S. D. WRIGHT.

CONVEYER.

APPLICATION FILED OCT. 4, 1907.

995,648. Patented June 20, 1911.

5 SHEETS—SHEET 1.

Fig. 1

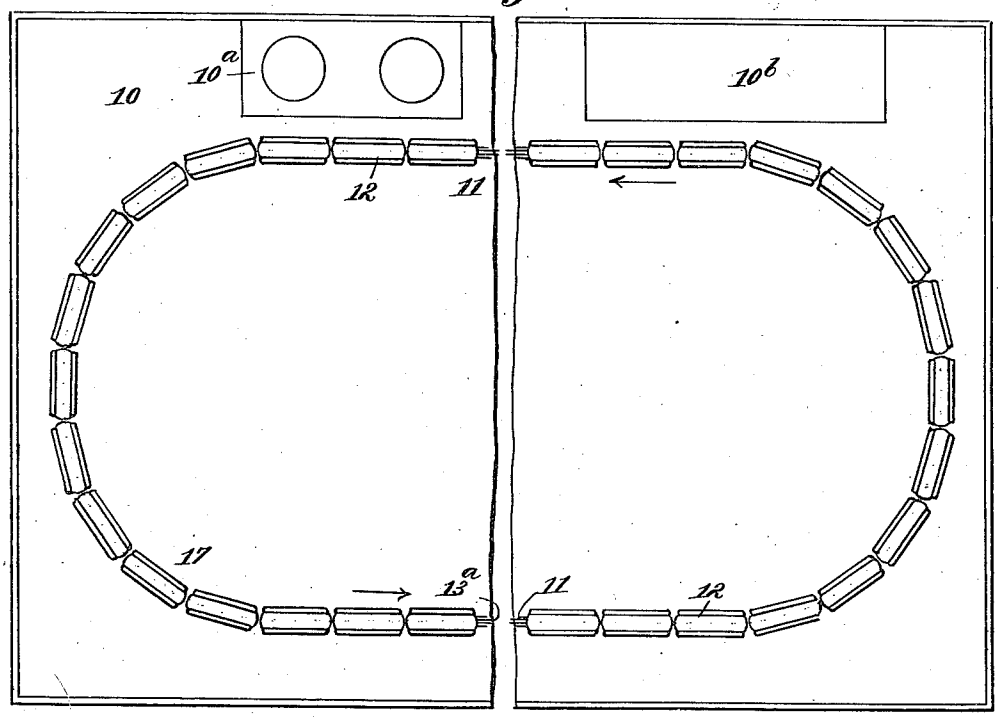
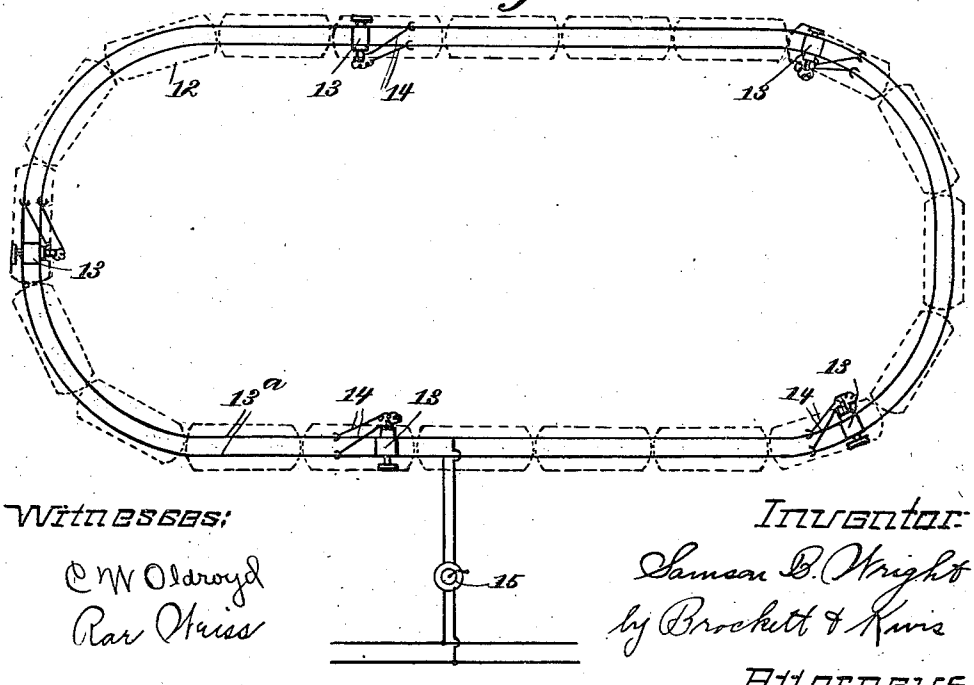


Fig. 2



Witnesses:

C. W. Oldroyd

Rae Haiss

Inventor:

Samuel D. Wright

by Brockett & Kerr

Attorneys.

