No. 880,790. PATENTED MAR. 3, 1908.

J. H. GOEHST.

IMPLEMENT FOR REMOVING INSULATING COVERING FROM ELECTRIC CIRCUIT WIRES.

APPLICATION FILED FEB. 25, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

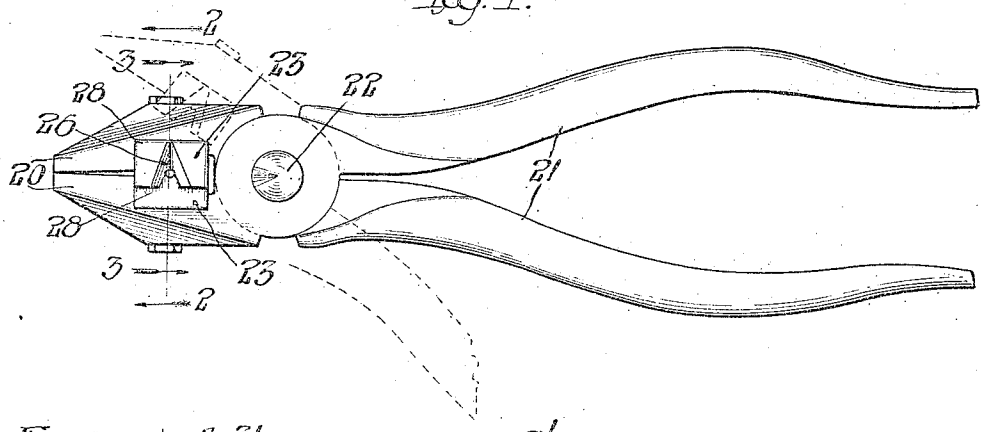


Fig. 2.

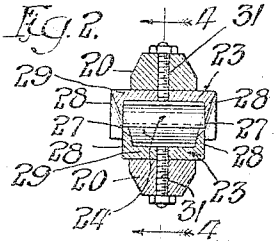


Fig. 19.



Fig. 20.

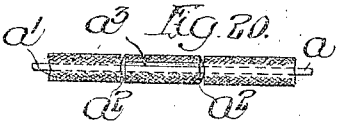


Fig. 3.

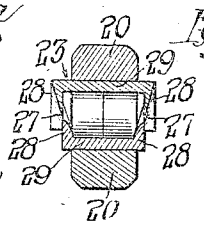


Fig. 21.

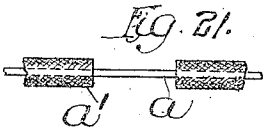


Fig. 4.

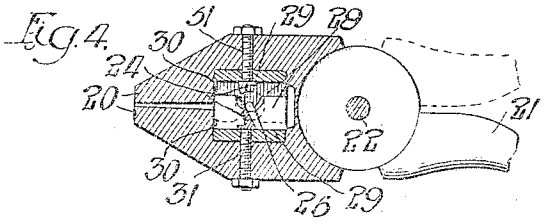


Fig. 5.

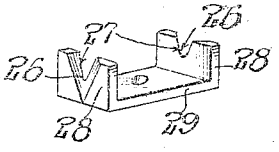


Fig. 7.

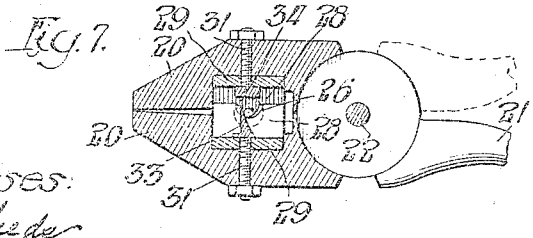
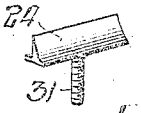


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 8.

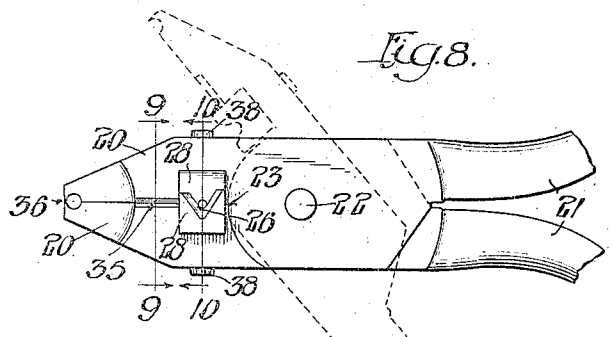


Fig. 9.

