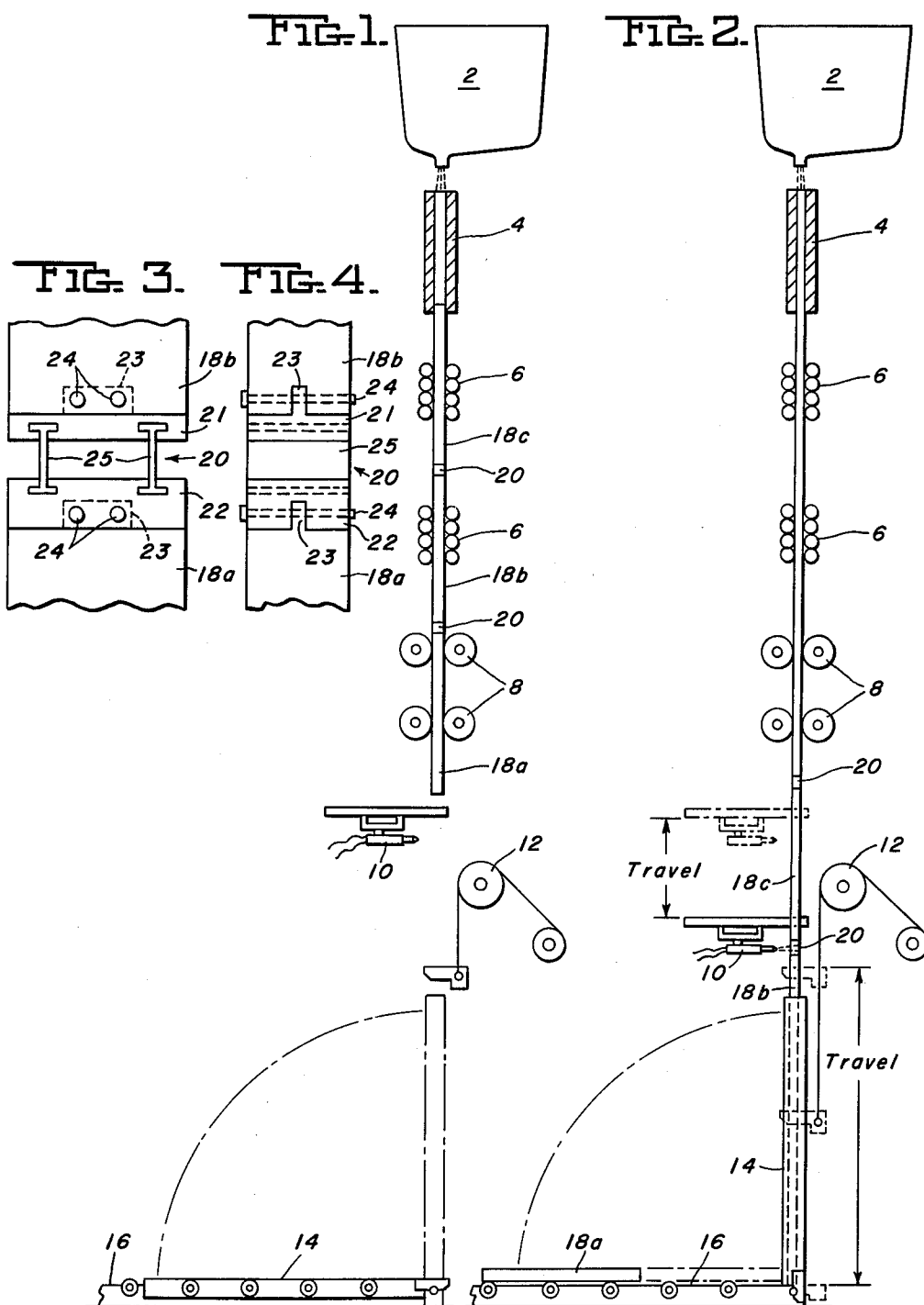


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G. C. GEISEN, JR.
CONNECTOR WITH SEVERABLE ELEMENTS FOR CONTINUOUS-CASTING
STARTER-BAR SECTIONS
Filed March 11, 1963

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3,220,068

CONNECTOR WITH SEVERABLE ELEMENTS FOR CONTINUOUS-CASTING STARTER-BAR SECTIONS

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6 Claims. (Cl. 22-57.2)

This invention relates generally to the continuous casting of semi-finished masses of metal (slabs, billets or the like) and, in particular, to a means for connecting the sections of a starter bar used therein, and subsequently disconnecting them.

In conventional continuous-casting apparatus, it is customary to employ a starter bar to plug the usual open-bottomed mold initially and to provide means for supporting the metal column or casting as it descends through the guide rolls and pinch rolls normally mounted below the mold. The sectional area of the starter bar usually approximates that of the casting, and its weight should be sufficient to overcome the friction between the guide rolls and the casting, and insure the continued downward movement of the casting until it is engaged by the pinch rolls, which then control further descent of the casting. It is necessary that the starter bar be composed of separate sections to facilitate placement by "threading" it upwardly from the floor level through the pinch rolls, guide rolls, and thence to the bottom of the mold. As each section of the conventional starter bar is properly positioned, it is rigidly connected to the adjacent section by bolts or pins.

