

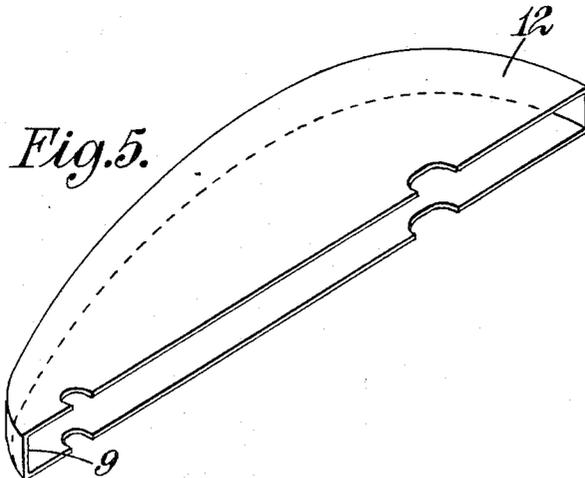
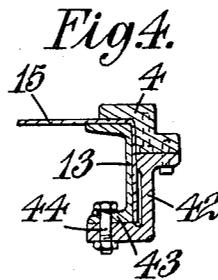
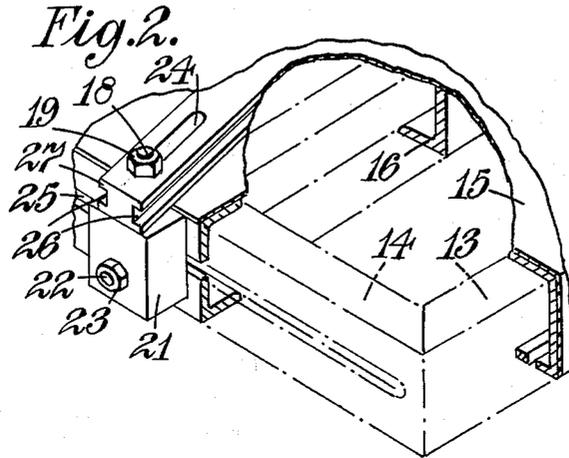
May 17, 1960

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JIGS, MOULDS AND THE LIKE

2,936,486

Filed Sept. 16, 1957

2 Sheets-Sheet 2



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2,936,486

JIGS, MOULDS AND THE LIKE

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Application September 16, 1957, Serial No. 684,246

Claims priority, application Great Britain September 19, 1956

9 Claims. (Cl. 18—34)

The invention relates to jigs, moulds and the like, and provides a jig, mould or the like comprising two members supported in adjacent but spaced relationship and having surfaces directed towards each other, and two relatively adjustably movable end carriers connected by a flexible strip, the said end carriers and flexible strip being positioned in the space between the said adjacent surfaces and arranged to form a transverse wall between those surfaces so as to define therewith a hollow shape.

The construction and arrangement is preferably such that by adjusting movement of one or each of the end carriers and the consequent, or additional, positioning of the flexible strip the transverse wall may be caused to assume any one of a range of different configurations.

The jig, mould or the like provided by the invention may be employed for example in the manufacture of casings for chain-and-wheel, or like transmissions.

Preferably one of the end carriers is secured to an edge of one of the said members, preferably adjacent one end thereof, and the other end carrier is adjustably movable along that edge towards and away from the said one of the end carriers.

Preferably the two members are provided as rectangular plates or boards. One of the said two members may be removed to expose the flexible strip and end carriers to permit their use as a contact mould or template.

A specific construction of apparatus embodying the invention will now be described by way of example and with reference to the accompanying drawings in which:

Figure 1 is a general view of the mould with the upper plate removed,

Figure 2 is a detailed view showing the construction of the lower plate of the mould,

Figure 3 is a side view of the mould,

Figure 4 is a part sectional view on the line 4—4 in Figure 3, showing the adjustable attachment of the formers for the shaft holes, and

Figure 5 shows one half-casing as made in the mould.

In this example the apparatus is for use in the manufacture of a casing for a transmission comprising two spaced sprocket wheels interconnected by a chain, the casing being formed in two substantially symmetrical halves, and the drawing shows a mould or jig for forming those two halves separately.

