J. R. McWANE.

APPARATUS FOR MAKING PIPES.

APPLICATION FILED JULY 12, 1909.

955,423.

Patented Apr. 19, 1910.

4 SHEETS—SHEET 1.

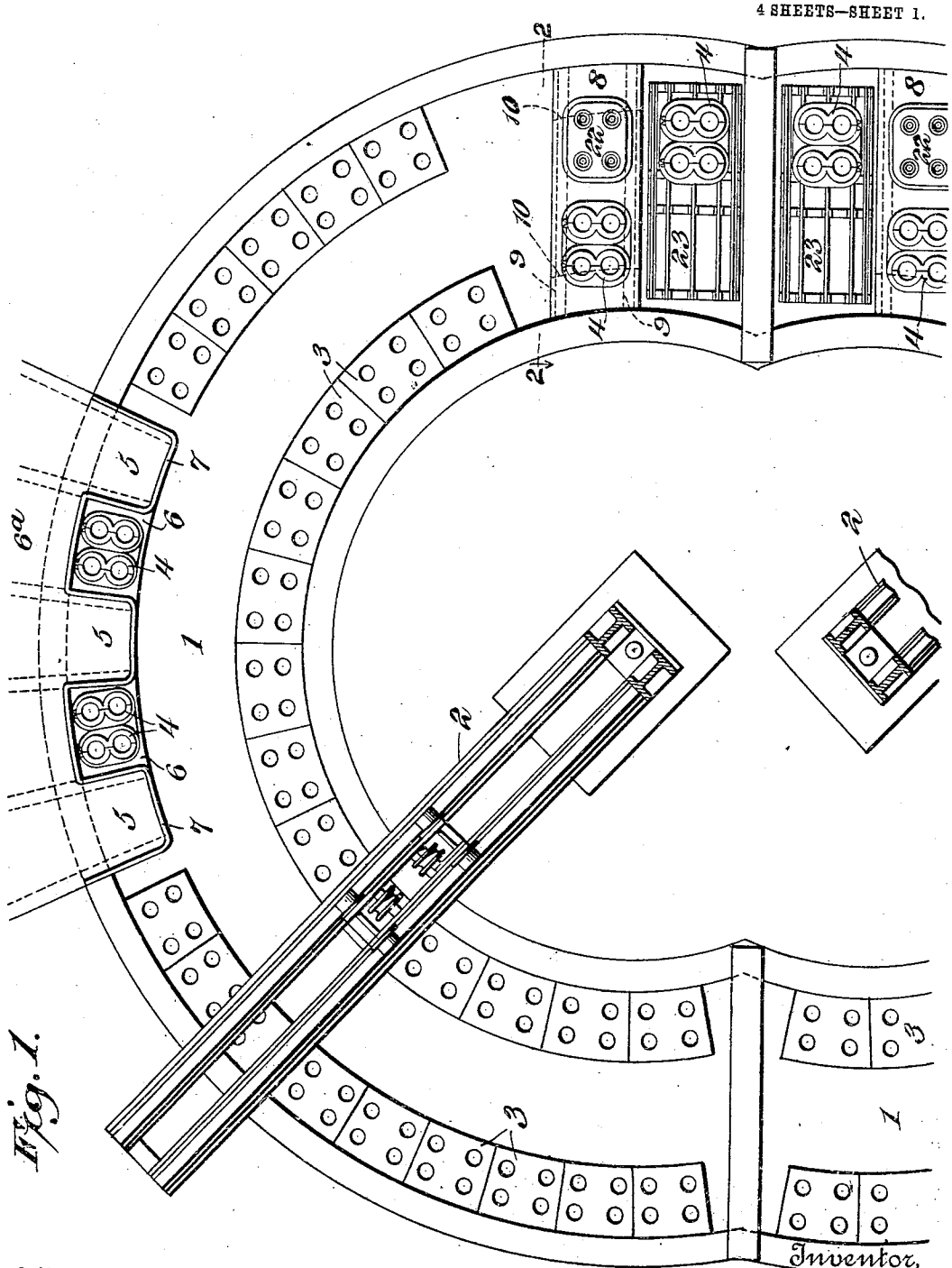

Fig. 1.

