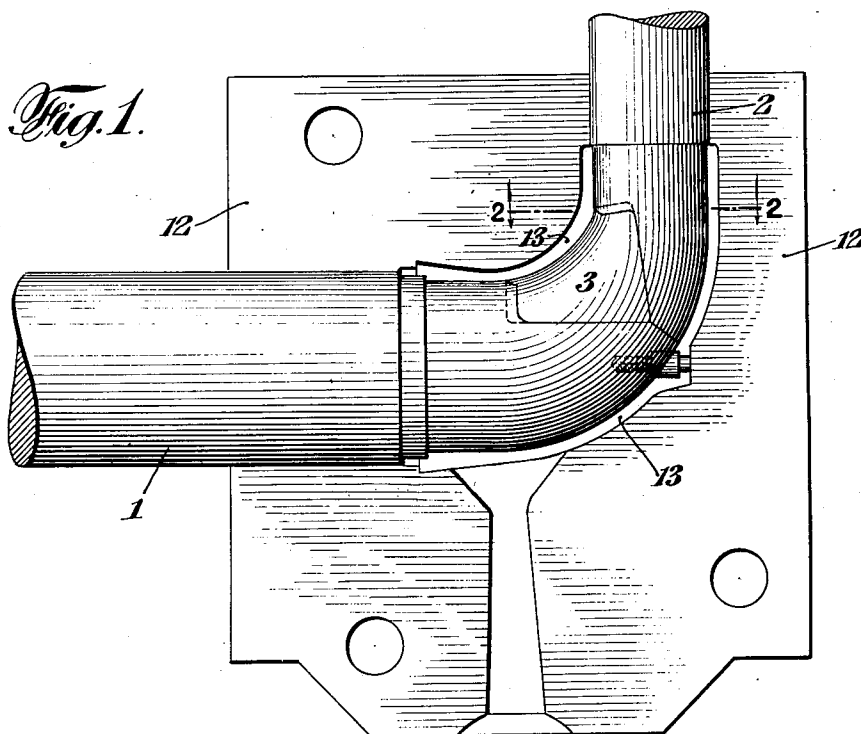
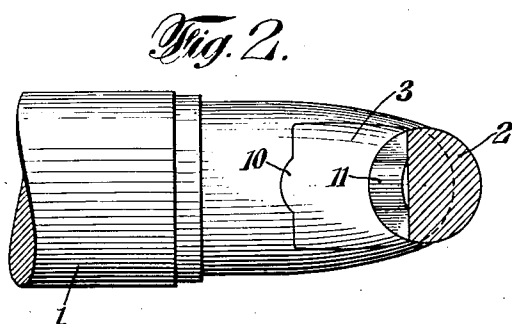
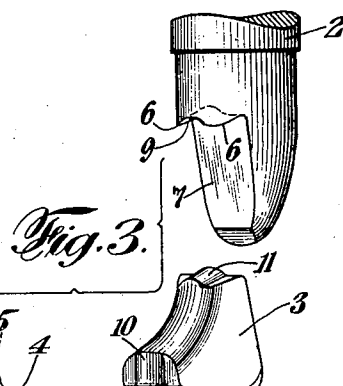
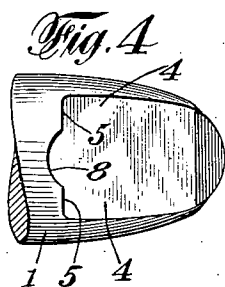


G. W. BUNGAY.
CORE FOR CASTING CURVED TUBULAR BODIES.
APPLICATION FILED APR. 21, 1920.

1,347,575.

Patented July 27, 1920.



Inventor
George Waldemar Bungay
By his Attorneys
Williams & Bitchard

UNITED STATES PATENT OFFICE.

GEORGE WALDEMAR BUNGAY, OF BROOKLYN, NEW YORK, ASSIGNOR TO ACME DIE CASTING CORPORATION, A CORPORATION OF NEW YORK.

CORE FOR CASTING CURVED TUBULAR BODIES.

1,347,575.

Specification of Letters Patent.

Patented July 27, 1920.

Application filed April 21, 1920. Serial No. 375,488.

To all whom it may concern:

Be it known that I, GEORGE WALDEMAR BUNGAY, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Cores for Casting Curved Tubular Bodies, of which the following is a specification.

