Sept. 7, 1965 J. KOSTENKO 3,204,304

DIE CASTINGS AND DIE CASTING SYSTEMS

Filed Aug. 10, 1962

FIG. 1

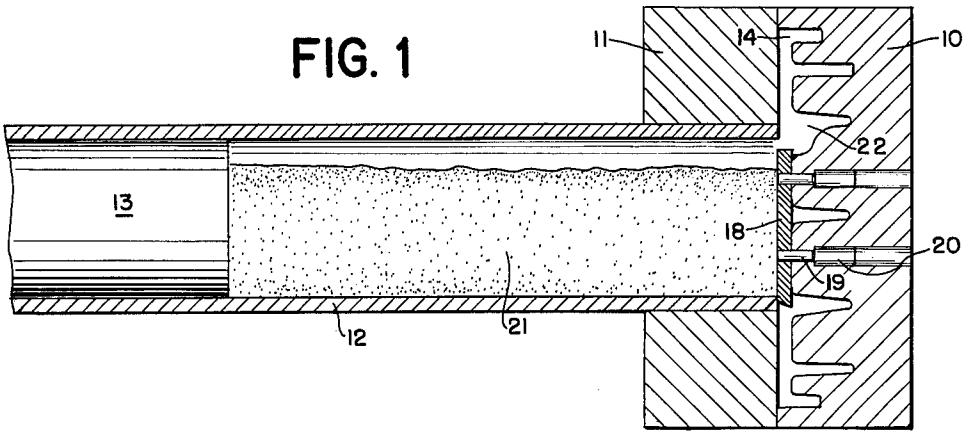


FIG. 2

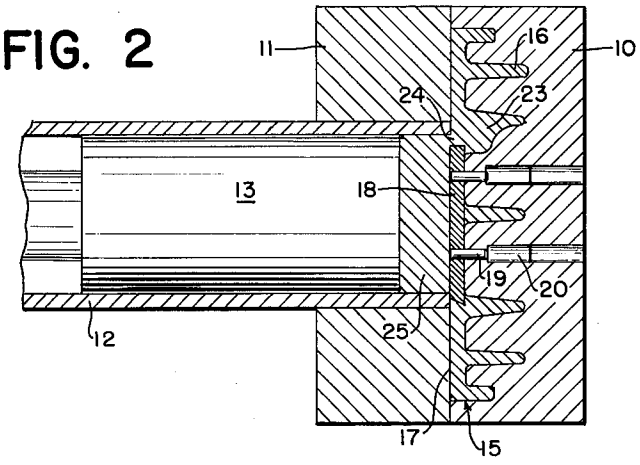


FIG. 3

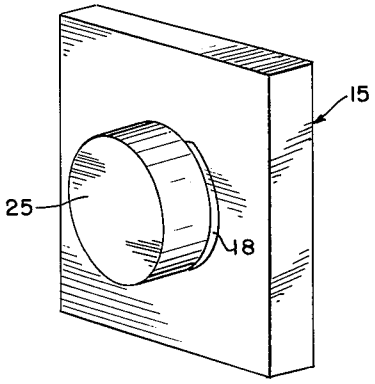
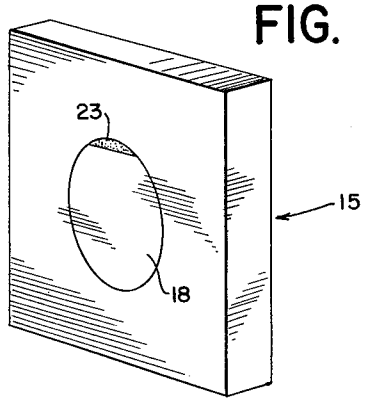


FIG. 4



INVENTOR.
John Kostenko
BY
D. Rupert Baker
ATTORNEY

United States Patent Office

3,204,304
Patented Sept. 7, 1965

3,204,304

DIE CASTINGS AND DIE CASTING SYSTEMS

John Kostenko, Wayne, N.J., assignor to Watchung Die Casting Corporation, Watchung, N.J., a corporation of New Jersey

Filed Aug. 10, 1962, Ser. No. 216,200
3 Claims. (Cl. 22—203)

This invention relates to die castings and more particularly to a die cast structural unit fabricated of conventional aluminum alloy material.

A particular problem for many years has been the machining required to finish such units.

It will be recognized that the production of such a die casting results in a residue of material immediately outside of the die, which residue is integral with the casting and must be removed, generally by expensive machining procedures.

