Oct. 26, 1948. H. L. KITSELMAN 2,452,474

SERVING TOOL

Filed Dec. 29, 1944

Fig. 7.

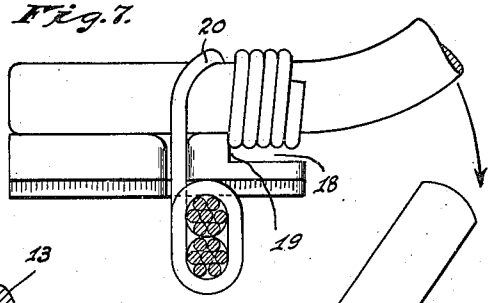


Fig. 3.

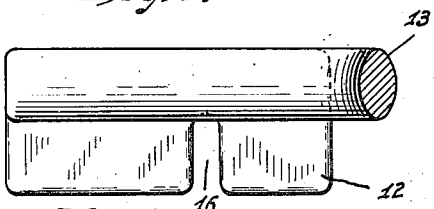


Fig. 4.

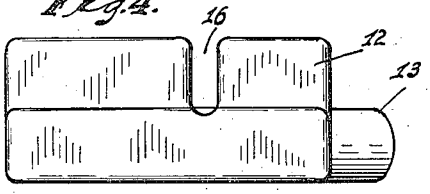
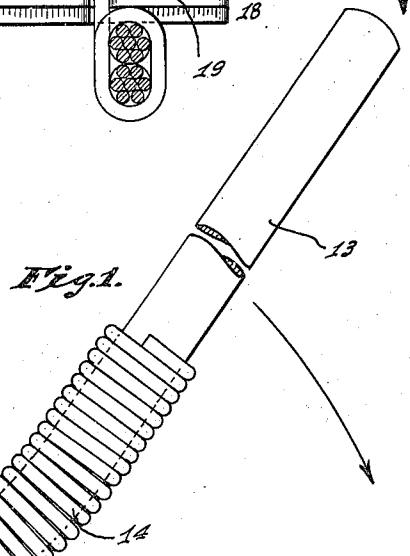


Fig. 1.



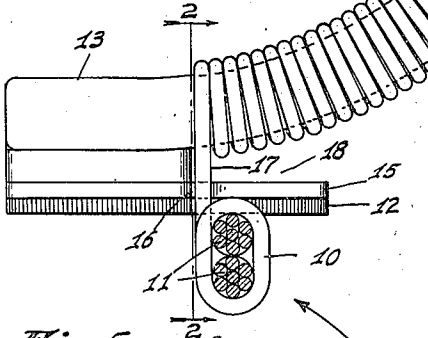


Fig. 2.

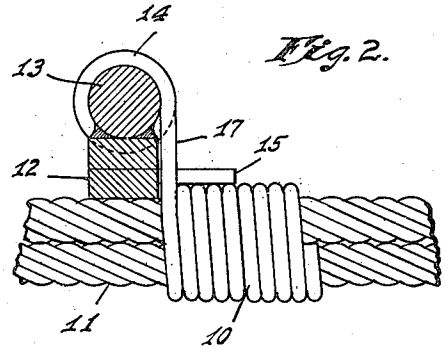


Fig. 5.

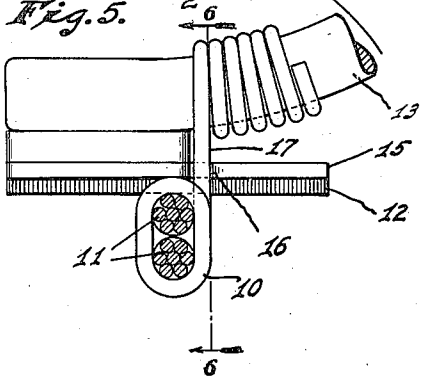
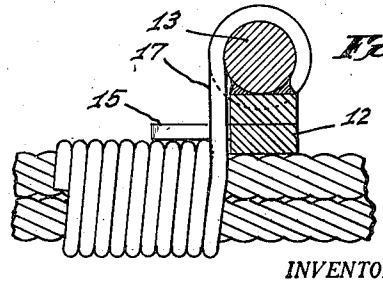


Fig. 6.



