July 4, 1950 D. C. HUBBARD 2,514,063

FOLDING CLAMP STICK

Filed April 22, 1948 3 Sheets-Sheet 1

Fig. 1.

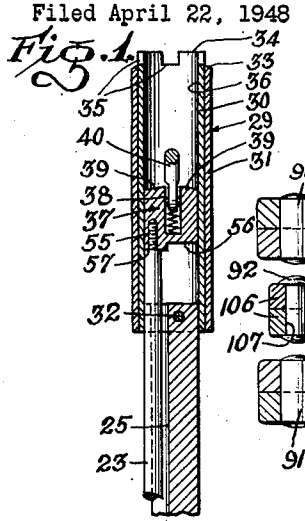


Fig. 4.

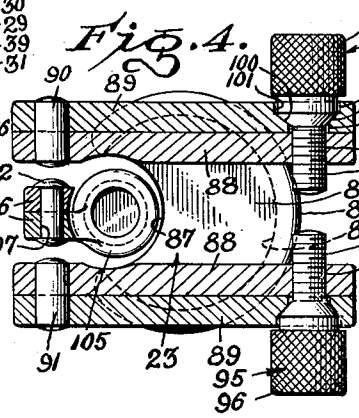


Fig. 3.

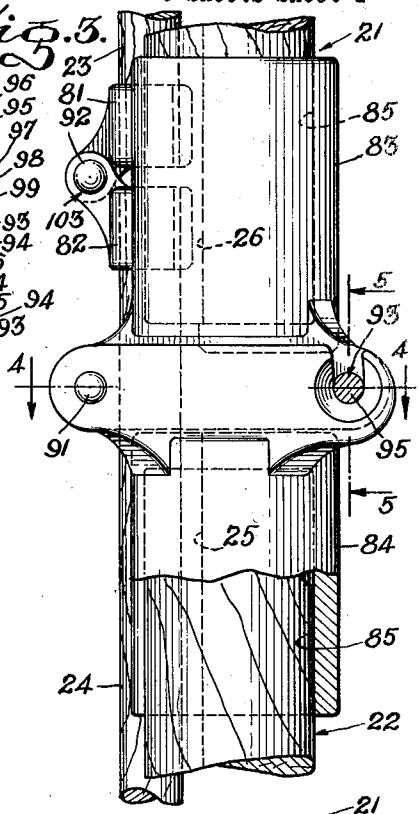
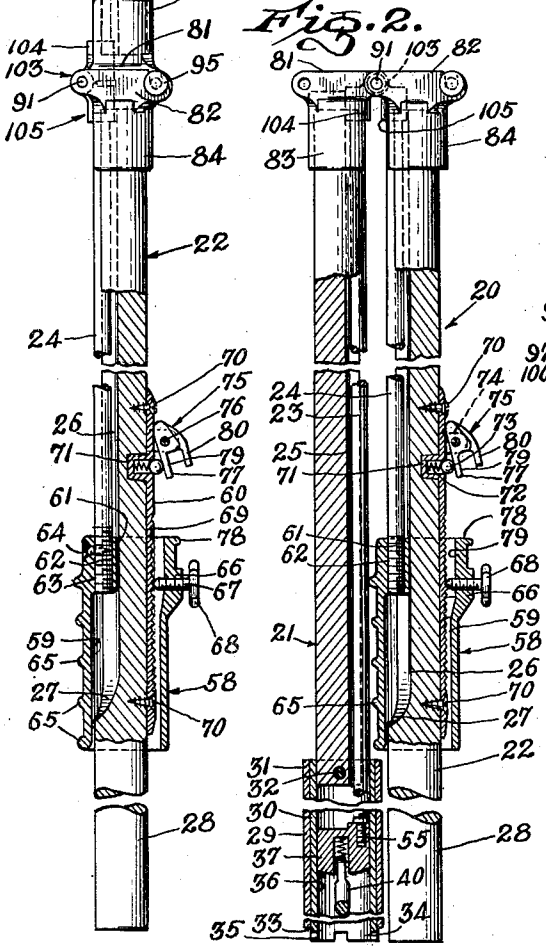


Fig. 2.



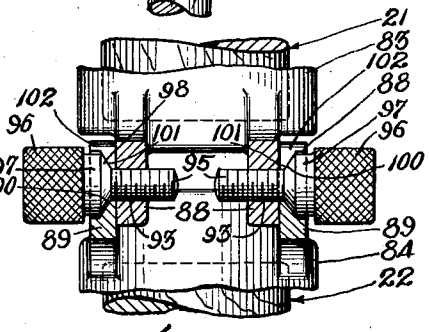


Fig. 5.

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Fig. 6.

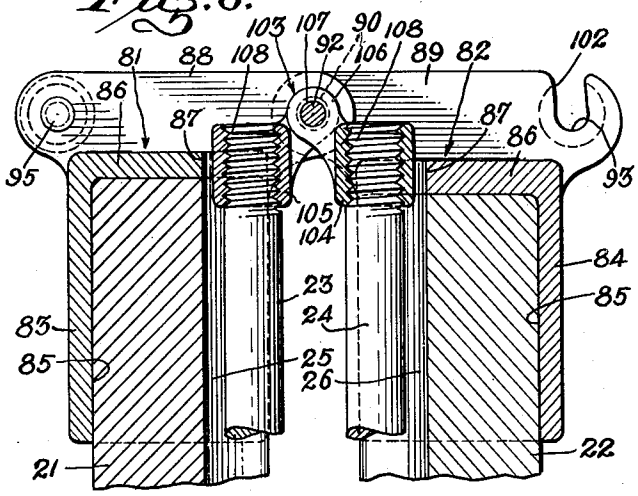


Fig. 7.

