

United States Patent [19]
Kleiber

[11] 3,758,067
[45] Sept. 11, 1973

[54] **MOVABLE MULTIPLE CASTING MOULDS
AND ELEMENTS THEREFOR**

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[22] Filed: Mar. 1, 1972

[21] Appl. No.: 230,630

[30] **Foreign Application Priority Data**

May 12, 1971 Germany P 21 23 478.6

[52] **U.S. Cl.** 249/129, 104/1, 105/1 A,

105/157 R, 249/120, 280/79.1, 425/62

[51] **Int. Cl.** B28b 7/26

[58] **Field of Search** 299/128, 129, 120;
425/62; 280/79.1, 79.3

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Primary Examiner—J. Spencer Overholser

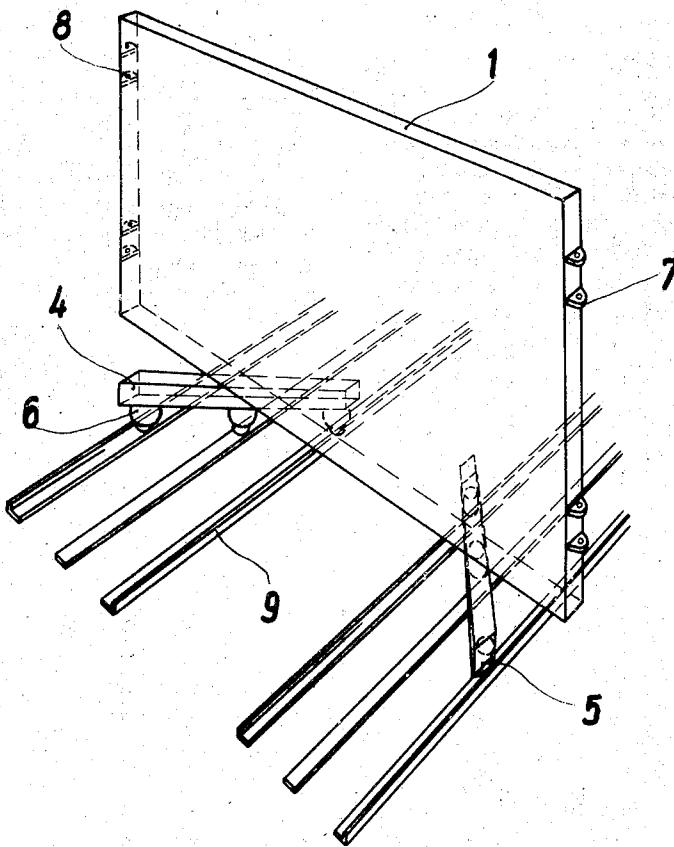
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[57] **ABSTRACT**

A movable casting mould for use in a production line for such articles as prefabricated concrete slabs is adapted to run on a track which may comprise parallel rails. The mould is assembled from a plurality of individual movable elements each comprising a panel which forms a side wall of an individual mould, and running gear which preferably includes rotatable ball units in contact with said track to allow movement in direction both parallel and perpendicular to the planes of the panel.

