Aug. 3, 1965 L. BOURDIER 3,197,865

PINCER TYPE TOOL WITH SECURING MEANS

Filed Dec. 12, 1963

Fig. 1

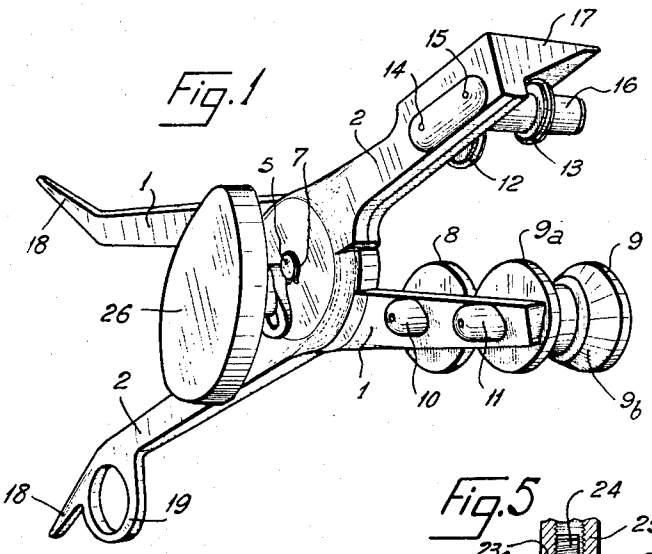


Fig. 5

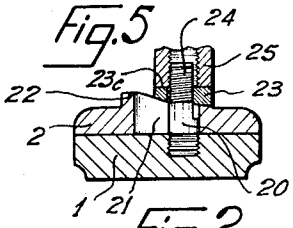


Fig. 6

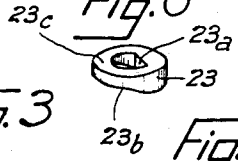


Fig. 3

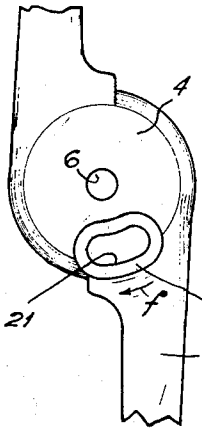


Fig. 4

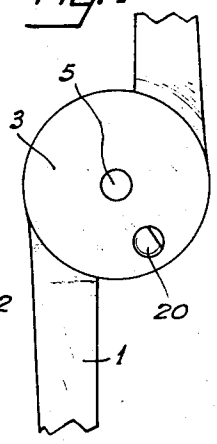
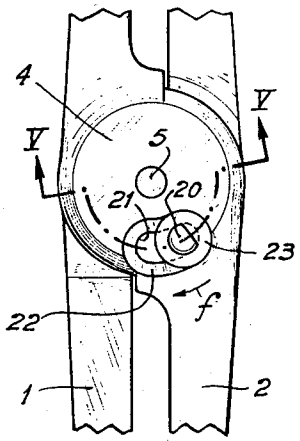


Fig. 2



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PINCER TYPE TOOL WITH SECURING MEANS

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7 Claims. (Cl. 30—91)

The invention relates to tools of the class including pincers, pliers, tongs, scissors, shears and the like, of the general type having a pair of crossed interpivoted members adapted to press, cut, and/or shear work between their jaws.

In the use of tools of this kind it would often be convenient to secure the members of the tool in a determined fixed angular relation, e.g. throughout a working process of some duration or in performing similar operations on a number of different articles of work. It is an object of this invention to provide improved, simple and effective mechanism for thus securing a tool of the class described. Another object is to provide such mechanism whereby the tool will be positively limited against opening movement but not against closing movement of its interpivoted members.

The invention has especial though not exclusive utility when applied to a pincers tool disclosed in my French Patent No. 1,289,445, serving to strip insulation off electrical conductors and cables, and for similar operations. In a tool of that kind, one of the interpivoted members is provided with one or more cutter disks and the other member carries backing rollers cooperating with the cutter disks. By inserting an insulated cable between the cutter disks and rollers in an appropriate direction, a circumferential or a longitudinal cut—depending on the direction of insertion of the conductor into the tool—can be easily and quickly made in the insulation, and the cut-off portion of insulation thereafter readily removed from the cable.

