

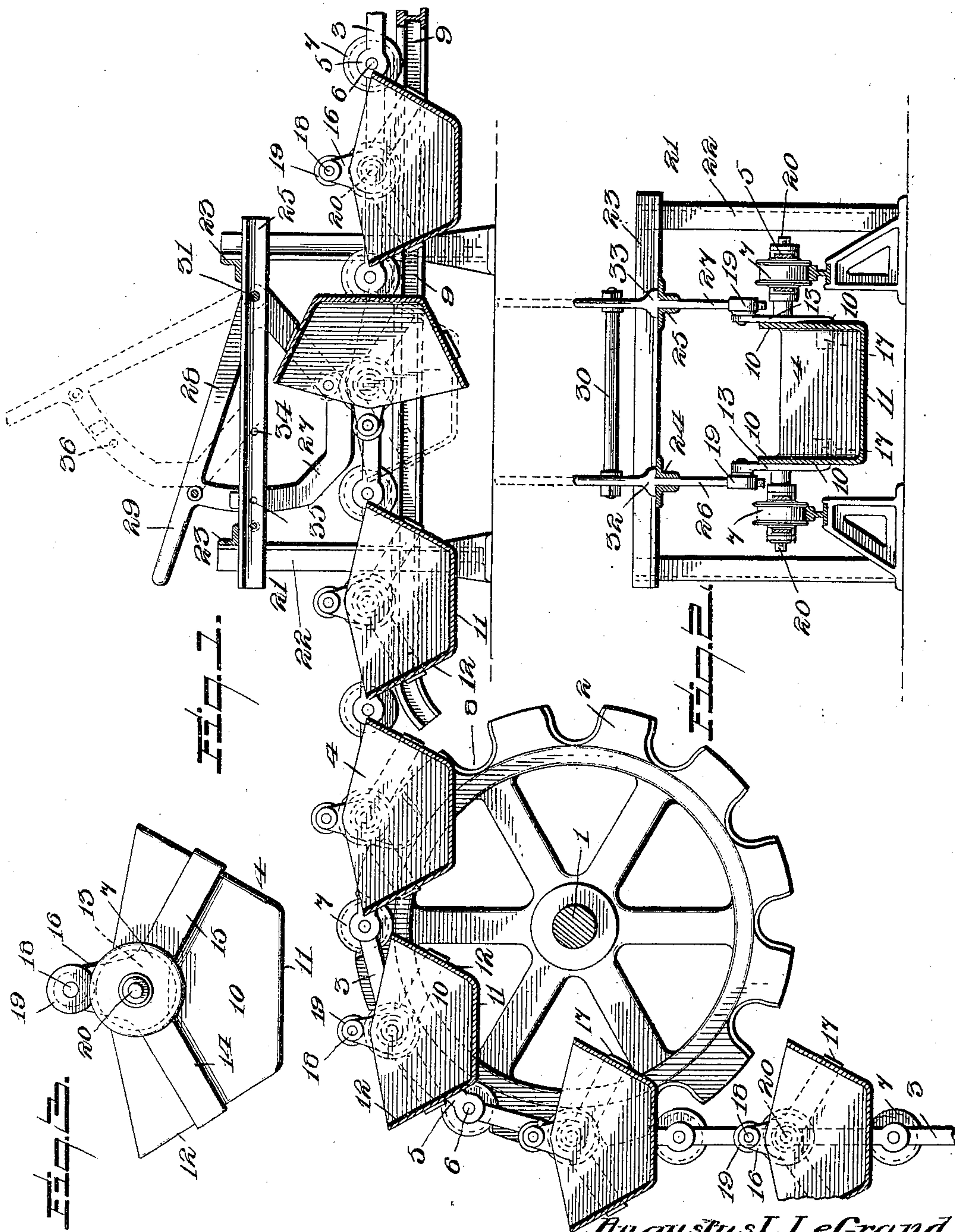
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A. L. LE GRAND.
DUMPING MECHANISM FOR CONVEYERS.

(Application filed May 10, 1900.)

(No Model.)



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DUMPING MECHANISM FOR CONVEYERS.

SPECIFICATION forming part of Letters Patent No. 658,656, dated September 25, 1900.

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To all whom it may concern:

Be it known that I, AUGUSTUS L. LE GRAND, a citizen of the United States, residing at West Pittston, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Dumping Mechanism for Conveyers, of which the following is a specification.

The invention relates to dumping mechanism for bucket conveyers, and is designed more particularly with reference to conveyers of that type which are distinguished by the assembling in endless series of gravity conveyor-buckets employed for the conveyance of coal, dirt, and various other materials. Various forms of dumping mechanisms for gravity-bucket conveyers have been devised, notably that form which comprehends one or more fixed trips arranged in the path of a projection carried by the bucket below its pivotal support; also, that form which comprehends the employment of a trip-cam located below the conveyer and in the path of the lower corners of the buckets. There are many valid objections to these well-known types of dumping devices, not the least of which is the injury to the mounting incident to the violent impact of the loaded bucket as it strikes the dumping-trip. A further objection is the discharge of the load in the direction of movement of the conveyer, necessitating an equally-violent reversal of the bucket to prevent scattering of the load, which would result from the fact that the bucket is moved by the conveyer in the direction of the discharging load.

Further imperfections in the art might be pointed out, but the foregoing is deemed to be sufficient to indicate those conditions which have led to the origination of the present mechanism, the primary object of the present invention being to provide a simple yet durable dumping element, cam, or trip arranged to be thrown into or out of operative relation to the conveyer by the operator and related to cooperating elements, cranks, or levers in a manner to cause the conveyor-bucket to be inverted by a movement in the direction of movement of the conveyer to effect the discharge of the load in the direction opposite to the direction of said movement, the effect of this manipulation of the bucket being to cause its withdrawal from the

load, first, by reason of the inversion of the bucket, and, second, by the bodily movement of the bucket with the conveyer. 55

A further object of the invention is to provide a novel bucket supporting and bracing device serving the dual function of a bucket-support and of means cooperating with the dumping-cam to effect the dumping of each bucket as it is presented to the cam at the dumping-station by the movement of the conveyer. 60

Still further but subordinate objects of the invention will hereinafter appear as the necessity for their accomplishment is developed in the succeeding description. 65

In the accompanying drawings, in which I have illustrated the preferred embodiment of my invention, Figure 1 is a sectional view through a portion of an endless gravity-bucket conveyer, illustrating the construction and mounting of the conveyer and the construction and operation of the dumping mechanism. Fig. 2 is a sectional view, in an angular plane, through the dumping-station, showing the trip-bars down and one of the buckets about to be tripped. Fig. 3 is a detail end view of one of the buckets. 70 75

Referring to the numerals of reference employed to designate corresponding parts in the several views, 1 indicates the drive-shaft, and 2 one of the driving-sprockets keyed thereon to support and drive one of the endless chains 3, which constitute an endless flexible support for a series of gravity-buckets 4, journaled intermediate of said chains. The conveyer chains or sections 3 may be of any desired form so far as their use as elements of my invention in its broadest aspect is concerned; but I prefer to employ a pair of chains the links of which are composed of parallel plates 5, overlapping at their ends to receive transverse bars or pintles 6, constituting the fulcrums for rollers 7, engaging peripheral recesses 8 in the sprockets 2 and serving as anti-frictional bearings or supports for the horizontal portions of the conveyer, ways or tracks 9 being preferably provided for the support of such horizontal portions or runs of the conveyer. The conveyor-buckets 4 are mounted upon each alternate pintle or transverse bar of the conveyer, or, more properly, their pivotal points of suspension are in axial aline- 80 85 90 95 100

ment with opposed alternate pintles of the conveyer-chains.

The construction and arrangement of the bucket-supporting devices constitute one of the novel features of the present invention and may therefore be described with some particularity. The buckets 4 are of usual form—that is to say, they are constructed from sheet metal and have comparatively-straight end walls 10, a bottom 11, located at right angles to the end walls, and angularly-related front and rear or side walls 12, which diverge upwardly from the opposite edges of the bottom 11 to form a receptacle or bucket of flaring form. Each end of the bucket is supported, braced, and stiffened by a bracket-plate 13, composed of three diverging arms 14, 15, and 16, the arms 14 and 15 extending from a point adjacent to the upper edge of the bucket at its center in directions at right angles to the walls 12 of the bucket and having their extremities 17 bent at right angles to engage the inclined walls of the bucket, which latter is therefore retained between the ends of the arms 14 and 15 with a wedging action—that is to say, the walls 12 of the bucket being downwardly convergent and resting upon the similarly-inclined ends of the supporting arms or plates of the brackets 13 tend to seat the bucket more securely in proportion to the weight of the bucket and its contents. As an additional security, however, the supporting-brackets may be bolted, riveted, or otherwise secured to the buckets.

The third arm 16 of each of the brackets 13 extends vertically above the bucket from the juncture of the arms 14 and 15, and each arm 16 is provided at its upper end with a stud 18, upon which is journaled a trip-roller 19, designed for a purpose which will presently appear. At that comparatively-heavy portion of each of the brackets 13 formed by the juncture of the arms 14, 15, and 16 extends an integral or otherwise fixed pintle 20, which serves as one of the link-connecting bars 6 and supports one of the conveyer-rollers 7 of the contiguous chain or section of the endless conveyer. Thus it will appear that these bucket-supporting brackets or plates comprehend means for supporting the bucket, for stiffening its ends, for bracing its inclined walls, for connecting the bucket to aligned pintles of the conveyer-chains, and for supporting a trip-roller at a point above the bucket and eccentric to its pivotal mounting. Obviously, however, these supporting-brackets would constitute simple and effective means for supporting and bracing the bucket in connections which would not require the use of the trip-arms 16, inasmuch as the divergent arms 14 and 15 would still perform their functions as supporting members and would constitute hangers supported by the conveyer-pintles for the purpose of pivotally retaining the buckets between the chains or sections of the endless conveyer.

As thus far described the apparatus com-

prehends an endless conveyer composed of chains or side sections suitably supported and driven and carrying an endless series of intermediate pivotally-suspended buckets, each of which is provided at each end with upwardly-extending trip-arms carrying trip-rollers. The apparatus thus far described is designed to convey coal, coke, slate, dirt, and various other materials which are intended to be dumped from each of the buckets as they arrive at the point of delivery, which point is known in the art as a "dumping-station." One of these dumping-stations is illustrated in Fig. 1 of the drawings and comprehends a supporting-frame 21, of any suitable character, preferably composed of standards or uprights 22, located beyond the opposite sides of the conveyer and supporting cross-beams 23, to the under sides of which are bolted or otherwise fixed two pairs of angle-iron guide rails or ways, (indicated by the numerals 24 and 25.) The ways formed between these rails are located directly above the paths of movement of the trip-rollers 19 of each bucket and serve to guide the cam-bars 26 and 27 of a pivoted trip 28, made up of twin frames, each of which is composed of an operating-lever 29, from which the cam-bars depend, said frames being connected by transverse bolts 30 and by a shaft 31, journaled in the guide-rails 24 and 25 and pivotally supporting the trip. 32 and 33 indicate lateral stop-lugs projecting from each of the cam-bars 26 and 27 and designed to rest upon the guide-rails 24 and 25 to limit the downward movement of the trip for the purpose of properly presenting the cam or trip bars in the paths of the trip-rollers. Any suitable means for fixing the dumping-trip in its operative and inoperative positions may be provided—as, for instance, a series of transverse apertures 34 in the guide-rails for the reception of a pin 35, which in the depressed or effective position of the trip is designed to pass through an opening 36 in one of the trip-bars and to be located under one of said bars to retain the trip in its elevated or inoperative position, as shown by dotted lines in Fig. 1.

The operation of my device is as follows: Supposing the structure to be organized and arranged as illustrated in Fig. 1 of the drawings and the conveyer to be moving, the trip-roller 19 of the bucket just in the rear of the dumping-station will be presented to the cam or trip bars 26 and 27, and the continued movement of the conveyer will cause the trip-arms 16 to be swung rearwardly, which will cause the bucket to be swung in the direction of movement of the conveyer. As the bucket proceeds under the trip it will be held for a short time in a position at right angles to its normal position and in advance of its pivotal support. The effect of this relation will be to dispose the open side or top of the bucket in the direction opposite to the direction of movement of the conveyer, and the contents of the bucket will consequently be discharged

in a direction opposite to such movement, and the progress of the conveyer will serve to withdraw the bucket from the load being discharged, as contradistinguished from the movement of the bucket in the general direction of the discharge, as is ordinary during the dumping operation of devices of this character. Ordinarily a number of these dumping-stations are employed in connection with each conveyer, and when it is not desired to effect the dumping of the buckets at any particular station the operator simply removes the locking-pin 35 and swings the trip to its elevated position by means of the operating-levers 29, where it is retained by the insertion of the pin 35 in another of the series of apertures 34, as will be obvious.

It may be well at this point to call attention to the fact that the trip-arm is not carried by the bucket in a manner to cause a violent jar upon the pintle, as in the ordinary structures, but is rigid with the pintle, so that the only effect of the more or less violent presentation of the trip-arms to the trips is to rotate the pintle within the bearings provided for it in the plates and rollers of the chains, and, further, that the discharge of the load in a direction opposite to the direction of movement of the conveyer facilitates the dumping and decreases the strain on the conveyer by the bodily withdrawal of the bucket from the load as it is being discharged therefrom.

From the foregoing it will be observed that I have produced a simple, durable, and highly-efficient dumping apparatus for gravity-bucket conveyers; but while the present embodiment of my invention appears at this time to be preferable I do not desire to limit myself to the precise construction illustrated, as it is obvious that many structural modifications and variations might be effected without departing from the invention as comprehended within the scope of the appended claims.

What I claim is—

1. The combination with a conveyer-bucket, of a supporting-plate bracing the end of the bucket and engaging the side walls thereof, and a pintle extending from the supporting-plate.

2. In a conveyer, the combination with a pair of chains composed of pivoted links, of pintles comprising connectors for the links, bucket-supporting plates suspended from and integral with the adjacent ends of the pintles, and buckets carried by the bucket-supporting plates and located wholly between the inner ends of the pintles.

3. The combination with a conveyer-bucket, of a supporting-plate having angularly-disposed arms bracing the end of the bucket and engaging the inclined side walls thereof, and a pintle extending from the supporting-plate, whereby the supporting-plate constitutes means for connecting the bucket to its pintle

and serves to brace and stiffen the bucket structure.

4. The combination with a bucket having straight end walls and inclined side walls, of supporting-plates located against the ends of the bucket, each of said plates comprising a pair of arms having their extremities bent into engagement with the inclined side walls of the bucket and a trip-arm, a pintle rigid with each supporting-plate and extending from the juncture of the arms of said plate, whereby said plates serve to stiffen the bucket structure and to constitute trip devices and connectors between the bucket and pintles.

5. The combination with an endless conveyer comprising supporting-rollers, and a series of pivotally-mounted gravity-buckets, of trip-arms extending upwardly from the ends of each bucket, a dumping-station comprising a supporting-frame under which the conveyer passes, and a pivoted trip comprising a pair of trip-levers provided with depending, cam-shaped trip-bars, and means for retaining said trip in its elevated and depressed positions to permit the passage of said buckets through the loading-station without interference, or to obstruct the path of movement of the trip-arms for the purpose of dumping the contents of the buckets in a direction opposite to the direction of movement of the conveyer.

6. The combination with a conveyer comprising a pair of chains, gravity-buckets located between the chains and provided with terminal pintles constituting link-connecting devices for the chains, rollers mounted upon each of said pintles, trip-arms extending upwardly from the pintles and having terminal antifriction-rollers, a dumping-station comprising a supporting-frame and guide-bars, a pivoted trip comprising a pair of depending trip-bars guided by the guide-bars of the station and arranged to obstruct the path of movement of the trip-rollers, and locking means for retaining the trip in its operative or inoperative positions.

7. The combination with a conveyer comprising a series of buckets, of trip-arms extending upwardly from the ends of each bucket, a dumping-station comprising a supporting-frame under which the conveyer passes, a movable trip provided with depending trip-bars, and means for retaining said trip in its elevated and depressed positions to permit the passage of said buckets through the loading-station without interference, or to obstruct the path of movement of the trip-arms for the purpose of dumping the contents of the buckets.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

AUGUSTUS L. LE GRAND.

Witnesses:

SAMUEL C. WEBB,
HENRY GAUPP.