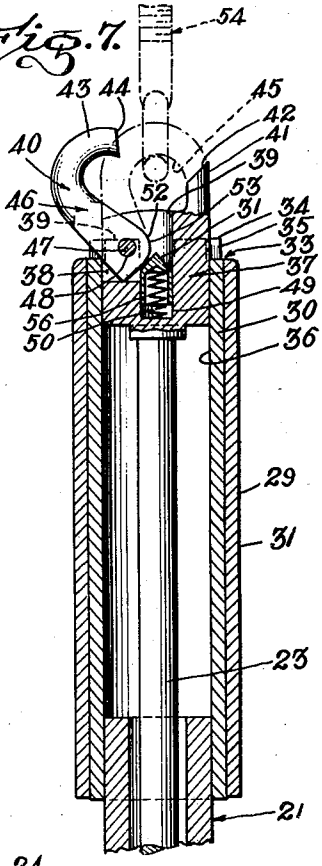


Fig. 8.

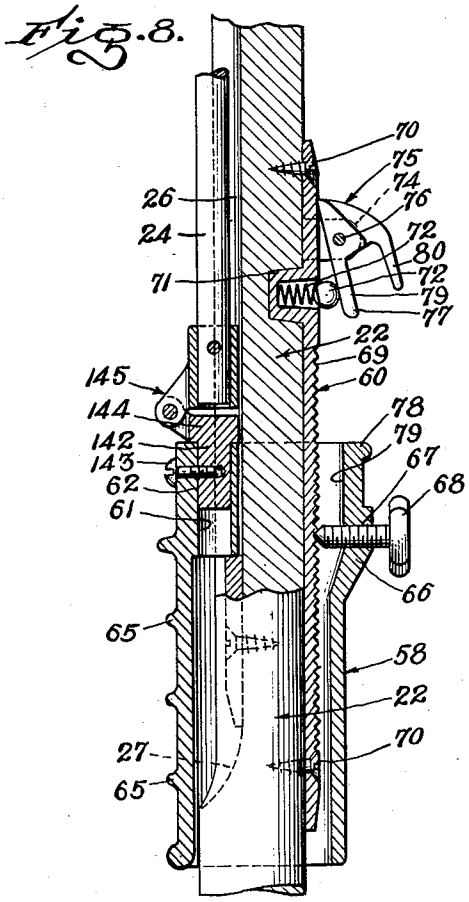
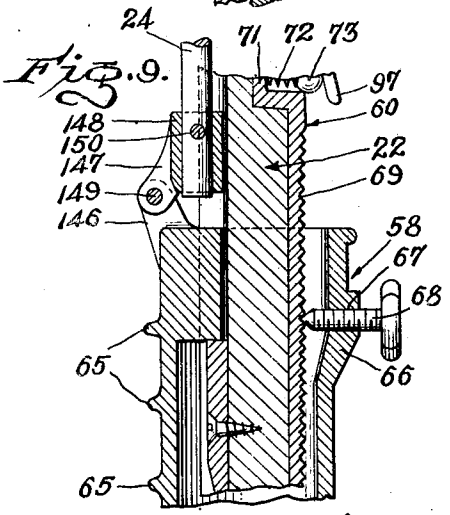


Fig. 9.



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Fig. 10.

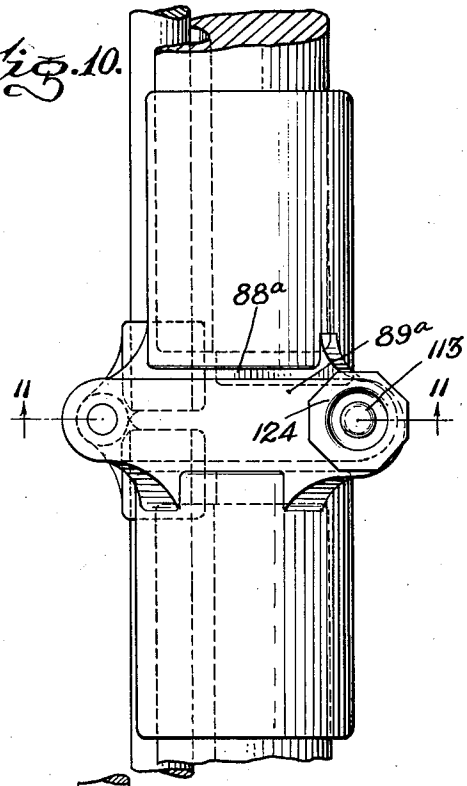


Fig. 11.

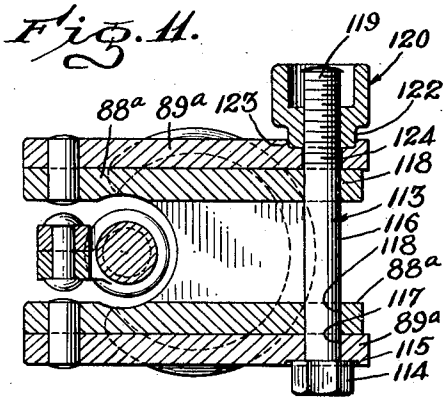


Fig. 12.

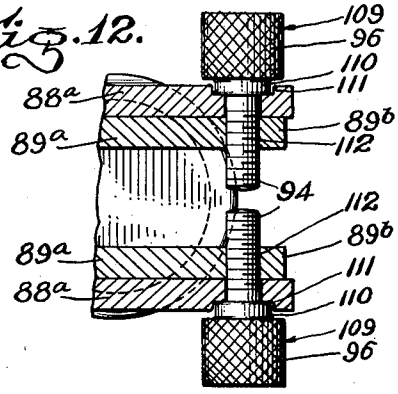


Fig. 13.

