

Nov. 15, 1955

R. J. ANDERSON
POWER DUMPING CRADLE AND CLOSURE MEMBER
FOR ENCLOSED MOLD CONVEYERS

2,723,768

Filed Feb. 9, 1952

4 Sheets-Sheet 1

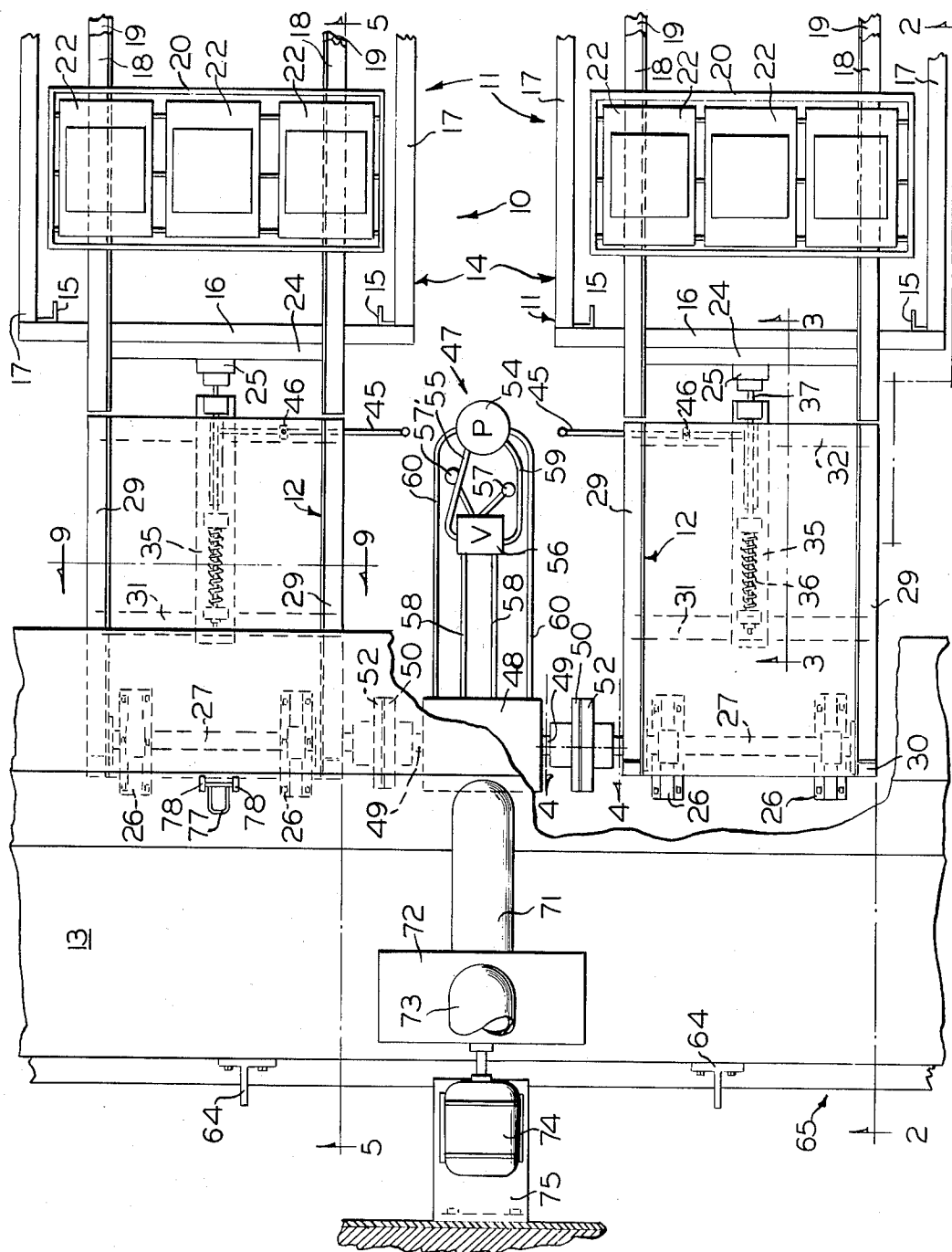


FIG. 1.

