June 22, 1926. 1,589,652

J. R. McWANE

MEANS FOR HANDLING CORE BARS AND CORES

Filed Dec. 12, 1924 3 Sheets-Sheet 1

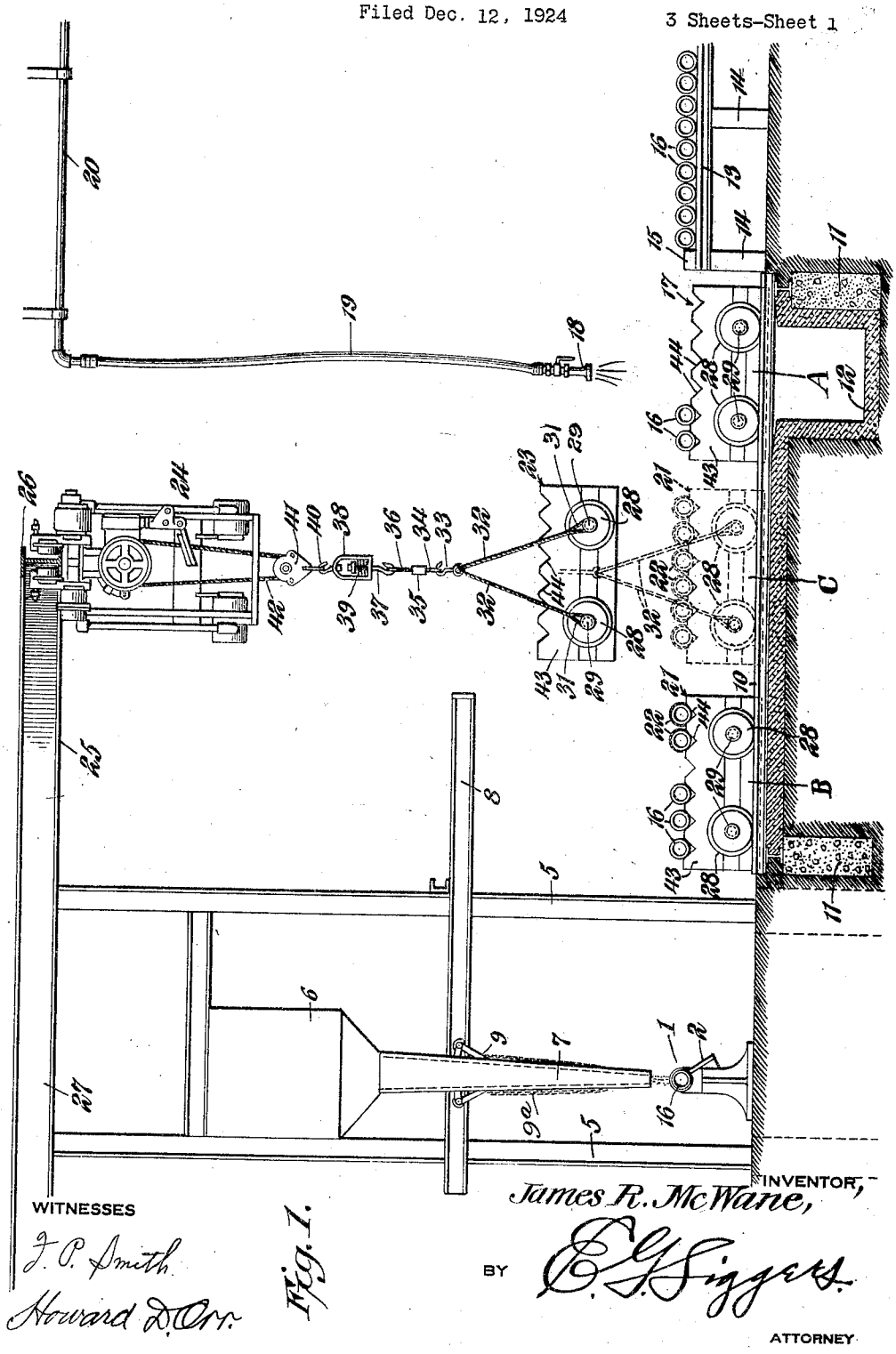


Fig. 1.

