

E. BIVERT.  
PIVOTED BUCKET CONVEYER.

APPLICATION FILED JULY 29, 1902.

NO MODEL.

6 SHEETS—SHEET 1.

Fig. 1.

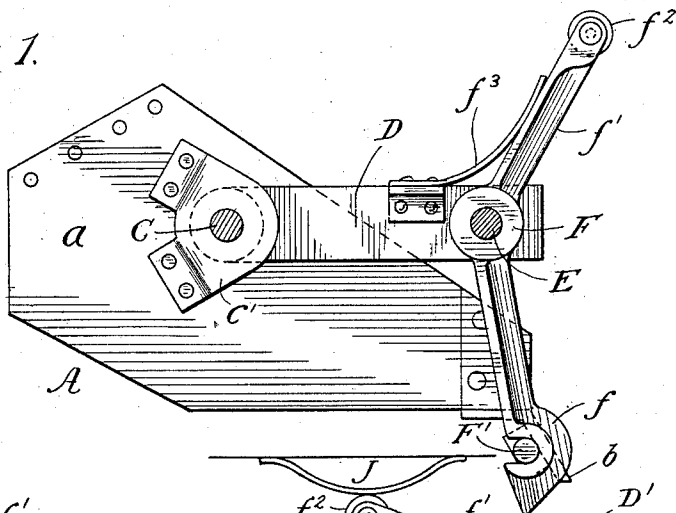


Fig. 2.

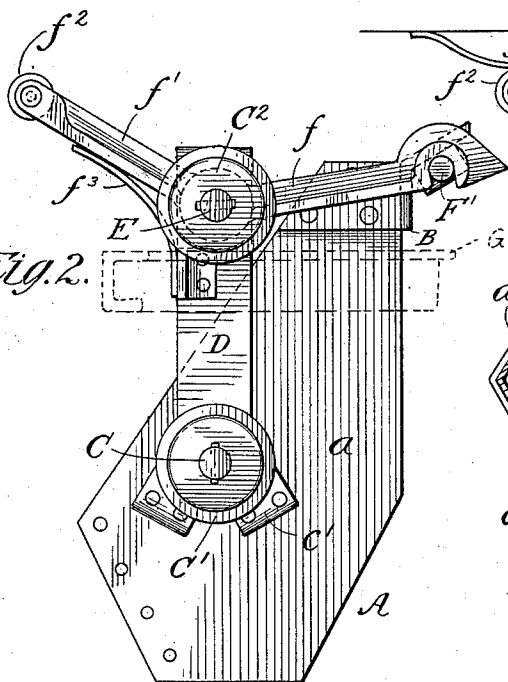
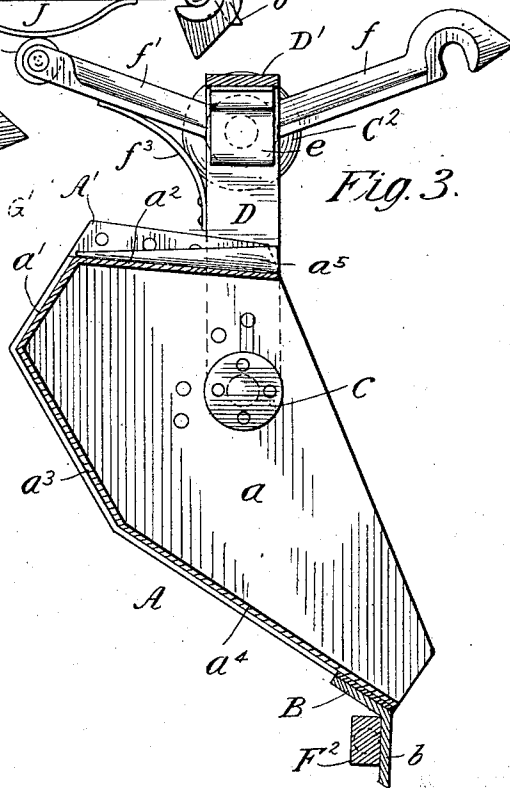


Fig. 3.