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5 SHEETS—SHEET 2.

Fig. 3

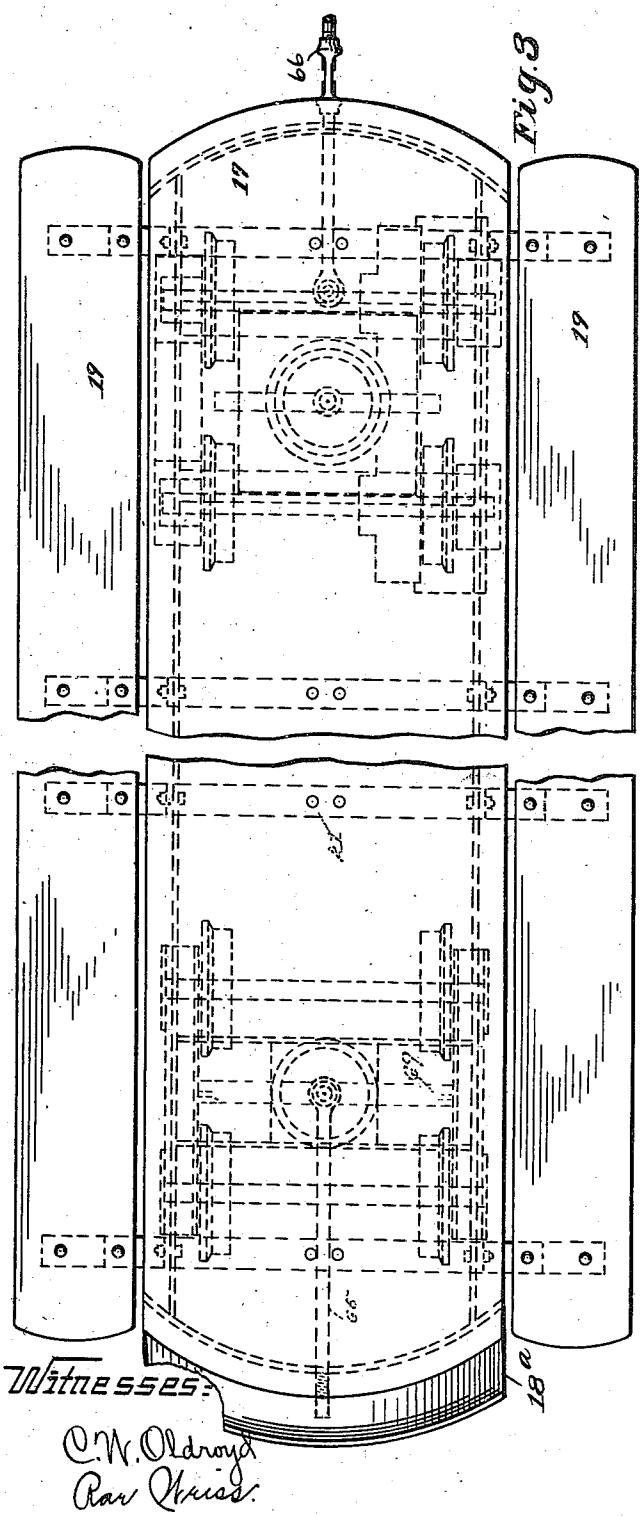
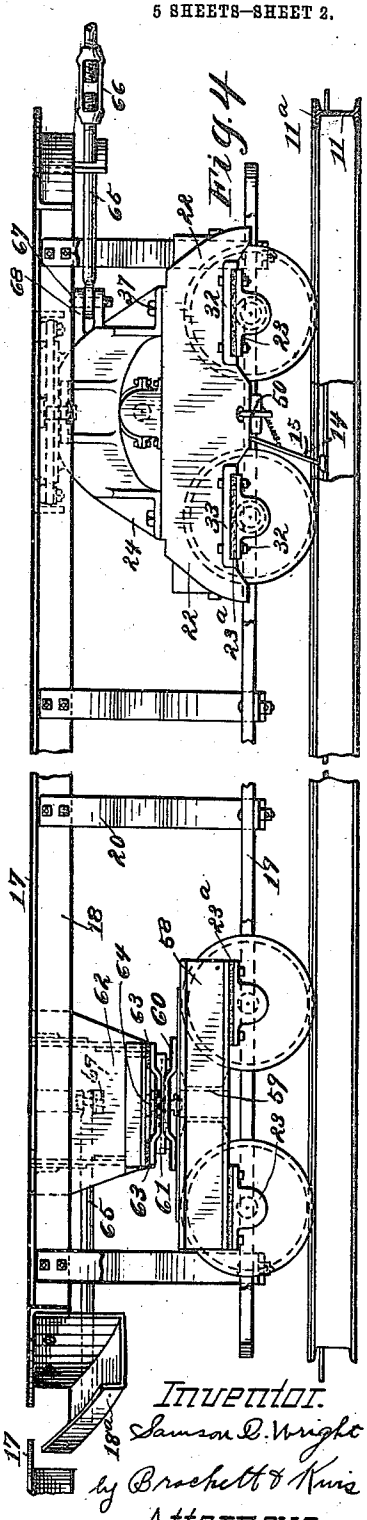


Fig. 4



Witnesses:

C. W. Oldroyd

Ray Kniss.

