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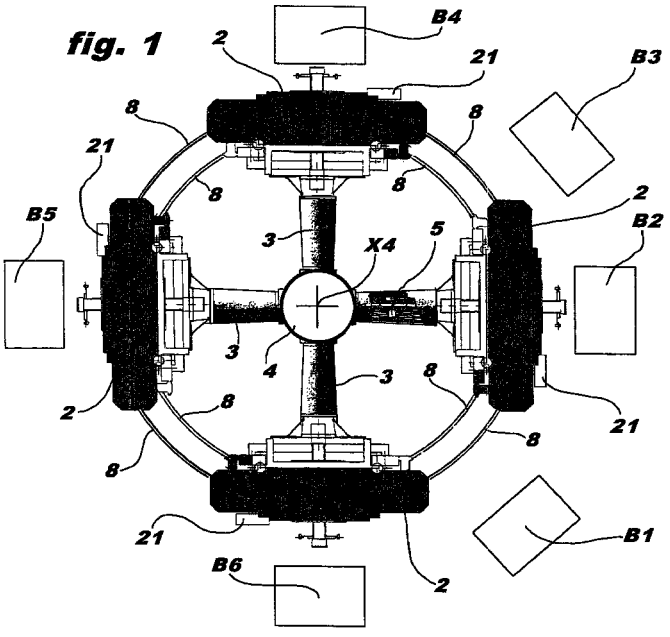
(54) Carousel structure, particularly for foundry applications

(57) A carousel structure, particularly for foundry applications, comprises a plurality of peripheral elements (2) typically configured as casting machines, cooperating with one another in a generally carousel-like structure so as to be able to orbit about at least one principal axis (X4). The peripheral elements (2) have respective separate and independent means (7) for supporting them in motion.



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Description

[0001] The present invention relates to carousel structures according to the preamble to Claim 1.

[0002] Carousel structures of this type are currently used in the art, for example, for cyclically performing operations such as filling a mould, possibly locating cores in the mould, pouring the casting material into the mould, extracting the moulded piece, etc., by advancing successively in front of work stations located in fixed positions around the carousel structure. Naturally, these operations are referred to purely by way of example.

[0003] In known practical solutions, the carousel structure constitutes a single unit supported on the ground by means of a base with the interposition of an articulation element such as a bearing between the base and the rotary portion of the carousel structure.

[0004] In foundry applications, this solution often gives rise to structures which are large and heavy both with regard to the structure as a whole and with regard to its component parts. A typical example in this connection is represented by the above-mentioned bearing which, in some applications, may reach diametral dimensions of several metres with a corresponding weight and a very high cost.

[0005] To mitigate these disadvantages, it has been proposed in the past to use structures which may be defined as linear or Cartesian. One of these solutions provides for the use of a certain number of casting machines movable to and fro on respective rail or track guide structures disposed side by side. The stations which operate on these machines are then configured as units which can be brought selectively to the regions of the various casting machines, moving on respective guides extending transversely relative to the paths along which the casting machines move to and fro.

[0006] This solution at least partially solves the problems set forth above but gives rise to a disadvantageous situation since it is necessary to provide for the movement both of the casting machines and of the stations for operating thereon with the further possibility that, in order to reach the casting machines on which it is possible to operate at any particular time, these stations may have to travel quite long distances. This results in working cycles which are often far from optimal.

[0007] The object of the present invention is to provide a solution which retains the intrinsic advantages of a carousel structure whilst avoiding the problems outlined above.

[0008] According to the present invention, this object is achieved by means of a carousel structure, particularly for foundry applications, having the specific characteristics recited in Claim 1.

[0009] The invention will now be described, purely by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 is a schematic plan view of a carousel structure according to the invention, and

Figure 2 shows in greater detail, in a local, sectioned and elevational view, the ways in which the elements of the carousel structure of Figure 1 are supported on the ground.

[0010] In Figure 1, a carousel structure for use, for example, in a foundry, is generally indicated 1.

[0011] Basically, the structure 1 is composed of a plurality of peripheral elements 2, preferably configured in the form of casting machines and connected to a central hub or core 4 by means of respective arms 3. The core 4 is usually rotatable about a principal vertical axis X4 which also defines the principal central vertical axis of the carousel structure 1.