INVENTOR
RUSSELL J. ANDERSON
BY *Harmond O. Vogel*
ATT'Y

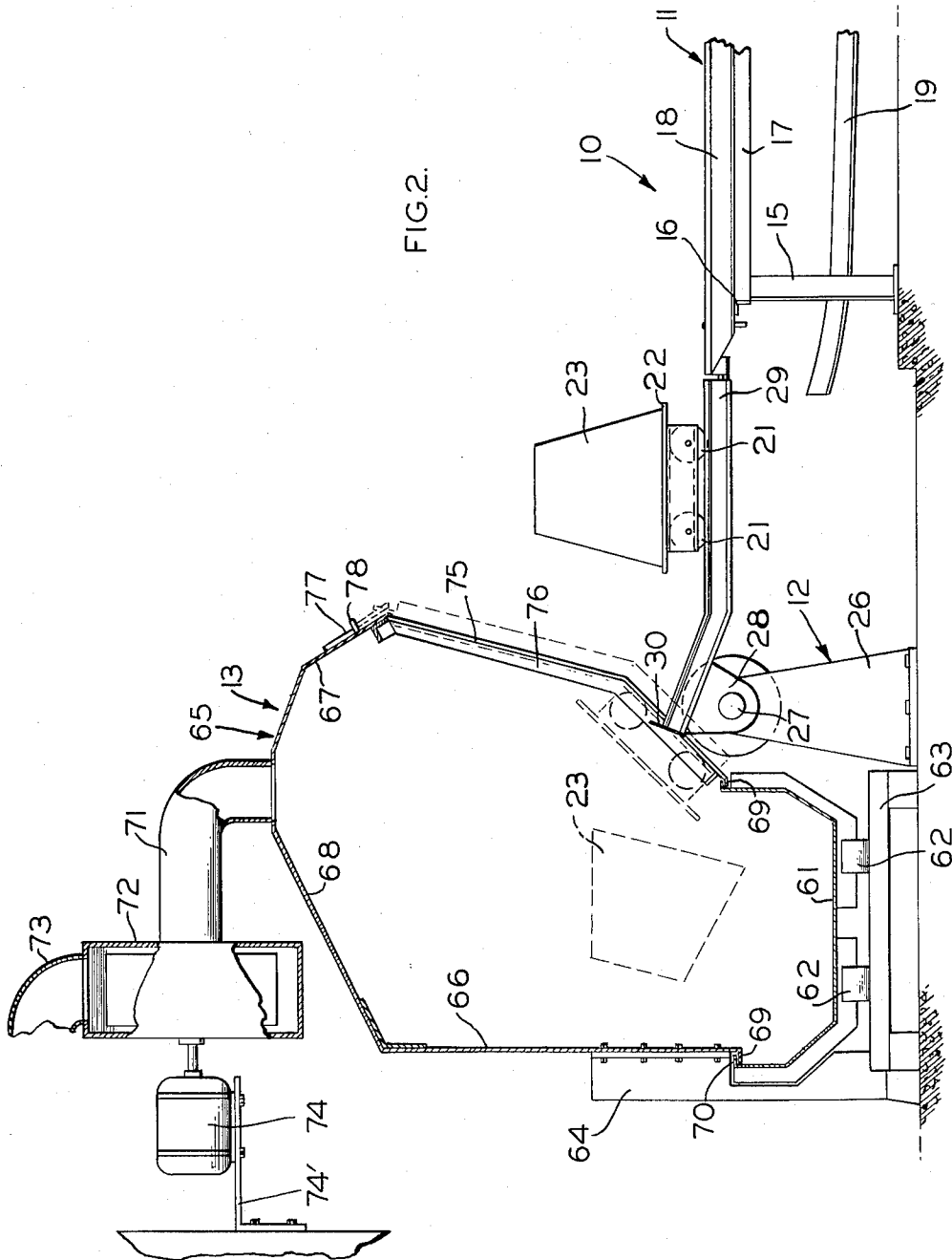
Nov. 15, 1955

R. J. ANDERSON
POWER DUMPING CRADLE AND CLOSURE MEMBER
FOR ENCLOSED MOLD CONVEYERS

2,723,768

Filed Feb. 9, 1952

4 Sheets-Sheet 2



INVENTOR
RUSSELL J. ANDERSON
BY *Harold O. Vogel*
ATT'Y

Nov. 15, 1955

Filed Feb. 9, 1952

R. J. ANDERSON
POWER DUMPING CRADLE AND CLOSURE MEMBER
FOR ENCLOSED MOLD CONVEYERS

2,723,768

4 Sheets-Sheet 4



INVENTOR
RUSSELL J. ANDERSON
BY *Howard O. Vogel*
ATT'Y

1

2,723,768

POWER DUMPING CRADLE AND CLOSURE MEMBER FOR ENCLOSED MOLD CONVEYERS

Russell J. Anderson, Racine, Wis., assignor to Belle City Malleable Iron Company, a corporation of Wisconsin