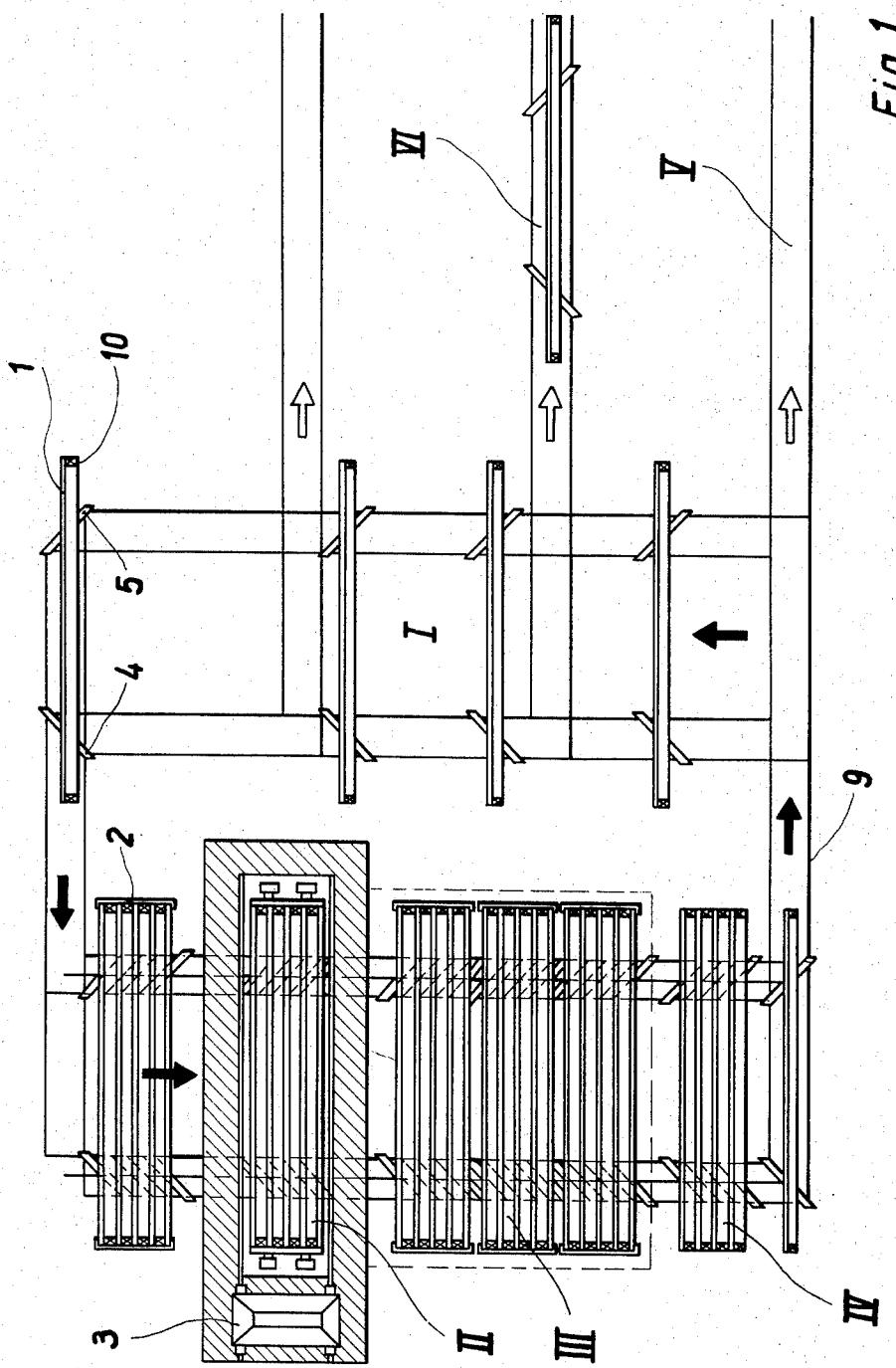
8 Claims, 3 Drawing Figures



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Fig. 2

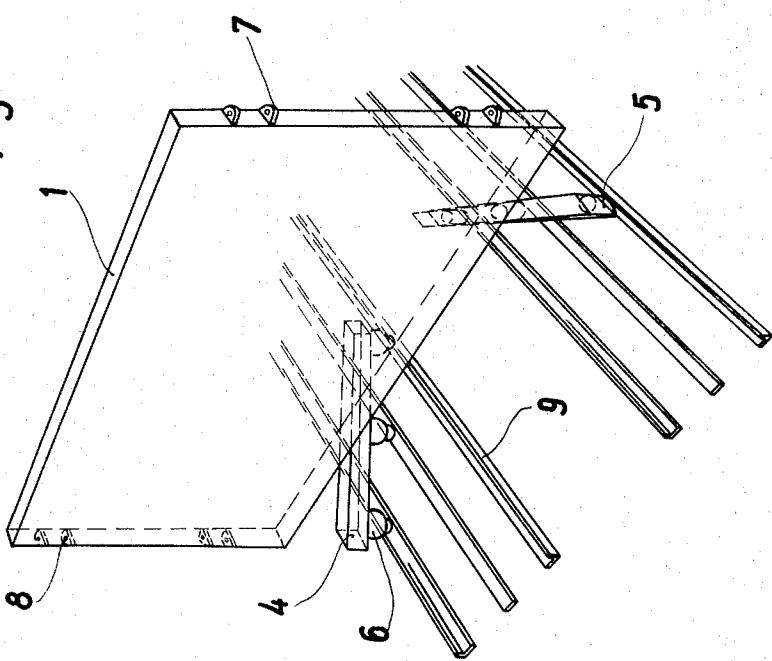
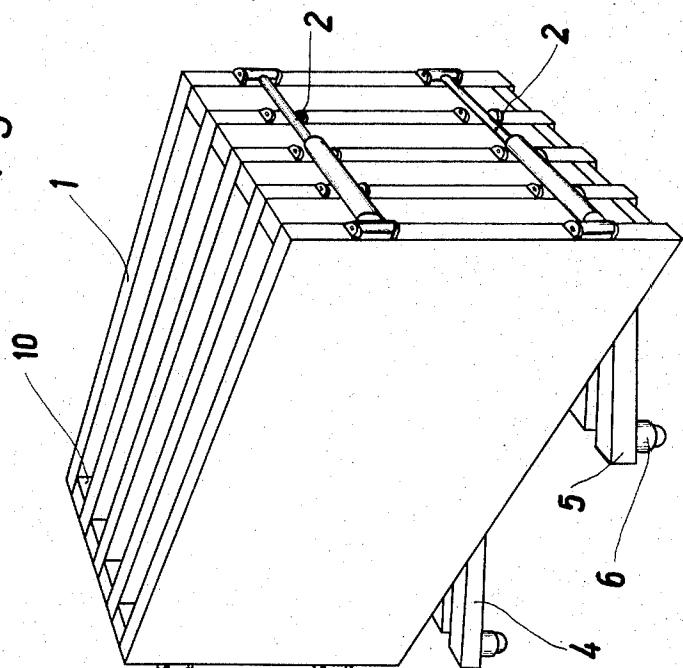


Fig. 3



MOVABLE MULTIPLE CASTING MOULDS AND ELEMENTS THEREFOR

This invention relates to movable multiple casting moulds which are assembled from a number of similar elements. The invention also relates to elements for use in such a mould.

It has already been proposed to assemble multiple casting moulds from individual panel elements. This enables preparatory work and cleaning to be performed on freely accessible individual panel elements instead of within the narrow spaces of a so-called battery mould. Such multiple moulds may be used in an endless production line for carrying out prefabrication processes with material such as concrete. The panel elements are assembled into a multiple mould and pass through a casting and setting position and finally to a position where the castings are removed. The multiple moulds are then dismantled into their constituent panel elements which can be separately cleaned and/or prepared for re-use again in the assembly of multiple moulds.

The cost of a production line using such composite movable casting moulds depends primarily upon the characteristics of the panel elements and more particularly upon the nature of the method of assembling and dismantling the multiple moulds. Another important factor affecting the efficiency of such a production line is the type of method used for moving the individual panels and the composite multiple moulds.

It is one object of the present invention to provide an arrangement including a movable multiple casting mould composed of individual movable panel elements, both the mould and the elements being capable of movement on an endless production line.

Accordingly the invention provides an element for use in a movable multiple casting mould, said element comprising a panel for defining a wall of said mould and running gear for movably supporting said panel, said panel being arranged to extend in a generally vertical plane above the running gear when said running gear is in contact with a generally horizontal surface, said running gear being adapted to allow movement of the element in directions both normal and parallel to the plane of said panel. A number of such similar elements may be assembled together to form a multiple mould. With this arrangement the mould itself as well as the individual elements may be traversed in directions normal and parallel to the planes defined by the panel sides. The arrangement of individual panel elements with running gear enables the elements to be conveniently assembled into a multiple mould and easily dismantled again. The use of elements capable of movement in two perpendicular directions is particularly simple and allows the elements to proceed along a rectangular path in an endless production line; it is found that such a path is particularly convenient and can occupy a minimum amount of floor space.

In a preferred arrangement the panel of the element is mounted on an edge on support members, said support members being provided with running gear. The support members may be bar members which are arranged at an oblique angle with the planes defined by the sides of the panels and which project beyond said planes as produced. This arrangement ensures stability of the individual panels. The longitudinal axes of the straight bar members may be arranged in parallel rela-

tion or alternatively, where there are two such members, they may be arranged so that the axes intersect so that the bars form the divergent sides of an angle. Conveniently the bar members may define an angle of 45° with the plane of panel. In either case the arrangement enables the panels to be easily assembled to form multiple moulds and to be dismantled again.

The running gear for the elements may include rotatable ball units on which the elements are normally supported. The balls of said units may conveniently run on a track comprising parallel rails. Ball running units have the advantage that they are suitable for carrying considerable loads and they are well adapted for travel on rails in more than one direction relative to their mounting. It is contemplated, however, that other running gear capable of carrying heavy loads and capable of allowing sudden changes of direction of the elements could be used.

Where the elements are mounted on bar members which have their longitudinal axes parallel, the elements are especially suitable for an endless production line using a track having parallel rails. Should it be necessary that the elements travel with the plane of the panels normal to the direction of travel, that means in case of the elements being connected to form a multiple mould with several parallel moulding spaces, then a larger number of parallel rails, i.e., four, is required. But, after the mould has left the dismantling station and after removing of the concrete slaps, it is possible to dismantle the multiple mould and to let the single elements travel solely. In this travelling or returning path it is only desirable to have the plane of the panels easily accessible for cleaning and other working. In this part of the production line, the elements could be allowed to travel inclined with their planes of the panels along the parallel rails to which the bar members lie parallel. Therefore, if suitable curved and transferring sections of the track are applied the number of rails in the returning line, in which the bar members travel in the direction of the rails, may be minimized, i.e., from four to two rails.

Individual elements and multiple casting moulds may be conveniently moved along a production line by means of cable or chain gear. However, if required, the panels and the assembled multiple moulds may readily be moved by hand.

