May 26, 1959 J. R. RILEY 2,888,157

LIFT AND DISCHARGE FOR WHEELED CART

Filed April 6, 1955 5 Sheets-Sheet 1

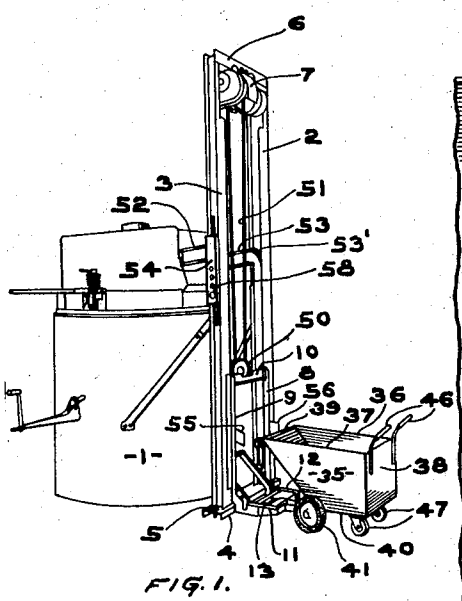


FIG. 1.

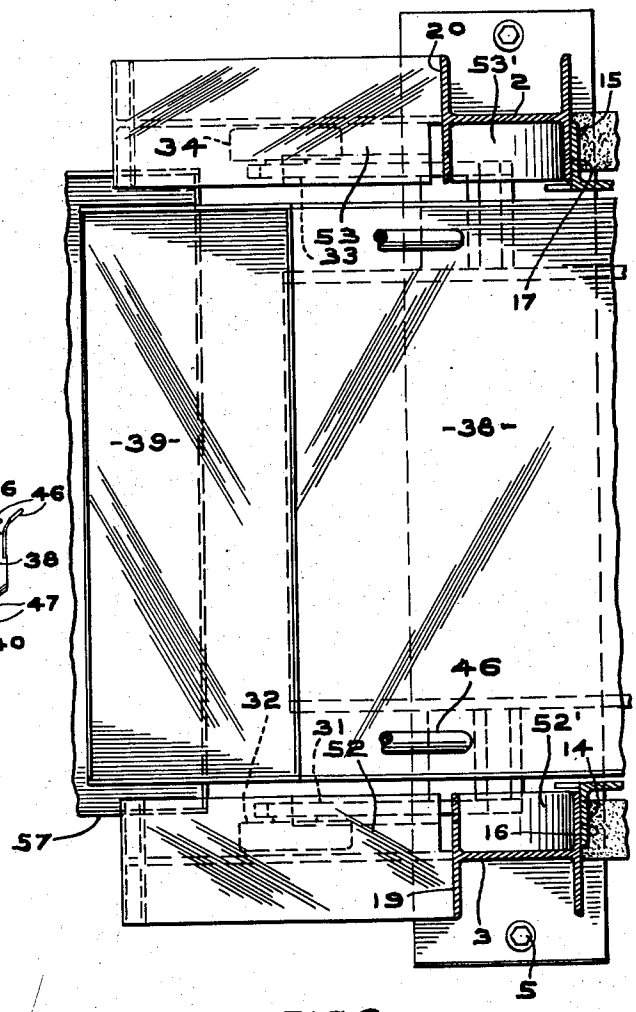


FIG. 6.

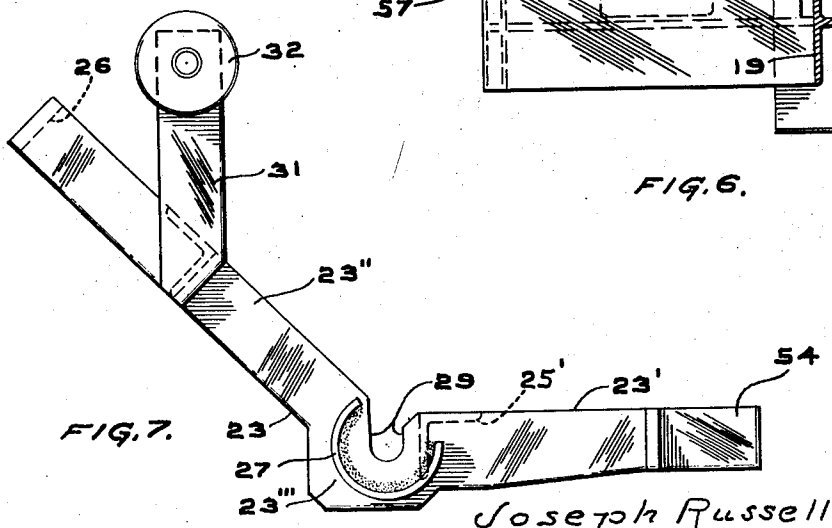


FIG. 7.

