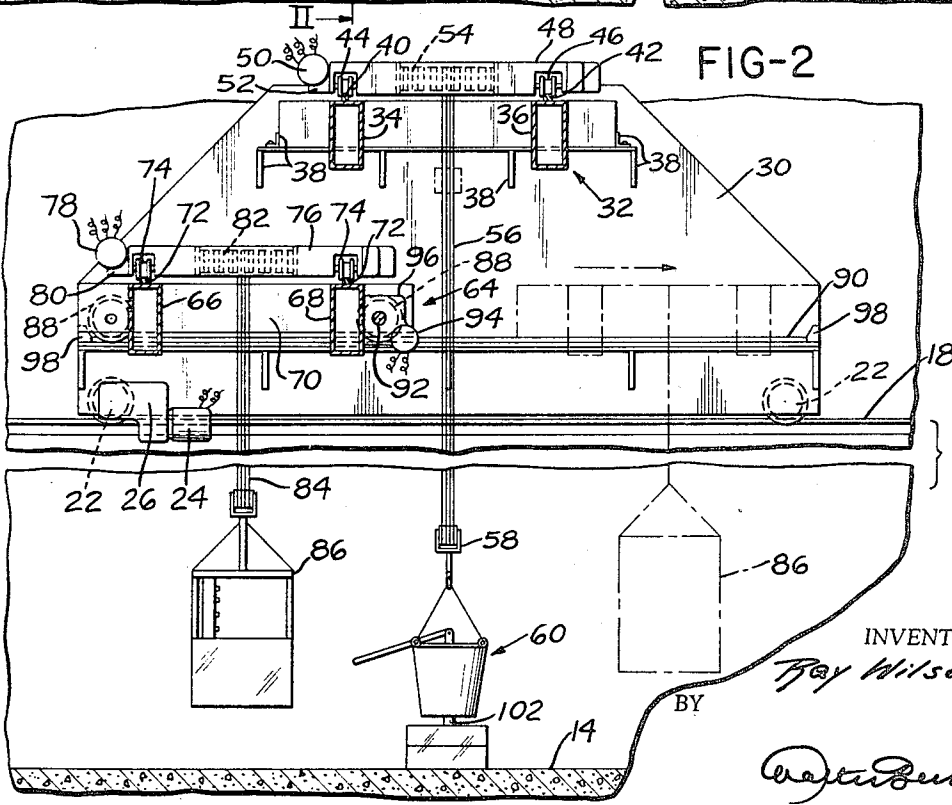


3,389,809

2 Sheets-Sheet 1



June 25, 1968

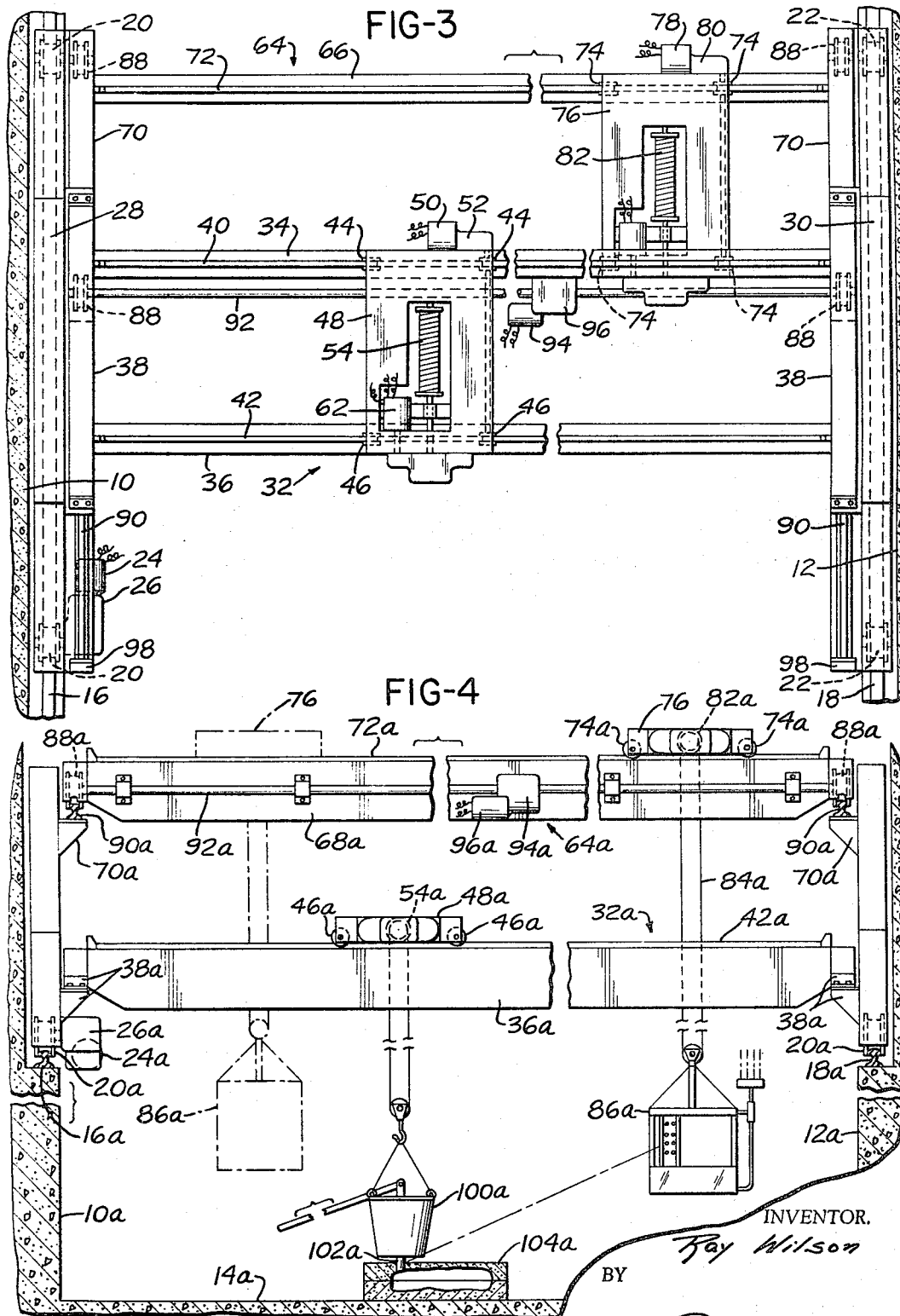
R. WILSON

3,389,809

OVERHEAD CRANE WITH MAIN BEAM

Filed June 20, 1967

2 Sheets-Sheet 2



1

3,389,809

OVERHEAD CRANE WITH MAIN BEAM

Ray Wilson, R.R. 1, Box 102, West

Alexandria, Ohio 45381

Filed June 20, 1967, Ser. No. 647,539

11 Claims. (Cl. 212-10)

ABSTRACT OF THE DISCLOSURE

Overhead crane with main beam with a main load carriage thereon and an auxiliary beam on the crane structure parallel to but at different height than main beam and movable at right angles to the main beam and supporting an auxiliary carriage movable along the length of the auxiliary beam with an operator's cab vertically movably suspended from the auxiliary carriage.

The present invention relates to travelling cranes or hoists of the type used in foundries, factories, warehouses and the like for conveying heavy loads from place to place. This invention is related to the invention disclosed in my Patent No. 3,300,058. The disclosure of the aforementioned patent is incorporated herein by reference.

Cranes of the nature referred to are extremely large and heavy and require a skilled operator. The operator for the larger type cranes rides in a cabin dependent from beneath the main beam of the crane at one end. From this position the crane operator operates the crane as it travels along its tracks and operates the load carriage as it moves along the length of the brake beam, and also operates the load hook or other load-engaging means which can be raised and lowered from the crane carriage.

