April 1, 1969 J. A. ORRIS ET AL 3,435,884

GATE POSITIONING DEVICE FOR ARTICLE-CASTING MACHINE

Filed June 1, 1966 Sheet 1 of 2

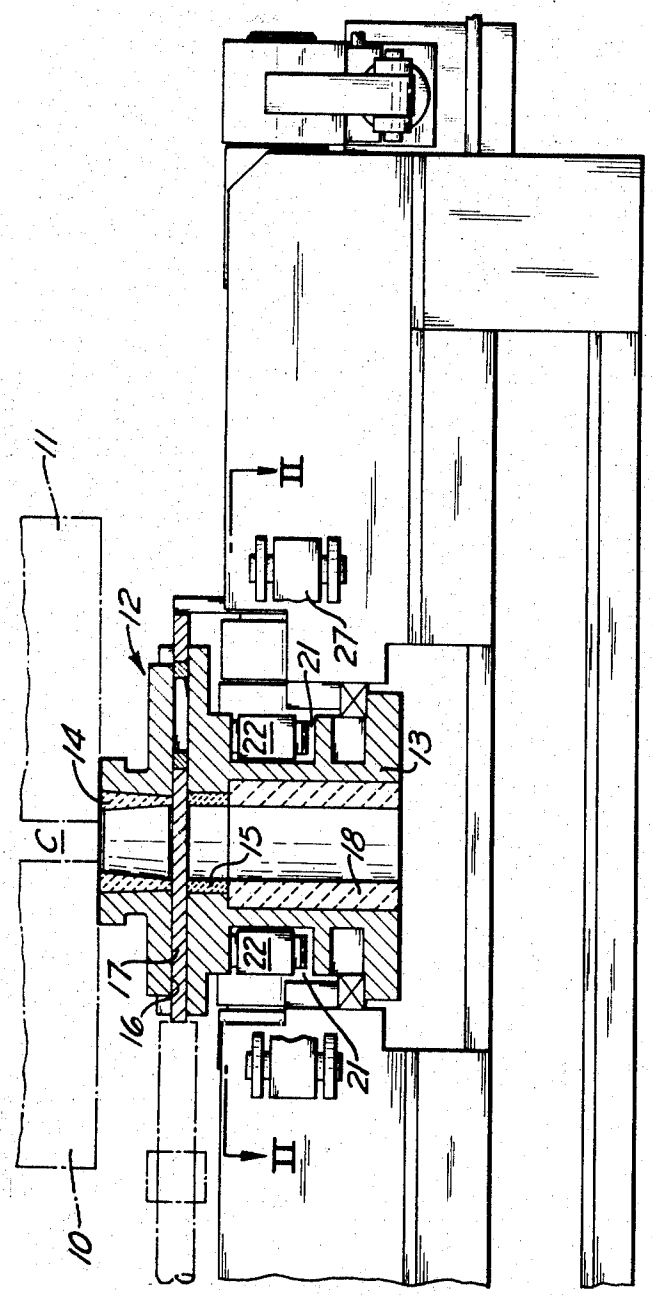


Fig. 1

INVENTORS.
JOHN A. ORRIS
LEON DAROSZEWSKI
BY
Henry C. Westin
ATTORNEY.