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LIFT AND DISCHARGE FOR WHEELED CART

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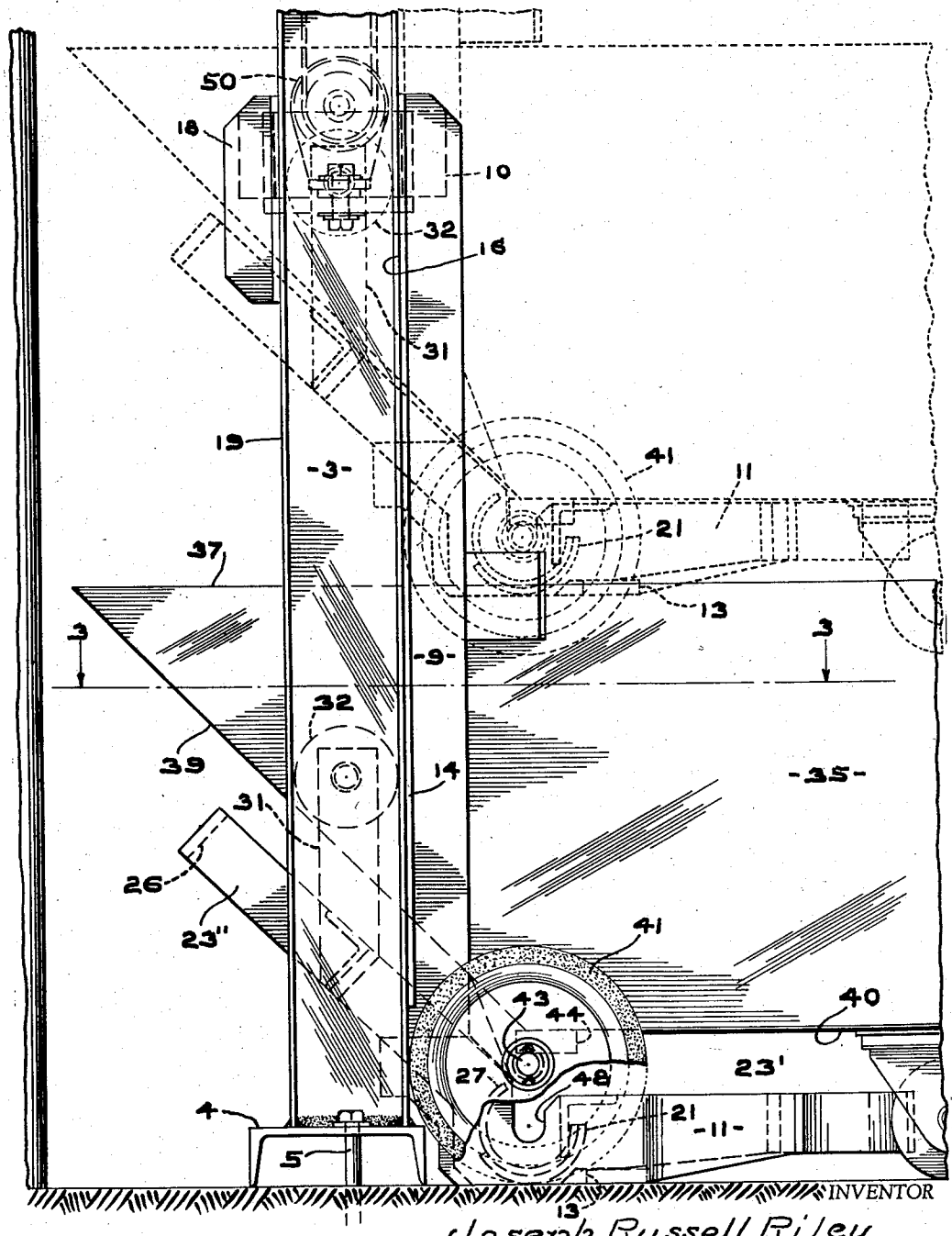


FIG. 2.

