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DEVICE FOR ENGAGING, HOLDING AND RELEASING OBJECTS

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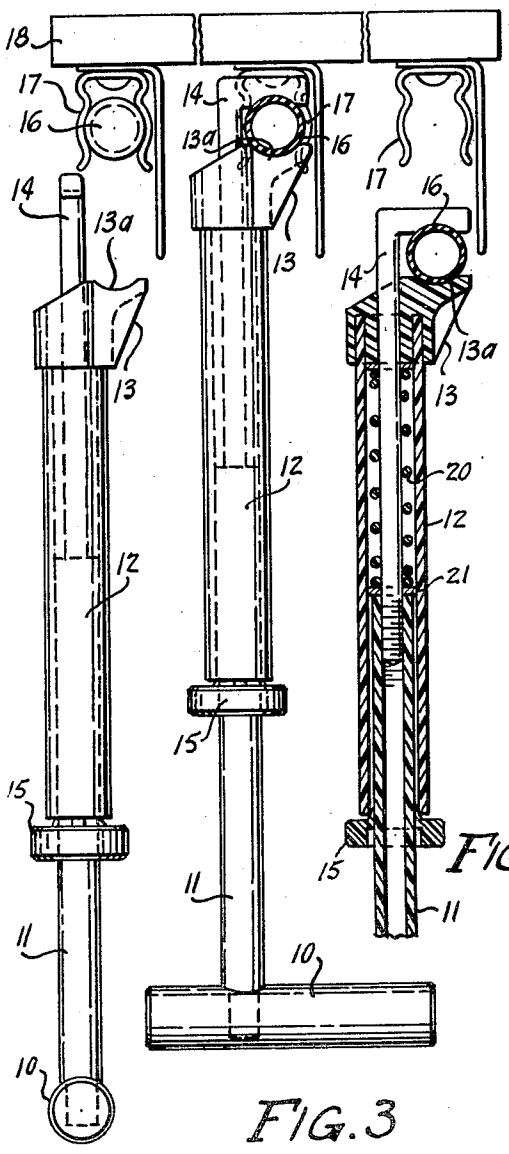


FIG. 2

FIG. 3

FIG. 4

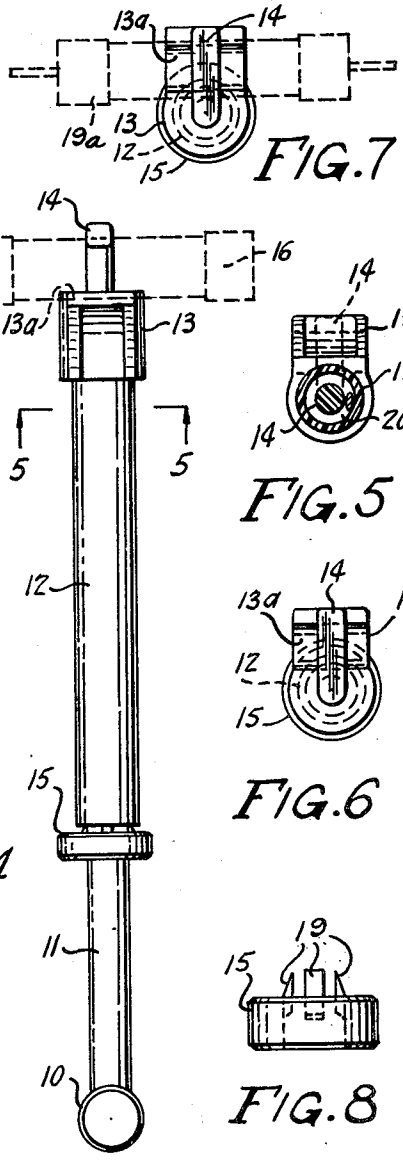


FIG. 1

FIG. 7

FIG. 5

FIG. 6

FIG. 8

INVENTOR.
JEAN L. BICKS
BY
Kimmel & Crowell
ATTORNEYS.

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DEVICE FOR ENGAGING, HOLDING AND RELEASING OBJECTS

Jean Leonard Bicks, P.O. Box 3, Severna Park, Md.

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This invention relates in general to a device for inserting, holding or removing objects, and more particularly, cartridge type fuses that are inserted into electrical circuits and switch gear boxes as ferrule or knife blade type fuses and the like.

Electricians, service men, craftsmen, model makers, mechanics, and even surgeons, often find it necessary to have and employ a small tool-like device to get into cramped inaccessible spaces to remove, insert or hold small objects of various shapes which are not capable of being held by conventional tools such as a pair of pliers, operator's hands and the like.

The instant invention solves the above problems by being adapted to be selectively used for many types of objects as desired.

