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PROCESS FOR THE MANUFACTURE OF SHAPED METAL PRODUCTS

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Fig. 1.

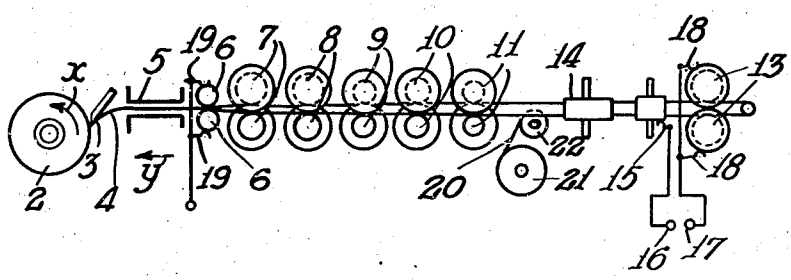
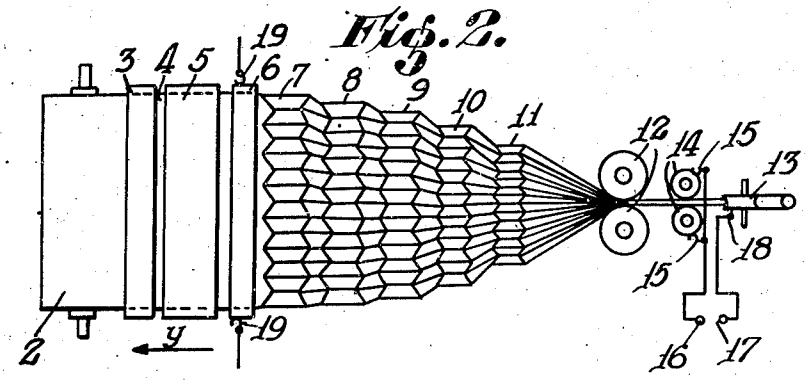


Fig. 2.



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PROCESS FOR THE MANUFACTURE OF SHAPED METAL PRODUCTS

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In Belgium January 19, 1940

2 Claims. (Cl. 29—188)

It is known that shaped metal products, especially shaped metal products of small cross-section, may be produced by a process consisting in working a continuous band, which has been obtained by causing a cylindrical piece to turn in front of a tool which only removes a fraction of the radial thickness of said piece.

In the case where the thickness of a band obtained in the above-mentioned manner could not be sufficiently increased in order to form a relatively thick strip, it has also been proposed to superpose a plurality of such bands and weld them together by hot rolling in order to obtain strip metal.

The present invention has for its object a process which will permit the easy production of a sectional iron of a relatively great thickness from a thin band which may be easily and economically obtained by peeling from the above-mentioned metal piece.

To this end, according to the invention, the band is folded longitudinally, the faces of the formed folds are brought together until they contact and the mass so obtained is rolled so as to form the desired section.

According to a modification adapted to produce a section having greater strength, the body formed by bringing the faces of the folds into contact with each other, is rolled at the welding temperature of the metal so as to weld together the adjacent faces of the folds. This welding of the faces of the folds may be performed, according to the invention, during the period in which the section is formed or after bringing together the faces of the folds.

Preferably, the cut out band is rolled before being folded, in order to make it more malleable. This rolling is especially useful when the folding is carried out cold.

In one useful embodiment, the folding of the cut out band is effected by passing the latter successively through pairs of shaping rollers provided with grooves of generally triangular shape, the width of which decreases as the distance of the rollers to which they belong from the point at which the folding of the band starts increases, the faces of these grooves having moreover the same width whatever may be the shaping roller to which they belong.

Other features and details of the invention will become apparent in the course of the description of the drawing annexed to the present specification and which show diagrammatically and merely by way of example, an installation for performing the process according to the invention.

Figures 1 and 2 illustrate this installation in elevation and in plan view respectively.

The same references have been used in both figures to denote identical elements. A cylindrical piece 2 turns in the direction of the arrow X in front of a tool 3 which may be advanced in the direction of the arrow Y. By means of this tool, a thin strip or band 4 is peeled from the body of the cylinder 2. This band, in spite of its small thickness, has a cross-sectional area substantially equal to that of the section of the shaped metal product it is desired to manufacture. This band is then heated in a furnace 5 before it is rolled between rollers 6.

When it leaves these rollers, the band is folded longitudinally. To this end, it passes successively through pairs of shaping rollers which are provided with grooves of generally triangular form. The successive pairs of shaping rollers are designated 7, 8, 9, 10 and 11. The faces of the grooves in the different pairs all have the same width, but the angle which these faces make with each other varies from one pair of rollers to the next.

