April 4, 1950 F. MELEY ET AL 2,502,737

METHOD FOR FORGING CONNECTING RODS

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Fig. 1

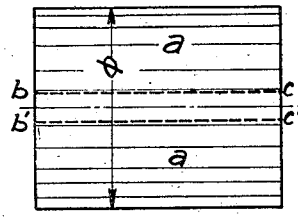


Fig. 2

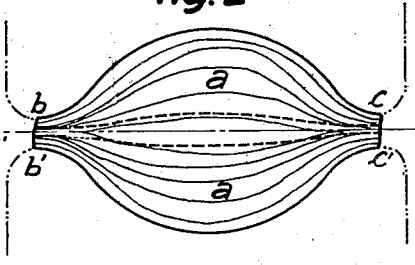


Fig. 3

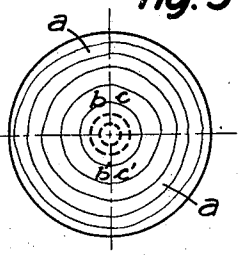


Fig. 4

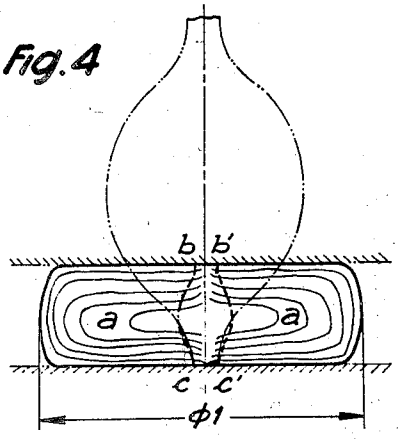


Fig. 7

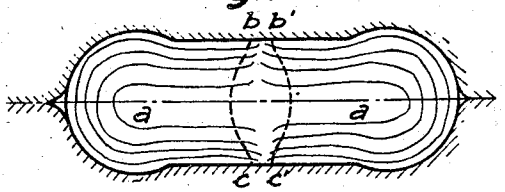


Fig. 8

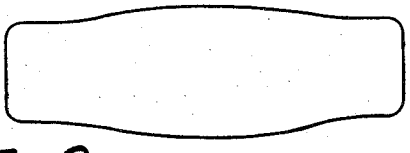


Fig. 9

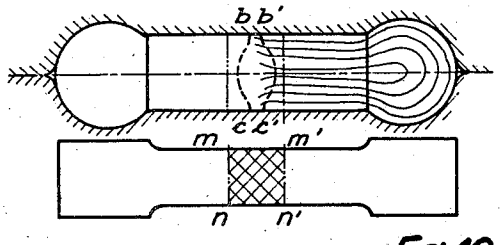


Fig. 10

Fig. 5

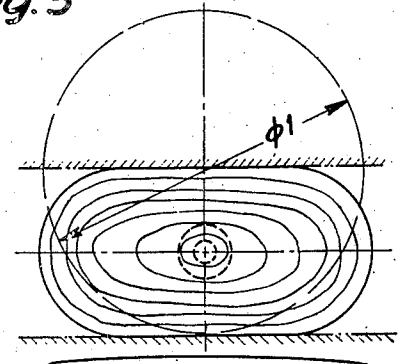


Fig. 6

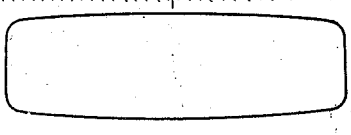


Fig. 11

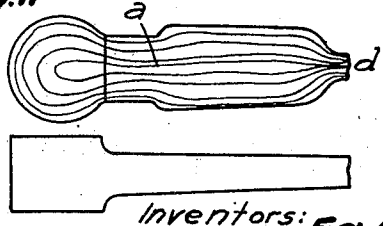


Fig. 12

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Fig. 13

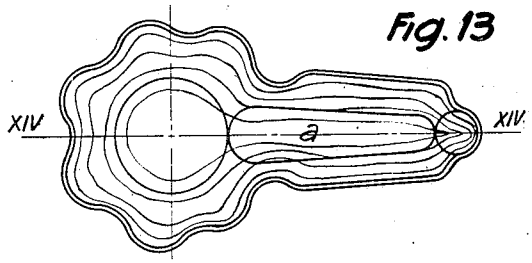


Fig. 14

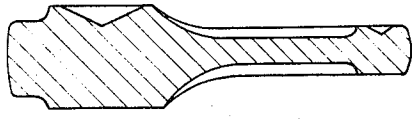


Fig. 15

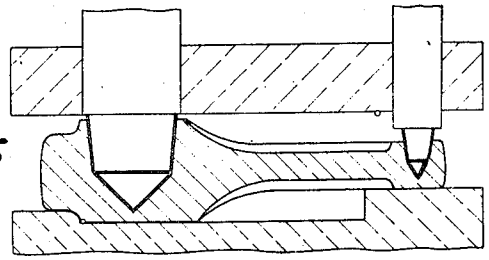


Fig. 16

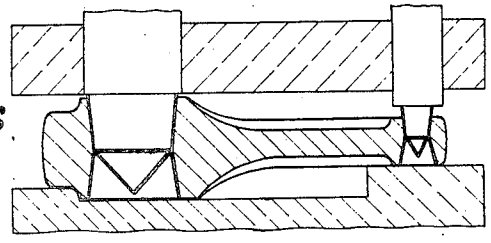
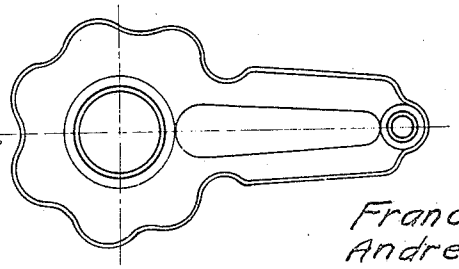


