April 8, 1958 J. D'ANGELO 2,829,411

METHODS OF INTERCASTING ROTATABLE PARTS

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FIG. 1

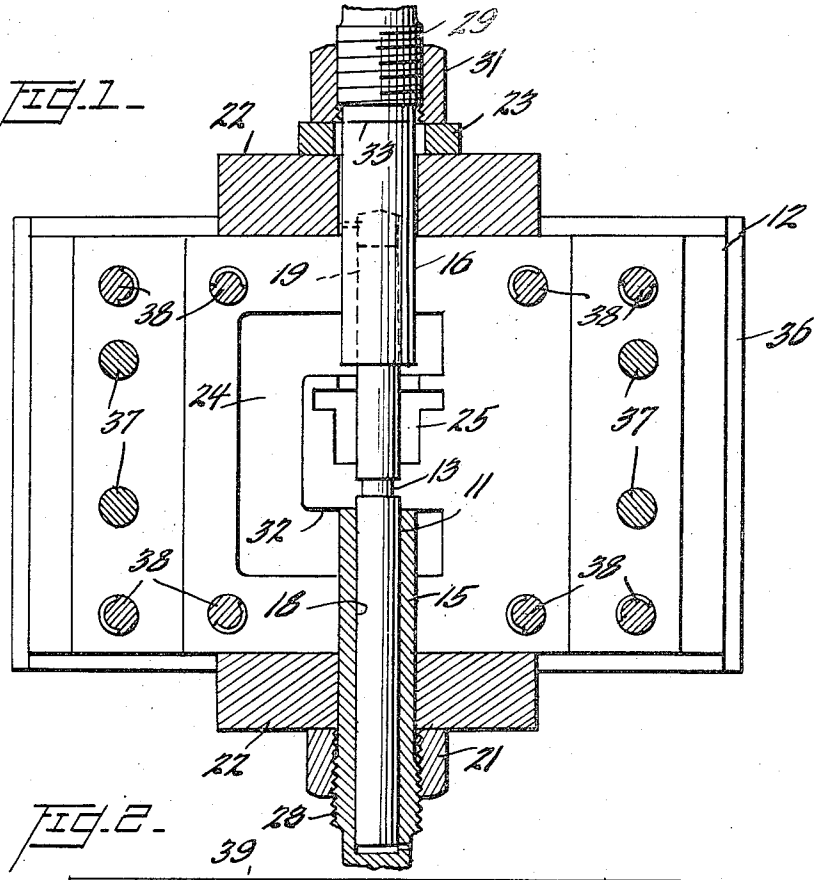
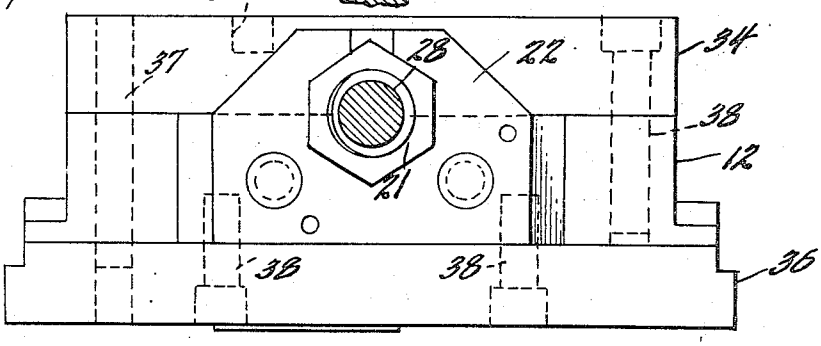


FIG. 2



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FIG. 3.

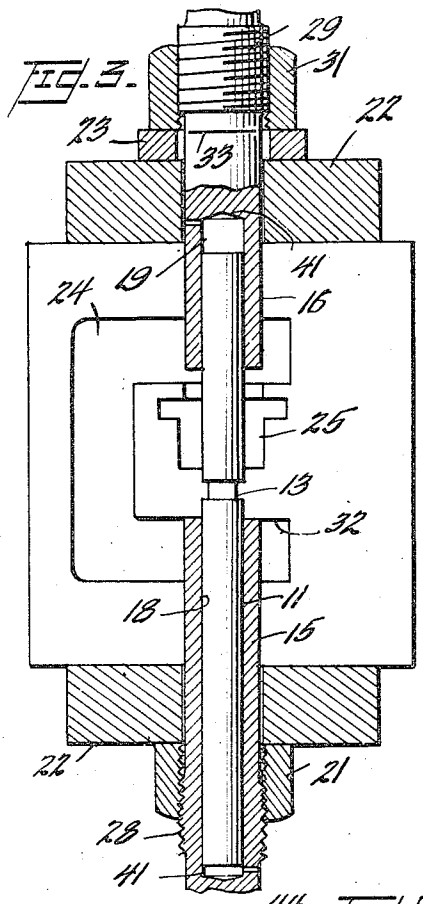


FIG. 4.