Inventor.

Samuel D. Wright

by Brackett & Kniss

Attorneys.

S. D. WRIGHT.

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5 SHEETS—SHEET 3.

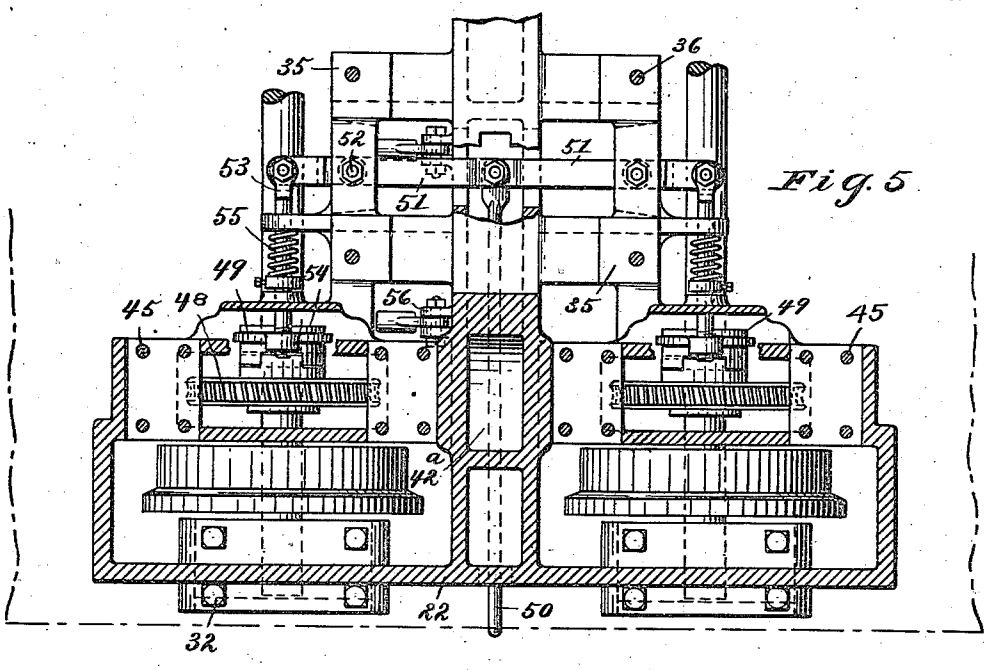

Fig. 5

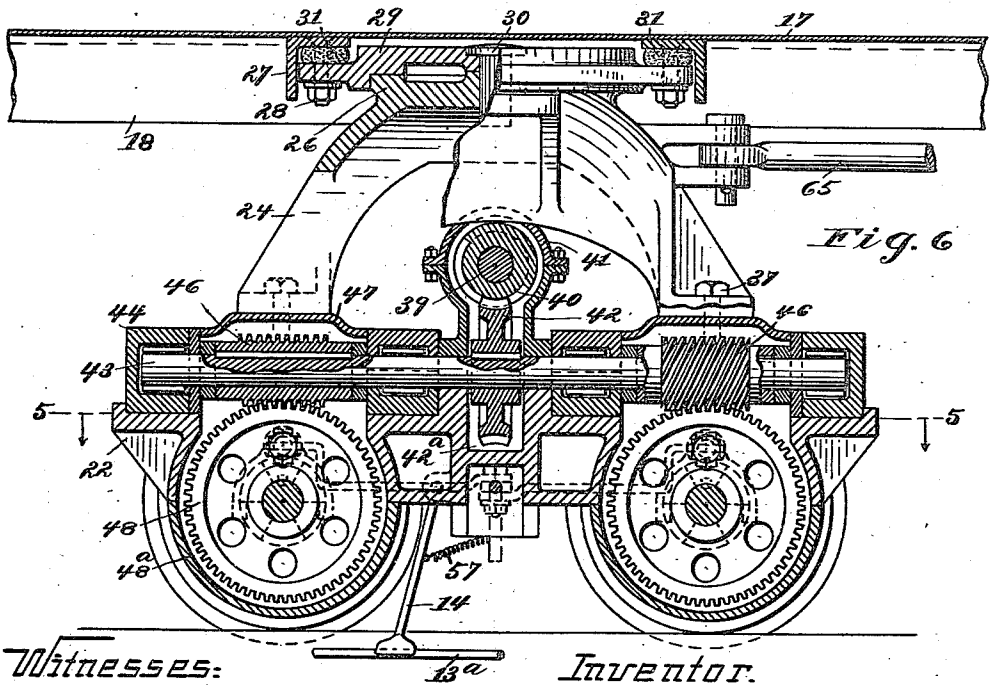

Fig. 6

Witnesses:

C. W. Oldroyd

Rae Weiss

Inventor.

