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METHOD OF FORMING CAST ARTICLES.

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Fig. 1.

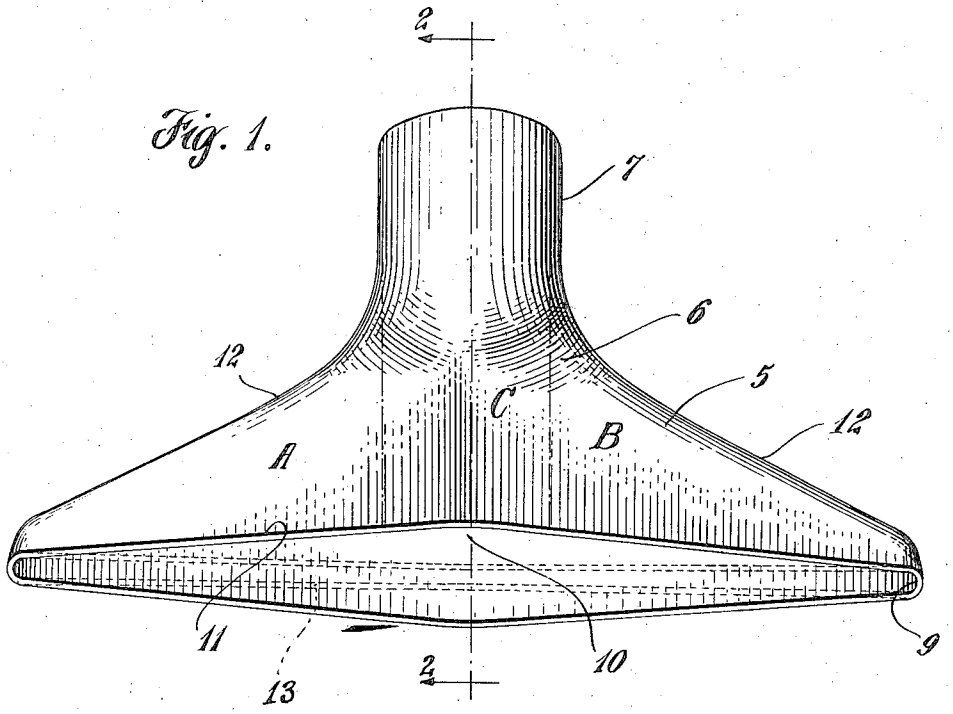
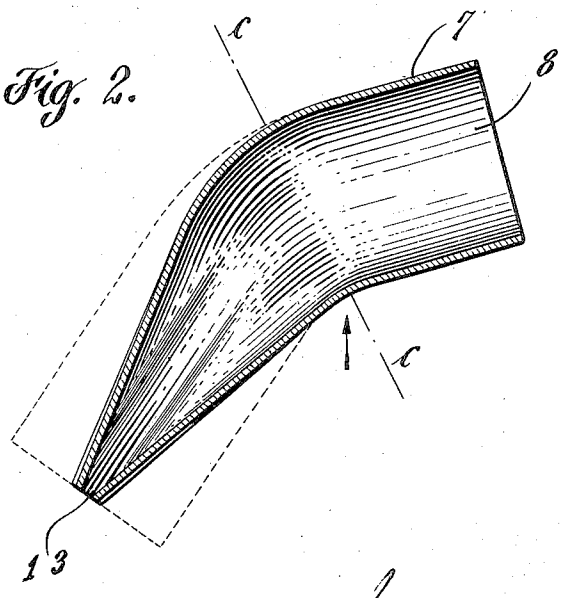


Fig. 2.



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UNITED STATES PATENT OFFICE.

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METHOD OF FORMING CAST ARTICLES.

Application filed March 16, 1921. Serial No. 452,696.

To all whom it may concern:

Be it known that I, GEORGE WALDEMAR BUNGAY, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Methods of Forming Cast Articles, of which the following is a specification.

This invention relates broadly to the art of metal working and specifically to a method of forming metallic articles having distorted or restricted passages or openings.