Witnesses

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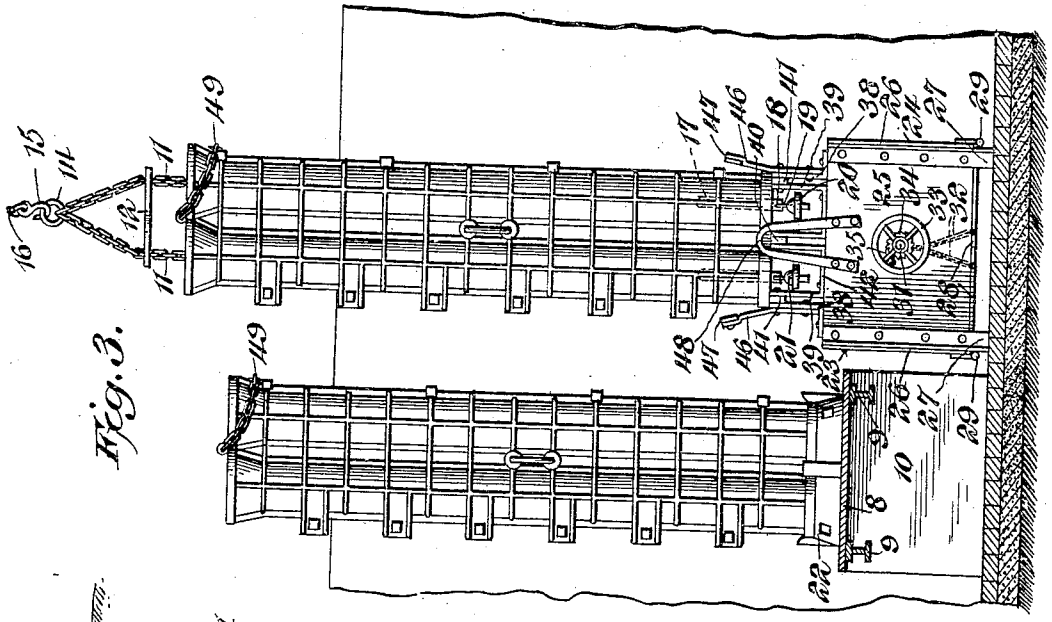

Fig. 3.

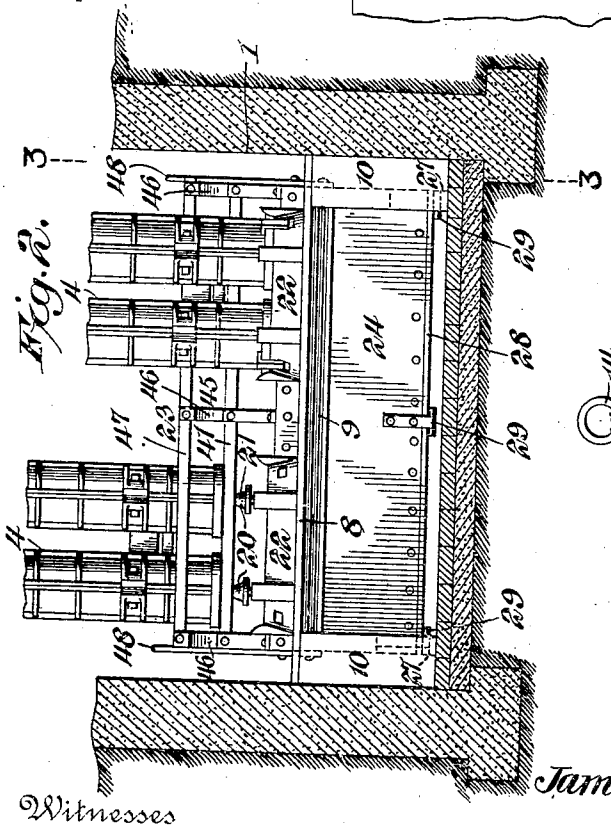

Fig. 2.

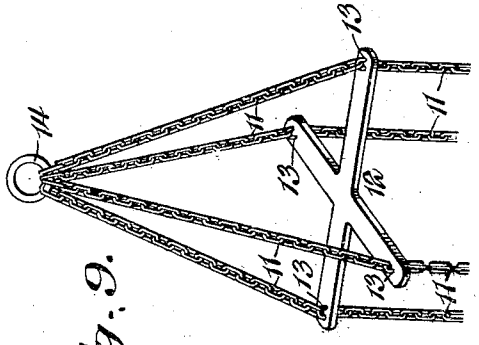

Fig. 9.

Witnesses

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4 SHEETS—SHEET 3.

