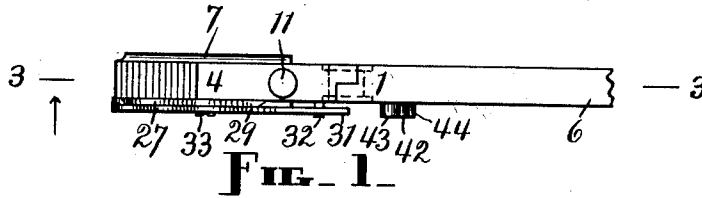
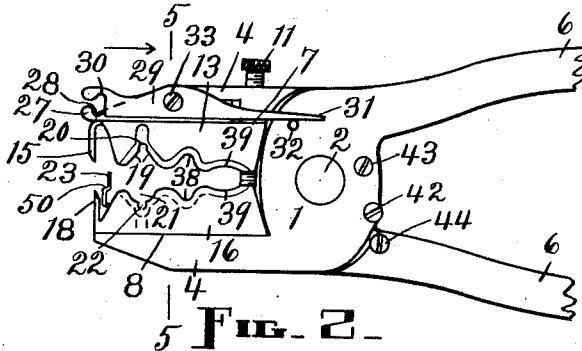
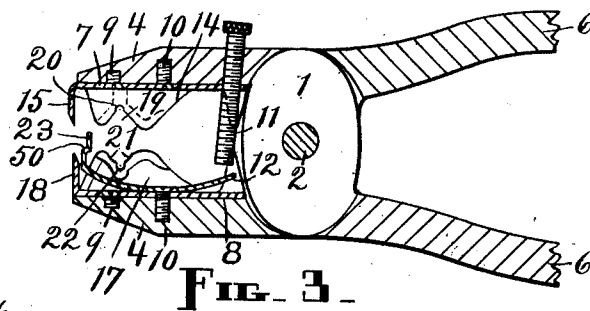
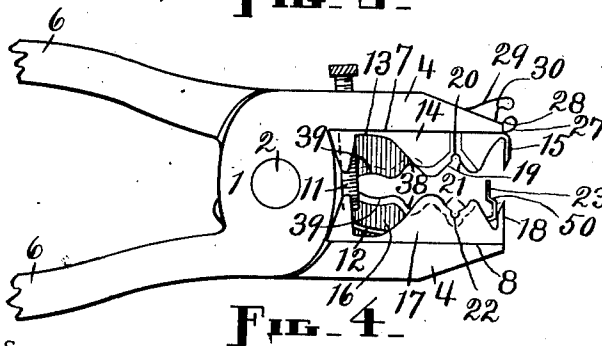


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PLIERS.
APPLICATION FILED DEC. 15, 1910.

1,107,243.

Patented Aug. 11, 1914.

2 SHEETS—SHEET 1.



WITNESSES:

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2 SHEETS—SHEET 2.

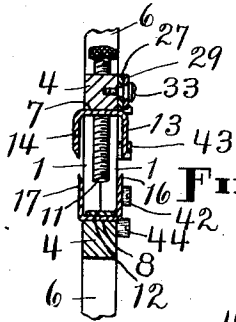


FIG. 5.

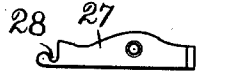


FIG. 6.

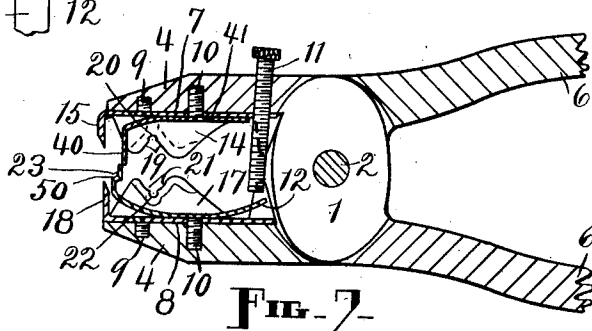


FIG. 7.

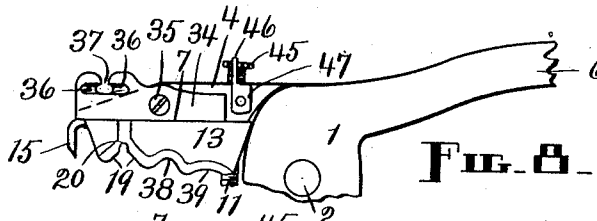


FIG. 8.