Witnesses—  
*Walter H. Schaper*  
*Alfred C. O'Connell*

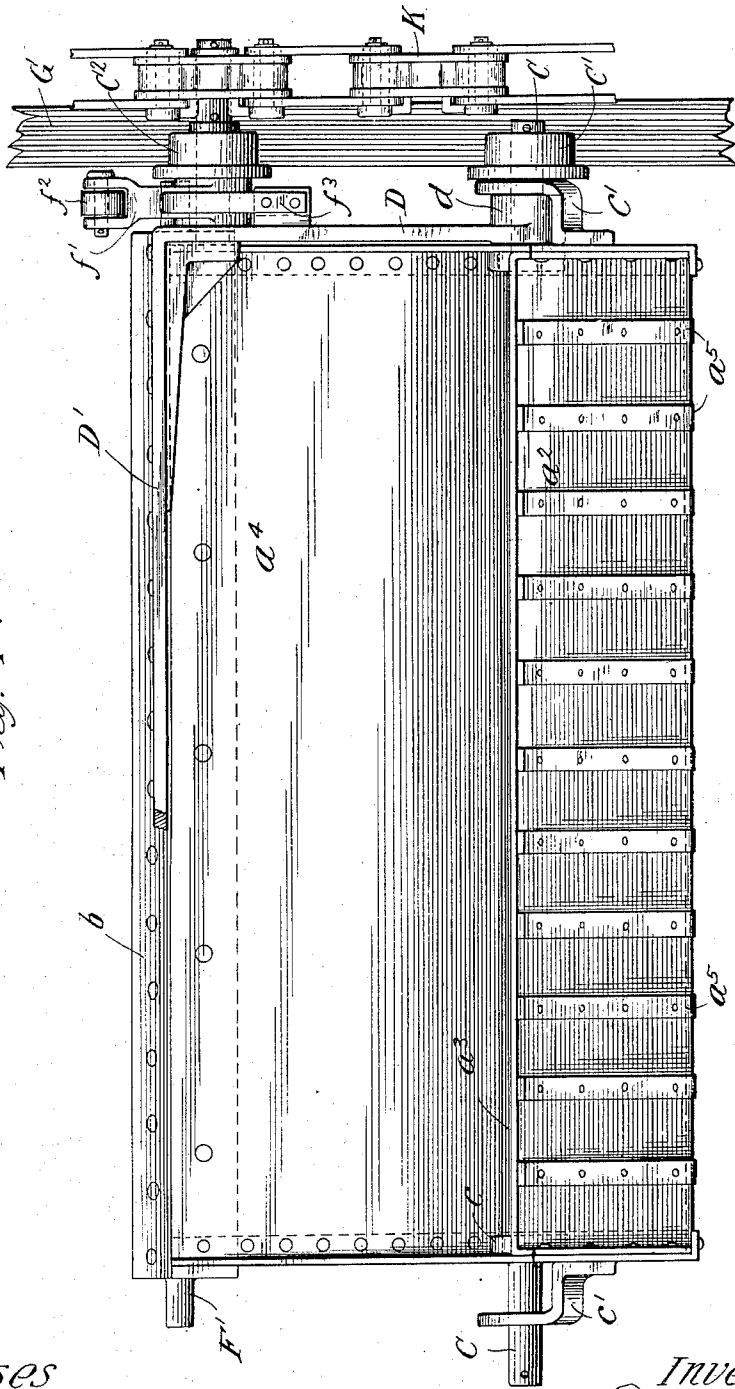
Inventor:  
*Eugene Bivert*  
 By *Charles M. Hill*

E. BIVERT.  
PIVOTED BUCKET CONVEYER.  
APPLICATION FILED JULY 29, 1902.

NO MODEL.

6 SHEETS—SHEET 2.

Fig. A.



Witnesses  
*Charles H. Schaefer*  
*Alfred B. Ouell*

Inventor  
*Eugene Bivert*  
 By *Charles W. Hill*  
 Atty.

E. BIVERT.  
PIVOTED BUCKET CONVEYER.  
APPLICATION FILED JULY 29, 1902.

NO MODEL.

6 SHEETS—SHEET 3.

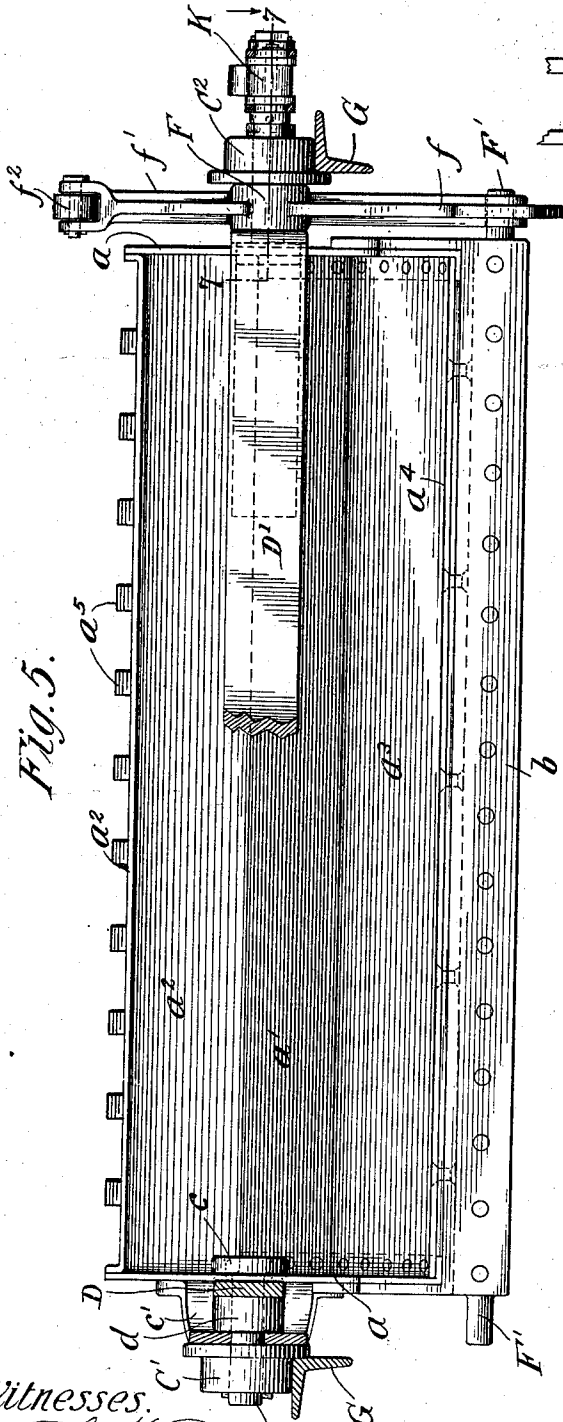


Fig. 5.