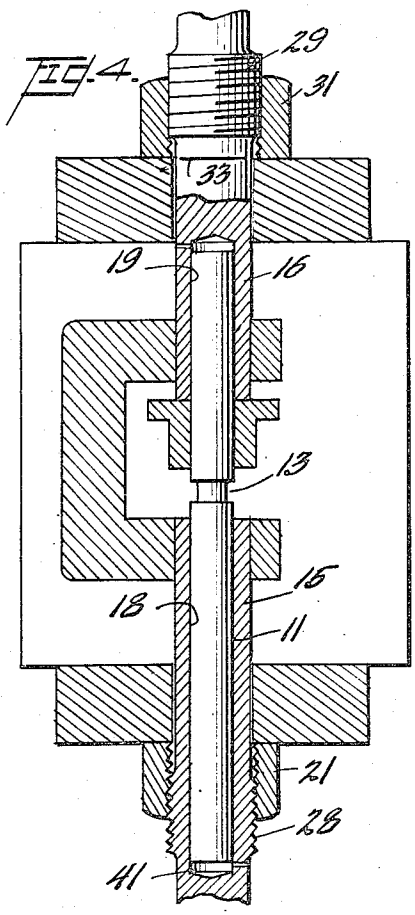
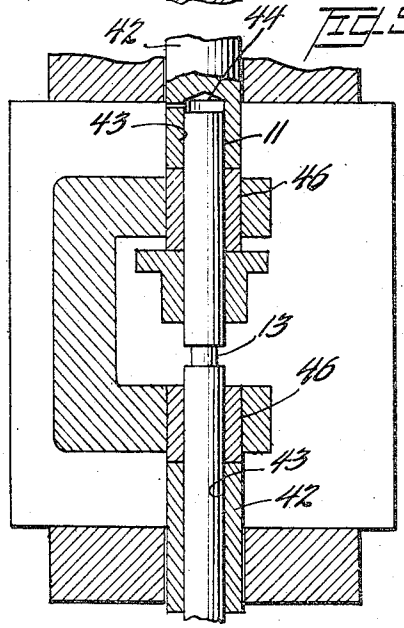
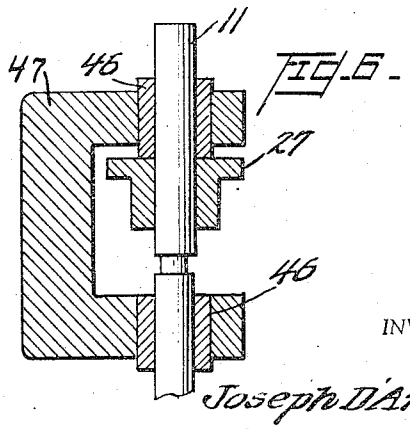


FIG. 5.





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United States Patent Office 2,829,411 Patented Apr. 8, 1958

2,829,411

METHODS OF INTERCASTING ROTATABLE PARTS

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Application May 22, 1956, Serial No. 586,490

5 Claims. (Cl. 22—203)

This invention is concerned generally with metal casting, and more particularly with the intercasting around an inserted shaft in a die casting mold.

The invention discloses a method of intercasting parts around an inserted shaft in a die casting mold so that after ejection two or more independent parts make up a complete rotatable assembly for non-precision work. This process utilizes the dwell time required for solidification, during which time and after molten material has filled the mold cavity, a sliding core cuts off the section forming the rotatable piece from the base and, upon removal of the core, leaves an opening for the subsequent insertion of a bearing. Better alignment of parts is obtained since the mold is not opened until the process has been completed with the finished product ready for ejection from the mold.

An object of this invention is to define a method whereby an inserted shaft in a die casting mold may have parts intercast around it so that after ejection there will be two or more parts making up a rotatable assembly.

Another object is to maintain correct alignment of the shaft and intercast parts throughout the casting process.

Still another object is to disclose a process of casting parts on a shaft wherein utilization is made of the dwell time required for the solidification of the die cast material.

A further object of this invention is to reduce the cost of trimming, machining, and assembly costs of non-precision expendable rotatable die cast parts.

A still further object of the invention is to permit the intercasting of parts in a permanent mold.

A better understanding of the invention may be had by reference to the accompanying drawings wherein:

Fig. 1 is an elevation view, partly in section, of the lower part of a mold with the top removed;

Fig. 2 is a side view of the mold with the top in place;

Fig. 3 is a partial elevation view with a setting core adjusted to the stop in the cavity and a cutoff core adjusted to the gauge line;

Fig. 4 is a partial elevation view similar to Fig. 3 but with the cutoff core at its farthest inward position;

Fig. 5 is a partial elevation view with bearings in place in the mold and bearing pushers also showing, and

Fig. 6 is the finished intercast product.

