March 14, 1967 M. E. ROWLAND 3,308,513

APPARATUS FOR CORING BOLT HOLES

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FIG. 1

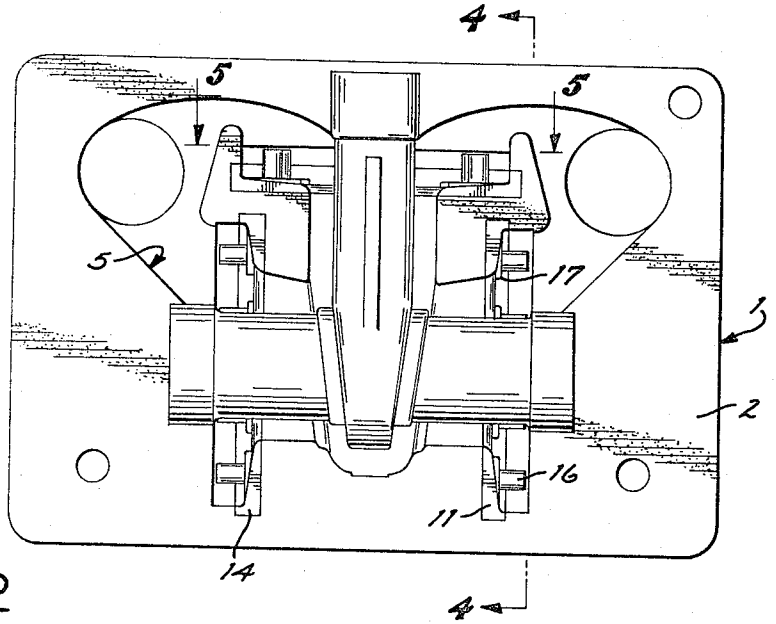
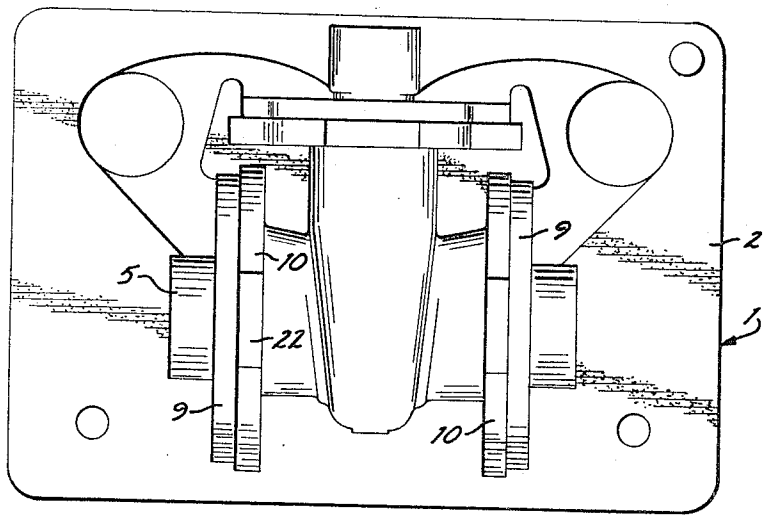


