No. 708,759. Patented Sept. 9, 1902.

J. M. DODGE.

ENDLESS CONVEYER.

(Application filed Dec. 17, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 8.

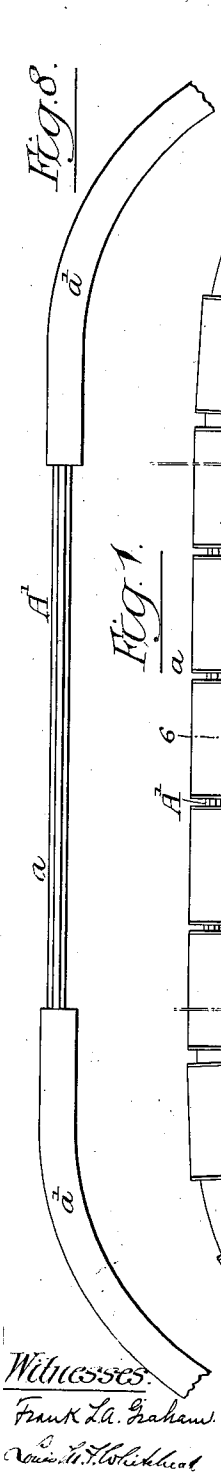
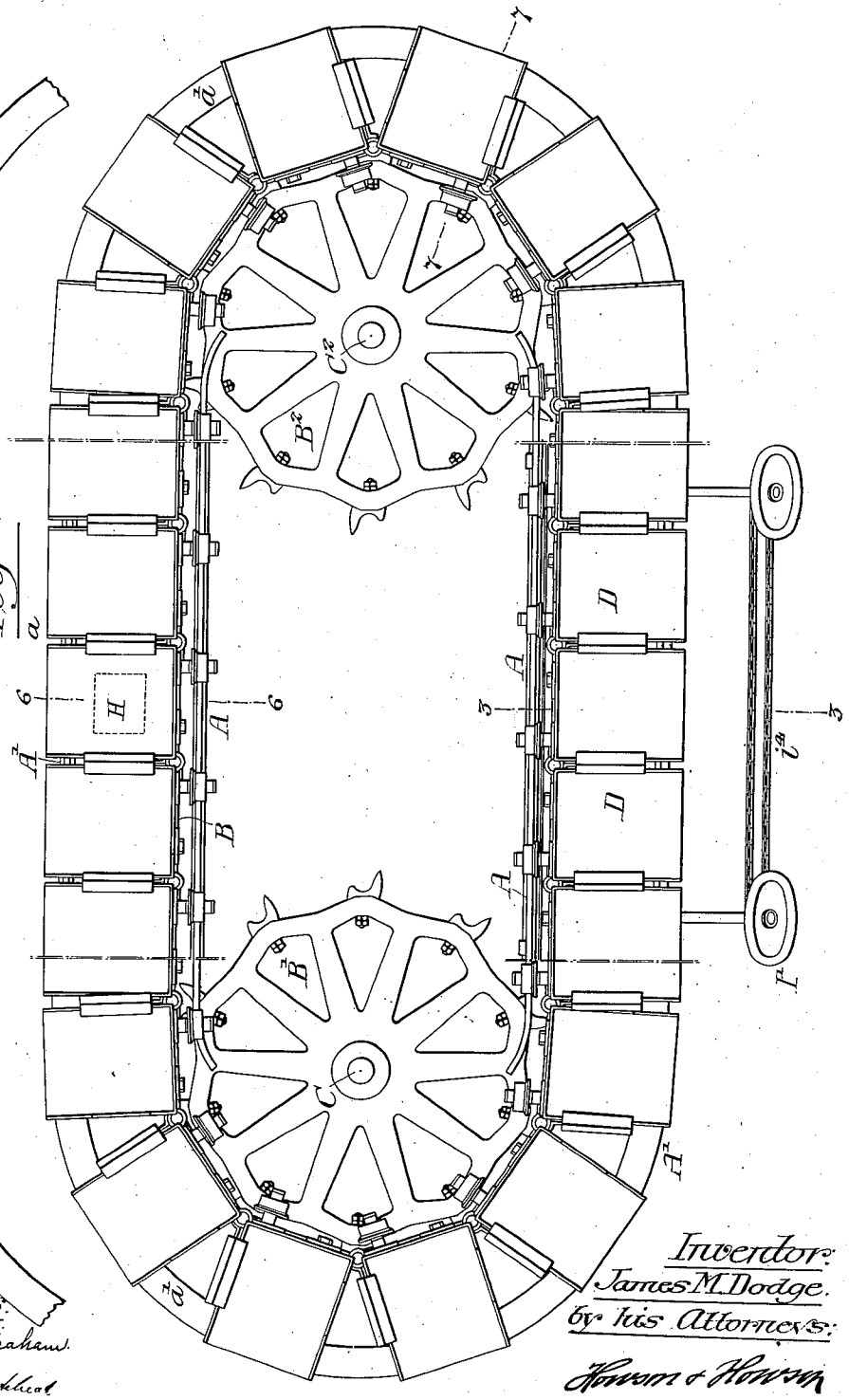


