

Oct. 18, 1966

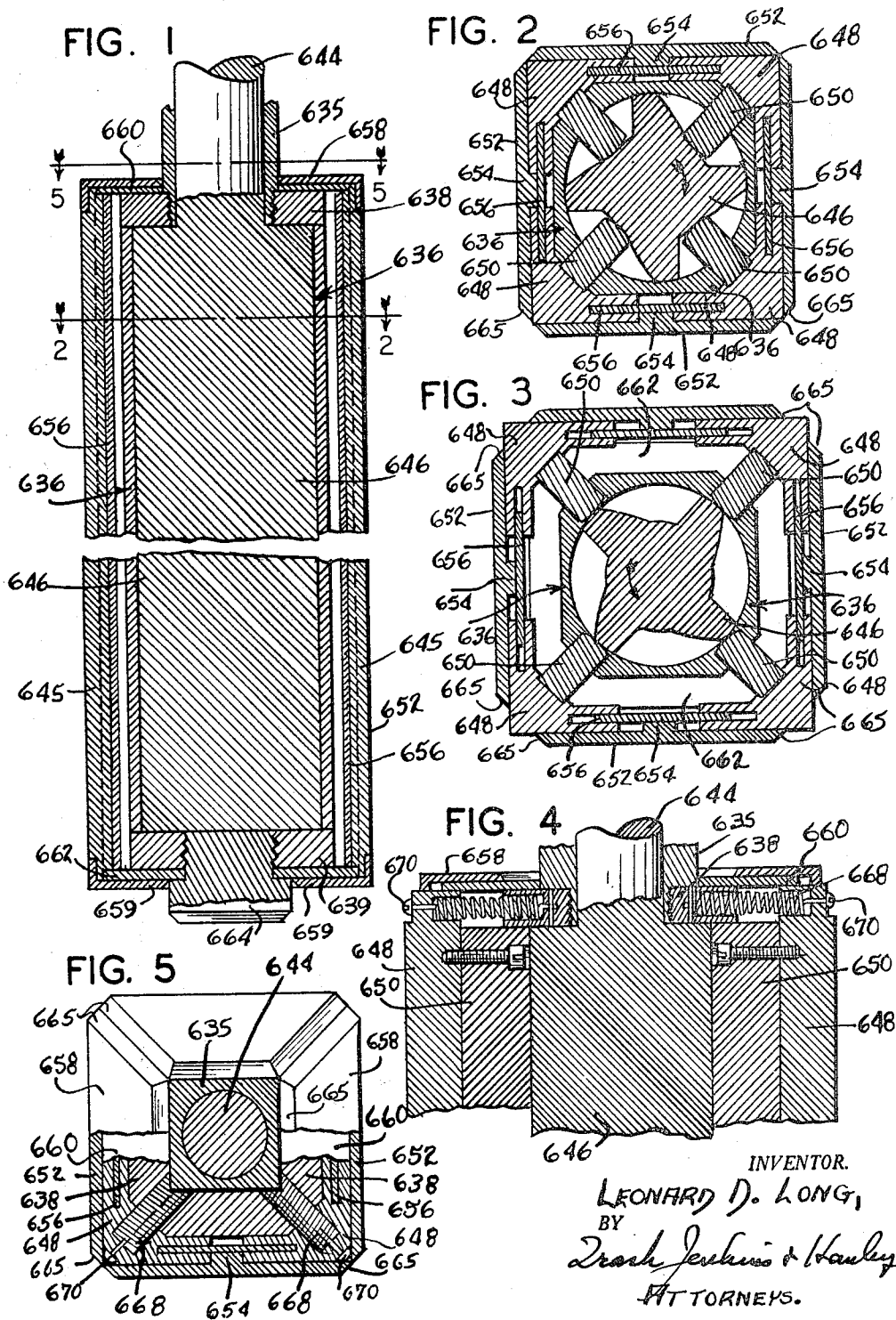
L. D. LONG

3,279,739

EXPANDABLE CORE-FORMER

Original Filed Aug. 25, 1960

2 Sheets-Sheet 1



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FIG. 6

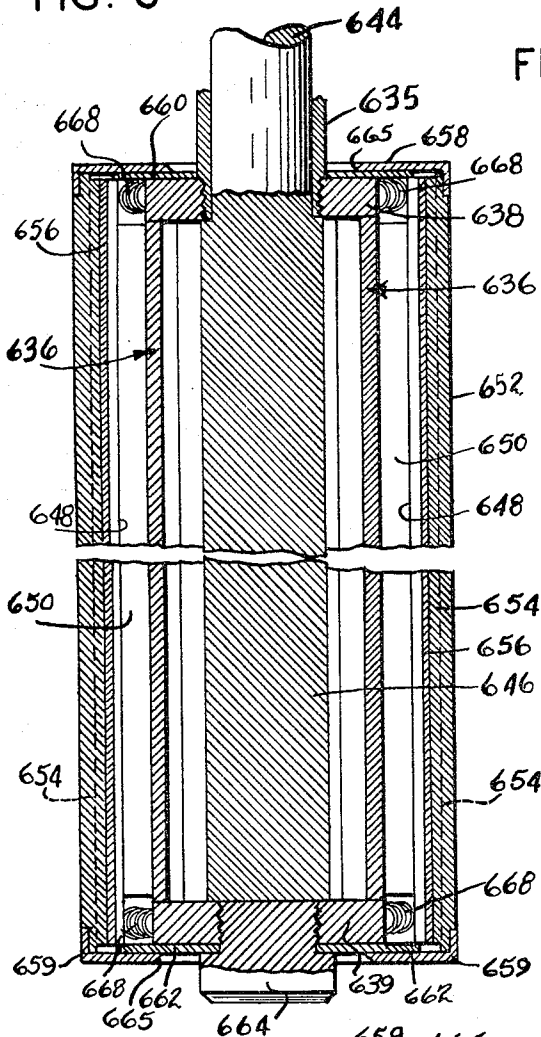


FIG. 8

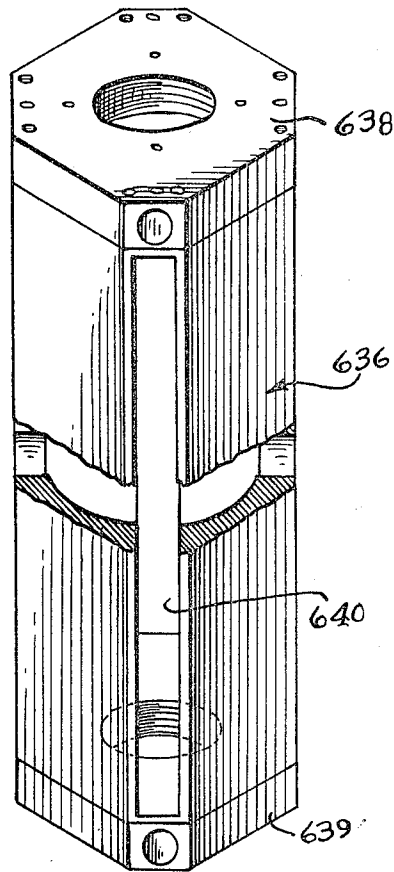
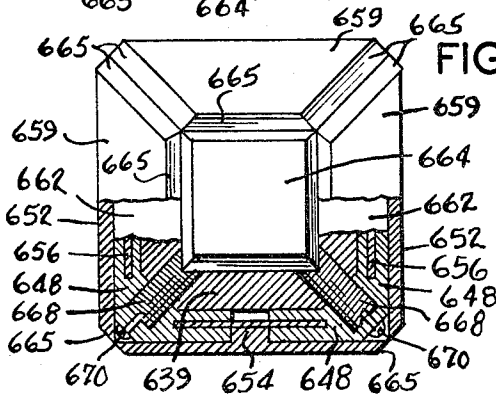


FIG. 7



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3,279,739

EXPANDABLE CORE-FORMER

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Application Aug. 1, 1962, Ser. No. 215,218, now Patent No. 3,210,039, dated Oct. 5, 1965, which is a division of application Ser. No. 51,972, Aug. 25, 1960, now Patent No. 3,090,093, dated May 21, 1963. Divided and this application July 19, 1965, Ser. No. 473,046
3 Claims. (Cl. 249—181)

This invention relates to a core-former, and more particularly to an expandable core-former for producing cores in cored building blocks and the like. This application is a division of my copending application Serial No. 215,218, filed August 1, 1962, now Patent No. 3,210,039, issued October 5, 1965, and which is a division of my application Serial No. 51,972, filed August 25, 1960, Patent No. 3,090,093, issued May 21, 1963.