FIG. 2



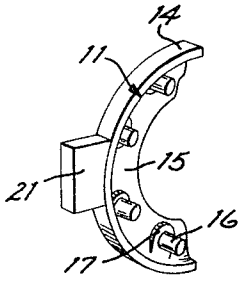


FIG. 3

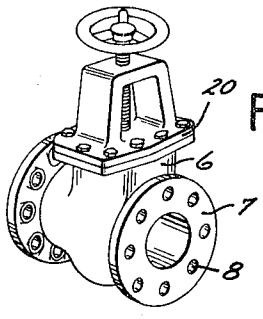


FIG. 9

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FIG. 4

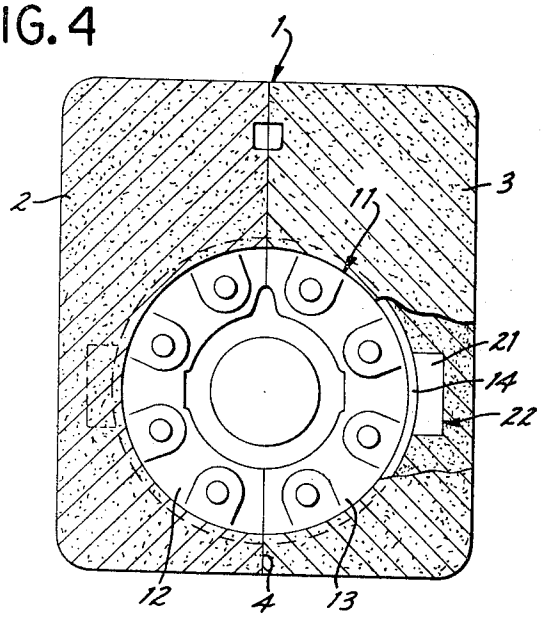


FIG. 6

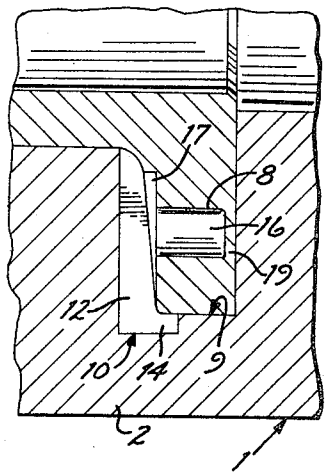


FIG. 5

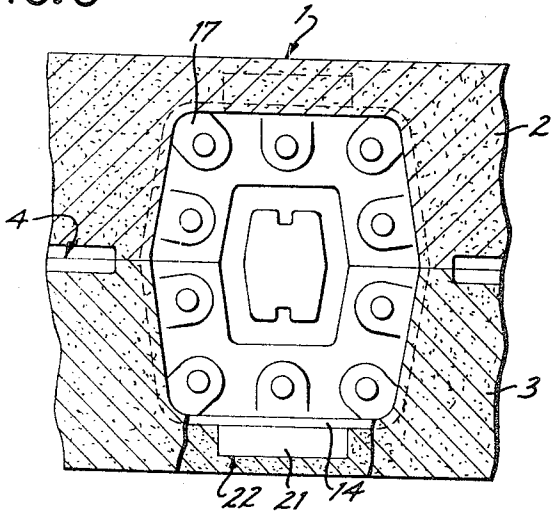
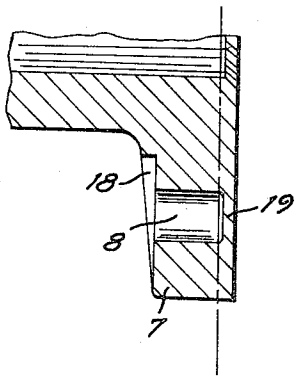


FIG. 7



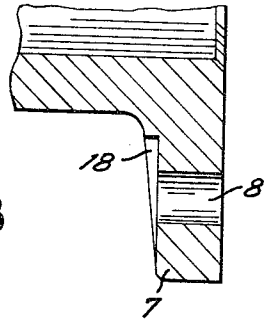


FIG. 8

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3,308,513

APPARATUS FOR CORING BOLT HOLES

Milton E. Rowland, Long Beach, Calif., assignor to Pacific Valves, Inc., Long Beach, Calif., a corporation of California

Filed June 1, 1965, Ser. No. 460,181
5 Claims. (Cl. 22—131)

This invention relates to a method of coring bolt holes in a steel casting, and particularly where such holes are required in a flanged part of the casting, such as a valve body which is provided with flanges whereby the valve is bolted in a pipe line or the like.

An object of my invention is to provide a novel method whereby bolt holes may be cored in a steel casting, which has not been heretofore accomplished due to the amount of contraction of the steel when going from a molten to a solid state.

Another object of my invention is to provide a novel method of simultaneously forming bolt holes in a steel casting, and the flat spot face areas which surround the bolt hole at one end thereof.

Another object of my invention is to provide a novel method of coring bolt holes in which the core can be formed of either metal, wood, or a plastic product.

Still another object of my invention is to eliminate the present requirement of setting a valve in a drill press to drill the bolt holes and, subsequently, to operate the spot face tool through the drilled holes.

Still another object is to provide a method which materially decreases the cost of manufacture of the cast articles, and also which will provide greater accuracy for the bolt hole spacing in the casting, and also to accomplish a flat and smooth spot face surface. Also with my method the production of articles can be materially increased, since the drilling time and setting-up time of drilling machines is entirely eliminated.

Other objects, advantages and features of the invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

In the drawing:

FIGURE 1 is a top plan view of the sand mold with various cores positioned therein.

FIGURE 2 is a plan view of half of a sand mold showing the shaped recesses therein but without the cores.

FIGURE 3 is a perspective view of one-half of a bolt hole forming core.

FIGURE 4 is a sectional view taken on line 4—4 of FIGURE 1.

FIGURE 5 is a fragmentary sectional view taken on line 5—5 of FIGURE 1.

FIGURE 6 is a fragmentary vertical sectional view through one of the bolt holes formed by a core.

FIGURE 7 is a fragmentary vertical view of the steel casting as it is removed from the mold.

FIGURE 8 is a view similar to FIGURE 7 but showing the flange surface machined to expose the bolt holes.

FIGURE 9 is a perspective view of a valve molded according to my method.