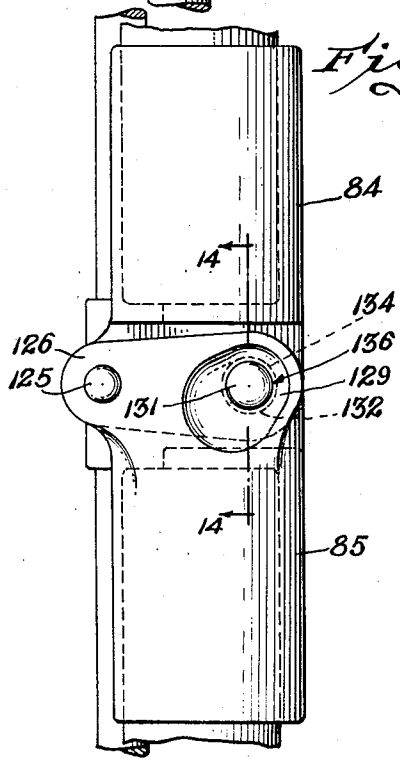
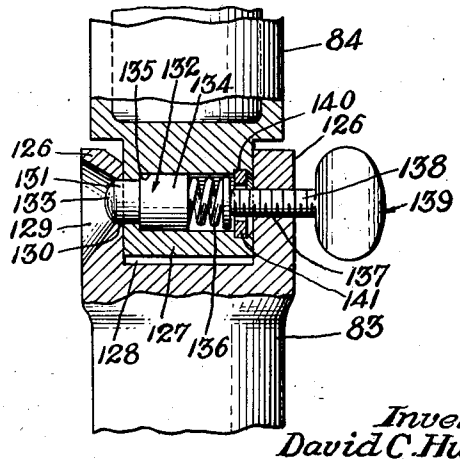


Fig. 14.



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UNITED STATES PATENT OFFICE

2,514,063

FOLDING CLAMP STICK

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Application April 22, 1948, Serial No. 22,559

8 Claims. (Cl. 294—19)

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The present invention relates to folding clamp sticks, and is particularly concerned with the provision of a clamp stick construction which is adapted to be folded intermediate its length so that it can be more conveniently stored in shorter storage space than the devices of the prior art.

One of the objects of the invention is the provision of an improved clamp stick of the class described, which is adapted to be suspended from an eye bolt or any supporting member by means of one of its uppermost clamping members, and which is provided with a pivotal joint intermediate its ends in both the supporting pole and the operating rod, by means of which this tool is manipulated when used on high tension lines.

Another object of the invention is the provision of an improved structure for a folding clamp stick, which is so constructed that an indication is given to the operator if he fails to get the two points of pivotal attachment for the pole and the rod in axial alignment with each other before he folds the stick up.

Another object is the provision of improved modifications of such a clamp stick that are so constructed that it is practically impossible to damage the clamp stick by endeavoring to fold it when the pivotal points of the operating rod and operating pole are not in alignment with each other.

Another object of the invention is the provision of an improved clamp stick which is simple in structure, efficient in its operation, high in insulating value, capable of economical manufacture and adapted to be used for a long period of time without necessity for repair or replacement of any of its parts.

Other objects of the invention will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the three sheets of drawings accompanying this specification,

Fig. 1 is a fragmentary elevational view in partial section taken through the axis of a clamp stick embodying the invention, with the clamp stick fully extended;

Fig. 2 is a similar view with the clamp stick in its folded position;

Fig. 3 is a fragmentary view in partial section on a larger scale, showing the structure of the pivoted joint between the parts of the operating pole and a similar joint performing a similar function on the operating rod;

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Fig. 4 is a transverse sectional view taken on the plane of the line 4—4 of Figure 3;

Fig. 5 is a fragmentary vertical sectional view taken on the plane of the line 5—5 of Figure 3, looking in the direction of the arrows;

Fig. 6 is a fragmentary sectional view showing the structure of the clamp stick adjacent the joint, by means of which its parts are folded into a shorter space;

Fig. 7 is a fragmentary axial sectional view, with the operating rod and clamping member in elevation, showing the structure and arrangement of the parts at the upper end of the clamp stick;

Fig. 8 is a fragmentary vertical sectional view taken on an axial plane with operating rod shown in elevation, this rod being provided with an auxiliary joint at its lower end to prevent breaking of the rod when the parts of the pole are folded without getting the points of pivot of the pole and points of pivot of the rod in alignment with each other;

Fig. 9 is a vertical fragmentary sectional view of another modification in which the operating rod is provided with another form of pivotal mounting at its lowermost end;

Fig. 10 is a side elevational view of another form of fitting for hinging the operating poles together;

Fig. 11 is a fragmentary sectional view of a modification of Figure 4, showing different forms of screw bolts and sockets;

Fig. 12 is a fragmentary sectional view similar to Figure 4 of another modification, showing another form of securing bolts and nut for the pole hinges;

Fig. 13 is a side elevational view of another form of operating pole hinge; and

Fig. 14 is a top plan view of the pole hinge of Figure 13 in partial section to show the structure of the latching plunger.

Referring to Figures 1 and 2, 20 indicates in its entirety the folding clamp stick, the folding pole of which comprises a pair of sections 21 and 22, and the operating rod includes a pair of sections 23 and 24 of insulating wood.

The operating pole sections 21 and 22 preferably comprise round wooden insulating poles of suitable wood, such as spruce, suitably dried and coated with an insulating varnish. At one side the round pole sections 21 and 22 are each provided with a longitudinally extending partially cylindrical groove 25 or 26, the latter groove in the lower section 22 terminating at 27, and leaving a cylindrical handle portion 28 at the lower end of the assembly.

The upper operating pole section 21 supports a tubular head 29, which may consist of an inner metal tube 30 covered by an outer tube of insulating fibre 31, both of which are fixedly secured at the upper end of the operating pole section 21 by means of one or more transverse pins or rivets 32.

The insulating sleeve 31 may terminate at 33, slightly short of the upper end 34 of metal tube 30, and the end 34 of the metal tube preferably has a pair of diametrically opposite axially extending slots 35.

The slots 35 are for the purpose of receiving a complementary depending lug on tap clamps and other tools or fixtures, by means of which the clamp stick may be used to rotate the whole tap clamp or other member as a unit, as distinguished from the separate rotation of the eye bolt.

