

July 12, 1960

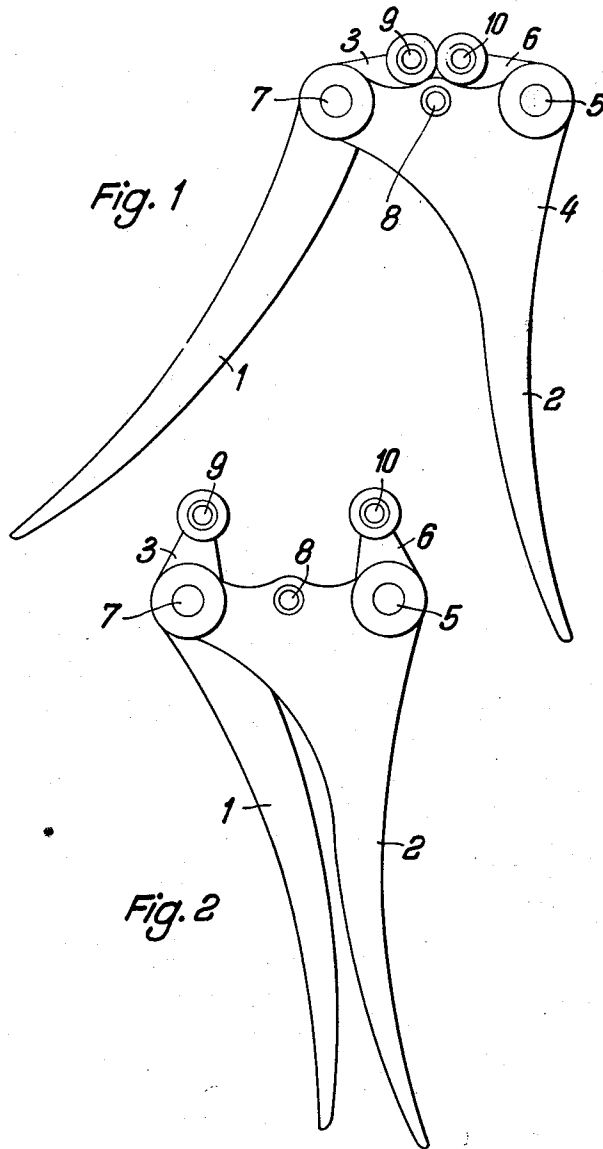
H. KABEL

2,944,335

DEVICE FOR WIDENING PIPES, TUBES, SPOUTS OR THE
LIKE MADE OF RUBBER, SYNTHETIC RUBBER, OR
ARTIFICIAL RESILIENT MATERIAL

Filed Oct. 14, 1957

3 Sheets-Sheet 1



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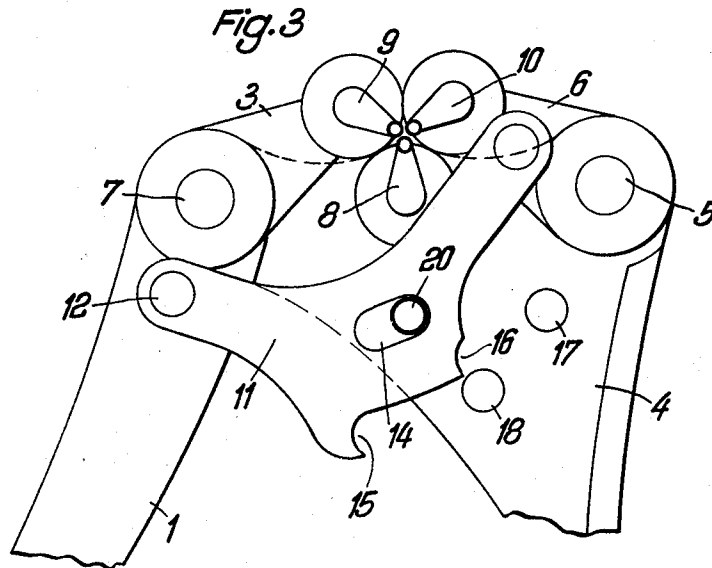
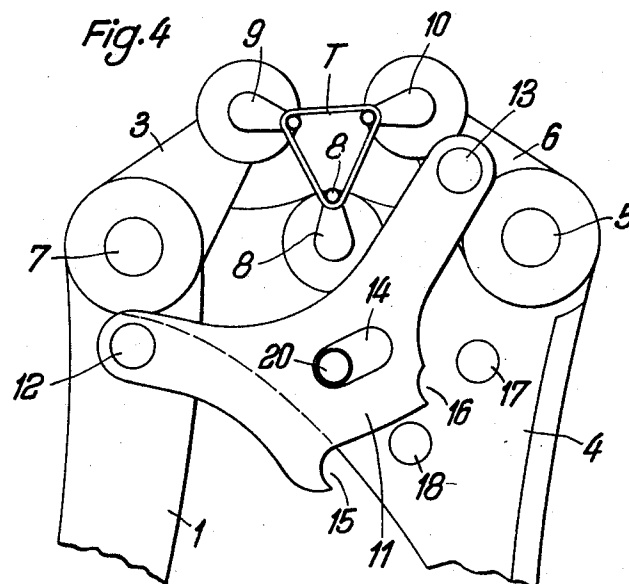
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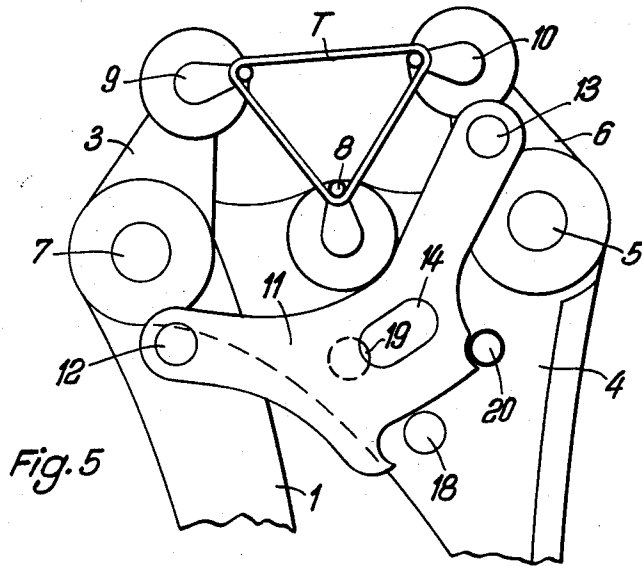
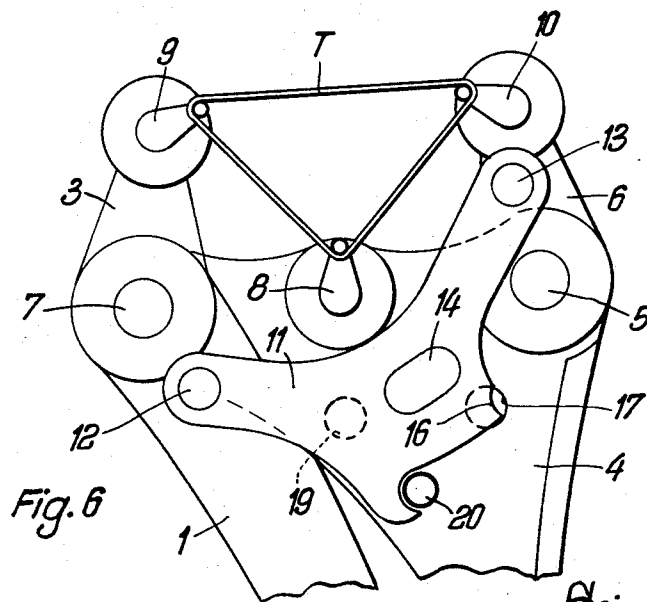
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DEVICE FOR WIDENING PIPES, TUBES, SPOUTS OR THE LIKE MADE OF RUBBER, SYNTHETIC RUBBER, OR ARTIFICIAL RESILIENT MATERIAL

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7 Claims. (Cl. 29—235)

This invention relates to a device for widening pipes, tubes, spouts or the like made of rubber, synthetic rubber, or artificial resilient material, and is particularly though not exclusively concerned with hand pliers having three triblets placed close together, increasing the distance one from the other when the device is operated, and thereby widening the previously covered part. Such devices are known in the form of so-called three-triblet pliers. These consist in principle of two two-armed levers each of which carries a triblet and which can swing about a common fulcrum pin, as well as of a draw-arm which carries the third triblet and moves in the downward direction when the pliers are operated.

The disadvantage of these known hand pliers consists in that the shanks of the pliers serving as hand grips, must be so far prised apart, that spanning with the hand, especially for women, entails some difficulties.

A further disadvantage is, that owing to the length of the force-exerting arm in relation to the length of the load-taking arm, relatively great muscular force is required to operate the pliers for the purpose of widening spouts and the like. With continuous mass production work, the hand and arm muscles may tire. The pressure to be exerted on the shanks of the pliers, needed to widen the spouts and the like, is often beyond the power of women, and women are mostly engaged on such work. If the shanks of the pliers are made shorter, to relieve the muscular force needed for the work, then, corresponding to the known rule in mechanics that the gain in force is lost in progress, the triblets are not prised apart sufficiently.