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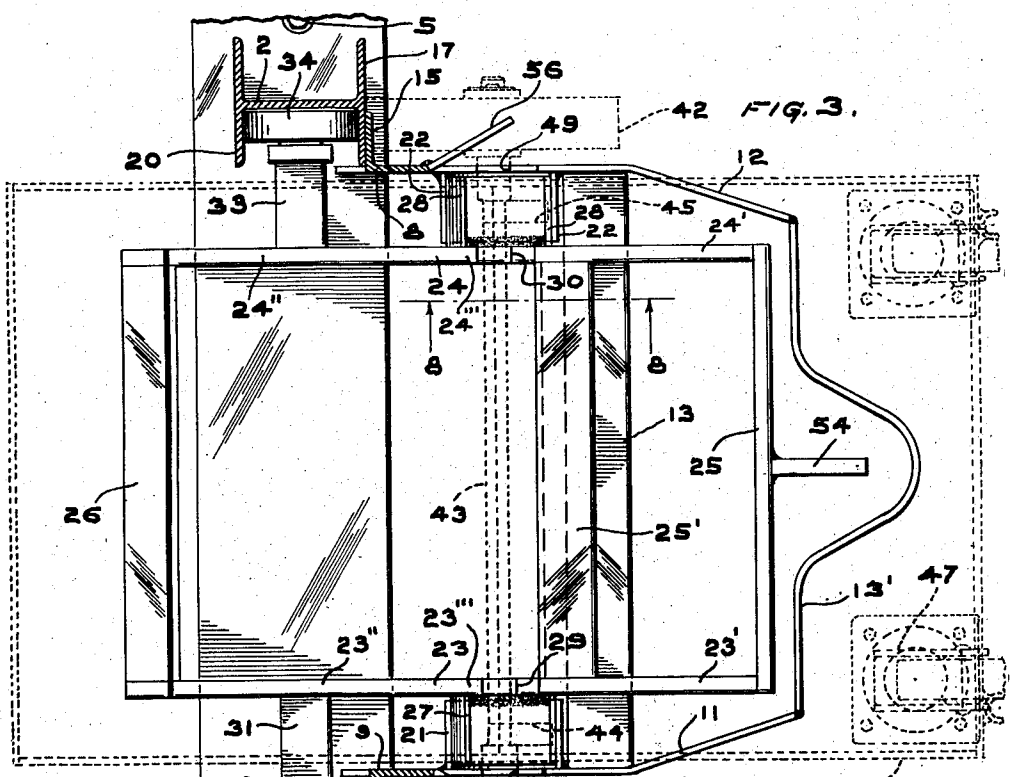
BY Thomas W. J. Clark

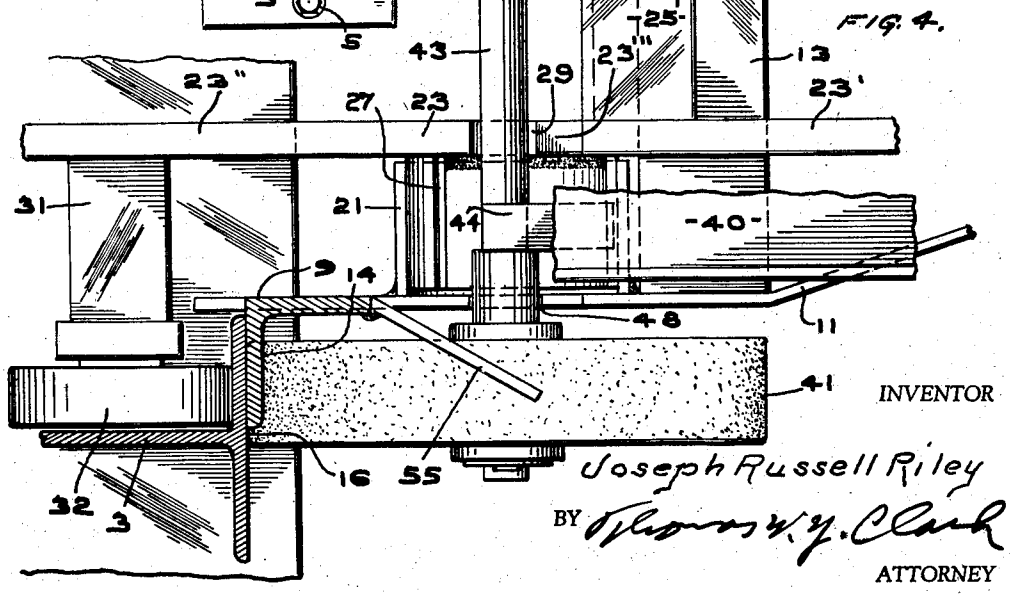
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May 26, 1959 J. R. RILEY 2,888,157

LIFT AND DISCHARGE FOR WHEELED CART

Filed April 6, 1955 5 Sheets-Sheet 3





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May 26, 1959 J. R. RILEY 2,888,157