Samson D. Wright

by Brockett & Kerr

Attorneys.

S. D. WRIGHT.

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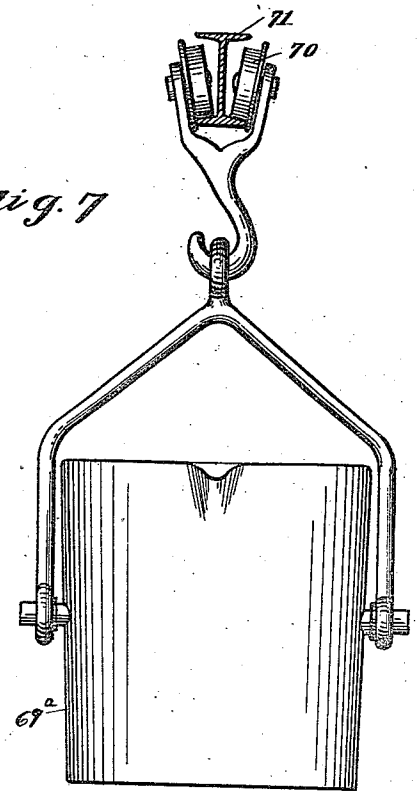
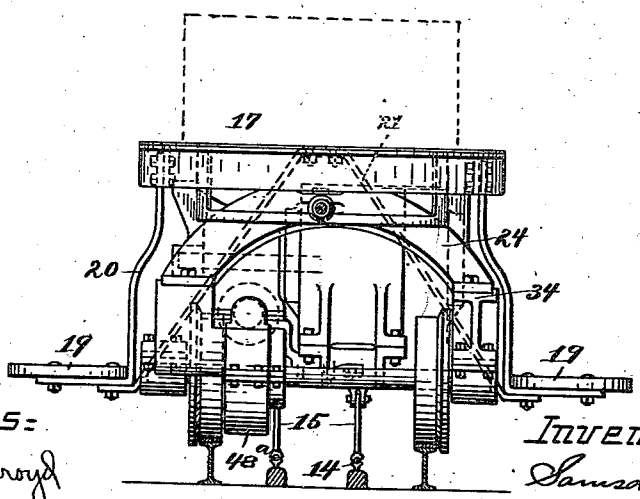
5 SHEETS—SHEET 4.

Fig. 7





Witnesses:

C. W. Oldroyd

Rae Haiss

Inventor.

Samuel D. Wright

by Brockett & Lewis

Attorneys.

S. D. WRIGHT.

CONVEYER.

APPLICATION FILED OCT. 4, 1907.

995,648. Patented June 20, 1911.

5 SHEETS—SHEET 5.

Fig. 8

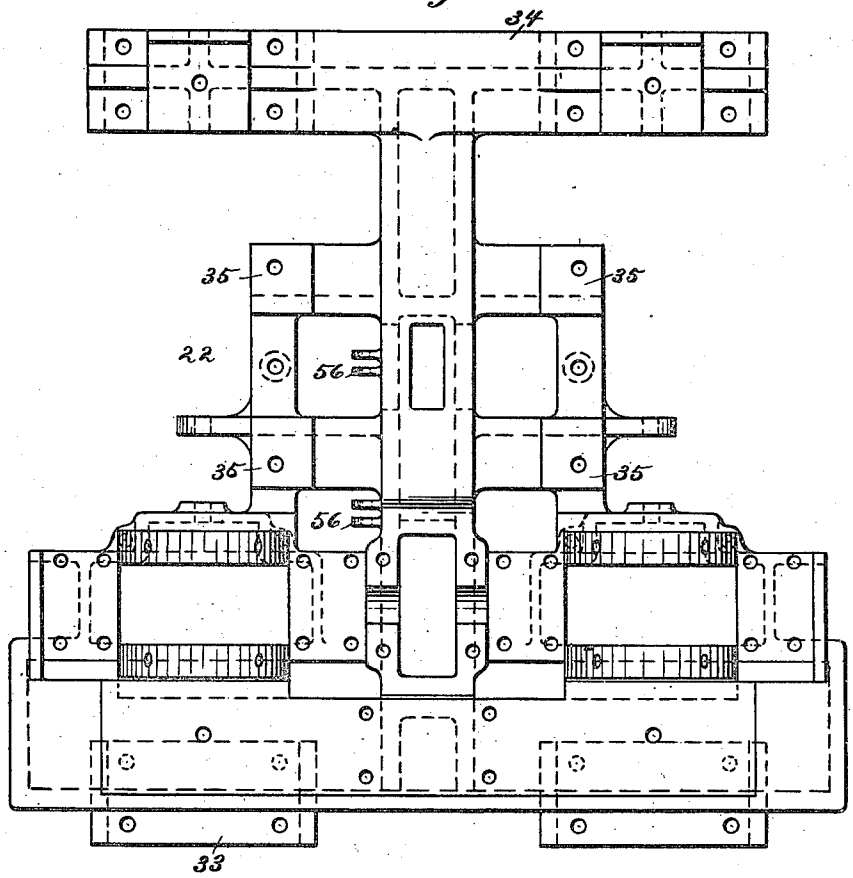
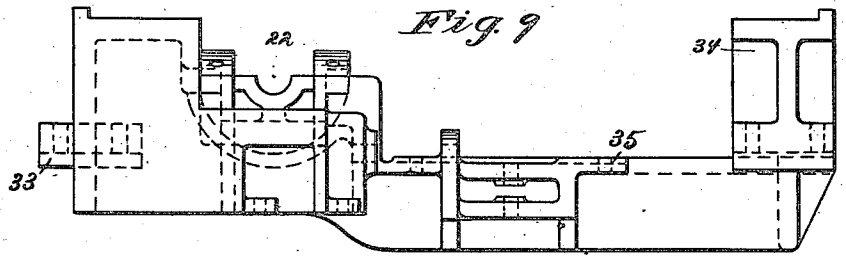