Fig. 1.



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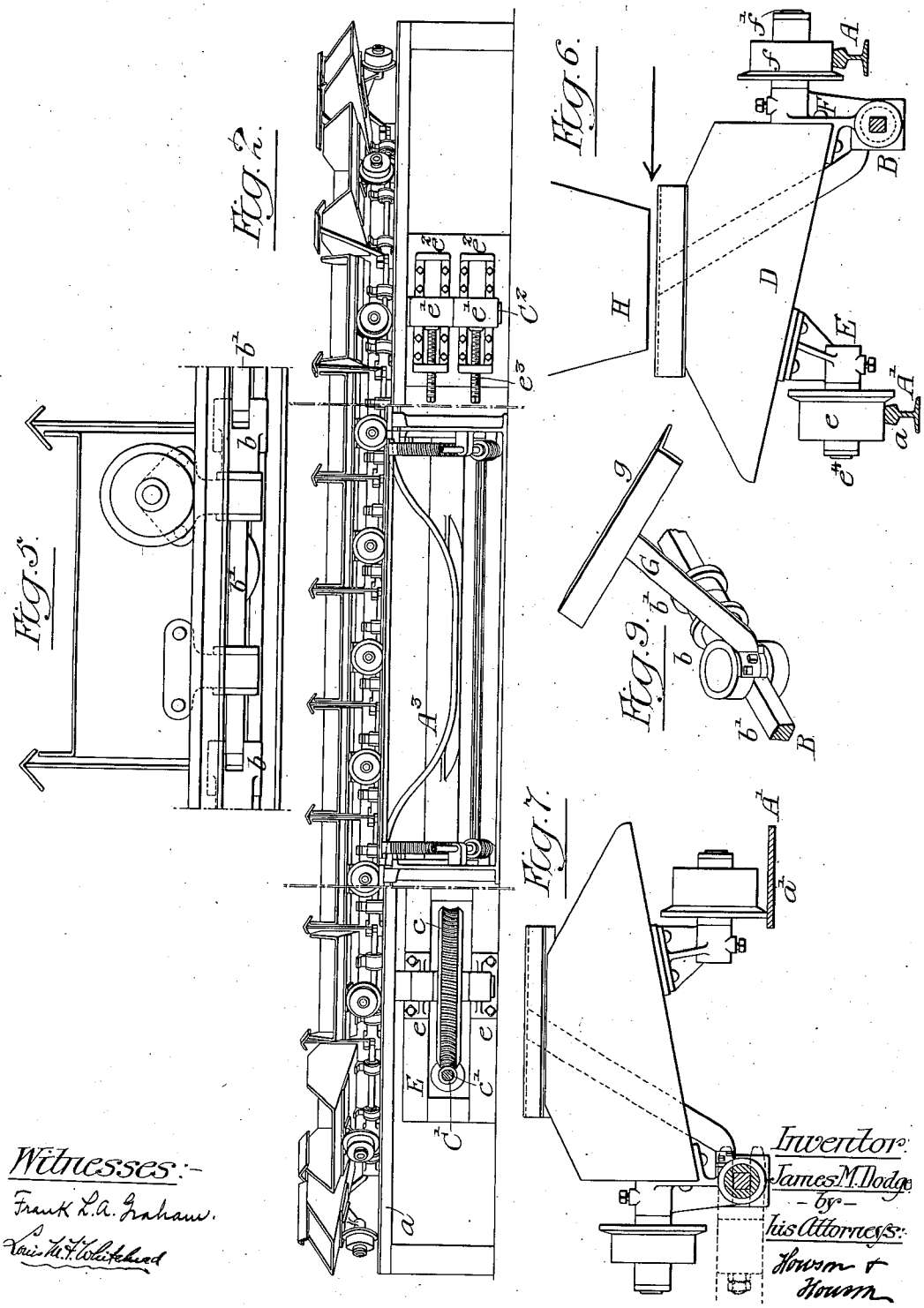
(No Model.) 3 Sheets—Sheet 2.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