My invention relates to pressure casting or die casting and relates more particularly to means for forming curved tubular bodies having end parts extending at an angle to each other, such for example as bent or curved tone arms of phonographs.

My present invention relates more particularly to a three-piece core having two end members or outer core members, and an intermediate or inner core member interposed between and held in place by the inner ends of said outer core members and curved in such manner as to form a curve in the tone arm. In practice the core of my invention may be combined with a die or mold of usual or of any suitable construction, such for example, as a die or mold comprising complementary mold-forming or die members provided with recesses forming between them an interior mold cavity or die chamber for casting a bent or elbow-shaped tone arm or other similar tubular body.

My invention comprises an improved core in which the outer curve of the core is formed by outer core members and in which the inner curve of the core is formed by an inner core member.

My invention also includes the provision of flaring recesses and tapered projections adapted to fit therein to form the joints between the separable core members, such as flaring grooves which may be of concave contour and tapered tongues which may be rounded. My invention also more particularly includes features of construction and combinations of parts, as will appear from the following description.

I shall now describe the embodiment of my invention illustrated in the accompanying drawings and shall thereafter point out my invention in claims.

Figure 1 is an inner face view of one of the die members together with the three core members appearing in elevation, parts being omitted.

Fig. 2 is a transverse section of the assembled core on a horizontal plane indicated by the line 2—2 in Fig. 1 as viewed from above.

Fig. 3 is a perspective view of the three core members separated, the view of each member being taken angularly from the left in the position of each of these parts appearing in Fig. 1.

Fig. 4 is a plan view of the inner end of the larger outer core member.

The core embodying my invention illustrated in the accompanying drawings is made up of three core pieces or core members comprising a larger horizontally arranged end member or outer member 1, a smaller downwardly extending vertically arranged end member or outer member 2, and an intermediate or inner core member 3. The outer core members 1 and 2 are shown as arranged substantially at right angles to each other, and on the outer sides of the elbow formed thereby, these core members 1 and 2 are rounded at their ends and come together to form a gradual outer curve. The inner ends of these core members are shown as meeting or abutting against each other on an inclined plane forming a miter joint extending through about one-fourth of the diameter of the complete core at a point at about the middle of the outer curve, as shown in Fig. 1. The inner end of each of these core members 1 and 2, at the inner side of the elbow formed thereby, is provided with a large notch, and outward longitudinally from such notch, each of these core members is cylindrical and straight, that is to say, without longitudinal curvature.

The inner or intermediate core member 3 forms the inner curve of the core and is shaped so as evenly to fill out the space or recess formed by the notches between the inner ends of the core members 1 and 2, so as to form with these core members an outer rounded continuously smooth surface. In this connection it is to be particularly noted that the rounded or transversely convexly curved surface of this core member 3, at the inner side of the elbow formed between the outer core members 1 and 2, is curved concavely in a longitudinal direction so as thereby to form with the tangential inner straight sides of the outer core members 1 and 2, a continuous longitudinal curve at the inner side of the elbow, this

inner curve corresponding to but being of less radius than the outer curve within the tone arm at the outer side of the elbow formed, as above described, by the joined inner ends of the outer core members 1 and 2.

The inner or intermediate core member 3 is adapted to be securely held in place by the outer members 1 and 2, and the means by which this is accomplished will now be described. The above noted large notch in the inner end of the horizontal outer core member 1 for the reception of the inner core member 3, is defined by a substantially horizontal or longitudinal upper surface 4 and by a transverse surface 5 disposed substantially at right angles to the surface 4 and also at right angles to the axis of the core member 1, these notch-forming surfaces 4 and 5 being shown as joined by a short connecting curved surface. Similarly, the inner end of the downwardly extending outer core member 2, has its large notch formed by means of a short transverse surface 6 joined by a short curve to a longer generally longitudinal but slightly outwardly inclined surface 7, the surfaces 6 and 7 being disposed substantially at right angles to each other. The transverse surface 5 of the horizontally arranged outer core member 1 and the corresponding transverse surface 6 of the downwardly extending outer core member 2, are shown as disposed at a slightly obtuse angle to each other, diverging toward the outer curve of the core and converging toward the inner curve of the core, and thereby form retaining shoulders for the intermediate or inner core member 3 which effectively prevent the escape or displacement of this core member 3 toward the inner side of the elbow when this core member 3 is clamped between the inner ends of the core members 1 and 2 in the large notches formed therein for its reception, and as is clearly shown in Fig. 1.