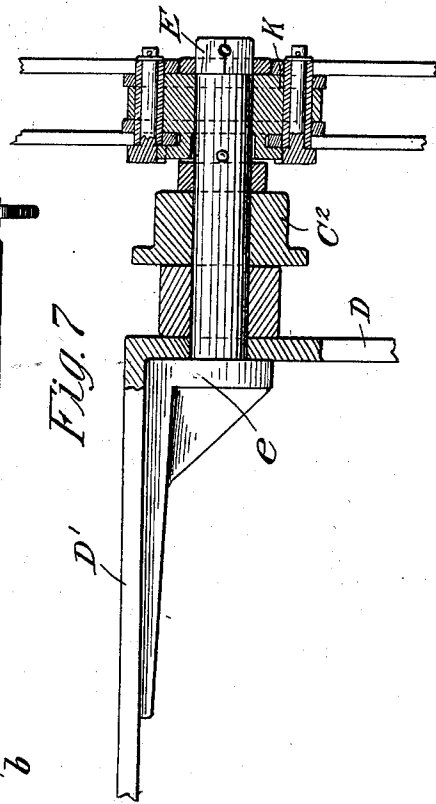


Fig. 7

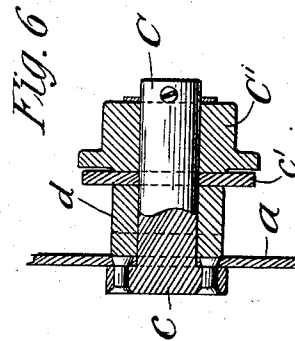


Fig. 6

Witnesses.  
*W. H. Schaefer*  
*Alfred B. ...*

Inventor  
*Eugene Bivert*  
 By *Charles W. Hill*  
 Atty.

No. 748,576.

PATENTED JAN. 5, 1904.

E. BIVERT.  
PIVOTED BUCKET CONVEYER.

APPLICATION FILED JULY 29, 1902.

NO MODEL.

