Sept. 13, 1932. H. C. FISKE 1,876,892

FUSE PULLER

Filed Feb. 27, 1929 2 Sheets-Sheet 1

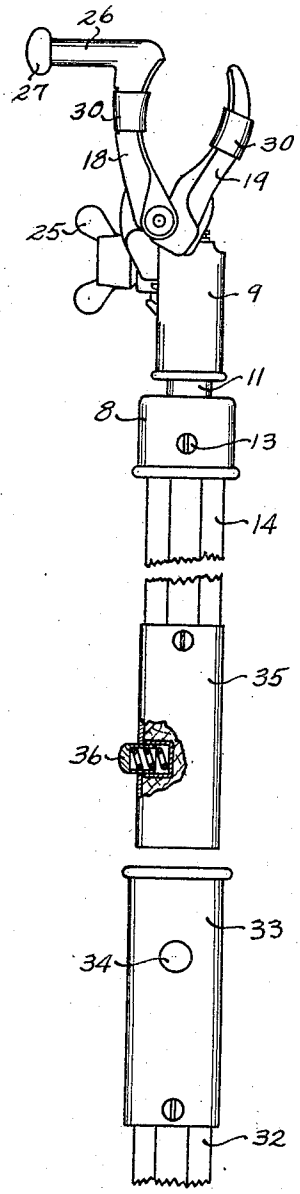


FIG. 1

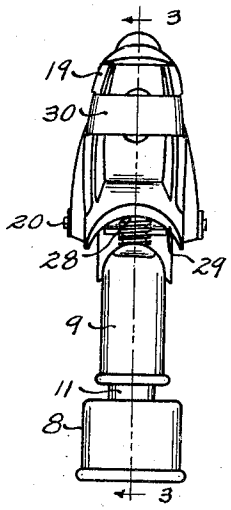


FIG. 2

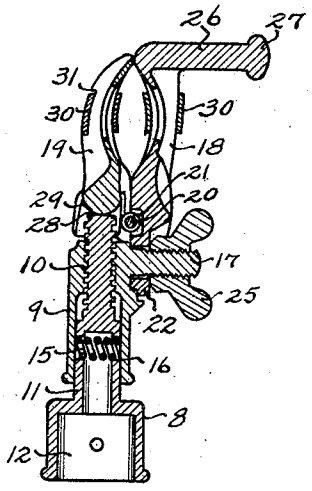


FIG. 3

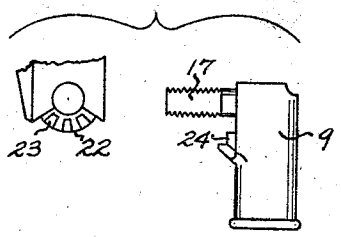


FIG. 4

INVENTOR
HAROLD C. FISKE
BY
Edwards Schaumburg
ATTORNEYS

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FUSE PULLER

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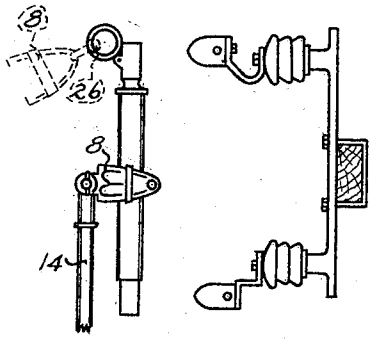


FIG. 5

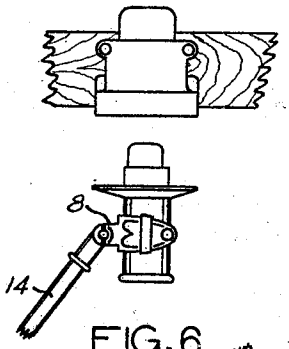


FIG. 6

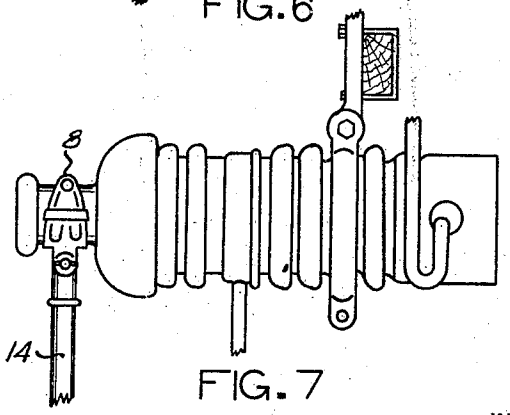


FIG. 7

INVENTOR
HAROLD C. FISKE
BY
Edwards Schaumberg,
ATTORNEYS

Patented Sept. 13, 1932 1,876,892

UNITED STATES PATENT OFFICE

HAROLD C. FISKE, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO JAMES R. KEARNEY CORPORATION, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI

FUSE PULLER

Application filed February 27, 1929. Serial No. 343,204.