To the disadvantages mentioned must be added the fact that in the known three-triblet pliers, sliding parts are provided, especially the part carrying the downward-moving triblet and which serves as draw-bar. On widening the spouts this part is greatly subject to bending stress and to considerable unilateral forces, so that there is danger of warping and thus of jamming in the slide. Moreover, more friction occurs substantially, than with rotating parts. Then, greater force is required to operate the pliers.

The disadvantages outlined are overcome by means of the present invention, with the arrangement which above all, differs from the constructions already known in that the shanks of the pliers which carry the two triblets for prising are connected by an intermediate transmission which moves them into the prised position upon the closing movement of the grip-shanks of the pliers.

The device does not require to be made as pliers or hand pliers but may also be constructed as bench device.

It consists inter alia of a head in which for the construction as hand pliers, two shanks are placed rotatable, each carrying one of the prising triblets. Then one of the shanks of the pliers is connected articulated through a lever, with the grip shank which carries the other pliers shank. This lever serves as thrust lever and presses the pliers shank connected with it outwards when the grip shanks of the pliers move one against the other. The

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other pliers shank firmly fixed to its grip shank, is swung outwards by the movement of this grip shank.

According to one embodiment, the centre axis of the pivots of both pliers shanks and the centre axis of the stationary prising triblet, lie in a straight line. However, differing therefrom, the arrangement may be such that only the two axes of rotation of the pliers shanks lie in a straight line, whilst the centre axis of the fixed prising triblet is placed outside, in particular over, this line.

In order that the widening may not be done by feeling, whereby the expansion limit of the material forming the part to be widened, might readily be exceeded, and faster working with the device be obtained, by a further development of this invention there is a limit to the opening width, which may be altered according to the particular requirements, with the aid of an adjustable stop. For this purpose the thrust lever connecting the two pliers shanks articulated together, is provided with several cut-outs for a stop pin serving for limiting the width of opening and able to be inserted according to choice into corresponding openings in the head of the pliers. According to the opening in which this stop pin is found in the head of the pliers, one or the other cut-out of the lever strikes against the pin when the device is operated, whereby the opening width is limited.

The arrangement in conformity with this invention as compared with arrangements previously known has above all, the following advantages:

(1) Less muscular force is required for the operating.

(2) There are no sliding parts. All highly-stressed parts are rotatable, so that bending, as with the draw-bar of the known three-triblet pliers, cannot occur.

(3) Pliers made according to this invention fit easily in the hand.

(4) The stroke limitation is effected quickly and simply. The means required for this do not complicate the construction at all.

Further details and further advantages of this invention result from the following description of the embodiment by way of example shown in the drawing. Therein:

Figs. 1 and 2 are a side view of a device constructed as hand pliers firstly the triblet pins being closed, and then being open:

Figs. 3 to 6 show the top part of the pliers on an enlarged scale and in various positions, partly in elevation, partly in section.

The hand pliers shown in Figs. 1 and 6 have two grips 1, 2. The grip 1 is firmly connected with the pliers shank 3. The grip 2 is fixed, on the pliers head 4. In this head is a pivot 5 about which the pliers shank 6 may swing. Further in the pliers head 4 a further pivot 7 is placed about which the grip 1 may rotate together with the pliers shank 3. The two pivots 5, 7 lie in a straight line, as seen from the figures. On this straight line is also found the expanding triblet 8, at a standstill during the working of the pliers, which is connected detachably with the pliers head 4. The two movable expanding triblets 9, 10 are found at the ends of the pliers shanks 3, 6. They are detachably connected with the pliers shanks 3, 6 appertaining thereto. The detachable connection may be made in any desired manner, for example by screws. The triblets 8—10 have round cross-section and advantageously consist of rustless steel.

The pliers shanks 3, 6 are connected articulated by a lever 11 shown in Figs. 3—6. For this purpose the lever 11 is connected by one of its ends through the pivot 12 to the grip 1 and by the other end through the pivot 13 to the pliers shank 6.