Fig. 9



Witnesses:

P. W. Oldroyd

Ray Hicks

Inventor.

Samuel D. Wright

by Brackett & Lewis.

Attorneys.

UNITED STATES PATENT OFFICE.

SAMSON D. WRIGHT, OF CLEVELAND, OHIO.

CONVEYER.

995,648. Specification of Letters Patent. Patented June 20, 1911.

Application filed October 4, 1907. Serial No. 395,891.

To all whom it may concern:

Be it known that I, SAMSON D. WRIGHT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Conveyers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to conveyers and particularly to continuously moving endless conveyers, which may be installed in foundries for conveying molds.

Heretofore attempts have been made to equip foundries with continuously moving endless conveyers for the purpose of conveying molds from the molding floor or molding machines past the pouring floor so that casting can be accomplished expeditiously and without loss of time. As far as I am aware, however, prior to my invention these attempts have not been successful for many reasons, principally because the conveyers would not run smoothly and uniformly, causing molds to be broken and destroyed, and for the reason that no satisfactory propelling power could be obtained which would drive the cars or conveyers in a satisfactory manner.

One of the objects of my invention is to provide an endless conveyer consisting of a large number of cars which may be moved at the desired speed without any jarring, jerking or vibration so that the molds can be carried without danger of being injured.

A further object is to provide means for propelling the cars so that they will move smoothly and continuously at uniform speed so that they will not buckle, and further so that they will be under perfect control of the operator at all times.

With these ends in view I provide an endless conveyer consisting of a large number of cars which are driven electrically, preferably only part of the cars being equipped with electric motors, the latter being interspersed in the series and all being controlled by a single means, preferably a conveniently located controller, by means of which the conveyer can be started or stopped quickly, or its speed increased or decreased. The motors are all preferably supplied with current from a single circuit and are so arranged that they operate at the same speed and all exert the same driving power so that said conveyer is propelled equally from a number of points. The motors are preferably geared down to a low speed, and to avoid jerking and jarring on account of back lash of the gears and also to avoid a multiplicity of gears, the motor shaft and car axles are preferably connected by worm and worm wheel gearing. The gearing may be unclutched at any time by suitably provided means so that in case it is desired to move the cars by hand or by any other means than by the motors themselves, said motors and gearing will not act as brakes. The cars are preferably coupled together by rigid adjustable couplers, so that all loose play between the cars is eliminated, thus further enhancing smooth and uniform running. The cars and tracks are also specially constructed with the view of avoiding jarring, particularly on the curves, or due to sand or gravel on the tracks.

The invention may be further briefly summarized as consisting in certain novel details of construction and combinations and arrangement of parts, which will be described in the specification and set forth in the claims.

In carrying out my invention any preferred form, construction and arrangement of parts may be employed, but in the drawings I have shown one embodiment which meets the necessary requirements very effectively and in said drawings Figure 1 represents somewhat conventionally a plan view of a foundry floor including the track and endless conveyer; Fig. 2 is a view showing diagrammatically the electric circuits and the arrangement of motors on the cars, the latter being shown by dotted lines, it being understood that no attempt is made to show the exact number of cars which would be employed in practice; Fig. 3 is a top plan view parts being broken away, of one of the motor equipped cars; Fig. 4 is a side elevation of the same, parts being broken away; Fig. 5 is a sectional plan view of part of the construction of the motor truck, the section being taken substantially along the line 6—6 of Fig. 6; Fig. 6 is a partial sectional elevation, parts being broken away showing the motor truck and part of the car con-

veyer to which it is attached; Fig. 7 is an end view of one of the motor equipped cars showing a pouring ladle and the method of supporting the same; Fig. 8 is a plan view of the main motor truck casting; Fig. 9 is end elevation of the same.