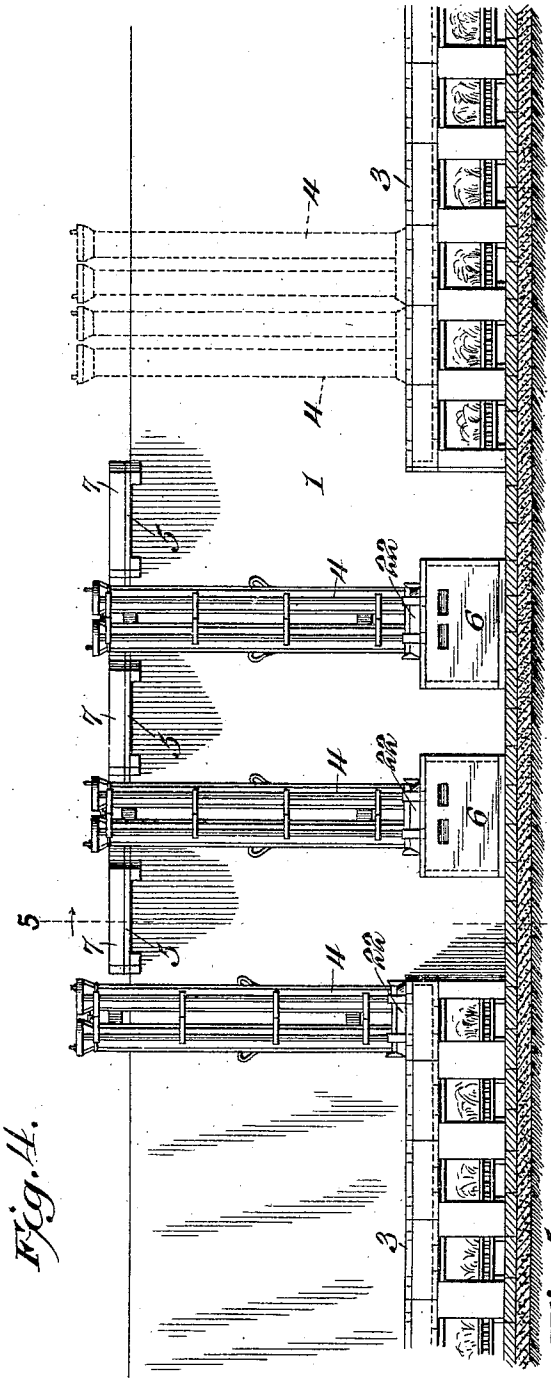

Fig. 4.

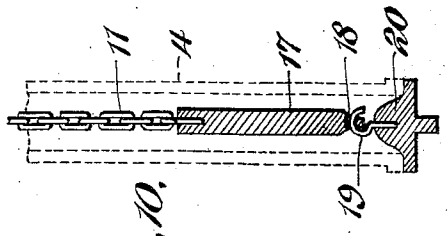

Fig. 10.

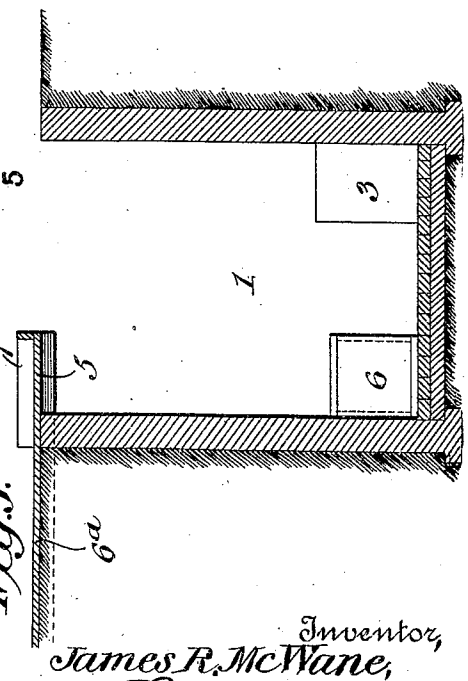

Fig. 5.

Witnesses

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4 SHEETS—SHEET 4.