[0012] As is well known, the term "casting machine" used by way of example with reference to the elements 2 indicates an element which can be used for performing the set of operations normally connected with the production of a mechanical element by casting (positioning the moulds, inserting the cores, the actual casting, extracting the moulded item, discharging the mould, etc.).

[0013] These operations are generally performed by the operation of respective work stations B1, B2, ... located in fixed positions around the carousel in a manner such that, as the various machines 2 follow their orbital path around the central axis X4, they are brought in succession in front of the various stations in question, of which there may be any number.

[0014] In this connection, it will be appreciated that the specific characteristics of the peripheral elements 2 and of the stations B1, B2, ... are in fact unimportant for the purposes of the implementation of the invention.

[0015] In a preferred embodiment of the invention, at least some of the arms 3 not only perform the function of connecting the elements 2 to the central core 4 but preferably carry associated conveyor lines, generally indicated 5. The lines 5, which are at least partially coextensive with the arms 3, enable the so-called servomeans (compressed air, lubricating and cooling fluids, electrical supply, etc.), which are necessary for the operation of the elements 2 and of the members associated therewith, to be supplied from the core 4 towards the elements 2.

[0016] With regard to the rotation of the structure 1, various solutions are possible.

[0017] It is possible, at least in principle, to consider bringing about the rotation of the structure 1 by associating a main drive means with the core 4 which rotates the elements 2 by means of the arms 3. However, the practical application of this solution may - at least in some cases - meet with difficulties connected with the intrinsic weight of the elements 2 and of the items (moulds, moulded elements, etc.) transported thereby.

[0018] For this reason, the solution of associating, with the elements 2, respective drive means 21 preferably linked with one another, and of leaving to the arms 3

the basic function of maintaining the exact positioning relative to the parts, is usually preferred.

[0019] Naturally, it is also possible to consider connecting the elements 2 and/or the arms 3 by means of structural elements (not shown specifically) extending at least partially tangentially relative to the carousel. In particular, with the use of this solution, it is then possible to consider mounting respective drive means 21 on only some of the elements 2, the remaining elements 2 (which do not have specific drive means) thus being arranged to be rotated, and hence pulled and/or pushed, by the elements 2 which have drive means.

[0020] Whichever solution is adopted for bringing about the rotation, an important characteristic of the solution according to the invention is that the structure 1 according to the invention does not provide for the use of a support member common to all of the moving parts (in particular for the elements 2 and for the core 4) as is the case in solutions with a suspension having a bearing mentioned in the introductory portion of the present description. Instead, in the solution according to the invention, the elements 2 have respective separate and independent means for supporting them in motion.

[0021] In one possible embodiment of the invention connected with the use of independent drive means 21 on the various elements 2, this overcomes the rigid connection between the elements 2 and with the core 4. This means that, whilst a fixed distance is maintained relative to the core 4 as a result of the connection by means of the arm 3, an individual element 2 can move independently angularly towards and/or away from the adjacent elements 2. This solution may be advantageous since it enables, for example, the time spent by an individual element 2 in the region of a certain station B1, B2, ... no longer to be constrained by the movement between one station and the other; in other words, an element 2 may, for example, be stopped selectively, whilst the adjacent elements are advancing, or vice versa. This capability is also advantageous for the purposes of the location of the stations B1, B2, ... which is no longer constrained by a fixed geometry of the carousel structure.

[0022] In the currently-preferred embodiment to which Figure 2 relates specifically, each of the elements 2 is in practice constituted by a type of carriage mounted on rolling bodies such as wheels or rollers 7, or on equivalent suspension means which support each element 2 independently of the other elements 2. Naturally, any connection established by the arms 3 (or by any further interconnection elements described above) remains unchanged in order to maintain the geometry of the wheel structure.

[0023] In a particularly advantageous embodiment, the elements 2 move on at least one common movement structure such as a rail 8 (preferably, there is a pair of rails forming a track) mounted, possibly with the interposition of a reinforcing and support section P, in a respective pit or channel T formed in the bed on which the structure 1 is mounted.

[0024] The use of one or more rails also enables a toothed structure to be associated with the rail, if this is considered appropriate, so as to provide the elements 2 with a rack drive mechanism.

[0025] The at least partially recessed arrangement of the rail or rails 8 has been found advantageous since it enables the general level of movement of the elements 2 to be lowered.

[0026] Naturally, the principle of the invention remaining the same, the details and forms of embodiment may be varied widely without thereby departing from the scope of the present invention as defined by the following claims.

Claims

1. A carousel structure, particularly for foundry applications, comprising a plurality of peripheral elements (2) which can orbit around at least one principal axis (X4), characterized in that the elements (2) have respective separate and independent elements (7) for supporting them in motion.

2. A structure according to Claim 1, characterized in that the peripheral elements (2) are configured as casting machines.

3. A structure according to Claim 1 or Claim 2, characterized in that:

   - the structure has a central core (4) connected to the peripheral elements (2) by respective arms (3), and
   - lines (5) for the supply of servo-means are associated with at least some of the peripheral elements (2), the lines (5) being at least partially coextensive with the arms (3).

4. A structure according to any one of the preceding claims, characterized in that the means for supporting the elements (2) in motion comprise rolling elements (7).

5. A structure according to Claim 4, characterized in that the rolling elements are selected from the group constituted by wheels and rollers.

6. A structure according to any one of the preceding claims, characterized in that the separate and independent means (7) for supporting the elements (2) in motion cooperate with a common movement structure (8).

7. A structure according to Claim 6, characterized in that the common movement structure comprises at least one rail (8).

8. A machine according to Claim 6 or Claim 7, characterized in that the common movement structure (8) is arranged at least partially in a recessed position relative to the surface on which the structure (1) bears.

9. A structure according to any one of the preceding claims, characterized in that at least some of the peripheral elements (2) have respective drive means (21) for rotating the carousel structure.

10. A structure according to Claim 9, characterized in that all of the peripheral elements (2) have respective drive means for rotating the carousel structure.

11. A structure according to Claim 9, characterized in that only some of the peripheral elements (2) have respective drive means for rotating the structure, the remaining peripheral elements (2) being driven by the peripheral elements (2) which have drive means.

