W. L. SILVERNAIL.

STRIPPING MECHANISM.

APPLICATION FILED NOV. 29, 1916.

1,314,759.

Patented Sept. 2, 1919.

FIG. 1

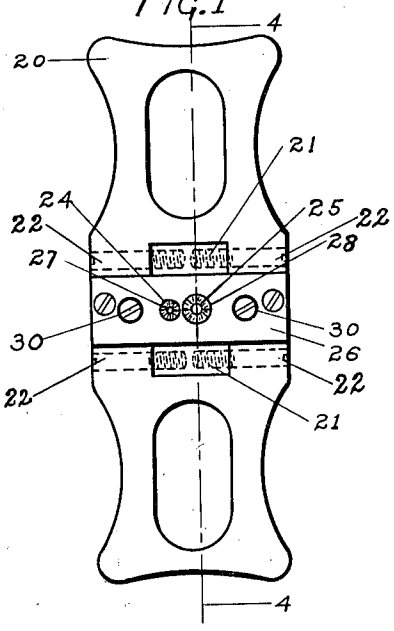


FIG. 2

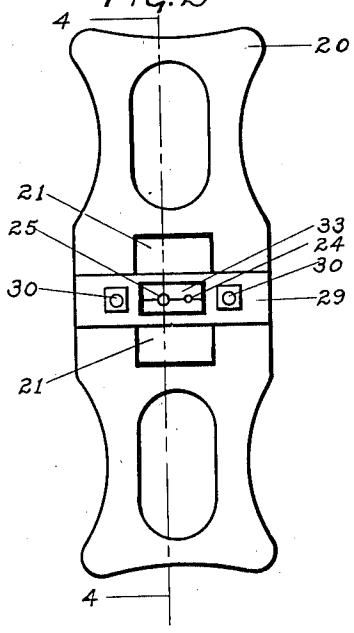


FIG. 3

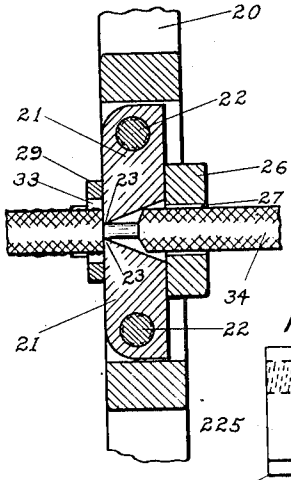


FIG. 4

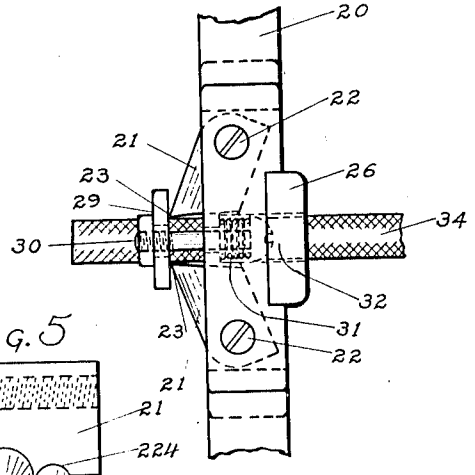
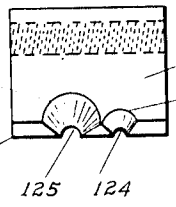


FIG. 5



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STRIPPING MECHANISM.

1,314,759. Specification of Letters Patent. Patented Sept. 2, 1919.

Application filed November 29, 1916. Serial No. 134,212.

To all whom it may concern:

Be it known that I, WILLIAM L. SILVERNAIL, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Stripping Mechanism, of which the following is a specification.

My invention relates to improvements in mechanism for scraping or removing the outer covering from various objects and is particularly adapted for stripping the covering from insulated wires.

In the use of prior mechanisms of this character, it has been necessary to perform three independent manual operations such as:—(1) Inserting the desired object in the stripping mechanism, (2) rendering the stripping mechanism effective (as by the manipulation and compression of tong-like handles), and (3) removing the stripped object from the stripping mechanism, both hands of the user being thus occupied.