6 SHEETS—SHEET 4.

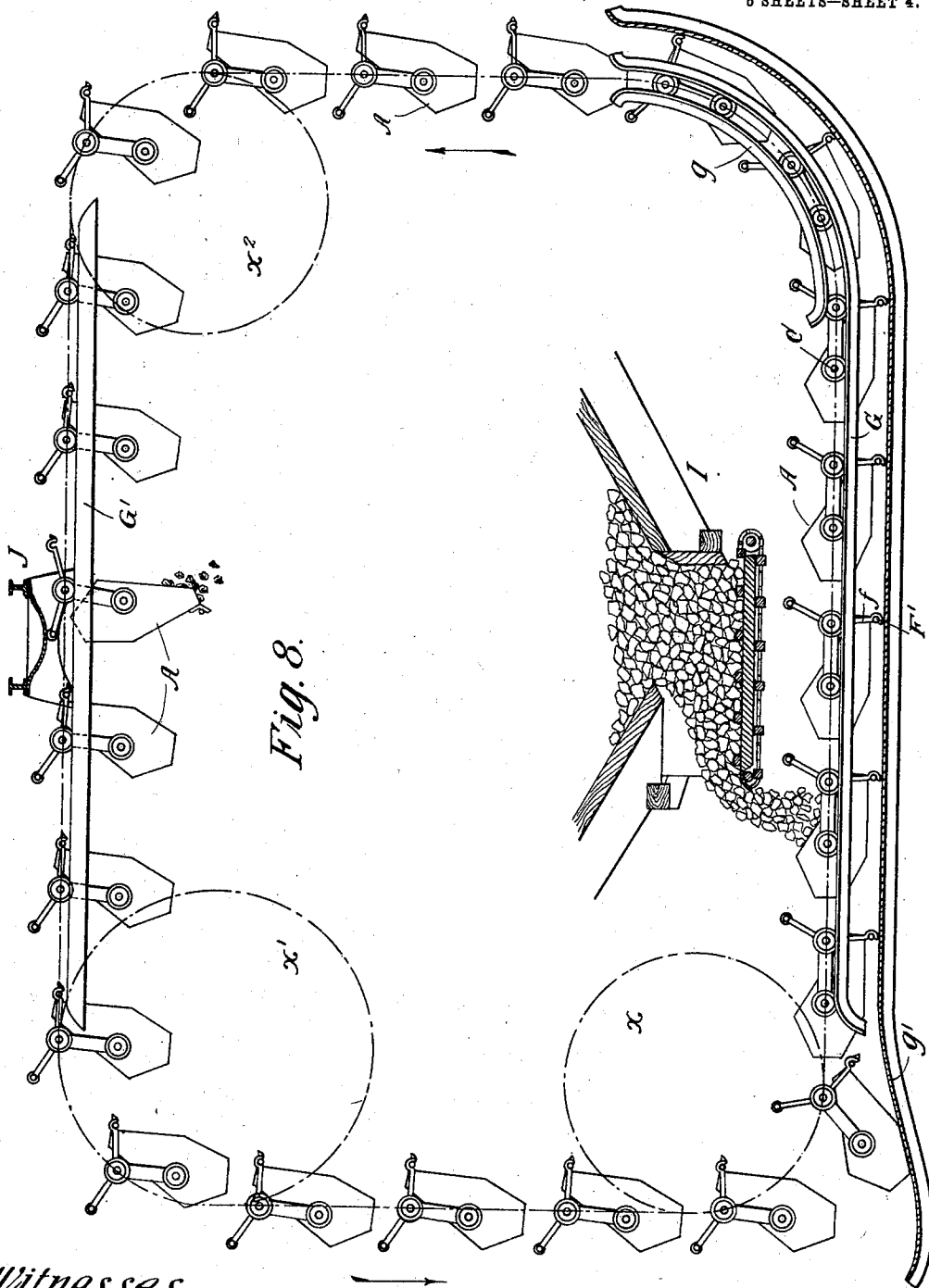


Fig. 8.

Witnesses  
*Charles H. Chapman*  
*Alfred C. Adell*

Inventor  
*Eugene Bivert*  
By *Charles W. Hill*  
*Att'y.*

E. BIVERT.  
PIVOTED BUCKET CONVEYER.  
APPLICATION FILED JULY 29, 1902.

NO MODEL.

6 SHEETS—SHEET 5.

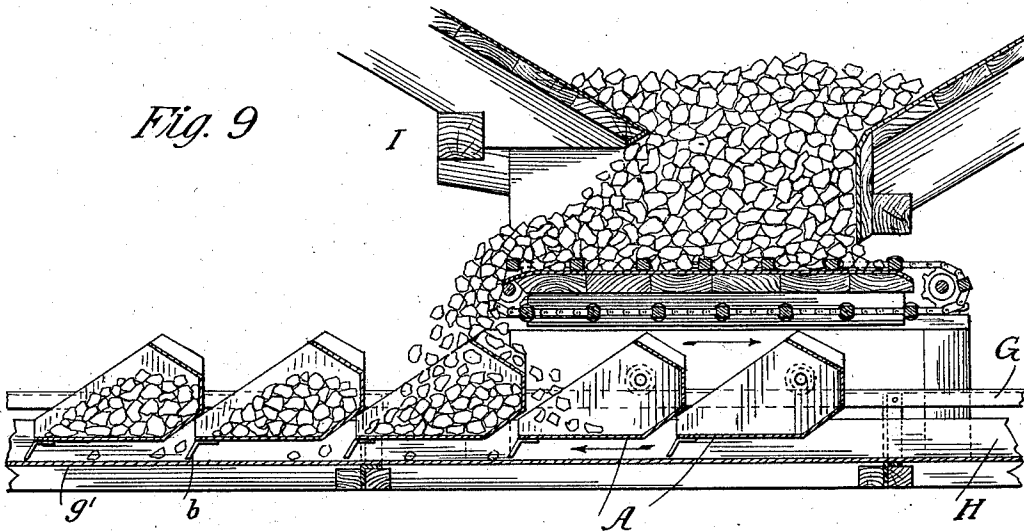


Fig. 9

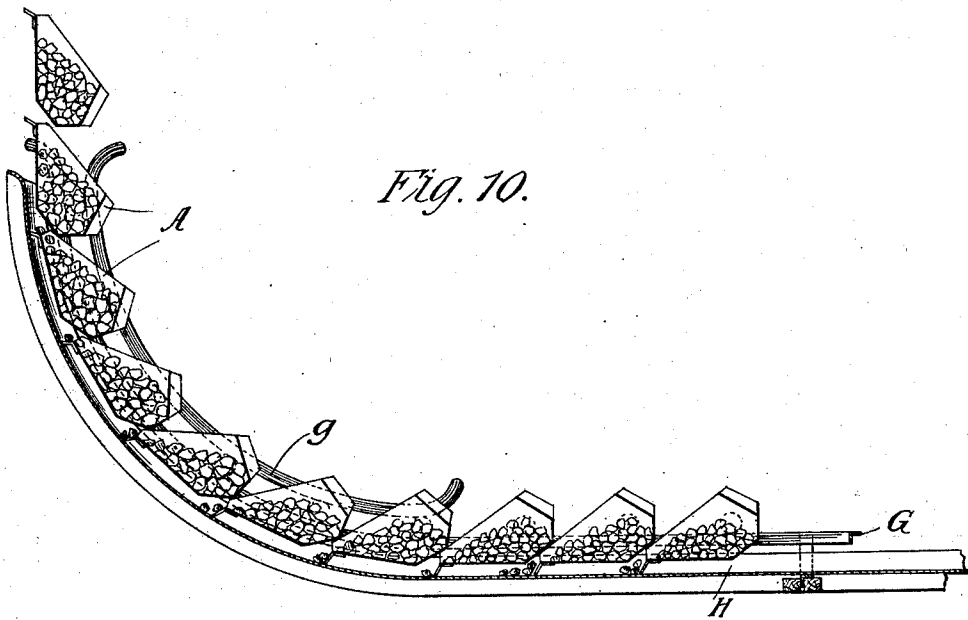


Fig. 10.