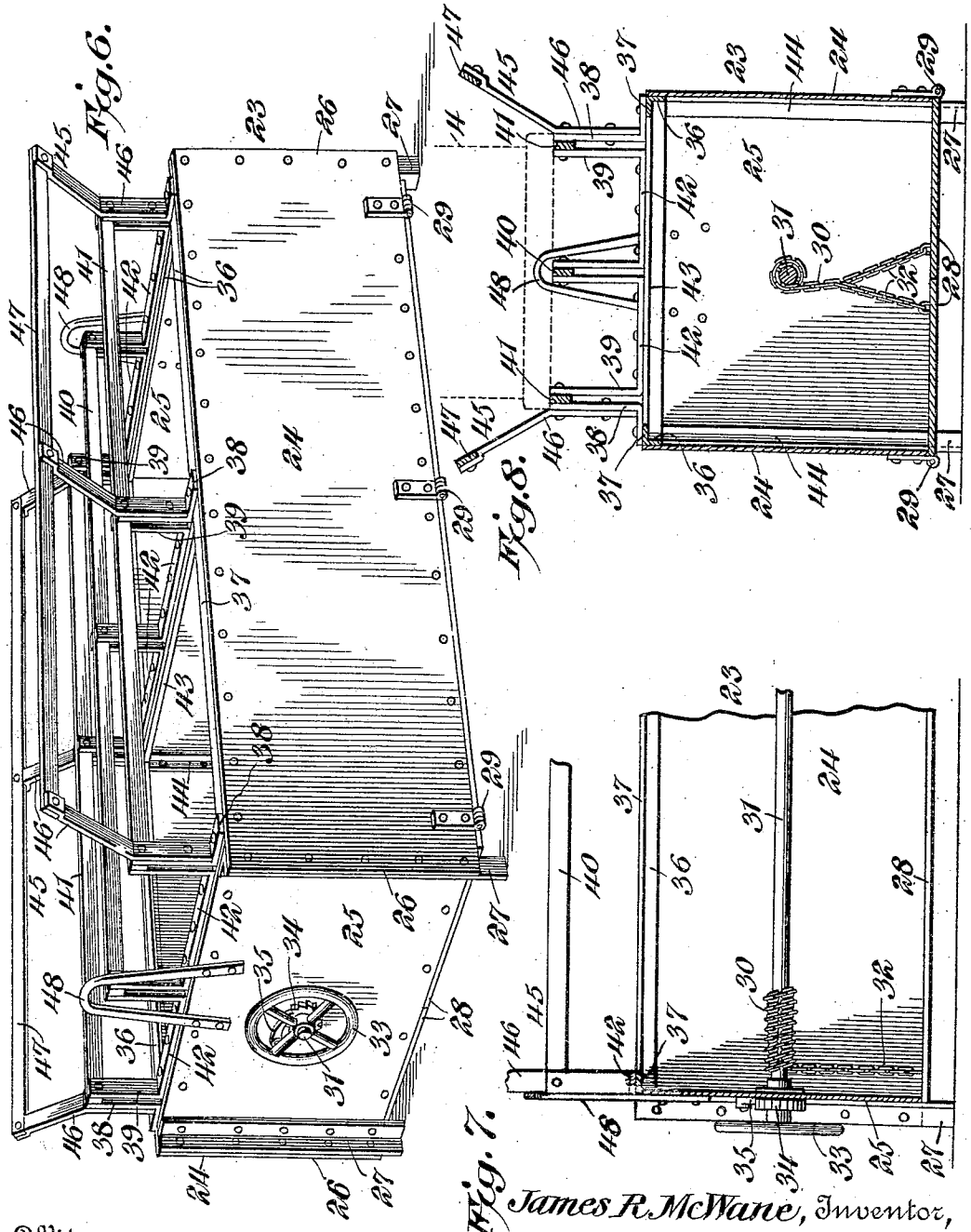

Fig. 6.

Fig. 8.

Fig. 7.

Witnesses

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H. J. Riley

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By E. G. Siggers.

Attorney

UNITED STATES PATENT OFFICE.

JAMES R. McWANE, OF BIRMINGHAM, ALABAMA.

APPARATUS FOR MAKING PIPES.

955,423. Specification of Letters Patent. Patented Apr. 19, 1910.

Application filed July 12, 1909. Serial No. 507,127.

To all whom it may concern:

Be it known that I, JAMES R. McWANE, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented a new and useful Apparatus for Making Pipes, of which the following is a specification.

The invention relates to improvements in apparatus for making pipes.

Heretofore, after pipes have been cast in an upright position in the pits, the flasks have been either transferred to shake out skids, located beyond the pits, or they have been shaken out within the pits at the various points where the pipes are cast. In the first method, the crane picks up a flask by means of a chain, which is connected with the flask at the central portion thereof, and as the flask comes up, the top end is pulled down to a horizontal position by means of a bar thrust into one of the pipes, and all the clamps except one are knocked off while the flask is swung around by the crane to the shake out skids, where the last clamp is knocked off to permit the flask to open and discharge the pipe, which rolls down the skids, while the sand drops into a pit provided for its reception. This method results in great danger to the workmen, as the one holding the flask in a horizontal position must run along the side of the pit and pass various obstructions as the crane moves toward the shake out skids, and the other workman, who removes the clamps from the flask, must ride on the latter, while the same is being carried to the shake out skids. Also the practice of this method subjects the crane to a relatively great amount of work, and as the capacity of a pipe pit is largely limited by the amount of work that can be done by a crane, only a single casting of pipe can be made every twenty-four hours with each equipment. Furthermore, great skill is required in the operation of the crane, and the wear and tear on the same and the flasks are very expensive. Another disadvantage attendant on this method is the difficulty of properly tempering the sand, which accumulates in large quantities in the sand pit at the shake out skids, and a relatively large amount of sand is required for each pit. Besides the dangers to the workmen and the disadvantages before mentioned, there is also great danger of upsetting the flasks on the heaters within the casting pit, when the crane is swung around from one point to another, resulting from the necessity of employing additional chains of sufficient length to extend down into the pit to connect with the flasks at the central portion thereof. Not infrequently the chains strike one flask, which falling against the next results in knocking down an entire series.