fig. 1

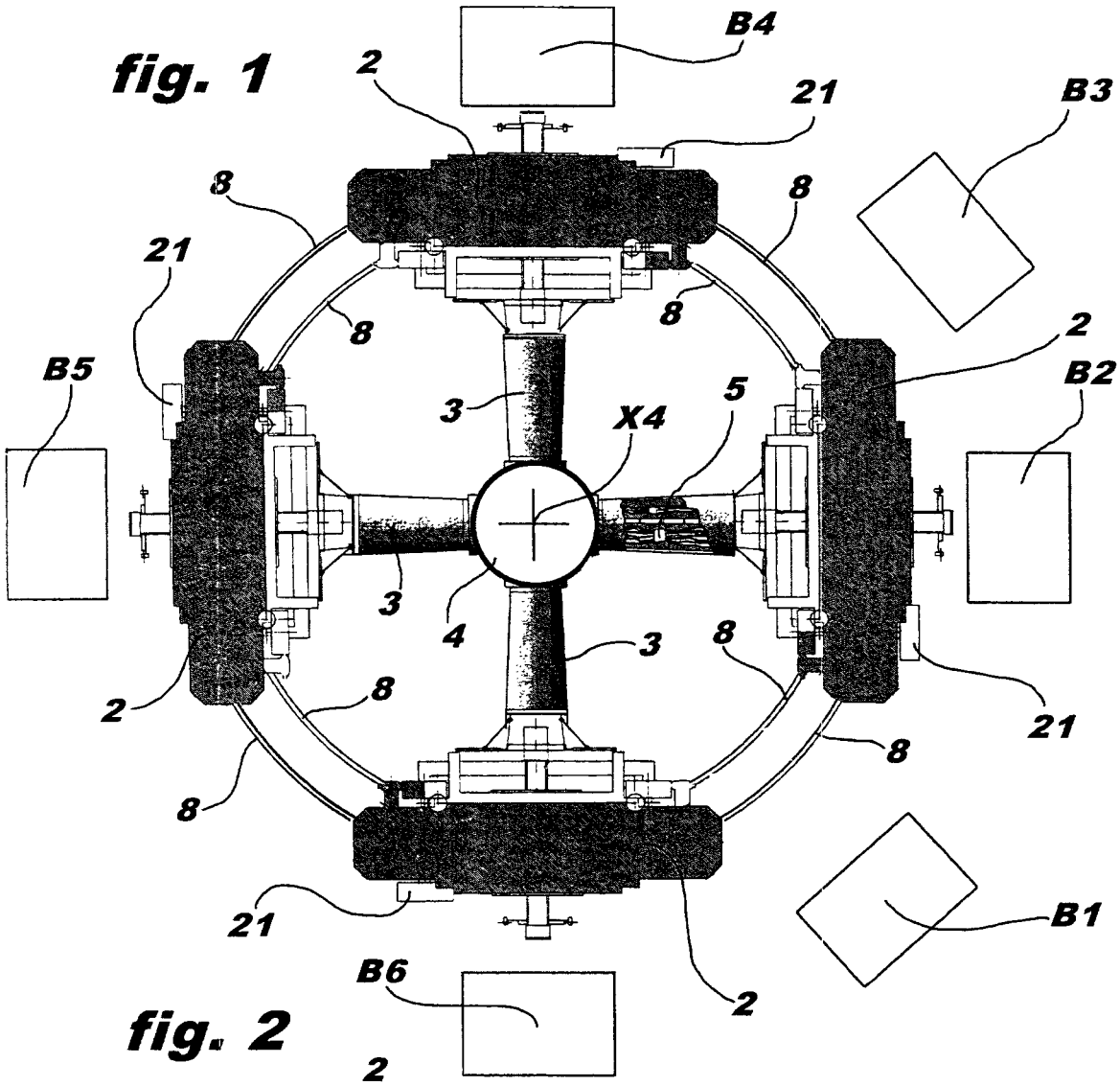
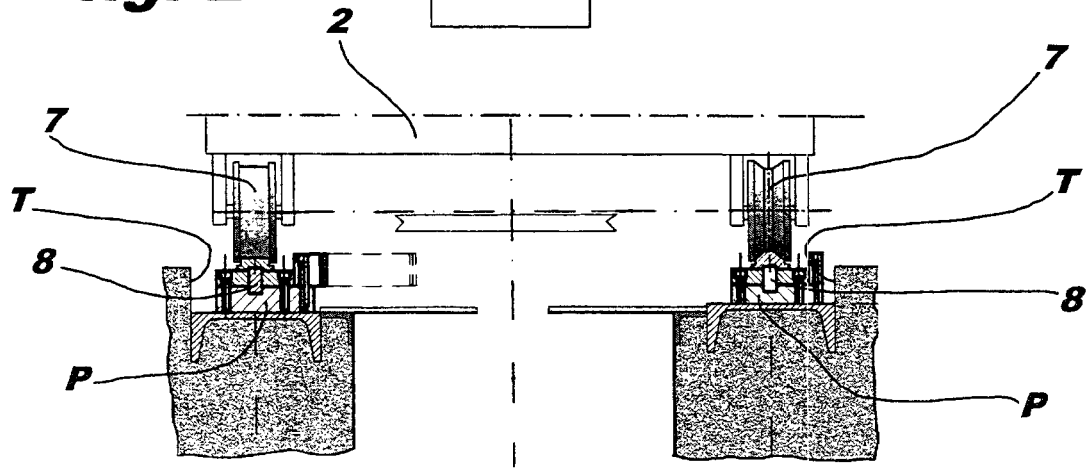


fig. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0496

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 3 977 461 A (POL KENNETH J ET AL) 31 August 1976 * column 3, line 25-27; figures 1,2,6 * * column 4, line 5-16 *	1-7,9,10	B22D47/00 B22C11/04

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B22D
B22C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 January 1999	WOUDENBERG, S

CATEGORY OF CITED DOCUMENTS

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