This invention relates to fuse handling equipment, and particularly to an improved fuse and wire handling device of a type which may be designated as a fuse puller.

An object of the present invention is to provide an adjustable, positively-actuated clamp, for use in removing and inserting a great variety of the different types of fuse holders and fuses, particularly those used in connection with overhead line installations.

A further object is to provide an adjustable clamp of the general type recited, with means for adjusting and actuating such a clamp, with entire safety to the operator, at a distance from the work or apparatus with which the clamp is used.

A further object is to provide a device of the type described, which may be universally, angularly positioned with respect to the clamp actuating means.

A further object is to provide a fuse puller with an adjustably offset operating head, whereby an operator or lineman is permitted to work from one side of, instead of directly under, the fuse or other apparatus engaged by the clamp.

An additional object is to provide a clamping fuse puller, having an operating head embodying means for safe locking engagement, without the necessity of adjustment, with the usual pull-ring of fuses and disconnects; such head also embodying a clamp of adjustable opening for engaging the body or removable portions of pole-type fuse plugs, expulsion cutouts, disconnect switch blades and other apparatus and devices of kindred nature.

Still a further object is to provide an improved fuse-cartridge clamp or puller, which is adapted not only for use in the removal and insertion of fuses, with their various types of containers, but which is equally adapted for distantly handling energized cables, wires and conductors in general, with absolute safety to the lineman or operator.

Further objects and advantages of the invention will appear from the following detailed description, and the accompanying drawings, illustrating by way of example, a preferred executional embodiment of the invention, the drawings being briefly described as follows:

Fig. 1 is a side elevation of the clamping head and a sectional handle therefor, the handle being foreshortened to illustrate a preferred form of connecting means for the various sections of the handle, to provide a handle of adjustable length; Fig. 2 is a rear elevation of the clamping head; Fig. 3 is a vertical section along line 3—3 of Fig. 2, and showing the internal construction and arrangement of parts of the clamping head; Fig. 4 is a view of the body portion of the clamping head, showing a partly exploded view of the angular adjusting means; Fig. 5 is a side elevation showing an application of the present device as a puller for removing or inserting a fuse cartridge of standard type, and indicating in dotted lines, an alternate position of the puller in removing or engaging a fuse cartridge or disconnect blade, equipped with a pull ring; Fig. 6 is a view illustrative of the manner of engagement of a standard plug cutout, by my device; and Fig. 7 shows the application of the device for fuse replacement in connection with an expulsion cutout.

It will be understood that the following description, as well as the drawings, relate to a single preferred embodiment of the present invention, which is herein described in detail by way of providing the requisite statutory example of the invention. It will be obvious to those skilled in the art, that the parts described, and the arrangement and combinations thereof, may be varied in many ways, without departing from the spirit and full intendment of the present disclosure.

Referring now by numerals to the drawings, the fuse puller or clamp is indicated generally at 8 and comprises a body portion 9, which is provided with a longitudinal bore, partially internally threaded at 10 and thereby adjustably connected to a threaded post or stud 11, which is, in turn, socketed at 12 and secured as by a through pin 13, to one end of a handle 14. The post 11 is preferably formed of slightly greater length than the bore through the body portion; so as, when desired, to project upwardly or out-

wardly therethrough for a purpose hereinafter appearing. To prevent casual or unintentional relative rotation of the recited body portion and stud, it is preferred to provide a frictional retaining means, such as a spring 15, disposed in a transverse aperture 16 in the post 11, so that the spring ends bear against the inside surface of the body portion.

Extending, preferably at a right angle from the body portion 9, is a threaded stud 17, which, if desired, may be formed initially and integrally with the body portion. This stud serves as a mounting means for a pair of relatively pivoted clamping jaws, indicated respectively as 18 and 19. Carried by both, or one only of the jaws, for example, by the jaw 18, is a transverse pivot pin 20, with which is pivotally engaged the opposite jaw 19. Disposed between the clamping jaws, and by preference carried by the pin 20, is a coiled, torsion spring 21, the opposite ends of which are extended upwardly a short distance between the jaws in a manner tending to spread the jaws apart. For strength and saving of metal, each of the clamping jaws 18 and 19 is preferably formed substantially U shaped in section. Not only the clamping jaws, but, if desired, the body portion 9, and the threaded post or stud 11, may be separately formed as bronze or brass castings. Any other suitable metal may, of course, be used and, if desired, some or all of the parts described may be formed by forging or the like.

In a portion thereof depending from the pivot 20, the jaw 18 includes, preferably as an integral part thereof, a ratchet member consisting of an annular portion 22, (Fig. 4), the inner face of which is provided with notches 23. Adapted for engagement in the recited notches, one at a time, is a projection 24, formed on the front or outer side of the body portion 9 to provide an angular adjustment of the clamping jaw assembly relative to the body portion. To this end, the threaded post or stud 17 is provided with a wing nut or the equivalent 25, which, upon being loosened, permits a ready adjustment of the jaw assembly relative to the axis of the body portion, and hence relative to the actuating handle.