Inside the tubular bore 36 of the metal tube 30 there is a metal cross-head 37 mounted for axial sliding movement, and preferably so arranged that it cannot rotate in the tube 30. Cross-head 37 (Figure 7) is provided with an axially extending slot 38 leaving a pair of upwardly extending pivot flanges 39 for pivotally supporting the hook jaw 40.

The cross-head 37 may have an integral axially extending jaw member 41 at one side, this jaw member terminating in a beveled end 42. The hook jaw 40 comprises a hook formation 43, the body of which is circular in cross-section and formed with a beveled end surface 44 that is in practically the same plane as the end surface 42 on jaw 41 when the jaws are closed, forming the eye 45, as shown in dotted lines.

The curved hook formation 43 of the hook jaw 40 is supported by a straight shank 46, which may be flattened at its lower end to fit in the slot 38, and provided with a through bore 47 for receiving the pintle 48 that is riveted in the bore 47.

Pintle 48 is so located in the two pivot flanges 39 that when the jaws 40, 41 are closed the straight portions of the jaws 40, 41 are located within the dimensions of the bore 36. Thus the complete cross-head 37 and jaws 40, 41, may be drawn into the tubular clamp stick head 29, as shown in Figure 1, and when drawn into the bore 36 the upper end 34 of the metal tube 30 engages the outer side of the shank 46 of the pivoted jaw 40, forcing this pivoted jaw into the closed and dotted line position of Figure 7 before the jaws can be drawn into the tube.

The cross-head 37 is preferably formed with an axial bore 49 for receiving a helical compression spring 50, which engages a spring follower 51, having a beveled surface 52 engaging the adjacent curved corner 53 of the pivoted jaw 40. Spring 50 and follower 51 tend to move the jaw 40 to open position, as shown in Figure 7, by pushing upward on the inner corner of the shank 46. Thus the jaws are urged to open position by the spring 50 and always assume this position when the cross-head 37 is outside of the tube 30.

When the cross-head 37 is drawn into the tube 30, the jaw 40 is forced over into closed position by engagement with the end 34 of the tube 30, forming a closed eye as shown at 45 in dotted lines in Figure 7. The closed eye thus provided is adapted to be engaged with the eye bolt 54 of a tap clamp, as shown in Figure 7, or with the eyes which are provided on drop-out cut-outs or other electrical apparatus.

The hook shaped formation 43 is of marked advantage because by means of this hook the clamp stick may be hooked into an eye and caused to suspend and support its own weight while it is being manipulated. Such a clamp stick will not get out of engagement with the eye bolt 54 while the operator is manipulating its mechanism.

The cross-head 37, Figure 1, is provided with a threaded bore 55, extending longitudinally into its lower end 56, the bore 55 being located to receive the rod 23, which may have a complementary threaded end portion 57. Thus the rod section 23 is adapted to be used to push and pull the cross-head 37.

Rod sections 23 and 24 are located in the partially cylindrical grooves 25 and 26 respectively in the operating pole sections 21 and 22, thus causing the entire tool to present a smaller size than it would if the operating poles were not grooved and the operating rods were located entirely on the outside.

The operating pole section 22 is preferably provided at its lower end with a plain cylindrical portion 28, serving as a handle, this part being long enough to leave a hand-grip exposed even when the cross-head 37 is pulled down to its lowermost position.

Operating pole section 22 slidably supports a tubular metal hand-grip 58, comprising a tubular casting with a generally cylindrical bore 59 of sufficient size to receive the pole 22, and, in addition, to provide space for an anchor plate 60. The wall of the tubular handle member 58 may be provided with an inwardly projecting lug 61 of partially cylindrical shape projecting into the groove 26, which groove is slightly larger than the operating rod 24.

Cylindrical lug 61 on handle 58 has a longitudinally extending threaded bore 62 into which the lower threaded end 63 of the operating rod 24 may be secured, or the rod may be secured in place by a headed pin or screw 64 passing through the wall into the rod 24. This headed pin mode of securement may be utilized in securing either end of the rods 23, 24 to their respective fixtures.

The hand-grip 58 may be provided with a plurality of peripherally extending ribs 65, and on the side adjacent the anchor plate 60 its wall is preferably thickened at 66 and provided with a threaded bore 67 for the set screw 68, which preferably has an enlarged noncircular head for manipulation with the fingers.

Set screw 68 is located to engage the anchor plate 60, which may have a transversely ribbed and grooved surface 69 to engage the end of set screw 68, Figure 8. The anchor plate 60 consists of a strip of suitable metal in the form of a casting, having apertures at each of its ends for receiving the wood screws 70, by means of which the plate 60 is secured to the pole section 22.

Adjacent its upper end the casting of the anchor plate 60 is formed with an integral socket member 71, containaing a helical compression spring 72 engaging a ball 73. The anchor plate 60 also has a pair of spaced pivot ears 74 between which there is pivoted a movable stop member 75 on the rivet 76. This movable stop member 75 has one depending flange 79, which is engaged by the ball 73 to move it outward to position where the end of the depending flange 77 engages the end 78 of the sliding hand-grip 58.

The pivoted stop member 75 is so located longitudinally of the anchor plate and pole that when the end of the sliding hand-grip 58 engages

the flange 77 the cross-head 37 is in the dotted line position of Figure 7, forming a closed eye, but the cross-head is prevented from moving upwardly beyond this position, thus assuring the fact that the eye will remain closed.

The depending flange 77 is of such thickness, however, that it may be inserted in a radially extending slot 79 located in the bore 59 of the sliding hand-grip 58. The pivoted stop 75 has another depending thumb flange 80 (Figure 2) by means of which it may be pivoted in the clockwise direction, in Figure 2, to compress the spring 72. When the flange 80 is pressed with the thumb the flange 77 moves inwardly out of engagment with the end 78 on the hand-grip sleeve 58.