When the casting operation is begun and the starter bar moves downwardly, it is necessary to separate the sections as their ends reach the level of the means, viz., a cutting torch, used for severing the casting. As each section is disconnected, it must be quickly moved out of the way to permit the continued descent of the remaining sections of the starter bar and the casting itself. Quick separation of the starter-bar sections is difficult to achieve, however, because the connecting means, whether they be bolts or pins, are tightly engaged by reason of the weight of the starter-bar section beneath the joint and the friction existing between the casting and the guide rolls which supports this weight. It is therefore a principal object of the present invention to provide a sectionalized starter bar having connecting means which are quickly severable.

It is a further object of the present invention to provide a connecting means whereby separation of the individual starter-bar sections may be achieved without requiring the removal of bolts or pins.

A more specific object of the invention is to provide a means for connecting the starter-bar sections which may be severed by the torch normally employed for cutting lengths off the casting.

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 diagrammatic view of a continuous-casting apparatus with a three-section starter bar in position prior to the beginning of casting;

FIGURE 2 is a similar view with one of the means connecting the starter-bar sections in position for severing by the cutting torch;

FIGURE 3 is an elevation of my improved connection; and

FIGURE 4 is a side view thereof.

The apparatus shown in FIGURES 1 and 2 includes a

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bottom-pour ladle 2 suspended above a water-cooled flow-through mold 4 open at the top to permit the continuous introduction of molten metal from the ladle. The other end of the mold is likewise open to permit a casting to be withdrawn continuously as it solidifies. A plurality of guide rolls 6 are mounted beneath the mold as well as coolant nozzles (not shown) for discharging cooling sprays onto the surface of the casting. The apparatus further includes a plurality of pairs of pinch rolls 8 adapted to engage the casting and control the continuous withdrawal thereof. A cutting torch 10 is mounted in a conventional manner for limited travel with the casting while severing it into sections of a length suitable for further working. Hoist means 12 is positioned to lower a severed section of the casting onto a tilting receiver 14 which transports it to a run-out table 16.

As shown in FIGURE 1, the starter bar 18, which is in three sections designated 18a, 18b, and 18c is of about the same section as mold 4 and is positioned initially to plug the discharge end of the mold, extending downwardly therefrom through the guide rolls and pinch rolls. When casting begins and the connector 20, (described in detail hereafter) joining the sections 18a and 18b, reaches the position of the cutting torch 10, the torch is actuated to sever the connector intermediate its ends and thus separate the section 18a from the section 18b. The section 18a is then transported to the run-out table by the operation of the lowering device 12 and the tilting receiver 14.

The severable connector shown in FIGURES 3 and 4, indicated generally at 20, comprises spaced upper and lower blocks 21 and 22. The blocks are attached to the lower end of bar section 18a, for example, and the upper end of section 18b, respectively, by mortise-and-tenon joints 23 and through bolts 24. Blocks 21 and 22 have ways or slots in their adjacent faces adapted to receive slidable key members, e.g., the web and flanges of structural members 25 which may conveniently be lengths of I-beam section.

Torch 10 is operated to cut through the webs of members 25 when the connector 20 has descended such a distance that it is within the torch range. After the webs have been severed, section 18a is free for removal as by receiver 14. The starter-bar sections may be re-assembled by inserting new lengths of I-beams in the slots in blocks 21 and 22 or by welding together the severed halves of the lengths used previously.

It will be apparent that the invention provides means for quickly and easily taking apart the starter-bar sections for disposal and storage. The connector may also be re-assembled for further use in a very short time. The maintenance cost is low whether the severed I-beam lengths are welded together or new lengths are employed for each casting start.

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 continuous casting starter bar comprising a plurality of aligned sections having cross-sectional areas approximately that of the casting with which the starter bar is used, each pair of adjacent starter bar sections being spaced apart and joined together by a severable connector, said connector having spaced upper and lower blocks detachably connected to the starter bar sections above and below said connector respectively, and at least one load-bearing member exposing a severable surface between the blocks and having a cross-sectional area substantially smaller than that of the blocks whereby it

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may be quickly severed transversely by a cutting torch, and means for releasably connecting the top and bottom portions of said load-bearing member with said upper and lower blocks respectively to interconnect said blocks.

2. A continuous casting starter bar according to claim 1 in which said blocks have keyways therein and said load-bearing member is a key member slidable in said keyways.

3. A continuous casting starter bar according to claim 4 in which said key member is a length of I-beam.

4. A severable connector for a continuous casting starter bar comprising a plurality of sections having cross-sectional areas approximately that of the casting with which the starter bar is used, said connector having spaced upper and lower blocks adapted for connection with two adjacent starter bar sections, and at least one load-bearing member exposing a severable surface between said blocks and having a cross-sectional area substantially smaller than that of said blocks whereby it may be

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quickly severed transversely by a cutting torch, and means for releasably connecting the top and bottom portions of said load-bearing member with said upper and lower blocks respectively to interconnect said blocks.

5. A connector according to claim 4 in which said blocks have keyways therein and said load-bearing member is a key member slidable in said keyways.

6. A connector according to claim 5 wherein said key member is a length of I-beam.

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MARCUS U. LYONS, *Primary Examiner.*

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,220,068

November 30, 1965

George C. Geisen, Jr.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 10, for the claim reference numeral "4"
read -- 2 --.

Signed and sealed this 27th day of September 1966.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents