

No. 639,655.

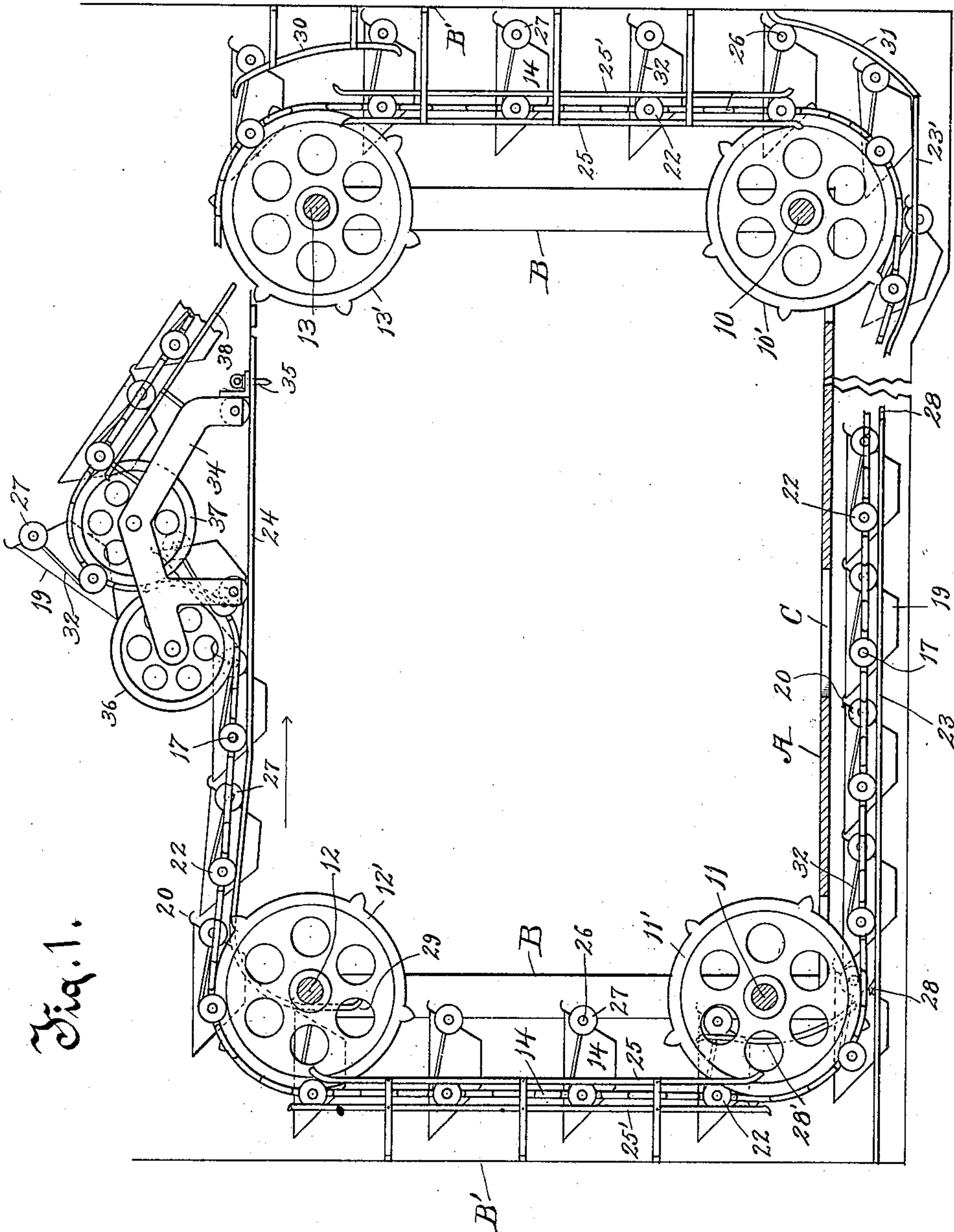
Patented Dec. 19, 1899.

E. C. BERGHOEFER.
ELEVATOR AND CONVEYER.

(Application filed Apr. 7, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses.