Then the hand-grip 58 may move up farther on the pole 22 until flange 77 is received in slot 79 in the hand-grip, and the cross-head 37 is moved outward to the full line position of Figure 7 with its jaw open. Thus the hand-grip 58 has two positions determined by the movable stop 75, one of which has the jaws open, as shown in full lines in Figure 7, and in the other of which the jaws are closed, as shown in dotted lines in Figure 7.

The hand-grip 58 may be secured in either one of these positions by means of the set screw 68, which may be rotated until it engages the anchor plate 60. In addition to these two positions the hand-grip 58 may be moved to any of a multiplicity of other positions below the movable stop 75 and secured in any such positions by means of the set screw 68.

The range of movement of the hand-grip 58 and cross-head 37 is only limited by the space provided in the bore 30, and when the eye 45 of the clamp stick has been engaged with an eye bolt 54 the cross-head 37 may be pulled into the tube 30 until the eye bolt 54 is housed in the bore 36, and the body of a tap clamp engages the end 34 with its depending lug in the slot 35, at the end of tube 30.

When a tap clamp is thus secured, the clamp stick may be used for twisting the tap clamp as a unit, and this is sometimes necessary to bend the tap-off wire until the jaws of the tap clamp extend transversely to the conductor to which they are to be applied.

In order to fold the clamp stick into a minimum amount of space the wooden insulating pole is provided in two sections 21 and 22, and these are joined together by means of a pair of hinge castings 81, 82, each of which is provided with a tubular ferrule 83, 84, having a bore 85 for receiving the ends of the operating pole sections 21 and 22.

The pole sections 21 and 22 may have a tight frictional fit in the bores 85 of the castings, and may be additionally secured by means of transverse through pins, rivets, or wood screws (not shown). Each hinge fitting 81, 82 is preferably provided with an end wall 86, formed with a partially circular groove 87 for passing the operating rods 23, 24 and their hinge fittings.

One of the hinge fittings 81, for example, may consist of a female ferrule having a pair of transversely extending securing flanges 88, carried by its end wall 86, in position to be received between the transversely extending securing flanges 89, which are carried by the end wall 86 of the male ferrule member 82.

The transversely extending flanges 88 and 89 are longer than the diameter of the operating poles and ferrules, and project at the left (Figure 4) sufficiently to locate the axes of the riveted pintles 90 and 91 outwardly of the cylindrical outline of the operating poles 21, 22, in alignment with the riveted pintle 92, which is used to provide a pivotal connection between the two operating rod sections 23 and 24.

Thus the two operating pole sections 21 and 22 may be pivoted on the pintles 90, 91 to the position shown in Figure 6, where they extend parallel to each other so that the length of the assembly is reduced by one-half. In order to secure the two pole sections 21, 22 together in their extended position the securing flanges 88 and 89 also project toward the right of the ferrules 83 and 84 (Figure 4), and the flanges 88 are provided with the threaded bores 93 for receiving the threaded portions 94 of the thumb bolts 95.

These thumb bolts 95 have a knurled head 96 for engagement with the fingers, a reduced cylindrical portion 97 and a frusto-conical portion 98. The securing flanges 89 are provided with a cylindrical bore 99 communicating with a frusto-conical bore 100 and a cylindrical counterbore 101, the latter two being complementary to the parts 97 and 98 on the thumb bolt 95.

The cylindrical bore 99 registers with the threaded bores 93 in the flanges 88, and the walls of the bores 99, 100, 101 are cut away at the top side of the flanges 89, forming a slot 102 (Figure 6) of the same width as the threaded portions 94 of the thumb bolts 95.

When the thumb bolts 95 are withdrawn by turning them counterclockwise in their respective bores until the frusto-conical part 98 is wholly out of the flange 89, then the threaded part 94 of each thumb bolt can pass out of the slot 102, thus permitting the two thumb bolts to escape from the threaded bores 93.

With the thumb bolts withdrawn in this manner the two pole sections 21, 22 may be moved from the position of Figure 1 to that of Figure 6. When it is desired to secure the two pole sections 21 and 22 in axial alignment with each other, as shown in Figure 1, the pole sections are pivoted with respect to each other on the flanges 88, 89 and pintles 90, 91 until the threaded parts 94 of the thumb bolts 95 have moved down into the bases of slots 102.

Then the pole sections are in alignment and may be so secured by turning the thumb bolts 95 clockwise to drive them in to the position of Figure 4. As this is done the frusto-conical portions 98 act as a cam to draw the flanges 88 and 89 into such alignment that the axes of their bores are in alignment, and thereafter the cylindrical part 97 of each thumb bolt passes into the cylindrical part 101 of the socket and provides a positive stop against relative movement between the flanges 88 and 89.

The socketing of the enlarged portions of the thumb bolts 95 in complementary sockets in the flanges 89 effectively secures flanges 88 and 89 together, and holds the pole sections 21 and 22 in axial alignment with each other.

When it is desired to fold the main operating poles 21 and 22, it is also necessary to provide a means for folding the two operating rods 23 and 24 and, therefore, the adjacent ends of the two operating rods 23 and 24 are secured together by an operating rod hinge 103. Such a hinge may consist of a pair of metal castings, each of which has a ferrule 104, 105, and each ferrule of which carries a pivot flange 106 having a bore 107 for receiving the common pintle 92 (Figure 4),

The ends of the wooden operating rods 23 may be threaded into the bores 108 in the ferrules 104, 105, and they may be additionally secured by means of transverse screws, pins or rivets passing through the ferrule and rod.

The location of the pintle 92 between the rod sections 23, 24 must be such that it is axially aligned with the axes of pintles of 90, 91 for the main operating pole sections 21, 22, as is shown in Figure 4.