Application February 9, 1952, Serial No. 270,858

6 Claims. (Cl. 214—46.22)

This invention relates to a foundry conveyer arrangement for transporting molds and for discharging them from a movable carrier. More specifically this invention relates to a tilting track section or cradle adapted to receive mold carriers from a first conveyer and for dumping the molds from the carrier to a second conveyer.

In applicant's Patent 2,535,715 patented December 26, 1950, for a Dumping Mechanism for Mold Conveyers, a foundry conveyer arrangement is disclosed. In this disclosure a dumping cradle is positioned at the open ends of an upper and a lower track, the cradle including a track section which may be pivoted into cooperative engagement with the upper track for receiving a mold carrying conveyer, for dumping the mold from the carrier, and for discharging the carrier to the lower track. The mold as it is dumped from the carrier is discharged to a laterally extending conveyer. As the mold, containing the cast article is discharged to the laterally extending conveyer, the mold is destroyed since the mold sand breaks free of the cast article whereupon the cast article is conveyed to the next desired station. During the breaking up of the mold a considerable amount of mold sand and dust is placed in atmospheric suspension and it can be appreciated that when a large number of dumping cradles are placed in operation it is desirable to contain this mold dust and to prevent it from contaminating the air of the foundry. It is a prime object therefore to provide an improved foundry arrangement including a dumping cradle operable to dump sand molds through the dumping opening of an enclosed conveyer, the cradle including provisions to form a closure for the dumping opening when the cradle is in a dumping position to prevent the escape of mold dust from the enclosure.

Still another object is to provide an improved foundry arrangement including a plurality of dumping cradles arranged to dump sand molds through the dumping openings of an enclosed conveyer, the dumping cradles having imperforate wall sections disposed between laterally spaced track rails, the wall sections providing sealing closures for said dumping openings when the cradles are moved into a dumping position.

A still further object is to provide an improved mold dumping arrangement including a plurality of mold dumping cradles positioned in adjacent relation to dump sand molds onto a conveyer extending transversely with respect to said dumping cradles, the transversely extending conveyer having a hooded enclosure provided with openings, the cradles each including a wall which when positioned with the cradles in a dumping position, provide a cover or closure member over the opening against the escape of sand dust from the enclosure.

A still other object is to provide an improved mold dumping arrangement including a plurality of dumping cradles which are positioned in laterally adjacent relation, the dumping cradles being movable to a dumping position by means of power unit having a pair of clutches connected thereto, each clutch being operable to actuate

2

one of said dumping cradles for moving the same to a dumping position.

A still further object is to provide an improved mold dumping arrangement including an enclosed conveyer, the conveyer including a hood or enclosure provided with dumping openings, the arrangement further including a plurality of dumping cradles which are positioned to dump sand molds from a carrier to the conveyer, the dumping cradles including walls or baffles which when the cradle is moved to a dumping position will cover the openings against the escape of core sand dust, the cradles further including clutch sections connected thereto, the clutch sections being engageable with clutch sections of a power unit for moving the cradles to a dumping position the clutch sections having a relative lost motion connection therebetween.

These and further objects will become more readily apparent from a reading of the specification when examined in connection with the accompanying sheets of drawings.

In the drawings:

Figure 1 is a plan view of a foundry conveyer arrangement showing a plurality of mold dumping conveyers positioned in adjacent relation for dumping sand molds to an enclosed conveyer;

Figure 2 is a sectional view of a mold dumping arrangement taken along the line 2—2 of Figure 1;

Figure 3 is a sectional view of a latch arrangement for a dumping cradle the view being taken substantially along the line 3—3 of Figure 1;

Figure 4 is a sectional view of a clutch for tilting a dumping cradle, the view being taken substantially along the line 4—4 of Figure 1;

Figure 5 is a sectional view of a dumping cradle and conveyer arrangement taken substantially along line 5—5 of Figure 1 showing the cradle in a dumping position;

Figure 6 is a sectional view through a clutch mechanism in one position prior to movement of the clutch elements for moving a cradle into a dumping position;

Figure 7 is a sectional view similar to Figure 6 showing the position of the clutch elements when a dumping cradle is in a carrier discharging position;

Figure 8 is a front view taken substantially along the line 8—8 of Figure 5 showing a dumping cradle in a closed position over the dumping opening of an enclosed conveyer; and

Figure 9 is a detail sectional view through a dumping cradle taken along the line 9—9 of Figure 1.