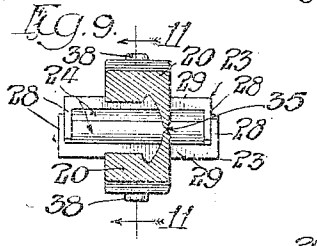


Fig. 10.

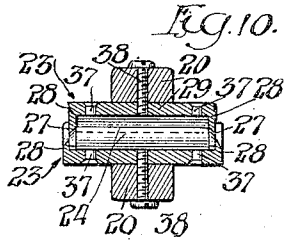


Fig. 11.

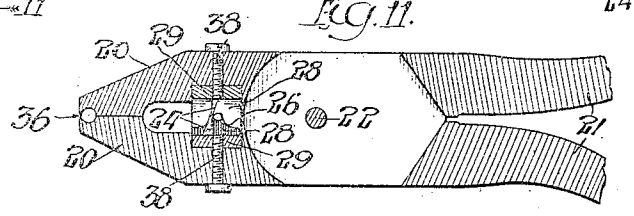
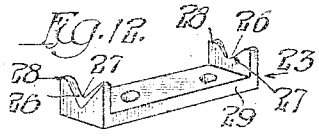


Fig. 12.



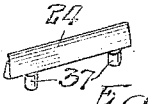


Fig. 13.

Fig. 14.

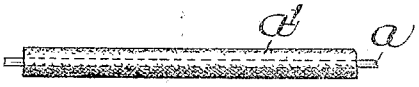


Fig. 15.

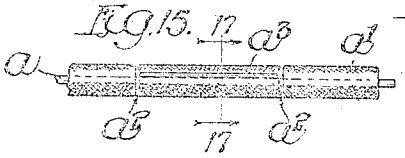


Fig. 16.

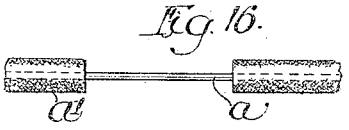


Fig. 17.



Fig. 18.



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UNITED STATES PATENT OFFICE.

JOHN H. GOEHST, OF CHICAGO, ILLINOIS.

IMPLEMENT FOR REMOVING INSULATING-COVERING FROM ELECTRIC-CIRCUIT WIRES.

No. 880,790. Specification of Letters Patent. Patented March 3, 1908.

Application filed February 25, 1907. Serial No. 359,296.

To all whom it may concern:

Be it known that I, JOHN H. GOEHST, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Implements for Removing Insulating-Covering from Electric-Circuit Wires; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the marks of reference thereon, which form a part of this specification.

This invention relates to a novel implement in the nature of pliers intended for use by wire-men in installing insulated electric circuit wires and has been designed to facilitate the removal of the insulating cover from insulated circuit wires at points in the wire where connections are to be made with binding posts or other circuit wires.

My improvements are adapted for use in connection with pliers ordinarily used by wire-men for installing circuit wires and may constitute parts of such pliers or attachments therefor.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

Heretofore it has been the common practice in removing the insulating covering from circuit wires to strip the same by the use of an ordinary pocket-knife, the insulation being circumferentially cut inwardly to the wire at the ends of the section to be removed and the parts of the insulation between said cuts being thereafter stripped from the wire by splitting or scraping away the severed section longitudinally thereof until the wire is bared on all sides. One serious objection found in this practice is that, unless the insulation be very carefully and skillfully stripped from the wire, there is great likelihood of the wire being scratched or indented by the edge of the knife-blade. This is highly objectionable because of the well known fact that the cutting or abrasion of the skin of the wire robs it of its flexible properties. As a consequence a wire cut or scratched in this manner is likely to be broken upon subsequent winding thereof about another wire in making a connection, or other manipulation necessary for attachment to a conductor or binding post. Furthermore, a wire possessing this latent defect is likely to be broken by subsequent flexing of the wire, which may occur by reason of movement to the parts to which it is attached, or as a consequence of continual vibration of the parts to which the wire is attached. The breaking or parting of a circuit wire under these circumstances brings about the formation of an arc which results in burning away the insulating tape usually wound about such joints, with the result of setting fire to adjacent combustible materials, and is the fruitful source of many serious fires which cannot be guarded against by the use of ordinary safety devices used in electric circuits. A further objection to the prior practice of stripping the insulation from the wire is that it consumes an undue amount of time of skilled labor and is, therefore, an unnecessarily expensive operation.

It is the object of my invention to provide a novel implement in the nature of pliers by which sections of insulation may be removed or stripped from the insulated circuit wires without danger of cutting or indenting the wire, and which is also of such construction as to simplify and reduce the cost of this operation.