INVENTOR.
HARRY L. KITSELMAN,
BY
ATTORNEYS.

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SERVING TOOL

Harry L. Kitselman, Muncie, Ind., assignor to Indiana Steel & Wire Company, Muncie, Ind., a corporation of Indiana

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7 Claims. (Cl. 140—124)

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It is the object of my invention to produce a simple and inexpensive serving tool which can be used to wrap a wire tightly about another wire or about a group of other wires or cables. A further object of my invention is to produce a tool which will be adapted without modification to apply either a right-hand or left-hand wrap. Another object of my invention is to produce a serving means including a compact supply of serving wire and a support for holding such supply in proper relation to the object or objects being served.

My improved serving tool in its preferred form comprises a shoe adapted to rest on the article to be served as the tool is rotated therearound, a support for the supply of wire which is to form the wrap, and a guide for guiding the wire as it is fed to the wrap. The wire supply carried by the tool is in the form of a helical coil and is mounted directly upon the support, which is rigid with the shoe and extends through the supply coil. The tightness of the wrap produced by a serving tool will depend upon the tension maintained in the wire as it is wrapped about the article being served, and such tension will in turn depend both upon the effort required to straighten the wire in the supply coil and upon the friction which opposes feeding of the wire to the wrap. The effort required to straighten the wire will increase as the diameter of the supply coil decreases; and by making the supply coil of relatively small diameter any friction which must be imposed on the wire in order to obtain a tight wrap can be kept well below a value obtainable only by pressures which would damage the surface or coating of the wire.

The accompanying drawing illustrates my invention: Fig. 1 is a side elevation of the serving tool applying a right-hand wrap to a pair of juxtaposed cables or wires; Fig. 2 is a section on the line 2—2 of Fig. 1; Figs. 3 and 4 are top and bottom plan views respectively of the end of the serving tool; Figs. 5 and 6 are a fragmental side elevation and a section, respectively, showing the tool as used in applying a left-hand wrap; and Fig. 7 is a fragmental view similar to Fig. 1 illustrating a modified construction.

My serving means is perhaps best described by reference to Figs. 1 and 2 in which it is illustrated in the process of applying a wire-wrap 10 about a pair of juxtaposed parallel cables or rods 11. The tool comprises an elongated shoe 12 adapted to extend transversely of the rods or cables 11. To the top of this shoe there is secured an elongated rod 13 of circular cross-section disposed to

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lie in a plane generally normal to the cables being served and adapted to be received within a single-layer, helically wound coil 14 of the wire which is to form the wrap 10. The shoe 12 is provided with a longitudinally extending, laterally projecting flange 15 having in its outer edge a notch 16 adapted to receive a generally straight stretch 17 of wire passing from the supply coil 14 to the wrap 10. Desirably, the flange 15 is spaced above the bottom of the shoe 12 a distance substantially equal to the diameter of the wire in the coil 14, so that as the tool is rotated about the cables 11 the lower surface of the shoe 12 will rest upon such cables while the flange 15 will overlie and rest upon the wrap 10.

Each supply-coil 14 provided for use with my tool is desirably formed with one end of the wire constituting it projecting in a straight stretch from one end of the coil as the wire-stretch 17 projects in Figs. 1 and 2. In putting a supply coil on the tool, the end of the coil with the projecting wire is applied first over the outer end of the rod 13, the coil is slid along the rod until it reaches the shoe 15, and is then rotated to bring the projecting wire-end into the notch 16. The wire-end projecting beneath the shoe 12 is secured to the cables 11 in any convenient way and, with the shoe 15 resting upon the cables, the tool is rotated about the cables. If the cables 11 are located in rear of the notch 16, as indicated in Fig. 1, the tool will be rotated in the direction of the arrow in that figure and a right-hand wrap will be produced. If a left-hand wrap is desired, the tool is disposed so that the cables 11 will be in front of the notch 16 and the tool is rotated in the opposite direction, as indicated in Figs. 5 and 6.

