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W. B. JOHNSON.

CONVEYER.

APPLICATION FILED JAN. 28, 1905.

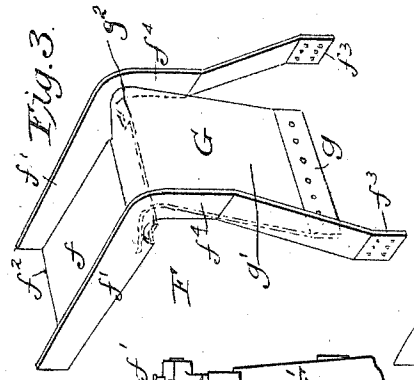

Fig. 3.

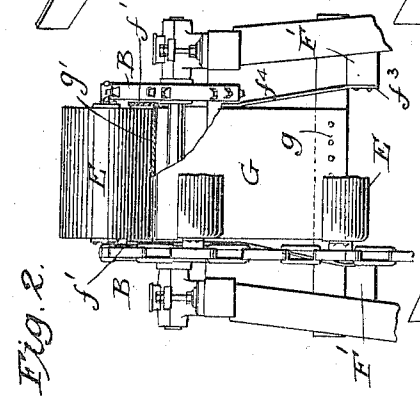

Fig. 2.

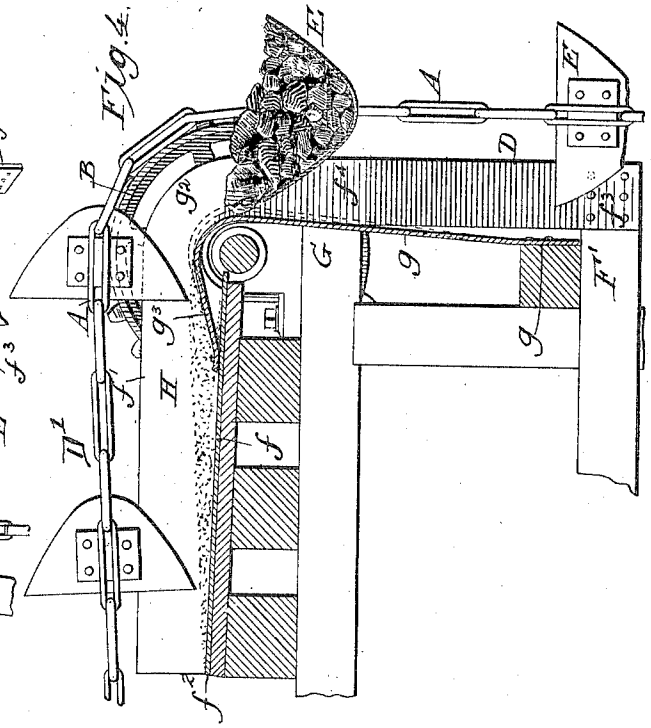

Fig. 4.

