Jan. 20, 1931. R. ARDELT 1,789,643

CORE MAKING FOR CAST PIPES

Filed Feb. 25, 1930 2 Sheets-Sheet 1

Fig. 1.

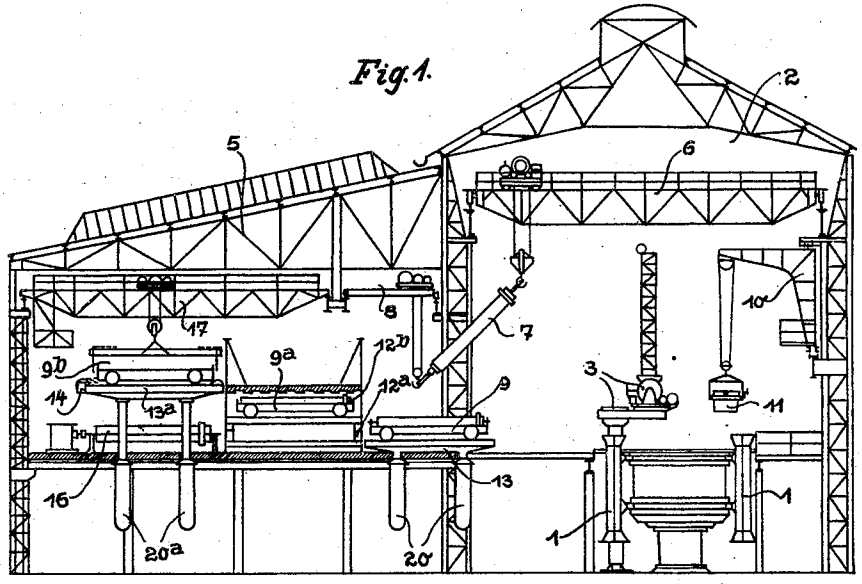

Fig 2.

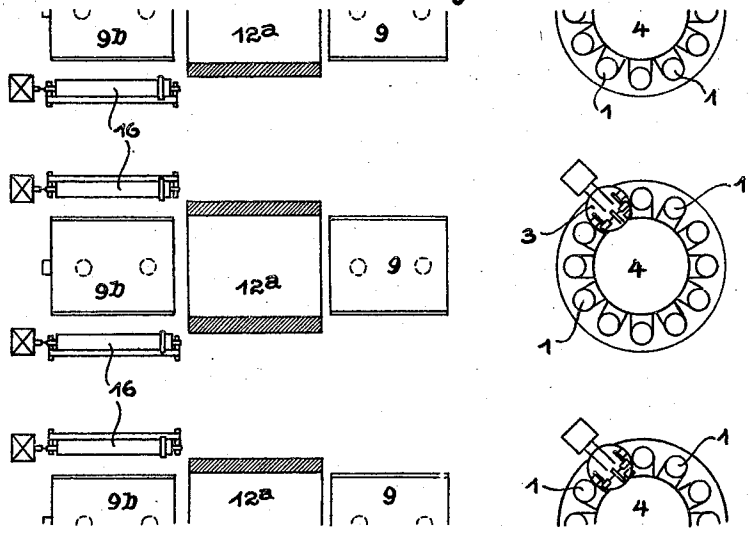

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Fig. 3.

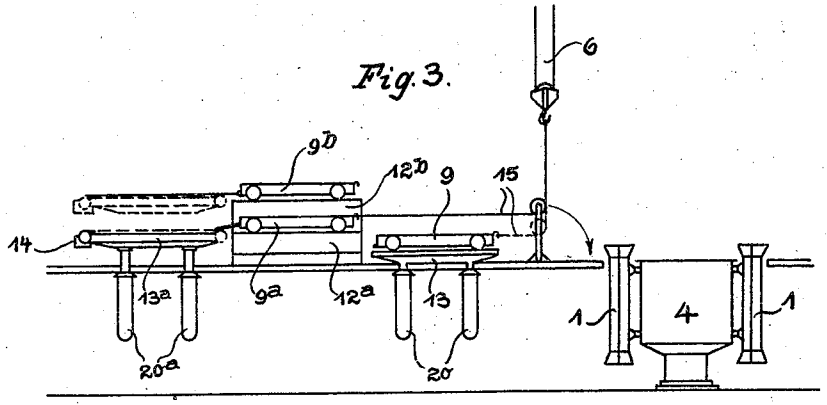


Fig. 4.

