(No Model.) 2 Sheets—Sheet 1.

# G. W. McCASLIN.

## CONVEYER.

No. 486,809. Patented Nov. 22, 1892.

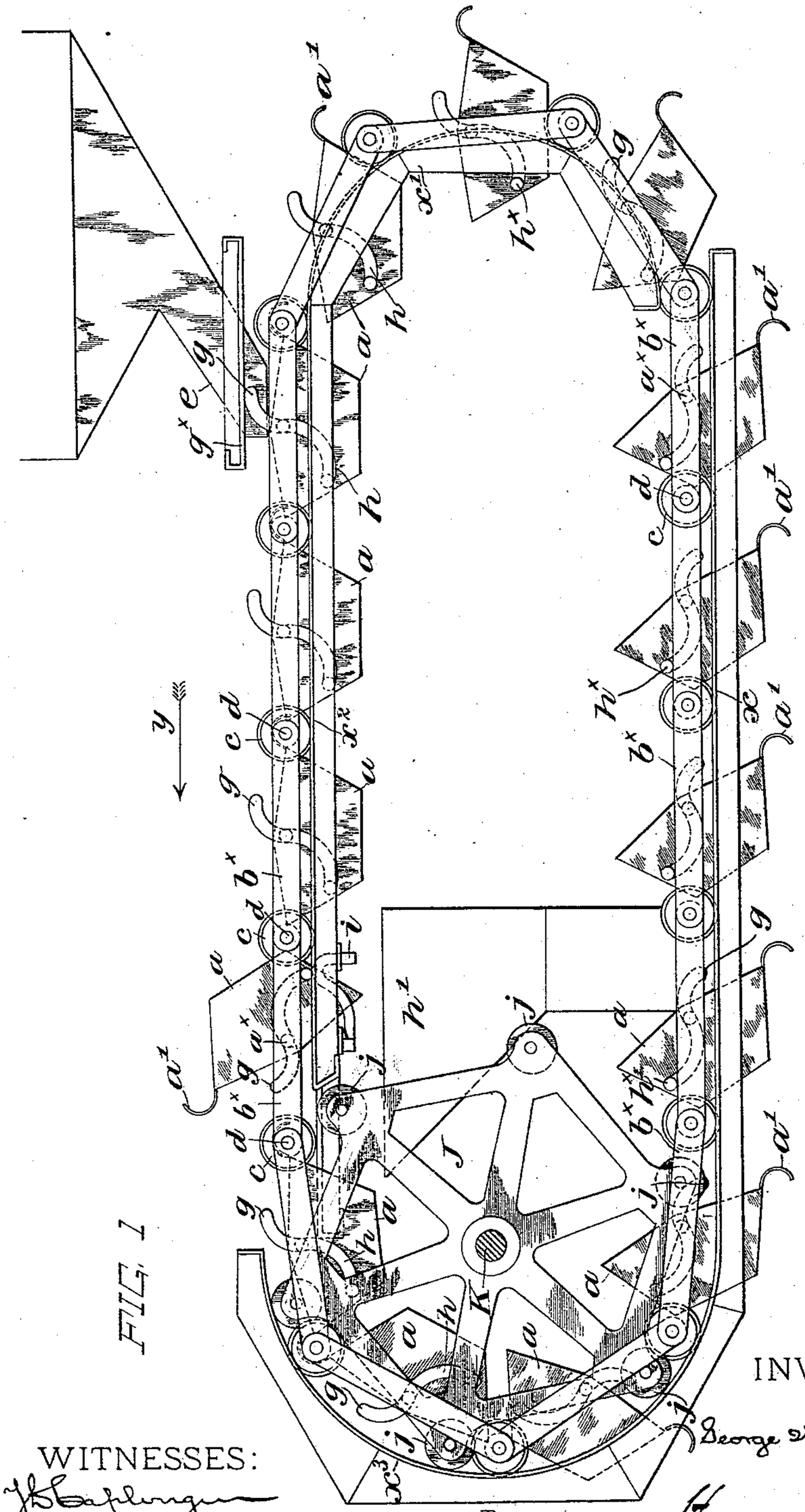

FIG. 1

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(No Model.) 2 Sheets—Sheet 2.