In the practice of the second method referred to, the pipes are pulled out of the flasks when the same are in a vertical position, and at the points around the pit occupied by the flasks when the metal is cast. One of the greatest objections to drawing the pipes out of the flasks and letting the sand fall into the pit, is that the ashes from the hay rope cores drop down into the pit when the pipe-pulling chains are let down into the flasks, and it is imposible to keep these ashes and the core clay from getting mixed with the molding sand, which is very objectionable. Another difficulty is that it is very expensive to shovel this sand into boxes and remove it from the pit. The work is so disagreeable that it is difficult to get men to do it. Another trouble is that the sand falling down into the pit where the iron is poured into the molds becomes mixed with particles of scrap iron, which may fall into the pit while the casting is being done.

The object of the present invention is to obviate the above objections, and to enable the flasks to be handled in a vertical position within the pit, without removing them therefrom and without permitting the core bar material to mix with the molding sand.

Another object of the invention is to enable the flasks to be shaken out within the pit at a common point and into a removable receptacle, adapted to be handled by the crane for carrying the sand to the ramming platforms or the vicinity thereof to enable the sand to be accurately tempered and immediately used, thereby reducing the amount of sand necessary for the operation of a plant.

A further object of the invention is to reduce the number and length of the movements of the crane, and thereby increase the capacity of a pipe pit to an extent, which will enable two shifts of hands to be worked in twenty-four hours instead of one shift as is the present practice, thereby doubling the output.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—Figure 1 is a plan view, partly in section, illustrating the layout of a pipe pit, equipped with an apparatus, constructed in accordance with this invention. Fig. 2 is a transverse sectional view of the same, taken substantially on the line 2—2 of Fig. 1, and illustrating the arrangement of the clamping platform and the shake out box. Fig. 3 is a vertical sectional view on the line 3—3 of Fig. 2. Fig. 4 is a longitudinal sectional view of the central portion of the pit, illustrating the arrangement of the ramming stools and the ramming platforms. Fig. 5 is a vertical sectional view on the line 5—5 of Fig. 4. Fig. 6 is a perspective view of the shake out box. Fig. 7 is a longitudinal sectional view of one end thereof. Fig. 8 is a transverse sectional view of the shake out box. Fig. 9 is a detail perspective view of the pipe-pulling chains. Fig. 10 is an enlarged detail sectional view of the lower end of one of the pipe-pulling chains, illustrating the construction of the weights and the pipe-supporting heads.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

The pipe pit 1, which is curved, is equipped with a centrally arranged crane 2 of the ordinary construction, and as the particular construction thereof does not constitute any portion of the present invention, a detail description thereof is deemed unnecessary. The pit is provided adjacent to its inner and outer walls with curved series of heaters 3, forming drying tables and adapted to dry the flasks 4 after the same have been transferred from the ramming platforms 5, where the sand molds are made. The flasks 4, which are quadruple or four-way flasks, form the subject-matter of my co-pending application, filed June 22, 1909, Serial No. 503,704. The ramming platforms 5, which extend inward horizontally over the central portion of the pipe pit from the outer wall thereof, are three in number to provide intervening spaces for two quadruple flasks, which are supported upon ramming stools 6 of the ordinary construction. This central and side arrangement of the ramming platforms enable the rammers and the sand pitchers to operate at each side of each quadruple flask, and in practice, one flask is rammed and completed, and the workmen then change their positions to the opposite sides of the other flask, which is placed on the ramming stool about the time the first flask is completed, as hereinafter more fully explained. The rammers and the sand pitchers operate simultaneously at each side of the quadruple flask, which is completed in practically the same length of time as a double flask. The ramming platforms 5, which consist of extensions of a sand-receiving platform 6^a, are provided with a continuous marginal wall 7, extending around the side and ends of the ramming platforms and across the spaces between the same, as clearly illustrated in Fig. 1 of the drawings to retain the sand on the platforms, and to prevent the former from dropping into the pit. The sand is screened and tempered on the sand platform 6^a, to which it is transferred at regular intervals after use, as hereinafter more fully explained.