A primary object of the invention is to provide a dielectric tool that is simple in operation, economical to manufacture, and adapted for inserting, extracting and holding various types of electrical fuses from electrical receptacles, fuse boxes and the like which have a minimum clearance therein.

Another object of the invention is to provide a dielectric tool that may be used with full safety precaution and as a guide against the side of the fuse.

A further object of the invention is to provide a device for engaging, holding and releasing objects of various sizes and shapes.

A still further object of the invention is to provide a dielectric device for handling various types of fuses with safety while in contact with any part of an energized electrical circuit.

Another object of the invention is to provide a dielectric tool adapted to completely grip and retain a fuse without operator assistance allowing greater facility of placement or removal of a fuse of the knife blade type.

Another object of the invention is to provide a dielectric device for holding hot electric fuses after their removal from a fuse box to prevent heat burns to an electrician or service man.

Other objects and many of the attendant advantages of the instant invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIGURE 1 is a side elevational view of the device of the instant invention carrying a fuse shown in dotted lines;

FIGURE 2 is a side elevational view of the instant device immediately before engaging a fuse;

FIGURE 3 is a view similar to FIGURE 2 showing the device of the instant invention engaged with a fuse, the latter element being shown in cross-section;

FIGURE 4 is a fragmentary view, partly in section and partly in elevation, showing the device of the instant invention after it has removed the fuse;

FIGURE 5 is a transverse cross-sectional view taken substantially on lines 5—5 of FIGURE 1;

FIGURE 6 is a top plan view of the device of the instant invention;

FIGURE 7 is a view similar to FIGURE 6 but showing the device carrying a fuse of the knife blade type in dotted lines; and

FIGURE 8 is a view of the wedge detent means serving to lock the finger in position relative to the tool head.

The new device of the instant invention comprises, in general, a tool handle **10**, tubular member or neck of tool **11**, hollow tool body **12**, head or jaw means **13**, finger member **14**, cooperating with head means **13** and wedge detent means **15**. Hollow tubular member **12** terminates in a centrally apertured jaw means **13** having an arcuate seat **13***a* for receiving and gripping objects. Tubular member **11** terminates at its outer end in a handle **10** and terminates at its inner end in an internally threaded portion, as shown in FIGURE 4. Member **14** is threaded at one end and terminates at the other end in a radial finger portion having a receiving seat thereon to cooperate with seat **13***a* in jaw **13**. The threaded end of member **14** is adjustably and threadably received by the internally threaded portion of tubular member **11** so that spring **20** is biased between washer **21** and the inner end of jaw means **13**. Jaw **13** reciprocably and rotatably receives member **14** in its central aperture. Tubular member **11** carries detent means **15** of collet-like design having longitudinally and circumferentially spaced tapered locking members **19** thereon to mate with the internal surface of member **21** and external surface of member **11**. Jaw seat means **13***a* and the finger portion of member **14** grips fuses **16** and **19***a*. Fuse **16** is carried by clip means **17** from support means **18**. Detent **15** is slidable and rotatably carried by member **11**. Tubular member **11** is reciprocably and rotatably mounted in outer tubular member **12**.

FIGURES 2, 3, 4 and 1 illustrate various ways the tool may be used in operation of the new device of the instant invention. In FIGURE 2 the operator has depressed handle **10** against spring bias means **20** to displace finger member **14** from head member **13** and has rotated finger member **14** substantially 90 degrees to the engaging jaw portion **13***a* of head means **13** preparatory to placing jaw portion **13***a* to engage the top portion of fuse **16** held by fuse holder **17** of a portion of receptacle **18**. In this position detent means **15** is locked in position by its wedge means **19** of FIGURE 8 being inserted or wedged between members **11** and **12** so as to position finger **14** out of line with jaw **13***a* in order that finger **14** may be used as a hook means to extract objects from confined places. In FIGURE 3 the jaw portion **13***a* and finger means **14** are in position for engaging fuse means **16** for removal from its holder **17**, and FIGURE 4 illustrates the coaction of parts, such as, finger means **14** and jaw portion **13***a* with fuse means **16** and a part sectional view of how finger member **14** is threadably secured to neck member **11** being spring biased by spring means **20** and washer means **21**. Finger **14** may be rotatably positioned against spring means **20** and locked in position as desired by rotatable detent means **15** having wedged prongs **19** which frictionally wedge between the end of body member **12** and neck means **11** as the operator forces tapered prongs **19** longitudinally therein with a uniform wedging action resulting from rotary turning of detent **15**. Handle means **10** is used to rotate finger means **14**. FIGURE 1 shows the relative positions of handle means **10**, neck means **11**, body means **12**, jaw means **13***a* of head means **13** and finger means **14** when engaging a fuse means **16** shown in broken lines.