I have herein shown my invention as adapted to two common forms of pliers, and have also illustrated slight modifications in adapting the invention. It will be understood, however, that the essential features of the invention may be embodied in other forms of implements and the invention is not limited to the illustrated disclosures except as herein made the subject of specific claims.

In the drawings:—Figure 1 is a side elevation of a pair of pliers embodying my invention. Fig. 2 is a transverse section, taken on line 2—2 of Fig. 1, looking toward the points of the jaws. Fig. 3 is a like section, looking in the opposite direction. Fig. 4 is a detail section, taken on line 4—4 of Fig. 2. Fig. 5 is a perspective view of a pair of the transverse cutter-blades by which the transverse severance of the insulation is effected. Fig. 6 illustrates one of the blades, by which the longitudinal slit of the section to be removed is effected, detached from the implement. Fig. 7 is a view similar to Fig. 4, showing a modification. Fig. 8 is a side view of another form of pliers showing my invention applied thereto. Fig. 9 is a cross-section, taken on the line 9—9 of Fig. 8, looking in the direction indicated by the arrows. Fig. 10 is a cross-section, taken on line 10—10 of Fig. 8, looking in the direction in-

dicated by the arrows. Fig. 11 is a longitudinal section, taken on line 11—11 of Fig. 9. Fig. 12 is a perspective view of the transversely cutting blades used in the implement shown in Fig. 8. Fig. 13 is a perspective view of one of the longitudinally cutting blades of the modification, detached from the other parts. Fig. 14 is a view in elevation of a short length of an insulated electric circuit wire. Fig. 15 illustrates said wire after a section of the insulation has been severed, but not removed from the wire. Fig. 16 illustrates said wire after the section of insulation has been removed. Fig. 17 is a cross-section, taken on line 17—17 of Fig. 15, illustrating the manner of longitudinally severing the section to be removed. Fig. 18 is a similar section, showing the section cut longitudinally from one side only. Figs. 19, 20 and 21 are views similar to Figs. 14, 15 and 16 illustrating the cutting of a shorter length of the insulating covering from a circuit wire.

In Fig. 14 is shown a short length of the insulated circuit wire referred to, comprising the central wire a and the surrounding cover or envelop a^1. In Fig. 15 is illustrated the manner in which I propose to sever the insulation preparatory to removing a section of the same. This operation consists in effecting two transverse or circular lines a^2 of severance and one or two longitudinal lines a^3 of severance extending longitudinally of the wire and joining the transverse lines of severance. The transverse lines of severance are effected by two pairs of cutting blades located a distance apart equal to the length of the sections to be removed, the longitudinal line or lines of severance being effected by the simultaneous action of a cutting blade or blades extending between the transverse blades. After the insulation has been cut, as shown in Figs. 15, 17 and 18, the segments of the insulation are removed by the use of the plier-jaws or analogous devices. Fig. 16 illustrates the length of wire after the section of insulation has been removed, thus baring the desired length of the wire a. The circuit wire shown in Fig. 16 is stripped or bared for a length sufficient to connect another wire by winding or coiling the other joining wire about said bared portion. In Figs. 20 and 21 is shown a wire in which a shorter section of the wire is bared or stripped for simple connection with a binding post or the like.

Referring first to the construction of the implement shown in Figs. 1 to 5, both inclusive, 20, 20 designate the jaws of a common form of pliers, 21, 21 the handles thereof, and 22 the pin by which the jaws are hinged together. 23, 23 designate the transversely cutting blades before referred to for effecting the transverse or circular cuts a^2 in the insulation, and 24, 24 designate the cutting blades for effecting the longitudinal cuts or lines of severance a^3. The transverse cutting blades 23 are arranged in pairs, one pair at each side of the jaws. One blade of each pair is fixed to one jaw and the other to the other jaw. They are disposed at right angles to the meeting faces of the jaws in overlapping or shearing relation to each other. They are provided in their adjacent margins with notches 26, 26 of general V-shape, the wider portions of which open to said adjacent margins, shown best in Fig. 5, and at the sides of said notches with converging cutting edges. The engaging or overlapping faces 28, 28 of said blades are made flat and fit closely in shearing relation to each other, and the cutting edges 27 are located in the planes of said overlapping faces. The said cutting edges of the blades at the sides of the V-shaped notches do not meet at acute angles, but the bottoms of said notches are slightly rounded. They are so arranged on the upper and lower jaws of the pliers that, when brought together in shearing relation, they are arrested by contact of one jaw with the other in such manner as to leave between the bottoms or narrower parts of the V-shaped notches openings between co-acting blades of a diameter slightly greater than that of the wire a. The openings between the blades of the two pairs are in alinement with each other. Thus the blades are brought together to sever the envelop of insulating material, but are stopped short of contact with the wire a.