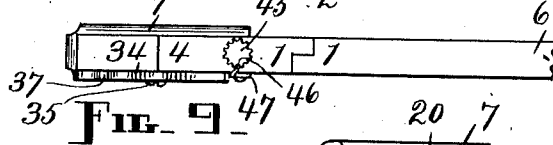


FIG. 9.

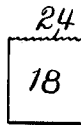


FIG. 10.

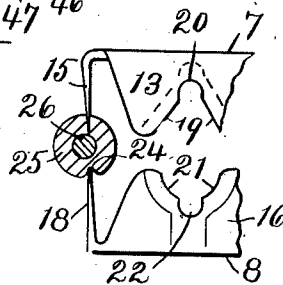


FIG. 11.

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PLIERS.

1,107,243.

Specification of Letters Patent.

Patented Aug. 11, 1914.

Application filed December 15, 1910. Serial No. 597,426.

To all whom it may concern:

Be it known that I, HARRY A. ADAMS, a citizen of the United States of America, residing at East Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Pliers, of which the following is a specification.

My invention relates to pliers of the insulation- and wire-cutting type, and resides in certain peculiar cutter, scraper, and bending features, also in improved features of general construction, which features are in the nature of improvements of the pliers covered by United States Letters Patent No. 964,600, issued to me July 19th, 1910, although in many particulars and to a very great extent quite distinct from anything disclosed in said patent.

The objects of my invention are, first, to produce pliers for easily, quickly, and conveniently cutting wire, whether covered with insulation or not, and for cutting and removing insulation from wire without severing the latter or injuring it in any way; second, to provide such pliers with adequate means for cleaning by scraping wire from which the insulation has been removed, and, third, to provide such pliers with means for forming a loop or hook at the end of a denuded wire.

Other objects will appear in the course of the following description.

I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a top plan of a pair of pliers in which is embodied one form of my invention, the handles of the pliers in this as in the other general views being broken off; Fig. 2, a front side elevation of said pliers; Fig. 3, a longitudinal vertical section taken on lines 3—3, looking in the direction of the associated arrow, in Fig. 1; Fig. 4, a back side elevation of the pliers; Fig. 5, a transverse vertical section taken on lines 5—5, looking in the direction of the associated arrow, in Fig. 2; Fig. 6, a front elevation of one of the scraper members, detached, used with, and constituting a part of, the pliers illustrated in the preceding views; Fig. 7, a longitudinal vertical section of a pair of pliers provided with two stop members or abutments instead of one for assisting in positioning the wire and insulation when the

latter is to be cut longitudinally; Fig. 8, a front side elevation of the upper portion of a pair of pliers provided with a gage for the adjusting screw and with a modified form of scraper; Fig. 9, a top plan of the parts shown in the preceding view; Fig. 10, a front elevation of the lower end member shown in the next view, and, Fig. 11, an enlarged detail of two cutter sections, illustrating a slightly modified form of construction wherein one of the end members is a gripping member, and also illustrating the application of the parts.

Similar figures refer to similar parts throughout the several views.

What may be termed the frame of my pliers consists of any ordinary and suitable construction, such as a pair of hubs 1 connected in the center by means of a pivot 2, a pair of jaws 4 extending forwardly from said hubs, and a pair of handles 6 extending rearwardly from said hubs.

Upper and under cutter sections 7 and 8 are respectively securely attached to the adjacent faces of the corresponding jaws 4 in some suitable manner, as by means of screws 9 and 10 which pass through the horizontal parts or webs of said sections into threaded engagement with said jaws. By attaching the cutter sections to the jaws in such a manner that the former can be removed from the latter, provision is made for readily changing said sections for others constructed to operate on different sizes of wire and insulation, and for replacing them when broken.

An adjusting screw 11 is tapped into the upper jaw 4 and passes downward through said jaw and the cutter section 7 into the lower part of the space between the jaws and cutter sections immediately forward of the hubs 1. A flat spring 12 is secured to the web of the cutter section 8 by means of the lower screw 10 which passes through said spring, and the back terminal of said spring projects rearwardly and upwardly beneath the base of the adjusting screw 11. The office of the screw 11 is to limit the jaws 4 in closing, and the office of the spring 12 is to force said jaws open after they have been closed and upon their release. The jaws 4 are actuated toward each other or closed by grasping the handles 6 and pressing them toward each other in the usual manner, and during this operation the screw 11 contacts with the adjacent raised termi-

nal of the spring 12 and overcomes the resistance offered by said spring and forces such terminal against the web of the section 8, when further movement is positively checked; then, when pressure on said handles is relaxed, said spring acts to thrust said jaws farther apart or to open them. In the last operation the spring 12 imparts a starting or initial opening impulse, as it were, to the pliers, which is all that is needed, since said pliers can be handled to better advantage if the pivoted members be left free and not subject to the influence of a spring throughout the greater portion of their movement.