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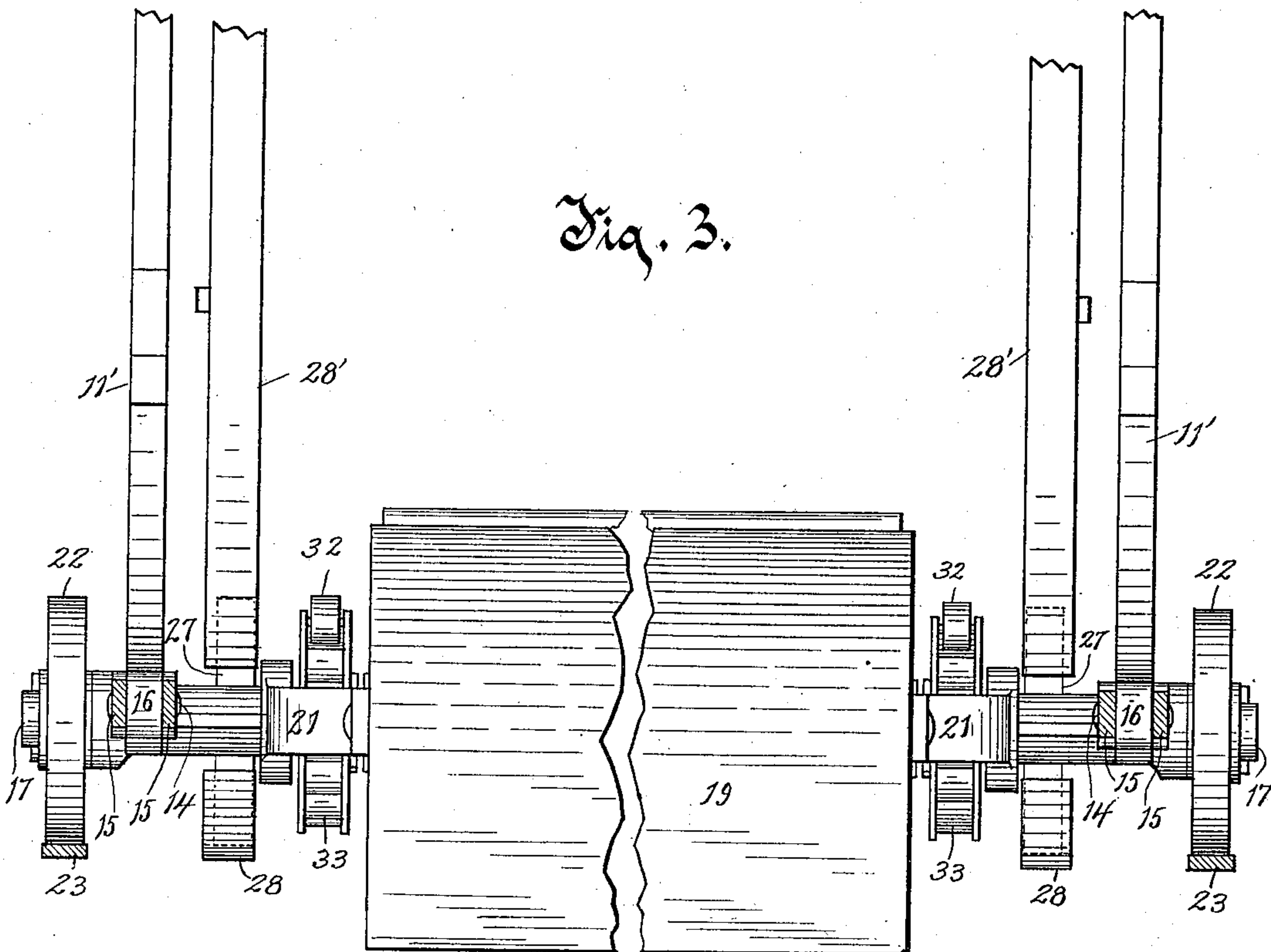
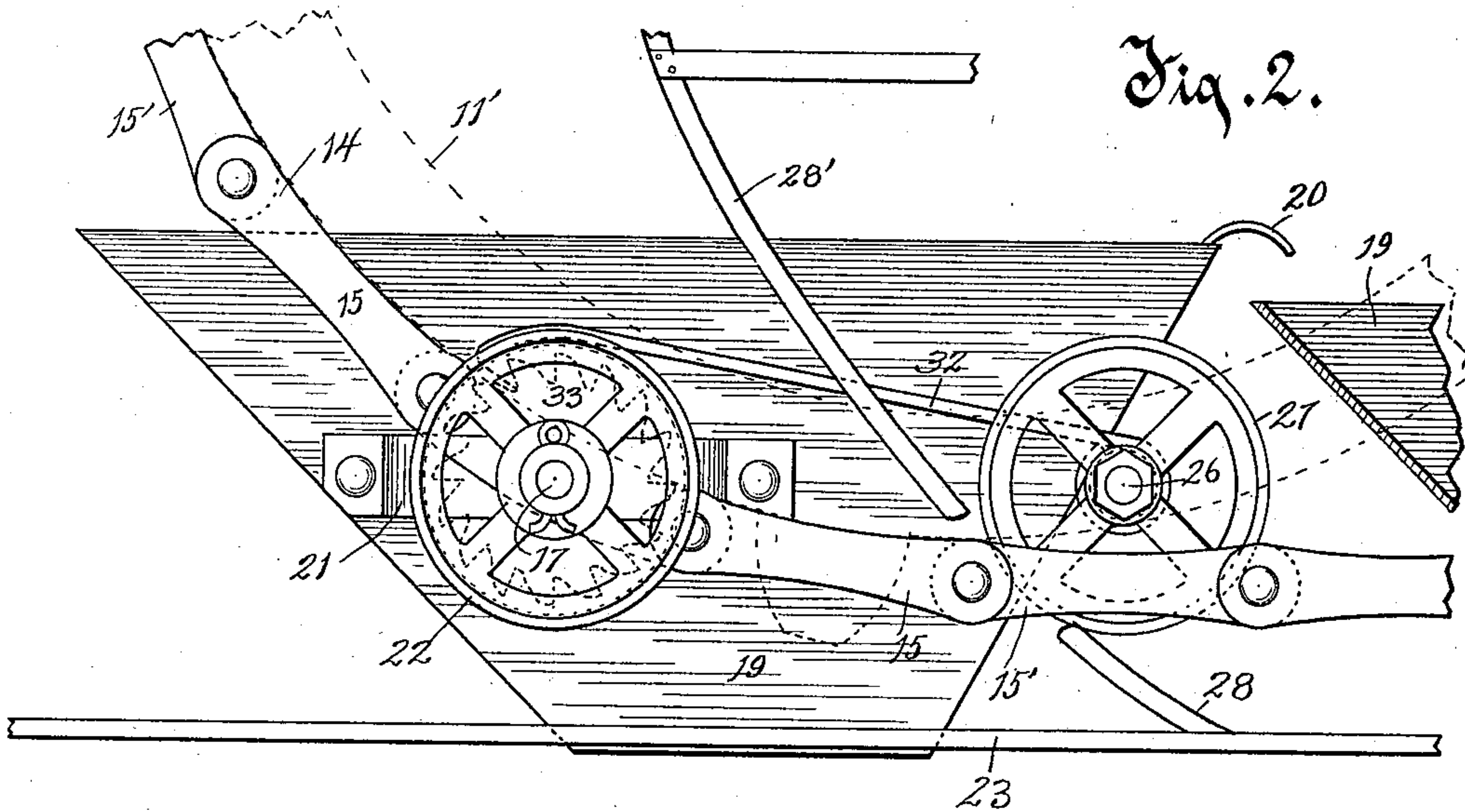
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3 Sheets—Sheet 2.