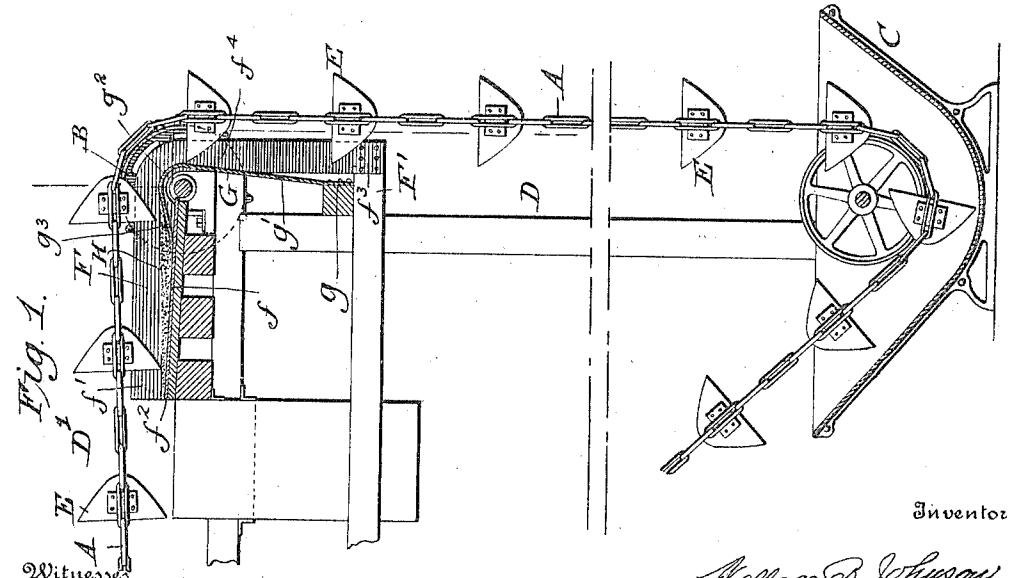

Fig. 1.

Witnesses:
Sidney P. Hollingsworth
Augusta J. Lisk.

Inventor
Wallace B. Johnson.
by H. H. Olin
Attorney

UNITED STATES PATENT OFFICE.

WALLACE B. JOHNSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO FAIRBANKS, MORSE & COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CONVEYER.

No. 811,149. Specification of Letters Patent. Patented Jan. 30, 1906.

Application filed January 28, 1905. Serial No. 243,051.

To all whom it may concern:

Be it known that I, WALLACE B. JOHNSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Conveyers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in elevating apparatus comprising endless carriers to which are attached buckets, scrapers, or the like.

Among its objects is this, namely: to provide devices at the head of the elevator which shall prevent any dropping or spilling of the contents of the buckets at the time they are passing around the head-shaft and which shall at the same time be adapted to allow a yielding of the guard element, so that there shall at no time be any cramping or binding of the buckets or undue straining of the chains or carriers.

Figure 1 is a vertical section of a portion of an elevating apparatus sufficient to illustrate how my improvements can be embodied in working form. Fig. 2 is a face or side view. Fig. 3 is a perspective view of the guard wall or fender-plate and trough. Fig. 4 is a vertical central section, on a large scale, of a portion of an elevating apparatus embodying my improvements.

Inasmuch as the improvements to which this invention relates are applicable for use in either of very many styles of elevating mechanisms considered as entireties, it is not necessary herein to describe in detail all of the parts of such a mechanism, as numerous forms are now well known. It is sufficient to note that the invention is especially applicable for use in elevators used for the lifting of coal, particularly coal which is delivered to it in masses of miscellaneous character with respect to the sizes of the parts thereof, such as what is known as "run-of-mine" coal; but I do not wish to be understood as limiting the invention to any particular sort of material.

A A indicate the main carrier-chains. These are shown as fitted to two series of sprocket-wheels B B, one on each side of the system. As illustrated, the chains travel through a boot at C, where they successively receive their charges. Thence they rise along the leg part D of the system to the head-wheels B. From the latter they move at an inclination upward or downward or travel horizontally across the region of delivery to the idler-wheels at the top, and from the latter they move back to the wheels in the boot either directly or, if occasion demands, around intermediate idlers, which direct the chains in any path selected. The buckets E are rigidly secured at their ends to the chains A A. These also may be of any of numerous forms, but preferably are substantially such as and of the shape shown. Each bucket is adapted as it passes through the boot to scoop up a load, and when it reaches the place selected for delivery along the upper run D′ the load is allowed to escape by the action of gravity, the buckets at that time being approximately half inverted.