It will be apparent that as the wire is fed from the supply coil 14 on the tool to the wrap 10 the supply coil 14 will rotate on its support 13 and that the friction opposing such rotation of the coil will tend to create tension in the straight stretch of wire 17 being fed from the coil. By far the greater part of the tension existing in the straight stretch 17 of wire, however, results from the effort required to straighten the wire from the bent condition existing in the supply coil. For a given diameter of serving wire, the wire straightening effort required will vary in a sense opposite to that in which the diameter of the supply coil 14 varies, and by making this coil small enough, I am enabled to insure in the straight stretch 17 of wire a tension great enough to provide the desired tight wrap. For best re-

sults, the internal diameter of the supply coil 14 should not exceed ten times the diameter of the wire of which it is formed.

To increase friction between the coil 14 and the support 13, the support 13 may be curved for a portion of its length rearwardly from its point of attachment to the shoe 15. As a result of the curvature of the support the supply coil 14 will be elastically distorted and will bear against the surface of the support in a manner which will create friction opposing coil-rotation. The use of a curved support 13 results in the additional advantage that the supply coil will not slip from the support accidentally when the tool is not in use.

It will be noted that any frictional drag imposed upon the coil at a point in rear of its front end will necessarily be overcome by torque transmitted through the intervening turns and that this torque will be in a direction tending to reduce the diameter of the coil. If this torque should be great enough to cause coil-turns to collapse and grip the support 13, the tool would not operate satisfactorily; for the coil would then seize the support and would not rotate thereon. I therefore make the inner diameter of the coil sufficiently greater than the diameter of the support to insure that the torque transmitted through successive turns of the coil in overcoming frictional resistance will not be great enough to collapse the turns of the coil into gripping engagement with the support. If the wire forming the coil 14 possesses no less resilience than that of ordinary mild steel wire, and if the support 13 is one-half inch in diameter, 0.015 to 0.020 inch clearance between the coil and rod will be adequate in the case of wires of guage No. 14 and larger.

In the tool shown in Figs. 1 to 6 inclusive, the upper rear portion of the shoe 15 is relieved, as indicated at 18, to a point adjacent the notch 16 to provide beneath the support 13 clearance for the front end of the coil 14, and thus the only friction opposing rotation of the coil will be that between the coil and the support 13. Where the wire leaves the body of the coil 14 in a plane substantially normal to the axis of the adjacent coil-turn, the wire-stretch 17 will not bear heavily against the sides of the notch 16, and the chief function of such notch will be to locate the coil along the support.

Increased tension in the wire-stretch 17 may be secured if, as indicated in Fig. 7, the relief 18 terminates in rear of the notch 16 to leave a shoulder 19 against which the front end of the coil 14 bears. In such a construction the last half-turn or so of wire on the support 13 will occupy a helical path of relatively long pitch, as indicated at 20 in Fig. 7.

There are several reasons for the fact that the presence of the shoulder 19 increases tension in the wire-stretch 17. In the first place, by increasing the pitch of the half-turn 20, the shoulder 19 increases the axial component and decreases the circumferential component of tension in that half-turn. The substantial axial component draws the coil against the shoulder, thus increasing the frictional resistance to coil rotation; and since the circumferential component of tension in the half-turn 20 is reduced, tension in such stretch is less effective in rotating the coil against frictional resistance. Further, because the shoulder 19 limits the approach of the supply coil to the notch 16, the wire-stretch 17 is drawn against the side of such notch to increase the frictional resistance exerted upon the stretch 17 as it feeds to the wrap.

It is to be noted that the axis of the supply coil lies in a plane generally normal to the axis of the wrap 10. As a result, the wire in the wrap 10 is bent in a plane which, with reference to the axis of the wire, is at a substantial angle to the plane in which the wire of the supply coil is bent. This fact contributes to the production of a tight wrap.

The flange 15 is of benefit in obtaining a close spacing of the turns of the wrap 10. In the absence of the flange, tension in the wire-stretch 17 and the reaction of the object being served upon the shoe would constitute a force-couple tending to rotate the tool into a position which would result in spacing the turns of the wrap. However, with the flange 15 bearing on the wrap this tendency is effectively resisted and it is easy for the operator to maintain the tool in the position which will produce a close-wound wrap.