Referring now particularly to Figures 1 and 2 a mold conveyer and dumping arrangement is generally designated by the reference character 10. The arrangement 10 comprises the following major components; the mold carrier conveyers 11, the dumping cradles 12 and the enclosed oscillating conveyer 13.

The mold carrier conveyers

The mold carrier conveyers 11 comprise a track supporting structure 14 including laterally spaced uprights 15 which support transverse members 16 to which longitudinally extending beams 17 are connected. A pair of spaced upper tracks 18 are supported on the structure 14, these tracks 18 being inclined in a direction toward the dumping cradles 12. A pair of spaced lower tracks 19 are supported on the supporting structure 14 directly below the tracks 18, the lower tracks 19 being inclined in a direction away from the cradles 12.

The tracks 18 and 19 are provided for movably supporting mold carriers 20 which are movable on track wheels 21. The carriers 20 support a plurality of mold boards 22 on which sand molds 23 are positioned.

As best shown in Figures 1 and 3 a transverse angle bar 24 is supported between the tracks 18. The angle

bar 24 supports a latch part 25 having a catch or recess 25' for receiving a latch which will presently be described.

The dumping cradles

The dumping cradles or tilting track sections 12 generally are disclosed best in Figures 1, 2, 5 and 8. The cradles or tilting track sections 12 include laterally spaced supports 26 on which a shaft 27 is journaled. Spaced brackets 28 are connected for rotation with shafts 27, the brackets 28 being securely connected to laterally spaced tracks or rails 29. The tracks 29 are inclined upwardly at their forward ends and are provided with stops 30. The tracks 29 are also connected by laterally extending members 31 and 32. As best indicated in Figures 1, 3, 8 and 9, a transversely extending wall or baffle 33 extends between the tracks 29, the baffle 33 having downwardly turned flanges 34 which are suitably connected to the sides of the tracks 29.

A longitudinally extending supporting member 35 is positioned beneath the wall 33 on the laterally extending members 31 and 32. A latch mechanism 36 is supported on the member 35 and includes a longitudinally extending latch rod 37 which is slidably supported in blocks 38 and 39 supported on the member 35. A collar 40 is secured to the rod 37. A spring 41 encircles the rod 37 and urges the rod 37 in a direction toward the latch part 25 and in engagement with the recess 25' for maintaining the cradles 12 in aligned relation with respect to the upper tracks 18. An adjustable nut 42 limits the movement of the rod 37 in its latch engaging direction. An L-shaped arm 43 is connected to the latch rod 37, the arm 43 projecting downwardly through a slot 44. The arm 43 is pivotally connected to a lever 45 which in turn is pivotally connected to the member 32 as indicated at 46.

Between the cradles 12 a hydraulic power system 47 is provided and as shown in Figure 1, is disclosed in schematic form. The system 47 includes a twin type power unit 48 which may be of conventional form having laterally extending shafts 49 projecting outwardly therefrom, each shaft being connected in an operative manner to a separately rotatable unit (not shown) within the power unit.

It must be understood that the power unit 48 instead of having separately operable twin rotors of a conventional form can also have only one rotor or motor for actuating both cradles to a dumping position in a simultaneous manner, the clutch arrangement as described below permitting such operation.

Since the driving connections or shafts 49 are the same for both cradles the reference characters will be the same for like parts. The shafts 49 as indicated in Figures 1, 4 and 5 through 7 are connected to clutch members 50. The clutch members 50 include oppositely disposed clutch dogs 51 which are rotatable with the clutch members 50. Each cradle 12 includes a clutch member 52 which is securely connected to rotate the shaft 27. The clutch members 52 are provided with clutch dogs 53 which are engaged by the clutch dogs 51 for rotating the cradles 12 to a dumping position.