Witnesses  
*W. H. Schaefer*  
*Alfred B. Odell*

Inventor  
*Eugene Bivert.*  
 By *Charles M. Hill.*  
 ATTORNEY

E. BIVERT.  
PIVOTED BUCKET CONVEYER.  
APPLICATION FILED JULY 29, 1902.

NO MODEL.

6 SHEETS—SHEET 6.

Fig. 11.

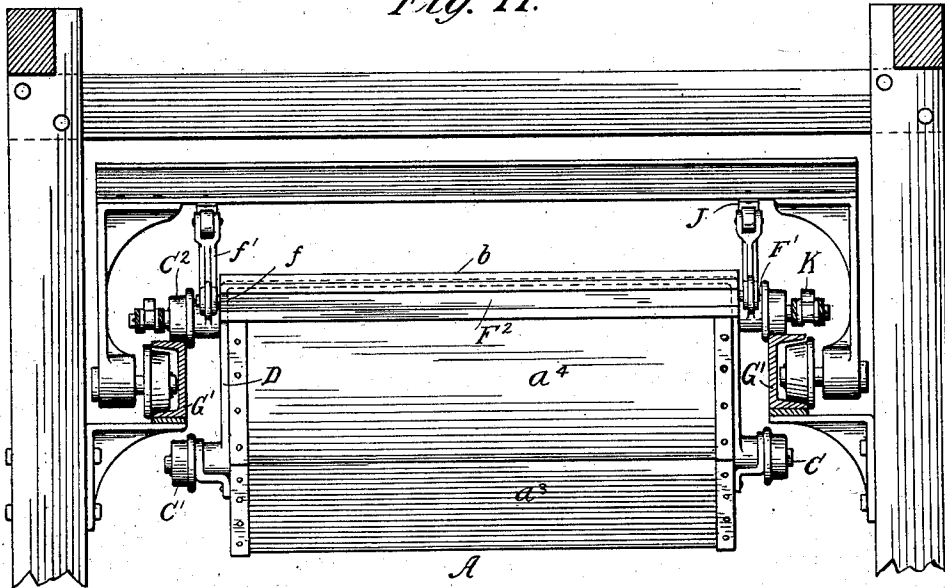
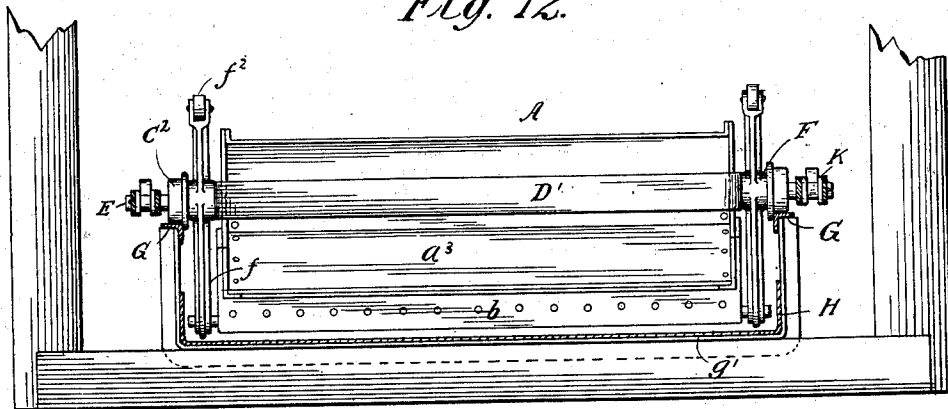


Fig. 12.



Witnesses.  
*Charles H. Schaefer*  
*Alfred B. Ouell*

Inventor:  
*Eugene Bivert.*  
 By *Charles W. Hill*  
 Att'y.

# UNITED STATES PATENT OFFICE.

EUGENE BIVERT, OF CHICAGO, ILLINOIS, ASSIGNOR TO FAIRBANKS, MORSE AND COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## PIVOTED-BUCKET CONVEYER.

SPECIFICATION forming part of Letters Patent No. 748,576, dated January 5, 1904.

Application filed July 29, 1902. Serial No. 117,471. (No model.)

*To all whom it may concern:*

Be it known that I, EUGENE BIVERT, a citizen of the Republic of France, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pivoted-Bucket Conveyers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in pivoted-bucket conveyers of that class adapted to fill and to dump automatically.

The object of the invention is to provide a construction whereby the buckets when filling form a practically continuous horizontal conveyer into which material is continuously delivered in any desired manner and whereby material may be conveyed and elevated to a predetermined point of delivery, at which point the buckets automatically dump their contents and right themselves preparatory to again refilling.

The invention embraces many novel features; and it consists in the matters hereinafter described, and more fully pointed out and defined in the appended claims.

In the drawings, Figure 1 is a side elevation of a bucket in filling position. Fig. 2 is a similar view showing the same in its carrying position preparatory to dumping. Fig. 3 is a longitudinal section illustrating the position the bucket assumes in dumping. Fig. 4 is a top plan view of a bucket embodying my invention. Fig. 5 is a front elevation showing the bail broken away. Fig. 6 is a detail of the pivot for the bail. Fig. 7 is a section taken on line 7 7 of Fig. 5. Fig. 8 is a somewhat diagrammatic side elevation illustrating the operation of the device as a whole. Fig. 9 is a fragmentary view, in vertical longitudinal section, showing the buckets movable from instead of toward the loader. Fig. 10 is a vertical longitudinal section of the buckets, illustrating the self-filling operation of the same. Fig. 11 is a transverse fragmentary section of the upper run of the conveyer. Fig. 12 is a similar section of the lower run thereof.

