March 10, 1953 J. A. THORNTON 2,630,730

ELONGATED FOLDABLE HANDLE FOR TOOLS

Filed March 28, 1949 2 SHEETS—SHEET 1

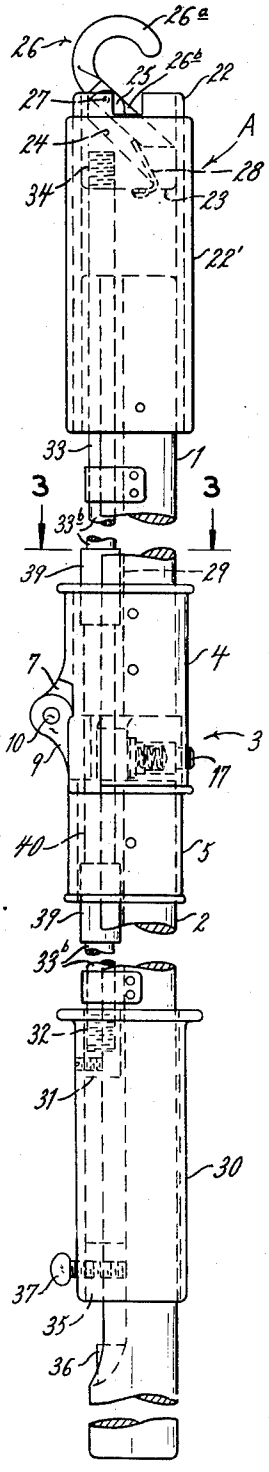


FIG. 1.

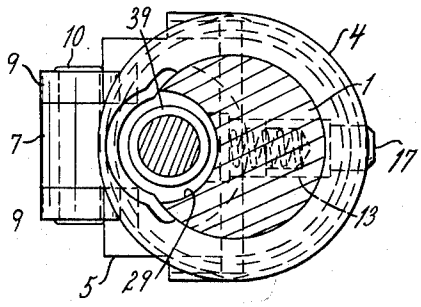


FIG. 3.

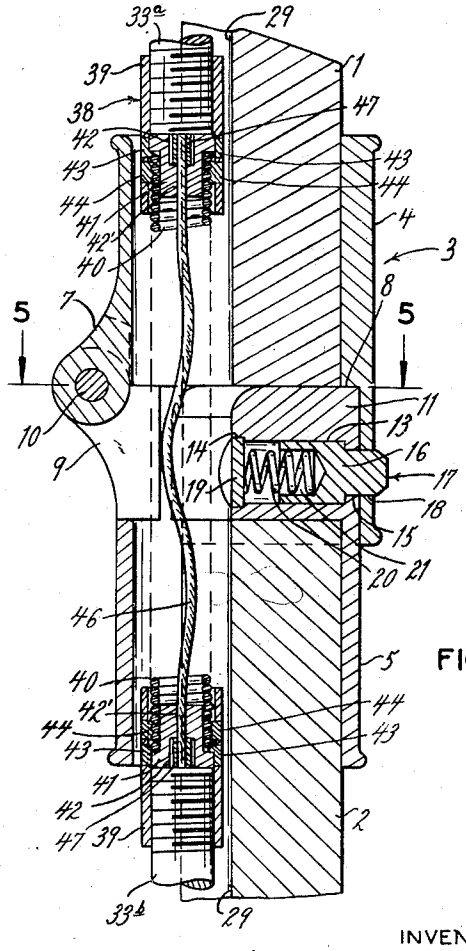


FIG. 2

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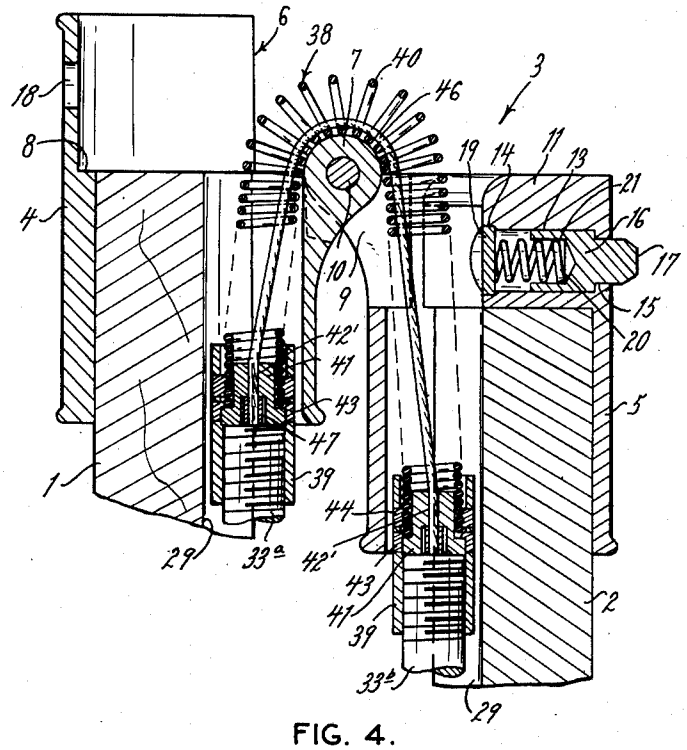