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## CONVEYER.

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FIG. 2

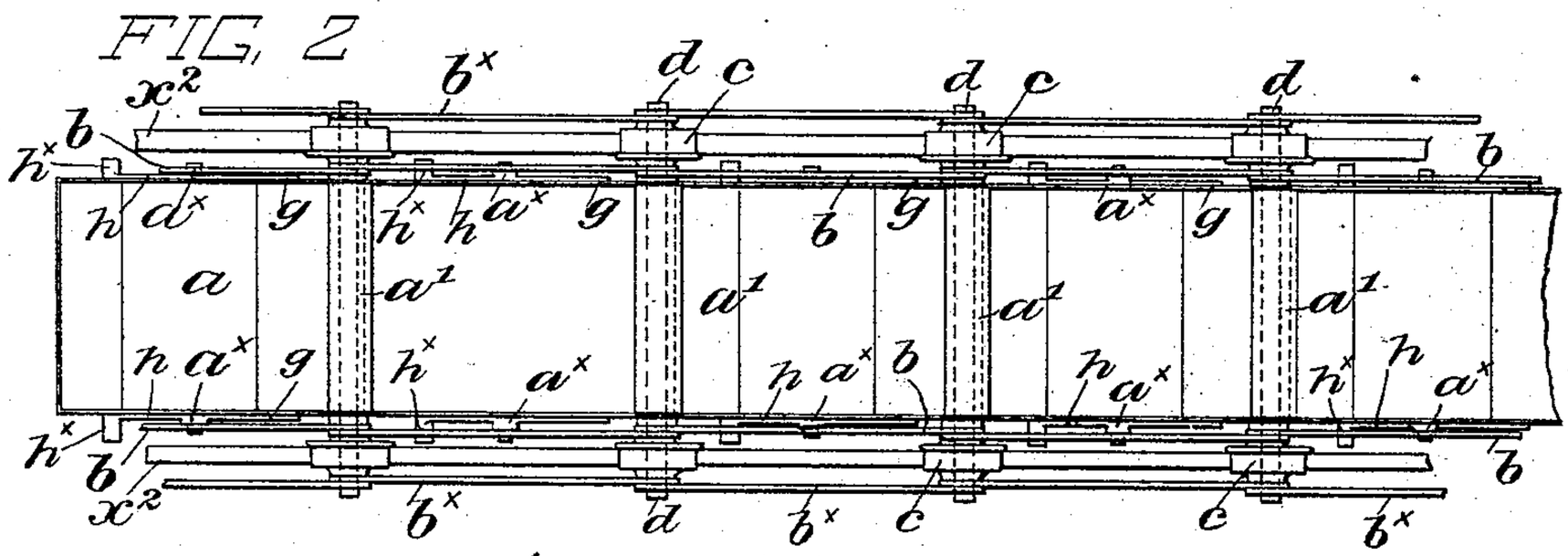


