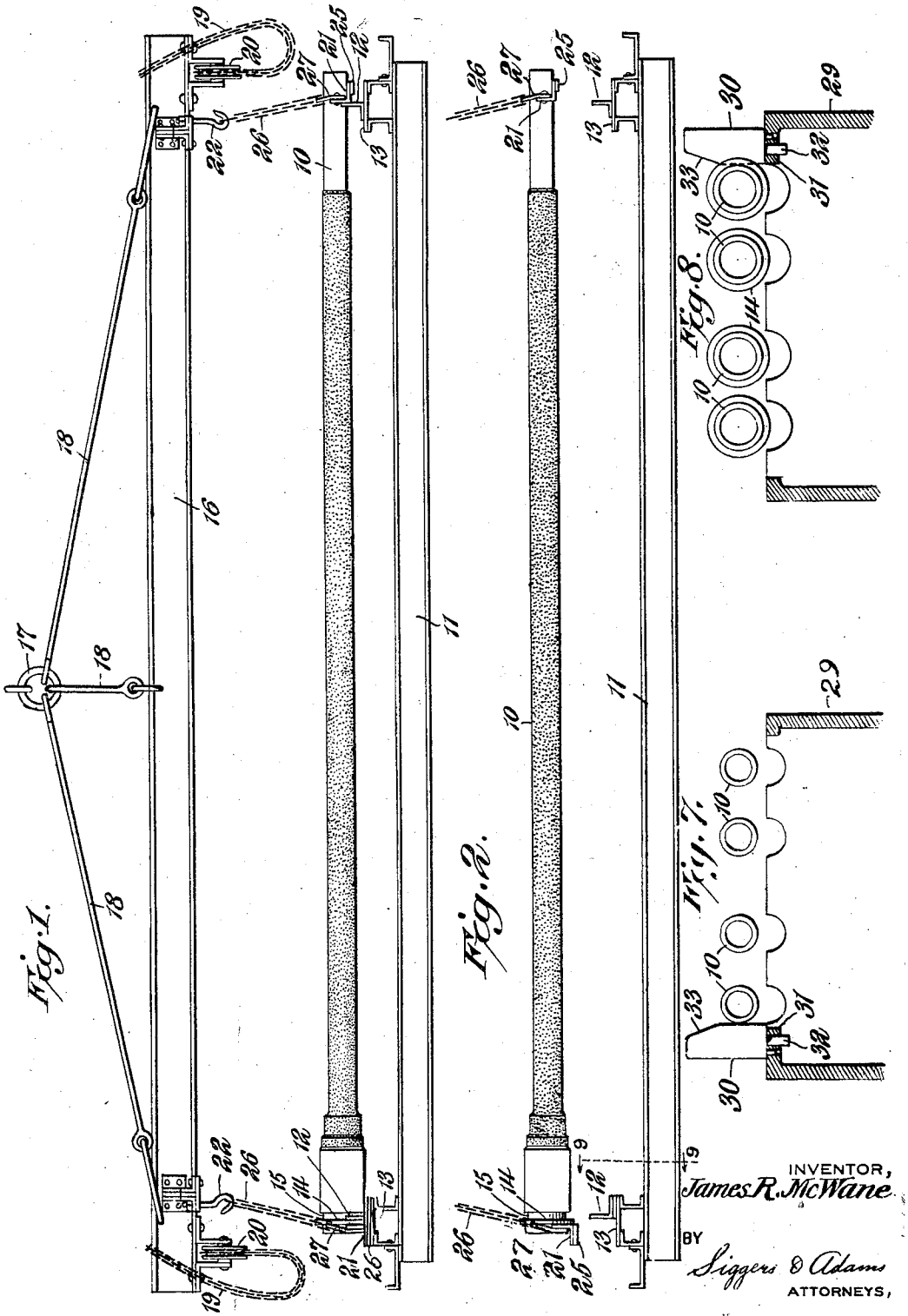
Oct. 28, 1930. J. R. McWANE 1,779,484

APPARATUS FOR HANDLING CORES

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APPARATUS FOR HANDLING CORES