When it is desired to fold the clamp stick it is first necessary to move the handle-grip 58 to such a position that these pintles 90, 91, 92 are in alignment. There the handle-grip may be secured by means of set screw 68, and by releasing the thumb bolts 95. The flanges 88, 89 may be released from each other in such manner that the thumb bolts clear the slot 102, and as the operating pole sections 21, 22 pivot on the pintles 90, 91 the operating rod sections 23, 24 pivot on the pintle 92.

Referring to Figures 10, 11 and 12, these are fragmentary illustrations showing alternative hinged ferrule arrangements between the pole and rod sections. In this case the hinge fittings for the operating rod may be substantially as previously described, and the castings for the hinge fitting for the operating poles may be substantially as described except for the means for securing the securing flanges together.

The securing flanges have been indicated at 88*a* and 89*a* since they are similar to those described, but differ in some details. In Figure 12, the thumb bolts 109 are identical in construction, and each has the same knurled head 96 previously described, but this form dispenses with the frusto-conical part.

Below the head there is a reduced cylindrical portion 110 which fits into a complementary cylindrical socket 111, and the threaded shank 94 of each thumb bolt passes through a complementary bore 112 in the flange 89*a* and is threaded into the flange 89*b*.

This mode of securement of Figure 12 does not have the advantage of a screw bolt which has a frusto-conical portion for drawing the bores in the securing flanges into registry with each other. Instead the parts must be pivoted over into the position of Figure 1, where the screw bolt shanks 94 hit the base of slots 102, and then the cylindrical part 110 of each thumb bolt 109 is already in position to be threaded into its securing socket 111.

Referring to Figure 11, in this alternative form of securing means a single screw bolt 113 is employed, the head 114 of which is adapted to be sealed in a complementary hexagonal socket 115. The shank 116 of this screw bolt is passed in a slot 117 in the right flange 89*a* and passes through a bore 118 in each of the flanges 88*a*.

The end of the bolt 113 is threaded at 119, and is engaged by a nut 120 having a knurled cylindrical body 121, and having a reduced cylindrical part 122 that fits into a complementary socket 123. Adjacent the socket 123 there is the slot 124 in the left flange 89*a*, but the left flange 88*a* has a bore 118. In this embodiment the nut 120 must be loosened sufficiently so that the head 114 may get out of its socket 115, and the cylindrical formation 122 may move axially out of its socket 123, than the bolt 113 will pass upward out of its slots 124, 117, which are equivalent to the slot 102 of Figure 6.

All of the screw bolts 109, 113, 95 preferably have their ends riveted over so that they cannot be wholly withdrawn and lost.

Referring now to Figures 13 and 14, these show the castings for another alternative form of fastener between the operating pole sections. In this case the two ferrules 83 and 84 are pivoted together by means of the pintle 125 (Figure 13) which passes through a pair of pivot flanges 126 formed on the ferrule 83 and through a pivot lug 127 that is located in the slot 128 between the pivot flanges 126.

The axis of the pintle 125 is located outside of the boundaries of the ferrules 83, 84, or at least in alignment with the adjacent external surfaces of the ferrules, to permit the ferrules to pivot over against each other at a point opposite to the pintle 125.

The flange 126 is formed with a tapered recess 129 surrounding a cylindrical bore 130, and the bore receives the cylindrical end 131 of a spring latch 132. The spring latch is a plunger with a partially spherical camming end 133, cylindrical portion 131 and enlarged body portion 134. It is mounted in a bore 135 in the pintle lug 127, and is urged outward by helical compression spring 136. It may be pressed inward by the thumb until the ball shaped end 133 rides on the insides of flange 126, permitting the two parts to pivot, or its cylindrical part 131 may snap into the bore 130 to hold the parts rigidly against pivotal movement.

In order to secure this type against rattling the opposite lower flange 126, in Figure 14, may have a threaded bore 137 for receiving the threaded shank 138 of a thumb screw 139. The counterbore 140 may receive a metal washer 141, which is secured by having the lug 127 riveted over into the counterbore 140 outside the washer 141.

The spring 136 may seat against the washer 141 and the hole in the washer 141 may be used for engagement with the end of the thumb screw 139 as a tightening screw to assure the securement of the joint in the position of Figure 14.

Under some conditions an operator might forget to move the operating rod sections 23, 24 longitudinally unit the pintles 90, 91, 92 were in alignment, and the operator might try to fold the clamp stick with these pintles out of alignment. This places a strain on the lower operating rod section 24, particularly at its lower end adjacent its securement in the socket 64 of the handle-grip 58, where the operating rod tends to bend.

I have discovered that strain on the operating rod can be avoided by placing an additional hinge fitting at the lower end of the operating rod section 23, as shown in Figure 8. Here the hinge fitting may be substantially the same as described at 103 between the two operating rods, but the lower part of the hinge fitting does not have a ferrule but is provided with a solid cylindrical body 142 (Figure 8) which is secured in the bore 62 in the handle-grip 58 by means of a transverse driven pin 143.

The lower part of the hinge fitting preferably has an enlarged cylindrical part 144 above the solid plug 142, but aside from these details this hinge fitting indicated in its entirety at 145 has its upper part of the same construction as described for hinge fitting 103.

Referring to Figure 9, this is a fragmentary view showing another alternative form of pivotally connecting the lower operating rod section 23 to the handle-grip 58. In this case the handle-grip is provided with an integral pintle

flange 146, which is engaged with the pintle flange 147 on a ferrule 148 by means of a riveted pintle 149. The operating rod section 23 is secured in ferrule 148 by a riveted pin 150.

The operation of this form of the clamp stick is as follows: The extra pintle connection at 145 or 149, between the handle-grip 58 and the lower operating rod section 23, permits the operator to begin to fold the pole without getting the pintles 90, 91, 92 in perfect alignment.

