

## PATENT SPECIFICATION



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## COMPLETE SPECIFICATION

## An Improved Cycle Chain-Wheel and Method of Making the Same

We, WALTON AND BROWN LIMITED, a Company registered under the laws of Great Britain, and FRANK RANDELLS, British Subject, both of Phoenix Works, 5 Downing Street, Handsworth, Birmingham, 21, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to cycle chain wheels, of that kind which are formed from sheet metal blanks which are joggled or pressed into shallow dished formations, so that the toothed peripheral portion of each wheel is off-set from the main centre part of the latter, to provide a shroud or annular shouldered part adjacent the root-ends of the teeth. The joggling or pressing operation serves to straighten the blank and gives increased strength to the completed wheel, but in chain wheels pressed up from a blank in this manner the outwardly-presented corner or edge of the shroud or annular shouldered portion, that is the corner or edge which is presented outwards when the wheel is on the machine, has hitherto been rounded or radiused, and the absence of a sharp well-defined edge or corner has detracted from the appearance of the wheel and has made it difficult to obtain a uniformly bright surface adjacent the rounded edge during the final polishing operation.

It has been proposed to make cycle chain wheels from mild steel blanks by a rolling operation to produce at the periphery of the blank a sharp-edged shroud or annular shouldered part at the one side of the root-ends of the teeth, and with a laterally-projecting flange at the opposite side. This flange has to be trimmed, and sometimes removed, by a subsequent machining operation and, in addition, machining of the outer face of the shaped blank is necessary, thereby increasing the cost of production.

The object of the present invention is to provide an improved and efficient method of producing a cycle chain wheel of the kind referred to, wherein the shroud or annular shoulder adjacent the

root-ends of the teeth is given a sharp or well-defined edge, and wherein the necessity for subsequent machining operations is avoided.

According to the invention, a method of making a cycle chain wheel consists in pressing or stamping the same from a metal blank by fashioning the blank into a shallow dished formation, to provide a peripheral shouldered portion adjacent an outer off-set flange for forming the teeth of the wheel; pressing an annular groove or annular depression in the inner face of the dished blank adjacent the inside corner of the shrouded or shouldered portion to displace the metal and impart a sharp well-defined edge to the annular shoulder on the outside face of the blank; and forming teeth in the outer flange of the shaped blank. The blank is preferably shaped by a cold-coining operation, the annular groove or annular depression, which imparts a sharp edge to the shouldered portion, being formed simultaneously with the dishing of the blank. The teeth may be formed at a subsequent operation, and the main central portion of the blank may be suitably pierced, and formed with a central aperture to receive the crank-axle, also at a subsequent operation.

Also, according to the invention, a cycle chain wheel of the kind referred to is formed with a pressed-in groove or depression in its inner face, at the inner corner of the shrouded or annular shouldered portion, to displace the metal and impart a sharp or well-defined edge to the annular shoulder on the outside face of the wheel.

Figure 1 of the accompanying drawings is a view of the inner face of part of a cycle chain wheel formed by cold-coining in accordance with this invention, showing the annular groove or depression made during the cold-coining.

Figure 2 shows a view of the opposite or outer face of a portion of the completed wheel.

Figure 3 is a view of the pressed blank, before it has been pierced and before the teeth have been formed, showing the annular groove left by the cold-coining

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to displace the metal of the blank.

Figure 4 represents a section through the pressed blank shown in the preceding Figure.

5 Figure 5 is a section through a part of the said blank upon a larger scale, showing clearly the sharp shoulder left on the outer face of the blank.

Figure 6 represents a section through 10 the completed wheel.

Figure 7 is a section through a pressed blank as previously formed.