The two pairs of co-acting blades at the opposite sides of the jaws are preferably spaced a distance apart to cut or sever a section of the insulating covering of the required length. The said co-acting blades 23 may be attached to the jaws in any suitable manner. As herein shown, said blades are made integral with cross-bars 29, 29, to which the blades are disposed at right angles. Said cross-bars fit in suitable notches 30 in the adjacent faces of the jaws, as more clearly shown in Fig. 4, and are attached thereto in any suitable manner, as by rivets 31 extending outwardly through the jaws.

The longitudinally cutting blades 24, 24 which produce the longitudinal cuts a^3 extend transversely across the jaws, one blade being attached to one jaw and the other blade attached to the other jaw. They are located out of alinement with the axes of the openings formed between the V-shaped notches of the transversely cutting blades. The inner or adjacent edges of said longitudinally cutting blades are knife edges and meet in shearing relation. They are made of such width as to cut approximately through one-half of the diameter of the insulating covering, as shown in Fig. 17, thus completely severing a segment of the section to be removed at one side of the wire a.

The said blades are herein shown as fixed in place by being attached to or made integral parts of the rivets 31 that secure the transverse cutting blades in place. In other words, said rivets constitute the shanks of said blades. In this construction, therefore, the said blades 24 constitute, in effect, the inner heads of said rivets 31 and are clamped firmly against the inner faces of the cross-bars which connect said transversely cutting blades.

In Fig. 7 is shown a construction where but a single longitudinally cutting blade 33 is provided. In this construction said blade opposes and co-acts with an abutment constituted by an elongated head 34 of one of the attaching rivets 31. When but a single longitudinally cutting blade is used, it will preferably be made of somewhat greater width than the blades 24, and produces a longitudinal cut in the insulating covering extending past the axis of the wire, as clearly shown in Fig. 18.

In Figs. 8 to 13, inclusive, I have shown my improvements as applied to a slightly different form of pliers. In this construction the jaws of the pliers are provided at one side thereof, in front of the side or transversely cutting blades 23, with cutting edges 35, 35 arranged longitudinally of the jaws for clipping or cutting wire. The said jaws are provided also at their points with transverse cutting edges 36, 36 for cutting wire in places difficult of access to other cutting tools. In this construction the blades 23 are made somewhat narrower than those shown in Fig. 1 so as to set back of the cutting or nipping edges 35 of the jaws. The longitudinally cutting blades are attached to the jaws by means of two integral shanks 37 that extend through apertures in the cross-bars 29, laterally outside of the jaws, and are riveted therein. The cross-bars carrying the blades 23 are fastened to the jaws by screws 38, best shown in Figs. 10 and 11.

My said improvements may be arranged to be detachably connected with pliers of various styles, in which event the improvements constitute an attachment for the pliers, or may be attached permanently to and made an integral part of the pliers or other analogous implement.

In the operation of the implement, the wire from which a section of the insulation is to be stripped is adjusted between the jaws in line with the notches of the side cutting blades and the pliers are then closed until arrested by contact of one of the jaws with the other. The device is so adjusted on the pliers, with respect to a given size wire, that when the jaws and blades are thus arrested, the insulation is transversely cut to the wire in the manner shown in Figs. 15 and 20 and is longitudinally cut on one or both sides, depending upon whether one or two longitudinally cutting blades be employed, as indicated in Figs. 17 and 18. Thereafter the severed section or sections of the insulation are stripped or pulled from the wire, as shown in Figs. 16 and 21, by the use of the points or noses on said plier jaws. It is obvious that this operation may be rapidly effected to strip the wire clean of the insulating cover, thereby effecting a substantial saving of time and correspondingly reducing the cost of installing circuit wires. In the implement shown in Figs. 1 to 6, inclusive, the two pairs of shearing blades are separated by but a narrow space, so that the section of insulation removed therefrom is a short one as shown in Figs. 20 and 21. The wire thus bared is designed for simple attachment to a binding screw, or the like. The implement shown in Figs. 8 to 13, inclusive, is designed to cut a longer section of the insulating covering from the wire, as shown in Figs. 15 and 16, and adapted for connection with a wire that is to be wound about the same. If it be desired to cut a section from the insulation of greater length than the distance between the transversely cutting blades of either implements, such additional length may be severed by moving the cutter longitudinally along the wire after the first cut has been made. Similarly a single pair of side cutters may be employed, located at one side of the jaws of the pliers and a section may be cut from the insulating covering by severing one end of said section while holding the pliers in one position and thereafter reversing the position of the pliers to sever the other end of the section.

