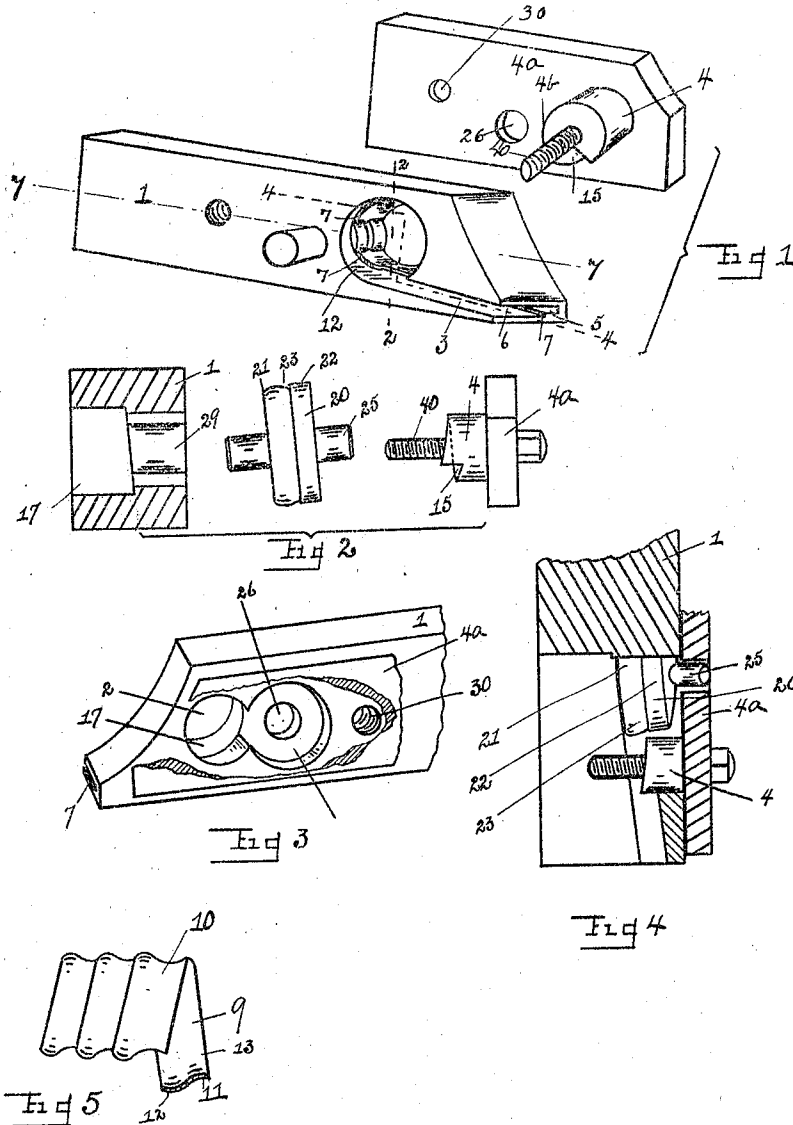


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2 SHEETS—SHEET 1.



WITNESSES:

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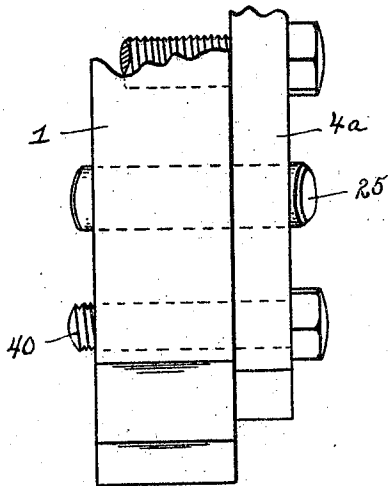


Fig 6

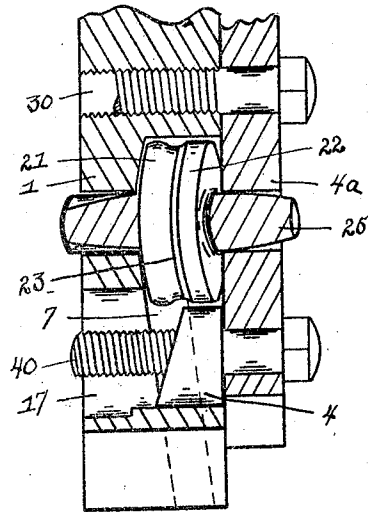


Fig 7

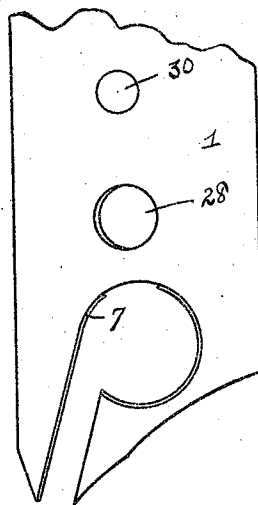


Fig 8

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UNITED STATES PATENT OFFICE

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PROCESS OF FORMING A SPIRALLY-WOUND TUBE.

1,046,851.

Specification of Letters Patent.

Patented Dec. 10, 1912.

Application filed December 6, 1909. Serial No. 531,479.

To all whom it may concern:

Be it known that I, CHARLES T. PRATT, a citizen of the United States, residing at Frankfort, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Processes of Forming a Spirally-Wound Tube, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to an improvement in the process of forming a spirally wound tube, and I declare that the following is a full, clear, concise and exact description thereof, sufficient to enable one skilled in the art to make and use the same, reference being had to the accompanying drawings in which like reference characters refer to like parts throughout.