If the operator inadvertently folds the sticks without first aligning the hinges of the pole and rod sections, the lower dowel rod can hinge at 149 or 145 at the same time it hinges at 92. It is found that this hinging action comes to a firm stop after traveling about 90 degrees. The operator's attention is thus drawn to the fact that he has not aligned the hinges, and without straightening the tool he is able to slide the upper hinge into the proper position and to continue to fold the tool to the position of Figure 2. Thus the additinal hinge at the lower end of the lower operating rod section prevents the operator from breaking the tool by folding it without aligning the hinges.

The operation of the clamp stick will be apparent from the foregoing description of its parts and the operation of the various parts. The present clamp stick has all of the advantages of the devices of the prior art, and it is also capable of being folded into such a position that it only occupies about half the length of an extended clamp stick.

When sticks are provided for use upon very high voltage they must be made longer, and the problem of storing them in a limited space becomes more acute. Therefore, the present folding clamp stick is of greater importance for longer clamp sticks, which may thus be carried and stored in more convenient places in vehicles and tool boxes.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desires to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a folding clamp stick, the combination of a pair of operating pole sections pivoted together at one side to be moved into position adjacent each other or into a position of longitudinal alignment, with means for securing the operating pole sections in longitudinal alignment, an operating rod comprising a pair of sections pivoted together at a point of pivot which is adapted to be brought into alignment with the pivot of the operating poles by moving the rod sections longitudinally, a clamp stick jaw operatively connected with the end of the rod and slidably mounted on the upper pole section, and an operating handle slidably mounted on the lower pole section, said operating handle being pivotally secured to the operating rod whereby the pivotal movement of the operating poles, when the pintles of the operating pole and operating rod are not in alignment, will cause the lower operating rod section to pivot on said handle without breaking until the operating pole pivotal movement comes to a stop at substantially right angles to prevent breaking of the operating rod and to indicate to the user that the pivots of the operating pole sections and operating rod sections must be brought into alignment to complete the folding of the clamp stick.

2. In a folding clamp stick, the combination of a pair of operating pole sections pivoted together at one side to be moved into position adjacent each other or into a position of longitudinal alignment, with means for securing the operating pole sections in longitudinal alignment, an operating rod comprising a pair of sections pivoted together at a point of pivot which is adapted to be brought into alignment with the pivot of the operating poles by moving the rod sections longitudinally, a clamp stick jaw operatively connected with the end of the rod and slidably mounted on the upper pole section, and an operating handle slidably mounted on the lower pole section, said operating handle being pivotally secured to the operating rod whereby the pivotal movement of the operating poles, when the pintles of the operating pole and operating rod are not in alignment, will cause the lower operating rod section to pivot on said handle without breaking until the operating pole pivotal movement comes to a stop at substantially right angles to prevent breaking of the operating rod and to indicate to the user that the pivots of the operating pole sections and operating rod sections must be brought into alignment to complete the folding of the clamp stick, the upper operating pole being provided with a tubular head having a central bore, and the said jaw being mounted upon a cross-head receivable in said bore.

3. In a folding clamp stick, the combination of a pair of operating pole sections pivoted together at one side to be moved into position adjacent each other or into a position of longitudinal alignment, with means for securing the operating pole sections in longitudinal alignment, an operating rod comprising a pair of sections pivoted together at a point of pivot which is adapted to be brought into alignment with the pivot of the operating poles by moving the rod sections longitudinally, a clamp stick jaw operatively connected with the end of the rod and slidably mounted on the upper pole section, and an operating handle slidably mounted on the lower pole section, said operating handle being pivotally secured to the operating rod whereby the pivotal movement of the operating poles, when the pintles of the operating pole and operating rod are not in alignment, will cause the lower operating rod section to pivot on said handle without breaking until the operating pole pivotal movement comes to a stop at substantially right angles to prevent breaking of the operating rod and to indicate to the user that the pivots of the operating pole sections and operating rod sections must be brought into alignment to complete the folding of the clamp stick, the upper operating pole being provided with a tubular head having a central bore, and the said jaw being mounted upon a cross-head receivable in said bore, said cross-head having spring means for pivoting said jaw outward, and said tubular member urging said jaw inward as the cross-head moves into said bore.

4. In a folding clamp stick, the combination of a pair of operating pole sections pivoted together at one side to be moved into position adjacent each other or into a position of longitudinal alignment, with means for securing the operating pole sections in longitudinal align-

ment, an operating rod comprising a pair of sections pivoted together at a point of pivot which is adapted to be brought into alignment with the pivot of the operating poles by moving the rod sections logitudinally, a clamp stick jaw operatively connected with the end of the rod and slidably mounted on the upper pole section, and an operating handle slidably mounted on the lower pole section, said operating handle being pivotally secured to the operating rod whereby the pivotal movement of the operating poles, when the pintles of the operating pole and operating rod are not in alignment, will cause the lower operating rod section to pivot on said handle without breaking until the operating pole pivotal movement comes to a stop at substantially right angles to prevent breaking of the operating rod and to indicate to the user that the pivots of the operating pole sections and operating rod sections must be brought into alignment to complete the folding of the clamp stick, the upper operating pole being provided with a tubular head having a central bore, and the said jaw being mounted upon a cross-head receivable in said bore, said cross-head having spring means for pivoting said jaw outward, and said tubular member urging said jaw inward as the cross-head moves into said bore, the said cross-head having an upwardly extending jaw formation engaging the first-mentioned jaw to form a complete closed eye when the cross-head is drawn into said bore.