The upper cutter section 7 has two parallel side blades 13 and 14 and an end blade 15, and the lower cutter section 8 has the same number of parallel side blades 16 and 17 and an end blade 18, the parts being so constructed and arranged that the three first-mentioned blades respectively close over or outside of the corresponding bottom-section blades, so that there is produced a shearing effect when the jaws 4 with said sections are closed. The blades 13, 14 and 15 are ground on the outside, and the blades 16, 17 and 18 on the inside. The blades 13 and 14 have alining notches 19, the edges of which form angles of about 45° and the apexes of which are approximately half-round recesses or insets 20, adjacent to the outer or front ends of said blades; and the blades 16 and 17 have alining notches 21 with concave edges and central approximately half-round recesses or insets 22, said notches 21 being adjacent to the outer or front ends of said blades 16 and 17. The two pairs of notches 19 and 21 are so positioned in the blades 13 and 14 and 16 and 17, respectively, that these portions of said blades operate in conjunction with each other and constitute the circumferential insulation cutters, two of which cutters are situated in front and two behind so as to sever an intermediate section of insulation. In order to facilitate this work, the radius of each of the concave edges of each notch 21 is equal, approximately, to a radius of the insulation adapted to be cut by the notched portions of the blades at 19 and 21; and in order to obviate any liability of cutting the wire in such insulation, the insets 20 and 22 are of a size to receive said wire without injury when the blades are closed on the insulation for the purpose of severing the same. It is found that the insulation cutters constructed in the manner just described are especially well adapted to cut insulation without possible injury to the wire therein, easily, quickly, and evenly so as to leave no ragged edges or ends.

A section of insulation, equal in length to the distance between the two pairs of cooperating and cooperating cutters described above,

is severed by said cutters, and then such section is cut longitudinally and removed from the wire by means of the blades 15 and 18, all in substantially the same manner, with the exception hereinafter explained, as fully disclosed in the aforesaid Letters Patent, it being understood that the screw 11 is first adjusted so as to permit the jaws 4 to close to an extent which is only just sufficient to enable the insulation to be cut circumferentially without cutting the wire.

To assist in properly positioning the insulated wire with its circumferentially severed section between the blades 15 and 18, I provide a backing or abutment by extending and bending upward the spring 12. The abutment 23 is so arranged that, when the pliers are open wide enough to receive the insulation between the blades 15 and 18, said abutment is in position to take the backward thrust of the insulation when inserted between said blades and so support it at the proper place to enable the cutting to be done to the best advantage. The upwardly-extending part of the spring 12, which has the abutment 23 at the top, rises directly behind and close to the blade 18, and is then bent rearwardly or inwardly before being carried upwardly to form said abutment, to form a shoulder or guard 50 for the purpose of preventing pieces of insulation from dropping behind said blade and clogging the cutters.

If deemed necessary or desirable, the abutment 23 may be supplemented by providing an additional abutment 40. The latter may be obtained by furnishing a second spring 41 and turning down the front end thereof, such spring being attached to the web of the cutter section 7 by means of the upper screw 10, as shown in Fig. 7. The abutment 40 serves, with the abutment 23, as a backing or stop for the insulation and wire, and prevents the same from entering too far into the pliers. The two abutments are arranged so they can pass by each other, when the pliers are closed, and thus do not interfere with such action.

Instead of giving cutting edges to both of the blades 15 and 18, I may leave the working edge of one of such blades comparatively dull so that it will not cut into the insulation, but may serrate such edge in order the better to enable it to bite into or grip said insulation, as represented in Figs. 10 and 11, wherein the lower blade 18 has a blunted and serrated working edge 24. As shown in Fig. 11, the edge 24 of the blade 18 grips the piece of insulation which has been severed from the rest of the insulation, such piece being represented at 25, while the blade 15 cuts the same longitudinally, and will continue to grip said piece while it is peeled off of the wire, the latter

being represented at 26, by a movement of the pliers about said wire. This is the exception hereinbefore referred to.

After the section of insulation has been stripped from the wire it is usually necessary to scrape said wire to remove any foreign matter that may have remained thereon, and for this purpose the pliers are equipped, generally on the upper jaw 4, with one of the two kinds of scrapers illustrated in this case.