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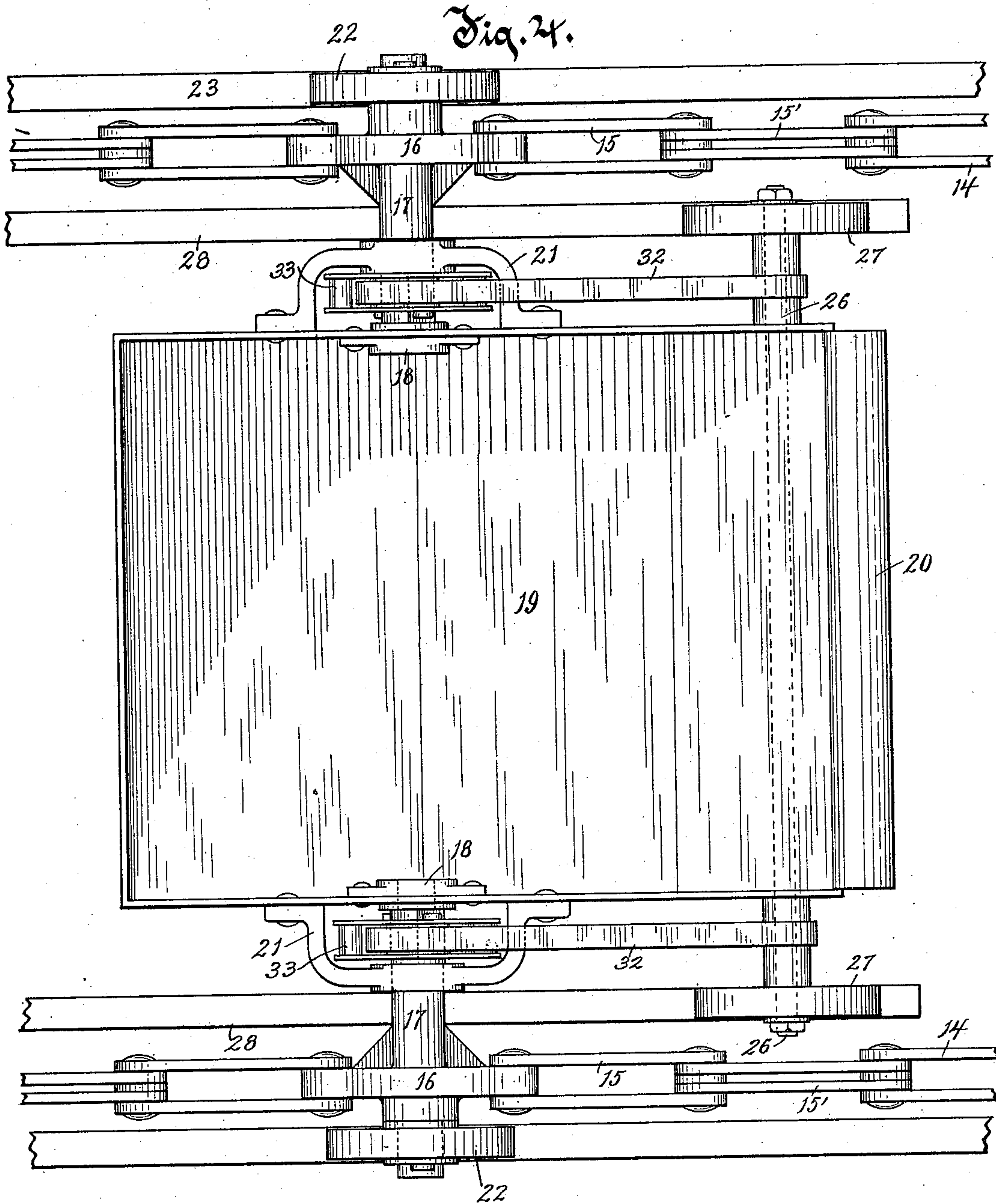
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

