment of the jaw spacing when the bar has been moved in its extreme shifted position.

2. A hand tool as set forth in claim 1, wherein the sets of teeth and the direction in which the slidable bar is shiftable form an acute angle with the direction of the jaw aperture, and the fine adjustment range of the sleeve element is about one-and-one-half times the width of the teeth of the set of teeth on the handle piece.

3. A hand tool as set forth in claim 1, wherein a spring bent in U-shape is provided which bears against the side flank of the slidable bar on the sleeve element.

4. A hand tool as set forth in claim 1, wherein a measuring scale is provided on the flat side of the handle piece at the edge remote from the side from which the jaw projects and a reading mark is provided for the scale formed by the end edge of the sleeve element.

5. A hand tool as set forth in claim 1, wherein a spring is provided with a pin bearing against the front face of the handle piece and in the sleeve element near the jaw opening.

6. A hand tool as set forth in claim 1, wherein the slidable bar is provided with a mark and the sleeve element has a window-like aperture provided with a scale on its upper boundary cooperating with the mark on the slidable bar for taking a fine reading of the adjustment of the slidable jaw according to the displacement of the slidable bar relatively to the sleeve element.

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