One of the clamping jaws, for example, the jaw 18, is provided near its outer end with an angular projection or hook 26, preferably formed integrally with the jaw, and terminating in an enlargement or head 27. This extension is adapted for engagement with, by extending through, the usual opening of the pull ring of a disconnect switch blade, or of a fuse cartridge assembly, in a manner hereinafter more fully set forth, and as best appearing from Fig. 5.

Since the assembly comprising the jaws 18 and 19 and related parts, is adapted to be angularly adjusted relative to the body portion, as described, provision must be made for insuring the actuation of the jaws for clamping action, irrespective of their angular position. This provision is found in a somewhat rounded head portion 28 on the top of the threaded post 11. This head or end portion engages, in assembly, an arcuate cam surface 29, formed, say, on the jaw 19, the particular area engaged depending upon the angular position of the assembly of clamping jaws.

From the construction of the clamping jaw assembly and the relation of the jaws to each other and to the spring 31 disposed therebetween upon the pivot 20, it will be seen that the tendency of this spring to spread the jaws, results in a tendency of the same spring to seat the depending portion 22 more firmly into engagement with the described projection 24 in a manner tending to prevent relative disengagement of these parts. At the same time, the portion of the jaw 18 just below the pivot, tends to be forced outwardly by the spring in a manner enabling the use of the spring in locking the wing nut 25 upon the stud or post 17, and preventing unintentional disturbance of this adjustment.

Due to the fact that it is often desired to employ the present device as a means for grasping, in clamping engagement, the body of a fuse cartridge, or similar outdoor equipment which includes a porcelain insulating body, any possible breakage of such a porcelain body is prevented by providing the jaws with a cushioning and gripping covering, such as the flexible rubber bands, indicated at 30. In order to position such bands on the jaws, notches or recesses 31 are formed in each of the jaws to provide a securing seat for the band. If desired, the rubber covering of the jaws may extend entirely thereover, and may be vulcanized in place on the jaws so as to constitute a permanently secured covering. I prefer, however, the use of a soft relatively flexible rubber covering, by reason of its ease of replacement and better gripping power.

The manner of use and operation, as well as the more obvious applications of my device, are thought to be apparent from the above detailed description of parts. The angle at which the jaw assembly is to be adjusted relative to the handle, may be readily determined by the operator or lineman, and quickly adjusted by loosening the wing nut 25, setting the jaw members at the desired angle, and clamping them in place by taking up the wing nut. The desired length of handle is obtained by the addition or removal of the desired number of sections 32, certain of which are provided with sockets 33, apertured as shown at 34, and others thereof having ferrules 35 each provided with a spring pressed plunger 36, disposed in a suitable recess. Upon connecting the portions 33 and 35, the sections are locked together, and against relative rotation by engagement of the apertures

34 by plungers 36. In this manner, as many sections may be provided as desired, and the length of handle determined accordingly.

Preliminary to use, the jaws of the fuse puller are opened somewhat wider than is necessary to accommodate the object to be engaged thereby. Upon application of one of the jaws to the surface, for example, of a fuse cartridge, as shown in Fig. 5, the handle is rotated, and the head is prevented from rotation therewith. The corresponding rotational movement given the stud 11 within the body portion 9, results in the extension of the threaded portion, with its rounded head 28, to engage the arcuate cam surface 29 on the jaw 19. Continued rotation causes the jaws to grasp the article to be engaged, and this clamping pressure is under the full control of the operator at all times. Upon bringing the jaws into gripping engagement with the article, the manner of use will be obvious. Release of the clamping jaw assembly is, of course, effected by rotation of the handle and the stud in the opposite direction.

It will be seen that, for the manipulation of apparatus provided with a pull ring, such as the fuse cartridge shown in Fig. 5, no adjustment of the jaws is required, since the operation may be effected merely by the engagement of the hook 26 with the pull ring; the terminal projection 27 serving to prevent unintentional disengagement of the hook and the ring.

Due to the substantially rectilinear contact between the outer ends of the jaw members 18 and 19, it will be seen that, if desired, the jaw members may be clamped together so as entirely to embrace an object therebetween. This feature is of value in enabling the use of my device as a means for handling energized wires or cables in a manner which will appear obvious.

It will be seen that the described device is of sturdy, yet economical construction, comprising a minimum number of parts. The handle being adjustable in length and formed of an insulating material, such as wood, for example, permits of using the device on live lines and in connection with energized apparatus, with perfect safety to the operator. A much wider range of uses of the device is contemplated than is suggested by the few remarks herein set forth. It is believed that the present invention provides an apparatus of great adaptability, and a high degree of safety, in fulfillment of the objects set forth above.