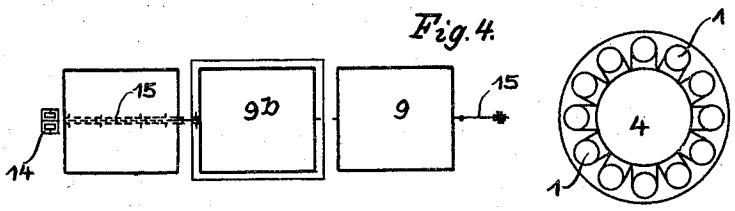


Fig. 5.

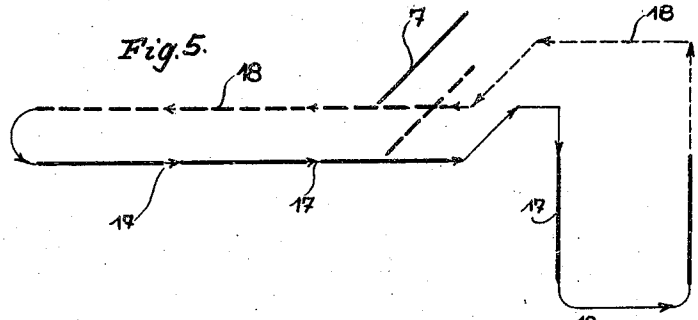
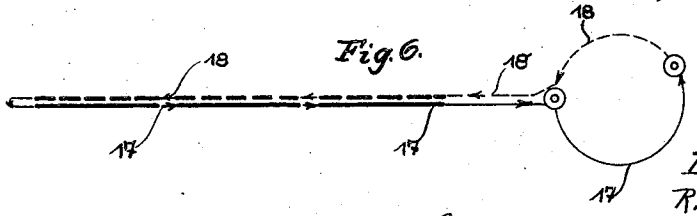


Fig. 6.



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UNITED STATES PATENT OFFICE

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CORE-MAKING FOR CAST PIPES

Application filed February 25, 1930, Serial No. 431,303, and in Germany February 26, 1929.

In pipe casting, for the mass production of cast iron pipes in sand moulds, the manufacture of the cores plays an important part. For each pipe to be cast, a new core is required, in addition to a sand mould. For the mass production of cores thereby rendered necessary, one has to find the shortest way of bringing the cores to the sand moulds and of transporting the core spindles, which always have to be used again, from the finished pipes to the core-making shop. In this connection it is already usual for the core-making shop to be arranged immediately adjacent to the casting shop, and the two shops are in direct communication with each other. A further advance in arriving at the fastest method of producing and feeding the cores is constituted by the increased ouput of the drying chambers, which, according to the present invention, are arranged in such a manner that they are always kept filled with cores, whereby the absolutely maximum use of the heating gases is ensured. An endeavour must also be made in the direction of using as few drying chambers as are possible, as by this means, an economy is effected in the transport charges for the cores and also for the core spindles. For this purpose the drying chambers are of the two storey type and always work with three core waggons, which alternately pass into the two storeys of the drying chambers. To enable the core waggon to be brought to the height of the top storey of the drying chamber, it is arranged to travel on a lifting table. The empty core spindles, returning from the casting shop, have to be again provided with core material. The waggons, conveying the core spindles, are at the outer side of the drying chamber, and must be brought to the side where the waggons are standing with fresh cores, as the core lathes are situated here. For this purpose the waggons, carrying the empty core spindles, must also be conveyed on lifting tables. In their highest position the waggons with the empty core spindles will then be brought back to the other side of the drying chamber over the top of the drying chambers, such transport being preferably effected by means of an electric winch. Thus the drying chamber is always kept full with core waggons in both its storeys. This overhead transport of the waggons containing the core spindles over the filled drying chamber has the further advantage that the work of the core-maker is not disturbed by the taking away of the finished cores from the drying chamber and their conveyance to the casting shop. On the other hand, the core-turning or lathe-work is proceeded with, without interruption on the one side of the drying chamber where the lathes are standing. Thus the whole of the work on the cores, commencing from the first operation on the floor of the shop, can be carried out and the operators do not need to mount steps or ladders for the purpose of hanging the links for the cores on the crane hooks. The raising of the finished cores to the top storey of the drying chamber is then effected by the aforesaid lifting tables, through the lowering of which the core waggons are deposited on the floor of the shop.