FIGURES 5, 6 and 7 show various views of body means **12**, jaw portion **13***a* of head means **13** in relation to finger means **14**. FIGURE 8 shows detent means **15** having a plurality of extending wedge projections **19** suitable for being wedged between the internal end surface of hollow body member **12** and outer surface of neck means **11**. FIGURE 7 shows the relative positions of body member **12**, jaw portion **13***a* and finger means **14** in engagement

with the intermediate portion of a knife type of fuse 19*a* indicated in broken lines.

In use, the inventive tool of the instant invention may be used merely as a hook means, as shown in FIGURE 2, for extracting objects from confined places, by rotating finger 14 at 90 degrees or 180 degrees with respect to jaw 13*a*, and locking finger 14 against compression spring 20 in the open position by tapered wedging detent means 15 coacting between members 11 and 12, by longitudinally forcing and rotatably turning of detent 15 for taper locking or wedging action between members 11 and 12, as understood by those skilled in the art. By rotating and positioning finger 14 with respect to jaw 13*a*, as above, permits greater clearance of operation of finger 14 as a hook extracting means of objects from confined places.

The instant inventive tool may be used by an operator as shown in FIGURES 1, 3 and 4, as a positively gripping tool by the operator gripping member 12 and handle 10 to depress spring 20 to sufficiently separate finger 14 from jaw 13*a* to receive a fuse or other object, after which handle 10 is released with respect to member 12 by the operator to allow spring 20 to permit both finger 14 and jaw 13*a* to cooperatively grip fuse 16, after which detent 15 is pushed by the operator longitudinally toward jaw 13*a* and rotatably turned by the operator to obtain a more uniform wedging and positive action of tapered members 19 between members 11 and 12. Detent 15 by the above action insures a more positive or vise-like gripping action of fuse 16 between finger 14 and jaw means 13*a* than would be obtained by the mere coaction of spring 20 between jaw 13*a* and finger 14. Of course, if desired, where the object to be removed requires only a slight pull, the detent 15 need not be used; but where fuses are corroded to their holders and the holders are located in various positions with respect to the operator and are difficult to be removed therefrom, then detent 15 is very helpful to coact with spring 20 to fixedly hold jaw 13*a* and finger 14 in tight and fixed relationship to securely grip fuse 16 to insure removal of a fuse from holder 17, which may be mounted in a horizontal, vertical or other position in an accessible place requiring a pull against fuse 16, which is substantially parallel with the finger and gripping jaw seat means 13*a*. By use of detent 15 the new tool may be used as a work holder to replace a fuse element in fuse 16. Also where the tool is made small for surgical applications for compressing blood vessels, then detent means 15 may be used to fixedly lock finger 14 and jaw seat 13*a* around a blood vessel during surgery to insure positive stoppage of blood flow or bleeding when the instant inventive tool is used as a hemostat, as understood by those skilled in the surgical art.

The instant new device may be made of various materials as desired, also the shape and size of jaw portion 13*a* and finger means 14 may be modified as desired without departing from the scope and intent of this invention. Although the device has been shown in its preferred form as utilized as a fuse puller, it will be understood that by

varying the size and shape of same it may readily be adapted for use in engaging, holding and releasing other objects. For example, by providing an elongated thin device, the same could be utilized in surgery to reach into an opened body cavity and grasp an object such as a blood vessel to temporarily move the same out of the way of the surgeon during a sensitive operating procedure.

From the foregoing it will now be seen that there is herein provided an improved engaging, holding and releasing device which accomplishes all the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

It should be understood, of course, that the foregoing disclosure relates to only a preferred embodiment of the invention and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention set forth in the appended claim.

I claim:

A multipurpose instrument for gripping, clamping, holding, inserting and pulling objects comprising an outer tubular member terminating at one end in a jaw means having an arcuate seat therein adapted to receive an object, an inner tubular member, adapted to be rotatably and reciprocably received in said outer tubular member, and terminating at one end in an outer handle and terminating at the other end in an internally threaded portion, a rod member threaded at one end and adapted to be threadably received by the internally threaded end of said inner tubular member, and terminating at the other end in a radially extending finger portion having a receiving seat thereon to cooperate with the seat on said jaw means to grip an object, a compression spring within the outer tubular member between the end having a jaw means thereon and the threaded end of the inner tubular member to bias said finger portion to coact with said jaw means to hold an object, and a collet-like locking means having a plurality of longitudinally and circumferentially spaced tapered fingers thereon and a central aperture therein adapted to be rotatably and slidably received on said inner tubular member, said longitudinally tapered fingers adapted to wedgingly engage the inner wall of the outer tubular member to selectively lock said tubular members against either axial or rotational movement.

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WILLIAM FELDMAN, *Primary Examiner.*

MICHAEL BALAS, *Examiner.*