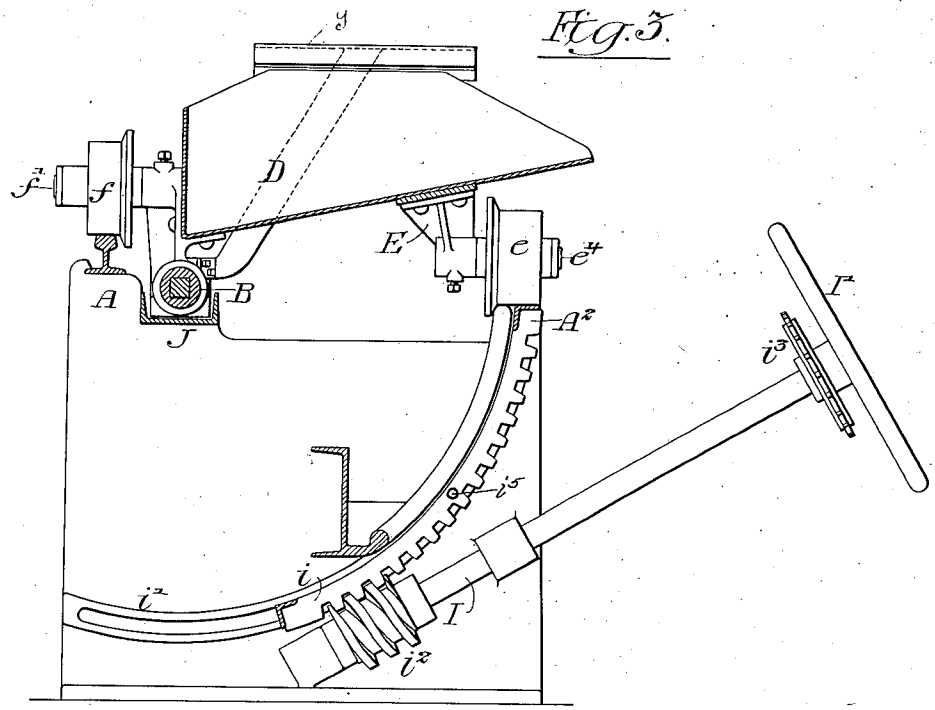
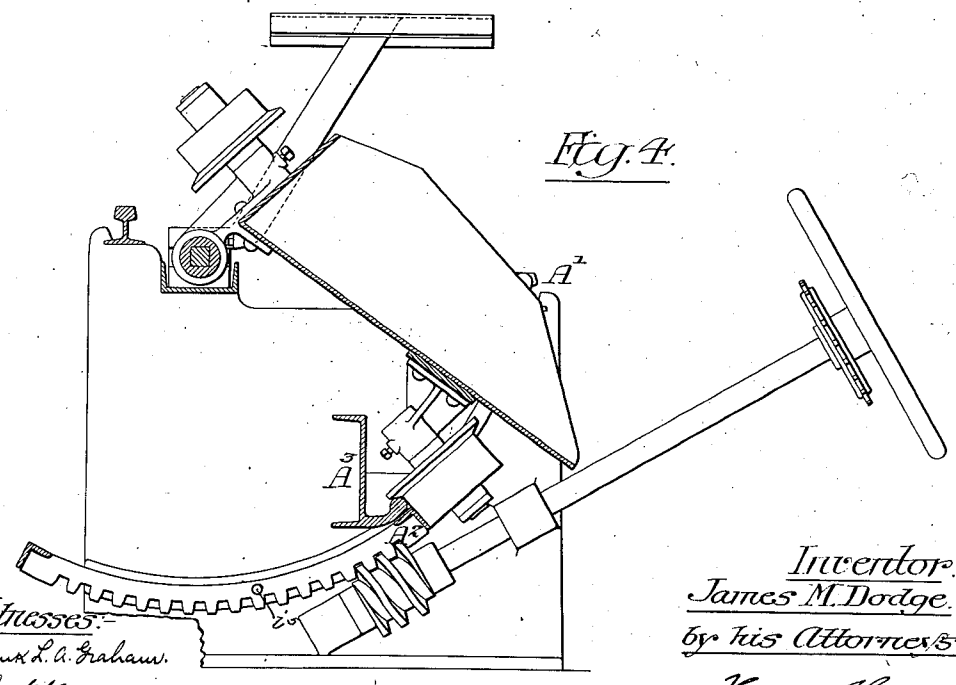