The means provided to prevent the escape or displacement of the inner core member 3 transversely or laterally will now be described. The otherwise plane transverse surface 5 of the inwardly extending horizontal outer core member 1 has formed therein a recess in the form of a transversely concavely curved groove 8 extending medially outward from the longitudinal surface 4, and the corresponding otherwise plane transverse surface 6 of the downwardly extending outer core member 2 has formed therein a recess in the form of a groove 9 which is made concavely curved transversely and extends medially outward from the longitudinal surface 7. The intermediate or inner core member 3 on its vertical end appearing at the left is provided with a projection in the form of a vertical transversely convexly curved ridge or tongue

10 adapted snugly to fit into the complementary groove 8 of the core member 1, as is shown in Figs. 1 and 2. This inner core member 3 on its upper end, as shown in the drawings, is provided with a projection in the form of a transversely convexly curved ridge or tongue 11 complementary to and adapted to fit snugly into the correspondingly shaped groove 9 formed in the transverse surface 6 of the downwardly extending outer core member 2, as is shown in Fig. 1 and indicated in Figs. 2 and 3. It is to be noted that when the outer core members 1 and 2 come together in abutting relation as shown in Fig. 1, the horizontal upper surface 4 of the core member 1 and the longitudinally inclined surface 7 of the downwardly extending core member 2, form a slightly acute angle, as is clearly shown in Fig. 1.

In assembling the complete core, the core members 1 and 3 are first fitted together after which the other core member 2 is lowered upon the core members 1 and 3 thereby securely to clamp the intermediate core member 3 in place, and whereby this core member 3 will be firmly and securely held in place against possibility of escape, by reason of the means provided for this purpose above described. In taking the core apart after the casting has been completed, the core members 1 and 2 are simply withdrawn in the usual way, thereby leaving the intermediate core member 3 detached within the casting, from which it may be very readily dislodged and removed.

My complete invention is carried out by combining the above described three-piece core with a suitable mold or die, which may comprise complementary die members or die sections of which one such as 12 is illustrated in Fig. 1 of the drawings. These die members, such as 12, have complementary recesses in their contiguous faces, thereby forming a mold cavity or die chamber 13 of curved elbow-shape both as to its outer and inner curves, and corresponding substantially to the contour of the complete core made up of the smoothly joined core parts or members 1, 2 and 3. The outer or end core members 1 and 2 extend into this medially curved mold cavity 13 from opposite ends thereof in substantially a usual way, and at their outer ends, the outer parts of which are omitted to save space and unnecessary drawings, these core members 1 and 2 may be supported and provided with any suitable operating means familiar to those versed in the art.

In assembling the complete core, the intermediate core member 3 may be conveniently manually placed in position on the horizontally arranged outer core member 1 after this core member 1 has been moved longitudinally into place in the die member

12. The inner or intermediate core member 3 will remain in place on the inner end of the core member 1 without liability of accidental displacement, this being accomplished in part by reason of the joint 5 formed by the ridge or tongue 10 and the groove 8. With the core members 1 and 3 thus in proper position within the part of the mold cavity 13 formed in the die member 10 12, the other core member 2 may be moved downward into engagement with the core members 1 and 3, and the groove 9 of the core member 2 will then embrace or engage over the ridge or tongue 11 of the inner core member 3. The transverse curve 15 of the groove 9 and corresponding curve of the ridge or tongue 11, together with the longitudinal inclination of the engaging surface 7 on the core member 2, all conduce 20 to the correct coming together and the firm engagement of the contiguous surfaces of the core members 2 and 3, as will be readily understood. The rounded contour of the tongues 10 and 11 together with their location 25 on the ends of the intermediate inner core member 3, not only provides for the easy separation of the core members, but assures that the core members are brought into proper alinement as they are pushed together, thereby providing an outwardly smooth surface on the assembled core. All 30 of the above described members and parts of course may, and in fact are intended to, be mounted upon and virtually to form parts of any suitable die casting machine, 35 as is well understood in the art.

It is obvious that various modifications may be made in the construction shown in the drawings and above particularly described within the principle and scope of my 40 invention.

I claim:—

1. A core for casting in which end members are arranged at an angle to each other 45 and an intermediate core member is held in place by said end members, characterized by the fact that interengaging tapered projections and correspondingly flaring recesses are provided to form joints between the 50 intermediate core member and the end members, whereby the core members may be readily joined and easily separated.