Filed Feb. 28, 1928 2 Sheets-Sheet 2

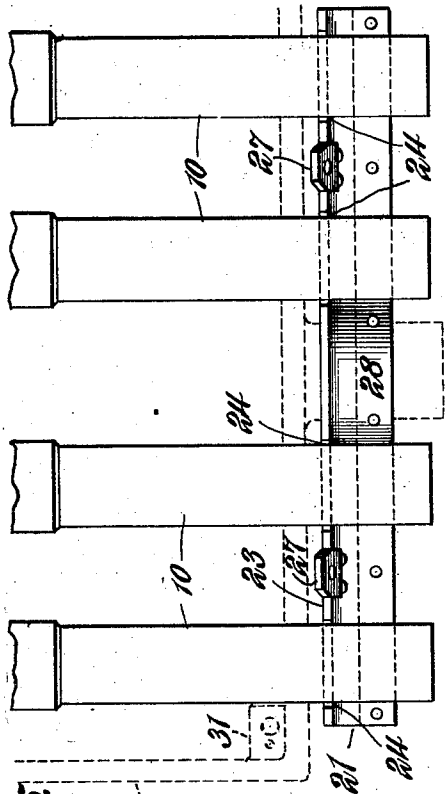


Fig. 5.

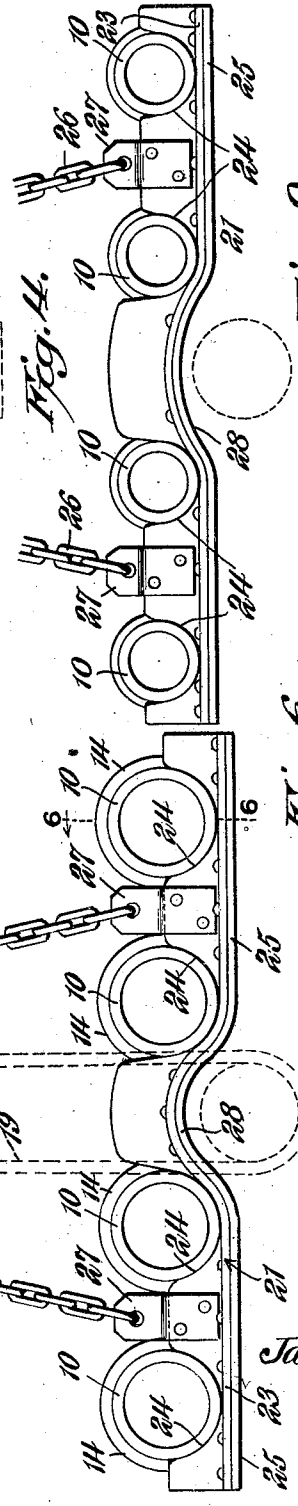


Fig. 4.

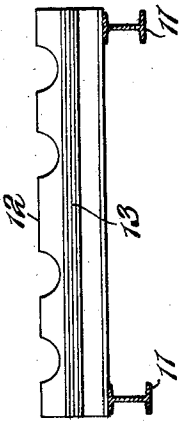


Fig. 9.

