April 12, 1932. T. BIRKENMAIER 1,853,598

GRAPPLE

Filed May 12, 1928

Fig. 1.

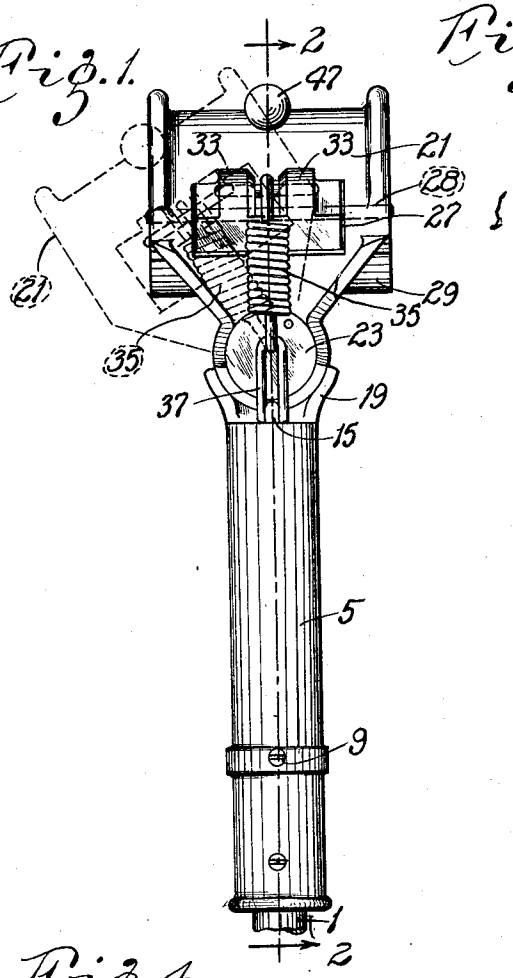


Fig. 2.

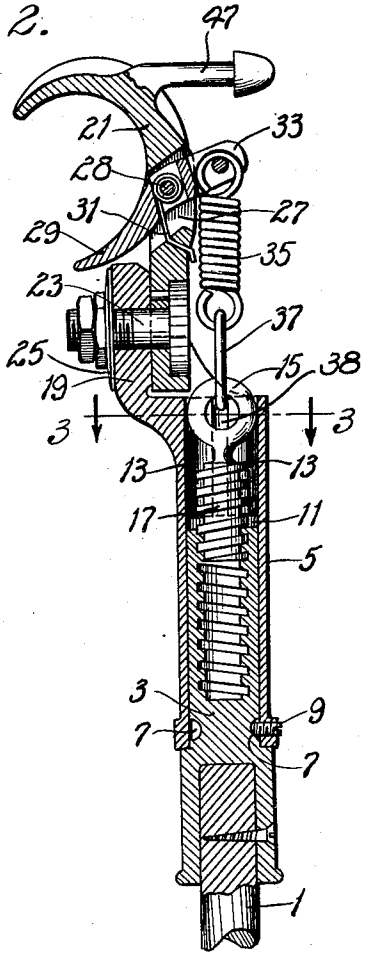


Fig. 4.

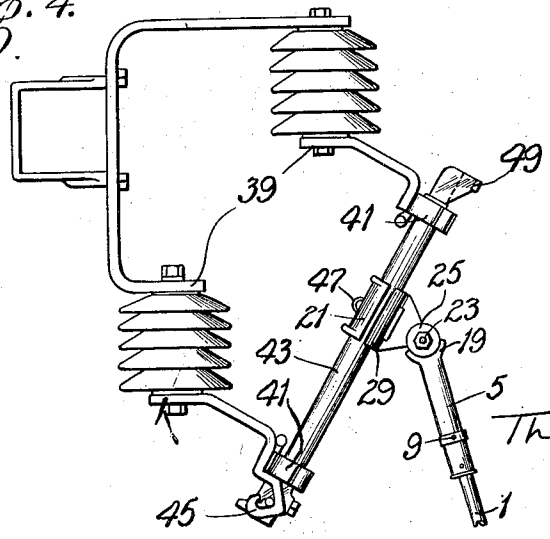
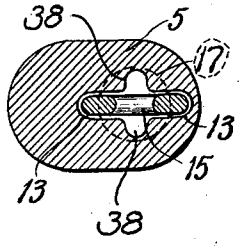


Fig. 3.



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UNITED STATES PATENT OFFICE

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GRAPPLE

Application filed May 12, 1928. Serial No. 277,161.

This invention relates to grapples and with regard to certain more specific features, to resilient and universally operable grapples for the operation of electrical fuses, switches and the like.

Among the several objects of the invention may be noted the provision of a grapple having resiliently operable clutching means, whereby a universal movement is permitted and whereby inadvertent damage to line terminals is prevented; and the provision of a device of the class described which has a minimum number of parts. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structure hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a top plan view of the device;

Fig. 2 is a longitudinal section thereof, certain portions being in elevation;

Fig. 3 is a cross section taken along line 3—3 of Fig. 2; and

Fig. 4 is an assembly of the mounted fuse showing the application of the grapple.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now more particularly to Figs. 1 and 2, there is illustrated at numeral 1 an extension handle preferably formed of some insulating material such as wood, bakelite or fiber, upon which is permanently mounted a draw nut 3, the latter being rotatable in a body portion 5, because of the use of an annular recess 7 and retaining screw 9.

The body 5 has an opening 11 therethrough, the lower end of which rotatably receives said draw nut 3 and the upper end of which is recessed to form guides 13 which receive in longitudinally slidable relationship the head or eye 15 of a draw screw 17. The screw 17 cooperates with the nut 3, the former being longitudinally movable but not rotatable in the body 5 (see also Fig. 3). Upon turning the nut 3 in the body 5 from the handle 1, the longitudinal positioning of the eye may be controlled without rotating said eye.