Referring, first, to the scraper shown in whole or in part in Figs. 1, 2, 4, 5 and 6, it will be observed that the same comprises a fixed member 27 having a recess 28 in its forward part, a movable member 29 having a recess 30 in its forward part and a more or less resilient tail-piece 31 behind, said members being attached to the front side or face of the upper jaw 4, and a pin 32 projecting from the front side or face of the hub 1 of the lower jaw, said pin being in operative relation to said tail-piece. A screw 33 is employed to attach the head 27 rigidly to the upper jaw, and to serve as a pivot for the member 29. The recesses 28 and 30 are designed together to receive the wire to be scraped, hence they must be of the proper size and depth for that purpose, but not so large that the member 29 cannot be closed tightly upon the wire in said recesses when said member is actuated in the direction to close the recessed parts, as it is by the action of the pin 32 on the tail-piece 31 whenever the pliers are operated to swing the jaws 4 near together, since at such times said pin bears against said tail-piece. In practice, while the pliers are quite wide open the scraper is presented to the bare wire in such a way that the wire is passed or passes between the front ends of the members 27 and 29 into the recesses 28 and 30, and then said pliers are closed to bring the pin 32 into contact with the tail-piece 31 and so rock said member 29 on its pivot 33 and cause its recessed part, in conjunction with the recessed part of said member 27, to grasp said wire with some little force. While held closed the pliers are next moved laterally in both directions on the exposed part of the wire in the grasp of the scraper until such exposed part is clean and bright. Finally the pliers are opened to release the movable member 29 and permit the wire to be removed from the recesses 28 and 30 or the scraper to be removed from the wire. The pin 32 is so located relative to the tail-piece 31 that some little pressure is brought to bear on the wire in the recesses 28 and 30, as before mentioned, the parts being arranged to apply pressure to any size of wire that the pliers are capable of handling. Necessarily, however, the tail-piece must yield more for a large wire than for a smaller one.

The scraper shown in Figs. 8 and 9 consists of a single plate or member 34 fastened to the upper jaw 4 by means of a screw 35 and having oppositely-disposed recesses 36—36 which open into a central recess 37, the latter being the entrance passage for the wire. The recesses 36 and 37 are in a portion of the plate 34 that extends above and beyond the upper jaw 4. Each recess 36 is approximately semi-circular and is capable of receiving and acting on a wire introduced therein. To use this scraper, simply apply it to the wire and move it laterally as in the previous case, with the wire first in one of the recesses 36 and then in the other, the entrance to and exit from such recesses being by way of the recess 37. The edges of one recess 36 clean one-half of the wire and the edges of the opposite recess 36 clean the other half of the wire, as will be readily seen.

In the blades 13 and 16, behind the notches 19 and 21 in the same blades, are two notches 38, and these parts of said blades constitute a cutter provided more especially for insulation in which is an electric conductor made up of a number of fine wires, the whole forming what is known as a cord. The cutter thus provided is designed not only to cut the insulation, but also to strip it from the wires. These operations are performed, after adjusting the screw 11 so as not to cut the wires but only the insulation, by placing the cord between the notched portions 38 of the blades 13 and 16, with the length of such cord transverse to the jaws 4 and with its free end extending the desired distance beyond said blades, closing the pliers to cut the insulation circumferentially, and while closed moving said pliers laterally along the wires toward their free ends to strip off said insulation beginning at the place where it is severed. It will be noticed that the apexes of the notches 38 are curved, and it is in these curved places in the blades 13 and 16 that the conductor is received, at the time the insulation is cut, and so prevented from being cut also, provided the screw 11 be properly adjusted. The cutter just described may be used for removing insulation from ordinary wire, as well as a cord cutter and stripper.

Back of the notches 38 the blades 13 and 16 are provided with slightly concave cutting edges 39—39 for severing insulation, wire, or both. Also with this cutter insulation may be cut and stripped from the wire, but the screw 11 should first be adjusted so that the edges 39 can be brought into contact with the wire without indenting it. A side pressure of the closed pliers lengthwise of the wire and toward the free end thereof removes the intervening insulation. A section of insulation at the free end of a wire can be removed also by the same means and

in substantially the same way as a section remote from such end, as is clear from what has previously been stated herein. It will be understood that the wire in any instance
 5 can be severed with any pair of the cutting edges previously described as being intended for cutting the insulation, by turning out the screw 11 far enough to enable such edges to pass completely by each other.