A specific object of this invention is to provide an improved insulation-stripping tool of the type disclosed in my said French patent, in which the jaws of the tool can be secured or limited against mutual separation beyond a selected angular relationship, whereby greatly to facilitate the use of the tool. With an improved stripping tool provided with the securing or limiting means of the present invention, the tool can first be clamped around the insulated cable so as to cause the cutter to penetrate to a selected depth into the insulation or covering thereof, and then the securing mechanism can be actuated to prevent any separating movement of the jaws. The cable can then be manipulated as required, i.e. pulled longitudinally and/or rotated relatively to the cutter, without having to maintain manual pressure on the interpivoted members of the tool. A more uniform incision can thus be made, muscular fatigue is diminished and stripping operations are performed more quickly and effectively.

The securing or limiting means of the invention may comprise an inclined surface formed on one of the interpivoted members concentric with the pivot axis, for cooperation with adjustable means having a complementary inclined surface, carried by the other of said members, for limiting the extent to which said members may have relative movement in the jaw-opening direction.

The novel features of the invention will be readily understood from the ensuing description of an exemplary embodiment given by way of illustration but not of limitation and with reference to the accompanying drawings, wherein:

FIGURE 1 is a perspective view of an insulation stripping tool provided with the improvement of the invention.

FIGURE 2 is a partial plan view of the region of the tool surrounding the pivot.

FIGURES 3 and 4 are similar to FIGURE 2 but each respectively illustrating only one of the members of the tool.

FIGURE 5 is a section on line V—V of FIGURE 2; and

FIGURE 6 is a perspective view of a limiting insert.

The drawings illustrate a stripping tool comprising a pair of crossed interpivoted members **1** and **2**. Each member, as shown in FIGURES 3 and 4, includes a central disk-like hub **3** and **4**, respectively, with opposite handle and jaw portions projecting in generally parallel relationship in opposite directions from diametrically opposed regions of the hub, as will be apparent from those figures. The hubs **3** and **4** have flat mating surfaces adapted to lie in mutual rotational engagement. In the hub **4** of member **2** (FIGURE 3) there is formed a central hole **6**, and from the center of the hub **3** of member **1** (FIGURE 4) there projects a pivot stud **5** which extends into and through the hole **6** when the mating faces of the hubs are in engagement. The projecting end of pivot **5** carries a spring retainer clamp **7** (see FIGURE 1) holding both members of the tool in interpivoted assembled relation.

As shown in FIGURE 1 each of the members **1** and **2** has an handle portion extending to one side from the pivot and a jaw extending from the opposite side of the pivot, with the corresponding portions of the respective members positioned in crossed relation as between one and the opposite side of the pivot. The handle portions of both members **1** and **2** are formed with outwardly jutting ends **18** to oppose slipping of the operator's fingers during use, and moreover the handle of member **2** is provided with a finger-grip ring portion **19**.

The jaw of member **2** is provided with cutter disks **12** and **13** and the jaw of member **1** is provided with backing rollers **8** and **9**. First referring in detail to these backing rollers, there is provided a first roller **8** of flat cylindrical shape rotatably mounted on a pivot pin **10** secured in member **1**. A second roller **9** is rotatably mounted on a pivot pin **11** secured in member **1** some distance along the length of the member away from pivot pin **10**, and roller **9** includes a first roller part **9*a*** which is flat cylindrical similar to roller **8** and positioned adajcent to and in the same general plane as roller **8**, and another roller part **9*b*** which may be integral with part **9*a***, roller **9** being generally spool shaped.

The cutters carried by member **2** include a first disk-shaped cutter **12** rotatably mounted on a pin **14** and positioned substantially in the common median plane of roller **8** and roller part **9*a*** and in an intermediate position therebetween so as to cooperate with the intervening space between rollers **8** and **9*a***. The second cutter disk **16** is rotatably mounted on a pin **15** which is positioned along member **2** at a position corresponding to that of the pivot **11** along the member **1**, and the cutter **13** is supported on its pin **15** by means of spacers such as **16**, at an axial position such as to cooperate with the reduced diameter part of the spool-shaped roller portion **9*b***.