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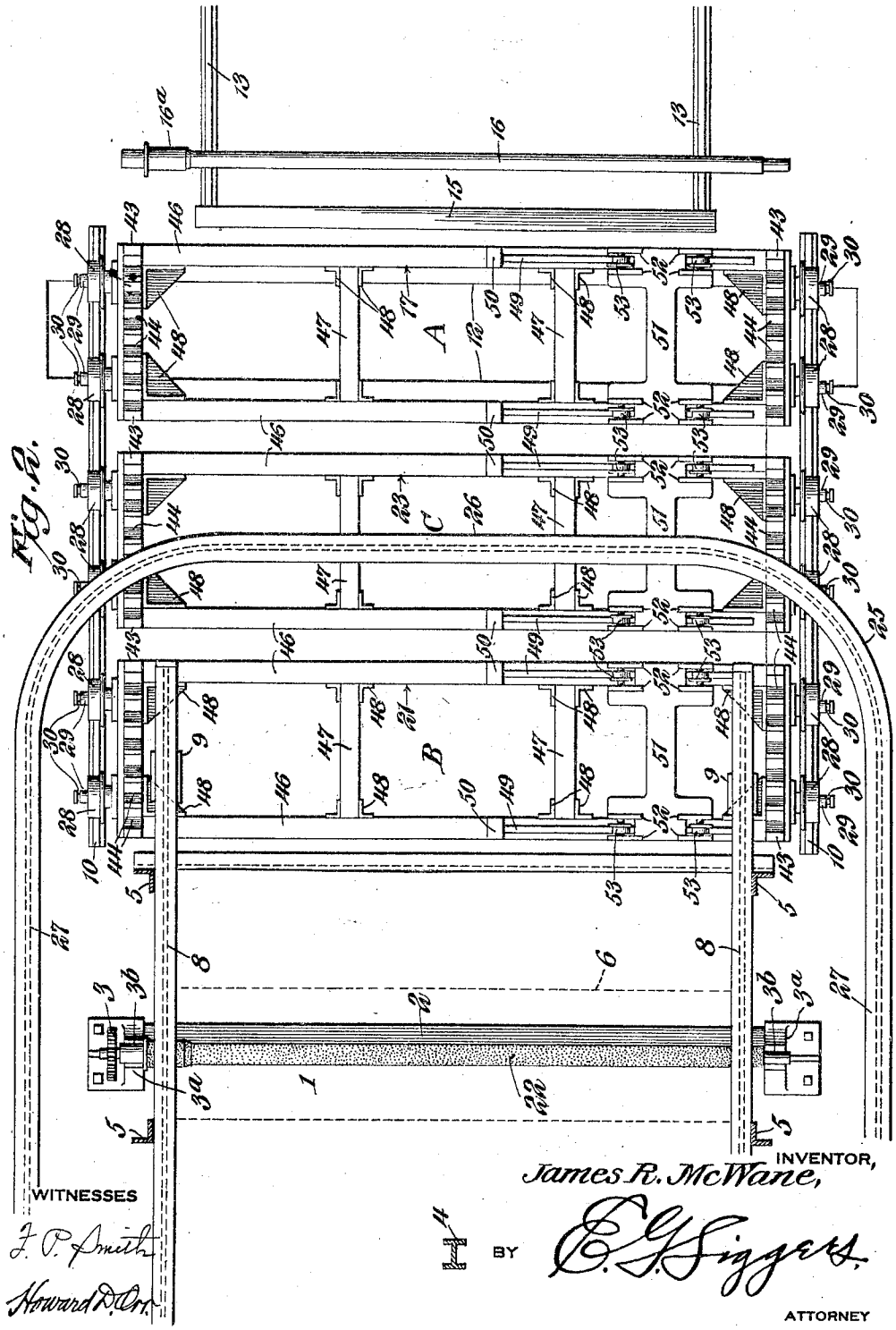


Fig. 2.

