

Nov. 10, 1953

K. R. RUNDE

2,658,784

CLAMP STICK

Filed Dec. 5, 1949

2 Sheets-Sheet 1

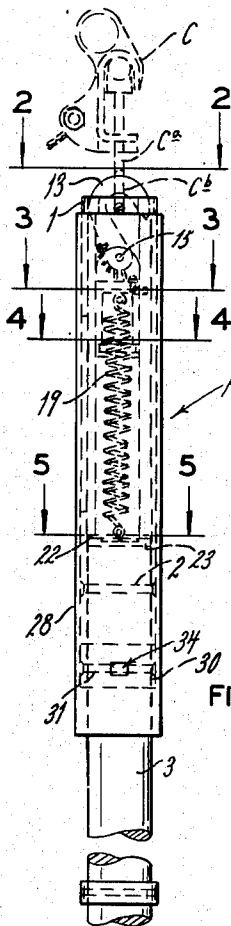


FIG. 1.

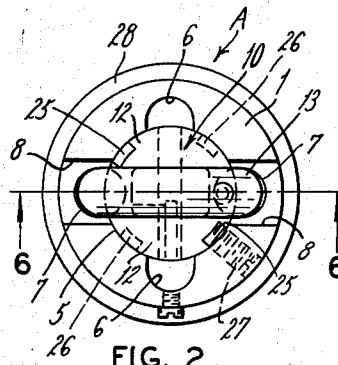


FIG. 2.

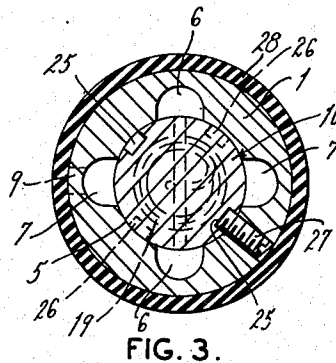


FIG. 3.

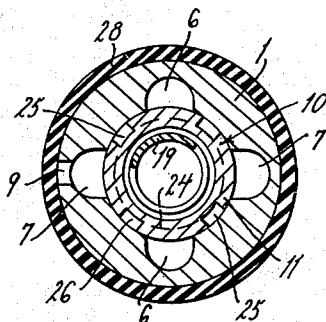


FIG. 4.

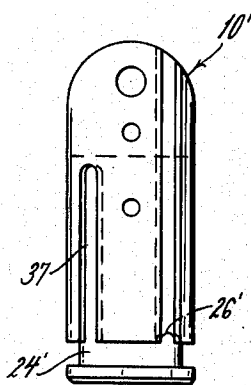


FIG. 15.

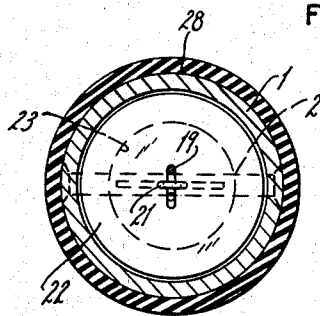


FIG. 5

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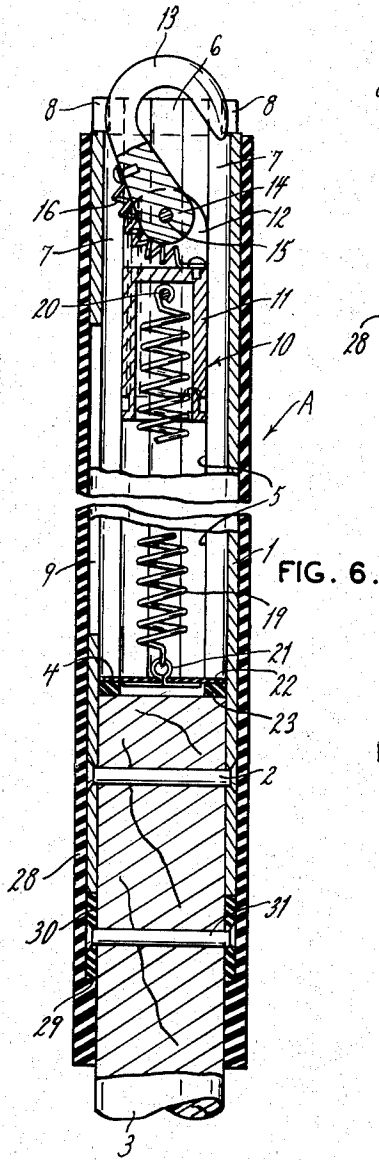


FIG. 6.