EDWARD C. BERGHOEFER, OF MILWAUKEE, WISCONSIN, ASSIGNOR OF ONE-HALF TO CHARLES BERGHOEFER, OF SAME PLACE.

ELEVATOR AND CONVEYER.

SPECIFICATION forming part of Letters Patent No. 639,655, dated December 19, 1899.

Application filed April 7, 1899. Serial No. 712,106. (No model.)

To all whom it may concern:

Be it known that I, EDWARD C. BERGHOEFER, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Elevators and Conveyers, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

10 My invention relates to improvements in elevators and conveyers that are adapted especially for raising and transporting coal to a place of deposit more or less distant from the locality at which it is elevated. The apparatus can be conveniently employed for
15 handling broken stone or grain or other material or substances loose in mass.

The invention consists of the apparatus, its parts, and combinations of parts, as herein described and claimed, or their equivalents.

In the drawings, Figure 1 is an elevation of the complete elevator and conveyer, parts being broken away for convenience of illustration and parts being in section. Fig. 2 is a side view of a small portion of the apparatus on enlarged scale, being chiefly an elevation of a fragment of the endless chain and of a bucket mounted thereon. Fig. 3 is an elevation of a fragment of the apparatus, parts being in section and other parts being broken
25 away, the view being taken at the lower left-hand corner of Fig. 1. Fig. 4 is a plan of a fragment of the apparatus, the view illustrating the construction, so far as permanent parts of the structure are included, just at the left
30 of the lower sprocket-wheel at the right hand in Fig. 1.