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES M. DODGE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE LINK BELT ENGINEERING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ENDLESS CONVEYER.

SPECIFICATION forming part of Letters Patent No. 708,759, dated September 9, 1902.

Application filed December 17, 1900. Serial No. 40,207. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. DODGE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Endless Conveyers, of which the following is a specification.

My invention relates to certain improvements in horizontal conveyers.

The object of my invention is to increase the capacity of this type of conveyer, to simplify the construction, to use only one drive-chain, and to provide a discharging device which can be readily thrown into and out of action, as fully described hereinafter.

In the accompanying drawings, Figure 1 is a plan view illustrating my improved conveyer. Fig. 2 is a side view of Fig. 1. Fig. 3 is a sectional view on the line 3 3, Fig. 1. Fig. 4 is a view similar to Fig. 3, showing one of the carriers or buckets tilted to discharge the material carried thereby. Fig. 5 is a view looking in the direction of the arrow, Fig. 6. Fig. 6 is a sectional view on the line 6 6, Fig. 1. Fig. 7 is a view on the line 7 7, Fig. 1. Fig. 8 is a detail view showing one of the main supporting-rails detached, and Fig. 9 is a perspective view showing the hood and part of the chain.

A A′ are the two rails upon which the conveyer travels. The drive-chain in the present instance is adjacent to the rail A, and this rail A is continuous except at the turns, where it is cut away to allow for the sprocket-wheels, as clearly shown in Fig. 1. The rail A′ is continuous except at the discharge-points, where a movable rail A^2 is inserted. This rail is so arranged as to either carry the conveyer over the discharge-point or allow the carriers to tilt and discharge, as fully described hereinafter.

B is the chain, which may be of any type desired. I preferably use the chain illustrated in Figs. 5 and 9, having vertically-arranged pivots *b*, connecting the links *b*′. The chain B passes around sprocket-wheels B′ B^2, as shown in Fig. 1. In this instance the wheel B′ is a driving-wheel, being mounted on a shaft C, having a worm-wheel *c*, driven by a worm *c*′ from a driving-shaft C′. The shaft C is mounted in suitable bearings on the frame E, while the shaft C^2 of the wheel B^2 is mounted in bearings *e*′, adjustable in ways e^2, in the present instance by means of screws e^3, so as to take up any slack in the chain.

It will be understood that while I have shown the simplest form of endless-belt conveyer, in which the chain passes around a driving-wheel and a guide-wheel, the conveyer can be adapted to pass around any number of guide-wheels and be driven at any point desired, the use for which the conveyer is intended controlling the arrangement of the conveyer. If it is desired to convey material from one portion of a building to another, in which several turns are necessary, then a number of guide-wheels must be used to guide the chain and the rails must be designed accordingly; but in order to simplify the drawings I have shown a short section, and while I have termed this as a "horizontal" conveyer it can be arranged at an incline, if desired; but it is intended mainly for horizontal use. I preferably discontinue the rails A at the turns and allow the driving-wheel or guide-wheels to carry the inner end of the carriers or pans.