The crane operator, in such cranes, must depend on his own eyesight, or is signalled from the place where the load is to be picked up or is to be set down, by individuals at that place, by hand signals or the like, to direct the operator in the operation of the crane. This system for controlling the crane leaves something to be desired when a precise locating of the load is required, for example, when a ladle is to be positioned with a pouring spout exactly located relative to an opening in a mold which is to receive molten metal from the ladle, or when a work member, such a structural part, is to be exactly located with reference to a receiving structure and set down thereon.

In the act of moving a load supported by the crane from one spot to another, it is often the case that the load must be raised and lowered or moved back and forth in order to clear obstructions in the form of machines or the like. In cases of this nature, also, the position of the crane operator at one end of the crane and up near the main beam thereof is not always to advantage.

In my previous application referred to above, I show a crane arrangement in which the cab is carried by its own supporting carriage and can be raised and lowered on the supporting carriage. The cab supporting carriage in my previous application is movable along the main beam of the crane structure in parallelism with the main load carriage of the crane.

In another modification according to my previous application, the cab supporting carriage is supported on its own beam on which it is movable in parallelism with the main beam of the crane while a structure supports the two beams for movement in unison in a direction at right angles to the length of the beams.

The present invention represents a further advance in refinement of the invention disclosed in the prior application referred to.

2

In my prior application, the main load supporting carriage of the crane and the cab supporting carriage were arranged at substantially the same level and for this reason the carriages could pass each other in the direction of the length of the beams but could not pass each other in the direction at right angles to the beams.

The present invention proposes the provision of a cab supporting carriage on a crane in which the cab supporting carriage is supported at a different height than the main load supporting carriage of the crane, and wherein the cab supporting carriage can thereby be moved in a direction parallel to the main beam of the crane on which the main load supporting carriage is supported, while the cab supporting carriage can also be moved in a direction at right angles to the main beam from one side thereof to the other. This arrangement permits extreme freedom of mobility of the cab supporting carriage so that the crane operator can always dispose himself in the best possible position for directing the operation of the crane.

Substantially conventional controls for the several motors involved in moving the crane and the carriages and for operating the winches in the carriages are provided and are under the control of a substantially conventional centralized control panel in the operator's cab. Since controls of this nature are substantially conventional and may, for example, be of the nature illustrated in my co-pending application referred to above, no specific detailed showing of control circuits is made herein.

In the following detailed description, it will be appreciated that the present invention can be adapted to Gantry cranes of the single or double-leg type, to ladle cranes, and to industrial overhead cranes. The particular crane illustrated in the drawings accompanying this application is an overhead type crane, but it will be readily apparent in what manner the invention can be adapted to the other types of cranes referred to.

The nature of the present invention and the objects and advantages thereof will become more apparent upon reference to the following detailed description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a schematic view of an industrial type overhead or ladle crane embodying my invention;

FIGURE 2 is a somewhat schematic vertical sectional view indicated by line II-II on FIGURE 1;

FIGURE 3 is a somewhat schematic plan view of the construction of FIGURE 1 and FIGURE 2; and

FIGURE 4 is a somewhat schematic view similar to FIGURE 1, but showing a modified arrangement of the crane structure according to my invention.

Referring to the drawings somewhat more in detail, FIGURE 1 is a schematic cross-sectional view taken through a factory, warehouse or foundry, or the like, and wherein numerals 10 and 12 represent the vertical side walls of the structure, whereas numeral 14 represents the floor of the structure. It will be understood that no particular sizes or proportions are intended to be shown in the drawings but that they are illustrative only.

Extending longitudinally of the building illustrated, and supported in a suitable manner, are main support rails 16 and 18 along which the entire crane structure is movable in the direction of the length of the building. The rails support the ends of the crane structure as by means of rollers 20 and 22 carried by the crane structure at its opposite ends. Of these rollers at least one, for example roller 20, is driven by a motor 24 via a suitable speed reducing gear box 26. Rollers 20 and 22 are carried on the lower ends of trestle-like structures 28 and 30 disposed at respectively opposite ends of the crane structure and extending vertically in parallel spaced relation to the adjacent side walls 10 and 12 of the building structure.