Fig. 17



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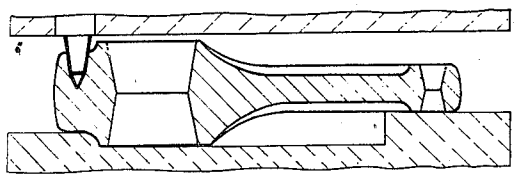
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Attorney

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METHOD FOR FORGING CONNECTING RODS

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Fig. 18



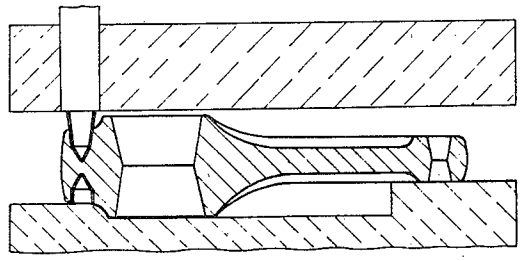


Fig. 19

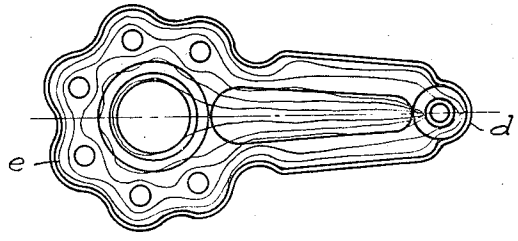


Fig. 20

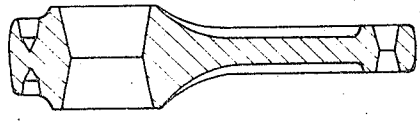


Fig. 21

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Patented Apr. 4, 1950 2,502,737

UNITED STATES PATENT OFFICE

2,502,737

METHOD FOR FORGING CONNECTING RODS

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Application June 19, 1945, Serial No. 600,377
In France November 2, 1944

1 Claim. (Cl. 29—156.5)

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Our invention has for its object a method for manufacturing forged connecting bars having an integral fibre formation.

