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[54] CONCRETE ELEMENT CASTING APPARATUS

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[56] References Cited

UNITED STATES PATENTS

3,010,174 11/1961 McCall.....249/50

3,645,490 2/1972 Beasley 249/50

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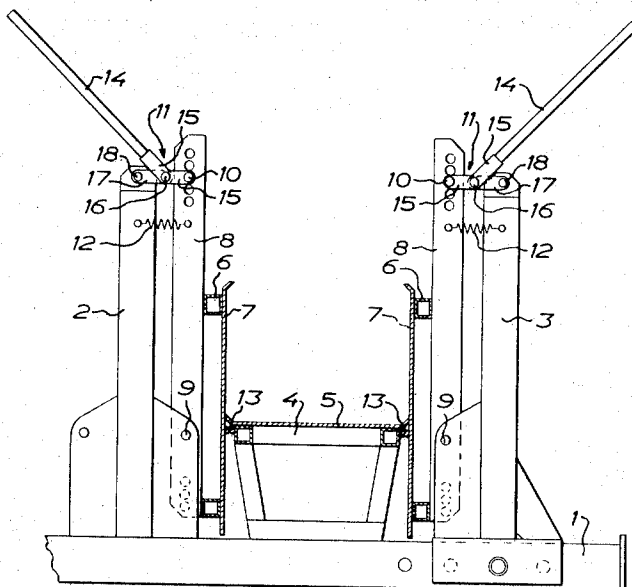
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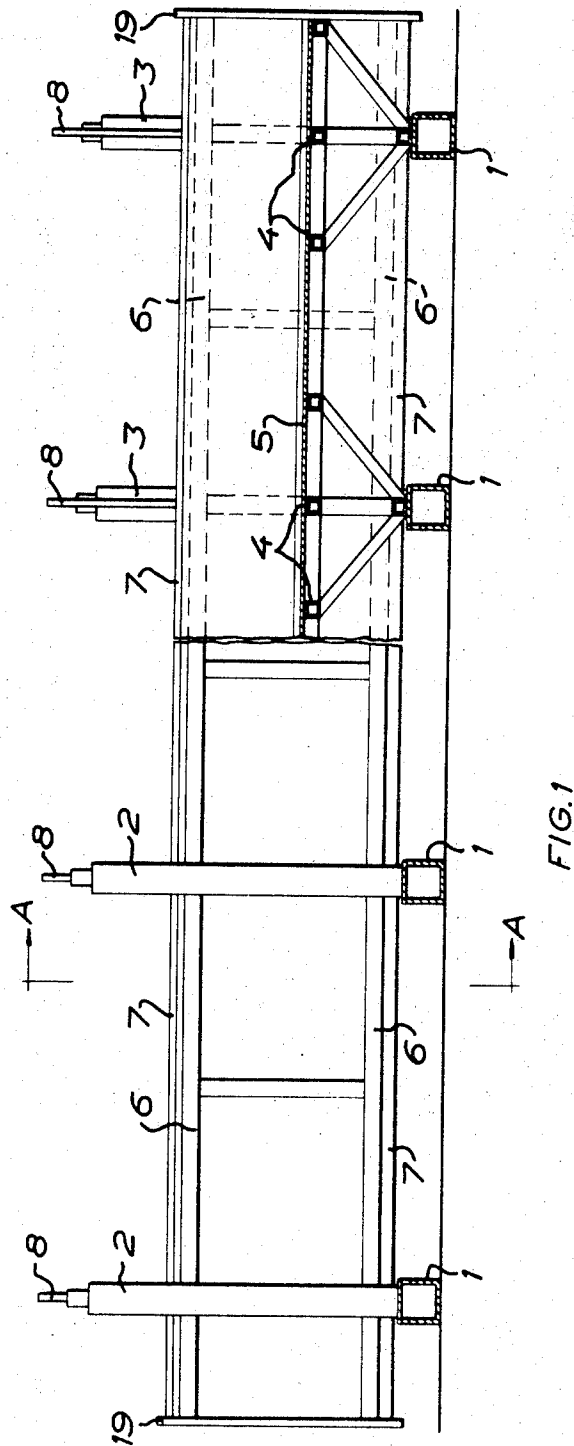
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[57] ABSTRACT

An apparatus for casting concrete pillars, columns and beams comprises several units following upon each other and serving to support a pair of mold side walls and a bottom plate of a concrete mold, the mold side walls and the bottom plate being exchangeable for permitting casting concrete elements of varying lengths, the distance between the mold side walls being adjustable and the height position of the mold side walls being variable to permit casting concrete elements of varying sizes, and the mold side walls being so arranged as to allow being moved apart for "opening" of the mold so that the concrete element cast can be removed.

5 Claims, 3 Drawing Figures





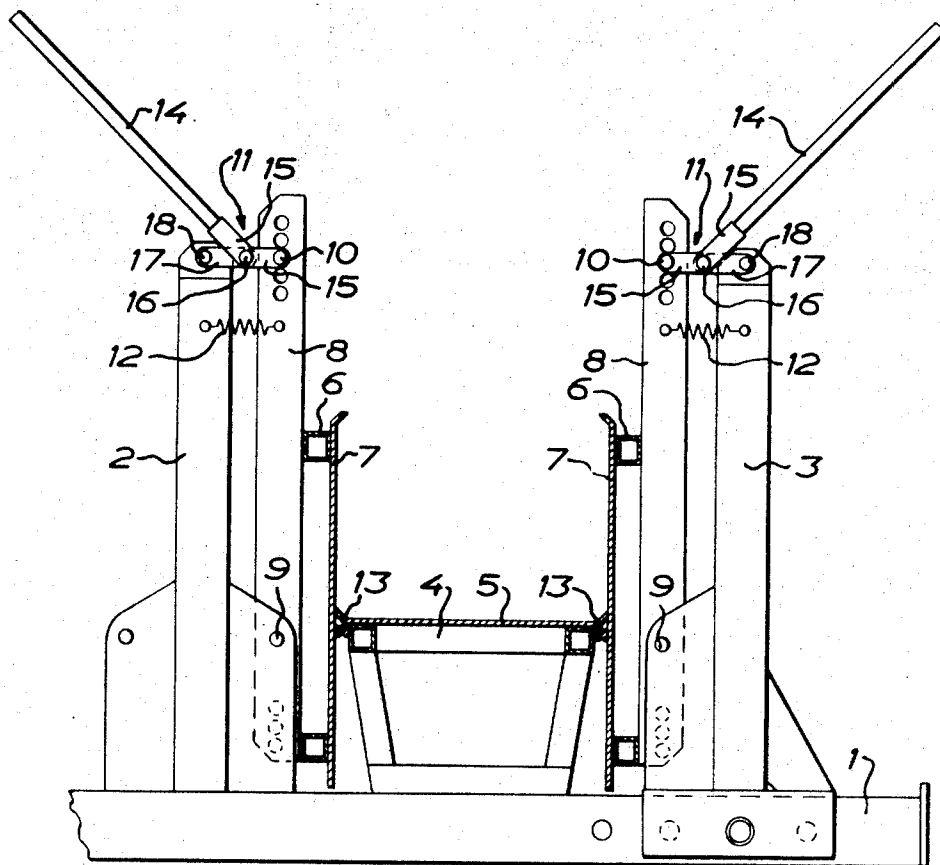
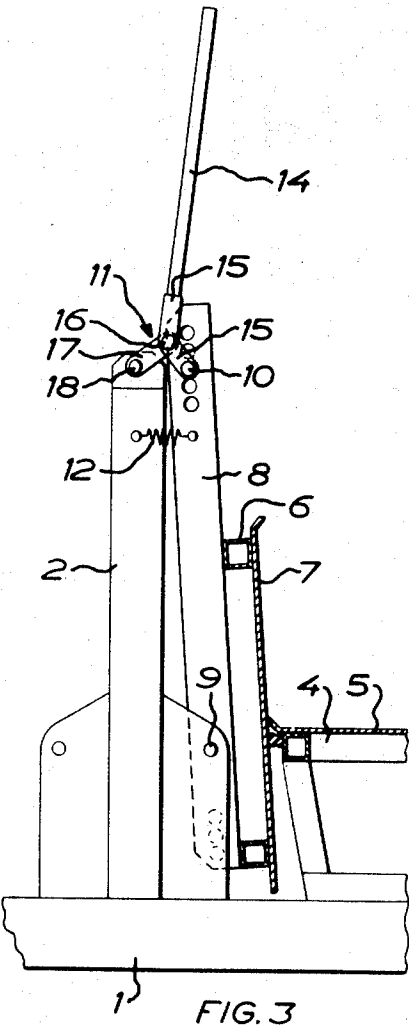


FIG. 2



CONCRETE ELEMENT CASTING APPARATUS

This invention relates to an apparatus for casting such concrete elements as pillars, columns or beams of varying height, width and length, which apparatus comprises a plurality of units collectively constituting the supports for two mold side walls and one bottom plate of a concrete mold, said units being arranged following upon each other to make up the desired mold length.

One object of the invention is to provide a concrete mold the height, width and length of which can be altered by simple operations to permit casting concrete elements of varying dimensions.

Another object of the invention is to provide a concrete mold which is readily "opened" to facilitate placing the reinforcement therein and to remove the finished concrete element therefrom, said mold being nevertheless extremely stable.

Characteristic of the apparatus according to the present invention is that each of the units has a horizontal frame beam which has mounted thereon a fixedly connected frame standard and a horizontally movable frame standard which can be locked to the frame beam, that there is provided between the two standards support means disposed on the horizontal frame beam and supporting the bottom plate of the mold on a level above the frame beam, that the mold side walls are situated on both sides of the bottom plate and the support means and extend vertically both above and below the horizontal plane of the bottom plate, and that on the side of the mold side walls facing away from the bottom plate there are mounted fixedly arranged uprights for the fixation of the mold side walls to the frame standards on the one hand on a level with the bottom plate by means of a journal inserted in a hole in the respective adjoining frame standard and in one of the holes of a lower series of holes formed in the upright, and on the other hand adjacent the upper end of the upright by means of a cotter pin or like element which is inserted in one of the holes of an upper series of holes formed in the upright and in a hole in a toggle lever means which is pivoted to the frame standard and operable by means of a manually actuable lever or by means of a pressure medium operated cylinder-piston unit and by means of which the upright with the mold side wall can be swung into two different positions, one in which that part of the mold side wall which is situated above the bottom plate makes a right angle with the bottom plate of the mold, and the other in which that part of the mold side wall which is situated above the bottom plate makes an angle with the bottom plate of the mold greater than 90°.

The invention will be described more in detail hereinbelow with reference to the accompanying drawings in which:

FIG. 1 is a side view, partly in section, of an apparatus according to the invention;

FIG. 2 is a cross section on line A—A in FIG. 1;

FIG. 3 is a view of part of FIG. 2 in which a mold side wall is swung into inclined position.

The apparatus comprises a plurality of units which follow upon each other and each of which is a horizontal frame beam 1 which has fixedly mounted thereto a frame standard 2 and a horizontally movable frame standard 3 which can be locked to the frame beam. Disposed between the two frame standards on the

horizontal frame beam 1 is a support 4 which carries the bottom plate 5 of a concrete mold on a level above the beam 1. The side walls of the mold are constituted by panels 7 and supporting frame structures 6 secured thereto. The mold side walls 6, 7 are situated on either side of the bottom plate 5 and the support 4 and extend vertically both above and below the horizontal plane of the bottom plate 5. Uprights 8 are fixedly secured to the sides of the frame structures 6 facing away from the side walls 7 and serve to secure the mold side walls 6, 7 to the frame standards 2, 3, which takes place on a level with the bottom plate 5 by means of a journal 9 which is inserted in a hole in the frame standard and in one of the holes of a lower series of holes formed in the upright 8, and also adjacent the upper end of the upright by means of a cotter pin 10 or like element which is inserted in one of the holes of an upper series of holes formed in the upright and in a hole in a toggle lever means 11 which is pivoted to the frame standard 2 and 3, respectively, and is operated by means of a manually actuable lever 14 so that the upright 8 with the frame structure 6 and the mold side wall 7 can occupy two different positions, one in which that part of the mold side wall which is situated above the bottom plate 5 makes a right angle with the bottom plate of the mold (FIG. 2), and the other in which that part of the mold side wall which is situated above the bottom plate makes an angle with the bottom plate of the mold greater than 90° (FIG. 3). The upright 8 and the mold side walls 6, 7 are retained in these two positions by means of a spring 12 which is disposed between the frame standards 2, 3 and the upright 8. The toggle lever means 11 is a bellcrank lever 15 which at one end is mounted on the cotter pin 10, at the other end is detachably connected to the lever 14 and between its ends is pivoted by means of a pin 16 to one end of a link 17 to the other end of which is pivotally connected to the frame standard 2 and 3, respectively, by means of a pin 18.

To prevent liquid or grout from escaping from the concrete mold seals 13 may be disposed between the support 4 for the mold bottom plate 5 and the mold side walls 6, 7 immediately beneath the bottom plate.

If desired, a double mold may be provided in a simple manner by extending the frame beams 1 and by placing identically alike but mirror-reversed elements on both sides of the row of stationary frame standards 2.

In the manufacture of concrete elements with the aid of the apparatus the mold side walls 6, 7 are first caused to incline outwardly away from one another and from the center of the mold, as viewed in an upward direction, in that the toggle lever means 11 is collapsed by means of the levers 14 (FIG. 3) so that the springs 12 contract and retain the mold side walls in inclined position. The fulcrums of the mold side walls are situated approximately in the horizontal plane of the bottom plate 5, which means that the parts of the mold side walls above the bottom plate 5 of the mold are moved apart and the parts of the mold side walls below the bottom plate 5 of the mold are moved together, which latter movement is made possible in that the support 4 for the bottom plate 5 of the mold tapers in a downward direction. This "opening" of the mold facilitates placing the reinforcement, often in the shape of a basket, in the mold. After placing the reinforcement

ment in this manner and other details (such as lifting lugs) have been brought in position, the mold side walls are moved back to vertical position (the mold is "closed") in that the toggle lever means 11 are straightened by means of the levers 14 into the position shown in FIG. 2 in which they are retained by the springs even though the mold is vibrated at the casting. Suitable end walls 19 are mounted for the closure of the mold ends. The concrete is now poured. Curing of the concrete may be facilitated by leading steam or hot water into the hollow profiles of the support 4 for the bottom plate 5 and into the frame structures 6 which support the mold panels 7. When the concrete has cured, the mold is "opened" by the toggle lever means 11, and the element as cast can be removed from the mold with the aid of a vacuum lifting appliance or with the aid of the lifting lugs embedded in the elements.

To permit casting concrete elements of varying dimensions the mold has been constructed so as to allow the manufacture of concrete elements of a great many different dimensions by changing the length, width and height of the mold through simple measures.

The length of the concrete mold is altered by increasing or decreasing the number of units (frame beam 1 with frame standards 2, 3) so that the total length corresponds to the length of the chosen mold side walls and of the associated bottom plate.

The width of the concrete mold is altered by removal of the movable frame standards 3 and the adjacent mold side walls 6, 7 with the uprights 8 so that it is possible to remove the support 4 with the bottom plate 5, whereupon another support with a bottom plate of desired dimensions is placed on the horizontal frame beams 1 and the movable frame standards 3 and the mold side walls 6, 7 with the uprights 8 are again placed in position on the frame beams and locked in some suitable way in the new position. It should be observed that the supports 4 for the various bottom plates are of the same height so that said bottom plates will always be in register with the journals 9 about which the mold side walls pivot on the frame standards.

The height of the concrete mold can be altered in two different ways depending upon the desired size of the variations. With normal changes of the height of the mold the mold side walls can be raised or lowered in a simple manner by removal of the journals 9, 10 retaining the uprights 8 to the frame standards 2, 3 and raising or lowering the uprights with the mold side walls to the desired level, whereupon the journals are again placed in position. In the case of great changes the mold side walls 6, 7 can be exchanged in a manner similar to the bottom, that is, the movable frame standards 3 with the associated mold side walls 6, 7 are removed and the bottom 5 and the support therefor is shifted laterally, whereupon the mold side walls 6, 7 with the associated uprights 8, which side walls are fastened to the stationary frame standards 2, can be exchanged. After that the bottom 5 and its support 4 are again moved back in position and the movable frame standards 3 with the exchanged mold side walls 6, 7 are brought in position and locked.

By these possibilities of variation, that is, exchange of the bottom, raising or lowering of the mold side walls or exchange thereof, concrete elements of a great many different dimensions can be manufactured in a simple

manner without great expenditure of work or high costs.

Instead of operating the toggle lever means 11 by manually actuable levers 14 use can be made of pressure medium operated cylinder-piston units which may displace the pin 16 of the toggle lever means between the positions shown in FIGS. 2 and 3.

What I claim and desire to secure by Letters Patent is:

1. An apparatus for casting such concrete elements as pillars, columns and beams of varying height, width and length, which apparatus comprises a plurality of units collectively constituting the supports for two mold side walls and one bottom plate of a concrete mold, said units being arranged following upon each other to make up the desired mold length, characterized in that each of the units has a horizontal frame beam which has mounted thereon a fixedly connected frame standard and a horizontally movable frame standard which can be locked to the frame beam, that there is provided between the two standards support means disposed on the horizontal frame beam and supporting the bottom plate of the mold on a level above the frame beam, that the mold side walls are situated on both sides of the bottom plate and the support means and extend vertically both above and below the horizontal plane of the bottom plate, and that on the side of the mold side walls facing away from the bottom plate there are mounted fixedly arranged uprights for the fixation of the mold side walls to the frame standards on the one hand on a level with the bottom plate by means of a journal inserted in a hole in the respective adjoining frame standard and in one of the holes of a lower series of holes formed in the upright, and on the other hand adjacent the upper end of the upright by means of a cotter pin or like element which is inserted in one of the holes of an upper series of holes formed in the upright and in a hole in a toggle lever means which is pivoted to the frame standard and operable with the aid of an adjusting mechanism and by means of which the upright with the mold side wall can be swung into two different positions, one in which that part of the mold side wall which is situated above the bottom plate makes a right angle with the bottom plate of the mold, and the other in which that part of the mold side wall which is situated above the bottom plate makes an angle with the bottom plate of the mold greater than 90°.

2. An apparatus as claimed in claim 1, characterized in that the uprights with the associated mold side walls are retainable in their two positions that are adjustable with the aid of the toggle lever means.

3. An apparatus as claimed in claim 1, characterized in that seals of suitable material, e.g., rubber, are provided between the support for the bottom plate of the mold and the mold side walls immediately beneath the bottom plate, to prevent the liquid or the grout from escaping from the concrete mold.

4. An apparatus as claimed in claim 1, characterized in that the adjusting mechanism is a manually actuable lever.

5. An apparatus as claimed in claim 1, characterized in that the adjusting mechanism is a pressure medium operated cylinder-piston unit.

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