While the art of what is known as die casting, a comparatively recent development in the art of metal working has come quite generally into use and has greatly supplanted the former methods of casting in which sand molds or their equivalents are used to receive the molten metal poured therein and allowed to cool, it has nevertheless been restricted in its field of application by reason of the fact that it has been found impossible to provide a means by which difficult coring operations may be practically carried out. A specific example of what is termed a difficult coring operation may be found in an article such as a vacuum cleaner nozzle in which the entrance end of the nozzle is required as having an elongated restricted passage which would necessarily prevent the removal of a core, in practical die casting methods, from the inlet end of the nozzle.

So it is with many articles which would lend themselves naturally to the die casting methods, because of the relatively low cost of production arising by the use of such method, if it were not for the difficult coring operations which render the die casting of such articles practically impossible, thus restricting the field of general application of die casting apparatus and methods involving the use of such.

The method which I employ consists in first die casting an article of approximately the shape required in its finished state and of such a shape as to permit the metallic cores used in die casting practice to be removed from the article and then subjecting the article to pressure in order to distort it, giving it the required shape in its finished state.

By employing die casting, in the carrying out of my process, a distinct advantage is obtained over the former methods, wherein the metal is poured into sand molds, in that the article in its initial form is in a smooth state, the casting being made in a metal mold, and therefore requires no surface treatment other than to remove the burs formed at the union of the dies when a two-pieced die is used; the only other operation necessary to complete the article being the bending or distorting of the metal.

Another distinct advantage in employing my method resides in the fact that, by forming the unrestricted passages and later restricting them, I am enabled to use the cores of the die casting machine a great number of times, they being removed as a unit, whereas in forming restricted passages by means of sand cores, the cores in order to be removed are necessarily destroyed.

The primary object of my invention is to provide a method wherein the process of what is known as die casting as practiced in the casting of articles having relieved or regularly shaped passages may be utilized to a practical extent in the manufacture of articles having restricted or torsional passages heretofore rendering impractical the formation of such articles by die casting methods.

Other objects and advantages of the invention will become apparent during the course of study of the following description.

In the accompanying drawing wherein is illustrated a particular article in the manufacture of which I am enabled to practice my invention to advantage;

Figure 1 is a view in elevation of a vacuum cleaner nozzle viewed in the direction of the arrow shown in Figure 2, the mouth of the nozzle being shown as distorted, and

Figure 2 is a sectional view taken on line 2—2 of Figure 1, the mouth of the nozzle being shown as restricted.

For the purpose of illustrating how I propose to employ the method wherein the art of die casting articles having relieved or regularly shaped passages may be utilized to a practical degree in the manufacture of articles having restricted or torsional passages, I have elected to show as such an article a vacuum cleaner nozzle, indicated as

a whole by the numeral 5, which comprises a main body portion 6 die-cast to substantially the required shape or contour as shown in Figure 1, and provided with an outlet end 7 having an outlet passage 8 formed therein which is tapered to conform to the general outline or contour of the main body longitudinally thereof as shown by the numeral 9 of Figure 1 and to the general contour of the body transversely thereof as clearly shown in Figure 2. The passage 8, it will be seen, therefore gradually changes from a substantially true cylindrical passage, within the outlet end 7, to an elongated intake passage 10 as it approaches the elongated intake end 11 of the nozzle and gradually widens transversely thereof from a relatively narrow passage at the sides 12 of the nozzle towards the center of the nozzle or the plane thereof on which Figure 2 is taken. Thus it becomes apparent that the passage within areas indicated by the characters A and B gradually widens from any point therein towards the intake end of the passage 10 and in considering Figure 1 in connection with Figure 2 it further becomes apparent that the distance between the walls of the passage lying within the area C remains substantially uniform. Because of this construction I am enabled to cast the article in the form indicated by the full lines in Figure 1 by the use of die casting methods with great rapidity, requiring the use of only two so-called "simple cores", one being used to form the outlet passage 8 and the other being used to form the passage 10. The cores which are used to form the hollow body are brought together in an end to end relation, meeting substantially on the plane C—C of Figure 2, the outlet and inlet passage-forming cores being easily removed respectively from the body upon the completion of the casting operation through the outlet and intake passages 8 and 10.