The essential characteristics of the invention are explained in detail with the assistance of the appended drawings and in conjunction with a casting shop, which enables the whole process, which has to be followed in the production and use of the cores to be understood.

On the appended drawings:—

Figure 1 is a section through a core-making plant in accordance with this invention, and of a casting shop adjacent thereto.

Figure 2 is a ground-plan of a portion of such a plant.

Figure 3 shows in elevation the device for feeding the core waggons through the core-making shop.

Figure 4 is a ground-plan of Figure 3.

Figures 5 and 6 are an elevation and ground-plan diagrammatically showing the working track completely covered by the cores.

It is obvious that the plant illustrated is for the manufacture of large types of pipes with a diameter of 100 to 120 m/m. In this connection the supply of the cores from the core-making shop to the casting shop and

movement inside these two shops can only be effected by cranes, as the cores are so heavy that they could not be carried even by two workmen.

The moulds 1 in the casting shop 2 are manufactured, by a pipe mould stamping machine 3, on a rotary frame 4, of which several are placed in a row in the immediate neighbourhood of the shop 5 for the core-making. The travelling crane 6 takes the cores 7 direct from the core-making shop 5 and deposits them in the moulds 1. For this purpose the core must change its position from the horizontal to the vertical. This is done with the aid of a crane 8 in the shop 5. The reverse process takes place when the casting shop crane 6, after the casting of the pipes in the moulds 1, extracts the hollow iron spindles of the cores (which always have to be used over again) from the moulds 1 and deposits them on the core waggon 9. The casting of the pipes is effected by means of the travelling crane 10 and the casting pan 11. In the core-making shop 5 there is the two-storied drying chamber 12*a*, 12*b*. At each side and in the drying chamber there is located a core waggon, so that there are always three waggons 9, 9*a* and 9*b* simultaneously in use. Groups of core waggons and drying chambers corresponding to the number of mould frames 1, 4, in the casting shop 2, are arranged behind each other in the shop 5. The core waggons 9, 9*b*, are conveyed vertically on lifting tables, 13, 13*a*, which are lifted and lowered in the embodiment shown in the drawings by two hydraulically driven pistons 20, 20*a*. The core waggons 9, 9*a* and 9*b* are conveyed horizontally by a drawing device 15 (cable, chain or the like) driven by an electric winch 14 or by the crane 6.