When such prior mechanism has been employed for stripping insulation from each of a large number of loose pieces of wire, as is frequently done in factories, both hands of the operator are simultaneously engaged in a complex awkward operation of a very fatiguing character. The successful operation of such prior mechanisms has usually depended upon the application of a uniform force throughout the stripping operation for the purpose of maintaining the stripping members in sufficiently firm contact with the conductor to assure the complete removal of the insulation while avoiding the application of such degree of force as would be calculated to cut or score the conductor. Thus, in the cases of many prior wire stripping mechanisms, the application of too much force, especially just before or at the commencement of the stripping operation, would cause damage to the conductor being stripped; and, all prior stripping mechanisms with which I am acquainted fail to provide uniform and satisfactory results in practical use, under the conditions just referred to, in that the fatigue of the user, sooner or later, results in the application of insufficient and irregular degrees of force in applying such prior mechanisms, thus failing to fully and effectively remove the intended portions of the insulation, greatly decreasing speed and output, and incurring other practical disadvantages which are well understood by those who have had occasion to employ such prior stripping mechanisms.

An object of this invention is to provide a stripping mechanism adapted to be repeatedly employed with considerable rapidity and with a minimum of fatigue to the user.

Another object is to provide a mechanism in which the degree of the effectiveness of the stripping function is automatically determined, and is not affected by any lack of skill, or judgment or by the degree of fatigue of the user.

Other objects are to provide stripping mechanism which is more compact, more simple in operation, more economically manufactured, and more durable than prior mechanisms.

Still other objects are referred to in the following specification and claims.

In constructing this invention, I provide a suitable frame or support in which are pivoted a plurality of stripping or scraping blades, each having a notched cutting edge. These blades are so formed and arranged that they may swing on their pivots to a position where their cutting edges will be contiguous and the notches therein will coöperate in the desired manner, and so that they may swing on their pivots to another position where their cutting edges will be sufficiently separated to permit intended objects which have not been stripped to pass between said blades. Guiding means for objects to be stripped should be provided adjacent to the opening or openings formed by the notch or notches in said blades, which guiding means may form a stop for suitably limiting the swing of said blades.

The blades should be of such thickness, and should have tapered recesses so formed therein, that, when an object to be stripped is inserted through the guiding means, such object will be held by the tapered sides of such recesses in concentric relation to the opening formed by the notches in the cutting edges of said blades.

A yieldingly resilient restoring means, such as a spring pressed part, is so applied to said blades that, when an object to be

stripped is pushed through the guiding means and thereby swings said blades away from the stop, said restoring means will tend to move said blades toward and to maintain their cutting edges in engagement with said object at points which are equidistant from said stop.

For the purpose of enabling this invention to be more clearly understood, a stripping mechanism for removing the covering from insulated wires is shown in the accompanying drawings and hereinafter described which embodies the various features of this invention; but this invention is not limited to the construction shown and hereinafter described, as various changes in form, and additions or omissions of parts, may be made without departing from the spirit of this invention.

Like characters of reference denote the same parts throughout the accompanying drawings in which:

Figure 1 is a front elevation of a wire-stripping mechanism embodying this invention.

Fig. 2 is a rear elevation of the wire-stripping mechanism shown in Fig. 1.

Fig. 3 is an enlarged sectional view of the center portion of Figs. 1 and 2 taken through the line 4—4 thereof and showing a wire in process of being stripped.

Fig. 4 is an enlarged side elevation of the center portion of Figs. 1 and 2 showing the position of the various parts when a piece of wire has been inserted ready to be stripped.

Fig. 5 is an enlarged rear elevation of one of the blades shown in the other views.

In these drawings, 20 is a frame in which the blades 21, 21 are so mounted, by means of the pivots 22, 22, 22, 22, as to be adapted to freely swing therein. Each of said blades has a cutting edge 23 formed along one side of the free end thereof, the other side of the free ends of said blades being suitably beveled so as to afford a proper clearance during the operation of the blades hereinafter more fully described.