As shown in said drawings, the material to be handled is coal, and a substantially horizontal trough H is provided, along which the buckets A are drawn in filling position, while a loader I acts to deliver the material at a uniform rate into the buckets. The conveyer-buckets, as shown, are constructed of plates of metal flanged at their margins, as shown, and rigidly secured together along their meeting edges by riveting or like means and comprise the plane side walls  $a$ , parallel with each other and between which are secured, integrally or otherwise, the bottom  $a'$  and the divergent walls  $a^2 a^3$ . The wall  $a^3$  is extended to correspond in length with the length of the side wall  $a$ , as shown in Figs. 3 and 9, the portion  $a^4$  thereof forming a substantially horizontal bottom for the bucket when in its filling position. On the upper end of the bucket and rigidly secured on the under side of the wall  $a^4$  is a strap of iron B, provided with a flange  $b$ , directed obliquely forward and outwardly from the bucket, as shown in Fig. 3, and adapted to scrape along the bottom of the trough, which is provided with an upturned end and acts to scrape any material that may have fallen into the trough up into said end, where it falls back into the buckets. Flanges  $A'$ , integral with side walls  $a$ , extend upwardly above the wall  $a^2$  and act to direct the material falling on side wall rearwardly into the next adjacent bucket. Said bucket is pivoted at a point slightly above its center of gravity when empty by means of stud-shafts or trunnions C, which, as shown, extend through the walls  $a$  and are each provided on their inner ends with a flange  $c$ , which is riveted to said wall. Said trunnions extend through hubs  $d$  at the lower ends D of a bail  $D'$ , and a bracket  $c'$  is riveted on the wall  $a$  of the bucket and apertured to engage the end of the trunnion outside of the hub  $d$ , thereby acting to hold the trunnion in alignment independent of the weight of material. Journaled on the outer ends of said trunnions are the track-wheels  $C'$ , on which the bucket is supported when in its filling position, as shown in Figs. 2 and 8.

The bail ends are apertured near their upper ends, as shown in Fig. 7, and stud-shafts E, longer than the trunnions C, extend there-through. Said stud-shafts at their inner ends

are integrally connected with a bracket *e*, which fits closely in the bend of the bail and is riveted both to the bail end D and the horizontal portion D', as shown in Figs. 4 and 7.

5 Journalled on each of said stud-shafts is a latch comprising a hub F, having radial arms *f f'*, of which the arms *f* are provided on their outer ends on the under sides with a notch adapted to engage laterally-projecting ends F' of a bar F<sup>2</sup>, secured on the under side of the flange or lip *b*. The arm *f'* is provided at its outer extremity with a roller *f*<sup>2</sup>, adapted to engage a trip mechanism which acts to release the bucket. A spring *f*<sup>3</sup> is engaged on the bail and acts to hold the arm *f'* elevated and the arm *f* in position to engage the bucket.

15 Track-wheels C<sup>2</sup> are journalled upon each of the stud-shafts in alinement with the track-wheels C' on the trunnions C and, together with the track-wheels C', act to support said bucket during the filling operation, said bail, with the track-wheels, forming a truck for that purpose. The ends of said stud-shaft beyond the track-wheels C<sup>2</sup> are journalled transversely in carrier-chains K of any desired type, as shown in Figs. 4, 5, and 7, which provide means whereby said buckets are operated. Obviously any of the several different forms of conveyer-chains may be used for the purpose.

30 I have shown, however, a "conveyer or traction chain," the subject-matter of a different invention for which application for United States Letters Patent was executed by me on the 27th day of June, 1902. Said chains, with the buckets pivoted between them, are trained over sprocket-wheels, (shown in dotted lines in Fig. 8 and indicated, respectively, by X X' X<sup>2</sup>.) of which, as shown, the wheel X' is located above the sprocket-wheel X.

40 The wheel X<sup>2</sup> is located at approximately the same level as the wheel X' and above the point where the buckets start upwardly after filling.

Tracks are provided on which the track-wheels C' and C<sup>2</sup> engage to support the buckets in a horizontal position when filling and to support said buckets in a vertical position between the sprocket-wheels X' and X<sup>2</sup> when passing to a dumping position. The lower of said tracks (indicated by G) comprises angle-bars secured on each side of the trough H in position to be engaged by said track-wheels and to form a rigid support therefor. Said angle-bars extend from beneath the sprocket-wheel X to a point beneath the sprocket-wheel X<sup>2</sup> and are there upturned, as shown in Fig. 8, to direct said buckets upwardly in a vertical position. Angle-bars *g*, curved concentrically with the curvature of the ends of the track-rails G, are rigidly secured one above each of said extremities to afford engagement with said track-wheels from above and to direct the bucket to a vertical position beneath the periphery of the sprocket-wheel X<sup>2</sup>. The lip or flange *b* scrapes along the bottom of the trough H, the end of which also curves upwardly. Said trough, as shown,

is lined with sheet metal approximately the same height as the curved ends of the track G and the rails *g*, thereby scraping material in the trough into the bucket. The rear end of said trough is inclined downwardly at *g'* to permit the buckets to descend in a vertical position a sufficient distance for the top thereof to swing inwardly as the buckets enter the trough. Material may be delivered into said buckets while passing along said trough by any desired means. As shown, however, a loader (indicated by I, and for which application for patent was executed by me of even date herewith) is used and acts to deliver the material continuously and uniformly into said buckets as they pass beneath the same.

