Aug. 21, 1962 R. A. SCHULTZ 3,049,769

ADJUSTABLE-TAPER MOLD FOR CONTINUOUS CASTING

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FIG. 1

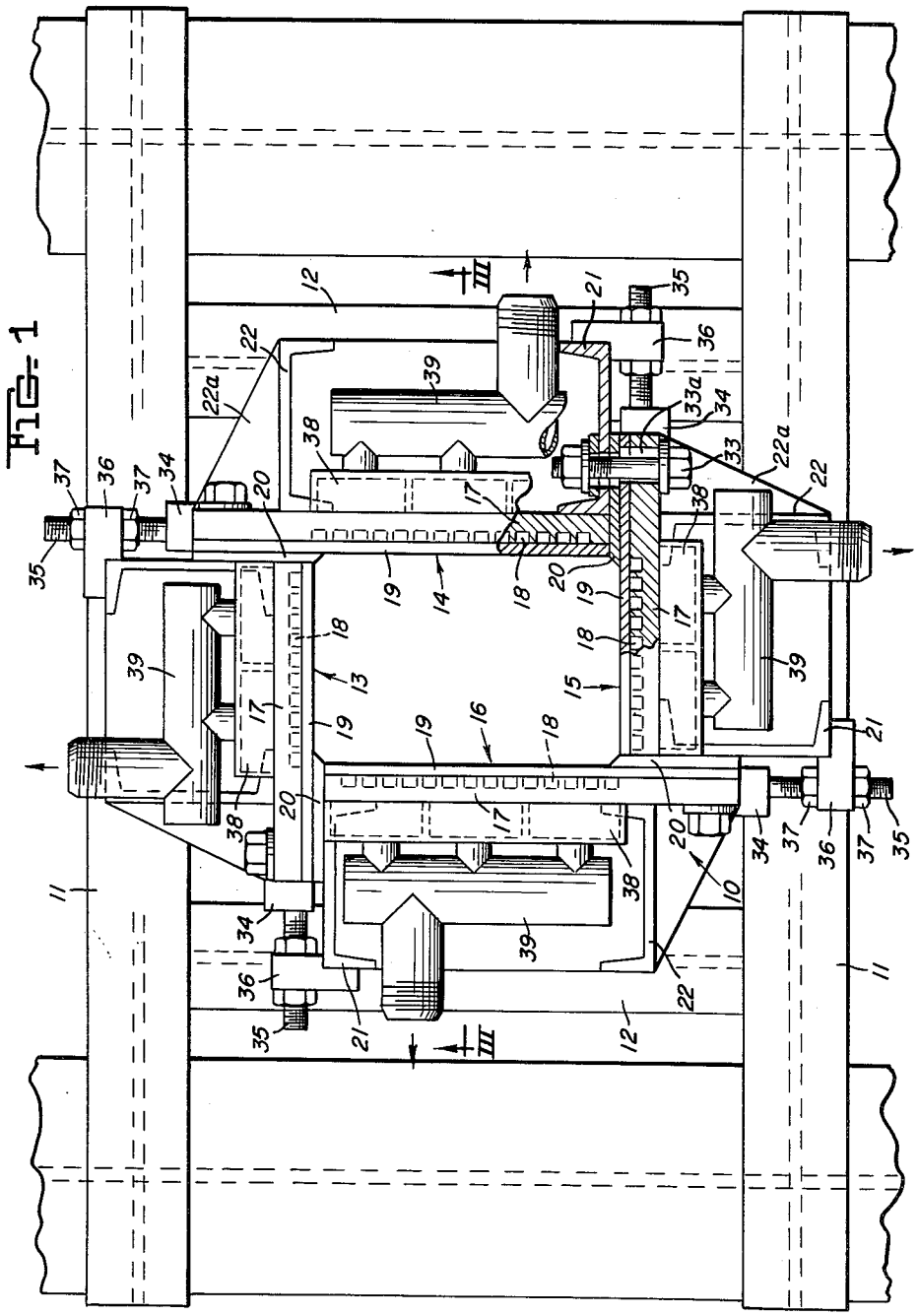

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FIG. 2

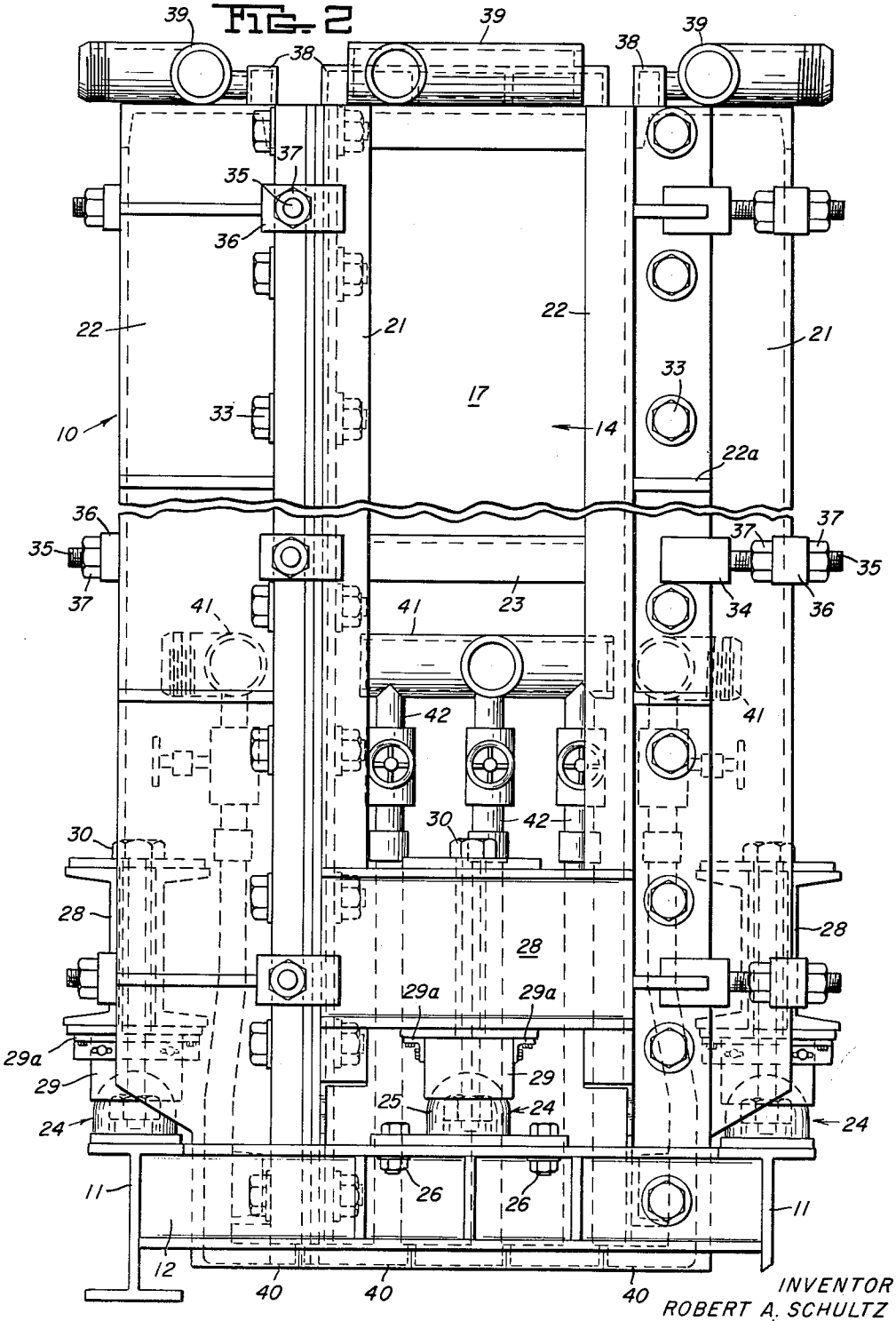

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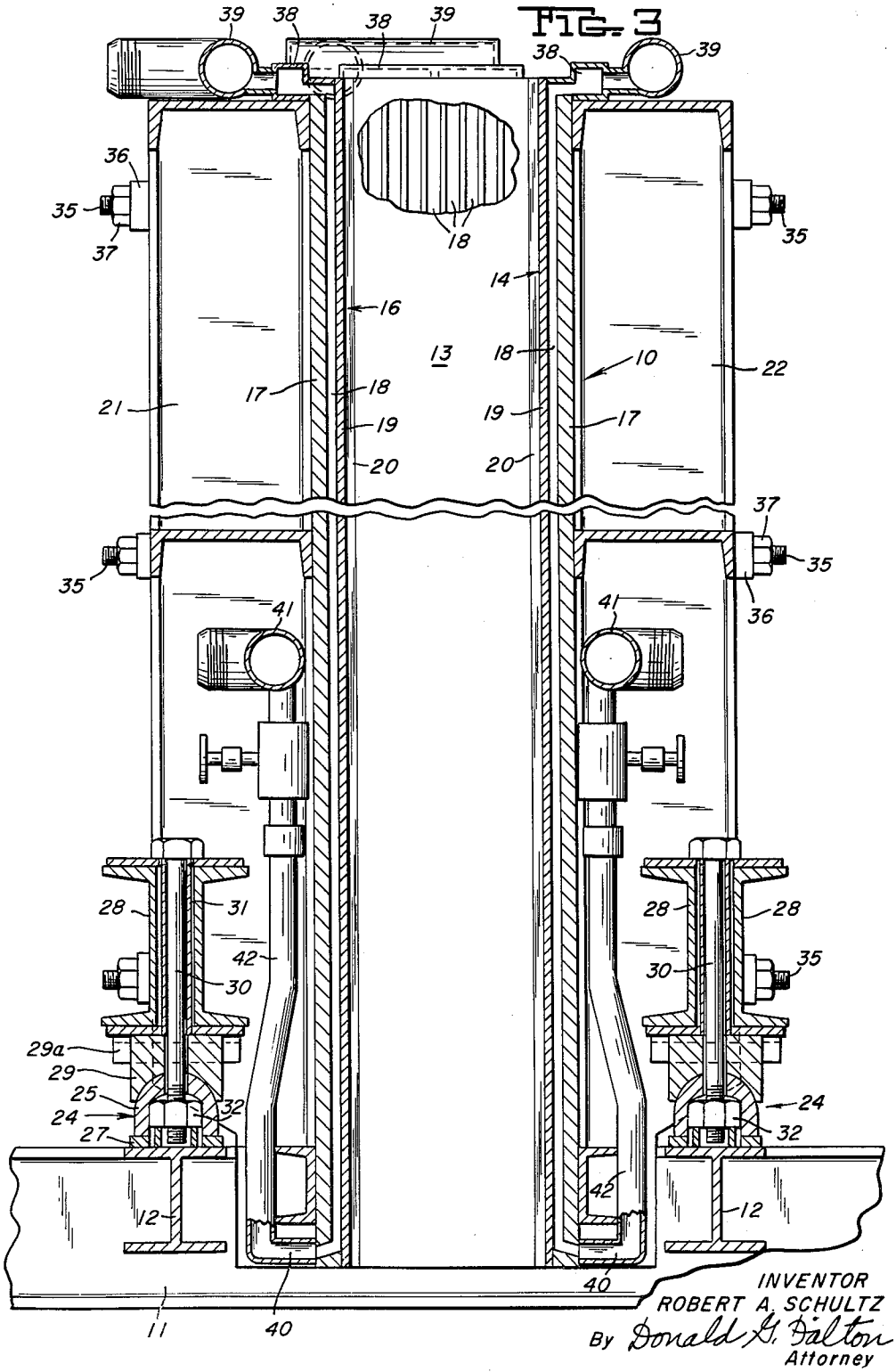
FIG. 3



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ADJUSTABLE-TAPER MOLD FOR CONTINUOUS CASTING

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5 Claims. (Cl. 22—145)

This invention relates to a mold for continuous casting and, in particular, to a mold of rectangular section having independently adjustable walls, whereby a tapered mold cavity may be formed and the degree of taper thereof varied.

Tapered molds have special advantages for continuous casting. The optimum degree of taper, however, varies with conditions such as the pouring rate, the volume of coolant applied, etc. It is therefore the object of my invention to provide a mold having walls adjustable to different inclined positions, thereby affording the possibility of varying the degree of taper of the mold cavity.

In a preferred embodiment of the invention, the walls of a mold of rectangular section are supported independently on a hemispherical bearing which is itself adjustable toward and from the axis of the mold cavity. The walls are secured together adjacent their edges and means are provided for effecting movement of one relative to the others. The walls are of metal of high thermal conductivity, such as copper, backed up by steel plates having passages therein for coolant liquid.

A complete understanding of the invention may be obtained from the following detailed description and explanation which refer to the accompanying drawings illustrating the present preferred embodiment. In the drawings:

FIGURE 1 is a plan view;

FIGURE 2 is a side elevation;

FIGURE 3 is a longitudinal section taken along the plane of line III—III of FIGURE 1.