Referring now to the figures of the drawing and particularly to Fig. 1, 10 represents conventionally a foundry floor, 10^a the cupola furnaces or pouring floor, and 10^b the molding floor, and at 11 is shown an endless track, in this case within the foundry and passing along the molding floor and the pouring floor. The rails of the track are preferably formed of I-rails and in this case are covered with rubber 11^a, cemented or otherwise secured thereto, for the purpose of reducing jolting or jarring of the cars or conveyers. On the track is an endless conveyer consisting of a large number of cars 12, which are constructed with the view of securing smooth and even running and to permit the molds to be handled and the metal to be poured in the most expeditious manner. The cars are in this case electrically driven preferably only part of the cars being equipped with motors 13, said cars being interspersed in the series as is shown most clearly in the diagrammatic representation of Fig. 2. The motors are preferably supplied with current from a single circuit, in this case being fed directly from trolley wires or cables 13^a intermediate the rails and co-extensive with the track. The motors are themselves connected to the trolley wires or cables by a pair of depending trolleys 14, which will be explained in detail later. The trolleys may be supplied from an isolated source of current such as a separately driven generator or from storage batteries or from outside distributing mains. As is seen the motors are all connected in parallel and in this case they are controlled by a single controller 15, which may be located at any convenient position. If desired all the motors may be controlled from a number of points instead of one. The purpose of this arrangement is to obtain equal speed and equal driving power from all the motors and instant and simultaneous control of all the motors, so that the conveyers will be driven equally from a number of points, all the motors starting to operate or ceasing operation at the same time. In practice these motors preferably will be interconnected with equalizing conductors, so that absolute synchronism will be assured. As many of the interspersed motors may be employed as will be necessary to secure satisfactory operation.

The construction of all the cars is preferably the same except that the motor cars have a special motor truck as will appear. Each of the cars is provided with a flat top or platform 17 formed preferably of a continuous sheet or plate of rolled steel. The ends of the top or platform are curved or rounded on an arc of a circle, the radius of which is carefully selected with reference to the radius of curvature of the track, so that when the cars are taking the curves the ends of the cars will roll on each other without friction or jolting. Depending from the top or platform are flanges 18 formed preferably of angle iron, extending along the sides and ends thereof, the flanges at the ends being curved. Each car is provided at one end with an apron 18^a which extends below the top or platform of the adjacent car for the purpose of catching sand or the like which may drop from the platform and preventing it dropping on the track. This apron is preferably attached to the curved end flange and is turned upward along the outer edge. Each of the cars is also provided along each side thereof with running boards 19 for a purpose which will be explained. These running boards may be secured to the flanges 18 by supporting straps or bars 20, and braces 21. Each is also provided with two double trucks located near the ends thereof, the trucks and car body being swiveled in such a manner that the cars take the curves without difficulty. The construction of both the trucks of the cars not equipped with motors is the same, but the two trucks of the motor equipped cars are, as was stated above, different. The motor truck consists principally of two main castings, a lower casting 22, to which the axle bearings 23 are secured and which supports the electric motor and other parts to be explained, and an upper dome-shaped casting 24, which rests upon the lower casting 22 and is provided at its top with a carefully machined circular bearing head 26. Secured to the under side of the top or platform are transverse angle bars 27, to which are secured by bolts 28, a bearing plate 29 having a circular recessed portion which receives with a close but working fit the circular top of the dome-shaped casting 24. The truck is swiveled to this plate 29 by a king-bolt or pin 30 located on the longitudinal axis of the car. Located intermediate the angle bars and the flange of the plate 29 are rubber cushions 31, in this case in the form of washers surrounding the bolts 28. The bearings 23 for the axles, on one side of the truck are secured by bolts 32 to the under sides of flanges 33, and on the opposite side of the truck to the under side of an elongated extension 34, rubber cushions 23^a being interposed between the bearings and the casting 22, said cushions likewise serving to eliminate jarring and vibration. The casting 22 is also provided intermediate the axles with four supporting feet 35 for the flanges of the motor, the motor being se-

cured thereto by bolts 36. The dome-shaped casting 24 is provided with four supporting feet which rest upon opposite sides of the main casting 22 and are secured thereto by bolts 37.