I claim as my invention:

1. In a serving means for securing together a plurality of elongated articles in juxtaposed relationship, said means comprising a supply of wire in the form of a close-wound helical coil from one end of which there projects in a plane substantially normal to the coil a generally straight stretch of wire adapted to be secured to said articles, the internal diameter of said coil being less than ten times the diameter of the wire composing it, an elongated support disposed within and frictionally engaging said coil, means for locating along said support that end of said coil from which said generally straight stretch extends, said means comprising an abutment having a coil-engaging surface generally normal to the coil-axis, and a shoe mounted at one side of said support adjacent the generally straight stretch of wire extending from said coil and adapted to engage said articles as the support and shoe are rotated thereabout, said serving means being free of any wire-deforming provisions engaging said straight stretch of wire.

2. In a serving means for securing together a plurality of elongated articles in juxtaposed relationship, said means comprising a supply of wire in the form of a close-wound helical coil from one end of which there projects in a plane substantially normal to the coil a generally straight stretch of wire adapted to be secured to said articles, an elongated support disposed within and frictionally engaging said coil, means for locating along said support that end of said coil from which said generally straight stretch extends, said means comprising an abutment having a coil-engaging surface generally normal to the coil-axis, and a shoe mounted at one side of said support adjacent the generally straight stretch of wire extending from said coil and adapted to engage said articles as the support and shoe are rotated thereabout, said serving means being free of any wire-deforming provisions engaging said straight stretch of wire.

3. In a serving means for securing together a plurality of elongated articles in juxtaposed relationship, said means comprising a supply of wire in the form of a close-wound helical coil from one end of which there projects in a plane substantially normal to the coil a generally straight stretch of wire adapted to be secured to said articles, the internal diameter of said coil being less than ten times the diameter of the wire composing it, an elongated support disposed

within and frictionally engaging said coil, and means for locating along said support that end of said coil from which said generally straight stretch extends, said serving means being free of any wire-deforming provisions engaging said straight stretch of wire.

4. In a serving means for securing together a plurality of elongated articles in juxtaposed relationship, said means comprising a supply of wire in the form of a close-wound helical coil from one end of which there projects in a plane substantially normal to the coil a generally straight stretch of wire adapted to be secured to said articles, an elongated support disposed within and frictionally engaging said coil, and means for locating along said support that end of said coil from which said generally straight stretch extends, said serving means being free of any wire-deforming provisions engaging said straight stretch of wire.

5. In combination, a close-wound helical coil of wire, and a support disposed within said coil and projecting beyond one end thereof to be supported from an object about which the wire is to be wrapped, said support within that portion of its length occupied by said coil being curved to an extent sufficient to produce a substantial elastic deformation of the coil.

6. In a serving tool, an elongated support adapted to be slidably received within and to support a single-layer, close-wound coil of wire, a shoe rigidly mounted on said support in laterally offset relation thereto to engage an object to be served and to hold the support spaced from such object as it is rotated thereabout while disposed in a plane generally normal to the object, and wire-guiding means carried by said shoe for receiving a stretch of wire extending from one end of the coil and thence about the object to be served, said wire-guiding means providing a substantially straight path for said wire-stretch from the point at which it leaves the support to the point at which it engages the object, whereby friction between the coil and support and the effort required to deform the wire from coiled to straightened condition as it leaves the support constitute substantially the only factors opposing the feeding of wire from the tool.

7. In a serving tool, an elongated support adapted to be slidably received within and to support a single-layer, close-wound coil of wire, a shoe rigidly mounted on said support in laterally offset relation thereto to engage an object to be served and to hold the support spaced from such object as it is rotated thereabout while disposed in a plane generally normal to the object, and wire-guiding means carried by said shoe for receiving a stretch of wire extending from one end of the coil and thence about the object to be served, said wire-guiding means providing a substantially straight path for said wire-stretch from the point at which it leaves the support to the point at which it engages the object, whereby friction between the coil and support and the effort required to deform the wire from coiled to straightened condition as it leaves the support constitute substantially the only factors opposing the feeding of wire from the tool, said shoe being provided along one edge with a laterally projecting flange spaced upwardly from the bottom surface of the shoe, said wire-guiding means comprising a notch in the outer edge of said flange.

HARRY L. KITSELMAN.

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