Referring now in detail to the drawings, my improved mold, indicated generally at **10**, is supported below the teeming vessel and above the casting receiving means (not shown) on a framework comprising spaced beams **11** and girders **12** extending therebetween. The mold comprises four similar wall panels **13**, **14**, **15** and **16** arranged so that an edge of each abuts the adjacent panel close to its other edge but inwardly thereof, as shown in FIGURE 1. Each panel comprises a plate **17** grooved at **18** to provide coolant passages, with a face plate **19** and a filler plate **20** of metal of good thermal conductivity such as copper, overlying the inner face and an edge of plate **17**, respectively. The plate **19** of each panel makes flatwise engagement with plate **20** of the adjacent panel. Plates **19** and **20** are secured to plate **17**, respectively, in any convenient manner.

Each panel includes rails **21** and **22** of channel section extending therealong and welded thereto. Rail **22** has gussets **22***a* on one side. Cross ties **23** extend between the rails at locations spaced therealong and are welded to plate **17**. Each panel has a bearing structure **24** adjacent the lower end thereof. Such bearing structure includes a hemisphere **25** secured to one of the beams **11** (or one of the girders **12**) by screws **26**. Slots are formed in the beam flanges and in bottom plates **27** of hemisphere **25**, at right angles to each other, permitting limited adjustment of the knob along the beam or normal thereto.

A cross bar **28** including a pair of spaced channels, extends between rails **21** and **22** adjacent the lower ends thereof. A bearing socket **29** secured to the bottom of the transom by angles **29***a* fits on hemisphere **25**, forming therewith a ball-and-socket joint. A bolt **30** extends through a guide sleeve **31** in the transom, through socket

29 and hemisphere **25** and is threaded into a nut **32** nonrotatably secured within the latter.

As shown in FIGURE 1, the lapping edge of one mold wall is secured to the adjacent wall which it abuts by bolts **33**. The lapping edge of one wall has slots **33***a* therein and the rail **21** of the adjacent wall has similar slots. These slots through which bolts **33** are inserted, permit limited adjustment of one wall along the other when the bolts are loosened.

The lapping edge of each mold wall also has lugs **34** welded thereto. Studs **35** fixed to lugs **34** extend from said lugs and through lugs **36** welded to the rail **21** of the adjacent wall. Adjusting nuts **37** on the stud permit pressure or tension to be exerted on the stud to effect the adjustment of the mold walls just described.

Coolant headers **38** on top of the rails of each mold wall communicate with the upper ends of passages **18** and have a manifold **39** connected thereto. Similarly, headers **40** communicate with the lower ends of passages **18** and have a manifold **41** connected thereto. As shown, three branch pipes **42** extend from manifold **41**, each having its own control valve, and enter header **40** which has a separate chamber for each branch pipe. Thus the volume of coolant flow in different areas of the mold wall may be independently controlled.

It will be evident that the angle made by each mold wall with the horizontal, in two vertical planes at right angles may be adjusted to vary the taper of the mold and thus vary the cross-section of the mold cavity from top to bottom. This is permitted by the overlapping wall design and the ball-and-socket joint in each bearing structure **24**. These bearings themselves may also be adjusted along beams **11** and girders **12** or toward and from the longitudinal axis of the mold, for dimensional changes. When the mold walls have been adjusted, tightening of the bolts **33** makes the joints between walls leakproof.

The mold is rigid and sturdy, despite the provision of taper-adjustment means, yet the structure is simple and easy to operate.

Although I have disclosed herein the preferred embodiment of my invention, I intend to cover as well any change or modification therein which may be made without departing from the spirit and scope of the invention.

I claim:

1. A mold comprising a fixed support, a plurality of wall panels extending upwardly therefrom together defining a mold cavity, one edge of each wall panel having flatwise engagement with the inner surface of an adjacent wall panel, releasable means securing the edges of adjacent wall panels together, a ball-and-socket bearing structure adjacent the lower edge of each wall panel, one part of said bearing structure being secured to its wall panel and the other part resting on said fixed support.

2. The combination defined in claim 1, characterized by coacting means mounted on the edges of adjacent walls to effect relative movement therebetween on release of said securing means.

3. The combination defined in claim 1, characterized by each wall comprising a metal plate having spaced vertical rails extending exteriorly therealong and secured thereto.

4. The combination defined in claim 3, characterized by said bearing structure including a cross bar extending between said rails adjacent the bottom of said plate.

5. The combination defined in claim 3, characterized by lugs spaced along one rail of each wall, screws extending from the edge of the adjacent wall through said lugs and nuts on said screws engaging said lugs effective to apply axial stress to the screws.

No references cited.