At F there is a trough having the bottom or floor part f and the wings or side walls f' f'. In the construction shown there is but one point for the final escape of the coal from the elevator and trough—namely, at the edge f^2 of the floor or bottom f—the material dropping at this point being delivered to any suitable receptacle, such as a bin, or being delivered to a supplemental carrier or to a suitable guiding-chute; but the essential parts of my apparatus can be also used in the elevator mechanisms which have longer troughs and are provided with opening and closing gates or doors that permit the deliveries to be effected now at one point and now at another. The side walls f' f' are extended beyond the head-shaft and carried down, as shown at f^4, by the sides of the up-run or vertical leg D. They gradually diverge from a horizontal plane near that of the head-shaft as they extend downward and at their lower ends f^3 are secured to a suitable support, such as one of the beams F′ of the framework.

In elevator mechanisms of this class much trouble has been experienced from the fact that the loaded buckets while they are passing around the head-shaft tend to drop or spill more or less of their contents as they swing from their upright to their partially-inverted position. To overcome this, it has been proposed to use, and more or less use has been made of, curved chutes or apron-like fenders or guard-walls carried around the axis of the head-shaft on curved lines approximately concentric with that shaft. As heretofore made and used these fenders or guard-devices have consisted of extensions of the

bottom part of the top trough or chute analogous to that indicated at *f* in these drawings—that is to say, the sheet of metal has been extended backwardly across the shaft and then carried down on curved lines to a line in or near the horizontal plane of the axis of the head-shaft; but these extended trough-bottoms or curved chutes have in turn produced disadvantages equal to and in some cases greater than those incident to the older apparatus, these arising from the fact that an overloaded bucket approaching the rigidly-supported curved chute or trough bottom would bear against it so hard that binding and cramping of the buckets and of the chains result, even causing a breakage. For instance, if a large lump of coal should overhang the inner edge of a bucket when it approaches the curved chute or trough wall it is drawn between the latter and the bucket, and as there is no yielding incident to either of the elements it tends to strain and break one or the other parts of the apparatus. I have devised a construction and arrangement of parts which entirely obviates this difficulty.

G indicates an apron or fender wall preferably made of sheet metal. It is supported not in the way heretofore followed, but is extended downwardly a considerable distance inside of the up-run of the elevator and has its lower end *g* secured to the framework. It is shaped so as to have an outwardly and upwardly inclined part *g'*, a curved section g^2, and a forward projecting inclined or approximately horizontal part g^3 at its upper end. It is preferably made of flexible and elastic material and is elongated to such an extent that it can be bent or caused to yield inward with sufficient ease to meet all ordinary demands, but at the same time is held with such stiffness in its normal position as to prevent the spilling or escape of the contents of the buckets. The upper end of the part *g* is extended outward to or a little beyond the vertical plane of travel of the inner edges of the buckets, and consequently as they reach the turning-point they slightly contact with the upper part of this fender, and it insures that any of the contents of any buckets which are liable to escape shall be held back until the bucket has been partially inverted or turned and is ready to pass off onto the trough-bottom *f*. Should any large lumps or bodies overhang the inner edge of the bucket, they will be gradually and jointly forced away from the edge under ordinary circumstances; but if at any time such a lump should be in a position where it is impossible to move it outward farther into the bucket by pressure the fender-plate will yield and the bucket, together with the assumed lump and the rest of the load, will be carried from the top and ready for discharge on the horizontal parts. Preferably the extreme upper edge part of the fender or guard is curved so as to come to the horizontal plane and the fender as an entirety is so adjusted that the upper free movable edge shall press constantly slightly on the bottom *f*, so as to maintain a tight joint and prevent material from working backward toward the head-shaft.

I attain another matter of advantage in the construction and arrangement of parts which I have described—that is, in the region indicated by H in the neighborhood of the head-shaft I provide a pocket in which there collects and remains practically constantly a mass of the material, such as a mass of the finer parts of the coal. This pocket extends somewhat below the plane of travel of the edges of the buckets as they move on from the head-shaft toward the trough-bottom *f*. Because of this mass of deposited material in the said pocket the apparatus operates much more easily and smoothly than if the parts were fitted in such lines and planes as that no such pocket or collecting region should exist. Lumps or large objects that may fall from the bucket as it is inverted while traveling around the shaft are received upon this bed of loose material, and when the scraping action of the buckets commences they do not catch or jerk, as is the case when such lumps or large objects immediately fall upon a hard surface. Moreover, the blows and shocks caused by the large heavy lumps when they fall upon and strike the trough-bottom are prevented by having a dead-pocket for material at the place described.