In accordance with said method we start from a blank having itself a proper fibrous constitution as obtained in accordance with the teachings of the copending U. S. patent application Ser. No. 600,375, filed June 19, 1945, for "Method of forging blanks."

Operating according to said teachings, we obtain starting from a section of ingot or bar, two blanks wherein the less sound parts corresponding to the axial zone of the ingot or bar have been eliminated.

The method according to the present invention consists in plastically deforming the metal of these blanks in a manner such as will provide a direction and an arrangement of the fibres ensuring a maximum resistance against stresses of opposite and alternating directions. In particular this deformation provides for the fibres remaining perpendicular to the transversal effort in the parts which resist to shearing stresses.

Appended drawing shows by way of example and by no means in a limitative manner the application of our method to the manufacture of a master connecting rod for a seven-cylinder star motor.

Figs. 1 to 12 recall to mind the different known steps in the production of a first blank having enclosing fibres without the impure portions of the original ingot section.

Figs. 1, 2, 4, 5, 7, 9 and 11 are side views and Figs. 3, 6, 8, 10 and 12 plan views, corresponding respectively to Figs. 2, 5, 7, 9 and 11.

Fig. 13 shows the blank in plan view after stamping.

Fig. 14 is a cross-section along line XIV—XIV of Fig. 13 of the same blank.

Figs. 15 and 16 show the manner of performing a first and then a second punching.

Fig. 17 is a plan view of the blank after said punching.

Figs. 18 and 19 illustrate the manner of operating for a third and a fourth punching operation.

Fig. 20 is a view of the blank when finished.

Fig. 21 is a cross-section along line XXI—XXI of Fig. 2 showing the same blank.

The original ingot section (Fig. 1), more or less forged or rolled, comprises impure parts in its axial portions as bonded by the interrupted lines *bc—b'c'*. Its outer portions *a* are on the contrary formed of sound metal. Starting from said ingot section, a first blank is prepared in accordance with the method disclosed in our said copending application. To this end it is given, through swaging, the shape of a shuttle as shown in Figs. 2 and 3. It is then flattened along its axis so as to be transformed into a thick disc

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(Fig. 4). A further flattening in a direction perpendicular to the preceding gives the ingot section the elongated shape shown in Figs. 5 and 6. It is swaged in a manner such that its ends become wider than the intermediate zone (Figs. 7 and 8). The central part *mn—m'n'*, in which the impurities are collected is finally eliminated and one obtains two first identical blanks provided with enclosing fibres. The principle of this manner of operating has been described in our copending above mentioned application.

A first preparation provides then the first desired blank containing no impurities and having already a suitable fibre arrangement.

The stamped object assumes its final shape (Figs. 13 and 14). It is then punched to form the apertures in the head and foot of the connecting rod in two stages (Figs. 15, 16 and 17), then the axial holes for the foot of the small connecting rod, also in two stages (Figs. 18 and 19) and the blank reaches thus its final state (Figs. 20 and 21). It is apparent that the fibres are disposed in parallel sheets with a single outlet at *d*. These fibres are perpendicular to the maximum transversal stresses transmitted by the small connecting rods in the peripheric parts *e* of the head of the connecting rod in front of the holes serving for the pivotal mounting of the small connecting rods.

What we claim is:

A process for obtaining from an ingot preliminarily subjected to a mechanical treatment to secure a longitudinal fibre structure two connecting rod blanks of sound metal wherein the fibres are parallel to the contour of said blanks comprising attenuating the ends of said ingot by swaging to give it the form of a shuttle, flattening said shuttle along its axis to form a thick disc, flattening said disc along a diameter thereof to form a bar with rounded ends, partially flattening the median portion of said bar and then removing the central unsound part of said flattened median portion of said bar to form said blanks.

FRANÇOIS MELEY.
ANDRÉ LEMOINE.

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