LIFT AND DISCHARGE FOR WHEELED CART

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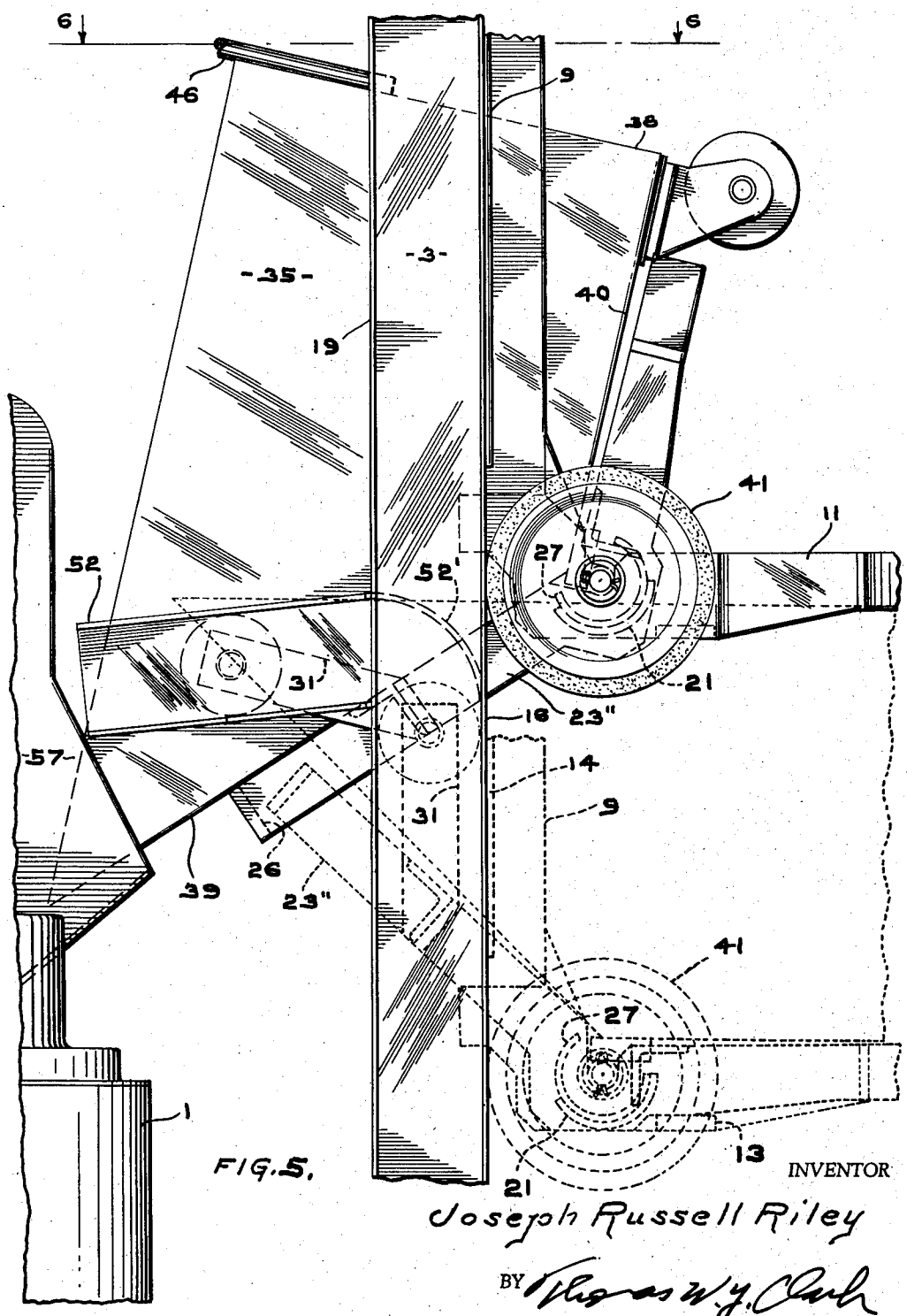


FIG. 5.

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LIFT AND DISCHARGE FOR WHEELED CART

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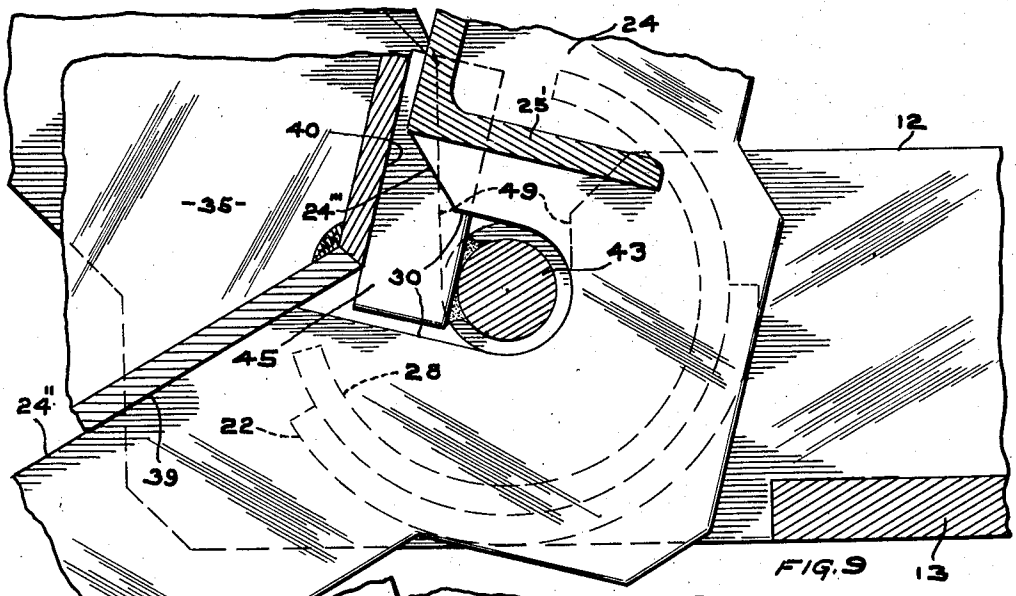