It is an object of my invention to provide a core-former which can be expanded by a rotational thrust force, which can be uniformly expanded throughout its length, which can be expanded against the action of substantial counterforces, which can be maintained in a fixed position and orientation during its expansion, and which will prove sturdy and durable in use.

In accordance with one form of my invention, the core-former comprises a plurality of core segments having inwardly presented thrust-receiving faces which are operatively engaged by thrust-transmitting cam means mounted on a first shaft interposed between the core segments and rotatable to cause said cam means to move the core segments into spaced relation to each other for expanding the core-former. Conveniently, the core segments are operatively interconnected whereby upon reverse rotation of said first shaft said core segments will be moved toward each other to collapse the core-former. A second shaft is operatively connected to said core segments for moving the core-former to and from operative position in a mold.

A plurality of face plates are carried against the outer faces of the several core segments to bridge the spaces between said segments and prevent the entry of the material being cored from entering into the interior of the core-former from the sides thereof when said core-former is expanded. Preferably, the opposed ends of the face plates are provided with cover plates extending over plate means at the opposed ends of the core-former to prevent the material being cored from entering into the interior of the core-former from the ends thereof.

Other objects and features of my invention will become apparent from the more detailed description which follows and from the accompanying drawings, in which:

FIG. 1 is a vertical section through an expandable core-former embodying my invention;

FIG. 2 is a horizontal section taken on the line 2—2 of FIG. 1;

FIG. 3 is a horizontal section taken on the line 2—2 of FIG. 1, but showing the core-former in expanded position;

FIG. 4 is a fragmentary enlarged vertical section of the core-former shown in FIG. 1, but taken on an oblique core-former axis and showing the core-former in expanded position;

FIG. 5 is a horizontal section taken on the line 5—5 of FIG. 1, but showing portions of the core-former broken away;

FIG. 6 is a vertical section similar to FIG. 1, but showing the core-former in expanded position;

FIG. 7 is a bottom plan view of the core-former shown in FIG. 1, but with portions thereof broken away; and

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FIG. 8 is an enlarged isometric view of the cam sleeve shown in FIG. 2.

My core-former is adapted to be used in combination with an apparatus of the type disclosed in my Patent No. 3,090,093, issued May 21, 1963, for producing molded components having cores formed therein. The construction of my core-former is such that it can be inserted in a collapsed condition into an appropriate mold prior to the addition of the material to be molded, and then expanded to compress said material against the inwardly presented mold walls. This permits the formation of high-density molded articles having cores formed therein.

For ease of description, the core-former is described herein as being used to produce cored building blocks formed from an aggregate mixture. It is to be understood, however, that my core-former can be used for producing various other types of cored elements.

The core-former is movable into and out of operative position on a mold by means of an outwardly extending shaft 635. As shown in FIG. 1, an elongated sleeve 636 having a pair of inwardly extending end blocks 638 and 639 is rigidly mounted on the lower end of the shaft 635, as by threadably connecting the end block 638 thereto. The sleeve 636 has an octagonal cross-section, and on its alternate faces is provided with a plurality of elongated slots 640 extending between the end blocks 638 and 639.

The core-former is expanded by means of a rotatable shaft 644 extending upwardly through the shaft 635 for connection to a rotational power source. The lower end of the shaft 644 comprises a quadri-lobed cam 646 rotatably carried in the sleeve 636 with the end faces of said cam slidably rotating against the opposed inner faces of the end blocks 638 and 639 and the outer faces of the cam lobes being slidably against the inner walls of said sleeve. As shown, the cam lobes are disposed on the transverse and oblique core-former axes when the core-former is in its collapsed and expanded positions, respectively.

As shown in FIG. 2, four elongated core segments 648 having lengths generally corresponding to the length of the sleeve 636 including its end blocks are disposed at each corner of the core-former. The inwardly presented faces of each of the core segments comprise three angularly disposed faces adapted to abut the adjacent outer faces of the sleeve 636 with an elongated cam follower 650 keyed and bolted to the intermediate upwardly presented face and projecting inwardly therefrom through one of the sleeve slots 640. As shown in FIG. 2, each of the cam followers 650 is disposed on an oblique core-former axis, and is thus received between a pair of the lobes on the cam 646 when the core-former is in its collapsed position.

In order to prevent aggregate from entering the core-former when it is in expanded position, I mount a vertically extending face plate 652 on each pair of adjacent core segments 648. Each of the face plates 652 has a width corresponding to the width of the core-former in collapsed position so that it bridges the space between a pair of adjacent core segments when the core-former is in expanded position. A rib 654 projects inwardly from each face plate between a pair of adjacent core segments for connection to a slide 656 slidably carried in a pair of aligned slots formed in the adjacent faces of a pair of adjacent core segments for thus holding the face plate on said core segments.

Extending inwardly from the upper and lower ends of the face plates are top and bottom cover plates 658 and 659, respectively. As is best shown in FIG. 4, a screed plate 660 is received on the shaft 635 and is interposed between the outwardly presented face of the end block

638 and the top cover plates 658. The screed plate has a lateral extent only slightly smaller than the lateral extent of the core-former in its collapsed position, and thus acts in combination with the cover plates 658 to close the upper end of the core-former when it is in its expanded position to prevent aggregate from entering the upper end of said core-former.

Similarly, a pilot plate 662 is interposed between the outer face of the end block 639 and the bottom cover plates 659 to act in combination with said cover plates to prevent aggregate from entering the bottom of the core-former when it is in its expanded position. Extending upwardly through the pilot plate 662 is a pilot 664 threadably received in the end block 639 and having a generally rectangularly shaped lower end adapted to seat in an opening in the bottom of the mold and engage the faces thereof to prevent the core-former from rotating in said mold. As shown in FIG. 1, the cover plates 658 and 659 extend inwardly from their respective face plate 652 to abut the shaft 635 and pilot 664 when the core-former is in its collapsed position. Said cover plates, during collapse of the core-former, slide against the screed and pilot plates, and the face plates 652 slide against the outwardly presented faces of the core segments 648, to screed any aggregate therefrom. Conveniently, to facilitate such screeding, the edges of the said face and cover plates are beveled, as at 665.

The cam 646 is adapted to effect only an expansion of the core-former, and thus to collapse said core-former and to hold the core segments 648 in operative position, I mount a pair of coil springs 668 on each of the core segments 648 adjacent each of their ends. The springs 668 at the upper end of the core segments are received in recesses formed therein and extend inwardly therefrom on the oblique core-former axes for reception in recesses formed in the end block 638, the end of said springs being retained in position by screws 670. Similarly, the springs 668 at the lower ends of the core segments are recessedly mounted in said core segments and the lower end block 639.

Thus, the operation of the core-former illustrated in FIGS. 1-8 is as follows: The shaft 635 is moved axially to position the core-former in a mold, with the pilot 664 seating said core-former in an operative position therein. When the shaft 644 is rotated through a 45° angle, in a clockwise direction as viewed in FIG. 2, the lobes on the cam 646 bear against the cam followers 650 to force them outwardly in the sleeve slots 640 to thus move the core segments outwardly on the oblique core-former axes. During such expansion, the sleeve 636 remains in a fixed angular position so that the sliding movements of the cam followers 650 in the slots 640 will guide the expansion movements of the core segments and prevent any rotation thereof, the slides 656 providing additional guiding action. With the core segments in this expanded position shown in FIG. 3, the face plates 652 bridge the spaces between the spaced pairs of adjacent core segments along the side faces of the core-formers to prevent the entry of aggregate therein, and the top and bottom cover plates 658 and 659 cooperate with the screed plate 660 and pilot plate 662 prevent the entry of aggregate into the core-former from the top and bottom thereof.

To retract the core-former into its collapsed position, the shaft 644 is rotated through a 45° angle in a counter-clockwise direction as viewed in FIG. 3. Such rotational movement disengages the lobes on the cam 646 from the cam followers 650, and the core segments 648 are thus pulled inwardly by the springs 668 until the cam followers 650 abut the faces of the cam 646 between its cam lobes, as shown in FIG. 2. The inward movement of the core segments is guided by the cam followers 650 sliding in the sleeve slots 640 and by the face plate slides 656 sliding in the aligned slots formed in the pairs of adjacent core segments. During this inward movement of the core segments, the beveled edges 665 on the face

plates and their cover plates 658 and 659 slide against the outer faces of the core segments and the screed and pilot plates to screed any aggregate therefrom. With the core-former in its collapsed position, it may be removed from the mold by applying a lifting force to the shaft 635. As can be seen from FIG. 1, this lifting force causes the upper end block 638 to bear against the screed plate 660, and the ends of the sleeve slots 640 to bear against the lower ends of the cam followers 650, to thus raise the entire core-former out of the mold.

I claim:

1. An expandable core-former, comprising a plurality of core segments movable with respect to each other, a first shaft movable for moving the core-former to and from an operative position in a mold and having a sleeve provided with end blocks fixedly mounted thereon and interposed between said core segments, a second shaft rotatably carried in said first shaft and having cam means disposed within said sleeve and extending between said end blocks, a plurality of cam followers extending the length of said cam means fixedly mounted on said core segments and slidably received in slots in said sleeve for engagement with said cam means along the length thereof upon rotation of said second shaft in one direction to force said core segments outwardly with respect to each other to expand the core-former, means operatively interconnecting said core segments to said sleeve in alignment with said cam followers beyond the ends of said cam means and moving said core segments toward each other to collapse the core-former upon rotation of said second shaft in an opposite direction, a pair of plates disposed against the opposed ends of said sleeve end blocks, a pilot extending through one of said pair of plates and fixedly connected to one of said sleeve end blocks for releasably retaining the core-former in a non-rotatable position in a mold, and a plurality of face plates on said core segments closing and bridging the spaces between adjacent core segments along the sides of the core-former and having cover plates at their ends receivable over said pair of plates and acting in combination with said pair of plates to close and bridge the spaces between the core segments at the top and bottom of the core-former.

2. An expandable core-former, comprising a plurality of core segments movable with respect to each other, a first shaft movable for moving the core-former to and from an operative position in a mold and having a sleeve provided with end blocks fixedly mounted thereon and interposed between said core segments, a second shaft rotatably carried in said first shaft and having cam means disposed within said sleeve and extending between said sleeve end blocks, a plurality of cam followers extending the length of said cam means fixedly mounted on said core segments and slidably received in slots in said sleeve for engagement with said cam means along the length thereof upon rotation of said second shaft in one direction to force said core segments outwardly with respect to each other to expand the core-former, a plurality of springs in alignment with said cam followers interconnecting said core segments to said sleeve beyond the end of said cam means and moving said core segments toward each other to collapse the core-former upon rotation of said second shaft in an opposite direction, a plurality of face plates closing and bridging the spaces between said core segments along the core-former sides and having slides received in slots formed in adjacent core segments, and means closing and bridging the spaces between the core segments at the ends of the core-former.

3. An expandable core-former, comprising a plurality of core segments movable with respect to each other, a first shaft movable for moving the core-former to and from an operative position in a mold and having a sleeve provided with end blocks fixedly mounted thereon and interposed between said core segments, a second shaft rotatably carried in said first shaft and having cam means disposed within said sleeve and extending between the

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sleeve end blocks, a plurality of cam followers extending the length of the cam means fixedly mounted on said core segments and slidably received in slots in said sleeve for engagement with said cam means along the length thereof upon rotation of said second shaft in one direction to force said core segments outwardly with respect to each other to expand the core-former, a plurality of springs in alignment with the cam followers beyond the ends of the cam means interconnecting each of said core segments to said sleeve for moving said core segments toward each other to collapse the core-former upon rotation of said second shaft in an opposite direction, a plurality of face plates closing and bridging the spaces between said core segments along the core-former sides and having slides received in slots formed in adjacent core segments, and means closing and bridging the spaces between the core segments at the ends of the core-former.

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