

(No Model.)

2 Sheets—Sheet 1.

H. W. HIXON & J. A. DYBLIE.
CAR AND SET OF MOLDS FOR CASTING ANODES DIRECT FROM CONVERTERS.
No. 539,270. Patented May 14, 1895.

Fig. 1.

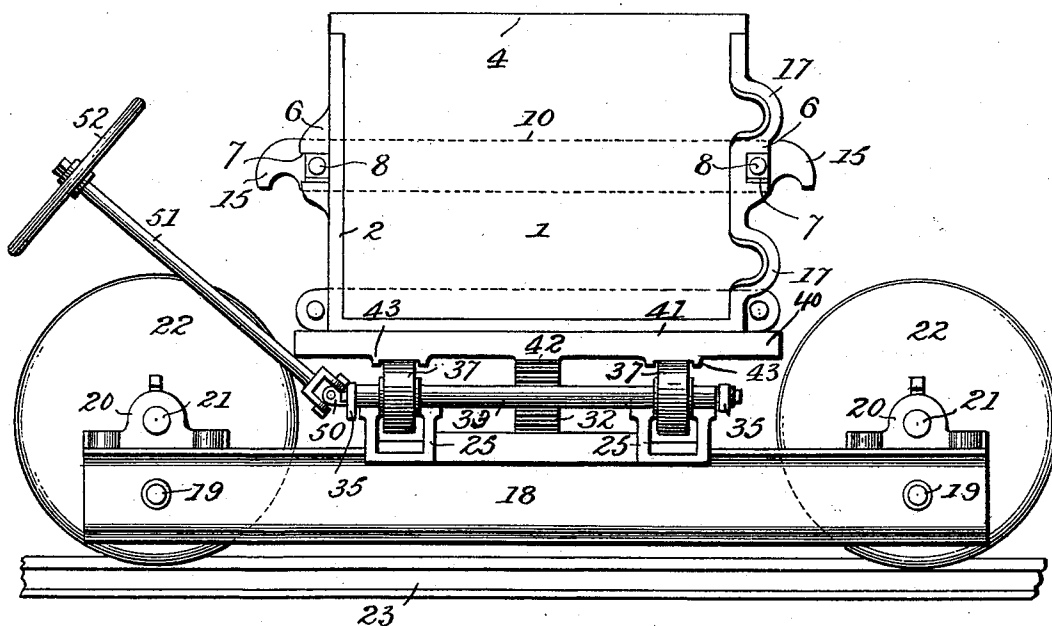


Fig. 2.

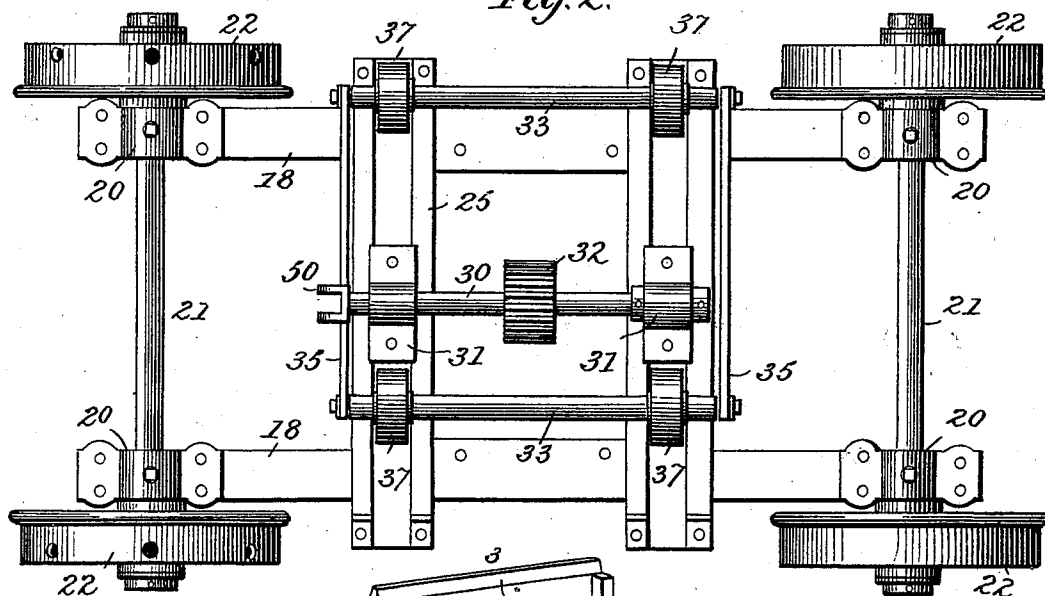
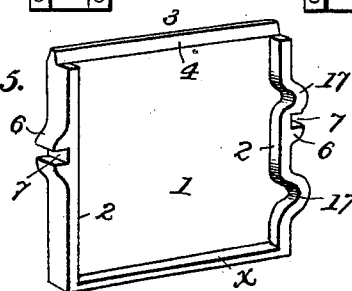


Fig. 3.