FIG. 4.

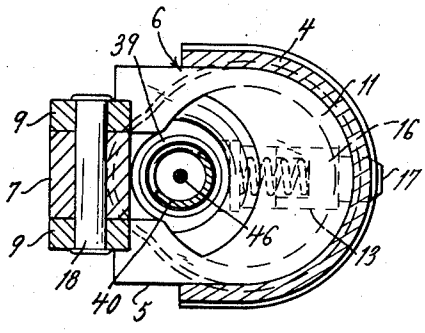


FIG. 5

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ELONGATED FOLDABLE HANDLE FOR TOOLS

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This invention relates generally to elongated handles for tools used by workmen engaged in building, repairing and maintaining electrical systems which include energized electrical conductors, and more specifically to such tool handles which are in the form of poles of very considerable length that are made from electrical insulating material and which, because of their insulative nature and their lengths, serve to protect the users of the tools from injuries resulting from electrical shock, the predominant object of the invention being to provide such an elongated tool handle with improved hinge means whereby hinged sections of the tool handle may be folded with respect to one another, when the tool is not in use, so as to greatly reduce the length of the tool handle in order that a tool of which the improved handle forms a part may be conveniently carried in a small maintenance truck.

Fig. 1 is a fragmentary side elevational view of a tool provided with an elongated handle made in accordance with this invention.

Fig. 2 is an enlarged, fragmentary, vertical sectional view illustrating the improved hinge type splice of the tool handle of the present invention.

Fig. 3 is an enlarged, horizontal section taken on line 3—3 of Fig. 1.

Fig. 4 is a fragmentary, vertical sectional view showing the tool handle in a folded condition.

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 2.

In the drawing, wherein is shown for purposes of illustration, merely, one embodiment of the invention, A designates a tool which is provided with a handle constructed and arranged in accordance with the present invention. The particular tool illustrated in Fig. 1 is intended for use in applying clamps to and removing clamps from overhead electrical lines, but, obviously the improved handle of the present invention may be employed as part of a great variety of other tools of the type having elongated, pole-like handles. The tool A includes an elongated handle which comprises an upper handle section 1 and a lower handle section 2, the handle sections 1 and 2 being hingedly connected together by a hinge type pole splice 3.

The hinge type pole splice 3 comprises a pair of socket members 4 and 5, the socket member 4 having a lower portion of the handle section 1 extended thereinto, while the socket member 5 receives therein the upper portion of the handle section 2, and said handle sections are suitably fixed to the respective socket members. The socket member 4, throughout its upper portion is of tubular formation, while the lower portion of

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said socket member 4 is shaped in horizontal section as is shown to good advantage in Fig. 5. In other words, throughout its lower portion the socket member 4 is open at a side thereof, as is indicated by the reference character 6 in Fig. 5. Also, the socket member 4 has formed thereon a hinge element 7 through which an opening is formed, and said socket member 4 is provided at the inner face of the wall thereof with a horizontally disposed shoulder 8 (Fig. 2).

In the normal, locked position of the pole splice 3 the upper portion of the socket member 5 extends into the lower portion of the socket member 4, as is shown to good advantage in Fig. 2. The socket member 5 is provided with a pair of spaced hinge elements 9 between which the hinge element 7 of the socket member 4 is disposed, as is shown to good advantage in Fig. 3, the hinge elements 9 having openings formed therethrough which are alined with the corresponding opening of the hinge element 7 of the socket member 4, and a pivot pin 10 is extended through said openings of said hinge elements so as to hingedly attach the socket members 4 and 5 together. An upper portion of the socket member 5 is of solid formation, as is shown at 11 in Fig. 2, and a part of the top face of this solid portion contacts with the shoulder 8 within the socket member 4.