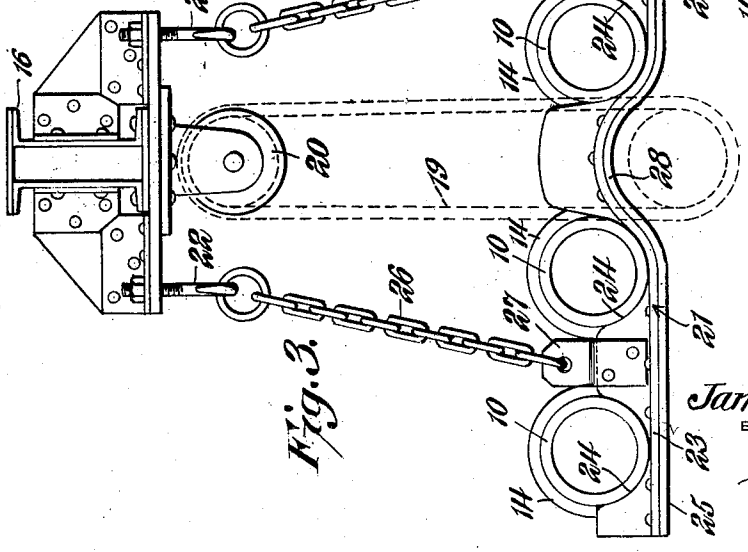


Fig. 3.

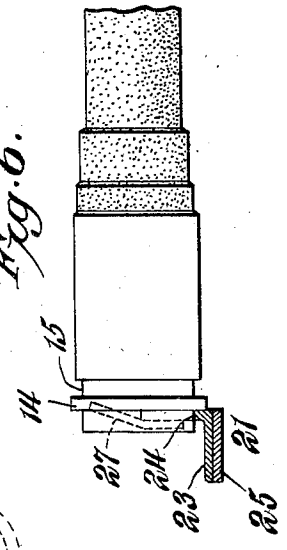


Fig. 6.

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Patented Oct. 28, 1930 1,779,484

UNITED STATES PATENT OFFICE

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APPARATUS FOR HANDLING CORES

Application filed February 28, 1928. Serial No. 257,708.

This invention relates to apparatus for handling cores such as are used in the manufacture of standard cast iron pipes and among other objects, aims to provide improved equipment whereby a plurality of cores may be simultaneously picked up, conveyed, and set in place in the drag section of a multiple pipe mold by means of lifting mechanism, without injury to the cores or molds.

The invention is preferably employed in connection with the system claimed in my copending application, Serial No. 220,730, filed September 20, 1927.

In the accompanying drawings, showing a preferred embodiment of the invention,

Fig. 1 is a side elevation of a core setting rig shown with cores and a core supporting frame;

Fig. 2 is a fragmentary side elevation showing the core setting rig after it has lifted the cores from the core supporting frame;

Fig. 3 is an end view of the core setting rig supporting a plurality of cores;

Fig. 4 is a fragmentary end view of the core setting rig showing it in lowered position over the drag section of a mold;

Fig. 5 is a fragmentary top plan view of the rig of Fig. 4, showing the drag in dotted lines;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 3.

Fig. 7 is a cross-sectional and somewhat diagrammatic view taken through one end of a drag section and showing a plurality of cores being guided into the journals thereof;

Fig. 8 is a view like Fig. 7 but with the plane of the section passing through the other end of the drag; and

Fig. 9 is a section on line 9—9 of Fig. 2.

In the manufacture of cast iron pipe by the horizontal casting method, the practice heretofore has been to set one core at a time in the drag section of the pipe molds, notwithstanding that multiple molds are used in casting a plurality of pipes at one time so as to speed up production. In making short, light lengths of pipes, the core setting has been done by hand, a stick or bar being placed in each end of the tubular core bar and the core being lifted and placed in the mold. Setting longer, heavier cores has been accomplished mechanically by picking up and placing one core at a time by means of an overhead crane or other lifting mechanism. The procedure of setting the cores, one at a time, in these multiple pipe molds, seriously interferes with quantity production, and it is therefore highly desirable to set all of the cores required for a given mold in a single operation. However, on account of the delicate nature of the work, the danger of mutilating the molds, and the greater danger of jarring the sand off the core bars, thus destroying the cores, the setting of a number of cores simultaneously has heretofore been considered wholly impracticable.

This invention provides apparatus which facilitates the setting of a group of cores in the molds at one time, and which minimizes the likelihood of injuring the cores or the molds.