I claim as my invention:—

1. An implement for removing the insulating covering from electric circuit wires comprising, in combination with swinging jaws, coacting blades at the side of said jaws, one carried by each jaw, for transversely cutting the covering, and a blade between the jaws for longitudinally splitting the covering and arranged and designed to split the said covering past the center of the wire.

2. An implement for removing the insulating covering from electric circuit wires comprising, in combination with swinging jaws, co-acting blades at the side of the jaws for transversely cutting the covering, one carried by each jaw, said blades being provided with opposing notches, and at the side of said notches with inclined cutting edges, and a blade disposed transversely between the jaws for longitudinally splitting the covering, the splitting blade extending with its cutting edge past the bottom of said notches.

3. An implement for removing the insulating covering from electric circuit wires comprising, in combination with swinging jaws, co-acting blades at the side of the jaws for transversely cutting the covering, one carried by each jaw, said blades being pro-

vided with opposing notches, and at the side of said notches with inclined cutting edges, and a blade disposed transversely between the jaws, at one side of the center of said notches, for longitudinally splitting the covering.

4. An implement for removing the insulating covering from electric circuit wires comprising, in combination with hinged jaws, co-acting blades at the side of the jaws, for transversely cutting the covering, one carried by each jaw, and co-acting blades between the jaws, one carried by each jaw, and located at one side of the centers of said transversely cutting blades, for longitudinally splitting the covering.

5. An implement for removing the insulating covering from electric circuit wires comprising, in combination with swinging jaws, two pairs of co-acting blades, one pair at each side of the jaws for transversely cutting the covering, one of the blades of each pair being carried by one jaw and the other by the other jaw, and a blade extending transversely between the side blades at one side of the centers of the transverse cutting blades for longitudinally splitting the covering.

6. An implement for removing the insulating covering from electric circuit wires comprising, in combination with swinging jaws, two pairs of co-acting blades, one pair at each side of the jaws for transversely cutting the covering, one of the blades of each pair being carried by one jaw and the other by the other jaw, and two blades for longitudinally splitting the covering, said latter blades being carried one by each of the jaws and extending between the side blades with their edges arranged in shearing relation.

7. An implement for removing the insulating covering from electric circuit wires comprising, in combination with swinging jaws, co-acting blades arranged in pairs, one pair at each side of said jaws for transversely cutting the covering, bars integral with said blades and extending transversely across the jaws, a blade extending across the jaws between the said side pairs of blades for longitudinally splitting the covering and a single fastening device for fastening to the pliers the splitting blade and the bar carrying two of the transverse cutting blades.

8. The combination with the swinging jaws of a pair of pliers, of co-acting blades at the side of said jaws, one carried by each of said jaws, and provided with opposing notches having inclined cutting edges, and a blade extending transversely across the jaws at one side of the centers of said notches.

9. An attachment for pliers for removing the insulating covering from electric circuit wires, comprising a side blade provided with a notch having inclined cutting edges, combined with a cutting blade fixed at right angles to said side blade at one side of the center of said notch.

10. An attachment for pliers for removing the insulating covering from electric circuit wires, comprising a bar provided at its ends with angularly disposed blades having alined notches, the sides of which constitute cutting edges, combined with a blade extending between the first mentioned blades in fixed relation thereto and located at one side of the centers of said notches.

11. An attachment for pliers for removing insulating covering from electric circuit wires, comprising a bar provided at its ends with angularly disposed blades for transversely cutting the insulation, combined with a blade seated on said bar and extending between the first-mentioned blades for longitudinally splitting the insulating covering of the wire, and a single fastening device for fastening said bar and splitting blade to the pliers.

12. An attachment for pliers for removing insulating covering from electric circuit wires, comprising a bar provided at its ends with angularly disposed blades for transversely cutting the insulation, combined with a blade seated on said bar and extending between the first-mentioned blades for longitudinally splitting the insulating covering of the wire, a screw-threaded device extending through the jaw of the pliers and said bar for fastening said splitting blade and cross-bar to the plier jaw.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 9th day of February, A. D., 1907.

JOHN H. GOEHST.

Witnesses:
WILLIAM L. HALL,
GEORGE R. WILKINS.