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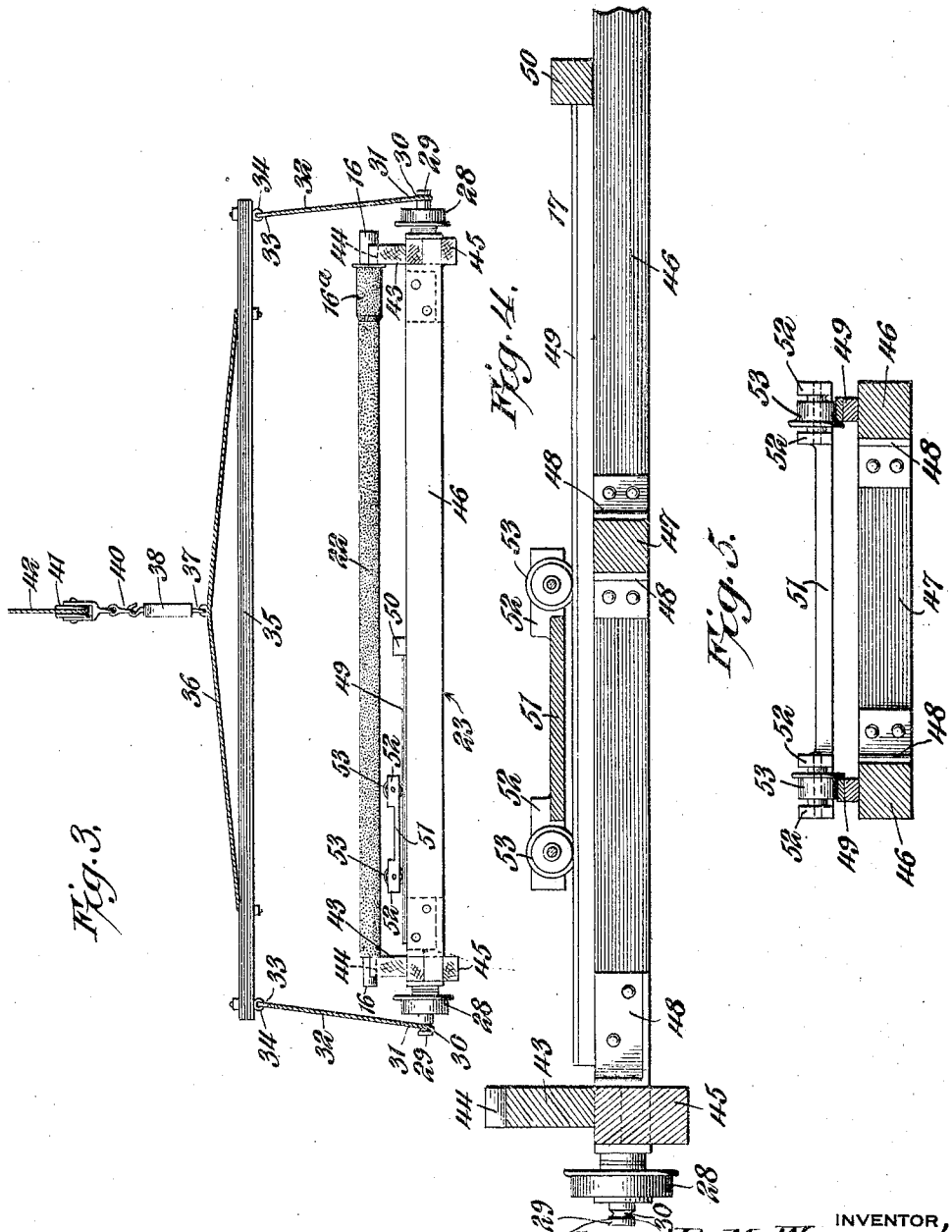


Fig. 3.

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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MEANS FOR HANDLING CORE BARS AND CORES.

Application filed December 12, 1924. Serial No. 755,510.

This invention relates to means for handling core bars and cores in the manufacture of cast iron pipe or similar castings.

The object is to provide means for handling the empty core bars, after being shaken out to remove the sand from a previous casting operation, subjecting the same to a washing or wetting treatment and carrying a plurality of said bars to the core making machines, to expedite the placement thereof, one at a time, in said machine, for the purpose of forming the sand core thereon, said means also providing for the transportation of the plurality of completed cores to one "bay" or unit of the foundry plant or another, and safeguarding against damage or injury to the sand cores during such transit.