The apparatus here shown is designed to be used between the core reconditioning zone and the assembling zone of the plant described in my above mentioned application. In general, provision is made for supporting finished cores, ready to be set in molds, on a frame such as that of a core car more or less like those shown in my Patent No. 1,589,652. The cores are supported by the frame in the same relative positions that they are to occupy in a multiple pipe mold. A crane rig, hereinafter described and claimed, is utilized to pick up a group of the cores without injury thereto and hold them in their same relative positions while they are being transferred to and placed in the drag. The drag has means for guiding the group of cores both longitudinally and laterally into their respective seats. The rig is so constructed and arranged that it may be lowered clear of the walls of the drag, and may be manually disengaged from the cores after they are set in position, thus obviating destruction of or injury to the mold and cores.

Referring to Figs. 1 and 2, there is shown a core handling rig ready to pick up a group of cores 10 which may be like those shown in my Reissue No. 17,121 dated October 30, 1928. The cores in Fig. 1 are shown supported on a

frame 11, which may be on an ordinary core car (not shown), with their ends projecting beyond arcuately notched vertical flanges 12 (Fig. 9) which conveniently may be made of structural angles supported on plates 13 (Fig. 2) whose surfaces extend beyond the vertical flanges and underlie the projecting ends of the cores. The arcuate notches in the vertical flanges 12 are preferably machined, and are spaced apart the same distance as the core-centering journals in a multiple pipe mold (see Reissue 17,121), and all the cores are positioned longitudinally on the frame 11 when they are set in the notches by causing correspondingly located portions of the core bars to engage or rest in the seats provided by the notches. Herein, the core bars have annular flanges 14 at their large or bell ends and present grooves 15 between the flanges 14 and said ends. The grooved portions of the core bars are conveniently received in the machined seats or notches with the annular flanges 14 outside the flanges 12. By the described construction, the ends of all the cores of the group on frame 11 are exactly even with each other and are spaced apart the exact distance between their respective seats or journals in the drag; and because of the way the core bars interfit with the flanges 12, the cores rest immovably upon frame 11.

The rig for picking up a group of the cores includes a spreader beam 16 which may be and preferably is a part of the standard equipment used for handling flask sections. See my Patent No. 1,557,072. This spreader has provision in the form of an eye 17 on links 18 to be suspended from an overhead traveling crane (not shown). The means for engaging the flask sections are shown as endless chains 19 (Figs. 1 and 3) trained over sheaves 20 arranged at the opposite ends of the spreader, as described in the patent last mentioned. The rig also includes a pair of slings 21 (Figs. 2 and 3) suspended from laterally spaced hooks 22 secured to the spreader inside of or between the sheaves 20 so that the chains 19 may be thrown over the ends of the spreader (Fig. 1) and the slings may be detachably connected to the hooks and used without interference from the flask handling chains.

Herein, the slings 21 are shown (Figs. 3, 4, 5 and 6) as each comprising rigid members in the form of angles 23 whose vertical flanges are provided with machine arcuate notches or seats 24 for the ends of a group of cores. The horizontal flanges of the angles are shown as being reinforced by plates 25 riveted to them.

The slings are adapted to seat four cores at a time and are shown as being flexibly suspended from the hooks 22 of the spreader by means of chains 26, secured to bent ears 27 fast to the vertical flanges of the slings, the arrangement being such that the slings may be swung on the hooks to be engaged with and disengaged from the ends of a group of cores, thus permitting handling thereof, without injury to the cores.

To enable the slings to lower a group of cores into the journals of the drag section of a mold such as that shown in my co-pending application Serial No. 262,683 filed March 19, 1928, and entitled "Apparatus for molding cast iron pipes", they are bent as at 28 where they overlie the trunnions of the drag so that the trunnions will not interfere with seating the ends of the cores in the journals; that is to say, the slings will not strike the trunnions before all of the cores are set in place. Moreover, a clearance between the slings and the trunnions is necessary in order to permit the slings to be lowered to disengage the ends of the cores, permitting them to be swung outwardly beyond the ends before the crane again lifts the rig. The necessity for this clearance accounts for the flat reinforcing element 25 instead of a vertically flanged one which would project downwardly too far.