Each cutting edge 23 has formed therein the notches 124 and 125, said notches being so relatively located that when said edges are brought together said notches will cooperate to form the openings 24 and 25 respectively. Each of said openings is of such size and shape that it will permit the stripped conductor of some desired size of insulated wire to snugly pass therethrough and it will be noted that the opening 24 is of smaller diameter than the opening 25, so that said openings are suited for the passage of conductors of different sizes therethrough.

A cross-bar 26 is mounted on one side of the frame 20 in such position as to be adapted to act as a stop for arresting the movement of the blades 21, 21, when they have been swung toward the beveled sides thereof until their cutting edges meet.

The guide-hole 27 is provided in the cross-bar 26, said hole being so located as to be substantially concentric with the opening 24 and being of such diameter as to permit free passage therethrough of insulated conductors which are suited to be stripped by passing them through said opening 24. The guide-pole 28 is correspondingly suited for use in connection with the opening 25.

The notches 124 and 125 in the blades 21, 21 are cut away toward the beveled edges of said blades so as to form the tapered recesses 224 and 225 as shown in Fig. 5, so that, when the cutting edges 23 of said blades are brought together in the intended manner, the openings 24 and 25 formed by said enlarged part of said recesses 224 and 225 respectively, will be conical in form, and that the cut-away ends of said openings presented to the guide-holes 27 and 28 will be as large as, or slightly larger than, said respective holes.

Restoring means is provided, comprising the recessed plate 29, which is yieldingly secured to the frame 20 by means of the screws 30, 30, under the heads of which screws the spiral expanding springs 31 are so applied in the countersunk holes 32 as to constantly act to tend to press said screw-heads out of said holes and to thereby draw said plate 29 toward the bar 26. The head of one screw 30, its associated spring 31 and recess 32 are indicated by dotted lines in Fig. 4. The plate 29 is recessed, as at 33, so as to permit insulated wires which are of sizes suited to the holes 27 and 28 to pass therethrough, and said plate 29 is of such size and shape as to be adapted to act upon the blades 21, 21 so as to tend to simultaneously move or hold both of said blades against the bar 26, while permitting said blades to so swing away from said bar as to allow insulated wires of sizes suited to the guide-holes 27 and 28 to pass between said blades.

It is important that the plate 29 shall act upon the blades 21, 21 with a suitable force, and that said blades are caused to maintain such symmetrical relation to one another that when they are or have been forced apart, as by passing the wire 34 between them as shown in Fig. 4, the points of engagement of the cutting edges of said blades with the outside surface of the insulation of such a wire will at all times be so located that, upon the withdrawal of such a wire in the direction of the bar 26, said cutting edges will catch in the insulating covering of such a wire at points which are equidistant from the bar 26 so as to cause said blades to swing around their pivots until their cutting edges meet, and thereby sever the insulation located at one side of said

blades from that located at the other side thereof.

It is evident that if these blades were to catch in the surface of the insulation of the wire at points which were not diametrically opposite, or equidistant from the bar 26, the notches produced in said insulation by the approach of the cutting edges would not form a continuous notch around the wire, but would comprise two substantially semi-circular notches, one of which would be located in advance of the other, along the length of said wire, and would thus not completely sever the insulation located at opposite sides of said blades when the movement of the leading blade was arrested by the bar 26. While a mechanism which so acted might still be employed in some cases for removing the insulation from a wire, in the instances of wires having the thickness of insulation for which such a mechanism is most likely to be employed, the results would not be as neatly and satisfactorily accomplished, and a materially greater amount of energy would be needed to accomplish corresponding results, and in many cases the conductor would be objectionably scored.

While only two notches are shown in each of the blades 21, 21, it is evident that such number of notches can be provided as may be desired, and in any event there should be such number of notches as is needed to make suitable provision for every size, and any special shapes of conductors which it is desired to strip by means of a given mechanism.

It is likewise evident that, if desired, more than two blades may be employed, and that in any event the blades should be of such shape, so mounted, and provided with cutting edges of such form:—that, when the blades are in one position, said cutting edges will snugly inclose a bare conductor of the desired size; that, when in another position, said blades will permit such conductor and its insulating covering of the desired thickness to pass between them: and that, when open to so receive the insulated conductor, the cutting edges will be adapted to so engage the insulating covering, that, if the conductor is drawn through said blades in a certain direction, said cutting edges will so catch in the insulation as to swing said blades on their pivots as to force said edges to cut through the insulation in a plane substantially perpendicular to the length of the conductor.