In the drawings, A represents a floor with a coal-hole, which may be that of a coal-shed or of a wharf, or in connection with a switch
40 or shunting-tracks of a railway.

B and B' represent posts or such permanent portions of a building or structure as are adapted for supporting the parts of the apparatus.

The elevator and conveyer consists, in a general way, of an endless carrier made up of two endless chains and series of buckets mounted thereon, which carrier is mounted
50 and is caused to travel on suitably-supported wheels, one or more sets of which are driven by

power applied thereto, compelling the travel of the carrier.

In the construction of the apparatus a number of shafts 10, 11, 12, and 13, so arranged
55 and supported on the permanent structure that there shall be two of these shafts below in substantially the same horizontal plane and two above, are each provided with a pair of sprocket-wheels 10' 10', 11' 11', 12' 12', 13' 13'
60 at equal distances apart on each shaft and adapted to carry thereon the two lines of the carrier or endless chains 14. The shafts 10 and 13 may be located at a considerable distance horizontally from the shafts 11 and 12,
65 so that the endless carrier running on the sprocket-wheels thereon will extend for a considerable distance between the respective limits to the right and left of the travel of the carrier. Any one of these shafts 10, 11,
70 12, or 13 may be provided with means for driving it, or two or more of the shafts may be rotated concurrently by any well-known means therefor. The endless chains 14 are so constructed as to be flexible and to be
75 adapted to engage the teeth on the sprocket-wheels on the shafts 10, 11, 12, and 13, and for this purpose the two chains are each conveniently constructed of bar-links 15 15', pivoted together at their extremities, in connection with occasional plate-links 16, which
80 plate-links are rigid to and carry thereon the pintles or arbors 17. These plate-links 16 are arranged in pairs opposite each other in the two chains, and the inner ends of the opposite arbors 17 are mounted revolvably in
85 boxes 18 therefor fixed on the sides of small cars or buckets 19. These buckets 19 are preferably constructed with oblique walls at the front and rear inclining inwardly downwardly and are of such number and so arranged on the carrier that the front end of one bucket at its upper edge is close to the rear end of the preceding bucket at its upper edge when the buckets and the chains are
90 disposed in a horizontal plane, as they are along the lower line of movement from the shaft 10 to the shaft 11. A guard-plate 20, secured to the rear upper edge of each bucket, projects rearwardly therefrom and extends
100 over the front wall of the succeeding bucket when in a horizontal plane, following each

other, as seen at the lower side of Fig. 1, thus forming a construction that is adapted to prevent coal or other material with which the buckets are being loaded from escaping downwardly between the adjacent ends of the buckets, the material falling thereon being caught and carried into the buckets by the curved surface of the guard-plates. Brackets 21, secured to the sides of the buckets and pierced medially by the arbors 17, provide an additional support and box-like bearing for those arbors. The outer ends of the arbors 17 are provided with wheels 22, that travel on tracks or ways 23, 24, 25, and 25'. The tracks 23 are in a substantially horizontal position below the lower line or route of the carrier, the rails being lowered or carried downwardly at the initial ends thereof at 23' in the vicinity of and below the sprocket-wheels on the shaft 10, the object of this depression being that the buckets 19, coming down empty from above, are carried a little below the plane on which thereafter they are hauled forward to receive their load, and being thus below that plane the bucket ahead is brought onto the load-plane first, and the bucket succeeding it being at a lower plane and slightly uptilted, (as shown in Fig. 1,) below the sprocket-wheel on shaft 10 the forward end of the succeeding bucket will come up under the guard 20 in proper manner, as indicated in Fig. 2. The tracks 24 are located along the upper route of the carrier and support the wheels 22 thereon during that portion of the travel of the carrier. The tracks 25 and 25' are disposed substantially vertically at the respective ends of the route of the carrier and at such distance apart in pairs as to allow of the travel of the wheels 22 between each pair of tracks 25 and 25'. The tracks 23 24 and 25 25' are throughout their extent in duplicate, one track or sets of tracks being at each side of the buckets and carrier, as clearly shown in the fragments of the construction contained in Figs. 3 and 4.