I claim as my invention:

1. In a distantly operable clamp for electrical apparatus, a pair of clamping jaws, a handle associated with said jaws for rotation relative thereto, a body member having a threaded bore coaxial with the handle, a pivot stud projecing laterally from the body, one of said jaws having an aperture adapted to receive said stud, and adapted to be clamped thereby in adjustable offset, normally stationary relation to the body member, a pivot carried by the stationary jaw, the opposite jaw being arranged for clamping movement about said last named pivot, and having a curved actuating seat disposed in line with said threaded bore, and a threaded clamp actuating member coacting with the threaded bore, said member being operatively associated with the handle and operatively engaging said curved seat.

2. In an extensible device adapted for use as a fuse puller or the like, a handle, a clamping head secured to a terminal section of said handle and comprising a socketed portion engaging the end of the handle, an upstanding threaded stud supported upon the socketed portion, a body portion having a longitudinal bore, internally threaded and adapted thereby for the reception of said stud, said stud projecting outwardly through said bore; an angularly disposed post carried exteriorly of said body portion, a pair of clamping jaws, one of said jaws having an aperture adapted to accommodate said post, means for securing said jaws onto the body portion in angularly adjustable relation, said means comprising a nut disposed upon said post and a ratchet constituted by a portion of one of said jaws and a projection on said body portion; a pivot between said jaws, a spring carried by said pivot and tending to spread said jaws into open position, and means forming an arcuate cam surface on one of said jaws, adapted for engagement by said threaded stud upon rotation of the handle, to urge the jaws toward their closed, clamping position.

3. A handling device of the class described comprising a handle, a sleeve in threaded engagement therewith, a part pivotally carried by the sleeve, clamping jaws mounted upon said part for movement one towards the other in a general direction angular to the general direction of swinging movement of the part, and coacting means carried by the handle and the jaws for moving said jaws one towards the other upon rotation of the handle in said sleeve in one direction.

4. A handling device of the class described comprising a handle, a sleeve in threaded engagement therewith, a part pivotally carried by the sleeve, clamping jaws mounted upon said part for movement one towards the other in a general direction angular to the general direction of swinging movement of the part, said handle upon rotation in one direction moving the jaws one towards the other, and means for braking the relative rotation of the handle and sleeve.

5. In a distantly operable clamp for electrical apparatus, including a pair of clamping jaws, a handle having a threaded stud at one end, arranged for rotation therewith, a

body member having a threaded opening through which the stud is adapted to operate, one of said jaws being normally secured in adjusted relation to, and adapted to be angularly offset from the body portion, the other jaw being freely movable to and from the secured jaw; a threaded clamping member extending laterally from the body member and through the secured jaw, and adapted to permit angular adjustment thereof with respect to the body; a pivot carried by the secured jaw and serving to position the movable jaw for abutting engagement by said threaded stud, said stud being arranged, upon rotation of the handle, to operate the movable jaw into clamping relation with the secured jaw about an axis normal to that of the adjusting movement of the jaws.

6. In a device for distantly engaging electrical apparatus, a body portion having an internally threaded bore, a pair of clamping jaws, one thereof being adjustably secured in position on the body portion and the other relatively movable for clamping actuation, a handle for the device, a threaded extension on the handle, coacting with the threaded bore of the body portion, a pivot for the fixed jaw, carried by the body and adapted to permit angular adjustment of said pair of jaws relative to the handle, a pivot for the movable jaw, carried by the normally fixed jaw, and resilient means for actuating the movable jaw toward open position, said extension being rotatable with the handle, and adapted, upon rotation of the handle, to extend through said bore into pressing engagement with said movable jaw.

7. In a device for manipulating overhead electrical apparatus, a clamping head including an internally threaded sleeve, a pair of clamping jaws one thereof being adjustably secured to the sleeve, and the other mounted for pivotal movement on the secured jaw, a handle having an end portion in abutting relation with the last recited jaw and threadedly disposed in said sleeve, means for angularly adjusting and securing said jaws relative to said body, said means including a threaded pivot carried by the body, and a nut coacting with the pivot.

8. In a device for distantly manipulating electrical apparatus, a handle terminating at one end in an axially projecting, threaded stud, a clamping head including a tubular body, internally threaded to accommodate said stud, and a pair of clamping jaws, one thereof being normally fixed in position, and the other movable, said stud engaging the movable jaw for clamping actuation thereof, upon rotation of the handle in one direction, relative to the clamping head, resilient means associated with said jaws for actuating the movable jaw toward open position, a pivot for said movable jaw carried by the normally fixed jaw, a second pivot projecting from the body and extending through said fixed jaw, and threaded means for securing the normally fixed jaw in selective offset positions relative to the body and handle.

HAROLD C. FISKE.