The peripheral shape of each half of the casing is defined by a flexible steel strip 1 clamped at one end to an end block 2 movable along one side of a horizontally arranged, rectangular base plate 5. The face 8 of the block 2 is curved to form the radius of the part 9 of the casing which is for encompassing one wheel. The other end of the flexible strip 1 is attached to a second end block 3 having a rigid curved portion 11 which is curved to suit the radius of the part 12 of the casing which is for encompassing the other wheel. The distance between the two end blocks 2, 3 is adjustable to suit, for example,

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the distance between the two wheels of the transmission, and a number of different size blocks 2, 3 and associated strips 1 are provided to enable casings to be made for different sizes of transmissions and for a range of wheel diameters.

A second horizontally arranged plate 6 is positioned to overlie the first said plate 5 and rests on the upper surfaces of the end blocks 2, 3. Two pairs of formers 4, 4a are arranged to form the shaft holes through the casing, one former of each pair being attached to the lower plate member 5 and the other former of each pair being attached to the upper plate member 6.

The base plate 5 comprises four U section girders 13, 14, forming a rectangular frame work which is covered at its upper surface by a firm metal sheet 15 which also covers the outer faces of the side girders 13. Additional U girders 16 extend between the end girders 14 to strengthen the structure.

A clamp bar 17 extends across the upper face of the plate 5 and is secured at its ends by bolts and nuts 18, 19, to blocks 21 which are secured by bolts and nuts 22, 23 to the side girders 14. The bolts 18 pass through slots 24 in the clamp bar 17, and the bolts 22 pass through slots 25 in the end girders 14 to permit adjustment of the clamp bar 17 to any desired position. The clamp bar is provided with two longitudinal grooves 26 which form flanges 27 on it, which flanges 27 inter-engage with blocks 28, 29, slidable longitudinally along the clamp bar 17. Each block 28 carries an arm 31 having a pivot clamping head 32 which engages against the flexible strip 1. Clamping pressure is applied by means of a screw 33 threaded through a bolt 34 pivoting in the block 28. Each screw 33 has a knurled head 35 at one end, and its other end is engageable within any one of a number of notches 36 in the bar 31, according to the relative positions of the end blocks 2, the clamping member 17 and the blocks 28. The pressure thus applied between the clamping heads 32 and the end blocks 2 serves to retain one end of each of the flexible strips 1 as aforesaid. Each sliding block 29 carries a slotted arm 37 clamped to it by means of a nut 38, and each slotted arm 37 carries a screw 39 which clamps an angle-piece 41 against the plate 5, each angle-piece serves as an intermediate positioning piece for the flexible strip 1. The inherent resilience of the flexible strip 1 serves to retain it firmly in the shape shown, when it is supported by the clamping head 32, the end block 3 and the angle piece 41.

Each of the formers 4, 4a is secured to a carrier 42 which is slidable along the side of the plate 5 or 6. The lower flange of the girder 13 is slotted at 43 to receive a clamping bolt 44 to retain the formers in position. The plate 6 is of similar construction to the plate 5; and its side girders, corresponding to the girders 13, have slots (corresponding to the slots 43) provided in their upper flanges. The end blocks 2 are similarly adjustable along the length of the plate 5 and are adjustably clamped in position by bolts 45 passing through the slots 43. The end blocks 3 are similarly clamped in position.

The apparatus of this example provides a mould for use in the manufacture of transmission casings from reinforced synthetic material e.g. fiberglass-reinforced plastic material, which mould is constructed so that by adjusting the relative positions of the two end blocks the shape of the mould may be altered from one size and form to another, and by adjusting the positions of, or by changing the pairs of formers, the distance between and/or the size of the shaft holes may be changed. In use the mould is lined with the reinforcing fibres and a

coating of plastic applied to the mould when in a flowable state and the plastic allowed to set.

The apparatus of this example also provides a jig for use in the manufacture of transmission casings from sheet metal or other material. To mark the metal or other material the plate 6 is removed and the plate 5 inverted so that the strip 1, and end blocks 2 and 3 rest on the material. The material is then marked using the strip 1 and block 2 as a template. The plate 6 is then replaced, the component parts of the casing inserted in the jig, and those parts secured together e.g. by welding, soldering or other conventional means.