Referring now to the drawings for one embodiment of the invention, a steel shaft **11** or a shaft of some other suitable material is placed in an open mold **12** and positioned by a necked portion **13** on the shaft **11**. A setting core **15** and a cutoff core **16** are placed in position with the open ends of the passages **18** and **19**, respectively, slid over the ends of the shaft **11**, as shown in Figs. 1 and 3. The setting core **15** is adjusted so as to have nut **21** against the side **22** of the mold and the cutoff core **16** is adjusted in a similar manner except that a split washer **23** is used to hold it a specified distance out of the cavity **24** in order that molten material may flow into the cavity **25** wherein the rotatable piece **27** will be formed. Threaded portions **28** and **29** of setting core **15** and cutoff core **16**, respectively, allow adjustment of nuts **21** and **31**, respectively, so that the cores may be correctly and easily positioned when the mold is closed. The setting core **15** thus reaches to the interior wall **32** of the cavity **24** and the cutoff core **16** is positioned by the gauge line **33** which is scribed on the cutoff core **16** only. Another function of the necked portion **13** on the shaft **11** is to keep the shaft from shifting when subjected to pressure during the pouring of the molten material. The upper part of the mold **34**, which is essentially a mirror copy of the configuration of the lower mold **12**, is now placed on the lower section **12** and closed preparatory to the pouring operation. The parts of the mold are positioned and held in relative positions to each other on a base **36** in a usual manner such as by means of dowel pins **37** and bolts **38** as shown in Figs. 1 and 2. The mold is thus permanent in nature.

Molten material of some suitable metal or plastic is poured through the sprue hole **39**, Fig. 2, thereby entering the mold cavity **24**. Due to the position of the cutoff core **16**, as shown in Fig. 3, the molten material is enabled to enter the cavity **25** for molding what becomes the rotatable piece **27**. Shallow vents, and an overflow well if needed, are included in the mold as is standard practice in this type of operation but are not illustrated in the figures shown. It should be noted also, that while not illustrated, a heated mold and insulated risers may be utilized, if necessary, to prevent too rapid solidification of the molten material. After sufficient time has been allowed to fill the mold cavity **24—25** completely, at which time material no longer flows from cavity **24** to cavity **25**, the split washer **23** is removed and cutoff core **16** is moved inwardly until stopped by nut **31** engaging the mold side **22** in the position shown in Fig. 4. Air trapped in the cylindrical passages **18** and **19** is allowed to escape through air holes **41**. Just prior to the solidifying of the molten material and with both setting core **15** and cutoff core **16** in positions as shown in Fig. 4, both cores are withdrawn. Bearing pushers **42**, containing cylindrical passages **43** and air holes **44**, which operate similarly to the passages and air holes in the cores, are used to push bearings **46** into the openings in the partially solidified molten material left by withdrawal of both cores. The bearings **46** are inserted until they are in position as shown in Fig. 5. Upon final solidification of the molten material the mold is opened and the top half **34** is removed. The bearing pushers **42** are then easily removed and the finished product may be ejected from the mold. The finished intercast product, as shown in Fig. 6, has a base **47** and a rotatable piece **27** which is connected to the shaft **11** and may rotate with shaft **11** and free of the base **47** by means of the bearings **46**.

Manifestly, the invention is not limited to the specific embodiment hereinabove described, but may be utilized in many varied applications within the spirit and scope thereof.

What is claimed is:

1. A method of intercasting a rotatable assembly which includes the steps of placing a shaft between mold halves, adjusting a setting core in the mold halves, placing a cutoff core between the mold halves and extending therein a predetermined distance, closing the mold, pouring molten material into the mold, advancing the cutoff core inwardly of the mold to a second position upon cessation of flow of the molten material, removing the cutoff core and the setting core, and inserting bearings about the shaft and in a portion of the spaces occupied previously by the cutoff and setting cores.

2. A method of intercasting a rotatable assembly which includes the steps of placing a shaft between mold halves, positioning setting and cutoff cores in the mold, pouring molten material into the mold, moving the cutoff core inwardly to a farthest inwardly position upon cessation of flow of the molten material, removing the cores, and inserting bearings about the shaft and in a position occupied previously by a portion of the cutoff and setting cores.

3. A method of intercasting a rotatable assembly which includes the steps of positioning a shaft, and setting and cutoff cores between mold halves, pouring molten material into the mold, repositioning the cutoff core to cut off connecting material to an adjacent cavity prior to solidification of the molten material, removing the cores, and inserting bearings about the shaft and in a position occupied previously by a portion of the cutoff and setting cores.

4. A method of intercasting a rotatable assembly which includes the steps of cutting off connecting material to an adjacent cavity prior to solidification of the material by means of a cutoff core, and inserting a bearing in place of the cutoff core.

5. The method of intercasting a rotatable assembly which comprises the steps of placing a shaft within a mold, placing a setting core partially within the mold and surrounding a portion of one end of the shaft, placing a cutoff core a predetermined distance within the mold and surrounding a portion of the opposite end of the shaft, pouring molten material into the mold, advancing the cutoff core a further predetermined distance within the mold prior to solidification of the molten material, removing the setting and cutoff cores from within the mold, and inserting bearings about the shaft and in a position occupied previously by at least a portion of the cutoff and setting cores.

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