The heaters are of the ordinary construction and, therefore, require no detail description herein. After the molds have dried and the cores set, the casting is commenced. When the metal has been sufficiently cooled, the core bars are removed and the following operations of shaking out the sand, removing the molded pipe, carrying the flasks to the ramming platforms and returning the flasks to the heaters, so as to be dried for the next casting operation, take place. The crane first lifts the flasks, which allow the upper clamps thereof to be knocked off, or otherwise unfastened. Then the crane is operated to place the flask on a clamping platform 8, located near one end of the pit, in the embodiment of the invention illustrated in the accompanying drawings, but it may be arranged at any other convenient point. The clamping platform preferably consists of a heavy metal plate supported by I-beams 9, which are set in columns or supports 10 of cement, or other plastic material. The columns or supports 10, which are located adjacent to the inner and outer walls of the pit, may, of course, be constructed of any other suitable material. The clamping platform extends transversely of the pipe pit, and is adapted to accommodate two quadruple flasks, and the workmen necessary for operating the clamps and connecting the pipe pulling chains 11 with the pipes. The pipe chains 11 are placed in the pipes, while the other clamps of the flask are being removed.

The pipe pulling device is equipped with four chains 11, adapted to extend through the pipes, and spread near their upper ends by a spider 12, constructed of suitable metal, and consisting of arms, extending diametrically from the center of the spider and provided at their outer ends with openings 13

through which the chains pass. The upper ends of the pipe-pulling chains are linked into a ring 14, adapted to be engaged by the hook 15 of the crane chain 16. The lower ends of the chains are equipped with weights 17, adapted to hold the chains sufficiently steady to enable them to be inserted in the pipes to be pulled. The lower ends of the weights 17 are provided with perforations 18, which are detachably engaged by hooks 19 of the pipe supporting heads 20. The pipe supporting heads 20 are provided with rounded portions 21 to fit within the lower ends of the pipes, and the hooks project centrally from such rounded portions 21. The pipe pulling chains are of sufficient length to extend below the lower end of the body portion of the quadruple flask, when the latter is lifted from the base or chill plate 22, preparatory to transferring the same from the clamping platform to a shake-out box 23. When the flask is lifted by the crane, the chains drop through the lower ends of the pipes, and the wabbling of the chains within the same shakes out the core bar material, which is deposited on the clamping platform, so that there is no liability of mixing the core bar material with the molding sand when the flasks are shaken out over the shake-out box.

The shake-out box, which is covered in my co-pending application, is oblong, as shown, and is constructed of stout sheet metal, or other suitable material, and its sides 24 are preferably extended beyond the ends 25 to provide projecting flanges 26 for the attachment of legs 27 for supporting hinged bottom sections 28 above the bottom of the pit, or other supporting surface. The legs 27, which may be of any suitable construction, preferably consist of angle bars, fitted in the corners or angles formed by the ends 25 and the projecting terminals 26 of the sides 24, and the legs are riveted or otherwise secured to the receptacle, as clearly illustrated in Fig. 6 of the accompanying drawings. The sections 28 are connected at their outer edges to the lower edges of the sides 24 by hinges 29, and they are adapted to swing downward to dump the contents of the shake-out box on the sand platform, or other suitable receptacle. The sections of the dumping bottom are connected by chains 30 with a horizontal windlass shaft 31, extending longitudinally of the shake-out box and journaled in suitable bearings of the ends thereof. The chains 30 are provided at their lower ends with branches 32, which are suitably secured to the sections 28 near the inner edges thereof. The shaft 31, which is adapted to be rotated to open and close the dumping bottom, is equipped at one end with a hand wheel 33, or other suitable means for rotating it, and it has a ratchet wheel 34 fixed to it and engaged by a pivoted pawl 35 for locking the shaft against rotation to secure the hinged sections of the bottom in their closed position.

The shake-out box is reinforced at its upper edges by angle bars 36, forming inwardly extending horizontal supporting flanges 37, upon which are mounted inner and outer brackets 38 and 39 for supporting central and side flask-receiving bars 40 and 41. The inner brackets 39, which are arranged in pairs at the center and ends of the shake-out box, are approximately U-shaped, consisting of a horizontal bottom attaching portion 42 and inner and outer vertical arms. The outer brackets 38 are substantially L-shaped and consist of horizontal attaching portions and upwardly extending arms. The adjacent arms of the supporting brackets are spaced apart to receive the horizontal bars 40 and 41, which are arranged edgewise with relation to the flasks. The centrally arranged U-shaped brackets are mounted on a top cross bar 43, suitably secured at its terminals to the sides of the shake-out box and supported by metallic bars or cleats 44, located at the inner faces of the sides 24 and preferably constructed of angle metal. The horizontal bars 40 and 41 and their supporting brackets form an open or grated flask-supporting frame, and provide a superimposed seat for the flasks, and it is equipped at opposite sides with inclined wings 45, forming guards and adapted to center the flasks with relation to the shake-out box, so that the sand will fall into the shake-out box when the pipes are pulled. The guards or wings are composed of supporting bars 46 and longitudinal connecting bars 47, secured to the upper ends of the bars 46. The bars 46 have their lower portions riveted, or otherwise secured to the outer faces of the vertical portions of the brackets 38, and the upper portions of the bars 46 are bent at an angle, and extend upwardly and outwardly therefrom, and the side faces of the longitudinal connecting bars 47 are set at an inclination, as clearly shown in Figs. 6 and 7. The shake-out box is equipped at its ends with upwardly extending loops or bails 48, adapted to be connected with the crane, when it is desired to dump the shake-out box. The handling of the sand from the shake-out box enables the sand to be tempered immediately in small quantities with an accurate amount of clay wash and new sand, and the successive use of the sand will permit a pipe pit to be operated with a comparatively small amount of sand. After the flask is placed on the shake-out box, the pipes are pulled and the chains are removed and laid down. The flask is then returned to the clamping platform and replaced on its chill plate or base, and while the clamps are being adjusted, a second flask is taken through the same steps as the first