Referring now to the handling of a group of cores by the apparatus, as shown in Fig. 1, the vertical flanges of the slings 21 are shown as facing each other so that when the slings are lowered below the projecting ends of the cores on the supporting frame, they may rest first on top of the flat plates 13, whereupon the sling at the spigot ends of the cores may be pushed or slid into contact with the vertical flange 12 and the sling at the bell ends may be slid against the annular core bar flanges 14. This arrangement insures the initial spacing of the two slings sufficiently far apart to enable them to clear the end walls of the drag; and such spacing is maintained because of the friction between one of the slings and the core bars, and because of the engagement of the annular flanges 14 with the other sling. The slings with the cores thereon are carried to the assembling zone of the plant by an overhead crane (not shown) and then lowered into position upon the drag.

It is of utmost importance to guide the group of cores properly into the journals in the drag, because any false move might result in destruction of or injury to either the mold or the cores or both. To this end, each of the drags 29 (Figs. 7 and 8) is shown as having provision for mounting thereon guides 30 to guide the whole group of cores both laterally and longitudinally. It has been found that two such guides should be used, preferably at diagonally opposite corners. The one at the bell end of the drag is arranged to engage the groove 15 of one of the outside core bars and the one at the spigot end is arranged to engage the projecting end of the core bar on the opposite side of the group. In the present example, the drags have inwardly extending lips or

ledges 31 provided with a pair of holes to receive spaced pins 32 on the guides 30 whereby the guides are held in proper guiding position, and yet are readily removed. The guides may be and preferably are made of flat pieces having downwardly and inwardly inclined edges 33, along which the group of cores is guided laterally as the group is lowered by the crane. An attendant will start the group downwardly with the upper, inner edge of guide 30 at the bell end engaging the groove 15 (Fig. 8) and will hold one of the chains suspending the sling until the whole group is lowered into position; then attendants at both ends will disengage the slings and remove the guides so that the crane can take another trip for another load.

From the above, it will be clear that by means of the described apparatus it is possible to pick up a group of cores and transport them any distance and set them in position without the least injury to the very easily destroyed cores. This result is effected by first grouping the cores on a support which holds the cores in the exact relative position they will occupy when in the mold, then engaging the cores from underneath with a pair of slings which maintain the original spacing of the cores and lifting them off the support and transporting them to the mold, lowering the cores in place with guiding means to insure seating of the cores in the machined journals provided for them, and finally disengaging the slings without disturbance to the cores.

From the foregoing, it will be seen that this invention provides apparatus eminently adapted to expedite the assembling of molds ready for pouring or for transfer to the pouring zone and that it will materially increase the production of a plant, such as that described in my co-pending application. Moreover, use of the invention reduces production expense. To be concrete, the described apparatus permits the seating of four cores simultaneously as rapidly as one core has heretofore been seated, and thus (in conjunction with other apparatus) makes it possible to quadruple the output of the plant without employing any complex mechanism requiring high skill, and without additional labor, and with a great saving in power and in the time of several workmen. Proportionately greater savings are realized by using apparatus capable of handling more than four cores at a time.

Obviously the present invention is not restricted to the particular embodiment thereof herein shown and described. Moreover, it is not indispensable that all the features of the invention be used conjointly, since they may be employed advantageously in various combinations and sub-combinations.

What I claim is:—

1. Apparatus of the character described comprising, in combination, means for picking up simultaneously and holding a group of spaced cores by their ends, without disturbing the relative positions thereof and without injury to the cores, and means for guiding the cores simultaneously into seats provided on the drag section of a multiple mold, without relative movement of the cores of the group, thus obviating injury to the cores or to the mold.