Referring to the drawings, the improved cycle chain wheel 1 is formed by 15 a pressing or stamping operation from a steel blank 1<sup>a</sup> which is fashioned into a shallow dished form to provide an annular shouldered part or shroud 2 which lies adjacent the root-ends of the chain-teeth 20 3 of the completed wheel, the teeth 3 being subsequently cut from an annular flange 3<sup>a</sup> off-set from the body of the blank. Hitherto, in chain wheels formed

25 by a pressing operation the blank, after being dished or joggled, has assumed more or less the form shown in Figure 7, and it will be seen from this Figure that the annular shoulder or shroud 4 is of a rounded form, which not only detracts 30 from the appearance of the completed wheel but which, as previously stated, makes it difficult to give the wheel a uniformly polished surface. By the present invention this rounded shape of the 35 shoulder or shroud 4 is avoided, and the shoulder or shroud 2 is given a sharp well-defined, square edge 2<sup>a</sup>, as shown in Figures 4 to 6. The said shoulder or shroud 2 is disposed on the outer face of

40 the completed wheel, the opposite or dished face being presented towards the machine when the wheel is attached to the latter, and in order to impart the sharp outer edge 2<sup>a</sup> to the shoulder or 45 shroud 2 an annular groove 5 (see Figure 5) is formed during the pressing operation, in the inner face of the dished blank, so as to lie adjacent the inside corner of the shrouded or shouldered portion 2.

50 This annular groove 5, and the dishing or joggling of the blank, are formed simultaneously during a single operation by a cold-coining process, and the pressure exerted to form the groove 5 is such that 55 the metal is displaced and is caused, by the shape of the dies, to flow towards the outer corner of the annular shoulder or shroud 2 produced by the dishing of the blank, the dies being such that the displaced metal imparts to the shoulder the 60 sharp, square outer edge 2<sup>a</sup> shown in the drawings, the said edge being similar to that which has hitherto been produced only by rolling and machining operations. 65 Not only is the blank dished or

joggled and formed with the annular groove and sharp-edged shoulder at one operation whilst the steel blank is in a cold state, but the dies are shaped so that the annular flange 3<sup>a</sup>, which serves to 70 form the teeth 3 of the completed wheel, is pressed by the cold-coining to the required tapering profile, shown in Figure 5, at the same operation, whereas previously the flange of the dished or joggled 75 blank has been left with a square edge, as shown in Figure 7. After the cold-coining operation the blank assumes the form shown in Figures 3 and 4 of the drawings, and it is then only necessary to 80 cut the teeth from the flange 3<sup>a</sup>, and to pierce the main part of the blank with the usual central aperture 6 for the crank-shaft, and with apertures, such as 7, according to the design required. No 85 machining of the sides of the wheel is necessary.

The annular groove which is formed around the inside corner of the shouldered portion or shroud may be of any 90 other cross-sectional shape, and may be of any desired width, provided it serves to displace the metal and to produce a shouldered portion having a sharp or 95 well-defined outer edge.

Although it is preferred to form the cycle chain wheel by cold-coining, it may be pressed to shape whilst in a hot state, if desired.

Having now particularly described and 100 ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. The method of making a cycle chain 105 wheel by pressing or stamping the same from a metal blank, by fashioning the blank into a shallow dished formation, to provide a peripheral shouldered portion adjacent an outer off-set flange for forming 110 the teeth of the wheel; pressing an annular groove or annular depression in the inner face of the dished blank adjacent the inside corner of the shouldered portion to displace the metal and 115 impart a sharp well-defined edge to the annular shoulder on the outside face of the blank; and forming teeth in the outer flange of the shaped blank.

2. The method of making a cycle 120 chain wheel, as claimed in claim 1, wherein the blank is shaped by a cold-coining operation, the annular groove or annular depression, which imparts a sharp edge to the shouldered portion, being formed 125 simultaneously with the dishing of the blank.

3. The method of making a cycle chain wheel, as claimed in claim 1, wherein the blank is shaped by a cold-coining 130

- operation, the annular groove or annular depression being formed simultaneously with the dishing of the blank, and the outer off-set flange being pressed simultaneously to the required cross-sectional profile for the forming of the teeth of the wheel.
4. A cycle chain wheel of the kind referred to, formed with a pressed-in groove or depression in its inner face, at the inner corner of the shrouded or annular shouldered portion, to displace the metal and impart a sharp or well-defined edge to the annular shoulder on the outside face of the wheel. 15
5. The method of forming a cycle chain wheel as herein described.
6. A cycle chain wheel substantially as herein described with reference to the accompanying drawings. 20

Dated this 22nd day of February, 1945.

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[This Drawing is a reproduction of the Original on a reduced scale.]