The boxes 18, in which the arbors 17 are journaled and by which means the buckets 19 are mounted on the endless chains 14, are at one side of the vertical planes through the center of gravity of the buckets, preferably at the front thereof, and means are provided by which the buckets are held upright or with their open tops upwardly throughout their travel with the carrier, except only at the point where they are uptilted for discharging their loads. For this purpose an axle 26, mounted in the rear end of each bucket, is provided with wheels 27, that through portions of the route of the carrier are adapted to travel on tracks provided therefor. Of these, tracks 28 extend in a horizontal direction from a little in front of the shaft 10, in a proper position for the wheels 27 to travel thereon, supporting the buckets in upright position, to a locality nearly below the shaft 11, where the rear ends of the tracks 28 are curved upwardly a little away and then terminate ab-

ruptly, Figs. 1, 2, and 3. At a point a little farther along in the proper line of travel of these wheels 27 the support therefor is continued in and by the tracks 28', which tracks are continued upwardly to a plane above the shaft 11 and to a locality at which the carrier has taken a directly upwardly moving line. The object of the break or space between the ends of the tracks 28 and the initial ends of the tracks 28' is to allow of the passage of the arbors 17 across the line of the tracks, Figs. 2 and 3. This is required as the tracks 28' are turned upwardly inside of the route of the travel of the arbors 17 on the carrier. Near to and about the shaft 12 other tracks 29 are provided, adapted to receive thereon the travel of the wheels 27 and support their ends of the buckets in the movement of the buckets while turning about the sprocket-wheels on shaft 12, and these tracks 29 are continued in a substantially horizontal direction along the upper line of the travel of the carrier corresponding with the line of the tracks 24. About the shaft 13 and correspondingly about the shaft 10 there are other tracks 30 31, so curved and disposed as to receive thereon the travel of the wheels 27 as the buckets pass around the shafts, respectively, and to thereby support or assist in supporting their ends of the buckets.

Besides the wheels 27 and the tracks on which they run for supporting through a portion of the route that end of the buckets that has been hereinbefore denominated the "rear" end, each bucket is also provided with two pawls 32 32, one at each side, which are pivoted on the axles 26 and which take into the teeth of ratchet-wheels 33, splined and keyed on the arbors 17. These pawls, thus engaging with the ratchet-wheels 33, which are, in effect, a part of the chains 14, hold the buckets 19 upright in the position shown in Fig. 1 during the vertical travel of the carrier at the ends of its route. When the carrier turns in its route about the shafts 10, 11, 12, and 13, the pawls 32 are carried forward over the ratchet-wheels 33 and engage one or more teeth in advance of those last engaged, thus providing for the change of relation between the parts caused by the change in the direction of the motion of the carrier as it turns around the shafts.

It will be understood that the buckets are loaded, as they pass along under the floor A, with coal or the load material dumped through the aperture or coal-hole C in the floor A. This loading may be supplied from cars running over the coal-hole and dumped into it or from a chute running from a vessel or other supply of material. To provide for the dumping of the loads from the buckets 19 at some point on their line of travel along the upper portion of their route, I provide an ancillary frame 34, mounted on wheels arranged to travel on the tracks 24, which ancillary frame is adapted to be moved on the tracks 24 to any point desired and to be secured temporarily releasably thereto by pins 35 passing

through parts of the frame and entering the tracks 24. This ancillary frame 34 is provided with two sets of wheels 36 and 37, the wheels 36 being mounted on an axle jour-
 5 naled in the frame and so disposed that the wheels 36 receive thereon, underneath and at the hither side thereof, the bearing of the chains 14, which thereafter run upwardly and over the wheels 37, the shaft of which is
 10 mounted in a higher plane in the ancillary frame. By thus diverting the course of the carrier acutely upwardly over the wheels 37 the buckets are uptilted, and thereby dumped of their loads. From the wheels 37 the buck-
 15 ets and the carrier pass downwardly again to their course on the tracks 24, the ancillary tracks 38, supported on the frame 34, being advisably provided for the travel of the wheels 21 thereon downwardly from the wheels 37 to
 20 the tracks 24.

Adjacent to the shaft 12 the tracks 24 in-
 cline downwardly a little, so that each bucket as it passes over the shaft 12 and comes down to the plane of the horizontal portion of the
 25 tracks 24 will be a little lower than the following bucket, whereby the plate 20 on each bucket is brought to a proper overlapping position over the wall of the adjacent bucket, substantially as the similar adjustment is ac-
 30 complished as the buckets pass around and beyond the shaft 10.