FIG. 9

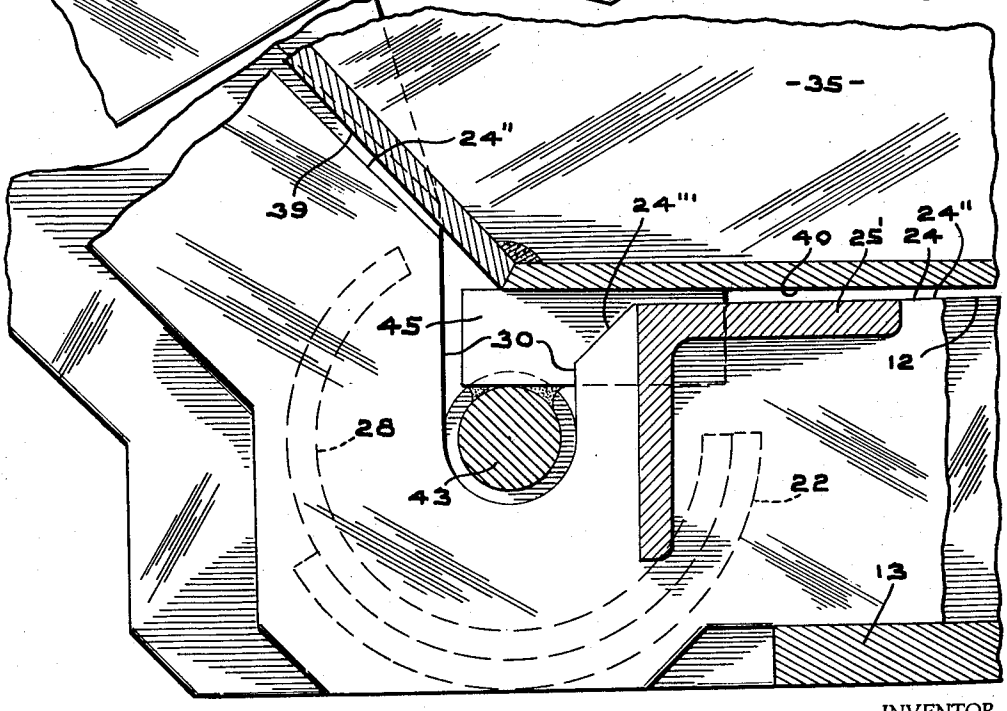


FIG. 8.

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United States Patent Office 2,888,157 Patented May 26, 1959

2,888,157

LIFT AND DISCHARGE FOR WHEELED CART

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Application April 6, 1955, Serial No. 499,707

12 Claims. (Cl. 214—313)

The present invention relates in general to a lift for hoisting and tilting a detachable cart, or wheeled container.

The lift is particularly designed for loading remelting pots or furnaces with used type metal in printing establishments. However, the lift may be used for hoisting many other types of materials such as depositing small castings and forgings into tumbling vats. It also may be used for handling liquids or granulated materials particularly if they are heavy.

The primary object of the invention is to provide an improved lift for raising or elevating heavy material from one level to another by using means for engaging a detachable cart, or wheeled container, and tilting the cart or container to discharge its contents after it has been raised a predetermined distance.

Another object of the invention is to provide a lift of this type which is free from accidental dislodgement of the cart during the lifting and tilting operations.

Still another object of the invention is to provide a structure which will, during the tilting operation of the cart, dislodge the contents being carried therein.

A further object of the invention is to provide a lift which is simple in construction and practical in its operation.

With the above and other objects in view, the invention consists in the novel combination, construction and arrangement of parts described in the following written description and shown in preferred embodiment in the accompanying drawings in which:

Figure 1 is an assembly view.

Figure 2 is a fragmentary elevational view of the lower portion of the lift showing the cart in its initial position for the lifting operation.

Figure 3 is a fragmentary sectional plan view taken on the line 3—3 of Figure 2.

Figure 4 is a fragmentary sectional plan view of the carriage, cradle and cart, showing their co-operation.

Figure 5 is a fragmentary elevational view of the upper portion of the lift showing the cart in tilted position.

Figure 6 is a fragmentary sectional plan view showing the cart in its upper unloading position, taken on the line 6—6 of Figure 5.

Figure 7 is a detailed view of the cart support and tilting element.

Figure 8 is an enlarged fragmentary sectional view in elevation taken on line 8—8 of Figure 3.

Figure 9 is a view similar to that shown in Figure 8 showing the relative change in the position of the bearings of the lift and that of the cart supporting element and their engagement with the axle of the cart when the cart is in tilted position.

Like reference characters refer to like parts throughout the several views.

Referring to the particular apparatus, there are in general two main parts, a remelt pot or furnace and a lift. The term lift is used herein to indicate the complete

apparatus for raising and lowering the cart and the cart itself.