The track G' supports the upper run of the conveyer between the sprocket-wheels X' X<sup>2</sup> on the track-wheels C<sup>2</sup>, as shown in Fig. 8, permitting the buckets to hang below the same on said bail. A tripper J, provided with a downwardly-curved cam-surface, is supported above said track G' in position for the ends of the arms or levers *f'* to engage beneath the same as the bucket passes beneath the tripper, thereby releasing the latch and permitting the buckets to successively dump by gravity. Said buckets are so pivoted in the bail that after dumping, the same swing upwardly and are again secured by the latches in a vertical position. Counterweights *a*<sup>5</sup> may be secured on the bucket along the side *a*<sup>2</sup> to aid the return.

The operation is as follows: Said buckets, pivoted, as before described, on the gudgeon or trunnions C in the ends of said bail and having the catch *f* securely engaged upon the projections F', are drawn along the trough, preferably oppositely from the flow of material from the loader, and are partly filled when beneath the loader. Any material which falls upon the inclined wall *a*<sup>2</sup> slides therefrom into the trough and the next succeeding bucket. As the buckets are drawn by the chain along said trough the extending lip *b* scrapes any material in the trough along to the upturned end thereof, where it falls back into the bucket as it rises to a perpendicular position preparatory to passing over the sprocket X<sup>2</sup>. When the bucket rights itself to a perpendicular position, the material assumes the position shown in Fig. 10, carrying the center of gravity much above the trunnions C and to the rear side of the same. The track-wheels C<sup>2</sup> engage on the track G' as the buckets pass the wheels X<sup>2</sup>, and the buckets supported on the bail pass along the rails to the tripper J, which may be adjusted at any point intermediate of the wheels X' and X<sup>2</sup>. The downwardly-turned cam-surface, beneath which the roller on the ends of the arm *f'* engages, forces the arm *f* upwardly and disengaging the same from the projection F' on the nose of the bucket and permitting the bucket to swing downwardly, dumping its contents. When the material is delivered from the bucket, the bottom of the bucket,



being much heavier than the top, causes the same to swing backwardly until the projection  $F'$  strikes the inclined end of the arm  $f$ , raising the same against the spring  $f^s$  and permitting said projection to pass into said notches in the extremities of said arm, thus again locking the buckets in a perpendicular position. As the buckets pass downwardly over the sprocket  $X'$  and beneath the sprocket  $X$  the bottoms engage on the downwardly-inclined end  $g'$  of the trough, and the continued forward movement of the top of the bucket returns the same to its horizontal position with all of the track-wheels again engaged upon the track  $G$ , in which position the bail with four track-wheels form a truck upon which the bucket is supported in filling.

While I have described my invention as preferably assembled so that the buckets move oppositely from the flow of material as it falls from the loader, this is obviously not essential, and, as shown in Fig. 9, said buckets will fill very satisfactorily if moved in the same direction with the flow of the material in the chute, the only difference being that in some instances more of the material will be deposited in the trough in the one case than in the other. This is immaterial, however, inasmuch as the depending lip or flange  $b$  on the nose of each bucket acts to push said material along the trough, as shown in Fig. 10, until the same by gravity falls into the bucket. Obviously the buckets may be constructed of any desired size or in any desired manner, and any desired type of chain, tracks, rollers, trippers, or the like may be employed, and I do not desire to be limited to the exact construction of buckets herein shown and described, inasmuch as many details of construction may be varied without departing from the principles of this invention.

I claim as my invention—

1. The combination with a bucket of the class described, of a bail in the ends of which the bucket is pivoted, track-wheels on each side of the bail on all of which said bucket is carried in horizontal position when loading and on two of which the bucket is carried in vertical position approaching the dumping position and a latch adapted when released to permit the bucket to swing to a dumping position.

2. A bucket of the class described comprising a bottom and side walls, one of which is elongated, oppositely-extending trunnions having their axis located near the center of gravity, a bail in the ends of which said trunnions engage, a latch carried on said bail and adapted to engage a part on said extended wall of the bucket and to hold the bucket rigidly with respect to the bail, track-wheels on said trunnions and on said bail acting to support said buckets in a horizontal position in loading and from two of which the bucket depends when unloading.

3. A bucket of the class described comprising a bottom and extended side walls, a bail

pivoted on the bucket on each side thereof near its normal center of gravity, front and rear track-wheels on each side of said bail on all of which said bucket is carried when in loading position and on the front pair of which the bucket depends in unloading position, means for locking said bucket from movement on the bail whereby when said lock mechanism is released said bucket swings on the bail.

4. A conveyer-bucket pivoted upon a bail, track-wheels journaled on each side of the bucket adjacent to said pivot for the bail, other track-wheels carried on the bail, a latch also pivoted on the bail and acting to rigidly engage the bucket to the bail, a horizontal track to support the bucket on all of the track-wheels when in loading position and a corresponding track adapted to support the bucket on the track-wheels on the bail when moving to unloading position and means for releasing the latch to permit the bucket to dump.