April 1, 1969 J. A. ORRIS ET AL 3,435,884

GATE POSITIONING DEVICE FOR ARTICLE-CASTING MACHINE

Filed June 1, 1966 Sheet 2 of 2

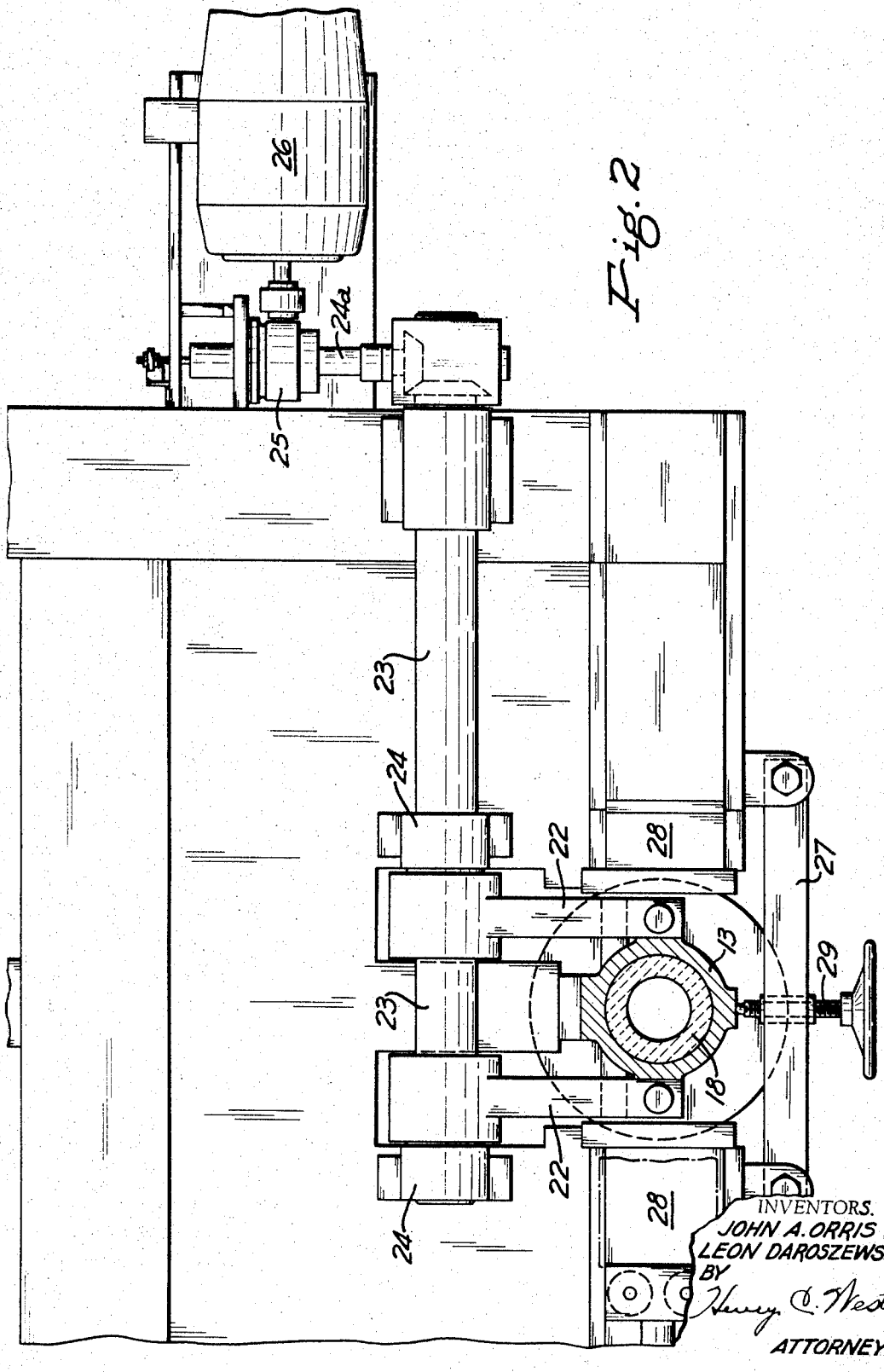


Fig. 2

INVENTORS.
JOHN A. ORRIS
LEON DAROSZEWSKI
BY
Henry C. Westin
ATTORNEY.

United States Patent Office 3,435,884
Patented Apr. 1, 1969

3,435,884

GATE POSITIONING DEVICE FOR ARTICLE-CASTING MACHINE

John Adam Orris, Mars, and Leon Daroszewski, Pittsburgh, Pa., assignors to United Engineering and Foundry Company, Pittsburgh, Pa., a corporation of Pennsylvania

Filed June 1, 1966, Ser. No. 554,602
Int. Cl. B22d *35/04*; B29f *1/05*
U.S. Cl. 164—341 3 Claims

ABSTRACT OF THE DISCLOSURE

The present disclosure relates to a novel gate assembly for an article-casting machine and, more particularly, to a simple and trouble-free mechanism for moving the gate and assuring that a proper sealing condition will exist between the gate and the cooperating mold assembly.

In the preferred form of the present disclosure, there is provided a gate assembly adapted to be moved forcibly into engagement with a portion of a mold assembly and through which molten metal is delivered to a mold, an arm for supporting said gate assembly, and projecting from one side thereof, a shaft arranged normal to and spaced away from the mold for carrying said arm, a mechanical self-locking device rotatably connected to said shaft, a power means connected to said device for causing operation of the device and, hence, applying to said gate assembly through said shaft and arm a desired sealing force to urge the gate forcibly against the mold assembly, the construction being such that on the inadvertent drop in the force produced by said power means said device will retain the gate assembly in its operative position.

BACKGROUND OF INVENTION

While, as will be apparent, the present invention can be employed in many article-casting devices, for the purpose of explanation and illustration only, the invention is addressed to a bottom pressure casting machine of the type shown in U.S. Patent No. 3,015,863 dated Jan. 9, 1962, that issued to C. F. Strom et al.

In this machine it is important that the gate be urged against the mold with a specific, predetermined force and that the means for urging the gate be not subject to inadvertent power failures since in such an event the molten metal would be allowed to run out of the mold assembly. It is also a requirement in certain casting machines that the gate be allowed to move a sufficient distance away from the mold so as to allow the cast article to be removed. Heretofore, the gate had been urged against the mold by a fluid pressure cylinder, such as, an hydraulic piston cylinder assembly which was directly subject to power failures and, hence, was found very objectionable.