The lift is illustrated as being positioned adjacent a remelt pot, or furnace 1, and is preferably supported by a pair of spaced side standards or uprights 2 and 3 which rest upon a cross member 4, which, held by bolts 5, in turn rests upon the floor upon which the pot or furnace is supported. Extending across the upper ends of the standards 2 and 3 is a brace 6 which also is utilized to support a hoist assembly 7. The side supports are H-shaped members in cross section known generally as H beams. Such formed members are provided with channels extending along each side of the center section.

Adapted to move along these uprights is a carriage having upright side members 8 and 9 sliding upon the face of the uprights. Extending between these side members at the top is a cross member 10. Extending outwardly at an angle of approximately ninety degrees from the lower end of the members 8 and 9 and fixedly secured thereto are members 11 and 12, joined together by connecting members 13 and 13' which, with cross member 10, make up a rigid frame. The upright members of the carriage are provided with outwardly extending flanges 14 and 15 which ride along the outer faces 16 and 17 of the lift upright members 2 and 3. The cross member 10 extends around to the back sides of the lift upright members 2 and 3 and connected at each end to this cross-member are shoes 18, Figure 2, for engaging the rear faces 19 and 20 of the upright members. The carriage is constructed to slide easily up and down the upright members of the lift. Projecting inwardly from horizontal members 11 and 12 and adjacent the vertical members 8 and 9 are arcuate bearings 21 and 22. These bearings are adapted to receive similar bearings carried on a cradle for tilting the cart.

A plan view of this cradle is shown in Figure 3. A side elevation is shown in Figure 7. This cradle has two angular side arms 23 and 24 connected at their ends by the members 25 and 26 and intermediately by member 25'. Each of the side members is formed in two angular sections 23', 23'', 24', 24''. At the junction of each of these two sections there is an enlarged bearing portion 23''' and 24''', and projecting outwardly from these portions are arcuate bearings 27 and 28 which are slightly more than semi-circular, having their open portions at the top of the bearings. Extending downwardly from the top edge of the bearing portions 23''' and 24''' are slots 29 and 30. The bearings 27 and 28 on the cradle fit and rest in the bearings 21 and 22 welded to the carriage. Fixedly secured to the arms 23 and 24, substantially midway of the portions 23'' and 24'' are brackets 31 and 33, the outer ends of which are provided with rollers 32 and 34, which roll within the inner channels of the H beams 2 and 3. The brackets 31 and 33 are positioned on the cradle so that the portions 23' and 24' of the members 23 and 24 extend horizontally during the initial lifting operation. A plan view of the assembled carriage and cradle is shown in Figure 3.

The cart 35 preferably has vertical sides 36 and 37, a rear end section 38 and a front end 39 slanting upwardly and outwardly from the bottom 40 to the cart top. The cart has a pair of main supporting wheels 41 and 42 adjacent the bottom and the lower edge of the slanting front end. These wheels are preferably mounted on an axle 43. The axle is mounted slightly below the plane of the bottom of the cart by spacing members 44 and 45 and it extends outwardly from each side of the cart.

The cart has suitable handles 46 for manually pushing the cart about the floor in order to collect the material to be deposited in the furnace. In addition to the main

supporting wheels 41 and 42 there are placed upon the bottom of the cart adjacent the rear, casters 47. The main supporting wheels 41 and 42 of the cart are spaced to be in line with the faces of upright members 2 and 3 and are adapted to roll along these faces as the cart is being raised.

The carriage is provided with recesses 48 and 49 similar to the slots 29 and 30 in the cradle. The recesses 48 and 49, and slots 29 and 30 are in alignment when the cradle is supported in the bearings 21 and 22 of the carriage and closely receive therein the cart axle. When the carriage is at the bottom of the lift, the bottom portion of the carriage and the bottom portions 23' and 24' of the cradle are both substantially horizontal. When in this position, the axle 43 of the cart is free to enter the slots in the cradle and the recesses in the carriage. Connected with the pulley 50 on cross member 10 and the hoist 7 on brace member 6 is a cable 51. The hoist is preferably of the electrically operated type and the electric current to the hoist motor is controlled by any one of the well-known switches now on the market.

The guide channels formed by the H beams extend upwardly to where the cart is to be tilted to empty its contents. At this point the channels change their direction toward the melting furnace, to the side of the lift opposite the side along which the carriage and cart are carried. This is provided by cutting away one side of the guiding channels and inserting channel members 52 and 53 with curved connections to provide continuous guiding channels from the bottom of the lift to the portions 52' and 53' where the rollers are turned out of their vertical paths into the channels of the members 52 and 53. The members 52 and 53 extend outwardly and slightly downwardly to form an acute angle with the lower portion of the members 2 and 3 as shown particularly well in Figure 5.