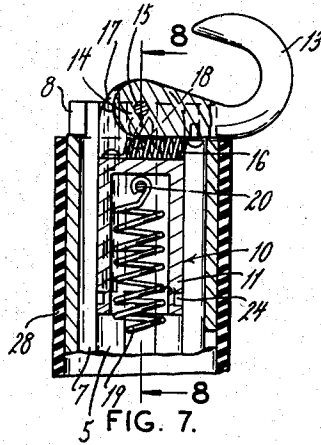


FIG. 7.

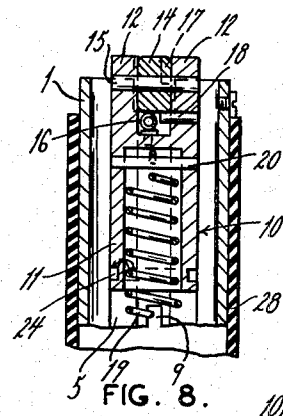


FIG. 8.

FIG. 12.

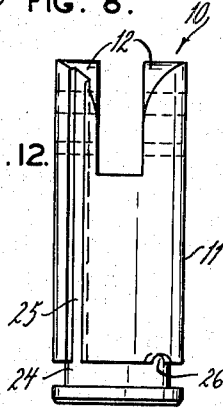


FIG. 9.

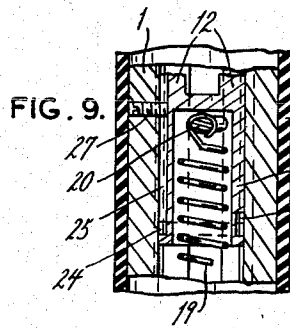


FIG. 11.

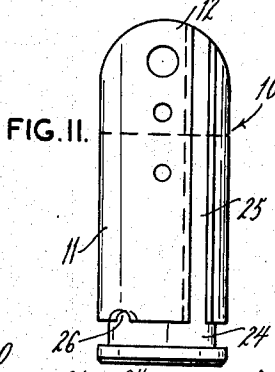


FIG. 10.

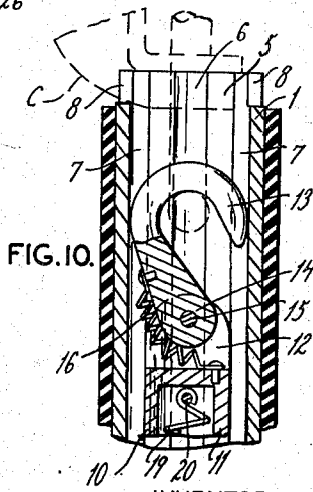


FIG. 14.

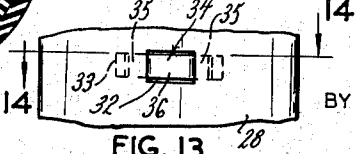
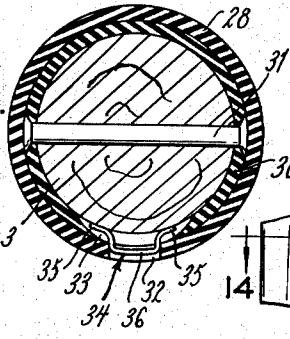


FIG. 13.

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CLAMP STICK

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10 Claims. (Cl. 294—19)

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This invention relates generally to clamp sticks and more specifically to clamp sticks of the type employed for applying electrical clamps to and removing electrical clamps from overhead electrical conductors, the predominant object of the invention being to provide a clamp stick of the type referred to which is simple in construction and operation and is capable of performing its intended function in an improved and highly efficient manner.

Fig. 1 is a fragmentary side elevational view of the improved clamp stick of this invention, a clamp, which is shown by dotted lines, being associated with the clamp stick.

Fig. 2 is an enlarged plan view of the clamp stick shown in Fig. 1.

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

Fig. 4 is an enlarged horizontal section taken on line 4—4 of Fig. 1.

Fig. 5 is an enlarged horizontal section taken on line 5—5 of Fig. 1.

Fig. 6 is a fragmentary vertical section, on a slightly reduced scale, taken on line 6—6 of Fig. 2.

Fig. 7 is a fragmentary vertical section of the upper portion of the clamp stick, as illustrated in Fig. 6, but with certain parts thereof shown in changed positions.