Referring more particularly to the drawing, the numeral 1 indicates a sand core which has been shaped and baked so that it forms a substantially rigid bed, into which the molten steel can be poured to produce the cast article. The mold 1 is preferably formed in two complementary parts 2–3 which separate on what is termed a parting line 4. The sand of which the mold 1 is made has certain additives which, when the sand is baked, will produce a very rigid body and one in which the sand will not shift about. The mold 1 has shaped recesses 5 formed therein to produce the external shape of an article, such as the valve 6 and the flanges 7 thereon. The

flanges 7 are provided with a plurality of circumferentially spaced bolt holes 8, and it is these bolt holes which form the subject matter of this invention. Heretofore it was necessary to drill these bolt holes in a drill press, requiring many man hours of labor, and also these bolt holes were not necessarily accurately spaced. In my invention these bolt holes are accurately cored in the flanges 7 of the article 6 and are molded simultaneous with the body of the article, such as the valve 6. The recesses 9 are circularly shaped to produce the flanges 7, and an adjacent recess 10 is parallel to the recess 9 for the purpose of receiving the bolt hole core 11. The bolt hole core 11 is formed in two complementary halves 12–13 and each half includes the following parts:

A peripheral rim 14 is substantially the same width as the groove 10 and completely fills this groove at the periphery thereof. Integral with the rim 14 I provide a flange 15 which projects inwardly from the rim 14. A plurality of circumferentially spaced bolt hole cores 16 in the shape of short pins project into the arcuate groove 9. The pins 16 are each formed with a somewhat circular base 17 which form and shape the spot face 18 in one face of the flange 7 of the finished product. It will be noted that the pin 16 does not extend entirely to the outer wall of the groove 9, but terminates before reaching this end wall to form a thin steel covering sheet 19 over the bolt hole 8, as best shown in FIGURES 6 and 7. When the surface of the flange 7 is machined to provide a smooth and accurate face, the thin metal sheet 19 will tend to guide the tool in its path and will prevent the tool from dropping into the bolt holes 8, and will thus prevent chattering of the tool or damage to the flange of the cast article.

In FIGURE 5 the bolt hole core is somewhat differently shaped than that shown in FIGURE 4. The purpose of this core is to form the bolt holes in the flanged portion 20 of the valve 6. The general construction of the pins, the base of the pins, etc., is the same as previously described with regard to the core 11. So that the cores 11 may be accurately positioned and aligned in the sand mold 1, I provide an outwardly projecting blade 21 on each of the bolt hole cores, and this blade fits accurately into the blowhole 22 in the mold.

Under certain casting conditions it is also possible to reverse the position of the bolt hole core 11 so that the pins 16 thereon will extend in the opposite direction; that is, they will extend inwardly instead of outwardly when in position in the mold box. It is also possible to make the bolt hole core 11 in one circular piece instead of two pieces, as shown, if this should be desirable.

Having described my invention, I claim:

1. An apparatus for coring bolt holes in a steel casting during the casting operation comprising,

a mold having cavities therein conforming to the shape of the steel article, including a cavity conforming to the shape of a flange on the article;

said mold having another cavity therein adjacent and parallel to the cavity conforming to the shape of the flange on the article,

a bolt hole core fitting into the last named cavity,

said bolt hole core including a core pin projecting into the cavity conforming to the shape of a flange on the article,

a protruding spot face base on the inner end of the bolt hole core.

2. An apparatus for coring bolt holes in a steel casting during the casting operation comprising,

a sand mold formed in two complementary parts having cavities therein conforming to the shape of the steel article, including a cavity conforming to the shape of a flange on the article;

said mold having another cavity therein adjacent and parallel to the cavity conforming to the shape of the flange on the article,

a bolt hole core fitting into the last named cavity formed in two complementary parts,

said bolt hole core including a core pin projecting into the cavity conforming to the shape of a flange on the article.

3. An apparatus for coring bolt holes in a steel casting during the casting operation comprising,

a sand mold formed in two complementary parts having cavities therein conforming to the shape of the steel article, including a cavity conforming to the shape of a flange on the article;

said mold having another cavity therein adjacent and parallel to the cavity conforming to the shape of the flange on the article,

a bolt hole core fitting into the last named cavity formed in two complementary parts,

said bolt hole core including a core pin projecting into the cavity conforming to the shape of a flange on the article,

a protruding spot face base on the inner end of the bolt hole core.

4. An apparatus for coring bolt holes in a steel casting during the casting operation comprising,

a mold having cavities therein conforming to the shape of the steel article, including a cavity conforming to the shape of a flange on the article,

said mold having another cavity therein adjacent and parallel to the cavity conforming to the shape of the flange on the article,

a bolt hole core fitting into the last named cavity,

said bolt hole core including a rim, an inwardly projecting flange, and a core pin projecting into a cavity conforming to the shape of a flange on the article.

5. An apparatus for coring bolt holes in a steel casting during the casting operation comprising,

a mold having cavities therein conforming to the shape of the steel article, including a cavity conforming to the shape of a flange on the article,

said mold having another cavity therein adjacent and parallel to the cavity conforming to the shape of the flange on the article,

a bolt hole core fitting into the last named cavity,

said bolt hole core including a rim, an inwardly projecting flange, and a core pin projecting into a cavity conforming to the shape of a flange on the article,

a protruding spot face base on the inner end of the bolt hole core.

References Cited by the Examiner

UNITED STATES PATENTS

1,002,355	9/1911	Anderson	22—131
1,039,596	9/1912	Schuricht	249—100 X
1,410,777	3/1922	Thomes	22—134
2,052,921	9/1936	Dockray et al.	22—126 X

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