In some instances the material being carried by the cart is difficult to get started out of the cart when the cart is tilted. For aiding this situation, the angles between the two portions 23' and 23'' and 24' and 24'' of the tilting cradle are slightly greater than the angle between the bottom of the cart and its sloping front end. This is particularly shown in dotted lines in the upper portions of Figure 2 and in Figure 5. When the center of gravity shifts toward the slanting end of the cart, the difference in the angle of these arms of the cradle and the angle between the bottom and the slanting end of the cart will cause the slanting end to move down and contact the portions 23' and 24' of the cradle with a bumping or snapping action as shown in Figure 5. The cradle end member 25 has an extension 54 thereon to give the cradle greater length in supporting and tilting the cart 35.

In use, the cart may be moved about the establishment and loaded with scrap or used type metal. When the cart is loaded, it is rolled over to the lift where the front slanting end is guided between the upright members 2 and 3 by the wings 55 and 56 thereon. The cart is pushed forward until the sloping front contacts cradle members 23'' and 24'' and their joining member 26, at which time the axle is in contact with the far side of the recesses 48 and 49 of the carriage. The cart is now in position to be raised up the lift. As the carriage moves up the lift, the portions 11 and 12 thereof and the portions 23' and 24' of the cradle move up in contact with the bottom of the cart. The recesses 48 and 49 formed in the bottom of the carriage, and the slots 29 and 30 of the cradle receive the axle 43 of the cart and move the cart up the lift to a point where the cart is to be dumped. At this point the rollers 32 and 34 engage the curved faces 52' and 53' of the guide channels along the H beams, and move out into the channels in the members 52 and 53 as the carriage continues to move upwardly. The portions 23' and 24' of the cradle contact the bottom of the cart and rotate the cart about the axis of the axle 43 which is held within the recesses 48 and 49 of the carriage.

When the cradle begins to hinge upon the bearings 21 and 22 of the carriage, the outer ends or openings of the slots in the cradle are rotated out of vertical coincidence with the openings to the recesses in the carriage, the axle is locked in the recess by this rotation of the cradle, and the cart is securely held in tilted position on the carriage. In this position the end of the slanting portion of the cart enters or is placed over a suitable hopper 57 which is located above the furnace 1 and is adapted to guide the material thereto.

When the cart has reached its full tilted position, the motor operating the lift is preferably automatically stopped, and when the contents of the cart have been removed, the hoisting operation is reversed and the cart is lowered to its normal position. In the lowering operation, the rollers 32 and 34 follow the guide channels located in members 52 and 53 to the channels formed by the H beams and members 2 and 3. This rights the cart and unlocks the axle 43 from the holding recesses. The hoist is preferably automatically stopped when the carriage reaches its normal resting place after which the cart may be removed and again rolled about the premises and refilled.

The starting, stopping and reversing mechanism for the motor is accomplished by any of the well-known electrical devices and is controlled by the conventional switches 58.

While the invention has been illustrated and described for a specific purpose, this is not intended as a limitation, as various changes and equivalents may be used and substituted for those shown without altering its particular principles. Therefore, the scope of the invention is best defined in the depending claims.

What is claimed as new and is desired to be secured by Letters Patent is:

1. A lift comprising a pair of spaced uprights, a carriage having axle receiving recesses therein and being slidingly secured to said uprights and means to move the carriage up and down, a cart having forward and rear ends, and mounted on wheels on an axle extending from the sides of the cart and between the ends of the cart and on which the cart is tiltable, the forward end of the cart extending between the uprights upon wheeling the cart upon the carriage with the cart axle in vertical alignment with said recesses, means including said recesses and axle to retain the cart on the carriage upon its elevation, and means pivoted concentrically with said wheel axle when in said recesses to tilt the cart around said wheel axle and between the uprights at a predetermined elevation thereof to discharge the cart and cooperating with said retaining means simultaneously to lock the wheel axle in the recesses and thereby lock the cart on the carriage.

2. A lift comprising a pair of spaced flanged uprights, a carriage having axle receiving recesses therein and being slidingly secured to said uprights and means to move the carriage up and down, a cart having forward and rear ends, and mounted on wheels on an axle extending from the sides of the cart and between the ends of the cart and on which the cart is tiltable, the forward end of the cart extending between the uprights upon wheeling the cart upon the carriage with the cart axle in vertical alignment with said recesses, means including said recesses and axle to retain the cart on the carriage upon its elevation, the cart wheels then riding said flanged uprights and means pivoted concentrically with said wheel axle when in said recesses to tilt the cart around said wheel axle and between the uprights at a predetermined elevation thereof to discharge the cart and cooperating with said retaining means simultaneously to lock the wheel axle in the recesses and thereby lock the cart on the carriage.

3. A lift comprising a pair of spaced uprights, each having a way therein, a carriage having axle receiving recesses therein and being slidingly secured to said up-

rights, said carriage having means engaging said ways, and said ways having offsets adjacent their upper ends, means to move the carriage up and down, a cart having forward and rear ends and mounted on wheels on an axle extending from the sides thereof between the ends thereof and on which the cart is tiltable, the forward end of the cart extending between the uprights upon wheeling the cart upon the carriage with the cart axle in vertical alignment with said recesses, means including said recesses and axle to retain the cart upon the carriage upon its elevation, the offsets in the ways engaging said means on the carriage to tilt the cart around the wheels and between the uprights to discharge the cart the means on the carriage cooperating with said retaining means simultaneously to lock the cart on the carriage.