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2 Sheets—Sheet 2.

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Fig. 3.

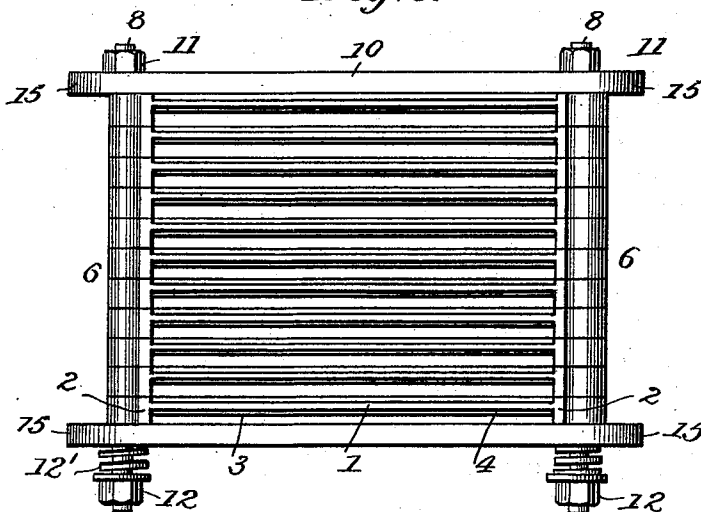


Fig. 4.

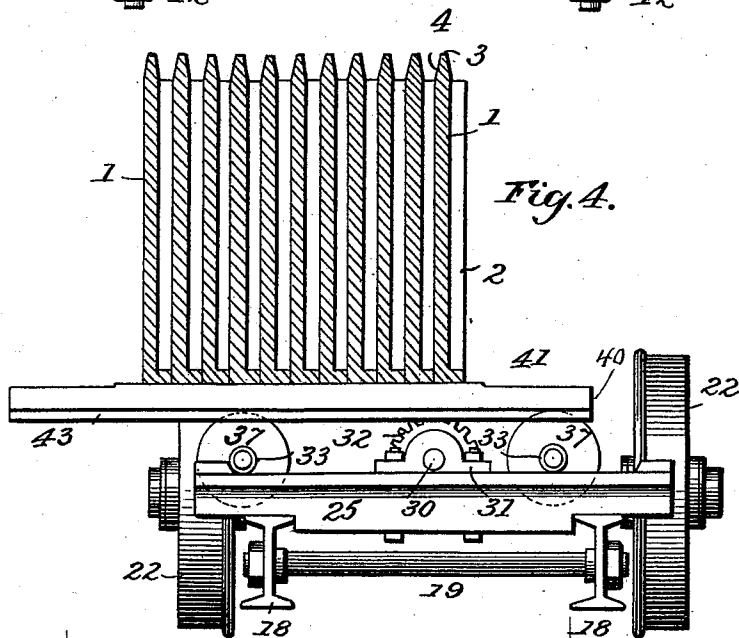


Fig. 6.

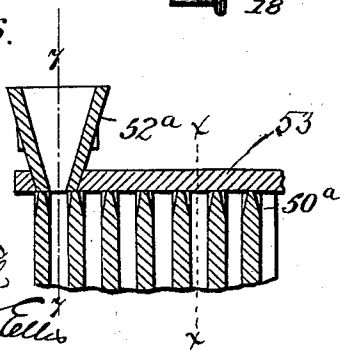
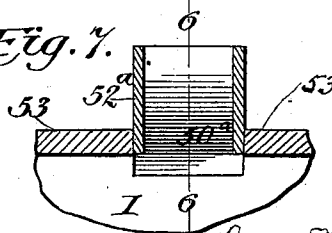


Fig. 7.



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UNITED STATES PATENT OFFICE.

HIRAM W. HIXON AND JULIUS A. DYBLIE, OF ANACONDA, MONTANA.