The carriers or pans D are clearly illustrated in the drawings. These carriers are preferably quadrangular in shape and preferably have inclined bottoms, as shown in Fig. 3, inclining from the outer edge toward the chain. By this construction the carriers will hold more material, and the material will be prevented from accidentally discharging over the outer edge. Furthermore, it gives room for the proper arrangement of the outer carrying-wheels *e*. The carrying-wheels are mounted on trunnions e^4, carried by brackets E, secured to the bottom of each carrier or pan. Brackets F F′ are secured to the inner end of each carrier and are journaled on the chain B. The bracket F has a trunnion *f*′, on which the wheel *f* is mounted. This wheel travels on the rail A, while the wheel *e* travels on the rail A′. In some instances only one bracket may be secured to the carrier; but I prefer two when practicable. I

preferably extend the bearing-surface of the rail A′ at the points where the conveyer turns, so that the flanges of the wheels will ride upon the rails instead of the tread at the turning-point, so as to give the chain and its carriers perfect freedom to turn. In the present instance the main portion *a* of the rail A′ is an ordinary T-rail, as shown in Figs. 6 and 8, and the section *a′* at each corner is flat, as shown in Figs. 1, 7, and 8, and the section *a′* is of such height that the bearing will be transferred from the tread to the flange of the wheel without jar. The carriers D, as shown in Figs. 1 and 2, are opened at one side and closed on the other three sides, and the sides of the carriers when they are arranged in line are close together, but not so close as to prevent the passage of material through the space between the carriers when the conveyer is fed from a continuous discharge-hopper.

To prevent the waste of material, I preferably arrange a hood *g*, Figs. 1, 2, and 9, which is carried by a bracket G, secured to the chain B, preferably at the pivot-point thereof. The hood has two flanges, one flange overlapping the edge of one bucket and the other flange overlapping the edge of the other bucket, so that while the carriers are passing under the hopper H, Fig. 6, they will receive material from the hopper, and as one carrier passes from under the hopper and the other comes into position the hood will deflect the material into one carrier or the other and prevent it passing through the space between the carriers.

It will be noticed that one flange of the hood is wider than the other, and the wide flange laps over the edge of the carrier, which is pivoted to the link to which the bracket G is attached, and the short flange does not lap over the edge of the adjoining carrier. This arrangement is for the purpose of allowing the carriers to part on turning a curve without the hood interfering with the movement.

I will now describe the mechanism for discharging the carriers. As before stated, the rail A′ is discontinued at the point where the discharge device is situated, and in place of the rail A′ is a movable section A^2. This section A^2 when in the position shown in Figs. 2 and 3 forms a continuation of the rail A′; but when it is deflected or lowered and in the position shown in Fig. 4 the wheel *e* of the carrier D travels on a fixed curved rail A^3, curved upward at each end to a point in line with the rail A′, so that when the rail-section A^2 is moved out of line, as shown in Fig. 4, the wheel of the carrier travels along the curved rail-section A^3, and as this rail-section is curved considerably below the normal line of travel the carrier is tilted, the chain B acting as a pivot, to such a degree as to discharge the contents of the carrier, and as the conveyer continues to travel the carrier is raised to its normal position in line with the rail A′ and travels on this rail until it comes again to the point of discharge. Any suitable means may be used to withdraw the rail-section A^2. In the present instance I secure the said rail-section to one or more toothed segments *i*, having pins i^5, traveling in guides *i′* on the supports for the structure. These segments can be arranged on one or both ends of the rail A^2. In the present instance I have shown a segment at each end, and these segments gear with worms i^2 on shafts I, arranged at an incline. On each of these shafts is a sprocket-wheel i^3, around which passes a chain i^4, and on each of the shafts I is a hand-wheel I′, by which either of the shafts can be turned, and the motion of the one shaft is transmitted to the other through the endless chain, so that both ends of the rail-section A^2 will be raised or lowered in unison. I preferably guide the carrying-chain B at the pivot-point by a flanged rail J, Fig. 3, made in the present instance in the form of a channel-bar, so as to support the chain-wheel and its carrier while the wheel *f* is raised off its rail A and the wheel *e* is traveling on the curved depressed rail A^3.