As can readily be seen from an inspection of Figure 2, the triangular grooves decrease in width as the distance of the rollers to which they belong from the point at which the folding of the band starts increases. The depth of the grooves obviously varies inversely proportionally to their width as the two faces of the grooves of all the shaping rollers have the same width.

Owing to this special method of folding the band, folds of a constant length are obtained, and transverse drawing of the metal is avoided so that there is no danger of its being torn during the folding, even when the folding is carried out cold.

It is to be noted that it is, however, useful to roll the band before its folding, in order to decrease the brittleness it might have assumed during its cutting or unwinding.

After it has left the last pair of shaping rollers 11, the band passes between two rollers 12, the axis of which is at right angles to the mean plane of the band. The distance between these two rollers is such that the faces of the folds are brought into contact with each other as they pass between these rollers.

After the faces of the folds have been brought together in this manner, the mass which is so obtained is hot rolled between rolling cylinders 13 the profile of which corresponds to that of the

desired section. The axis of these cylinders is at right angles to the plane of the faces of the folds in contact with each other. The heating of the mass which is to be rolled hot is effected, for example, electrically by the Joule effect between rollers 14 and the rolling cylinders 13. The rollers 14 are connected by means of contact members 15 to one of the terminals 16 of a source of current, the other terminal 17 of which is connected by means of contact members 18 to the rolling cylinders 13.

By having been passed hot through the rolling cylinders 13, the faces of the folds in contact with each other are welded together and form a shaped product of the desired section having a great strength. In this manner it is possible to obtain easily wires which can be drawn if desired after their exit from the rolling cylinders 13.

Instead of welding the faces of the folds during the shaping operation of the compacted folded strip as described, the welding may be effected at the end of the compacting operation. In such case, instead of connecting contact members 15 with the rollers 14, contact members 19 are provided, e. g., on the rollers 6, so as to heat the metal to its welding temperature before its passing through the rollers 12. In this manner, during the passage of the folded band through these rollers, the faces of the folds are approached, then brought into contact with each other and finally welded together.

Moreover, by connecting the contact members on the roller 6, the band is heated during its folding, what, in certain cases, makes the latter more easy. The latter arrangement forms strip iron immediately at the exit from the rollers 12 and by connecting the contact members 18 with the rollers 12, it becomes possible to eliminate the rollers 14 and the rolling cylinders 13.

The process as described makes it also possible to produce shaped products constituted of different metals. To this end, a continuous wire of a different metal is placed longitudinally on the band 4. Thus, in the illustrated installation, at the end of the folding operation, when the band 4 issues from the shaping rollers 11, a wire 20 unwound from a reel 21 is forced between the faces of one of the formed folds. For this purpose, a roller 22 presses the wire 20 in one of the folds of the band 4. After shaping by the rolling cylinders 13, a wire is obtained whose core is a metal different from that which forms the rest of the wire. By way of example, it is possible to manufacture in this manner an aluminium wire with a steel core from an aluminum band against which a steel wire is placed during the manufacture. Such products may be utilized, among others, as high voltage cables.

The process according to the present invention makes it possible to obtain in an economical manner small shaped products of great resistances similar to that of the shaped products which are obtained by successive rollings and reheatings. By cutting, e. g., a band 84 millimeters wide and one tenth millimeter thick, a wire of 3.28 millimeters in diameter can be easily manufactured.

If the desired section shaped product need not necessarily be of very great strength, the rolling of the mass formed by bringing together the folds of the band need not be effected at the welding temperature.

What I claim is:

1. A process for the manufacture of sectioned metal products consisting in cutting a continuous thin and wide band having a cross section approximately equal in area to that of the desired product from a cylindrical work piece, folding said band longitudinally into numerous folds, placing longitudinally against the band a continuous wire of a metal different from that of the band, bringing together the faces of consecutive folds until they contact, heating the resulting thicker and narrower strip to welding temperature, and rolling the strip so heated to the desired section.

2. A process for the manufacture of sectioned metal products consisting in cutting a continuous thin and narrow band having a cross section approximately equal in area to that of the desired product from a cylindrical work piece, folding said band longitudinally into numerous folds, placing longitudinally in one of the formed folds a continuous wire of a metal different from that of the band, bringing together the faces of consecutive folds until they contact, heating the resulting thicker and narrower strip to the welding temperature, and rolling the strip so heated to the desired section.

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