Fig. 8 is a fragmentary vertical section taken on line 8—8 of Fig. 7.

Fig. 9 is a fragmentary vertical section similar to Fig. 8 but showing parts of the clamp stick in changed positions.

Fig. 10 is a fragmentary vertical section of the clamp stick and showing the hook thereof in its lowered position.

Fig. 11 is a side elevational view of the hook-supporting member of the improved clamp stick.

Fig. 12 is a side elevational view of the hook-supporting member of the improved clamp stick, but looking at said hook-supporting member from an angle different from the angle from which said hook-supporting member is viewed in Fig. 11.

Fig. 13 is a fragmentary elevational view illustrating the means for retaining the outer tubular member of the clamp stick in place.

Fig. 14 is a horizontal section taken on line 14—14 of Fig. 13.

Fig. 15 illustrates a modified form of the hook-supporting member of the clamp stick of this invention.

In the drawings, wherein is shown for purposes of illustration, merely, two embodiments of the invention, A designates the improved clamp stick generally. The clamp stick A includes an elongated ferrule 1 which is secured by fastening means 2 at its lower end to a pole 3, an end portion of said pole being extended into the lower portion of said ferrule whose inside diameter is

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greater than the inside diameter of the upper portion of the ferrule so as to provide within the ferrule an annular shoulder 4 (Fig. 6). The portion of the ferrule located above the shoulder 4 has the cross-sectional shape illustrated to good advantage in Figs. 2, 3, and 4; that is to say, the bore 5 of the portion of the ferrule 1 located above the shoulder 4 is of substantially less diameter than is the bore of the portion of said ferrule that is located below said shoulder 4, and the wall of said upper portion of the ferrule has formed therein a pair of diametrically opposed grooves 6 and a pair of diametrically opposed grooves 7, said pairs of grooves 6 and 7 extending from the shoulder 4 to the top of the ferrule 1. At its upper end the ferrule 1 is provided with diametrically opposed recesses 8 at which the grooves 7 terminate, and said ferrule has formed through the wall thereof a slot 9 which extends longitudinally of the ferrule.

Supported within the upper portion of the ferrule 1, for longitudinal sliding movement therein, is a hook-supporting member 10, said hook-supporting member having a substantially cylindrical body portion 11 from the upper end of which a pair of spaced ears 12 are extended upwardly, and the outer face of said body portion being in sliding contact with the face of the bore 5 of the upper portion of the ferrule 1. Supported for pivotal movement by the spaced ears 12 is a hook 13, a portion 14 of said hook being disposed between said ears and a pivot element 15 is extended through aligned apertures formed through the ears and through the portion 14 of the hook 13. The hook 13 has associated therewith a coil spring 16, one end of which is anchored to said hook and the opposite end of which is anchored to the hook-supporting member 10, said coil spring tending to move the hook to the position in which it is shown in Fig. 7. In order to limit the movement of the hook 13 in the opposite direction to that in which it is moved by the coil spring 16, said hook is provided with an abutment 17 that contacts with a pin 18 when the hook has reached the limit of its movement in the direction referred to, said pin being mounted on one of the ears 12 of the hook-supporting member 10 and being extended inwardly therefrom, as is shown in Figs. 7 and 8.

Associated with the hook-supporting member 10 is a coil spring 19, the upper end portion of which is extended into the hollow interior of said hook-supporting member 10 and said upper end portion of said coil spring being connected to a pin 20 which extends transversely of the hollow interior of said hook-supporting member. The opposite or lower end of the coil spring 19 is connected by a clip 21 to a disk 22 whose marginal portion contacts with the shoulder 4 of the ferrule 1. The coil spring 19 is maintained

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under tension between its opposed anchor points and thus tends to move the hook-supporting member 10 downwardly relative to the ferrule 1. Also, an apertured disk 23 is interposed between the lower face of the marginal portion of the disk 22 and the top face of the pole 3 (Fig. 6).