The solid upper portion of the socket member 5 has formed horizontally therein an opening 13, said opening being of increased diameter at one of its ends, as is indicated at 14 in Fig. 2, and being of decreased diameter at its opposite end, as is indicated at 15 in the same view. Disposed within the opening 13 is a plunger 16 which has projected outwardly therefrom a locking pin 17, said locking pin being adapted to be extended through an opening 18 formed through a wall portion of the socket member 4 for the purpose of locking the socket members 4 and 5 together against hinging movement about the hinge pin 10. The enlarged end portion 14 of the opening 13 is closed by a disk 19 which is secured in place by a peening operation, or otherwise, and interposed under compression between this disk and the plunger 16 is a coil spring 20, the plunger being provided with a recess 21 which receives the end portion of the coil spring opposite to the end thereof that contacts with the disk 19. The coil spring 20 tends to move the plunger 16 in such direction that the locking pin 17 is urged outwardly, movement of the plunger by the coil spring being limited by contact thereof with a shoulder at the reduced portion 15 of the opening 13.

Mounted at the top of the upper handle por-

tion 1 is a socket member 22 which is of cylindrical shape, and an upper section of said upper handle portion 1 is received within the lower portion of said socket member 22 and is secured thereto. Disposed within the cylindrical socket member 22 for vertical movement therein is an element 23 which has a cavity 24 formed therein, and extended upwardly from the top face of said element 23 is a pair of opposed ears 25. Supported by the ears 25 is a clamp-engaging member 26 which includes a hook-shaped portion 26a and a tail portion 26b, a portion of said clamp-engaging member being disposed between the ears 25, and a pivot pin 27 being extended through an opening formed in said portion of the clamp-engaging member and being seated at its opposite ends in openings formed in said ears for attaching the clamp-engaging member to said ears for pivotal movement. The lower face of the element 23 has attached thereto an upwardly extended leaf spring 28 whose upper end portion is arranged in contact with a face of said tail portion of the clamp-engaging member 26 at one side of the pivot pin 27 so that said leaf spring tends to move the clamp-engaging member to its open position, as shown in Fig. 1. The socket member 22 is embraced by a sleeve 22' formed of suitable insulating material.

The upper handle section 1 and the lower handle section 2 are provided with grooves 29 that are disposed in alinement with respect to each other when said handle sections are arranged in their effective, alined relation, as shown in Fig. 1, said grooves being of substantially semicircular shape, as is shown to good advantage in Fig. 3. The lower handle section is embraced by a tubular operating element 30, said operating element including an extension 31 which is extended inwardly from the wall of said element 30 so that it projects into the groove 29 of the lower handle section 2. The extension 31 is provided with a screwthreaded opening 32 which screwthreadedly receives the lower end portion of a connecting structure 33, the opposite end portion of said connecting structure being screwthreadedly received within a screwthreaded opening 34 formed in the element 23, and said connecting structure being extended longitudinally of and partially within the grooves 29 of the upper and lower handle sections 1 and 2. Because of this arrangement the element 23 may be adjusted vertically relative to the member 22, upwardly and downwardly, by moving the operating element 30 in the desired direction with respect to the lower handle section 2, and with regard to such movement of the operating element 30, it is to be noted that said operating element at its lower end is provided with a portion 35 that extends into the groove 29 of the lower handle section 2 and which is adapted to abut against the top face of the stop member 36 to limit downward movement of the operating element relative to the handle. Additionally, the portion 35 supports a set screw 37 whose inner end may be forced into gripping contact with the wall of the groove 29 of the lower handle section 2 so as to lock the operating element 30 in various positions to which it may be adjusted.

The connecting structure 33 comprises a pair of stick-like elements 33a and 33b which have interposed between the proximate ends thereof a structure 38 that comprises a pair of spaced socket members 39 and a coil spring 40. Arranged within each of the socket members 39 is a plug 41 which is shaped as is shown to good advantage in Fig. 2; that is to say, each plug 41 comprises a main body portion that is of substantially less diameter than the diameter of the bore through the socket members in which said body portion is disposed, and which body portion is provided at an end thereof with an annular, outstanding flange whose outer circumferential edge contacts with the face of the bore of the related socket member. Also, each plug 41 has formed therein a recess 42 and an opening 42' which communicates with said recess. The plugs 41 are welded in place within the socket members 39, the walls of said socket members being provided with circumferentially spaced apertures in which welds 43 are formed. The opposite end portions of the coil spring 40 are disposed in annular spaces between the faces of the bores of the socket members 39 and the circumferential faces of the body portions of the plugs 41, the opposite ends of said coil spring abutting against the annular flanges of said plugs. Also, the opposite end portions of the coil spring are welded to the socket members by welds 44 which are formed in circumferentially spaced apertures that are formed through the walls of said socket members.