Extending horizontally between the upper ends of the trestles 28 and 30 is the main beam structure of the crane, generally indicated at 32. Any suitable rigid interconnection of beam structure 32 with the trestle structures can be made, and the particular connection shown is merely illustrative.

As will be seen in FIGURE 2, the main beam structure 32 comprises spaced individual beams 34 and 36 which are interconnected by a series of plates and ribbing generally designated 38, and which support the beams 34 and 36 in properly spaced relation and impart stiffening to the entire beam structure.

Rails 40 and 42 are carried by beams 34 and 36 and these rails are engaged by rollers 44 and 46 of the main carriage 48 of the crane. At least one of the rollers, roller 44 for example, is driven by means of a motor 50 and a speed reducing gear box 52 so as to cause the carriage 48 to move along rails 40 and 42.

Carried in carriage 48 is a drum or winch 54 about which is entrained the cable arrangement 56, and which in turn, carries a load supporting device 58 such as a hook which can supportingly engage a load such as a ladle 60. The winch or drum 54 is rotatable as by a hoist motor 62, best seen in FIGURE 3, so the load engaging means 58 can be raised and lowered whereby to raise and lower a load carried thereby.

According to the present invention, there is an auxiliary beam 64 supported beneath and in parallel relation to the main crane beam 32. As will be seen in FIGURE 2, auxiliary beam 64 also comprises a pair of spaced beams 66 and 68 interconnected by a structure 70. Beams 66 and 68 have rails 72 on top thereof which are engaged by rollers 74 carried by cab carriage 76. At least one of the rollers 74, for example the one shown at the left in FIGURE 2, is driven by a motor 78 via a speed reducing gear box 80 to cause carriage 76 to move on its rails.

The cab supporting carriage also has a winch 82 and extending downwardly therefrom is a cable system 84 which supports the operator's cab 86. Energization of motor 78 will cause vertical movement of cab 86 relative to its carriage 76.

The beam 64 for the cab carriage has rollers 88 at its opposite ends which engage rails 90 supported on the insides of the trestle structures 28 and 30 in any suitable manner. Rails 90 extend in the fore and aft direction of the trestles 28 and 30, namely in a direction parallel to the main crane supporting rails 16 and 18. The rollers 88 include at least one pair that are driven in rotation by driving of shaft 92 via a speed reducing gear box 94 from a motor 96. In this manner the auxiliary beam 64 is caused to move in the direction of the length of rails 90.

As will be seen in FIGURE 2, the rails 90 terminate in stop members 98 so that carriage 76 cannot, by accident, be driven off the ends of rails 90. Whenever the main crane structure is moved along its rails 16 and 18, it will be evident that auxiliary beam 64 will move therewith. The auxiliary beam therefore tends to follow main beam 32 at all times, while the provision of the movability of the auxiliary beam 64 on its rails 90, and of the carriage 76 on its rails 72, the vertical movability of cam 86, the location of load supporting means at 58, can always be under close observation of the crane operator for exact positioning or movement thereof at all times.

It will furthermore be evident that the cab supporting carriage is movable substantially the entire width of the building structure and can be moved in the fore and aft directions of trestles 28 and 30 from one side of the main beam to the other, merely by elevating the load supporting means 58 to a position above the cab carriage and then moving the cab carriage from whichever side of the main beam it then occupies to the other side thereof.

The arrangement shown in FIGURE 4 is the same as that shown in FIGURES 1-3 with respect to the basic operative components and is therefore numbered with the same reference numerals with the addition of a lower

case letter *a* to the numerals. In FIGURE 4, however, the auxiliary beam 64a is positioned above the main crane beam 32a such a distance that when the operator's cab 86a is lifted to substantially its uppermost position, the cab will pass over the top of main beam 32a thereby to permit it to be positioned on both sides of main beam 32a. It will be evident the same flexibility exists for the modification of FIGURE 4 with respect to the positioning of the operator's cab as exists in respect of the modification of FIGURES 1-3.