Another object is to provide means for the stated purpose which will alternately serve two bays or units of the plant without pause or delay in the cycle of operations, the operations requiring the attention of a minimum number of operatives and, in addition, effecting great economy in space on the foundry floor.

A further object is to provide means for carrying the plurality of core bars or cores during the several steps necessary in the improved method of handling the same, said means permitting of the ready placement of the bars or cores thereon without danger of injury, and of being picked up bodily, with all the cores being held against dislodgment, and carried from the core machine to the desired position and placed in the flasks on the casting floor of alternate bays or units of the foundry.

A final object is to provide manually operated means in connection with the holding and carrying means for the bars and cores, whereby the bell ends of the core bars, in the case of cast iron pipe manufacture, may be counterbalanced during transit from the core machine to and along the said bays, it being understood that the elongated form of such core bars necessitates an elongated and easily tiltable carriage when supported and carried by a single point suspending means, which is necessary in the present arrangement, in order to enable the load to be turned about a vertical axis to guide and direct the same through the more or less restricted confines about the core machine, and to enable turning at right angles to travel down one bay or another at either end of the machine, the said lifting and carrying means being in the form of a mono-rail hoist capable of making such turns.

A full and complete understanding of the invention may be obtained from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, it being understood that while the drawings show a practical form of the invention, the latter is not to be confined to strict conformity with the showing thereof, but may be changed or modified, so long as such changes or modifications mark no material departure from the salient features of the invention, as specifically pointed out in the appended claims.

In the drawings, in which similar reference characters designate corresponding parts throughout the several figures:—

Figure 1 is a side elevation, partly in section, of a portion of a pipe foundry plant and showing the improvements in operation in connection with a core making machine;

Figure 2 is a plan view of the same;

Figure 3 is a side elevation of the core bar and core supporting and transporting means;

Figure 4 is an enlarged, longitudinal section through one end of the supporting means;

Figure 5 is a transverse section of the same.

It has been found in practice that the individual handling and treatment of the core bars entails a great amount of labor and unnecessary expense in carrying the same from the shake-out racks or runways where the sand from previous castings is removed, and where any bent, warped or otherwise defective bars are detected and removed for straightening, to the core making machine for applying the coating of sand to the bars, and then carrying the individual cores to the floor of the bay or unit of the foundry, to be placed in the flasks for pouring the metal therein. By providing the improved means herein disclosed, a plurality of core bars and cores may be handled at one time, and by locating the core machine close to the said racks or runways, much time may be saved, thus increasing production and effecting economy in the cost thereof, the

said means consisting of improved cars or carriages capable of holding the desired number of core bars, and in the means or method of moving the cars or carriages and shifting the same to provide for the several steps necessary in the complete operation, and finally in picking up the entire car together with its load of cores and carrying the same to the pouring position.

In the drawings, 1 indicates a core making machine, which may be of any desired type capable of forming the proper core upon a permanent core bar, the usual knife or blade 2 causing the same to assume the necessary shape while being rapidly revolved by any suitable means such as gearing 3. No attempt has been made to show the core machine in detail, though the same is provided with upstanding pedestals 3^a having open seats 3^b at their upper ends for the end portions of the core bars, the bell ends of which are engaged by the gearing in any desired manner to impart a rotary motion to the bar.

The core machine is centrally located opposite the division between two bays or units of the pipe foundry, as indicated by the vertically disposed pillar or post 4 (Fig. 2), which serves as a roof supporting member, and said machine further includes upright corner posts 5 in the form of angle irons, suitably trussed and braced to support a sand bin 6 for holding the core sand. The bin is provided with a down spout 7 extending the full length of the core bar, and any suitable sand elevating means may be employed for supplying the bin with properly prepared sand for the purpose, said sand falling upon the revolving bar which has been wetted to cause the sand to adhere, the ever-increasing coat thereon being shaped by the said knife or blade.

At a suitable distance above the ground or floor level, the upright posts 5 support horizontal tracks 8, preferably in the form of I-beams, the free ends of which extend out in one direction beyond the supporting structure 5, as clearly shown in Figure 1. Each track 8 is provided with an independent hand hoist, indicated at 9, and having the usual operating chain 9^a depending within reach of an operator standing on the ground or floor and capable of being run from one end of the track to the other.