2. A rig for handling a plurality of core bars for cast iron pipes comprising, in combination, a spreader adapted to be carried by a crane; a pair of slings at the opposite ends of the spreader; flexible means for detachably connecting said slings to the spreader; and means on the slings to engage the ends of a plurality of spaced parallel core bars and confine them in fixed spaced relation while they are being conveyed and set in a multiple pipe flask.

3. A rig for handling sanded core bars for cast iron pipe comprising, in combination a spreader beam adapted to be carried by an overhead crane; pairs of laterally spaced hooks adjacent to the opposite ends of the spreader beam; a pair of slings each having chains detachably connected to said hooks; and means on the slings to receive the ends of a plurality of spaced parallel core bars and to confine them immovable relative to each other while they are being conveyed and set in a mold section.

4. A rig for handling core bars comprising, in combination, a spreader beam adapted to be carried by an overhead crane; and a pair of slings suspended from the spreader beam having notches for receiving a plurality of spaced parallel core bars and supporting them in position to be set in a multiple pipe mold section; said slings being spaced sufficiently far apart to clear the end walls of the flask section when lowered and being flexibly suspended so as to permit them to be disengaged from the core bars without disturbing them after they are set in the mold section.

5. A rig for handling sanded core bars for making cast iron pipes comprising in combination, a support; and a pair of slings depending from the support, each having spaced notches to engage beneath the corresponding ends of a plurality of core bars and hold them in proper spaced relation to be set in the drag section of a mold.

6. A rig for handling sanded core bars for making cast iron pipes comprising in combination, a pair of slings each having spaced notches to receive the ends of a plurality of core bars and confine them in proper spaced relation to be set in the drag section of a mold; said slings having means for flexibly suspending them from a support whereby they may be engaged with or disengaged from the core bars.

7. A rig for handling sanded core bars for making cast iron pipes comprising in combination, a pair of slings each including a flanged member having spaced arcuate notches to receive the ends of a plurality of core bars and confine them in proper spaced relation to be set in a drag section.

8. A rig for handling sanded core bars for making cast iron pipes comprising, in combination, a pair of slings each including an angle member having a wide vertical flange; a reenforcing member for the horizontal flange; and a plurality of spaced arcuate notches adapted to receive the ends of a plurality of core bars and hold them against movement whereby they may be set in the drag section of a mold without relative movement.

9. A rig for setting a plurality of sanded cores in a drag having trunnions projecting beyond the ends, comprising, in combination, a pair of slings each formed so as to engage and receive the ends of the core bars and each shaped so as to overlie the trunnion without striking it during the setting of the cores in the drag, and each of such vertical thickness as to permit lowering for disengagement from the core bars without interference with the drag.

10. In combination with a spreader having means for attachment to a crane and means for handling trunnioned flask sections, pairs of laterally spaced hooks secured to the spreader between the means for handling flask sections so as to permit suspending a core bar setting rig therefrom; said hooks being so located as not to interfere with the operation of the flask carrying rig.

11. In a spreader having means for attachment to a crane and means adjacent to the opposite ends to handle pipe flasks, independent means to suspend core carrying devices whereby they may be used without interfering with the flask handling means.

12. Apparatus for handling a plurality of sanded core bars for making cast iron pipes comprising, in combination, a core bar support having provision for receiving, supporting and holding said core bars in the same spaced relation that they occupy in a multiple pipe mold; and a core conveying and setting rig including means for picking up a plurality of said core bars at the ends thereof and conveying them in the same relative positions to the drag section of a mold.

13. Apparatus for handling a plurality of sanded core bars for making cast iron pipes comprising in combination, a core bar support having provision for receiving and supporting said core bars in the same spaced relation that they occupy in a multiple pipe mold; a core conveying and setting rig including means for picking up a plurality of said core bars and conveying them in the same relative positions to the drag section of a mold; and means associated with the drag to guide the core bars.

14. Apparatus for handling a plurality of sanded core bars for making cast iron pipes comprising in combination, a frame presenting laterally spaced core bar seats for receiving and supporting said core bars in the same spaced relation that they occupy in a multiple pipe mold; and a core conveying and setting rig including means for picking up a plurality of said core bars and conveying them in the same relative positions to the drag section of a mold.