The operation of this mechanism is as follows:—The frame 20 may be conveniently grasped in one hand of the person using it, or it may be secured in a fixed position, as by holding it in a vise.

Wire of the desired size and diameter of insulation should be passed through the guide-hole suited therefor, by suitably moving the mechanism with relation to a fixed wire, or by moving the wire with relation to the mechanism in cases where the mechanism is held in a fixed position, or by a combination of such movements in cases where neither the mechanism or wire is secured fixed in position. The end of the wire should be thus forced past the blades 21, 21, thereby swinging said blades as shown in Fig. 3, and the portion of the wire from which it is desired to remove the insulation should be caused to project past said blades in the direction of the plate 29.

Assuming that such a wire 34 is thus inserted through the guide-hole 28, it is evident that said hole will serve to guide the end of said wire into the large end of the conical opening 25 formed by the tapered recesses 225, and that, as such wire passes between said blades, the springs 31 will act through the screws 30 and the plate 29 to cause the sides of the conical notches 125 to press against the sides of said wire and thereby maintain said wire in concentric relation with said notches, and the cutting edges surrounding said notches will be kept in firm engagement with the insulation of said wire at diametrically opposite sides thereof. When a wire has been thus inserted the various parts will occupy the positions shown in Fig. 3. If a wire is similarly inserted through hole 27 and opening 24, such wire will be similarly guided and engaged.

When a wire is positioned for stripping, as just described, (see Fig. 3) it may be stripped by pulling on the end of said wire which projects outside of the bar 26, or by moving the mechanism along the wire in the direction of the end of the wire which projects through or outside of the plate 29. Such relative movement of the wire and stripping mechanism will first result in causing the blades 21, 21 to swing around their pivots until their further movement is obstructed by the bar 26, whereupon said blades will occupy the relative positions shown by Fig. 3, and the cutting edges of said blades will have severed the insulating covering and will snugly inclose the conductor. It is evident that further similar movement will draw through the opening 25 the portion of the conductor which extends from the blades 21, 21 through or outside the plate 29 while preventing the insulation of that portion of the wire from passing said blades.

From the foregoing it will be evident that insulated wires may be rapidly and effectively cleaned by means of the stripping mechanism shown and described, that but one hand of the operator need be occupied to accomplish such stripping, and that, so long as the intended relative movements of the wire and stripping mechanism are suc-

cessively obtained, wires may be stripped with uniform efficiency, without danger of scoring the conductor, and without danger of failing to fully and effectively remove the insulation from the portion of the wire upon which this mechanism acts, on account of any fatigue of the user.

When the wire is inserted between the blades, as just described, the movement of the surface of such wire across the cutting edges of the blades tends to sharpen the portion of said cutting edge employed in stripping insulation from such wire. Therefore this mechanism is self-sharpening to a large extent.

If the cutting edges are substantially shortened, as from long continued use and repeated sharpening, so that said cutting edges fail to substantially meet, the portion of the side of said blades which normally rests against the stop should be cut away, as by grinding them, or the stop itself should be cut or moved away, so as to permit sufficient additional swing of the blades so that their cutting edges may effectively meet.

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

1. In a stripping mechanism comprising suitable supporting structure,—stripping members carried by said structure and hinged or pivoted for convergent and divergent swing along the length of objects to be stripped, means for limiting the convergent swing of said members, and a piece movable along the length of objects to be stripped in the path of said members to yieldingly oppose and equalize the divergent swing thereof.

2. In a stripping mechanism comprising suitable supporting structure,—stripping members carried by said structure and hinged or pivoted for convergent and divergent swing along the length of objects to be stripped, means for limiting the convergent swing of said members, a movable piece disposed in the path of the divergent swing of said members, and means yieldingly urging said movable piece toward said members.