The operation of the conveyer is as follows: Motion is imparted to the conveyer through the driving-shaft C′ to the sprocket-wheel B′. This sprocket-wheel engages with a chain B, and as the carriers D are pivoted to this chain and supported by the rails the carriers will be moved forward, receiving material from any suitable hopper or discharge-spout H and carrying the material forward along straight sections and around curves to the point of discharge. At the discharge-point the conveyer is either carried across the discharge device by the movable rail A^2 or the movable rail is lowered and the wheels *e* of the carrier travel over the depressed rail A^3, thus tilting the carriers and discharging the material at the point desired. It will be understood that there may be several of these discharging devices through the length of the conveyer, depending altogether upon the type of conveyer and the use for which it is intended.

The above-described invention is of the same type as that described by me in an application for patent filed February 16, 1901, Serial No. 46,218, allowed June 6, 1902, and in which I have broadly claimed a horizontal conveyer consisting of a chain with buckets or carriers and means for turning the buckets on the chain to any predetermined point.

I claim as my invention—

1. The combination in an endless-chain horizontal conveyer, of a chain, means for driving said chain, carriers pivoted thereto, the pivot of each carrier being longitudinal, and means for allowing the carriers to swing on their pivots below the carrying level to discharge their loads, substantially as described.

2. The combination of a chain, means for driving said chain, a series of carriers pivoted thereto, the pivot of each carrier being longitudinal, two rails, one rail supporting the

inner side of the carrier and the other the outer side thereof, with means for depressing the outer supporting-rail to allow the carriers to turn on their pivots to discharge, substantially as described.

3. The combination of a chain, means for driving said chain, an inner and an outer rail, one on each side of the chain, a series of carriers pivoted to the chain, the pivot of each carrier being longitudinal, two wheels on each carrier arranged to travel on the two rails respectively, and means for deflecting the outer rail so as to cause the carrier to tilt, the chain acting as the pivot, substantially as described.

4. The combination in an endless-chain conveyer, of an endless chain, means for driving said chain, a series of carriers pivoted to the chain, the pivot of each carrier being longitudinal, a wheel mounted on each carrier, a rail for supporting said carrier in its normal position, said rail being interrupted at the discharge-point, and a movable rail forming a continuation of the carrying-rail so that when it is desired to discharge the carriers said movable rail is moved out of line to allow the carriers to tilt, substantially as described.

5. The combination in a conveyer, of an endless chain, carriers pivoted thereto, the pivot of each carrier being longitudinal so that the carriers can be tipped laterally to discharge, with hoods secured to the chain and overlapping the adjoining edges of the carriers, substantially as and for the purpose set forth.

6. The combination in a conveyer, of an endless chain, means for driving said chain, carriers pivoted to the chain, a rail supporting the outer end of each carrier, means for lowering the support at the discharge-point, and a hood carried by the chain and overlapping the edges of the carrier, substantially as described.

7. The combination of an endless chain, a carrier having ends and an inner side, said carrier being pivoted to the chain at the inner side, the pivot being longitudinal, two wheels on each carrier, rails for supporting the wheels, one of said rails being interrupted, a movable rail inserted in the interrupted portion, and a curved rail at the interrupted portion over which the carriers travel when discharging, substantially as described.

8. The combination in a conveyer, of a series of carriers having inclined bottoms, a bracket secured to the inner side of each carrier, a drive-chain to which the bracket is pivoted, the pivot of each carrier being longitudinal, a bracket secured to the bottom of each carrier, a wheel on said bracket, and a rail supporting the wheel, substantially as described.

9. The combination of an endless chain, a series of carriers pivoted to the chain so as to be moved up or down, a rail supporting the outer ends of said carriers, a curved rail-section forming a continuation of the main rail-section and arranged to support the carriers when tilted to discharge the material, a movable rail-section, a segment on said rail-section, a shaft, and a worm on the shaft engaging the segment, so that when the worm-shaft is turned the movable rail will be raised or lowered, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES M. DODGE.

Witnesses:
WILL. A. BARR,
JOS. H. KLEIN.