FIG. 3

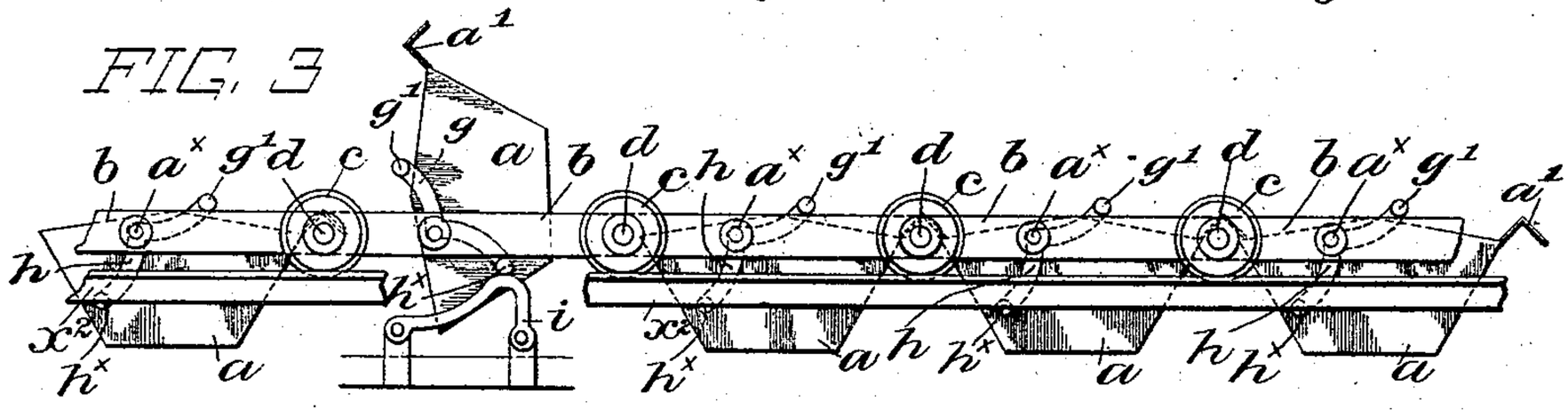


FIG. 4

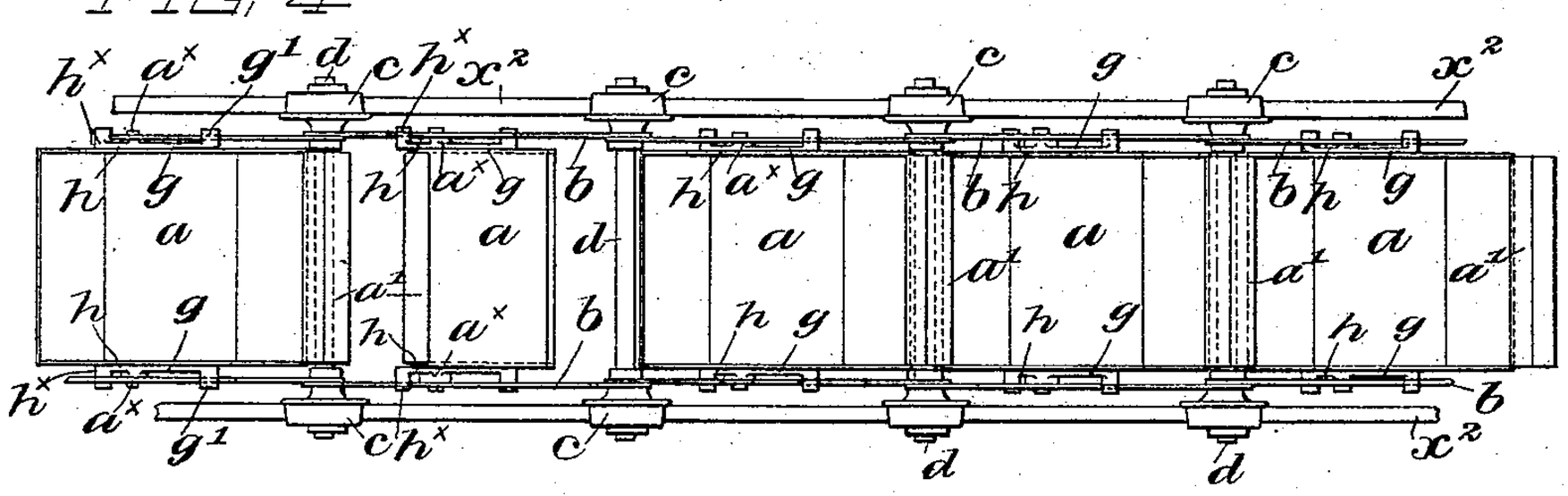
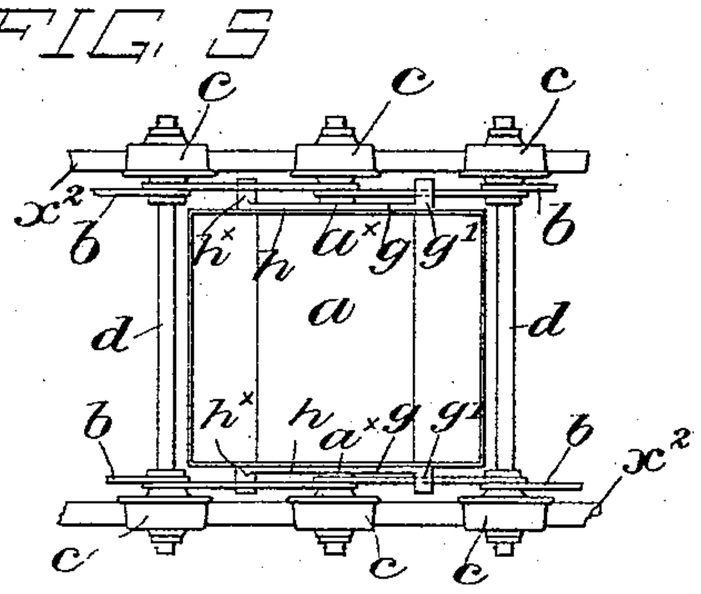