Extended through the coil spring 40 is a flexible element 46, a light cable, for instance, whose opposite end portions are projected through the openings 42' of the plugs 41 and into the recesses 42 thereof. Disposed within the recesses 42 are sleeves 47 which are fixedly secured to the opposite end portions of the flexible element 46, said sleeves being in abutting contact with shoulders located at the inner ends of the recesses 42. The socket members 39 are internally screwthreaded throughout portions thereof and these internally screwthreaded portions of said socket members receive screwthreaded portions of the stick-like elements 33a and 33b of the connecting member 33. Thus, the connecting structure 33 extends continuously from the operating element 30 to the element 23 at the top of the tool so that the clamp-engaging member 26 may be actuated by vertical movement of said operating element. However, within the length of said connecting member there is provided a flexible portion (the coil spring 40) which permits of the elongated handle of the tool being folded double to reduce the length thereof, as will presently appear herein.

In the use of the tool illustrated in Fig. 1, and assuming that the clamp-engaging member 26 is in its open position as is shown in that view, the hook-shaped portion of the clamp-engaging member 26 is passed through the eye of the operating member of a clamp to be actuated. The lineman using the tool grasps the lower end portion of the elongated handle of the tool with one hand and with the other hand he moves the operating element 30 downwardly relative to the lower section 2 of the handle. As a result of such downward movement of the operating element 30 the connecting structure 33 moves the element 23 downwardly within the socket member 22, the clamp-engaging member 26 moving downwardly with said element 23 and being cammed to its closed position because of its movement against an upper portion of the socket member 22. The set screw 37 may then be tightened to anchor the operating element in the position to which it has been adjusted, and the tool may then be manipulated to actuate the adjusting element of the clamp to bring the jaws of the clamp to open or

closed position. When it is desired to move the clamp-engaging member 26 from its closed to its open position the operation just described is reversed, the operating element 30 being moved upwardly so as to elevate the clamp-engaging member 26 relative to the top portion of the socket member 22 and permit the leaf spring 28 to move said clamp-engaging member to its open position.

When the tool A is in use the upper portion of the socket member 5 is extended into the lower portion of the socket member 4, and the locking pin 17 is projected into the opening 18 of the socket member 4, and because of this arrangement said socket members are securely locked together against relative hinging movement so as to provide the tool with a rigid, full-length handle. Also, when it is desired to store the tool away, in a maintenance truck, for instance, the locking pin 17 may be forced inwardly of the opening 18 of the socket member 4, whereupon the handle sections 1 and 2 may be subjected to hinging movement about the hinge pin 10 so as to bring the handle section 2 to the position with respect to the handle section 1 in which said handle section 2 is shown in Fig. 4. It is to be noted that when the handle section 2 is moved to the position in which it is shown in Fig. 4 the coil spring 40 yields and assumes a bent condition, and the flexible element 46, which normally has slight slack therein, follows the shape of the coil spring and becomes substantially taut. Thus the connecting member 33, which in the normal working condition of the tool is rigid enough to effectively actuate the clamp-engaging member 26 of the tool, is capable of being folded with the handle sections 1 and 2 so as to reduce the length of the handle of the tool and facilitate storing of said tool.

I claim:

1. An elongated handle for a tool having a movable part, said elongated handle comprising a pair of handle sections provided with means for hingedly connecting end portions of said handle sections together, an operating element supported by a handle section of said elongated handle for movement with respect thereto, and a connecting structure connected to said operating element and to the movable part of the tool for actuating said movable part of the tool by moving said operating element, said connecting structure comprising a pair of elongated elements, spaced socket members which receive end portions of said pair of elongated elements, and a coil spring interposed between said socket members and whose opposite end portions are received by and are secured to said socket members, said coil spring forming an operating part of said connecting structure.

2. An elongated handle for a tool having a movable part, said elongated handle comprising a pair of handle sections provided with means for hingedly connecting end portions of said handle sections together, an operating element supported by a handle section of said elongated handle for movement with respect thereto, and a connecting structure connected to said operating element and to the movable part of the tool for actuating said movable part of the tool by moving said operating element, said connecting structure comprising a pair of elongated elements, spaced socket members which receive end portions of said pair of elongated elements, a coil spring interposed between said socket members and whose opposite end portions are received by and are secured to said socket members, and a flexible element extended through said coil spring, said coil spring forming an operating part of said connecting structure.