The shaft 39 of the motor is connected to the axles in this case by worm and worm wheel gearing, so as to avoid danger of jarring due to back lash of the gears and to avoid a multiplicity of gears since the motors are geared down to a very low speed. In this instance the motor shaft is provided with a worm 40 located within a casing 41, which is supported on top of the main casting 22, said worm meshing with a worm wheel 42, the lower part of which is located within an oil filled depression 42ª of the casting and which is secured to a transverse idler shaft 43, which extends substantially the width of the truck and is supported in bearings 44, secured by bolts 45 to the upper face of the casting 22. The shaft 43 is provided at the end with worms 46 located respectively over the two axles, the worms being inclosed or covered by plates 47. Each of the worms meshes with a worm wheel 48 located on one of the car axles, so that the motor drives both axles simultaneously, the lower part of the worm wheels being inclosed within oil casings 48ª secured to the casting 22. Thus it will be seen by means of the gearing just described the cars will be driven by comparatively high speed motors at a very low speed, in this particular instance the motors being geared down from 750 r. p. m. to 3 r. p. m.

In order that the cars may be moved by hand or any other means than by the motors, I have provided means for unclutching the motors when desired. I therefore connect the worm wheels 48 to the axles by means of clutches 49, which are splined to the axles, the worm wheels 48 being free to turn on the axles when the clutches are shifted inwardly away from the worm wheels. The clutches on the truck are operated simultaneously by means of an operating rod 50, which is located below the motor shaft and is connected at its inner end to two oppositely extending levers 51 pivoted to the casting by bolts 52 and having outer free ends located over the car axles. The outer ends of the levers are connected to ends of plungers 53 supported by the casting and having at their other ends forks 54 which engage grooves in the clutches 49. The clutch members 49 are held in engagement with the clutch teeth on the worm wheels by means of springs 55. To disengage the parts the rod 50 is pulled outward shifting both levers 51 and moving longitudinally both rods 53 and the corresponding clutches.

The trolleys 14 previously referred to are pivoted by bolts between ears or lugs 56 on the casting 22. The trolleys may be insulated at this point from the metal frame work in any suitable manner. These trolleys are held yieldingly on the trolley wires by springs 57.

The rear truck of the motor equipped cars and the trucks of the cars not equipped with motors consist preferably of beams 58, to the lower sides of which are secured the bearings 23 of the axles, rubber cushions 23ª being interposed between the bearings and their supports as in the preceding case. These beams are preferably joined intermediate the two axles by channel beams 59 shown in Fig. 4 by dotted lines. Secured to the top of the beams 58 is a plate 60, upon the upper face of which bears a plate 61 secured to the supporting frame 62. This supporting frame 62 is formed of plates and angle iron secured to the flanges 18 of the platform and to the bearing plate 61, the lower part of the supporting frame being separated from the plate 61 by rubber cushions 63. The truck is swiveled as in the first instance by a king-bolt or pin 64.

The cars are coupled together by draw bars 65, which are adjustable so that all loose play between the cars is eliminated, thus avoiding bumping and jerking of the cars particularly at starting and on the curves. In this particular instance each of the couplers consists of two bars connected together by a turnbuckle 66. The draw bars are connected to the motor trucks by pins or bolts 67 between ears or lugs 68 on the castings 24. At the opposite end of each motor equipped car and at each end of the cars which are not equipped with motors, the draw bar is preferably pivoted to a cross bar or plate 69 extending between the two vertical sides of the supporting frame 62.

I prefer to construct the car wheels with their flanges on the outside of the rails instead of the inside. The purpose of this construction of the wheels is to permit smooth and noiseless running on the curves. The rails at the curves will be provided with flanges extending horizontally or at right angles to the flanges of the I-beam rails so that on the curves the flanges of the wheels may ride up on these horizontal flanges.

In the use of the conveyer described ordinarily it will be unnecessary to stop the conveyer at any time until all the casting has been completed. The flasks containing the sand molds are placed on the cars or conveyers and carried slowly past the cupola furnaces. The molten metal is run into ladles 69ª which are supported on trolley wheels 70 bearing upon an I-beam trolley 71, which extends from the cupolas over the cars. As the cars carrying the molds are moved under the ladle the latter is grasped by workmen standing on the running boards of the cars and tilted so that the metal is

poured into the molds while the latter are being carried along by the cars, the ladle being shifted with the cars by the workmen standing on the running boards. When one ladle is empty another ladle can be shifted onto the trolley without interrupting operations.

It is seen with the conveyer just described that the casting can be accomplished with less floor space and with the expenditure of less time and labor than with the methods usually employed. It will also be seen that the conveyer can be driven at any desired speed uniformly and evenly both on the straight and curved portions of the track; that jolting and jerking is reduced to a minimum, not only on account of the propelling power employed but on account of the construction of the cars, the rubber cushion on the track and the rigid adjustable coupling means between the cars; and that the conveyer is under perfect control of the operator so that its speed can be changed to suit the conditions or it can be stopped instantly in case of accident.

I do not desire to be confined to the exact details of construction or exact arrangement of parts, as many changes can be made without departing from the spirit and scope of my invention, and I aim in my claims to cover all such changes or modifications.