As further shown in Figs. 3 to 6 the lever 11 has three cut-outs 14, 15, 16. Moreover the pliers head is furnished with three orifices 17, 18, 19 which serve to take a stroke limiting pin 20. According to the orifice 17 to

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19 in which the stroke-limiting pin is inserted, a different opening width of the prising triblets results. The individual positions of the stroke-limiting pin 20 and the opening widths appertaining thereto, of the prising triblets as well as the form and size of the widened spout opening may be seen in Figs. 3 to 6 in which the spout is designated by T. The stroke-limiting pin 20 is readily interchangeable. For instance it may be screwed by its end into one of the orifices 17 to 19 or may be secured by means of a screw to be screwed in this end or may be fixed in any other manner. Through the stroke limitation any too wide turning of the parts to be widened and any resultant tearing, is prevented.

In addition, the work proceeds faster for the expansion limit no longer needs to be found by feeling for it.

The device works as follows:

The spout T or the like to be widened, with the pliers closed, that is, when the prising triblets 8, 9, 10 lie close together, is pushed over the latter. Then the two grips 1, 2 are pressed together. Thereby the grip 1 with the pliers shank 3 placed there, turns about the pivot 7. Thereby the pliers shank 3 moves outwards.

Upon this rotary movement of the grip 1, the lever 11 turns the pliers shank 6 outwards. Consequent upon the described movements of the pliers shanks 3, 6 the prising triblets 9, 10 move apart and away from the stationary triblet 8 found in the pliers head 4.

All the three triblets 8 to 10 form together, according to their distance from each other, the angles of a more or less large triangle as shown in Figs. 3-6. The triangle formed with small opening of the pliers is isosceles and acute-angles. This shape has the following advantages, when operating the pliers:

The thin cables and leads to be dealt with are variously equipped, before the provision of the rubber spouts, with cable shoes or cable eyelets. Both have a cross-section which projects beyond the circular cross-section of the leads. With an equilateral triangle therefore the spout must be widened so far that the cable shoes or eyelets may pass through it. Therefore the spout is then widened to a larger triangle than required for the passage of the corresponding lead without cable shoe. Since the internal diameter of the spouts which must be fixed firmly to the lead through specific tension is adapted to the lead diameter, with the use of the known three triblet pliers which do not have the advantage of widening in isosceles triangle shape, the material of the part to be widened is frequently stressed over and beyond its expansion limit so that often much waste occurs disproportionately.

With further compression of the grips 1, 2 this acute-angled isosceles triangle turns into an equilateral one and with further compression becomes an obtuse-angled isosceles triangle which offers the same advantages as the acute-angled isosceles triangle, namely protection of the parts to be widened against excess stress. Whilst the average pliers-opening is suitable for leads with dimensions which according to experience are rarely furnished with cable shoes or cable eyelets, such as for instance hanging

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cords, supply leads for table lamps and standard lamps as well as household equipment the leads; the diameter of which renders necessary a greater amount of pliers opening to widen the parts to be passed over are in most cases equipped with cable shoes or cable eyelets prior to the provision of these parts.

This invention is not restricted to the examples illustrated and described. Thus the thrust lever 11 may have a different form than the one shown. Also, more or less, than three orifices may be provided for the stroke-limiting pin 20 in the pliers head 4. In this case then, also the number of cut-outs which the thrust lever possesses, is correspondingly altered.

Instead of a thrust lever also another intermediate transmission may be provided, for instance a toothed wheel transmission.

I claim:

1. A device for widening tubes, spouts and the like of resilient material comprising a head having a first grip fixed to said head, pivots on opposite sides of said head and a fixed triblet on said head between and in alignment with said pivots, a shank carrying a triblet pivoted on one of said pivots and extending on the opposite side of said one pivot from said first grip, a second grip pivoted on said other pivot and a shank carrying a triblet fixed on said second grip and extending on the opposite side of said other pivot from said second grip, a lever pivoted on one of its ends on said second grip, the other end of said lever being pivoted to said pivoted shank, and means on said head cooperating with said lever for limiting the relative movement of said shanks.

2. A device according to claim 1 in which said movement limiting means includes a stop on said head adapted to contact said lever.

3. A device according to claim 2 in which said stop is a pin held in an orifice in said head.

4. A device according to claim 2 in which said stop is a pin held in an orifice in said head and operating in a slot in said lever.

5. A device according to claim 1 in which said movement limiting means includes a plurality of orifices spaced apart in said head, and a pin adapted to be inserted alternately in each of said orifices.

6. A device according to claim 1 in which said movement limiting means includes a plurality of orifices spaced apart in said head, and a pin adapted to be inserted alternately in each of said orifices, a plurality of cut-outs on said lever corresponding to said orifices and located at separated points on said lever, said cut-outs adapted to contact said pin.

7. A device according to claim 5 in which said orifices are in triangular arrangement.

References Cited in the file of this patent

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