flask, so that there will then be two flasks on the clamping platform either clamped or partially clamped, both having been shaken out. The first flask, which has by that time been completely reclamped, is then placed on one of the ramming stools between two of the ramming platforms, and while the first flask is being rammed, the crane goes after the third flask and takes it through the same operations as the first two. Two flasks are then on the clamping platform and one at the ramming platforms. The second flask, which by this time has been reclamped, is carried to the ramming platforms, and No. 1 flask, which will by this time have been rammed, is carried to the drying place and deposited over one of the heaters. The crane then returns for a new flask and the operation is continued until the day's work is finished.

The flasks, as fully described and shown in the aforesaid application, No. 503,704, are equipped at their upper ends with chain bails 49, which, when not connected with the crane, drop down below the top of the flasks. This obviates the necessity of the crane chain extending below the upper ends of the flasks, so that in transferring the flasks from one point or place to another, there is no liability of the crane chain, after it is disconnected from a flask, accidentally striking another flask and upsetting or otherwise injuring one or more of the molds. As the flasks are handled entirely in an upright position without removing them from the pit, the number and length of movements of the crane are greatly reduced and rendered simpler and less violent, and the manufacturing capacity of a pit is practically doubled. Less skill is, therefore, required to operate the crane, which in practice is a decided advantage, as the manufacturer of pipes will not be so dependent on the crane runner, who, with the present method, is the most important man on the pit. Also the up-keep of the crane and flasks is less expensive. Two of the most serious problems in a pipe foundry are the wear and tear on the crane and the breakage of the flasks. As the flasks are never lifted out of the pit and are never placed in a horizontal position, the wear and tear on the crane motors, gears and the possibility of breakage and accidents of any kind are reduced to a minimum.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. An apparatus of the class described including spaced ramming platforms, a ramming stool located below the space between the platforms, and means for placing a flask on the stool, whereby the former may be operated on at opposite sides by sand pitchers and rammers.

2. An apparatus of the class described including central and side ramming platforms spaced apart, and a pair of ramming stools located between the central and side ramming platforms and adapted to support flasks between the latter, whereby two flasks may be successively operated on at opposite sides.

3. An apparatus of the class described including a pipe pit, a clamping platform arranged within the pit to receive the flasks, and a shake-out box located within the pit adjacent to the clamping platform and adapted to receive the sand from the molds when the pipes are pulled.

4. An apparatus of the class described including a ramming platform, means for supporting the flasks adjacent to the platform, a clamping platform, a shake-out box adapted to receive the sand from the flasks when the pipes are pulled, and means for carrying the shake-out box to the ramming platform for returning the sand to the same to enable it to be retempered and immediately used.

5. An apparatus of the class described including a pipe pit, a fixed clamping platform located within the pipe pit and arranged transversely of the same and adapted to receive the flasks, and a portable shake-out box arranged within the pipe pit at one side of the clamping platform.

6. An apparatus of the class described including a pipe pit, spaced supports located within the pipe pit at opposite sides thereof, beams having their terminals mounted upon the said supports, a clamping platform consisting of a metallic plate supported by the said beams and located within the pit, and a shake-out box arranged within the pit at one side of the clamping platform.

7. An apparatus of the class described including a pipe pit, a clamping platform located within and extending across the pit adjacent to one end of the same, and a portable shake-out box arranged within the pit at the end of the same at one side of the clamping platform.

8. An apparatus of the class described including a pipe pit, a plurality of ramming platforms located at an intermediate point between the ends of the pit, and extending from the outer wall thereof, means for supporting a flask between the ramming platforms, drying means located at opposite sides of the ramming platforms, a clamping platform located within the pit, and a portable shake-out box arranged within the pit at one side of the clamping platform.