FIG. 5



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# UNITED STATES PATENT OFFICE.

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## CONVEYER.

SPECIFICATION forming part of Letters Patent No. 486,809, dated November 22, 1892.

Application filed May 31, 1892. Serial No. 434,973. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. MCCASLIN, a citizen of the United States, and a resident of Hoboken, in the county of Hudson and State of New Jersey, have invented certain Improvements in Conveyers, of which the following is a specification.

My invention relates to the class of endless-chain conveyers having buckets pivotally mounted in the links forming the chain, the conveyer having wheels which run on a track, and the improvements consist partly in providing limiting-stops to prevent the buckets from rocking or turning too far on their pivots in the chain, partly in means carried by the bucket for covering the space between it and the adjacent bucket at the loading-point, partly in providing the bucket having a projecting covering-plate with a limiting-stop to prevent the collision of the buckets on their return, partly in providing means for preventing the bucket from tilting to too great an extent at the loading-point, partly in constructing the chain of pairs of independent links having bearings at opposite sides of the wheels, the links being longer than the buckets and the buckets pivotally mounted in the inner links only of the pairs, partly in providing a bucket having a covering-plate and mounted pivotally at one side of its center with a limiting-stop to support its longer end, and partly in a novel driving mechanism, all as will be more particularly described.

In the accompanying drawings, which serve to illustrate an embodiment of the invention, Figure 1 is a side elevation of an endless conveyer constructed according to my invention, and Fig. 2 is a plan of a part of the same. Figs. 3, 4, and 5 are views illustrating slight variations in the construction, which will be referred to and described hereinafter.

Referring first to Figs. 1 and 2, $x$ represents the lower portion of the track on which the conveyer travels, $x'$ the ascending portion of the track, $x^2$ the upper portion, and $x^3$ the descending portion thereof. These four parts are commonly found in tracks for endless conveyers, but they are arranged in various ways to suit the circumstances of the case. The form shown in Fig. 1 is simply for illustration. On this track is mounted an endless conveyer arranged to move in the direction indicated by the arrow $y$. This conveyer is made up of buckets $a$, pivotally suspended in an endless chain. As seen in these figures, each bucket has its pivots $a^\times$ arranged at the center of its length or in a transverse vertical plane, passing through the center of gravity of the bucket, so that the latter will hang properly. On each side of the bucket are two independent links $b$ and $b^\times$, the pivots of the buckets having bearings in the inner links $b$ of each pair. The track-wheels $c$ are mounted on axles $d$, the extremities of the axles forming the pivots which connect the links of the chain in endless series. The links $b$ have bearings inside of the wheels $c$, and the links $b^\times$ have bearings outside of the wheels. The advantage from using pairs of independent links in this way is not only that the strain is exerted on the axle at both sides of the wheel, but the construction permits the outer link or links to be taken off at any time and a wheel or wheels slipped off from the axle without dismantling the entire structure. Moreover, where the links are arranged in pairs and the links of the pairs are entirely independent of each other lateral flexure or seesaw is freely permitted in the movement of the conveyer. This independent arrangement of the links in the pair also allows the conveyer in changing direction to pass about short curves which the links subtend as chords, as the links are not in the plane of the track, and there are no ties between the links to interfere with the track about the curve and prevent it from taking position between the links of the pair.