Adjacent to its lower end the hook-supporting member 10 is provided with an annular groove 24, and communicating with said annular groove at their lower ends is a pair of diametrically opposed grooves 25 which extend to and are open at the upper ends of the spaced ears 12 at the top of the hook-supporting member 10. The grooves 25 are cut in the outer face of the body portion 11 of the hook-supporting member 10 and in the outer faces of the ears 12, and said grooves are extended in straight lines longitudinally of the hook-supporting member. Also, formed in the top wall of the annular groove 24 of the hook-supporting member 10 and opening into said annular groove is a pair of diametrically opposed, semicircular notches 26, each notch 26 being spaced 90° from the grooves 25 located at opposite sides of said notch. The annular groove 24 receives the inner end portion of a screw-threaded element 27 which is screwthreadedly seated in a screwthreaded opening formed in the ferrule 1, as is shown to good advantage in Fig. 3, and said hook-supporting member may be rotated with respect to the ferrule 1 so as to cause the inner end portion of said screwthreaded element 27 to be seated in one of the notches 26, or pass into one of the grooves 25, for purposes to be hereinafter explained.

In describing the use of the improved clamp stick of this invention it will be assumed that it is desired to apply to an overhead electrical conductor a clamp C of the type having a screw-threaded jaw actuating element Ca which is provided with an eye Cb at its lower end. When the improved clamp stick is ready for such use, the hook-supporting member 10 is in its uppermost position within the ferrule 1 where it is held against the downward pull of the coil spring 19 by the screwthreaded element 27 which is seated in one of the notches 26. When the hook-supporting element 10 is in its uppermost position, as described, the coil spring 16 draws the hook 13 to the position in which it is shown in Fig. 7. The hook 13 is now passed through the eye of the jaw actuating element of the clamp C and the hook is moved to its vertical position against the force exerted by the coil spring 16. The hook is then drawn outwardly slightly to free the notch 26 from the screwthreaded element 27 and to locate the inner end portion of said screwthreaded element entirely within the annular groove 24 of the hook-supporting member. The hook 13 is then rotated 90° of a circle which will bring one of the grooves 25 in alignment relative to the screwthreaded element 27 and the coil spring 19 is permitted to draw the hook-supporting member 10 downwardly within the ferrule 1 of the clamp stick until the lower portion of the clamp contacts with the top portion of the clamp stick. In this connection it is pointed out that standard clamps of the type which the improved clamp stick is adapted to operate have lower portions that seat in the recesses 8 at the top of the ferrule 1, whereby the clamp is very securely held by the coil spring 19 in position atop the clamp stick.

With the clamp mounted firmly atop the clamp stick, as described, the clamp is elevated with the aid of the clamp stick to the overhead con-

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ductor to which it is to be applied, the fixed upper jaw of the clamp being passed over the conductor. The clamp stick is then pulled downwardly slightly to free the lower portion of the clamp from the recesses 8 at the upper end of the ferrule 1 and the clamp stick is rotated axially so as to cause the screwthreaded jaw actuating element of the clamp to be rotated and thereby adjust the movable jaw of the clamp into clamping engagement with the overhead conductor. The clamp now having been applied to the overhead conductor, the operator pulls the clamp stick downwardly relative to the hook-supporting member 10 until the inner end portion of the screwthreaded element 27 again projects into the annular groove 24 of said hook-supporting member. The clamp stick is then rotated axially 90° until the screwthreaded element 27 is seated in one of the notches 26 whereby the hook-supporting member 10 is locked in the position in which it is shown in Fig. 7. The hook is then disconnected from the jaw actuating element of the clamp, the coil spring 16 moving the hook to the position in which it is shown in Fig. 7, and the clamp stick is lowered to the ground. It is to be noted that when the hook 13 is drawn downwardly into the ferrule 1 to seat a clamp atop the clamp stick, opposite portions of the hook are disposed in and move through the grooves 7 of the ferrule, while opposite portions of the eye of the jaw actuating element of the clamp are disposed in and move through the grooves 6 of said ferrule.

When a clamp is to be removed from an overhead electrical conductor with the aid of the improved clamp stick of this invention the upper portion of the clamp stick is elevated to the position of the clamp with the hook 13 in the position it occupies in Fig. 7. The hook is inserted in the eye of the jaw actuating element of the clamp and the clamp stick is pulled downwardly to move the hook to a position where it is aligned with the clamp stick and to move the inner end portion of the screwthreaded element 27 to a position where it projects into the annular groove 24 of the hook-supporting member 10. The pole 3 is then rotated axially 90° to align the inner end portion of the screwthreaded element 27 with one of the elongated grooves 25 of the hook-supporting element, whereupon the coil spring 19 will pull the hook-supporting element 10 and the hook downwardly to the position of said parts as shown in Fig. 6. The clamp stick is then rotated axially to rotate the jaw actuating element of the clamp so as to lower the movable jaw of the clamp and thereby permit the clamp to be removed from the conductor, the lower portion of the clamp being drawn into firm engagement with the recesses 8 of the ferrule by the coil spring 19 for the action of lowering said clamp to the ground.