4. A lift comprising in combination, a pair of spaced uprights, a cart tiltable about an axis, a carriage mounted to move along said uprights, a cradle supported hingedly concentric with the axis about which the cart is tiltable in said carriage and extending along the bottom and one end of the cart, upon placing the cart on the cradle, means carried on the cradle cooperating with the uprights for rotating the cradle about its hinges for tilting the cart concentric with the cradle hinged support after the carriage has been raised a predetermined distance, means on the cradle and carriage cooperating simultaneously upon the rotation of the cradle upon its rising with the carriage to lock the cart on the carriage and means for raising said carriage.

5. A lift comprising, in combination a pair of spaced uprights, a tiltable cart having one end slanting from its bottom upwardly and outwardly to its top, a supporting axle extending outwardly from each side of the cart adjacent the junction of the bottom and slanting end, main supporting wheels rotatably carried on said axle, a carriage slidably mounted on said uprights, a cradle for tilting the cart hingedly supported in the carriage having two angular portions, one portion extending along the bottom of the cart and the other extending substantially along the slanting end portion of the cart, the carriage having means for receiving the axle after the carriage has been raised a short distance, the cradle having a corresponding means for engaging the axle when the bottom engaging portion of the cradle is in cart receiving position, said cradle means retaining the axle in the carriage axle receiving means when the cradle is in position to tilt the cart.

6. In a lift as set forth in claim 5 in which the angle between the cart bottom and its slanting end section is less than the corresponding angle between the cradle member extending along the bottom and slanting side surface of the cart.

7. In a lift comprising, in combination, a pair of spaced uprights, a tiltable cart having one end slanting outwardly and upwardly from its bottom and wheels supported thereon adjacent the junction between the bottom and slanting end, a carriage slidably mounted on said uprights having a portion extending parallel and in contact with the uprights and a portion extending outwardly from the said first mentioned portion substantially horizontally and adjacent the floor when the carriage is in lowered position to receive the cart, the carriage having an open top hinge for hingedly engaging the cart after the cart has been positioned over the horizontal portion of the carriage, a cradle carried by the carriage for tilting the cart and means associated with the cradle and cooperating with the uprights to control the position of the cart as it moves up the uprights and means for raising said carriage.

8. In a device as set forth in claim 7 in which the cradle closes said open hinge during the tilting operation.

9. A lift comprising, in combination, a pair of spaced uprights, a carriage slidably mounted on said uprights having an upright portion extending parallel and in contact with the uprights and a portion extending outwardly from said first mentioned portions substantially horizontally and adjacent the floor when the carriage is in lowered position, a tiltable cart having one end slanting outwardly and upwardly from its bottom, an axle extending transversely of the cart adjacent and below the junction of the bottom and slanting end, wheels rotatably mounted on the outer ends of the axle, and spaced apart equal to the distance between the two uprights, the horizontal carriage portion having a recess in each side with an open upper end for receiving the axle of the cart, the recesses being spaced from the uprights a distance equal to the radius of the wheels, the wheels riding the uprights upon the elevation of the cart, a cradle hingedly carried on the carriage for rotating the cart about its axle to discharge position when the axle is in engagement with the recesses in the carriage, the cradle having a positioning roller thereon, one of the uprights having a roller channel therein, the upper end of the channel extending outwardly at the cart tilting point and at an angle to deflect the upward movement of the roller to rotate the cradle about its hinges as the raising of the carriage is continued to discharge the cart and means for raising and lowering the carriage.

10. In a device as set forth in claim 9 in which the cradle has a cart bottom supporting portion and a portion sloping upwardly with the slanting cart end, and the angle therebetween is slightly greater than the angle between the bottom and slanting end of the cart to drop the cart slanting end a short distance to contact the sloping portion of the cradle when the cart is tilted.

11. In a device as set forth in claim 9 in which the rotating cradle has cart axle receiving recesses aligned with those in the carriage to secure the axle of the cart on the carriage when the cart is tilted.

12. A lift comprising in combination, a pair of spaced uprights, a carriage mounted to move along said uprights, a cradle hingedly supported in said carriage, and means to move the carriage up and down, means on the uprights and cradle to tilt the latter during its rising and adjacent the top movement of the carriage, a cart having forward and rear ends and mounted on wheels on an axle extending from the sides of the cart and between the ends of the cart and on which the cart is tiltable, the forward end of the cart extending between the uprights upon wheeling the cart upon the carriage, with the cart axle above and in vertical alignment with the cradle hinged support, the cradle hinged support pivoting concentrically to the cart axle and means on the cradle and carriage cooperating simultaneously upon the rotation of the cradle upon its rising with the carriage, adjacent the top movement of the carriage, to lock the cart axle on the cradle and thereby lock the cart on the carriage.

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