In the manufacture of such tubing, either in the form to produce a tube or to form an armor about a cable, a strip is wound spirally with overlapping coils. Such strips are sometimes given an S-shape in cross section so that when wound one edge will be of smaller diameter than the other so that the succeeding coil will overlap the former. In the straight strip or ribbon of such metal, with any variety of form in cross section, one edge is of equal length with the other; and if the strip be wound in a spiral with one edge overlapping another the product will not be of the same diameter from end to end. In other words, it is necessary that the edge which is to be covered by the overlapping and succeeding edge should be reduced or contracted.

The device which I illustrate in the accompanying drawings is one which is suitable for use in reducing one edge of the metallic strip or ribbon as it is fed through the machine.

In the drawings Figure 1 shows the parts which make up the die of such machine, the view being perspective from one side and the parts being separated. Fig. 2 is a vertical sectional view of the die on the line 2—2 of Fig. 1, the grooving-wheel and stud being removed and shown in full lines. Fig. 3 is a perspective view from the side opposite to that given in Fig. 1, with parts broken away. Fig. 4 is a sectional view on the line 4—4 of Fig. 1. Fig. 5 shows a portion of the ribbon and the coil. Fig. 6 is a fragmentary plan view, somewhat en-

larged of the die; Fig. 7, is a section enlarged taken on line 7—7 of Fig. 1, parts shown in full; Fig. 8 is a fragmentary view in side elevation of the die.

It will be understood that this die may be used in any suitable machine which comprises means for forcing the ribbon into the die. The formation of the die is such that the ribbon fed into it is guided with one edge against the end of the guiding stud whereby as it is pressed through the die it is fed out of the die in spiral form. The die is made of a suitable block 1 with a transverse bore shown at 2 into which opens the guideway shown at 3. The guideway is formed with different levels, shown at 5 and 6, with the shoulder 7 between, which shoulder forms a ridge passing along the guideway and obliquely thereof to the transverse bore and around the same in a continuous spiral wind. A portion of the ribbon 9 and coil 10 produced is shown in Fig. 5. As the ribbon is fed in, the portion which is shown as hollowed, 11, rides on the upper elevation, the lower portion of the guide being formed for the travel of the downwardly or outwardly curved portion 12 of the ribbon. The edge of the ribbon shown at 13 passes along the guideway and contacts with the guiding stud 4 substantially at the point 15. The end of this stud is formed with a spiral bevel corresponding to the spiral of the bore in the die, so that as the ribbon is fed into the die one edge is guided by the end of the stud, the guideway and spiral in the bore and around the same being large enough, as indicated at 17, to allow for the fullness of the ribbon where it has the outward curve and for the greater diameter of the tube between the points where one coil overlaps the other. A coil cannot, however, be formed with spirally wound overlapping folds of an equal diameter throughout unless one edge of the ribbon be bent inwardly. To accomplish this result I provide a wheel 20 having part of its periphery, as at 21, of curved formation, the rest of the periphery being plane, as at 22, a peripheral groove 23 being provided between the two portions into which the edge of the ribbon passes from the guiding stud. This wheel is mounted on a stud 25 which is obliquely supported in the block 1, as in the bore 26, so that the wheel 20 has the same alinement as the spiral twist in the die. It will be under-

stood, of course, that the die is cut out, as at 29, to receive the wheel. The stud 4 is mounted on a block 4^a which is a component part of the block 1 and substantially fills the bore 2 diametrically, leaving space between the wheel 20 and the stud for the passage of the ribbon, the stud being slightly flattened or reduced, as at 4^b, to allow space for the ribbon. The plate or block 4^a is held on the block 1 by bolts or other suitable means.

The ribbon or strip being bent inwardly into the die and being guided by the guides therein is brought with one face, the portion indicated at 11, Fig. 5, to bear against the part 21 of the wheel 20 which, as it revolves, presses constantly against the ribbon along that portion thereof and compresses or bends inwardly portion 11 of said coil whereby the next succeeding spiral overlaps to produce the tube shown in Fig. 5. While the wheel is shown as being of a uniform periphery it may be transversely notched or corrugated so as to effect a series of successive pressures instead of a continuous pressure, without departure from the spirit and scope of the invention which, briefly stated, is the process of coiling a ribbon with its edge overlapping in spirals and bent inwardly on the edge of the ribbon to allow for the overlapping.

The stud 4 is shown as having a bolt 40 and as being slotted with the bolt there-through. This construction is not exclusive of other forms however, for the stud may be shown as of a collar-form axially, leaving enough edge to guide the ribbon but having a bore for the passage of a wire or

cable around which it may be desired to form the armor.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The herein described process of coiling a metallic ribbon upon itself in a tube of uniform diameter, which consists in forcing the ribbon through a die and in its passage therethrough applying pressure thereon so as to bend one edge thereof inwardly, substantially as described.

2. The herein described process of coiling a metallic ribbon upon itself in a tube, which consists of forcing the ribbon through a die and in its passage through applying pressure thereon so as to bend one edge thereof inwardly, the opposite edge of the ribbon being convexed in cross section to overlap the bent edge and compressed into close contact therewith, substantially as described.

3. The herein described process of coiling a metallic ribbon upon itself into a tube which consists in forming the ribbon on its inner face into compound curves in cross-section and bending one edge of the ribbon inwardly for permitting the concaved portion to overlap the inwardly bent portion, substantially as set forth.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CHARLES T. PRATT.

Witnesses:

ELEANOR T. DE GIORGI,
T. L. WILDER.