The apparatus of this example provides a mould, jig or the like for use in the manufacture of transmission casings, which mould jig or the like is such that the shape and dimensions thereof can be adjusted, thereby enabling a variety of different shape and dimension casings to be made in the single mould, jig or the like.

The invention is not restricted to the details of the foregoing example. For instance, the apparatus may be arranged and mounted in any convenient manner e.g. so that it is conveniently handled and set-up. The transmission for which the casing is intended may employ chains, gears, belts or other means.

We claim:

1. A mould for use in the production of transmission casings having ends of predetermined radii, which mould comprises in combination a first member, a second member supported in adjacent but spaced relationship from said first member, said first and second members having surfaces directed towards each other, a first end-carrier secured to an edge of said first member, an arcuate shape rigid mould-surface provided on said first end-carrier, said first mould-surface being directed towards said edge and having a radius substantially equal to an end radius of the casing, a second end-carrier secured to said first member at a position spaced from said first end-carrier, a second arcuate shaped rigid mould-surface provided on said second end-carrier, said second mould-surface being directed towards said edge and having a radius substantially equal to the other end radius of the casing, and a flexible strip secured to said first and second end-carriers to extend therebetween so that said first and second end-carriers and said flexible strip form a transverse wall between said adjacent surfaces, the longitudinal shape of which wall is determined by the spacing of the end-carriers and the shape of the said first and second rigid mould-surfaces, whereby an open sided mould is provided.

2. A mould for use in the production of transmission casings having ends of predetermined radii, which mould comprises in combination a first member, a second member supported in adjacent but spaced relationship from said first member, said first and second members having surfaces directed towards each other, a first end-carrier secured to an edge of said first member, a second end-carrier secured to said first member at a position spaced from said first end-carrier, four formers, two of which formers are secured to said first member between said first and second end carriers and the other two of which formers are secured at aligned positions to said second member, an arcuate shaped rigid mould-surface provided on said first end-carrier, directed towards said edge and having a radius substantially equal to an end radius of the casing, a second arcuate shaped rigid mould-surface provided on said second end-carrier, directed towards said edge and having a radius substantially equal to the other end radius of the casing, and a flexible strip secured to said first and second end-carriers to extend therebetween so that said first and second end-carriers and said flexible strip form a transverse wall between said adjacent surfaces, the longitudinal shape of which wall is determined by the spacing of the end-carriers and the shape of the said first and second rigid mould-surfaces, whereby an open sided mould is provided.

3. A mould for use in the production of transmission

casings having ends of predetermined radii, which mould comprises in combination a first member, a second member supported in adjacent but spaced relationship from said first member, said first and second members having surfaces directed towards each other, a first end-carrier secured to an edge of said first member, a rigid mould-surface provided on said first end-carrier, directed towards said edge and having a radius substantially equal to an end radius of the casing, a guide surface on said first end-carrier extending tangentially away from said mould-surface, a second end-carrier secured to said first member at a position spaced from said first end-carrier, a second rigid mould-surface provided on said second end-carrier, directed towards said edge and having a radius substantially equal to the other end radius of the casing, a flexible strip, means for clamping an end portion of said flexible strip against said guide surface so that a consecutive portion of said strip forms a smooth continuation of said first mould-surface and extends to the said second end carrier to lie closely in contact with the said second arcuate shaped mould-surface whereby said first arcuate shaped mould-surface and said flexible strip form a smoothly continuous transverse wall between said surfaces, the longitudinal shape of which wall is determined by the spacing of the end-carriers and the shape of the said first and second rigid mould-surfaces, whereby an open sided mould is provided.