What I claim as new and desire to secure by Letters Patent is:

1. In a conveying apparatus, an endless track, an endless series of cars or conveyers, and means for driving said conveyer comprising motors interspersed in the series.

2. In a conveying apparatus, an endless track, an endless series of cars or conveyers, electric motors carried by several of said cars, the latter being interspersed in the series, and means for supplying current to said motors.

3. In a conveying apparatus, an endless track, an endless series of cars or conveyers, low geared electric motors carried by several of said cars, the latter being interspersed in the series and means for supplying current to said motors.

4. In a conveying apparatus, an endless track, an endless series of cars or conveyers, part of the latter being equipped with electric motors, means for supplying current to said motors, and means for controlling all of said motors from a single point.

5. In a conveying apparatus, an endless track, an endless series of cars or conveyers, electric motors carried by part of said cars, the latter being interspersed in the series and means for controlling all said motors from a single point.

6. In a conveying apparatus, an endless track, an endless series of cars or conveyers, several of the latter being equipped with electric motors, means for supplying current to said motors, and a fixed or stationary controller for governing said motors.

7. In a conveying apparatus, an endless track, an endless series of cars or conveyers, several of the latter being equipped with electric motors and trolleys, a pair of trolley wires or cables co-extensive with the track, means for supplying current to said trolley wires, and means for controlling all said motors, from a point which is fixed or stationary with respect to the cars or conveyers.

8. In a conveying apparatus, an endless track, an endless series of car or conveyer units each comprising a car body and trucks supporting the same, means for coupling said cars together so that all loose play between the latter is eliminated, and means for driving said car or conveyer units comprising motors carried by part of the units and interspersed in the series.

9. In a conveying apparatus, an endless track, an endless series of cars or conveyers, rigid adjustable coupling means pivotally connected to adjacent cars or conveyers, so that all loose play between cars may be eliminated, and means for driving said cars or conveyers comprising electric motors carried by part of the cars or conveyers and interspersed in the series.

10. In a conveying apparatus, an endless track, an endless series of cars or conveyers, means for coupling said cars or conveyers, so that all loose play between the latter is eliminated, and means carried by part of said cars for propelling said cars equally at a plurality of distributed points in the conveyer.

11. In a conveying apparatus, an endless track, an endless series of cars or conveyers, rigid adjustable coupling means pivotally connected to adjacent cars or conveyers, so that all loose play between cars may be eliminated, and electric motors for propelling said cars or conveyers, said motors being carried by part of the cars or conveyers and being interspersed in the series.

12. In a conveying apparatus, an endless track, an endless series of cars or conveyers, means for coupling said cars or conveyers together so that all loose play between the latter is eliminated, part of said cars or conveyers being equipped with low geared electric motors which are interspersed in the series, and means for supplying current to said motors.

13. In a mold conveying apparatus for a foundry, an endless track, and endless series of cars or conveyers coupled together, electric driving motors interspersed in the series, said cars having running boards along the sides thereof.

14. In a mold conveying apparatus for a foundry, an endless track, an endless series of electrically propelled cars or conveyers

coupled together, driving motors carried by part of said cars, said motors being interspersed in the series, each of said cars or conveyers having running boards along both sides thereof.

15. In a conveying apparatus, an endless track, an endless series of cars or conveyers, several of said cars being equipped with electric motors, the motor equipped cars being interspersed in the series, said motors being connected by worm and worm wheels to the car axles.

16. In a conveying apparatus, an endless track, an endless series of cars or conveyers, interspersed motors in the series, an idler shaft adjacent each motor shaft, and worm wheel gearing connecting the motor shaft to the idler shaft, and the idler shaft to the car axle.

17. In a conveying apparatus, an endless track, an endless series of cars, means for propelling the cars, each car having an apron which projects underneath the end of the next adjacent car, so as to prevent sand and other material dropping from the cars onto the track.

18. In a car or conveyer, a body portion, a truck supporting the same, said truck comprising a lower casting supporting an axle, axle bearings and a driving motor, and an upper casting bolted to the lower casting and swiveled to the car body.

19. In a car or conveyer, a body portion, a truck supporting the body portion, said truck comprising a cast lower portion and a cast dome-shaped upper portion which is swiveled to the body portion and has an annular bearing head engaged by the latter, and said lower portion of the truck supporting a pair of axles, a motor, and gearing connecting the motor and axles.

20. In a car or conveyer, a body portion, a truck supporting the same, said truck comprising a lower casting, a pair of axles journaled in said casting, a motor, and gearing connecting the motor and axles also supported by said casing, and said truck comprising an upper dome-shaped casting having feet which are bolted to the lower casting and having a circular bearing head upon which the car body is swiveled, and a king bolt connecting the car body and the dome-shaped casting.

In testimony whereof I affix my signature in the presence of two witnesses.

SAMSON D. WRIGHT.

Witnesses:
A. F. Kwis,
Rae Weiss.