The buckets may be mounted in the chain after the latter has been set up by merely springing in the sides of the bucket on which the pivots $a^\times$ are fixed, and also springing or bending out the links slightly, if this be necessary. After the pivots enter their bearings in the links the parts will spring back from their own resiliency, and in the ordinary use and operation of the conveyer the tendency of the strains and forces is to keep the pivots in place in their bearings in the links.

In order to prevent the material from falling between the buckets at the loading-point, where a chute $e$ will be placed to lead the material into the bucket, each bucket is provided at its end with a covering plate or lip

$a'$, arranged to take over the space between it and the adjacent bucket. Preferably this plate will be bent into a convex form, as seen in Fig. 1, or have an inverted-V form, as seen in Fig. 3, as these forms allow the material to slide off into the buckets.

As shown in Fig. 1, the conveyer is supposed to be moving at its upper or operation side in the direction of arrow $y$, and on this side the plates $a'$ are at the rear ends of the buckets, the plate on one bucket covering the space between it and the next following bucket. On the side of the bucket is fixed a plate $g$, which projects upward back of the pivot $a^{\times}$ or nearest the end where the plate $a'$ is situated, and as the bucket comes under the loading-chute $e$ the upwardly-projecting end of the plate $g$ moves under a fixed bar $g^{\times}$, situated at the loading-point. The object of this device is to prevent the rear end of the bucket from tilting up too much or too far when the chute begins to discharge the material into the advancing end of the bucket. Where the buckets are free to swing the material flowing into the advancing end is apt to tilt the bucket and overflow at its front or advancing end. Should the rear or following end of the bucket tend to descend at the loading-point or at any point in its travel along the upper track, the covering-plate $a'$ will strike the axle beneath it and prevent such movement. On the side of the bucket in front of the pivot $a^{\times}$ is secured a plate $h$, of curved form by preference, which strikes a dumping-cam $i$ on the track as the bucket advances, and this cam turns the bucket partly over, so that its contents will be dumped into a hopper or off-bearing chute $h'$, situated at this point in the track. This feature is illustrated in Fig. 1.

At the left in Fig. 1 is shown the driver of the conveyer, said driver being arranged, also, to change the direction of the conveyer. This driver consists of a wheel J, having arms with rollers $j$ arranged in the ends thereof. The wheel is fixed on a shaft K, which may be driven from any source of power. The curved track $x^3$ at this point is exterior and connects with the lower track $x$, and the conveyer is carried around by the rollers or wheels $j$, which take behind and bear against the track-wheel $c$ of the conveyer. The rollers $j$ are spaced to correspond with the spacing of the wheels of the conveyer and are so placed that the radial distance from the shaft K to the centers of the rollers $j$ will be a little less than the radial distance to the centers of the respective wheels $c$, whereby the driver tends to force the latter wheels outward against the track $x^3$. In the elevation, Fig. 1, only one wheel J is seen; but there will be two like wheels on the shaft K, one to engage each set of the track-wheels $c$. In Fig. 1 the near wheel J shown is directly in front of the other.

The endless conveyer may be of any length and the space between the receiving and discharging points will usually be considerable, although represented in Fig. 1 as quite close together. The upper and lower portions of the track need not be horizontal nor be parallel; but it is desirable that the track at the receiving-point be substantially horizontal. As the buckets pass down about the curved descending portion $x^3$ of the track they turn over in succession, rotating about their pivots, and when they reach the lower portion $x$ of the track a stop $h^{\times}$ (here shown as a laterally-projecting stud on the plate $h$) catches on the link of the chain and holds the buckets in the position represented. The object of this limiting-stop is to prevent the covering-plate $a'$ on a bucket from catching under the bottom of the next bucket ahead, which collision would be brought about by the efforts of the buckets to right themselves by gravity. When the buckets pass upward about the portion $x'$ of the track, they right themselves. The upper edges of the links when the conveyer is on the lower track become the lower edges on the upper track.