CAR AND SET OF MOLDS FOR CASTING ANODES DIRECT FROM CONVERTERS.

SPECIFICATION forming part of Letters Patent No. 539,270, dated May 14, 1895.

Application filed September 10, 1894. Serial No. 522,614. (No model.)

To all whom it may concern.

Be it known that we, HIRAM W. HIXON and JULIUS A. DYBLIE, citizens of the United States, residing at Anaconda, in the county of Deer Lodge and State of Montana, have invented certain new and useful Improvements in Cars and Sets of Molds for Casting Anodes Direct from the Converter, of which the following is a specification.

10 This invention relates to certain new and useful improvements in means for casting anodes for electrolytic purposes; and it consists substantially in such features thereof as will hereinafter be more particularly set forth.

15 It has been proposed heretofore in the casting of ingots to provide a combined mold-cage and ladle, the cage being provided with a series of vertical molds, and the ladle having a number of stoppers corresponding to the molds, and the combined device being so suspended as to be swung into position beneath an adjacent converter for receiving the molten metal therefrom, and then be carried over and deposited upon a car, the stoppers being

25 then or previously raised or opened to permit the molten metal to flow through openings in the bottom of the ladle into the several molds by which the ingots are formed. In the particular plant referred to, the molds are open at their lower ends and are provided with movable bottoms, so that after the ingots have become hardened or cooled they are ejected from the molds after sliding or moving the bottoms to one side; whereupon the car is

35 carried or moved to the proper place of deposit of the ingots, the combined cage and ladle having been previously lifted, and the operation is carried on continuously, in that, during the refitting of one set of devices and car, a duplicate set is being operated with in the manner explained. In another former instance, it has been proposed to provide an endless traveling chain of molds receiving the molten metal from the converter, and depositing the ingots in a cooled or hardened condition into or upon a car arranged upon a track at some distance from the converter, the said endless traveling chain of molds being

45 passed through a tank containing a cooling liquid and arranged at an intermediate point between the converter and the car. In still another instance, a number of molds have been

pivotally supported upon a car in such manner that the molds can be swung over into a position beneath the converter for receiving the molten metal, and then the molds are restored to a vertical position, and the car moved off to the proper locality for the subsequent working or treatment of the ingots.

With each of the former instances above referred to, the plants are open to a great many objections and disadvantages, and they are necessarily expensive in their construction and handling, very often requiring a great many hands or workmen to manipulate the same. Besides, considerable time is frequently lost, much material wasted, and there is considerable danger and risk encountered by the employes or operators while performing the work of melting and filling the molds. Furthermore, with the said former constructions, owing to the shrinkage of the metal on cooling, the molds can not be completely filled so as to produce perfect ingots, and even though many attempts have been made to obviate such difficulty, it has never heretofore been thoroughly accomplished owing to the fact that in most instances the molds are provided with some form of cover having inlets, which covers, no matter how constructed never permit the molds to be refilled without great labor and difficulty.

The objects of the present invention are to overcome all of the objections to the former constructions referred to, and to provide means for casting anodes perfectly smooth in shape and requiring practically no subsequent operation or treatment for that purpose.

A further object of the invention is to obviate remelting and to cast or produce anodes direct from the converter, thereby effecting a great saving in the production of anodes for electrolytical purposes.

A still further object of the invention is to furnish a plant for casting anodes, that is comparatively simple in construction requiring but little or no skill to operate, and producing the most desirable results in the molding of electrolytic metals.

The above objects we attain by the means illustrated in the accompanying drawings, wherein—

Figure 1 represents a side elevation of a car with the wheels of the obverse side re-

moved and the series of vertical molds resorted to in the practice of our invention. Fig. 2 is a top plan view of Fig. 1 with the molds and car-platform removed, showing the construction and arrangement of the gearing and differential rollers by which the car-platform is moved or carried outward transversely to the main frame, so as to bring the vertical molds successively beneath the converter, from which a constant stream of molten metal is caused or permitted to flow during the molding operation. Fig. 3 is a top or plan view of the series of vertical molds, and shows, also, the means for allowing for the expansion of the molds. Fig. 4 is an end elevation of the car, showing the wheels therefor, together with the longitudinal supporting-frame, in section, the series of vertical molds being also shown in transverse section, and the movable platform of the car being represented as moved outward to a limited extent. Fig. 5 is a view in perspective representing the form or construction of a single mold-section. Fig. 6 is a part longitudinal sectional view on the line 6 6 of Fig. 7, indicating the mold-sections as being open and beveled for a short distance only at the center, a suitable hopper being also represented, as well as top plates, which cover the mold-sections on opposite sides of the said open beveled portions. Fig. 7 is a transverse sectional view on the line 7 7 of the preceding figure.