3. In a stripping mechanism comprising suitable supporting structure:—stripping members having cutting edges so abutting that they may inclose an opening therebetween, said members being carried by said structure and so hinged or pivoted as to be convergently or divergently swung, respectively, by lengthwise movement in one direction or the other therebetween of objects to be stripped; a stationary piece for suitably limiting the convergent swing of said members; a piece movable in one direction by the divergent swing of any blade; and means for yieldingly urging said movable piece in the opposite direction.

4. In a stripping mechanism comprising suitable supporting structure:—stripping members suitably mounted in said structure for convergent and divergent movement along the length of objects to be stripped, and having cutting edges which may be abuttingly disposed by the convergent movement thereof to inclose an opening therebetween; and guide pieces on opposite sides of and in close proximity to said members, and having openings therethrough coaxial with the opening inclosed by the cutting edges of said members.

5. In a stripping mechanism comprising suitable supporting structure:—stripping members suitably mounted in said structure for convergent and divergent movement along the length of objects to be stripped, and having notched cutting edges which may be abuttingly disposed to present tapering openings by the convergent movement thereof; and guide pieces on opposite sides of and in close proximity to said members, and having openings therethrough coaxial with said tapered openings.

6. In a stripping mechanism comprising suitable supporting structure:—stripping members suitably mounted in said structure for convergent and divergent movement along the length of objects to be stripped, and having cutting edges which may be abuttingly disposed by the convergent movement thereof to inclose an opening therebetween; and guide pieces on opposite sides of and in close proximity to said members, and having openings therethrough coaxial with the opening inclosed by the cutting edges of said members, one of said guide pieces being movable along the axis of the opening therethrough.

7. In a stripping mechanism comprising suitable supporting structure:—stripping members suitably mounted in said structure for convergent and divergent movement along the length of objects to be stripped, and having notched cutting edges which may be abuttingly disposed to present tapering openings by the convergent movement thereof; and guide pieces on opposite sides of and in close proximity to said members; and having openings therethrough coaxial with said tapered openings, one of said guide pieces being movable along the axis of the opening therethrough.

8. In a stripping mechanism comprising suitable supporting structure;—stripping members suitably mounted in said structure for convergent and divergent movement along the length of objects to be stripped, and having cutting edges which may be abuttingly disposed by the convergent movement thereof to inclose an opening therebetween; guide pieces on opposite sides of and in close proximity to said members, and having openings therethrough substantially coaxial with the opening inclosed by the cut-

ting edges of said members, one of said pieces being movable along the axis of the opening therethrough; and means yieldingly urging said movable piece toward the stripping members.

9. In a stripping mechanism comprising suitable supporting structure:—stripping members suitably mounted in said structure for convergent and divergent movement along the length of objects to be stripped, and having notched cutting edges which may be abuttingly disposed to present tapering openings by the convergent movement thereof; guide pieces on opposite sides of and in close proximity to said members, and having openings therethrough substantially coaxial with said tapering openings, one of said pieces being movable along the axis of the opening therethrough; and means yieldingly urging said movable piece toward said stripping members.

10. In a stripping mechanism comprising suitable supporting structure,—stripping members carried by said structure and hinged or pivoted for convergent and divergent swing along the length of objects to be stripped, a stationary piece disposed in the path of the convergent swing of said members and so formed as to serve as a guide for the insertion of unstripped objects therebetween, a movable piece disposed in the path of the divergent swing of said members, and means yieldingly urging said movable piece toward the stripping members.

11. In a stripping mechanism comprising suitable supporting structure,—stripping members carried by said structure and hinged or pivoted for convergent and divergent swing along the length of objects to be stripped, a stationary piece disposed in the path of the convergent swing of said members, a movable piece disposed in the path of the divergent swing of said members, said pieces having openings therethrough to suitably guide unstripped objects passing between said members, and means for yieldingly urging said movable piece toward the stripping members.

12. In a stripping mechanism comprising suitable supporting structure,—stripping members carried by said structure and hinged or pivoted for convergent and divergent swing along the length of objects to be stripped, a stationary piece disposed in the path of the convergent swing of said members and so formed as to serve as a guide for the insertion of unstripped objects therebetween, a piece movable along the length of objects to be stripped and disposed in the path of the divergent swing of said members, and means for yieldingly urging said movable piece toward the stripping members.