Located upon the floor and in longitudinal alinement with the said tracks 8, are a pair of spaced rails 10 constituting a floor track suitably supported upon pillars 11 embedded in the ground. The rails 10 are relatively short, being slightly greater than the width of three cars, as will be described, the ends remote from the core machine being located over a drain pit 12, arranged transversely and provided with a suitable outlet.

A rack or runway 13 composed of spaced rails suitably supported above the floor by posts 14, is located at the pit end of the floor tracks 10 and in longitudinal alinement with the same. The said rack or runway is preferably inclined slightly toward the end adjacent to the pit, and is there provided with a stop bar or cleat 15, which serves to check the downwardly rolling core bars 16 coming from the shake-out location, where the sand from previous casting is removed. At this point any bars found to be defective are removed, and straightened out or otherwise treated to make the same perfect.

A car 17 is initially located over the pit in the position indicated at A and constituting the first position, said car, which will be later described in more detail, resting upon the floor tracks 10 and close to the stop end 15 of the rack or runway 13 for the purpose of receiving the empty core bars 16 thereon, the latter being arranged in longitudinal alinement on the car and parallel to each other and to the core bars upon the runway.

When said car 17 is full of core bars, the latter are washed or wetted throughout their lengths by means of a suitable sprayer 18 having controlling means and suspended by a flexible hose 19 connected to an overhead source of supply 20, such washing serving to remove all particles of dried or burned sand from the bars, and also to facilitate the application of new sand thereto by the core machine.

When the car 17 is filled with core bars, it is rolled along to the other end of the tracks 10 to the second position, indicated at B, the said car being indicated at 21, where an operative at each end of the car applies one of the hoisting means 9 to the adjacent end of the core bars 16, one at a time, and places the same within the aforesaid seats 3^b in the core machine for forming the core thereon. As each core 22 is finished, the same is placed back on the car 21. During this operation a second car 23 is brought by an overhead, traveling, monorail hoist 24 to a position between the first and second positions A and B, and it is lowered to the tracks 10 in the third position C. This car which has been brought back empty from one of the two bays or units of the foundry, is then rolled along the tracks 10 to the first position A, ready to receive a load of empty core bars. The first car which has now been filled with finished cores 22 is rolled to the central position C by hand, and in a position to be connected to and lifted by the said overhead hoist 24, and is carried along the single track or I-beam 25 to the other bay or unit, where operatives place the cores in the molds along that floor. The hoist 24 now picks up a third car from said bay,

which has been emptied of its cores, and carries the same back to position C, the second car having received its load of empty core bars and been moved to position B for the making of the cores. This cycle of operations continues without interruption until the two bays are supplied with cores for all the flasks; and it will be seen that, with the steps taken, the three cars serve to keep a constant supply on hand, the travel of the hoist taking place while one car is being loaded with empty core bars, and the latter being washed or wetted, while the second car is having the cores placed thereon, and while the third car is in the bay having the cores removed therefrom.

The track 25 is in the form of a loop having the transverse portion 26 running across the center of the position C, and the two extended longitudinal branches 27 running down the centers of the two bays being served and are joined thereto by rounded corners to facilitate the turning of the hoist and the heading or guiding of the load into the bays.

Each car is equipped on its ends with a pair of spaced, flanged wheels 28 journalled on trunnions 29 suitably held to the frame of the car and extended beyond the wheels, their ends being provided with annular grooves 30 for the reception of the looped ends 31 of relatively short flexible cables 32, which may thus be readily attached to the car for lifting the same. The upper ends of the cables are connected to hooks 33 for engagement with eyes 34, carried at each end of a spreader bar 35, of a length slightly longer than the car, as shown in Figure 3 of the drawings. The spreader bar is in turn suspended by a cable 36, having its end attached thereto adjacent to each end of the bar, and provided at the center with an eye for connection to a hook 37, the shank of which extends upwardly through a frame 38, and provided with a nut and washer having an interposed spring 39 for cushioning the weight of the load to prevent jarring or dislodgment of the sand cores on the bars while in transit, or while being hoisted or lowered. The frame 38 is provided with a hook 40 at the top for connection with a sheave 41, having a lifting cable 42 running to the aforesaid hoisting mechanism 24, so that it will be seen that the entire car and load of cores is suspended from a single, central point while in transit, and may be easily turned by hand about a central, vertical axis to head or guide the car around the turns of the supporting track, in the more or less confined space adjacent to the core machine, and direct the same down the bay to be easily turned again to arrange the load of cores transversely thereof for placement in the flask sections, which are also disposed transversely upon the floor ready for the core.