Provision is made in the construction of the improved clamp stick of this invention to retrieve the hook 13 in the event it accidentally or designedly becomes disposed deep within the interior of the ferrule with no clamp attached thereto. The means for accomplishing this purpose comprises an outer tubular member 28 which embraces the ferrule 1 and an upper portion of the pole 3. The tubular member 28 is provided with an annular shoulder 29 (Fig. 6) which underlies a ring 30 that is interposed between said shoulder 29 and the bottom edge face of the ferrule 1, said ring being secured to the pole 3 by a fastening device 31. The tubular member 28

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has an opening 32 formed through the wall thereof (Figs. 13 and 14) and the ring 30 likewise has an opening 33 formed through the wall thereof, said opening 33 having opposed, curved wall portions, as is shown in Fig. 14. Arranged in the openings 32 and 33 is a clip 34 formed of spring material, said clip having outwardly extended end portions 35 which contact with the circumferential face of the pole 3, and a forwardly extended portion 36 which is disposed in the opening 32 of the tubular member 28.

In the event the hook 13 of the clamp stick of this invention becomes disposed deep within the ferrule 1 of the clamp stick, as suggested above, the portion 36 of the clip 34 is pressed inwardly so as to move said clip portion out of the opening 32 of the tubular member 28. This releases the tubular member 28 for downward movement relative to the pole 3 to expose the slot 9 of the ferrule 1, and when said slot has been so exposed, a screwdriver, or other suitable tool, may be inserted through said slot into engagement with the hook 13, or a part of the hook-supporting member 10, whereupon the hook and the hook-supporting member may be moved outwardly against the force of the coil spring 19.

Fig. 15 illustrates a modified form of the hook-supporting member of the clamp stick of this invention. In accordance with the form of the invention illustrated in the views other than Fig. 15 the hook-supporting member 10 is provided with a pair of diametrically opposed notches 26, either of which is engaged by the screwthreaded element 27 to retain the hook-supporting member in the position in which it is shown in Fig. 7. However, the hook-supporting member 10' illustrated in Fig. 15 includes but one notch 26' and located in diametrically opposed relation to this notch 26' is a groove 37 of intermediate length when compared with the depth of the notch 26' and the length of the grooves 25'. In the use of a clamp stick provided with the hook-supporting member 10' of Fig. 15, the screwthreaded element 27 engages the closed upper end of the groove 37 so as to retain the hook 13 in such position that the pole 3 may be rotated axially to actuate the jaw actuating element of clamp without any likelihood that the lower portions of the clamp will contact with or engage the upper portion of the clamp stick.

I claim:

1. A clamp stick comprising a ferrule, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook pivotally supported by said hook-supporting member, spring means which tends to move said hook-supporting member in one direction within said ferrule, and means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, the last-mentioned means comprising an annular groove formed in said hook-supporting member, an abutment face formed on said hook-supporting member at said annular groove, and an abutment element supported by said ferrule which is adapted to project into said annular groove and is adapted to engage said abutment face.

2. A clamp stick comprising a ferrule, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook pivotally

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supported by said hook-supporting member, spring means which tends to move said hook-supporting member in one direction within said ferrule, and means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, the last-mentioned means comprising an annular groove formed in said hook-supporting member, a notch formed in said hook-supporting member that opens into said annular groove, and an abutment element supported by said ferrule which is adapted to project into said annular groove and is adapted to engage the wall of said notch.

3. A clamp stick comprising a ferrule, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook pivotally supported by said hook-supporting member, spring means which tends to move said hook-supporting member in one direction within said ferrule, means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, the last-mentioned means comprising an annular groove formed in said hook-supporting member, an abutment face formed on said hook-supporting member at said annular groove, and an abutment element supported by said ferrule which is adapted to project into said annular groove and is adapted to engage said abutment face, and a groove formed longitudinally of said hook-supporting member that communicates with said annular groove and which is movable relative to said abutment element longitudinally of said ferrule to cause said hook-supporting member and the hook supported thereby to assume a different position with respect to said ferrule.