Working process

The core spindles are extracted from the finished cast pipes by means of the crane 6, and are laid on the core waggon 9. When the core waggon is fully loaded, the lifting table 13 is brought to such a height that the waggon can be drawn back over the top of the drying chambers 12*a*, 12*b* by means of the winch 14, 15 to the lifting table 13*a* which is standing in a raised position. During this time there are two core-waggons 9*a*, 9*b* in the drying chamber. Thereupon the lifting table 13*a* is lowered and the core-makers lift the core spindles by means of the crane 17 to one of the core lathes 16. Here the core spindles are wound round with straw ropes or the like, after which a clay-like core mass is applied thereto. The core is then taken from the lathe 16 and laid again on the core waggon. When all the cores, which this waggon can take, have had their first application of clay, the core waggon is drawn into the drying chamber with the aid of the winch 14, 15. The lifting table 13*a* is now brought to such a height that the loaded core waggon in the top or bottom storey of the drying chamber can be drawn out on to this lifting table. The cores now receive their second application which consists of a more sandy clay (smooth coat). After this has been done, the core waggon is pushed back by the winch 14 into the drying chamber and the process is repeated with the next core waggon. After a third operation on the lathes viz. the application of the graphite, the core waggon does not return back to the core-making shop but is, with the aid of the crane and using a cable, rope or the like and loose rollers, withdrawn from the drying chamber and placed on the lifting table 13, from where the cores are now passed to the moulds 1, which have, in the meantime, been completed, the above being effected without the core-makers being hindered in the preparation of the cores by the removal of finished cores or the bringing back of the empty core spindles from the casting shop. The cores and core spindles, which latter are always returning back to be used again, thus take the shortest possible course from the core-making shop to the casting shop. The courses taken by the cores are diagrammatically represented in Figures 5 and 6 of the drawing. The extended lines show the course from the core-making shop to the moulds i. e. in the direction of the arrow 17. The empty core spindles make the return journey in the direction of the arrow and dotted line 18.

The invention ensures an uninterrupted and unimpeded working with a minimum number of core spindles and all other working accessories in the production stoves, core-making and casting shops, by virtue of the fact that the utmost use is made of such working accessories by avoiding empty running and standing still of the plant.

Claims:

1. Plant for the manufacture and transport of cores and core spindles for cast iron pipes, comprising waggons for receiving the core spindles extracted from the pipe moulds, which waggons stand in the core-making shop and adjacent the casting shop, core drying chambers, and means for transferring the said waggons over the core drying chambers to the core lathes on the opposite side of the drying chambers.

2. Plant for the manufacture and transport of cores and core spindles for cast iron pipes, comprising a drying chamber having two or more storeys, means for raising and lowering core waggons, on the side of the drying chamber on which the cores are prepared, to place the waggons in an upper storey, means for raising and lowering core waggons on the opposite side of the drying chamber to receive waggons from an upper storey in the drying chamber, and means for

passing a waggon, carrying core spindles, over the drying chamber to the core lathes on the opposite side of the drying chamber.

3. Plant for the manufacture and transport of cores and core spindles for cast iron pipes, comprising a drying chamber having two or more storeys, lifting tables on opposite sides of the drying chamber for raising and lowering the waggons into position opposite an upper storey or into position for enabling a waggon to pass over the drying chamber.

4. Plant for the manufacture and transport of cores and core spindles for cast iron pipes, comprising a drying chamber having two or more storeys, means for raising and lowering core waggons on the side of the drying chamber on which the cores are prepared to place the waggons in an upper storey, means for raising and lowering core waggons on the opposite side of the drying chamber to receive waggons from an upper storey in the drying chamber, means for passing a waggon carrying core spindles over the drying chamber to the core lathes on the opposite side of the drying chamber, and a lifting tool in the core-making shop and a lifting tool in the casting shop which function together so as to lift the core from the horizontal position on the core waggon to a vertical position, which latter lifting tool inserts the cores in the pipe moulds, and carries the core spindles back to the core waggon on which such spindles are placed in a horizontal position by the said lifting tools.

5. Plant for the manufacture and transport of cores and core spindles for cast iron pipes, comprising a drying chamber having superimposed compartments for the reception of core waggons, tables for raising and lowering core waggons on opposite sides of the drying chamber, means for moving the waggons having core spindles thereon over the drying chamber, and means for drawing the waggons into and out of the drying chamber, and also over the top of the chamber.

6. Plant for the manufacture and transport of cores and core spindles for cast iron pipes, comprising a drying chamber having two superimposed compartments for the reception of core waggons, means for raising and lowering core waggons on opposite sides of the drying chamber, three waggons coacting with each drying chamber, and means for moving a waggon having core spindles thereon over the drying chamber.

In witness whereof I have signed this specification.

ROBERT ARDELT.