4. A mould for use in the production of transmission casings having ends of predetermined radii, which mould comprises in combination a first member, a second member supported in adjacent but spaced relationship from said first member, said first and second members having surfaces directed towards each other, a first end-carrier secured to an edge of said first member, a rigid mould-surface provided on said first end-carrier, directed towards said edge and having a radius substantially equal to an end radius of the casing, a guide surface on said first end-carrier extending tangentially away from said mould-surface, a second end-carrier secured to said first member at a position spaced from said first end-carrier, a second rigid mould-surface provided on said second end-carrier, directed towards said edge and having a radius substantially equal to the other end radius of the casing, and a flexible strip, means for clamping an end portion of said flexible strip against said guide surface so that a consecutive portion of said strip forms a smooth continuation of said first mould-surface and extends to the said second end carrier to lie closely in contact with the said second arcuate shaped mould-surface whereby said first arcuate shaped mould-surface and said flexible strip form a smoothly continuous transverse wall between said surfaces, the longitudinal shape of which wall is determined by the spacing of the end-carriers and the shape of the said first and second rigid mould-surfaces, said clamping means comprising a rigid bar secured to said first member, a clamping arm pivoted to said bar to extend towards said guide surface, a clamping head pivotally secured to said clamping arm adjacent said guide surface and screw means for urging the clamping head towards said guide surface thereby to clamp the said end portion of the flexible strip against said guide surface.

5. A mould for use in the production of transmission casings having ends of predetermined radii, which mould comprises in combination a base plate, a second plate supported in adjacent but spaced relationship from said base plate, a first end-carrier positioned between said plates and secured to one edge of the base plate, a first arcuate-shaped mould-surface on said first end-carrier, directed towards said one edge of the base plate and having a radius substantially equal to an end radius of the casing, a second surface on said first end-carrier extending tangentially away from said first mould-surface, a second end-carrier positioned between said plates and adjustably secured to said one edge of the base plate for

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movement towards and away from said first arcuate-shaped mould-surface, a second arcuate-shaped mould-surface on said second end-carrier directed towards said one edge of the base plate and having a radius substantially equal to an end radius of the casing, a flexible strip, and means for clamping a portion of said flexible strip against said second surface of said first end-carrier so that a consecutive portion of said strip forms a smooth continuation of said first mould surface and extends to the said second end-carrier to lie closely in contact with the said second arcuate-shaped mould-surface whereby said first arcuate-shaped mould-surface and said flexible strip form a smoothly continuous transverse wall between said plates.

6. A mould for use in the production of transmission casings having ends of predetermined radii, which mould comprises in combination a base plate, a second plate supported in adjacent but spaced relationship from said base plate, a first end-carrier positioned between said plates and secured to one edge of the base plate, a second end-carrier positioned between said plates and adjustably secured to said one edge of the base plate for movement towards and away from said first arcuate-shaped mould-surface, four formers, two of which formers are secured to said one edge of said base plate between said first and second end carriers and the other two of which formers are secured at aligned positions to said second plate, a first arcuate-shaped mould-surface on said first end-carrier, directed towards said one edge of the base plate and having a radius substantially equal to an end radius of the casing, a second surface on said first end-carrier extending tangentially away from said first mould-surface, a second arcuate-shaped mould-surface on said second end-carrier directed towards said one edge of the base plate and having a radius substantially equal to an end radius of the casing, a flexible strip, and means for clamping a portion of said flexible strip against said second surface of said first end-carrier so that a consecutive portion of said strip forms a smooth continuation of said first mould surface and extends to the said second end-carrier to lie closely in contact with the said second arcuate-shaped mould-surface whereby said first arcuate-shaped mould-surface and said flexible strip form a smoothly continuous transverse wall between said plates.

7. A mould for use in the production of transmission casings having ends of predetermined radii, which mould comprises in combination a base plate, a second plate, supported in adjacent but spaced relationship from said base plate, a first end-carrier positioned between said plates and secured to one edge of the base plate, a first arcuate-shaped mould-surface on said first end-carrier, directed towards said one edge of the base plate and having a radius substantially equal to an end radius of the casing, a second surface on said first end-carrier extending tangentially away from said first mould-surface, a second end-carrier positioned between said plates and adjustably secured to said one edge of the base plate for movement towards and away from said first arcuate-shaped mould-surface, a second arcuate-shaped mould-surface on said second end-carrier directed towards said one edge of the base plate and having a radius substantially equal to an end radius of the casing, a flexible strip, and means for clamping a portion of said flexible strip against said second surface of said first end-carrier so that a consecutive portion of said strip forms a smooth continuation of said first mould surface and extends to the said second end-carrier to lie closely in contact with the said second arcuate-shaped mould-surface whereby said first arcuate-shaped mould-surface and said flexible strip form a smoothly continuous transverse wall between said plates, said clamping means comprising a rigid bar secured to said base plate, a clamping arm pivoted to said bar to extend towards said guide surface, a clamping head pivotally secured to said clamping arm adjacent said guide surface