With the foregoing in mind, I have devised a die casting system wherein the machining of such as structural unit is minimized while at the same time a far stronger and sturdier article is produced. I accomplish this by positioning a metal disk at the entrance of the die cavity, which disk becomes part of the finished casting. The disk is preferably of a metal, e.g. steel or the like, which is structurally stronger than and has a substantially higher melting point than the aluminum alloy so that it remains substantially unaffected by the molten aluminum alloy. The disk is arranged to provide a restricted feed channel or gate to the die cavity. Accordingly, the injected aluminum alloy material communicates with the excess material in the injection cylinder only through said restricted opening, resulting in a pancake shaped residue or sprue which is connected to the main casting by a bridge. The residue can be easily broken away from the main casting usually leaving a small bridge or gate portion which can be easily machined off. A portion of the gate remains with the main casting and is bonded to the disk. The restricted feed channel is further arranged to be at the top end of the die cavity to avoid gravitational depositing of the alloy into the die cavity, since the alloy should be forced therein under high pressure.

The invention will be further understood from the following description and drawings in which:

FIGURE 1 is a cross-sectional view illustrating the beginning of the injection process;

FIGURE 2 is a similar view illustrating the end of the injection process;

FIGURE 3 is a perspective view of the casting as it is removed from the machine; and

FIGURE 4 is a similar view of the finished casting.

The die casting machine itself is conventional, comprising a movable or ejector die half **10** and a stationary or cover die half **11**. Secured to die half **11** is the die sleeve **12** within which plunger **13** is longitudinally slidable. Plunger **13** is actuated by the usual hydraulic system or the like. A mold impression or cavity **14** is formed substantially in the ejector die half **10**. The particular die illustrated produces a structural panel unit **15**, the ribs **16** forming a gridlike structure and the outer panel **17** generally serving as the load bearing panel.

According to this invention a metal plate or disk **18** is centrally secured to ejector die half **10** at the entrance of cavity **14** as by resting on mounting pins **19** which

are threaded into sleeves **20** and which are separable from the finished casting. However, any mounting means may be employed whether frictional or magnetic. Disk **18** is preferably but not necessarily fabricated of steel although it may be of hardened brass or copper or the like. In any event its melting point is about 3000° or more as contrasted to that of 1200° for the injected material which is usually an aluminum alloy. Thus the disk **18** will be substantially unaffected by the molten aluminum alloy.

After the molten aluminum alloy **21** is poured into the sleeve **12** the plunger **13** is inwardly actuated under very high pressure so as to force the molten metal **21** into the cavity. It will be observed that cavity **14** is formed with a constricted gate valve opening **22** which is defined in part by the disk **18**. The injected material **21** can only be forced into cavity **14** through gate valve opening **22** which is disposed at the top end of disk **18**. In this way the molten metal **21** will not flow into the cavity by gravitation as this would produce a defective casting. It will be observed that the diameter of disk **18** is substantially that of injection sleeve **12** so as to block the flow except through constricted opening **22**.

At the end of the injection process the casting **15**, after cooling, is formed with a gate **23** having a small bridge or gate portion **24** to which is integrally connected the pancake shaped residue or sprue **25**. Inasmuch as sprue **25** is connected to the panel unit **15** only through bridge or gate portion **24** at one edge of disk **18**, the sprue can be easily knocked or pried off leaving only a minimal gate portion **24** which can be easily ground or otherwise machined off so as to be flush with surface of outer panel **17** and thus provide a satisfactorily finished surface.

The finished casting unit as shown in FIGURE 4, besides being produced in a most economical way, is actually far stronger than a conventional casting. The plate or disk **18** is embedded in and bonded to the body by the solidified alloy and is flush with the surface of panel **17**. Disk **18** reenforces the casting so as to greatly increase its load bearing strength. The casting **15** will generally be used as a module in building structures.

I have shown a preferred embodiment of my invention, but it is obvious that numerous changes and omissions may be made without departing from its spirit. For example, the gate valve opening **22** may be of any desired shape as may be the disk **18** itself.

In a satisfactory embodiment, the casting was about 18" square. The disk **18** as about 3½" in diameter and ⅛" thick. Of course, these figures are merely representative and are given strictly as examples.

What is claimed is:

1. In the die casting of metal wherein molten metal is injected under pressure through a sleeve into the cavity of a coupled die, the steps comprising separably positioning a barrier member of higher melting point than said molten metal is registry with the open end of said sleeve to define therewith a restricted outlet port, injecting molten metal under pressure through said restricted outlet port into said die cavity leaving a residue in said sleeve, cooling and solidifying said metal and disengaging the die cast piece and the residue and the barrier member as a unit from said sleeve, said residue being connected to said die cast piece by a relatively narrow bridge delineated by said outlet port, and thereafter separating said residue from said die cast piece along said bridge.

2. The method of claim 1 wherein said barrier member comprises a flat plate and said outlet port is disposed along the upper edge of said injection sleeve open end.

3. The method of claim 1 wherein said barrier member is separately supported by said die.

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MARCUS U. LYONS, *Primary Examiner.*