4. A clamp stick comprising a ferrule, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook pivotally supported by said hook-supporting member, spring means which tends to move said hook-supporting member in one direction within said ferrule, means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, the last-mentioned means comprising an annular groove formed in said hook-supporting member, an abutment face formed on said hook-supporting member at said annular groove, and an abutment element supported by said ferrule which is adapted to project into said annular groove and is adapted to engage said abutment face, and a groove formed longitudinally of said hook-supporting member that communicates at an end thereof with said annular groove and which is movable relative to said abutment element longitudinally of said ferrule to cause said hook-supporting member and the hook supported thereby to assume a different position with respect to said ferrule.

5. A clamp stick comprising a ferrule, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook pivotally supported by said hook-supporting member,

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spring means which tends to move said hook-supporting member in one direction within said ferrule, means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, the last-mentioned means comprising an annular groove formed in said hook-supporting member, an abutment face formed on said hook-supporting member at said annular groove, and an abutment element supported by said ferrule which is adapted to project into said annular groove and is adapted to engage said abutment face, and a groove formed longitudinally of said hook-supporting member that communicates at an end thereof with said annular groove and which is movable relative to said abutment element longitudinally of said ferrule to cause said hook-supporting member and the hook supported thereby to assume a different position with respect to said ferrule, said groove being open at the end thereof opposite to the end which communicates with said annular groove.

6. A clamp stick comprising a ferrule having a bore extended therethrough in the face of which longitudinally extended grooves are formed, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook pivotally supported by said hook-supporting member, spring means which tends to move said hook-supporting member in one direction within said ferrule, means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, the last-mentioned means comprising an annular groove formed in said hook-supporting member, an abutment face formed on said hook-supporting member at said annular groove, and an abutment element supported by said ferrule which is adapted to project into said annular groove and is adapted to engage said abutment face, and a groove formed longitudinally of said hook-supporting member that communicates with said annular groove and which is movable relative to said abutment element longitudinally of said ferrule to cause said hook-supporting member and the hook supported thereby to assume a different position with respect to said ferrule.

7. A clamp stick comprising a ferrule having a bore extended therethrough in the face of which pairs of opposed longitudinally extended grooves are formed, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook pivotally supported by said hook-supporting member, spring means which tends to move said hook-supporting member in one direction within said ferrule, means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, the last-mentioned means comprising an annular groove formed in said hook-supporting member, an abutment face formed on said hook-supporting member at said annular groove, and an abutment element supported by said ferrule which is adapted to project into said annular groove and is adapted to engage said abutment face, and a

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groove formed longitudinally of said hook-supporting member that communicates with said annular groove and which is movable relative to said abutment element longitudinally of said ferrule to cause said hook-supporting member and the hook supported thereby to assume a different position with respect to said ferrule.

8. A clamp stick comprising a ferrule, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook supported by said hook-supporting member, spring means which tends to move said hook-supporting member in one direction within said ferrule, means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, said ferrule having a slot formed longitudinally of the wall thereof, a tubular element which embraces said ferrule and normally covers said slot, and means for releasably retaining said tubular element in its slot-covering position.

9. A clamp stick comprising a ferrule, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook supported by said hook-supporting member, spring means which tends to move said hook-supporting member in one direction within said ferrule, means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, said ferrule having a slot formed longitudinally of the wall thereof, a tubular element which embraces said ferrule and normally covers said slot, and means comprising a spring clip for releasably retaining said tubular element in its slot-covering position.

10. A clamp stick comprising a ferrule, a pole to which said ferrule is fixed, a hook-supporting member disposed within said ferrule for longitudinal sliding movement therein, a hook supported by said hook-supporting member, spring means which tends to move said hook-supporting member in one direction within said ferrule, means for arresting movement of said hook-supporting member imparted thereto by said spring means so as to locate said hook-supporting member and the hook supported thereby in predetermined positions with respect to said ferrule, said ferrule having a slot formed longitudinally of the wall thereof, a tubular element which embraces said ferrule and normally covers said slot, and means comprising a spring clip for releasably retaining said tubular element in its slot-covering position, said spring clip having a portion which projects into an aperture formed in said tubular element and said spring clip being compressible to remove said clip portion from said aperture so as to release said tubular element for movement longitudinally of said ferrule to a position where the slot of said ferrule is uncovered.

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