We will first describe the construction of the molds, then the construction and operation of the car, and finally the means for operating the car and the nesting or arrangement of the molds upon the movable platform of the car.

The molds are so constructed that the back of one mold section forms or constitutes the face of the mold section next to it, by which construction we attain great economy of space, besides obtaining the desired form of anode and enabling us to readily re-assemble the mold sections after they have been separated for the purpose of removing the anodes therefrom. In describing the said molds, for the purpose of clearness, reference is made to Fig. 5, wherein it will be seen that each mold section is formed or constituted of a plate 1, of proper dimensions or size, formed at each end with a lateral vertical projection 2, the upper edge of the plate being projected somewhat above the upper ends of the lateral projections as shown in Fig. 4 at 3, each side of said projecting portion 3, being beveled at 4, so that when the mold sections are assembled together in vertical series, they will present flaring mouths at the top or upper ends, which construction is resorted to for the purpose of preventing the stream of metal from splashing or going into more than one mold at a time as the said molds are successively presented to the stream as it flows from the converter. No converter has been herein represented or shown, but it will be of course understood that any well known form is employed, and which is suspended at a suitable height to

enable the same to be manipulated during the operation of filling.

In addition to the construction above mentioned, each mold section is formed or provided at the bottom with a longitudinal flange x , and at each end with a projecting bearing 6, notched at 7 for the reception and accommodation of a rod 8, which rods also pass through openings (not shown) formed near the ends of handle bars 10, 10 arranged on opposite sides of the series of molds, and extending lengthwise of the latter. The rods 8, 8 are screw threaded at their ends and are provided with nuts 11 and 12, the tightening up of which serves to maintain the molds closely nested together and in position, and for the purpose of allowing for the expansion of the mold sections when the molten metal is poured therein, we supply one end of each of the rods 8, 8 with a spring 12', exerting its pressure or strength between the nut 12 of the rod and the adjacent handle bar 10. We preferably form the projecting bearings 6, 6 of the rods 8 at a point about midway of the height of the molds, since the effect is more equal as is apparent. The handle bars 10 are each provided with projecting portions 15 by which the series of molds can be readily lifted from the platform of the car by means of an ordinary crane for the purpose.

As will be seen the mold sections are securely and compactly maintained in their proper relative positions, and it will further be seen that as the metal cools down in the molds during the filling operation the series of molds can very quickly and readily be passed beneath the converter as many times as may be necessary to build the anode up to or flush with the upper edges of the molds. In this way anodes of equal sizes are obtained, and no dressing or subsequent treatment of them is necessary beyond simply shearing off the rough edges at the top in any suitable manner.

In order to provide or form the anodes with projecting portions to constitute a means of suspending the same in the electrolytic cell we form the molds at one end with the rounded or curved projections 17, see Fig. 1, the vertical lateral projections 2 at this end of the molds being correspondingly shaped in conformity. It is obvious that by means of such construction of molds the anodes when formed will be provided with corresponding projecting portions which may be punched with suitable holes, or cast with projecting lugs as a common means of suspension, when placed in a cell.

As shown in the modification, instead of beveling or flaring the upper edges of the molds for the entire length thereof, we in some instances simply bevel them for a short distance intermediate of their ends, as seen at 50^a; and also we sometimes employ a suitable funnel 52^a to facilitate the filling operation. With this construction two cast plates 53, are laid one on either side of the openings

to serve as a cover against which the copper will rise and chill, and thus making perfect anodes at one operation.