The cars which are of elongated oblong form are provided at each end with upstanding pillow blocks 43, preferably formed of suitable wood, and provided with a plurality of notches 44, preferably V-shaped, for the reception of the ends of the core bars. The blocks 43 are mounted on end timbers 45 of the open frame car structure, the longitudinal sills 46 of the same being substantially the same length as the core bars 16, and held together by intermediate cross timbers 47, the angles of the various members being reinforced by angle plates 48 to give the required strength for supporting a load of cores.

In placing the bars 16 and the cores upon the cars, the bell ends 16^a thereof are all placed at one end, and since the bell ends are enlarged, they are necessarily heavier and would cause the car, while in suspension, to tilt to that end, by reason of the single point of support at 37, and provision has been made for overcoming such disadvantage in the following manner.

Each longitudinal sill or timber 46 is provided with a track 49 extending from one end thereof to a point adjacent to the center of the car, where the track ends in an abutment 50. Mounted to roll on said tracks is a cast iron weight or carriage 51, preferably having a narrow, connecting body portion and enlarged ends provided at their outer corners with upstanding ears 52, between which are journalled flanged wheels or rollers 53, which are adapted to roll along said tracks 49, the stops 50 and the aforesaid blocks 43 serving to prevent the weight from rolling off the tracks. The weight 51 is located below the centers of the journals of the wheels or rollers 53, so as to retain the weight upon the tracks in the event of rocking motion of the car in transit. The bell ends of the cores are all placed at the end of the car opposite to the tracks 49, and the weight is manually shifted to a position where the bell ends are balanced and the car may be carried in a horizontal position. The said weight is carried in the center of the car when the latter is being transported empty.

From the foregoing it will be seen that a simple means and method of handling core bars and cores at the core machine has been provided, whereby the same may go through the various steps necessary without loss of time, and with the aid of fewer operatives to prepare the bars, adjust the same in position for receiving the cores, and then transporting the same.

What is claimed is:—

1. In means for handling core bars and cores to and from a core making machine, a runway elevated above the floor and terminating in spaced relation to the core machine and in front of the same, floor tracks

between the runway and core machine and capable of holding three core cars, a core car normally located on the floor tracks adjacent to the runway to receive the core bars therefrom, means for wetting the bars on said car, lifting means to lift the core bars one at a time from a filled car to place said bars in the core machine and then remove the cores therefrom back to said car, and overhead means for picking up an entire car loaded with finished cores, after the same has been moved to a central position on the floor tracks and conveying the loaded car to the flasks.

2. In means for placing core bars in a core machine and then placing the cores in the molds, relatively short, spaced floor tracks adjacent to the core machine, and in front of the same, an inclined elevated runway terminating at the other end of the floor tracks and adapted to supply the core bars, a first car mounted on the floor tracks to receive the bars from the runway, means for wetting the core bars, a second car located at the opposite end of the floor tracks and having wetted bars thereon, hoisting means mounted at the core machine and adapted to place the bars, one at a time, from the second car on the core machine for having the core formed thereon and then returning the core bar with the core back onto the second car, and an overhead hoisting means adapted to pick up the second and loaded car and convey the same to the flasks.

3. The combination with a sand core making machine, of spaced floor tracks arranged longitudinally in front of said machine, a plurality of core cars mounted to roll on said tracks, elevated tracks mounted on the core machine and extending over each end of the adjacent core car, hoists mounted on the elevated tracks and adapted to engage the opposite ends of one of the core bars or said car and place the same on the core machine, elevated tracks terminating at the opposite ends of the floor tracks to constitute a runway and carry bare core bars to an adjacent core car, overhead bar wetting means located above the said car, a drain pit provided below the same, an overhead mono-rail having a loop located transversely above the floor tracks, and a monorail hoist mounted thereon and adapted to pick up a car loaded with cores to convey the same to the flasks.