What I claim as my invention is—

1. An endless carrier, comprising endless flexible chains arranged in opposite parallel
 35 lines, means for supporting and driving the chains, plate-links opposite each other in and forming parts of the chains, arbors projecting rigidly from the plate-links, wheels on the arbors, tracks for the travel of the arbor-wheels,
 40 buckets mounted tiltably on said arbors, and means attached to the bucket and the fixed arbor on which the bucket is pivoted whereby the bucket may be held to a predetermined position with reference to the direction of
 45 movement of the carrier.

2. The combination with an endless-chain carrier having links provided with arbors projecting therefrom, of one or more buckets mounted tiltably and eccentrically on the
 50 arbors on the carrier, a pawl pivoted on a bucket, and a ratchet-wheel fixed on the arbor on which the bucket is pivoted adapted to be engaged by the pawl.

3. The combination with an endless-chain carrier having links provided with arbors projecting therefrom, of one or more buckets mounted tiltably and eccentrically on the
 55 arbors on the carrier, wheels on the heavier end of the bucket and tracks on which said
 60 wheels are adapted to travel.

4. The combination of an endless flexible carrier, wheels on which the carrier is carried and about which it turns, wheels 22 on the carrier, tracks in substantially horizontal di-
 65 rections for the travel thereon of said wheels, buckets mounted tiltably on the carrier, secondary wheels on the buckets, and curved

tracks at the turns of the course of the carrier on which said secondary wheels travel.

5. The combination of an endless flexible carrier, wheels on which the carrier is carried and about which it turns, wheels 22 on the carrier, and vertically-disposed tracks 25, 25' in sets at the ends of the route of the carrier between the tracks of each of which sets of
 75 tracks said wheels are adapted to travel.

6. The combination with an endless flexible carrier mounted to travel in substantially horizontal and vertical directions, buckets mounted tiltably on arbors projecting from the car-
 80 rier, and wheels on said arbors adapted to support and guide the carrier on tracks, of substantially vertically disposed tracks at the end of the route of the carrier on and along which said wheels are adapted to travel, and
 85 means holding said buckets in upright position substantially at right angles to the route of the carrier along said tracks upwardly.

7. The combination with an endless flexible carrier mounted to travel in a vertical plane
 90 about an inclosed space, of buckets pivoted tiltably on the carrier at one side of the vertical planes through their centers of gravity, and means for supporting the buckets upright on the carrier along the horizontal and up-
 95 ward lines of its travel.

8. The combination with an endless flexible carrier, of a series of buckets mounted tilt-
 ably on the carrier and successively in close proximity to each other, each bucket being
 100 provided at one end with a guard-plate 20 so disposed as to extend to and over the nearest end wall of the adjacent bucket while the buckets are traveling along the routes of the carrier that are in horizontal or substantially
 105 horizontal direction.

9. The combination with an endless flexible carrier, means supporting the carrier and caus-
 ing it to travel in a substantially rectangular route, buckets mounted tiltably and eccentric-
 110 ally on the carrier, wheels on the heavier ends of the buckets, and curved tracks at a distance from the route of the carrier at its corners adapted to receive thereon the travel of said
 115 wheels on the heavier ends of the buckets and support them in substantially upright posi-
 tions.

10. The combination with an endless flexible carrier, means for supporting and moving the carrier, buckets mounted tiltably on the
 120 carrier, and means for holding the buckets upright and substantially at right angles to the carrier along the upward and downward portions of the route of the carrier, of means in the horizontal travel of the carrier for de-
 125 flecting the route of the carrier upwardly and thereby uptilting and dumping the buckets.

11. The combination with an endless flexible carrier, means for supporting and moving the carrier, buckets mounted tiltably on the
 130 carrier, and means for holding the buckets upright and substantially at right angles to the carrier normally, a track on which through a portion of its route the carrier travels in a

substantially horizontal direction, of an ancillary frame adjustable on said track, and a set of wheels in said frame at a distance above the plane of said track over which set of wheels
5 the carrier runs, whereby the buckets are carried upwardly and are uptilted so as to discharge their loads.

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

EDWARD C. BERGHOEFER.

Witnesses:

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