Operation of the power unit 48 is effected by a pump 54 which pumps fluid under pressure through a conduit 55 to a valve 56 which may be actuated by levers 57 and 57' to direct the fluid under pressure to conduits 58 to the power unit 48. A by-pass line 59 and return lines 60 are provided in conventional manner. It must be understood that a conventional power unit has been described in schematic form and that any suitable hydraulic unit may be utilized to rotate the clutch elements described.

The enclosed oscillating conveyer

The enclosed conveyer 13 includes an oscillating trough 61, as best shown in Figures 1, 2, 5 and 8, which is supported on rollers 62 movable on a platform 63. The

conveyer trough 61 may be oscillated by any suitable mechanism which forms no part of the present invention, this type of equipment being conventional. A plurality of laterally spaced supports 64 support a sheet metal enclosure or hood 65 having a rear wall 66 and a front wall 67 connected by an upper wall 68. The walls 66 and 67 are provided at their lower ends with turned flanges 69 which meet flanges 70 on the oscillating trough 61 in a manner designed to prevent the escape of dust incidental to the mold dumping operation. It must be understood that the laterally spaced ends of the enclosure 65 are suitably closed by sides not shown since the drawings disclose only a section of such an oscillating trough and enclosure, and in a large foundry as many as twenty or more cradles may be positioned in adjacent relation with an oscillating conveyer and enclosure long enough to accommodate all cradles.

The enclosure 65 has its upper wall 68 connected to one or more exhaust ducts 71 in communication with a blower unit 72 in communication with an outlet 73. The blower unit 72 is driven by an electric motor 74 suitably supported on a support 74'.

As best shown in Figures 1, 2, 5 and 8, the enclosure 65 is provided with a plurality of dumping openings 75 formed in the wall 67. An opening 75 is provided for each cradle 12. Each opening 75 is suitably reinforced by angle bars 76 which extend about the top and the laterally spaced sides of the opening.

At the top of each opening 75 in a central location, there is provided a latch 77 which is pivoted on supports 78 which are connected to the wall 67. As indicated in Figure 8, the latch 77 is adapted to engage the end of the rod 37 for holding the cradles 12 in a closed position over the openings 75.

The operation

As indicated above the cradles 12 may extend in many numbers in adjacent relation throughout the foundry. The novel arrangement disclosed in the drawings shows two cradles, these being operated by one power unit, the arrangement being such that one or the other, or both may be operated at once, since the power unit 48 contains twin rotors or actuators not shown. The lever 57' may be moved for tilting the one cradle 12 and the lever 57 may be moved for tilting the other. The operation for tilting both cradles is alike and as a carrier 20 filled with molds 23 is moved to the cradle 12 the lever 57 is moved and liquid under pressure is pumped through one of the conduits 58 to the power unit 48. One of the shafts 49 is thus rotated from the position shown in Figure 6 in a counterclockwise direction due to the engagement of the dogs 51 with the dogs 53 which rotate the clutch member 52 and the shaft 27. The cradle 12 is of course locked in registering alignment with the upper track 18 and this latch mechanism 36 is simultaneously released by the operator during the movement of the lever 57, by the manual operation of the lever 45 which is pivoted to move the latch rod 37 out of engagement with the latch part 25 so that tilting of the cradle 12 can be accomplished. The clutch members 50 and 52 are moved as indicated in Figure 5 to a position wherein the cradle 12 is in a dumping position. The carrier 20 is maintained on the cradle 12 but the mold 23 is dumped through the opening 75 to the oscillating trough 61. As the mold 20 is dumped the cradle 12 by gravity now moves in a clockwise direction into a position shown in Figures 5 and 7 wherein the tracks 29 are in registering relation with the return track 19 and the carrier 20 is discharged. The cradle 12 is now moved back into the position shown in Figure 2 by means of a counterweight arrangement not disclosed here but shown in applicant's co-pending application Serial No. 255,226 filed November 7, 1951, and now Patent No. 2,662,651.

5

The position of the clutch member 50 is such that it is moved to the extreme position shown in Figures 6 and 7 to accommodate the extreme clockwise movement of the cradle 12 into alignment with the lower track 19. Thus there is a certain lost motion between the clutch dogs 51 and 53 before they become engaged with each other during the movement of the shaft 49 to move the cradle 12 to its dumping position. This lost motion between the dogs 51 and 53 thus permits the cradle 12 to travel to its carrier return position by means of gravity, since, upon the cradle 12 assuming its dump position the operation of the hydraulic unit is stopped by the operator and the cradle is actuated by gravity and the counterweight arrangement above indicated.