4. Means for handling core bars and cores to and from a core making machine, comprising floor tracks arranged adjacent to said machine, an elevated, inclined runway longitudinally disposed at the other end of the floor tracks, the latter having room for a plurality of core cars, a core car initially located in the first position adjacent to the runway to receive empty core bars therefrom, means for wetting the bars, said car, when filled, being adapted to be moved to the second position at the opposite end of the floor tracks and adjacent to the core machine, means mounted for lifting the core bars from the car and carrying the same to the core machine and then replacing them again on said car, and overhead hoisting means adapted to pick up the car with its load of cores, after the same has been moved to the third or central position, and conveying the same to the flasks.

5. A means of handling core bars and cores to and from a core making machine, comprising means for placing an empty core car in a first position next to a supply of empty bars for the reception of a plurality of said core bars on said car, means for wetting the core bars and moving the full car to a second position adjacent to the core making machine, means for bringing an empty car from a unit of the foundry and placing same in a third position, between the first and second positions, and rolling the same to the first position, means for lifting the core bars from the full car, one at a time, and placing them individually in the core machine and then transferring the finished cores to the same car, and rolling the loaded car to the third position, and means for picking up the loaded car and carrying it to the flasks.

6. In means for handling core bars and cores to and from a core making machine, comprising means for receiving and delivering a plurality of bare core bars, means for assembling a plurality of said core bars over a pit and for wetting the same, means for shifting a plurality of the wetted core bars to a position adjacent to a core making machine, means for individually handling each of the wetted core bars and delivering the same to the core making machine for the purpose of forming the core thereon, and then for transferring the completed core bars to a car, and means for elevating the car with the completed cores thereon and conveying the same to the flasks.

7. A means for handling bars or members which have one end heavier than the other, comprising a wheeled frame, upstanding members to engage the core bars or cores at their ends to prevent dislodgment, and a movable weight mounted on the frame and adapted to counterbalance the heavier bell ends of the core bars or cores, when the frame is suspended.

8. A means for handling a plurality of core bars or cores in the manufacture of cast iron pipe, comprising a substantially rectangular frame, spaced wheels mounted at each end of the frame, upstanding racks mounted at each end of the frame and provided with a series of alined seats for the ends of the core bars, longitudinal tracks

mounted on the frame, a weight, wheels mounted in the weight and adapted to roll on said tracks to permit said weight to be shifted to counterbalance the bell ends of the core bars.

9. A means for handling a plurality of elongated bars or members having one end heavier than the other, comprising a frame, means carried by the frame for holding the bars in place, pairs of wheels mounted at the ends of the frame and adapted to roll on a track, longitudinal tracks mounted on the frame and extending for a portion of its length, and a weight adapted to be manually adjusted longitudinally of the frame to counterbalance the heavier ends of the bar, said weight having wheels to roll on said tracks.

10. A means for handling a plurality of elongated core bars for casting pipe or the like, comprising an elongated frame provided with a pair of wheels at each end to engage a floor track, the trunnions of the wheels being extended and provided with annular grooves, a one point lifting and suspending means, a spreader bar connected to the same, flexible strands connected to the ends of the spreader bar and having terminal loops for engagement with the grooves of the trunnions for lifting the car.

11. A means for handling a plurality of elongated core bars for casting pipe or the like, comprising an elongated frame provided with a pair of wheels at each end to engage a floor track, the trunnions of the wheels being extended and provided with means for engagement with a single point lifting and suspending means for carrying the car and the core bars, racks mounted on the car for receiving the bars, opposite tracks mounted on the longitudinal members of the frame and extending from one end thereof to near the center of the same, said core bars being placed in the racks with their heavier or bell ends opposite to the said tracks, and a weight having opposite pairs of wheels to roll on the tracks and adapted to be manually shifted to balance said heavy ends, said weight being arranged below the journals of its supporting wheels to maintain the same on the said tracks.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

JAMES R. McWANE.