It will be understood at this point that the tool as so far described can be used in either of two ways for stripping the insulation off a conductor cable. In a first procedure, the cable can be placed in a general direction normal to the general plane of the tool, i.e. a direction parallel to the pivot axis of members **1–2**, so as to rest in the groove between rollers **8** and **9** on member **1**, and the member **2** can then be pivoted towards member **1** so as to bring cutter disk **12** into engagement with the insulation of the cable. By rotating the cable about its own axis, a circumferential incision can be made in the insulation so

that a desired end length of the insulation can then be stripped off the end of the cable. In the second procedure, the cable may be positioned in a direction generally parallel to the general plane of the tool, i.e. normal to the pivot axis so as to rest in the groove of the spool roller portion 9*b*, and the member 2 can then be pivoted to engage cutter disk 13 with the insulation of the cable. The cable can then be pulled lognitudinally so as to cause the cutter disk 13 to cut a straight longitudinal incision in the insulation.

In accordance with the invention, means are provided for limiting the degree of opening between the jaws of members 1 and 2 to a selected angle.

A stud 20 has a screw threaded lower end screwed into a blind tapping formed in the surface of hub 3 of member 1, at a radial position somewhat short of the periphery of the hub as shown e.g. in FIGURE 4. The stud 20 extends into and through a slot 21 of arcuate shape formed in a corresponding position in the hub 4 of member 2, said slot having an arcuate midline concentric with the pivot interconnecting both hubs 3 and 4. Slot 21 has a raised peripheral rim 22 surrounding it, and the outer surface of this rim constitutes a ramp sloping upward in the direction indicated by arrow *f* in FIGURE 3. The stud 20 in its part projecting above the face of the hub 3 in which it is threadedly secured, has a flatted side, and a perforate washer-like insert 23 having a perforation formed with a shape complementary to that of the stud 20, with a flatted side wall 23*a*, is received around the part of stud 20 projecting above the rim 22. The insert 23, as clearly shown in FIGURES 5 and 6, has a sloping under face 23*b* corresponding in slope to that of the ramp defined by rim 22, so that when the insert 23 is received around stud 20 with its sloping under surface 23*b* engaging said rim 22, the flat upper face 23*c* of the insert lies in a plane normal to the axis of the stud 20. A limiting knob 26 has an internally threaded sleeve 25 extending axially from it and engageable with a threaded projecting end part 24 of the stud 20, so that rotation of the knob 26 will be capable of clamping the insert 23 against the sloping rim 22. In such clamped condition, it will be evident from FIGURES 1 and 5 that the two members 1 and 2 can still be pivoted in a jaw closing direction relative to one another, since such motion will urge stud 20 and insert 23 in a direction (rightward in FIGURE 5) relative to rim 22 in which relative movement is permitted owing to the downward slope of ramp or rim 22, but that relative movement of the members in the reverse, jaw opening, sense will be positively prevented by the rising slop of the rim 22.

In the operation of the improved stripping tool, when desired to make a circular incision or cut in the insulation of a cable, the cable is inserted into the nip between rollers 8 and 9 as earlier described and the jaws of members 1 and 2 are pivoted towards each other until the cutter disk 12 has penetrated a desired depth into the insulating material. Knob 26 is then rotated in a securing direction and acts by way of threaded sleeve 25 and insert 23 on the rim 22 to prevent thereafter any relative movement of members 1 and 2 away from each other i.e. in the opening direction of the tool. The operator can therefore release his finger pressure on the rearwardly extending or handle portions of the members 1 and 2 and rotate the cable about its axis to present all the points of its circumference to cutter 12 which will thus cut the desired circular incision in the insulating sheath of the cable. Backing the knob 26 will permit opening the tool to release the cable.