It will be seen that the sloping part *g'* of the fender and the inclined leg parts of the supporting-legs for the trough all converge from their lower ends toward the upper, and as a result the buckets and any overhanging contents carried thereby are smoothly and jointly brought to the horizontal plane of the head-shaft.

What I claim is—

1. In an endless conveyer, the combination with the buckets, the endless carrier therefor, and the guiding devices for the upper horizontal flight of the carrier, of the take-off chute for receiving the material from the buckets as they turn from their vertical to their horizontal run, and the vertically-disposed yielding plate arranged adjacent to the line of travel of the inner sides of the buckets, and having its upper end extending over the adjacent end of the said take-off.

2. In an endless conveyer, the combination with the buckets, the endless carrier therefor, and the guiding devices for the upper horizontal flight of the carrier, of the chute arranged adjacent to the guiding device at the point where the buckets turn from their vertical to their horizontal run and along which the material is advanced by the buckets, and the vertically-disposed yielding plate ar-

ranged adjacent to the line of travel of the buckets on their up-run, and having its upper end extending over the bottom plate of said chute.

3. In an endless conveyer, the combination with the buckets, the endless carrier therefor, the head-wheels for the carrier adapted to direct it from its up-run to the horizontal run, and the shaft upon which the said wheels are mounted, of the take-off chute having one end arranged adjacent to the said shaft, and the vertically-disposed yielding plate arranged adjacent to the line of travel of the inner sides of the buckets and having its upper end curved over the said shaft and overlapping the adjacent end of the said take-off.

4. In an endless conveyer, the combination with the series of buckets, the endless carrier therefor, the head-wheels for directing the carrier from its up-run to a substantially horizontal run, and the shaft for the said wheels, of the vertically-disposed plate arranged at an inclination to the line of travel of the inner sides of the buckets and having its upper end curved about the said shaft and free to yield relatively thereto, and the take-off device adapted to receive the material from the upper end of said plate.

5. In an endless conveyer, the combination with the series of buckets, the endless carrier therefor, the head-wheels for directing the carrier from its up-run to a substantially horizontal run, and the shaft for said head-wheels, of the plate arranged at an angle to the line of travel of the inner sides of the buckets, and having its lower end the more remote from said line and its upper end curved about the said head-shaft, the said plate being movable relative to the said head-shaft.

6. In an endless conveyer, the combination with the series of buckets, the endless carrier therefor, the head-wheels for directing the carrier from its up-run to a substantially horizontal run, and the shaft for said head-wheels, of the plate arranged at an angle to the line of travel of the inner sides of the buckets, and having its lower end the more remote from said line and its upper end curved about the said head-shaft, the said plate being mounted so that its upper end can yield relatively to said head-shaft.

7. In an endless conveyer, the combination with the series of buckets, the endless carrier therefor, the head-wheels for directing the carrier from its up-run to a substantially horizontal run, and the shaft for said head-wheels, of the plate arranged at an angle to the line of travel of the inner side of the buckets, and having its lower end the more remote from said line and rigidly secured in position, and its upper end curved about the said head-shaft and free to yield relatively thereto.

8. In an endless conveyer, the combination with the series of buckets, the endless carrier therefor, the head-wheels for directing the carrier from its up-run to a substantially horizontal run, and a shaft for said head-wheels, of the take-off chute having a bottom wall with one end arranged adjacent to the said head-shaft, and the side walls extending upwardly from said bottom wall, and being extended about the said head-shaft and downwardly on either side of the up-run of the said series of buckets, and the vertically-disposed yielding plate arranged between said downwardly-extending side walls and adjacent to the line of travel of the inner sides of the buckets, and having its upper end curved over the said shaft and overlapping the adjacent end of the bottom wall of the chute.