5. In a folding clamp stick, the combination of a pair of operating pole sections pivoted together at one side to be moved into position adjacent each other or into a position of longitudinal alignment, with means for securing the operating pole sections in longitudinal alignment, an operating rod comprising a pair of sections pivoted together at a point of pivot which is adapted to be brought into alignment with the pivot of the operating poles by moving the rod sections longitudinally, a clamp stick jaw operatively connected with the end of the rod and slidably mounted on the upper pole section, and an operating handle slidably mounted on the lower pole section, said operating handle being pivotally secured to the operating rod whereby the pivotal movement of the operating poles, when the pintles of the operating pole and operating rod are not in alignment, will cause the lower operating rod section to pivot on said handle without breaking until the operating pole pivotal movement comes to a stop at substantially right angles to prevent breaking of the operating rod and to indicate to the user that the pivots of the operating pole sections and operating rod sections must be brought into alignment to complete the folding of the clamp stick, the said operating pole sections being provided on the side toward their pivot with a groove for receiving a substantial part of said operating rod sectons, and the pivots of the operating rod sections and pole sections being located outwardly of said rod with respect to said groove.

6. In a clamp stick, the combination of an upper pole section of insulating material with a guide sleeve carried by its upper end, and a sliding cross head member slidably mounted in said sleeve, a rod of insulating material secured to said cross head and extending from the inside of said sleeve parallel to said pole section, said cross head being provided with an upwardly extending fixed jaw, a pivoted jaw pivoted on said cross head and having an upper hook formation which is downwardly open, the end of the hook engaging said fixed jaw to form a closed loop when the cross head is pulled into said sleeve, said sleeve engaging the outside of the pivoted jaw to move it into engagement with the fixed jaw, resilient means for engaging the inner lower side of the pivoted jaw member to move it to open position when the cross head moves upwardly and the said pivoted jaw emerges from said sleeve, a lower insulating pole section extending downwardly from the upper section, said upper and lower pole sections having their adjacent ends secured in ferrules carried by a pair of separate hinge fittings, a pair of hinge fittings, each hinge fitting having a pair of laterally extending pivot flanges, the said pivot flanges being mounted on a common pintle located outwardly of the pole sections, a sliding tubular handle mounted on the lower pole section, a lower rod of insulating material secured to said handle, and hinge means for joining the lower rod to the upper rod, said hinge means having a pintle located outwardly of the pole sections and rods to be brought into alignment with the pintle of said fittings, the length of said rods being so proportioned that the cross head and jaws are drawn into said sleeve when the pintles of the rods and pole sections are in alignment with each other so that both pintles and rods pivot on the same axis, to be folded in such manner that the two pole sections extend parallel to each other.

7. In a clamp stick, the combination of an upper pole section of insulating material with a guide sleeve carried by its upper end, and a sliding cross head member slidably mounted in said sleeve, a rod of insulating material secured to said cross head and extending from the inside of said sleeve parallel to said pole section, said cross head being provided with an upwardly extending fixed jaw, a pivoted jaw pivoted on said cross head and having an upper hook formation which is downwardly open, the end of the hook engaging said fixed jaw to form a closed loop when the cross head is pulled into said sleeve, said sleeve engaging the outside of the pivoted jaw to move it into engagement with the fixed jaw, resilient means for engaging the inner lower side of the pivoted jaw member to move it to open position when the cross head moves upwardly and the said pivoted jaw emerges from said sleeve, a lower insulating pole section extending downwardly from the upper section, said upper and lower pole sections having their adjacent ends secured in ferrules carried by a pair of separate hinge fittings, a pair of hinge fittings, each hinge fitting having a pair of laterally extending pivot flanges, the said pivot flanges being mounted on a common pintle located outwardly of the pole sections, a sliding tubular handle mounted on the lower pole section, a lower rod of insulating material secured to said handle, and hinge means for joining the lower rod to the upper rod, said hinge means having a pintle located outwardly of the pole sections and rods to be brought into alignment with the pintle of said fittings, the length of said rods being so proportioned that the cross head and jaws are drawn into said sleeve when the pintles of the rods and pole sections are in alignment with each other so that both pintles and rods pivot on the same axis, to be folded in such manner that the two pole sections extend parallel to each other, the said fittings for the pole sections each having a pair of securing flanges disposed oppositely to the flanges bearing their pintle, and a pair of threaded members threaded into the threaded bores in the flanges of one fitting, and having heads adapted

to be received in sockets in the securing flanges of the other fitting, said sockets communicating with bores registering with the threaded bores, and said sockets having longitudinally extending slots for passing said threaded members in or out of the bores which communicate with the sockets.

8. In a clamp stick, the combination of an upper pole section of insulating material with a guide sleeve carried by its upper end, and a sliding cross head member slidably mounted in said sleeve, a rod of insulating material secured to said cross head and extending from the inside of said sleeve parallel to said pole section, said cross head being provided with an upwardly extending fixed jaw, a pivoted jaw pivoted on said cross head and having an upper hook formation which is downwardly open, the end of the hook engaging said fixed jaw to form a closed loop when the cross head is pulled into said sleeve, said sleeve engaging the outside of the pivoted jaw to move it into engagement with the fixed jaw, resilient means for engaging the inner lower side of the pivoted jaw member to move it to open position when the cross head moves upwardly and the said pivoted jaw emerges from said sleeve, a lower insulating pole section extending downwardly from the upper section, said upper and lower pole sections having their adjacent ends secured in ferrules carried by a pair of separate hinge fittings, a pair of hinge fittings, each hinge fitting having a pair of laterally extending pivot flanges, the said pivot flanges being mounted on a common

pintle located outwardly of the pole sections, a sliding tubular handle mounted on the lower pole section, a lower rod of insulating material secured to said handle, and hinge means for joining the lower rod to the upper rod, said hinge means having a pintle located outwardly of the pole sections and rods to be brought into alignment with the pintle of said fittings, the length of said rods being so proportioned that the cross head and jaws are drawn into said sleeve when the pintles of the rods and pole sections are in alignment with each other so that both pintles and rods pivot on the same axis, to be folded in such manner that the two pole sections extend parallel to each other, the said lower rod section being also pivoted to said handle sleeve so that some pivotal movement of the pole sections may be accomplished when the said pintles are not in alignment, to indicate to the operator that they should be brought into alignment, and preventing the operator from breaking the rods.

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REFERENCES CITED

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

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