3. An elongated handle for a tool having a movable part, said elongated handle comprising a pair of handle sections provided with means for hingedly connecting end portions of said handle sections together, an operating element supported by a handle section of said elongated handle for movement with respect thereto, and a connecting structure connected to said operating element and to the movable part of the tool for actuating said movable part of the tool by moving said operating element, said connecting structure comprising a pair of elongated elements, spaced socket members which receive end portions of said pair of elongated elements, a coil spring interposed between said socket members and whose opposite end portions are received by and are secured to said socket members, and a flexible element extended through said coil spring and engaged at its opposite ends by plugs disposed within said socket members, said coil spring forming an operating part of said connecting structure.

4. An elongated handle for a tool having a movable part, said elongated handle comprising a pair of handle sections provided with means for hingedly connecting end portions of said handle sections together, an operating element supported by a handle section of said elongated handle for movement with respect thereto, and a connecting structure connected to said operating element and to the movable part of the tool for actuating said movable part of the tool by moving said operating element, said connecting structure comprising a pair of elongated elements, spaced socket members which receive end portions of said pair of elongated elements, a coil spring interposed between said socket members and whose opposite end portions are received by and are secured to said socket members, and a flexible element extended through said coil spring and engaged at its opposite ends by plugs fixedly disposed within said socket members, said coil spring forming an operating part of said connecting structure.

5. An elongated handle for a tool having a movable part, said elongated handle comprising a pair of handle sections provided with means for hingedly connecting end portions of said handle sections together, an operating element supported by a handle section of said elongated handle for movement with respect thereto, and a connecting structure connected to said operating element and to the movable part of the tool for actuating said movable part of the tool by moving said operating element, said connecting structure comprising a pair of elongated elements, spaced socket members which receive end portions of said pair of elongated elements, a coil spring interposed between said socket members and whose opposite end portions are received by and are secured to said socket members, a flexible element extended through said coil spring, said flexible element having sleeves fixed thereto at its opposite ends, and plugs disposed within said socket members which engage said sleeves, said coil spring forming an operating part of said connecting structure.

6. An elongated handle for a tool having a movable part, said elongated handle comprising a pair of handle sections provided with means for hingedly connecting end portions of said handle sections together, an operating element supported by a handle section of said elongated handle

for movement with respect thereto, and a connecting structure connected to said operating element and to the movable part of the tool for actuating said movable part of the tool by moving said operating element, said connecting structure comprising a pair of elongated elements, spaced socket members which receive end portions of said pair of elongated elements, a coil spring interposed between said socket members and whose opposite end portions are received by and are secured to said socket members, a flexible element extended through said coil spring, said flexible element having sleeves fixed thereto at its opposite ends, and plugs disposed within said socket members having openings through which portions of said flexible element extend and provided with reforming an operating part of said connecting structure.

7. An elongated handle for a tool having a movable part, said elongated handle comprising a pair of handle sections provided with means for hingedly connecting end portions of said handle sections together, an operating element supported by a handle section of said elongated handle for movement with respect thereto, and a connecting structure connected to said operating element and to the movable part of the tool for actuating said movable part of the tool by moving said operating element, said connecting structure being guided in its movement by guideways formed in said handle sections and being extended through said means for hingedly connecting said handle sections together and said connecting structure comprising a pair of elongated elements, spaced socket members which receive end portions of said pair of elongated elements, and a coil spring interposed between said socket members and whose opposite end portions are received by and are secured to said socket members, said coil spring forming an operating part of said connecting structure.

8. An elongated handle for a tool having a movable part, said elongated handle comprising a pair of handle sections provided with means for hingedly connecting end portions of said handle sections together, an operating element supported by a handle section of said elongated handle for movement with respect thereto, and a connecting structure connected to said operating element and to the movable part of the tool for actuating said movable part of the tool by moving said operating element, said connecting structure being guided in its movement by guideways in the form of grooves formed in said handle sections and being extended through said means for hingedly connecting said handle sections together and said connecting structure comprising a pair of elongated elements, spaced socket members which receive end portions of said pair of elongated elements, and a coil spring interposed between said socket members and whose opposite end portions are received by and are secured to said socket members, said coil spring forming an operating part of said connecting structure.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
980,580	Williams	Jan. 3, 1911
1,672,477	Tipsord et al.	June 5, 1928
1,744,356	Bodendieck	Jan. 21, 1930
2,095,137	Johnson	Oct. 5, 1937
2,194,386	Dunaway	Mar. 19, 1940
2,316,428	Heinrich	Apr. 13, 1943