15. Apparatus for handling a plurality of sanded core bars for making cast iron pipes comprising in combination, a frame having vertical notched or cutaway flanges at the opposite sides for receiving and supporting said core bars in the same spaced relation that they occupy in a multiple pipe mold; and a core conveying and setting rig including means for picking up a plurality of said core bars and conveying them in the same relative positions to the drag section of a mold.

16. Apparatus for handling a plurality of sanded core bars for making cast iron pipes comprising in combination, a core bar support having provision for receiving and supporting said core bars in the same spaced relation that they occupy in a multiple pipe mold; and a core setting rig having slings engageable with ends of the core bars which project beyond the support adapted to transfer the core bars to the drag section of a mold without relative movement of the cores.

17. Apparatus for handling a plurality of sanded core bars for making cast iron pipes comprising in combination, a frame having vertical notched or cutaway flanges at the opposite sides for receiving and supporting said core bars in the same spaced relation that they occupy in a multiple pipe mold; and a core conveying and setting rig including means for picking up a plurality of said core bars and conveying them in the same relative positions to the drag section of a mold; said slings being so positioned on the core bars as to clear the end walls of the drag section.

18. Apparatus for handling a plurality of sanded core bars for making cast iron pipes comprising in combination, a frame having vertical notched or cutaway flanges at the opposite sides for receiving and supporting said core bars in the same spaced relation that they occupy in a multiple pipe mold; and a core conveying and setting rig including means for picking up a plurality of said core bars and conveying them in the same relative positions to the drag section of a mold; said slings being so positioned on the core bars as to clear the end walls of the drag section, and being so shaped as to overlie the trunnions on the drag without striking them.

19. Apparatus for handling sanded core bars used in making cast iron pipes comprising, in combination; means for supporting a plurality of cores in the same spaced relation as they occupy in a multiple pipe mold; said core bars projecting beyond the supporting means; a core bar conveying and setting rig including suspended slings having notched seats adapted to swing under the projecting ends of a plurality of the core bars; and guide pins removably mounted on a drag to guide the slings with the load of core bars both laterally and longitudinally so that all of the core bars will be set properly in their respective journals.

20. Apparatus for handling sanded core bars used in making cast iron pipes comprising, in combination; means for supporting a plurality of cores in the same spaced relation as they occupy in a multiple pipe mold; said core bars projecting beyond the supporting means; a core bar conveying rig including suspended slings presenting notched vertical flanges providing seats and adapted to swing under the projecting ends of the core bars against the supporting means; and removable guiding means on the drag section of a mold to guide the core bars both laterally and longiutdinally into respective core journals.

21. Apparatus for handling sanded core bars used for making cast iron pipes comprising in combination, a core bar supporting frame having notched vertical flanges providing seats into which a plurality of core bars are adapted to be placed in the same relative positions as they occupy in a mold; the flange at one end of the frame adapted to engage correspondingly located portions of the core bars; a handling rig including slings also presenting correspondingly notched flanges providing seats for a plurality of core bars, said slings adapted to be swung under the ends of the core bars one against the vertical flange at one end of the frame and the other against correspondingly located parts of the cores at the other end; a pair of bevelled guiding standards adapted to be inserted in holes in the drag section of a multiple pipe mold at diagonally opposite corners, one to guide one end of the group of core bars laterally and the other to guide the other end of the group both longitudinally and laterally.

22. Apparatus for setting a plurality of sanded cores in the drag section of a multiple cast iron pipe mold, comprising, in combination, a rig on which the cores are adapted to be suspended and lowered in the same relative positions as they occupy in a mold; the drag section having removably mounted guides at diagonally opposite corners each having inclined portions to engage a part of one of the core bars and guide the group laterally at its end; one of the guides cooperating with a part of a core bar also to guide the group longitudinally.

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

JAMES R. McWANE.