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and screw means for urging the clamping head towards said guide surface thereby to clamp the said end portion of the flexible strip against said guide surface.

8. A mould for use in the production of transmission casings having ends of predetermined radii, comprising a rectangular base plate, a second rectangular plate supported in adjacent but spaced relationship from said base plate, two first end-carriers positioned between said plates and secured respectively to opposite side edges of the base plate, a first arcuate-shaped mould-surface on each of said first end-carriers directed respectively towards the side edge to which the carrier is secured, and having a radius substantially equal to an end radius of the casing, a second surface on each of said first end-carriers, which second surfaces extend respectively tangentially away from said first mould surface, two second end-carriers positioned between said plates and adjustably secured respectively to said opposite side edges of the base plate for the movement towards and away from said first arcuate-shaped mould-surfaces of the first end-carriers, a second arcuate-shaped mould-surface on each of said second end-carriers, directed respectively towards the side edge to which the appropriate carrier is secured and having a radius substantially equal to the other end radius of the casing, two flexible strips, means for clamping a portion of one of said flexible strips against the said second surface of one of said first end-carriers and for clamping a portion of the other of said flexible strips against said second surface of the other of said first end-carriers so that consecutive portions of said strips form smooth continuations of said first mould-surfaces and extend respectively to the said second end-carriers to lie closely in contact with the said second arcuate-shaped mould-surfaces thereof whereby said first arcuate-shaped mould-surfaces and said flexible strips form two smoothly continuous transverse walls between said plates, the longitudinal shapes of which walls are determined by the spacing of the appropriate end-carriers and the shape of the said first and second mould surfaces.

9. A mould for use in the production of transmission casings having ends of predetermined radii, comprising a rectangular base plate, a second rectangular plate supported in adjacent but spaced relationship from said base plate, two first end-carriers positioned between said plates and secured respectively to opposite side edges of the base plate, a first arcuate-shaped mould-surface on each of said first end-carriers directed respectively towards the side edge to which the carrier is secured, and having a radius substantially equal to an end radius of the casing, a second surface on each of said first end-carriers, which second surfaces extend respectively tangentially away from said first mould surface, two second end-carriers positioned between said plates and adjustably secured respectively to said opposite side edges of the base plate for the movement towards and away from said first arcuate-shaped mould-surfaces of the first end-carriers, a second arcuate-shaped mould-surface on each of said second end-carriers, directed respectively towards the side edge to which the appropriate carrier is secured and having a radius substantially equal to the other end radius of the casing, two flexible strips, means for clamping a portion of one of said flexible strips against the said second surface of one of said first end-carriers and for clamping a portion of the other of said flexible strips against said second surface of the other of said first end-carriers so that consecutive portions of said strips form smooth continuations of said first mould-surfaces and extend respectively to the said second end-carriers to lie closely in contact with the said second arcuate-shaped mould-surfaces thereof whereby said first arcuate-shaped mould-surfaces and said flexible strips form two smoothly continuous transverse walls between said plates, the longitudinal shapes of which walls are determined by the spacing of the appropriate end-carriers and the shape of the said first and second mould surfaces, the said clamp-

ing means comprising a rigid member extending between the other opposite edges of the base plate, two clamping arms pivoted to the rigid member at spaced positions along the length thereof to extend respectively towards the said second surfaces of said first end-carriers, two clamping heads respectively pivoted to the free ends of said two clamping arms adjacent said second surfaces, and screw means for varying the angular setting of the pivoted arms to urge the clamping heads towards the said second surfaces thereby to clamp the flexible strips against those surfaces.

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