5. A pivoted-bucket conveyer comprising a plurality of scoop-shaped buckets, a bail pivotally secured at its ends upon each bucket with the pivot axis above the center of gravity of said bucket when empty, a track-wheel on each side of the bucket engaged on the pivot for the bail, corresponding track-wheels carried on the bail in advance of the first-named track-wheels, chains connecting said buckets along the top of the bail and acting to move said buckets simultaneously, a latch acting to rigidly engage each to its bail, a track adapted to support the buckets on all of their track-wheels when loading, and a track located above the same and on which the buckets hang on the track-wheels carried on the bail when unloading and a tripping device acting to release the latch.

6. A pivoted-bucket conveyer comprising a plurality of scoop-shaped buckets, a truck for each comprising a bail and laterally-disposed forward and rear track-wheels one pair of which is carried on the bail, conveyer-chains engaging the bails, a trough below the buckets, a lip on the front end of the bucket adapted to scrape along the bottom of the trough, and upwardly-extended flanges on each side of the bucket adapted to direct material falling thereon rearwardly into the next succeeding bucket.

7. The combination with a track having one upwardly-curved end, of a trough located below the same and correspondingly curved, a series of chain-connected scoop-shaped buckets, a downwardly-projecting lip at the front end of each adapted to scrape along the bottom of the trough and to direct material therefrom into the bucket, a truck acting to support each bucket comprising a bail pivoted on the bucket and a plurality of track-wheels journaled along each side of the bail all of which support the bucket in filling position and one pair of which support the bucket in dumping position.

8. The combination with a lower conveyer-

track having an upcurved end, of a similarly-curved trough located beneath the same, a plurality of chain-connected trucks movable along said track and each comprising a bail, 5 having a plurality of track-wheels along each side thereof, a scoop-shaped bucket pivoted on the rear end of each bail and movable along said trough, a latch engaging said bucket rigidly on the bail, an upper track 10 from which said buckets depend vertically and a tripping device in position to release the latch and to permit the buckets to be dumped.

9. In a conveyer the combination with an 15 upper track, of a lower track having the front end curved upwardly, guide-rails curved concentrically therewith and located within the curved ends of the track-rail, a trough below the lower track and also curving upwardly, 20 a feeding device located above the trough, scoop-shaped, chain-connected buckets provided on their front ends with a downturned flange acting to scrape along the bottom of the trough and bail-trucks on the rear ends 25 of which the buckets are pivoted, sprocket-wheels over which the chains are trained and acting to elevate the buckets and to move the same along the upper track to dumping position and means for dumping the bucket.

30 10. A bail-truck for the purpose specified comprising a U-shaped metal frame and apertured at its ends to receive trunnions extending through said apertures, track-wheels journaled on said trunnions, stud-shafts projecting laterally from the top of the bail, a 35 latch journaled on each stud-shaft and adapted to engage on the front of the bucket carried below said truck, and track-wheels also on said stud-shaft, said bail-truck acting to 40 support the bucket in horizontal position in filling and to swing the same in vertical position from the foremost track-wheels in dumping, and means for releasing the latch.

11. In a device of the class described the 45 combination with a scoop-shaped bucket, of a bail in the ends of which the bucket is pivotally supported in position to stand vertically upright when empty, a downturned lip on the front end of the bucket, lateral projections thereon, a latch journaled at the top 50 of the bail and adapted to engage said lateral projections, an arm extending oppositely from the latch, a spring engaged on the bail and pressing said arm and holding the latch in engaging position, forward and rear track-wheels on each of the bail sides, chains en-

gaged to the bail adjacent to the forward track-wheels and tracks located one above the other on the lower of which the bucket is supported in horizontal position on all of 60 the track-wheels and on the upper of which the bucket swings on the forward of said track-wheels, and a tripping device adapted to engage said arm and lift the latch to permit the bucket to dump. 65

12. The combination with a scoop-shaped bucket, of a bail pivotally engaged thereon at a point which causes the bucket to tend to assume a vertically-upright position when empty, a latch on the bail acting to engage the 70 nose of the bucket thereto, forward and rear track-wheels on each side of the bail on all of which the bucket is carried in filling position, and on the front pair of which the bucket is carried to dumping position, means for releasing the latch with the effect of causing the 75 bucket to dump its load, then swing to a vertical position and again engage the latch.

13. The combination with a conveyer-trough having one end curved upwardly to 80 approximately a vertical position, of chain-connected conveyer-buckets fitting closely in and movable toward said upturned end of the trough, means for delivering material from above into the buckets, upwardly-directed lateral flanges on each bucket acting to direct surplus material into the next adjacent bucket and a lip on the nose of each bucket acting to scrape material from the 85 trough into the bucket. 90

14. The combination with a feeding device, of a trough located below the same and having one upturned end, a track above the trough, chain-connected scoop-shaped buckets each fitting closely in the trough and journaled on a truck movable on said track toward said upturned trough end, upwardly-projecting lateral flanges on each bucket acting to direct surplus material into the next adjacent bucket, a lip on the nose of each 100 bucket fitting closely in the bottom of the trough and an upper track along which the buckets move to dumping position supported in a vertical position on the front wheels of the truck and means for dumping the buckets. 105

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

EUGENE BIVERT.

Witnesses:  
CHARLES W. HILLS,  
A. C. ODELL.