One of the important features of the invention reside in the operation of the cradle 12 in its dumping position to act as a closure member over the opening 75. The baffle or wall 33 and the tracks 29 are so constructed that when the cradle is in its dumping position the opening 75 is completely closed and thus the escape of sand dust which is placed in suspension incidental to the dumping of the molds is prevented from escaping from the enclosed conveyor to contaminate the air of the foundry. The baffle 33 effectively prevents such escape of sand dust. It must be appreciated that this feature is especially important in view of the fact that numerous cradles may be in dumping operation at one time within the foundry. Since the dumping openings 75 are thus sealed during dumping, the blower exhaust unit 72 can effectively remove sand dust in atmospheric suspension.

In Figures 5 and 8 the cradle 12 is shown with the latch 77 engaging the latch rod 37 in a retaining manner to maintain the cradle 12 over the opening. By this arrangement one or more of the cradles 12 may be maintained out of operation while the others are operating, the inoperative tilting track section or cradles fulfilling their function as closure members over the dumping openings.

It can now be seen that a novel foundry mold dumping arrangement has been disclosed including an improved mechanism for dumping or tilting the cradles and an improved cradle construction which is effective to provide a closure for a dumping opening through which the molds are dumped to an enclosed conveyor.

It must be understood that changes and improvements may be made which do not depart from the spirit of the invention disclosed nor depart from the scope thereof as defined in the appended claims.

What is claimed is:

1. In combination, a mold conveyor comprising an upper track inclined in one direction and a lower track inclined in an opposite direction, said tracks being adapted to movably support a mold carrier, a tilting track section positioned adjacent the ends of the upper and lower tracks, said tilting track section including a stop at one end and having an open end tiltable alternately into cooperative alignment with the upper and lower tracks, a power unit connected to said tilting track section for tilting the same from a cooperating position with the upper track to a dumping position, a second conveyor extending in a lateral direction with respect to said mold conveyor and below said tilting track section, a hood over said second conveyor, said hood extending substantially the length of said second conveyor, said hood having a dumping opening formed therein adjacent the tilting track section, and an imperforate wall section on said tilting track section substantially coextensive the width and length of said track section, said wall section being movable with the tilting track section to the dumping position wherein said wall forms a closure over the dumping opening of said hood during dumping of molds from said mold carrier.

2. In combination, a first mold conveyor comprising an upper track inclined in one direction and a lower track inclined in an opposite direction, said tracks being adapted

6

to movably support a mold carrier, a tilting track section positioned adjacent the ends of the upper and lower tracks, said tilting track section including a stop at one end and having an open end tiltable alternately into cooperative alignment with the upper and lower tracks, a power unit connected to said tilting track section for tilting the same from a cooperating position with the upper track to a dumping position, a second conveyor extending in a lateral direction with respect to said mold conveyor and below said tilting track section, a hood over said second conveyor, said hood extending substantially the length of said second conveyor, said hood having a dumping opening formed therein adjacent the tilting track section, an imperforate wall section on said tilting track section substantially coextensive the width and length of said track section, said wall section being movable with the tilting track section to the dumping position wherein said wall forms a closure over the dumping opening of said hood during dumping of molds from said mold carrier and an exhaust means including an exhaust duct in communication with said hood for discharging sand dust and the like.

3. In combination, a mold conveyor comprising an upper track inclined in one direction and a lower track inclined in an opposite direction, said tracks being adapted to movably support a mold carrier, a tilting track section positioned adjacent the ends of the upper and lower tracks, said tilting track section including a stop at one end and having an open end tiltable alternately into cooperative alignment with the upper and lower tracks, a power unit connected to said tilting track section for tilting the same from a cooperating position with the upper track to a dumping position, a second conveyor extending in a lateral direction with respect to said mold conveyor and below said tilting track section, a hood over said second conveyor, said hood extending substantially the length of said second conveyor, said hood having a dumping opening formed therein adjacent the tilting track section, an imperforate wall section on said tilting track section substantially coextensive the width and length of said track section, said wall section being movable with the tilting track section to the dumping position wherein said wall forms a closure over the dumping opening of said hood during dumping of molds from said mold carrier, a disengageable latch means on said hood adjacent said opening, a latch mechanism on said tilting track section, said latch means and said latch mechanism being engageable for maintaining said tilting track section in the dumping position over said opening.