9. An apparatus of the class described including a pipe pit, a plurality of ramming platforms located at an intermediate point between the ends of the pit and extending from the outer wall thereof, means for supporting a flask between the ramming plat-

forms, drying means located at opposite sides of the ramming platforms, a clamping platform extending across the pit and rigidly supported therein, and a portable shake-out box arranged to receive the sand when the pipes are pulled.

10. An apparatus of the class described including a curved pipe pit, central and side ramming platforms extending inward over the pit from the outer wall and located at an intermediate point between the ends of the pit, means for supporting the flasks in the spaces between the ramming platforms, a clamping platform extending across the pit at one end thereof, and a portable shake-out box located adjacent to the clamping platform and disposed transversely of the pipe pit.

11. In an apparatus of the class described, the combination with a curved pipe pit, and curved series of heaters, of a plurality of ramming platforms located at the outer wall of the pit, a clamping platform located within the pit and adapted to receive the flasks to enable the clamps to be removed and replaced thereon, a shake-out box also arranged within the pit and adapted to receive the sand from the flasks when the pipes are pulled, and a crane adapted to transfer the flasks from the ramming platforms to the heaters and from the heaters to the clamping platform and the shake-out box and back again to the ramming platforms while the flasks are in a vertical position and without lifting the flasks out of the pit.

12. In an apparatus of the class described, the combination with a crane, and a multiple flask, of a pipe pulling device adapted to be connected with the crane and including a plurality of chains connected at their upper ends, and a spider provided with arms spacing the chains, and means carried by the chains for engaging the lower ends of the pipes.

13. An apparatus of the class described including a clamping platform, a shake-out box, pipe pulling chains, and means for introducing the pipe pulling devices into the pipes while the same are over the clamping platform, whereby the core bar material will be knocked out of the pipes on the said platform and before the flask is shaken out.

14. An apparatus of the class described including a curved pipe pit, a plurality of ramming platforms projecting over the pit from the outer wall thereof, quadruple flasks, means for supporting the flasks between the ramming platforms, a clamping platform arranged within the pit for holding the flasks while the clamps are being removed therefrom and applied thereto, a shake-out box also arranged within the pit and adapted to receive the sand when the pipes are pulled, and a pipe pulling device provided with a plurality of chains introduced into the flasks while the same are over the clamping platform, whereby the core bar material will be shaken out of the pipes upon the clamping platform before the sand is shaken out of the flasks.

15. An apparatus of the class described including a shake-out box, pipe pulling chains, and means for introducing the pipe pulling chains into the pipes before the same are carried to the shake-out box, whereby the core bar material will be knocked out before the flask is shaken out.

16. In an apparatus of the class described, a pipe pulling device adapted to be connected with a crane and including a plurality of chains connected at their upper ends, a spider provided with arms spacing the chains, and means carried by the chains for engaging the lower ends of the pipes.

17. In an apparatus of the class described, a pipe pulling device including a plurality of chains connected at their upper ends, means for spacing the chains, weights carried by the lower ends of the chains, and pipe-supporting heads connected with the weights.

18. In combination with a curved pipe pit, and a series of heaters arranged therein, of a clamping platform located within the pit and adapted to receive the flasks to enable the clamps to be removed and replaced thereon, a shake-out box also arranged within the pit and adapted to receive the sand from the flasks when the pipes are pulled.

19. In an apparatus of the class described, the combination with a curved pipe pit, and a curved series of heaters, of a ramming platform located at the outer wall of the pit, a clamping platform located within the pit and adapted to receive the flasks to enable the clamps to be removed and replaced thereon, a shake-out box also arranged within the pit and adapted to receive the sand from the flasks when the pipes are pulled, and a crane adapted to transfer the flasks from the ramming platform to the heaters and from the heaters to the clamping platform and shake-out box and back again to the ramming platform while the flasks are in a vertical position and without lifting the flasks out of the pit.

20. An apparatus of the class described including a pipe pit, a portable shake-out box arranged within the pipe pit to receive the sand from the molds, and a crane for carrying the shake-out box to and from the pit.

21. An apparatus of the class described including a pipe pit, a portable shake-out box located within the pit to receive the sand from the molds, means for supporting a flask over the shake-out box, and a crane for carrying the flask to and from the shake-out box and for moving the shake-out box to and from the the pit.

22. An apparatus of the class described including a pipe pit, a portable shake-out box located within the pit and open at the top, a grated frame arranged to support a flask over the shake-out box, and a crane for conveying the flask to and from the shake-out box and for moving the shake-out box to and from the pit.

23. An apparatus of the class described including a pipe pit, a portable shake-out box located within the pit to receive the sand from the mold, said shake-out box being open at the top and having a flask-receiving seat and provided with guards extending upwardly from the seat, and means for carrying the shake-out box to and from the pit.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES R. McWANE.

Witnesses:
JOHN H. SIGGERS,
EDITH L. BROWN.