It will be understood that all of the motors illustrated are of the type that can be run in either one direction or the other, or brought to a halt. Further, any particular motor that is required to be held in its stopped position can be provided with a brake of a conventional type which locks the motor when it is not energized.

It is again pointed out that particular sizes and proportions have not been shown in the accompanying drawings for the sake of simplicity. For example, since the operator's cab is far lighter than the loads normally carried by the main load supporting carriage, the operator's carriage can be considerably smaller than the main carriage and its supporting beam can likewise be made smaller than the main crane beam.

The particular work operation being performed in the drawings is also illustrative. In the drawings, a ladle 100 having a pouring spout 102 is to be positioned over the fill opening of a mould 104. It will be obvious from the dot-dash line 106 in FIGURE 2 that the present invention enables a crane operator to position the load very precisely. Other work operations requiring precision or careful observation can also be handled in substantially the same manner.

What is claimed is:

1. In a crane structure having a horizontal main beam supported for movement in the lateral direction of the main beam and a load carriage supported on the main beam and moveable along the main beam in the direction of the length thereof and said load carriage including load engaging means vertically moveably suspended therefrom; an auxiliary beam parallel to said main beam and at a different elevation than the main beam, an auxiliary carriage supported on said auxiliary beam for movement thereon in the direction of the length thereof, an operator's cab having a control station therein vertically moveably suspended from said auxiliary carriage, and support means attached to said main beam and extending in the lateral direction thereof and supporting said auxiliary beam on said main beam for movement of said auxiliary beam in the lateral direction of said main beam in parallelism with said main beam from one side of the main beam to the other, said support means being rigidly fixed to said main beam whereby said auxiliary beam moves together with said main beam when the latter moves in the lateral direction thereof.

2. A crane structure according to claim 1 in which said auxiliary beam is located at a higher level than said main beam.

3. A crane structure according to claim 2 in which the vertical spacing between the main beam and the auxiliary beam is sufficient to permit the said operator's cab to be elevated by the auxiliary carriage to above the top of the main beam so the main beam will not obstruct the operator's cab when the auxiliary beam is moved from one side of the main beam to the other.

4. A crane structure according to claim 1 in which the auxiliary beam is located at a lower level than said main beam.

5. A crane structure according to claim 4 in which the vertical spacing between the main beam and auxiliary beam is sufficient to permit said load engaging means to be elevated by said load carriage to above the top of said auxiliary beam to permit unobstructed movement of the auxiliary beam from one side of the main beam to the other side thereof.

5

6. A crane structure according to claim 1 in which trestles are provided at the ends of said main beam depending therefrom and connected thereto for supporting the main beam, tracks extending laterally of said main beam at the bottoms of said trestles and rollers on the trestles engaging said tracks, said support means comprising other tracks fixed to the trestles extending laterally of the main beam, and other rollers on the ends of said auxiliary beam engaging said other tracks.

7. A crane structure according to claim 6 in which said other tracks are on top of said trestles and the auxiliary beam is at a higher level than said main beam.

8. A crane structure according to claim 6 in which said other tracks are on the insides of said trestles beneath said main beam and said auxiliary beam is at a lower level than said main beam.

9. A crane structure according to claim 1 in which said main and auxiliary beams are about the same length.

10. A crane structure according to claim 1 in which motors are provided for driving said main beam and said auxiliary beams in the lateral direction, for driving said

6

carriages on said beams, and for raising and lowering said load engaging means and said operator's cab on their respective carriages, said control station being adapted for controlling all of said motors.

11. A crane structure according to claim 1 in which said means supporting said auxiliary beam on said main beam comprises tracks on the main beam and rollers on the auxiliary beam engaging said tracks, and stop means at the ends of said tracks to prevent the rollers from running off said tracks.

References Cited

UNITED STATES PATENTS

1,812,951	7/1931	Heinle.
2,701,065	2/1955	Bertel.

RICHARD E. AEGERTER, *Primary Examiner.*

EVON C. BLUNK, *Examiner.*

H. C. HORNSBY, *Assistant Examiner.*