4. In combination in a foundry arrangement, a plurality of first mold conveyers positioned in adjacent substantially parallel arrangement, each first mold conveyor including a track adapted to movably support a mold carrier, a dumping cradle positioned at one end of said first mold conveyor for receiving a mold carrier therefrom, a track section including track rails on said cradle, said track section being adapted to align in cooperative relation with the track of said first conveyor during a first position, said cradle and track section being movable to a dumping position, an imperforate wall disposed between said track rails, means pivotally supporting said cradle for tilting movement about a horizontal axis, means for pivoting the cradle of each first conveyor, said means including a power unit disposed between said first conveyers, the power unit including a pair of rotatable elements, each rotatable element extending outwardly from opposite sides of said power unit for connection to the cradles, clutch elements connecting each cradle to said rotatable elements, said rotatable elements being operable through said clutch elements for moving each cradle independently to a dumping position, a second conveyor extending laterally with respect to said first conveyers, and an enclosure substantially surrounding said second conveyor, said enclosure having a plurality of dumping openings, each dumping opening being positioned adjacent to one of said cradles, said cradles being movable over the dumping opening dur-

7

ing the movement of the clutches to move the cradles to a dumping position thereby substantially covering said openings.

5. In combination in a foundry arrangement, a plurality of first mold conveyers positioned in adjacent substantially parallel arrangement, each first mold conveyer including a track adapted to movably support a mold carrier, a dumping cradle positioned at one end of said first mold conveyer for receiving a mold carrier therefrom, a track section including track rails on said cradle, said track section being adapted to align in cooperative relation with the track of said first conveyer during a first position, said cradle and track section being movable to a dumping position, an imperforate wall disposed between said track rails, means pivotally supporting said cradle for tilting movement about a horizontal axis, means for pivoting the cradle of each first conveyer, said means including a power unit disposed between said first conveyers, the power unit including a pair of rotatable elements, each rotatable element extending outwardly from opposite sides of said power unit for connection to the cradles, clutch elements connecting each cradle to said rotatable elements, said rotatable elements being operable through said clutch elements for moving each cradle independently to a dumping position, a second conveyer extending laterally with respect to said first conveyer, an enclosure substantially surrounding said second conveyer, said enclosure having a plurality of dumping openings, each dumping opening being positioned adjacent to one of said cradles, said cradles being movable over the dumping opening during the movement of the clutches to move the cradles to a dumping position thereby substantially covering said openings and a latch mechanism adjacent each opening, each latch mechanism being independently operable for engaging the cradles to maintain either cradle in covering relation with respect to an opening while the other cradle is in dumping operation.

8

6. In combination, a mold conveyer comprising an upper track inclined in one direction and a lower track inclined in an opposite direction, said tracks being adapted to movably support a mold carrier, a tilting track section positioned adjacent the ends of the upper and lower tracks, said tilting track section including a stop at one end and having an open end tiltable alternately into cooperative alignment with the upper and lower tracks, means connected to said tilting track section for tilting the same from a cooperating position with the upper track to a dumping position, a second conveyer extending in a lateral direction with respect to said mold conveyer and below said tilting track section, a hood over said second conveyer, said hood having a dumping opening formed therein adjacent the tilting track section, and an imperforate wall section on said tilting track section substantially coextensive the width and length of said track section, said wall section being movable with the tilting track section to the dumping position wherein said wall forms a closure over the dumping opening of said hood during the dumping of molds from said mold carrier.

References Cited in the file of this patent

UNITED STATES PATENTS

503,685	Ryder	Aug. 22, 1893
753,719	Logan	Mar. 1, 1904
1,221,416	Cheek	Apr. 3, 1917
1,425,556	Tingwall et al.	Aug. 15, 1922
1,491,546	Reiss	Apr. 22, 1924
1,973,163	Davis	Sept. 11, 1934
2,466,650	Walker et al.	Apr. 5, 1949
2,535,715	Anderson	Dec. 26, 1950
2,585,105	Frank	Feb. 12, 1952

FOREIGN PATENTS

193,425	Germany	Jan. 8, 1908
---------	---------	--------------