Figs. 3 and 4 illustrate a slight variation in the construction. In these views the pivots $a^{\times}$ on the buckets are not in a transverse plane, passing through the center of gravity, and the longer end of the bucket tends to fall, but is prevented from dropping down by a limiting-stop consisting of a laterally-projecting stud or part $g'$ on the plate $g$, which takes over and rests on the link $b$ of the chain, as clearly shown.

Fig. 5 illustrates a construction wherein the bucket-pivots $a^{\times}$ are prolonged to form axles for wheels $c$, intermediate between the wheels, as arranged in the constructions previously described, and the chain-links in this construction are only half as long as the links in the previously-described constructions. This view shows the two limiting-stops on a bucket pivoted at its center.

Having thus described my invention, I claim—

1. An endless-chain conveyer comprising a chain and buckets pivotally hung in said chain, said buckets being provided with stops to engage the chain and limit the movement of the buckets about their pivots, substantially as set forth.

2. An endless conveyer having buckets pivotally hung in the chain, said buckets being provided with limiting-stops to engage the chain and limit the movements of the buckets about their pivots and each bucket provided with a cover-plate, which extends over and covers the space between it and the next adjacent bucket, said limiting-stops serving to prevent collision of the buckets when turned, substantially as set forth.

3. In a conveyer, the combination, with the track, track-wheels, axles, and chain-links, of the buckets pivotally hung in the chain, each bucket having a limiting-stop to limit the movement of the buckets about its pivots and a cover-plate extension at one end, which extends over and into the next adja-

cent bucket, and a fixed bar at the loading-point on the track, said bar being arranged and adapted to prevent the passing bucket from swinging out from under the cover-plate on the next adjacent bucket while receiving its load, substantially as set forth.

4. In an endless conveyer provided with a track and track-wheels and with buckets pivotally mounted in the chain, the combination, with a fixed bar, as $g^{\times}$, situated at the loading-point, of the conveyer-buckets, each having a plate fixed to its side inside the plane of the chain-links and projecting upward above the top of the bucket back of the pivot, whereby its upper end moves under said bar $g^{\times}$ when the bucket passes the loading-point, and means carried by the moving conveyer, which prevents the rear ends of the buckets from being depressed too much when loading, substantially as set forth.

5. In a conveyer, the combination, with the chain, the wheels, the axles, the tracks, and means for driving the conveyer, of the buckets pivotally mounted in the chain and each provided with a covering-plate, which covers the space between it and the adjacent bucket and takes over the axle between the buckets, whereby it prevents undue depression of that end of the bucket at the loading-point, the horizontal bar $g^{\times}$, arranged in fixed position at the loading-point, and the plates $g$ on the respective buckets arranged to move under said bar $g^{\times}$ when the buckets pass the loading-point, and thus prevent undue depression of the front ends of the same, as set forth.

6. In a conveyer, the combination, with the track, the track-wheels, their axles, and the endless chain, of the buckets pivotally mounted in the chain, said buckets being provided with projecting covering-plates $a'$ and with projecting limiting-stops to engage the links above and below, respectively, as set forth.

7. In an endless conveyer, the combination, with the straight tracks $x$ and $x^2$ and the curved track $x^3$ at the point where the conveyer changes its direction, of the endless chain, the track-wheels and their axles, the buckets mounted pivotally in the chain, and the driver arranged concentric with said track $x^3$ and inside of the loop of the conveyer, said driver comprising a shaft K, wheels J, fixed on said shaft and having arms provided with antifriction-rollers at their extremities, said rollers being spaced to correspond with the spacing of the conveyer-wheels and arranged to bear upon the latter at points nearer to the center of the driver, measured radially, than the centers of the wheels are situated, substantially as set forth.

8. The combination, with the tracks of a conveyer, the axles, and the wheels, of the links of the endless chain arranged in pairs, the links of the pairs being independent and having bearings on opposite sides of the wheels, the buckets pivotally mounted in the inner links of the pairs, and limiting-stops on the buckets arranged to engage the inner links only of the pairs, whereby the space between the links is left unobstructed, substantially as and for the purposes set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE W. McCASLIN.

Witnesses:
JOHN D. CAPLINGER,
PETER A. ROSS.