2. A core for casting tubular bodies in longitudinally curved elbow form, such core 55 comprising end members arranged at an angle to each other and shaped at their inner ends to abut against each other on the outer longitudinal curve of said tubular body and so as to be spaced from each other 60 substantially throughout the length of the inner longitudinal curve of said tubular body, and an intermediate inner core member adapted to fill the space between the inner end parts of said outer core members 65 and to give longitudinally curved shape to

the inner longitudinal curve of said tubular body to be cast, interengaging tapered tongues and correspondingly flaring grooves being provided to form the joints between the intermediate core member and the end 70 members, thereby to facilitate the joining and the separation of the core members.

3. The invention claimed in claim 2 in which said tongues and grooves are on surfaces transverse to the length of the end 75 members of the core.

4. The invention claimed in claim 2 in which said tongues and grooves are of transversely curved contour.

5. The invention claimed in claim 3 in 80 which said tongues and grooves are of transversely curved contour.

6. A core for casting tubular bodies in longitudinally curved elbow form, such core comprising outer core members for forming 85 the outer curve of the core, and an inner core member for forming the inner curve of the core.

7. A core for casting tubular bodies in longitudinally curved elbow form, such core 90 comprising outer core members for forming the outer curve of the core, and an inner core member for forming the inner curve of the core and adapted to be held in place by said outer core members. 95

8. A core for casting tubular bodies in longitudinally curved elbow form, such core comprising outer core members for forming the outer curve of the core, and an inner 100 core member for forming the inner curve of the core, said inner core member and the inner ends of said outer core members being provided with means for holding said inner core member in place between and so 105 as to form an evenly smooth outer surface with said outer core members.

9. A core for casting tubular bodies in longitudinally curved elbow form, such core comprising outer core members for forming 110 the outer curve of the core, and an inner core member for forming the inner curve of the core, the contiguous faces of said inner and outer core members being provided with complementary interengaging parts adapted to hold the inner core member in 115 place and to provide for the free withdrawal of the outer core members.

10. A core for casting tubular bodies in longitudinally curved elbow form, such core comprising outer core members for forming 120 the outer curve of the core, and an inner core member for forming the inner curve of the core, the inner ends of the outer core members having recesses therein and the inner core member being provided with projecting tongues adapted to enter said 125 recesses for holding the inner core member in place, said tongues and recesses being shaped to provide for the free withdrawal of the outer core members. 130

11. A core for casting tubular bodies in longitudinally curved elbow form, such core comprising outer core members for forming the outer curve of the core, and an inner core member for forming the inner curve of the core, the inner ends of the outer core members having spaced surfaces disposed to each other at an angle converging toward the inner curve of the core and the inner core member being shaped to conform to said surfaces for preventing displacement of the inner core member toward the inner side of the elbow, said converging surfaces of the outer core member and the contiguous surfaces of the inner core member being provided with interengaging tongues and recesses for preventing lateral displacement of the inner core member and provided for the free withdrawal of the outer core members.

12. A three-piece core for casting tubular elbows, such core comprising two outer core pieces for forming the outer curve of the core, and a third core piece for forming the inner curve of the core.

13. A three-piece core for casting tubular elbows, such core comprising two outer core pieces for forming the outer curve of the core, and a third core piece for forming the inner curve of the core and adapted to be held in position by the two outer core pieces.

14. A three-piece core for casting tubular elbows, such core comprising two outer core pieces for forming the outer curve of the core, and a third core piece for forming the inner curve of the core, said third core piece and the inner ends of said two outer core pieces being provided with interengaging means for holding said third core piece in position and providing for the free withdrawal of the two outer core pieces.

15. A three-piece core for casting tubular elbows, such core comprising two outer core pieces for forming the outer curve of the core, and a third core piece for forming the inner curve of the core, the inner ends of the two outer core pieces having spaced surfaces disposed to each other at an angle converging toward the inner curve of the core and the third core piece being shaped to conform to said surfaces for preventing displacement of the third core piece toward the inner side of the elbow, said converging surfaces of the two outer core pieces and the contiguous surfaces of the third core piece being provided with interengaging tongues and recesses for preventing lateral displacement of the third core piece and providing for the free withdrawal of the two outer core pieces.

In testimony whereof, I have affixed my signature to this specification.

GEORGE WALDEMAR BUNGAY.