9. In an endless conveyer, the combination with the series of buckets, the endless carrier therefor, the head-wheels for directing the carrier from its up-run to a substantially horizontal run, and a shaft for said head-wheels, of the take-off chute having a bottom wall with one end arranged adjacent to the said head-shaft, and the side walls extending upwardly from said bottom wall, and being extended about the said head-shaft and downwardly on either side of the up-run of the said series of buckets and flared outwardly therefrom, and the vertically-disposed yielding plate arranged between said downwardly-extending side walls and adjacent to the line of travel of the inner sides of the buckets, and having its upper end curved over the said shaft and overlapping the adjacent end of the bottom wall of the chute.

10. In an elevator, the combination of an endless carrier arranged to travel around a path having different parts or sections, of which one is inclined to the next, a carrier supporting and guiding device adapted to deflect the carrier from one part of said path to the next, buckets secured to the said carrier, and a guard-wall or fender on the inner side of the carrier supported at points where the carrier is deflected as aforesaid and adapted to yield or move inward and outward in relation to the path of the buckets as the buckets travel past said guard or fender, substantially as set forth.

11. In an elevator, the combination of an endless carrier arranged to travel around a path having different parts or sections, of which one section is inclined to the next, a carrier supporting and guiding device adapted to deflect the carrier from one part of said path to the next, buckets secured to the said carrier, and a guard-wall or fender on the inner side of the carrier supported at points where the carrier is deflected as aforesaid, and formed in two parts or sections, one of which is arranged approximately parallel to one part or section of the carrier-path, and the other arranged approximately adjacent to the other section of the carrier-path, said guard-wall or fender being adapted to yield or move inward toward and outward from the axis around

which the carrier is deflected, substantially as set forth.

12. In an elevator, the combination of a supporting-frame, the endless carrier arranged to travel through an approximately vertical path and then through an approximately horizontal path, head-wheels or guides for the carrier when it passes from one of said paths to the other, a receiving chute or trough adjacent to the approximately horizontal part of the carrier, supports for said chute connected thereto and extending around the axis of the head-wheels and then downward therefrom and rigidly secured to the supporting-frame, and a guard-wall or fender on the inner side of the path of the buckets and adapted to yield inward toward and outward from the axis of said head-wheels, and extending from points adjacent to the upper horizontal path of the buckets around the axis of the head-wheels and downward on lines adjacent to the approximately vertical part of the carrier, substantially as set forth.

13. In a conveyer, the combination of an endless carrier arranged to travel around a path having different parts or sections of which one is inclined to the next, supporting and guiding devices adapted to guide and direct the said carrier from one of its paths to the next, a series of conveyer elements secured to said carrier, and a guard-wall or fender on the inner side of said carrier adjacent to one of the points at which the said carrier is deflected from one of its paths to the next and adapted to move or yield inward and outward in relation to the path of the said conveyer elements as they travel past said guard-wall or fender.

14. In a conveyer, the combination of an endless carrier, arranged to travel around a path having different parts or sections, of which one is inclined to the next, supporting and guiding devices adapted to guide the said carrier from one of its paths to the next, a series of conveyer elements secured to said carrier, a chute or trough arranged adjacent to said carrier at one of the points at which the said carrier is deflected from one of its paths to the next and along which the said conveyer elements travel, and a guard-wall or fender arranged adjacent to the inner sides of said conveyer elements along the path from which they are deflected to pass over said chute or trough and having one end extending over the receiving end of said chute or trough, said guard-wall or fender being adapted to move inward and outward in relation to the path of the conveyer elements as they travel past said guard-wall or fender.

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

WALLACE B. JOHNSON.

Witnesses:

CHAS. C. BRACKETT,

E. W. LANE.