The individual elements are normally conveniently provided with two bar members having suitable running gear. If the panels are of exceptionally large size arrangements including more bars can also be used.

It may also be useful for the panels to be tiltably mounted on the support members. Thus the panels may be tilted about an axis at or near their lower edge thereby permitting the panels to be tipped into a horizontal position.

Thus the above-described features provide a movable multiple casting mould which is assembled from individual panel elements and which necessitates only a relatively low capital expenditure particularly in provision of the running gear.

The invention will now be further described by way of example only with reference to the accompanying schematic drawings in which:

FIG. 1 is a plan view of production plant incorporating a movable multiple casting mould assembled from individual movable panel elements,

FIG. 2 is a perspective view of a panel element and

FIG. 3 is a perspective view of a multiple casting mould assembled from individual movable panel elements.

FIG. 1 shows a production line for prefabricated cast concrete slabs; the path along which the panel elements travel is indicated by arrows. The elements include panels 1 which are cleaned and/or reinforced or otherwise prepared at a cleaning and preparation position I. In use the elements are traversed longitudinally from the end of position I to a concrete pouring position II where they are hydraulically clamped together by clamping means 2 (FIG. 3). They are thus assembled to form a multiple mould. The mould is conveyed along a path parallel to the original path in the cleaning position I to the concrete pouring position II above which a concrete pouring bin 3 can be moved in a transverse direction.

When the multiple mould has been filled it is advanced to a concrete setting position III which may for example be constituted by a heating channel. After a sufficient period of time to allow the casting to at least partially set the mould is advanced to a dismantling position IV where the individual castings are lifted out, for instance with the aid of a suitable crane.

The panel elements are then returned to the cleaning and preparation position I along a path perpendicular to the direction in which the multiple moulds enter the dismantling position IV. An endless production line is thus formed.

At suitable points lateral withdrawing positions V, VI may be provided for the withdrawal of panels requiring repair or of slow running panels. The handling facilities for the panels thus permit special arrangements to be made to satisfy particular production conditions.

The construction of the elements and casting mould is more particularly shown in FIGS. 2 and 3. In FIG. 2 a panel 1 is shown standing on two straight bar members 4,5, each mounted on three ball running units 6. The panels 1 are provided with lateral lugs 7,8 for co-operation with hydraulic clamping members 2.

FIG. 3 shows the combination of four panel elements to form a multiple casting mould. The clamping members 2 are shown engaging the lateral lugs 7,8. In this case the bar members 4,5, are each fitted with two ball running units 6.

As shown in FIG. 2 the balls of the running units 6 are arranged to bear on one side against flanged rails 9. Whereas in FIG. 2 the two bars 4 and 5 are placed at a relative angle, the multiple mould shown in FIG. 3 has four panels 1 which stand on parallel bars 4,5. The surfaces of adjacent panels 1 in a multiple mould are spaced by the insertion of mould framing members 10 between adjacent panel elements. The members 10 are generally U-shaped and form the bottom and two minor sides of the individual moulds.

The construction of the individual panels and of the frame members associated with them may however vary. Furthermore, heating elements may be associated with the panels for accelerating setting of the concrete.

As already indicated the described multiple mould is particularly suitable for the production of precast concrete parts. However, it could also be used for moulding other materials such as plaster, or for manufacturing "sandwich panels" that are composed of layers of different materials.

I claim:

1. An element for use in a movable multiple casting mould said element comprising a panel for defining a wall of said mould and running gear for movably supporting said panel, said panel being arranged to extend in a generally vertical plane above the running gear when said running gear is in contact with a generally horizontal surface, said running gear being adapted to allow movement of the element in direction both normal and parallel to the plane of said panel, and said element further including at least two support members on which an edge of said panel is mounted, wherein said support members are in the form of bar members which project beyond the planes defined by the vertical faces of the panel and which are arranged at an oblique angle with respect to said planes, and each of said support members being provided with part of said running gear.
2. An element according to claim 1, wherein the bar members are arranged so that their longitudinal axes are parallel.
3. An element according to claim 1, wherein at least two bar members are arranged at equal and opposite angles to the normal to said planes so that the produced longitudinal axes of said bar members intersect.
4. An element according to claim 1, further including rotatable ball running units as said running gear.
5. An element according to claim 1 wherein the panel is mounted so that it can be tilted about an axis parallel to and adjacent said edge.
6. A movable multiple casting mould comprising a plurality of elements according to claim 1 releasably assembled by clamping means into a movable unit, the panels of said elements being arranged in parallel relation.
7. A movable multiple casting mould according to claim 6, further including a framing member interposed between adjacent elements, said framing member being clamped into engagement with adjacent panel faces by said clamping means and being generally U-shaped in cross section so that said member forms a bottom and two minor sides of a unit of said multiple mould.
8. A movable multiple casting mould according to claim 6 wherein said clamping means is hydraulically operated.