10 Two posts 42 and 43 are set in the front side of one of the hubs 1, preferably the front hub, and a post 44 is set in the handle 6 that is adjacent to said post 42, being set quite near to said post 42. These posts are
 15 for the purpose of forming or assisting in forming loops or hooks at the ends of bare wires, and they preferably consist of screw-studs so that they can be changed for studs having larger or smaller heads, which are
 20 the parts that project from the face of the hub, to accommodate different sizes of wire. To form a loop or hook, insert the denuded end of a wire between the posts 42 and 44, while the pliers are open, then close the
 25 pliers to grip the wire between said posts, and bend the wire around said post 42 to produce the loop or hook. The wire behind the loop or hook thus produced may be formed into a goose-neck by shifting such
 30 loop or hook on the post 42 to the required extent, the pliers being opened and closed again to permit this to be done, and then bending said wire part way around the post 43.

35 If desired, instead of depending on the eye alone for the proper adjustment of the screw 11, a gage may be provided for automatically determining or indicating the degree of adjustment. Such a gage is represented in Figs. 8 and 9, wherein a periph-
 40 erally notched head 45 is provided for the screw 11, and a resilient finger 46 is arranged in engagement with such notched periphery, such finger rising from a plate
 45 47 which is fastened against one side of the upper jaw 4. The notches in the edge of the head 45 are graduated to correspond with the different sizes of wire or conductors which it is desired to protect when cut-
 50 ting the insulation thereon, hence through the medium of the pulsations felt when the screw 11 is turned, as the toothed members of the head 45 click past the yielding finger 46, the amount of rotation of said screw is
 55 clearly denoted and the requisite adjustment is made known to the operator.

The blades 14 and 17 are cut away adjacent to the cord cutter and stripper and the wire cutter formed out of the blades 13
 60 and 16, so as to leave a clear space for the cords and wires while being acted on by such members.

Various other changes and modifications, in addition to those herein pointed out, may
 65 be made in my pliers without departing

from the nature of my invention, as will be readily understood by those skilled in the art to which said invention appertains.

What I claim as my invention, and desire to secure by Letters Patent, is—

70 1. The combination, with plier jaws provided with suitable cutters, the latter including a transverse end blade carried by one of such jaws, of an adjusting screw tapped into and through the other of such
 75 jaws, and a member mounted on said first-mentioned jaw and having a resilient part which extends into the path of the inner end of said screw.

80 2. The combination, with plier jaws provided with transverse end blades, of transverse means to assist in positioning a wire and its insulation between said blades, and means to support such positioning means between said jaws and adjacent to such
 85 blades.

90 3. The combination, with plier jaws provided with transverse end blades, of transverse yielding means to assist in positioning a wire and its insulation between said blades, and means to support such positioning means between said jaws and adjacent to such blades, such positioning means being adapted to yield under force incident to the cutting operation.

95 4. The combination, with plier jaws provided with longitudinal side and transverse end blades, of an adjusting screw tapped into and through one of such jaws, and a resilient member mounted on the other of
 100 such jaws in operative relation at one terminal to said screw, and being extended upwardly at the other terminal, inside of and adjacent to the transverse end blade carried by the jaw to which said resilient member is
 105 attached, to form an abutment for the material acted on by said end blades.

110 5. The combination, in pliers, of a jaw, a fixed scraper member secured to such jaw, a movable scraper member mounted on said jaw beside said fixed member, a hub movable relative to said jaw, and an engaging member carried by said hub in operative relation to said movable scraper member, said
 115 scraper members having complementary wire-receiving recesses in their outer terminals.

120 6. The combination, in pliers, of a jaw, a fixed scraper member secured to such jaw, a coating scraper member mounted on said jaw and provided with a resilient tail-piece, a hub movable relative to said jaw, and a pin carried by said hub, said tail-piece extending into the path of travel of said pin.

125 7. The combination, in pliers, with a hub, and a post carried thereby, of a member pivotally connected with said hub, and a post carried by said member in operative relation to said first-mentioned post, such posts having axes which are parallel with
 130

the hub pivot and constituting wire-bending members.

8. The combination, in pliers, with a hub, and two posts carried by said hub, of a member pivotally connected with said hub, and a post carried by said member in operative relation to one of said first-mentioned posts, for the purpose set forth, such posts having axes which are parallel with the hub pivot.

9. The combination, with plier jaws pro-

vided with transverse end blades, of a transverse shouldered member supported between said jaws and adjacent to said blades to prevent pieces of insulation cut by said blades from falling into the space behind the lower blade.

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Witnesses:

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A. C. FAIRBANKS.