The upper end of the body 5 is provided with an extension 19 to which is swiveled a finger claw 21. Swiveling is accomplished by means of a pin 23, a friction washer 25 being used under the fastening nuts thereof so that the claw 21 will be controlled and retained in any position into which it is put with regard to the body 5, even after long service.

The finger or first claw 21 is provided with a recess or opening 27 in which is pivotally mounted a thumb or second claw 29, the latter being normally held in open position by means of a return spring 31 (Fig. 2). The axis of pin 28 between the claws is substantially at right angles to the axis of pin 23. The second claw 21 is also provided with an extension 33 to which is hooked the upper end of a spring 35. The lower end of the spring 35 is coupled to the eye 15 by means of a connector link 37, the link 37 cooperating with guides 38 in the body 5 for slidable but non-rotative movement.

The device is adapted for use in withdrawing various electrical elements out of their working positions. For instance, in Fig. 4 is shown a mounting 39 including spring terminal elements 41 for a fuse cartridge 43. The cartridge 43 is pivoted at 45 so that by swinging it up or down it may be engaged or disengaged with the terminals 41.

In operation the open claws 21 and 29 are placed around the circular body of the element to be removed, such as the cartridge 43, and then the nut 3 is rotated by means of the

handle 1 so as to draw down the draw screw 17. The positioning of the claws around the cartridge prevents turning of the body 5. This clearly causes a closing action of the thumb claw 29 so that the cartridge is gripped. However, when the claw 29 engages the cartridge, the operator may continue to turn the handle 1 without doing damage to the cartridge by crushing, inasmuch as the spring 35 interposes a resilient connection between the draw screw and the claw 29.

The resilient feature is particularly useful in cases where it is desired to use the device on porcelain, glass and other brittle or fragile elements where local strains must be prevented to eliminate breakage. The fact that resiliency is effected by the spring 35, rather than rubber face elements on the claw faces is of advantage in that the spring will not deteriorate as fast as rubber or the like.

After the claws are closed on the cartridge, the resilient effect above referred to also permits the operator to turn the grapple on the cartridge without positively twisting it around a longitudinal axis to cause damage to the terminals 41. Any inadvertent turning of this nature merely results in the claws turning on the cartridge, the tension in spring 35 limiting the gripping effect to safe values.

The spring 35 has another function which is to permit swiveling of the finger claw 21 on the body 5 around the pin 23 without its being interfered with by the connection between the eye 15 and the thumb claw 29, the spring permitting the necessary play. The required play is variable with each positioning of the eye 15. Said eye should theoretically permit swiveling of the lower end of spring 35 on a center about coincident with the center of the pin 23, as shown in Fig. 1, but such being manifestly impossible in all positions of the eye 15, the spring functions as a take up for the varying deviations. As illustrated in Fig. 1 the claws may be set into the dotted line position and yet perfect control be had of the claw 29 from the handle 1. This control is had, regardless of the position of eye 15 because of the use of spring 35.

The pin 23 is set with such a frictional effect that the device will not tend to collapse, even though a relatively heavy cartridge be grappled and supported by the device. It is clear that the device may be used for removing, inserting or otherwise manipulating cartridges, switches and the like. It may be used on non-circular sections as well as circular ones.

A hook 47 is formed with the claw 21 for purposes of engaging with a bridge 49 such as is usually formed with fuse cartridges.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a grapple, a body portion having a swiveling claw, a longitudinally movable but non-rotatable draw screw cooperating therewith, a rotatable but not longitudinally movable draw nut engaging said draw screw to move the same upon rotation of the nut, a second claw pivoted to said first claw and universal means for coupling said draw screw and said second claw.

2. In a grapple, a body portion having a swiveling claw, a longitudinally movable but non-rotatable draw screw cooperating therewith, a rotatable but not longitudinally movable draw nut engaging said draw screw to move the same upon rotation of the nut, a second claw pivoted to said first claw on an axis substantially at right angles to the swivel axis between the first-named claw and the body and universal and resilient means for coupling said draw screw and said second claw.

3. In a grapple, a body portion, a swiveling claw thereon, a longitudinally movable but non-rotatable draw screw cooperating therewith, a rotatable but not longitudinally movable draw nut engaging said draw screw to move the same upon rotation of the nut, a handle affixed to said nut, a second claw pivoted to said first claw on an axis substantially at right angles to the swivel axis between the first-named claw and the body and universal and resilient means for coupling said draw screw and said second claw comprising a spring fastened to said second claw and a movable link joining the spring and said screw.

4. In a grapple, a body portion, a swiveling claw thereon, a longitudinally movable but non-rotatable draw screw cooperating therewith, a rotatable but not longitudinally movable draw nut engaging said draw screw to move the same upon rotation of the nut, a handle affixed to said nut, a second claw pivoted to said first claw on an axis substantially at right angles to the swivel axis between the first-named claw and the body and universal and resilient means for coupling said draw screw with said second claw comprising a spring fastened to said second claw, a movable link joining the spring and said screw, said screw having a head for engaging said link and guides in the body portion engaging the head for permitting longitudinal movement but preventing rotation of the screw.

5. In a device for the distant manipulation of electrical apparatus, a body member, a pair of clamping jaws, threaded means extending

through the body member for clampingly actuating one of said jaws, the other jaw being adjustably secured in position on the device, a pivot carried by the secured jaw adapted to permit the actuation of said jaws relative to each other, and means on the body member forming a pivot for said secured jaw, and permitting the conjoint movement of the jaws to an angularly offset position, relative to said actuating means.

In testimony whereof, I have signed my name to this specification this 4th day of May, 1928.

THEODORE BIRKENMAIER.