The car upon which the series of molds rest is constructed of two longitudinal angle beams 18, 18, connected together at near the ends by strengthening cross rods 19, 19, and provided at each end with a bearing box or plate 20 for the shafts 21, 21, which carry the supporting wheels 22 which latter are flanged in the usual manner to fit upon rails, 23. Extending transversely of the longitudinal side beams 18, 18 and supported thereby is a pair of double or box rails indicated at 25, 25, which rails are sunken or depressed for the portions thereof between the side beams, so that when the platform of the car is moved, there will be no frictional contact between the differential rolls (to be explained) and the bottoms of said double or box rails. At the same time, however, when the platform is in place upon the car the said rolls are supported on the ends of the rails which rest on the side beams. Located transversely of the said double rails, and extending lengthwise of the side beams is a shaft 30 supported in suitable bearings 31, 31, secured to the tops of the double rails, the said shaft being provided centrally with a fast pinion 32. Also extending transversely of the double rails and resting upon the upper surfaces thereof are two rollers 33, 33 on opposite sides of the central shaft 30, and the ends of the said rollers 33, 33 are connected by links 35, 35, thus constituting practically a movable roller frame. The said rollers 33 are also provided at near each end with an independent differential roll 37, which as will be observed passes between the double rails 25 without reaching to the bases thereof except, as hereinbefore stated, when the platform is back in place. The platform of the car is indicated at 40, and as shown is formed on its under side with a rack 42 (see Fig. 1) which engages with the pinion 32. The platform is also formed on each side of the rack with double guide flanges 43 between each pair of which the rollers 37 are received. In this way it will be observed that by means of the differential rollers employed, the platform of the car can be quickly moved outward and returned, with the least amount of friction, and that it requires the several rollers to travel but a short distance to cause the platform to be projected out the required distance for enabling the molds to be filled with the molten metal. The construction and arrangement are such that the platform can be moved back and forth very easily, thereby rendering it possible to bring any particular one of the molds instantly beneath the stream of metal. In operation, the platform of the car is carried directly by the rollers 37, while the latter are supported by means of the longer rollers 33, which latter turn or move upon the rails 25 as hereinbefore mentioned, and it will be at once seen that the effect is such as has been stated.

As a means of moving the platform, we form lugs 50 on the forward end of the shaft 30, and between these lugs is pivoted a tongue 51 provided with a handle or wheel 52, and it will be seen that the whole contrivance can be readily moved by turning the said tongue through the medium of said handle or wheel. The main car is easily moved forward and backward with a common pinch bar or wheel clamp bar.

From the foregoing remarks, it is thought the construction and operation of our invention will be fully understood, and it is obvious that immaterial changes could be resorted to in the details of construction and arrangement of the several parts and still be within the scope of our invention.

Therefore, without limiting ourselves to the precise details herein shown and described, we claim—

1. A car provided with transverse rails across its main wheel frame, a platform movable in the direction of said rails, and a series of mold sections mounted or supported upon said platform and constituting molds, substantially as described.

2. A car provided with rails extending transversely of the main wheel frame, a platform movable in the direction of said transverse rails, means for operating said platform back and forth, and a series of molds mounted or supported upon said platform, substantially as described.

3. A car provided with double box rails extending transversely of the main wheel frame, a differential roller frame supported by the rails, and a pinion, a platform movable in the direction of said rails and formed on its under side with a rack and guides, and a series of molds supported by said platform, substantially as described.

4. A car provided with transverse rails across its main wheel frame, a platform movable in the direction of said rails and supported thereon, a series of mold sections on the platform, and side bars together with rods and springs for holding said mold sections together, substantially as shown and for the purpose set forth.

5. The combination of a car having a platform, movable transversely to the direction in which the car travels and a series of mold sections nested on said platform and having their upper edges beveled to produce flaring mouths, said mold sections being each formed or constructed at each end and bottom with a flange abutting against the back of the next adjacent mold section, substantially as described.

6. The combination of a car having a platform, movable transversely to the direction in which the car travels means for operating said platform, and a series of mold sections nested on the platform and having their upper edges beveled to produce flaring mouths, said mold sections being each formed or constructed at each end and bottom with a lateral flange

abutting against the back of the next adjacent mold section, substantially as described.

7. The combination of a car having a platform, movable transversely to the direction in which the car travels means for operating said platform, a series of vertical mold sections nested together on the platform, means for securing or maintaining the mold section in position on the platform, and yielding elastic devices for said mold sections, substantially as described.

8. The car formed or constructed with the side bars and wheels, the transverse double rails supported upon the side bars, the central shaft carrying the pinion, the rollers extending across the rails and bearing upon the

surfaces thereof, and the differential rollers carried by the rollers first named and moving between the double rails, in combination with a platform provided on its under side with a rack engaging the pinion, and a series of vertical molds mounted and supported upon said movable platform, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HIRAM W. HIXON.
JULIUS A. DYBLIE.

Witnesses:

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