DRAWINGS

The above features of the present invention will be more evident when the following description is read along with the following:

FIGURE 1 is a sectional view of a gate assembly incorporating the present invention, and

FIGURE 2 is a sectional view taken on line II—II of FIGURE 1.

With reference first to FIGURE 1, there is illustrated two side mold blocks **10** and **11** that form a cavity C, a portion of which is shown and which defines the width of the article to be cast. It will be appreciated that in addition to these two side mold blocks, there will be employed bottom and top mold blocks and two end mold blocks to complete the perimeter of the cavity. It should also be appreciated that below the gate **12**, to be now

discussed, there is provided a pressure vessel to which molten metal under pressure is passed to the gate and, hence, into the cavity C of the mold assembly.

Immediately below the mold blocks **10** and **11** there is provided, as shown in FIGURE 1, the pouring gate **12** which essentially consists of a cylindrical hollow housing **13** or casing which is received in the space between the pressure vessel and the bottom of the mold assembly. At its top the gate receives the first of three refractory liners **14**. This liner is separated from the next liner **15** by an opening **16** into which is received a reciprocable shutoff valve **17** which is shown in FIGURE 1 in its metal blocking position, where metal is prevented from passing from the vessel to the mold cavity. Below the liner **15** is the third liner **18**.

As noted above, the housing **13** is vertically movable; the movement being accomplished by providing on opposite sides of the housing openings **21** to which there are received the ends of a pair of arms **22**. FIGURE 2 best shows the arms which run from the pouring gate **12** outward therefrom in the direction of the mold blocks at which point the arms **22** are carried by a shaft **23**, the shaft being rotatably received in bearing blocks **24** and adapted to rotate and through which rotation the gate **12** is advanced towards and away from the mold assembly. When lowered, the gate permits easy removal of the cast article. In the illustrated case the total movement of the gate will approximate 6 inches. At one end of the shaft **23** there is secured a mitre gear which meshes with the second mitre gear fixed to a shaft **24***a* which is rotated by a mechanical jack **25**. It is important to note, as previously noted, that this jack **25** has a high gear ratio so that it is substantially self-locking, as to any tendency of the weight of the gate-arm-shaft to operate the jack. The gear ratio of the jack in the illustrated form is a 24:1 reduction having a ¼" pitch. The input side of the jack is connected to an electrical torque motor **26** of a well-known type which has the necessary capacity through the jack to furnish the desired lifting pressure to the gate **12**. In the illustrated form the motor is rated 2 H.P. at 300 to 1200 r.p.m. which is operated at an overload condition momentarily to obtain the desired gate-lifting force of 150% of its full torque capacity, after which the motor is shut off and the jack is employed to hold the gate in a sealed condition.

FIGURE 2 also shows the holding mechanism of the gate at the front thereof, which prevents the gate from moving relative to the arms **22**. The gate-holding mechanism includes parallel bars **27** that are carried by a frame portion **28**, the bars themselves carrying a handscrew **29** that engages and secures the gate.

In accordance with the patent statutes, we have explained the principle and operation of our invention and have illustrated and described what we consider to represent the best embodiments thereof. However, we desire to have it understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. In a gate assembly adapted for use with a bottom pressure casting machine and through which molten metal passes to the mold assembly comprising:

a frame,

a gate housing, including a molten metal passageway, and having one end adapted to be brought into a sealed condition with a portion of the mold,

a carrying arm on said frame freely engaging said housing and projecting away from one side thereof,

a mechanical self-locking device connected to said arm to vertically displace said arm and, hence, move said housing towards and away from said mold assembly,

a power means connected to said device for causing operation of said device,

said powen means characterized in having the capacity to at least momentarily deliver the required sealing force between said housing and said mold assembly, and

wherein said self-locking device has means to maintain said sealing force on a reduction or discontinuation of the force developed by said power means.

2. In a gate assembly according to claim 1, in which said arm is connected to said self-locking device by a shaft,

said self-locking device comprising a single screw jack having a gear ratio and pitch characteristic so as to hold the arm and, hence, the gate assembly at a force substantially equal to that developed by said power means, and

wherein said power means comprises a single torque motor.

3. In a gate assembly according to claim 1 wherein a pair of openings is formed in said housing:

said arm comprising a pair of fingers, one of which extends into one of said housing openings and the other of which extends into the other of said housing openings:

a shaft located on one side of said housing carrying said fingers in a manner that the fingers and the shaft form a three-sided channel into the open end of which is received said housing; and

means for holding said housing on said arms.

References Cited

UNITED STATES PATENTS

3,005,358	10/1961	Musser	74—640
3,340,926	9/1967	Sylvester	164—335 X

FOREIGN PATENTS

1,200,514	6/1959	France.
851,662	10/1952	Germany.

J. SPENCER OVERHOLSER, *Primary Examiner.*

R. D. BALDWIN, *Assistant Examiner.*

U.S. Cl. X.R.

164—337