In some instances it has been found desirable to restrict the intake passage at the entrance thereof to provide a relatively narrow elongated slot as shown at 13 which is somewhat narrower at its center than at its extreme ends, its width being gradually increased towards its ends, as shown in Figure 1, to more evenly distribute the power of suction throughout its length. To form such a passage, so restricted with respect to the interior of the nozzle, as shown more clearly in Figure 2, is practically impossible in forming the article as a completed unit by die casting methods; and to convert the relatively simple die casting hereinbefore described into a finished casting, having such a restriction as required which would render the die casting of the completed article impossible, I propose to place the article in its form indicated in full lines of Figure 1 into a suitable die press and then shape the same to the required form. In so shaping the article the metal of the nozzle is moved from its full line position shown in Figure 1 to the dotted line position shown therein, or from its dotted line position shown in Figure 2, to the full line position therein, thus forming the elongated slot 13 as required in an article in which it has heretofore been deemed impossible to employ die casting methods to any extent whatsoever.

In the manufacture of vacuum cleaner nozzles of the type herein shown and described, it has been customary to cast the main body portion by die casting methods, and by the same methods cast a restricted entrance end adapted to be secured to the main body in the completed article. This resulted in the necessity of two casting operations, and further necessitated expense and labor in the assembly of the articles whereas I am enabled to accomplish the same result with one casting operation, and to eliminate the expense of assembly by forming the article in a single piece in the first instance. While it is true that I resort to a pressing operation to distort the approximated article into its finished form, I am nevertheless enabled to produce the article at a lower cost than previously made possible, and I am also enabled to produce a more desirable article, such as a vacuum cleaner nozzle, by reason of the fact that I overcome the objection to the two-piece nozzles in that they are susceptible to leakage at the jointure of the two parts, which results in a detriment to the efficiency of the cleaner in its operation.

Having thus described my invention, I claim:

1. The method of forming a metallic article which consists in forming a die casting of such article to approximately its desired form, and then distorting the casting to produce the finished article.

2. The method of forming a metallic article which consists in forming a die casting of such article to approximately its desired form, and then subjecting the casting to pressure whereby the same is distorted to produce the finished article.

3. The method of forming a metallic article requiring a restricted passage which consists in forming a die casting of an approximated article having a passage cored therein, and then distorting the approximated article to restrict the passage.

4. The method of forming a metallic article having a passage therein, the entrance to which is required as being restricted which consists in forming a die casting of an article with an unrestricted passage therein, and then distorting the casting to restrict the entrance to the passage thereof.

5. The method of forming a metallic article required as having a uniform passage

blended into a passage, one axis of which is elongated with respect to another axis thereof, the blended passage being restricted at one end thereof, which consists in die casting a metallic article with an unrestricted blended passage, and then partially closing the unrestricted passage to form a restriction therein.

6. The method of forming a vacuum cleaner nozzle required as having a restricted inlet passage which consists in forming a die casting of an approximate article having an unrestricted inlet passage cored therein, and then subjecting the casting to pressure, whereby the metal surrounding the unrestricted passage is moved and set to restrict the inlet passage.

7. The method of forming a vacuum cleaner nozzle required as having an inlet passage terminating in an elongated slot, which consists in die casting a metallic body having a passage cored therein, and then subjecting the body to pressure whereby the passage is partially closed to provide the elongated slot.

8. The method of forming a vacuum cleaner nozzle required as having a passage terminating in a slot having a variable width, which consists in die casting a metallic body having a passage cored therein, and then partially closing the passage to variable limits to provide the slot having a variable width.

9. The method of forming a hollow metal article which consists in die casting the article so that a portion of the casting is in its permanent shape and pressing the other portion into the form desired in the finished article.

10. The method of forming a metallic article which consists in forming a die casting, and then distorting the casting to the shape desired in the finished article.

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

GEORGE WALDEMAR BUNGAY.