13. In a stripping mechanism comprising suitable supporting structure,—stripping members carried by said structure and hinged or pivoted for convergent and divergent swing along the length of objects to be stripped, a stationary piece disposed in the path of the convergent swing of said members, a piece movable along the length of objects to be stripped and disposed in the path of the divergent swing of said members, said pieces being so formed as to suitably guide unstripped objects passing between said members, and means for yieldingly urging said movable piece toward the stripping members.

14. In a stripping mechanism comprising suitable supporting structure,—stripping members carried by said structure and hinged or pivoted for convergent and divergent swing along the length of objects to be stripped, and having abutting notched cutting edges the notches presenting tapering recesses and openings, a bar disposed in the path of the convergent swing of said members and having an opening therethrough to guide objects to be stripped into the recesses in the edges of said members, a movable piece disposed in the path of the divergent swing of said members, and means for yieldingly urging said movable piece toward said members.

15. In a stripping mechanism comprising suitable supporting structure,—stripping members having cutting edges so abutting that they may inclose an opening therebetween, said members being carried by said structure and so hinged or pivoted as to be convergently or divergently swung, respectively, by lengthwise movement in one direction or the other therebetween of objects to be stripped, a stationary piece for suitably limiting the convergent swing of said members, a piece movable in one direction by the divergent swing of any blade, and means for yieldingly urging said movable piece in the opposite direction, said pieces being so formed as to suitably guide the lengthwise movement of objects to be stripped with relation to the stripping members.

16. In a stripping mechanism comprising suitable supporting structure:—stripping members having cutting edges along one side of adjacent ends thereof to inclose an opening therebetween, said members being carried by said structure and so hinged or pivoted as to be convergently or divergently swung, respectively, by lengthwise movement in one direction or the other therebetween of objects to be stripped; a piece yieldingly mounted on the cutting side of said blades and movable along the axis of the opening therebetween; means for yieldingly urging said movable piece toward said members; and a stationary piece on the other side of said members and in the path of the convergent swing thereof; said movable and

stationary pieces having guide openings therethrough for objects to be stripped, said openings being disposed in coaxial relation with one another and with the opening inclosed by the cutting edges of the stripping members.

17. In a wire stripping device,—a frame plate having an opening therethrough, blades hinged or pivoted therein at their remote edges on axes parallel to opposite sides of the frame plate, and having abutting notched cutting edges the notches presenting tapering recesses and openings, a piece yieldingly mounted on the cutting side of said blades and movable in a line perpendicular to the frame plate, spring mechanism urging said piece toward the stripping blades, and a bar secured to the other side of the frame plate and having openings through it to guide wires to be stripped into the recesses in the edges of said blades.

18. In a wire stripping device,—a frame plate having an opening therethrough, blades hinged or pivoted therein at their remote edges on axes parallel to the opposite sides of said frame plate, and having abutting cutting edges along one side of the free ends thereof, a piece yieldingly mounted on the cutting side of said blades and movable in a line perpendicular to the frame plate, spring mechanism urging said piece toward the stripping blades, and a bar secured to the other side of the frame plate and having an opening through it to suitably guide wires to be stripped.

19. In a stripping mechanism; the combination of a frame structure comprising a guide for objects to be stripped, and blades hinged or pivoted for convergent swing toward and into contact with said guide and for divergent swing away from said guide.

20. In a stripping mechanism; the combination of a frame structure comprising a guide for objects to be stripped, blades hinged or pivoted for convergent swing toward and into contact with said guide and for divergent swing away from said guide, respectively, by lengthwise movement in one direction or the other therebetween of objects to be stripped.

21. In a stripping mechanism; the combination of a frame structure comprising a guide for objects to be stripped, and stripping members hinged or pivoted for convergent swing toward and into contact with said guide and for divergent swing away from said guide, and having cutting edges along the side of the adjacent ends thereof remote from said guide.

In witness whereof, I hereunto subscribe my name, this 27th day of November, A. D. 1916.

WILLIAM L. SILVERNAIL.