Similarly, in order to make a longitudinal incision, the cable is placed in the depression of spool 9*b* member 2 is pivoted to engage longitudinal cutter 13 into the insulating sheath to a selected depth, knob 26 is actuated to secure the jaws in this position against opening movement, and the cable can then be pulled longitudinally relatively to the cutter 13 which will thus cut the desired longitudinal incision.

It will be noted that in either case the secured condition of the mechanism will not prevent increasing the cutter pressure into the work should this be desired at any time during a cutting process, since the members 1 and 2 remain free to pivot towards each other if increased manual pressure is applied to their handles, as earlier described. Thus the operator retains the possibility of adjusting the cutting pressure during the process.

It is noted that the arcuate or circumferential length of the slot 21 is provided long enough to ensure that a desired wide range of tool opening angles remains available. It should further be noted that the slope of ramp 22 and the lower face of insert 23 should be selected high enough to provide the desired positive limiting action against backing movement, while not being so great that the motion transmission therethrough becomes reversible so that rotation of knob 26 in the securing direction would be liable to impart unwanted relative movement to the members, through relative displacement between the mating surfaces of rim 22 and insert 23.

It will be evident that the invention may be modified in various ways so as to depart from the single illustrative example here disclosed, and that it may be applied to a variety of tools other than the insulation-stripper tool here shown, provided such tools are of the type having interpivoted members as earlier specified.

What I claim is:

1. A tool including a pair of crossed interpivoted members having forwardly extending jaws adapted to engage work therebetween, and securing means engaging both members and movable between a limiting position in which said members are limited against relative movement in an opening direction while remaining freely relatively movable in a closing direction, and a release position in which said members are released for free relative movement in both directions, including means for moving the securing means between its said positions, said securing means comprising an arcuate slot in one of said members generally concentric with the pivot axis of said members, a pin projecting from the other member into and through said slot, an upstanding rim surrounding said slot and sloping downwardly in an arcuate direction towards that end of the slot which is foremost when said one member is moved in an opening direction relative to the other member, an element carried by said pin and engageable with said sloping rim surface, and means for clamping said element into firm engagement with said surface.

2. The tool claimed in claim 1, wherein said element comprises a washer-like insert receivable around said pin and having a sloping under surface mating with said sloping rim surface and a flat upper surface engageable by said clamping means.

3. The tool claimed in claim 1, wherein said clamping means comprises a knob having an internally threaded hub threadedly engageable with a threaded end portion of said pin and with the end surface of said hub engageable with said element.

4. A tool for stripping insulated cables and the like comprising a pair of crossed interpivoted members having forwardly extending jaws, a first cutter disk rotatably mounted on one of said jaws about an axis parallel to the interpivot axis, first backing means carried by the other jaw in a position to receive a cable therein extending generally parallel to said interpivot axis so as to be engageable by said first cutter disk for cutting a transverse circumferential incision therein, a second cutter disk rotatably mounted on one of said jaws about an axis parallel to said interpivotal axis and second backing means carried by the other jaw in a position to receive a cable therein extending generally orthogonal to said interpivot axis so as to be engageable by said second cutter disk for cutting a longitudinal straight incision therein, and securing means engaging both said members and movable

between a limiting position in which relative movement of the members is prevented in at least that direction which corresponds to opening of said jaws and a release position, and means for moving the securing means between its positions.

5. The tool claimed in claim 4 wherein said securing means comprises an arcuate slot in one of said members generally concentric with the pivot axis of said members, a pin projecting from the other member into and through said slot, an upstanding rim surrounding said slot and sloping downwardly in an arcuate direction towards that end of the slot which is foremost when said one member is pivoted in an opening direction relative to the other member, an element carried by said pin and engageable with said sloping rim surface, and means for clamping said element into firm engagement with said surface.

6. The tool claimed in claim 5 wherein said element comprises a washer-like insert receivable around said pin and having a sloping under surface mating with said sloping rim surface and a flat upper surface engageable by said clamping means.

7. The tool claimed in claim 5 wherein said clamping

means comprises a knob having an internally threaded hub threadedly engageable with a threaded end portion of said pin and with the end surface of said hub engageable with said element.

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