

(No Model.)

2 Sheets—Sheet 1.

E. P. DAVIS.
WATER AND SAND ELEVATOR.

No. 534,551.

Patented Feb. 19, 1895.

Fig. 1.

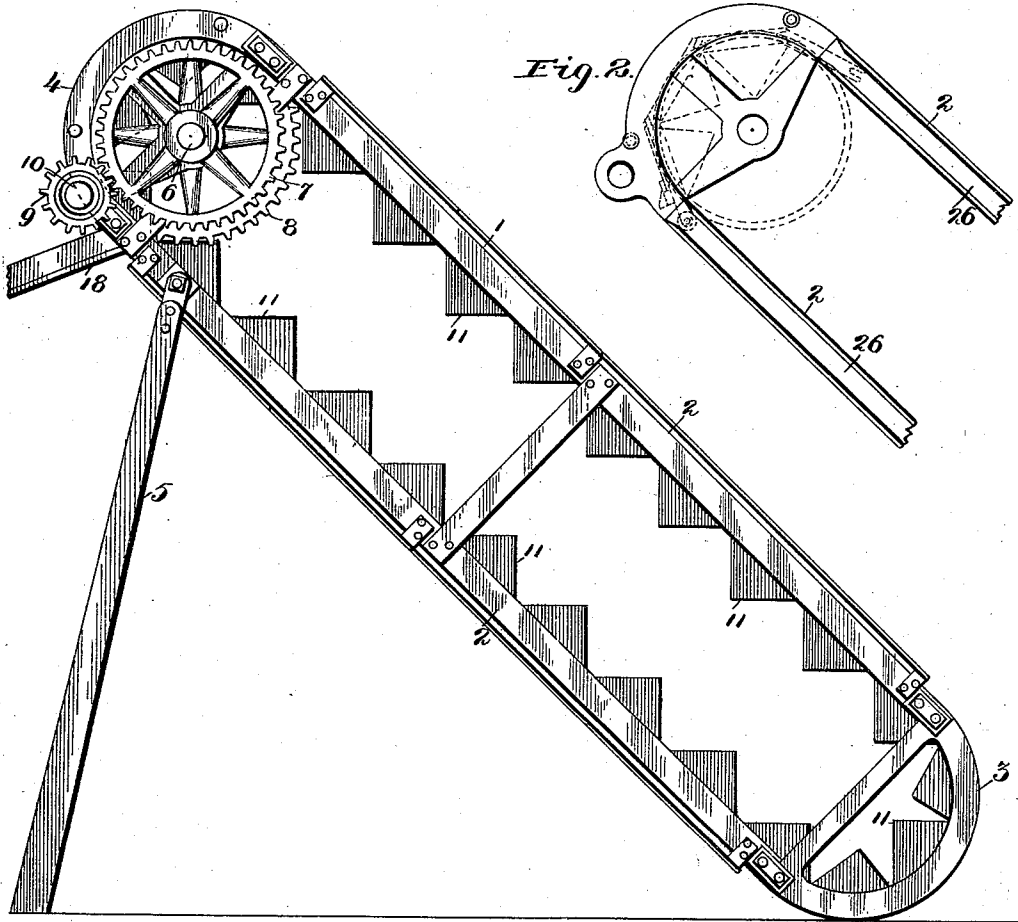


Fig. 2.

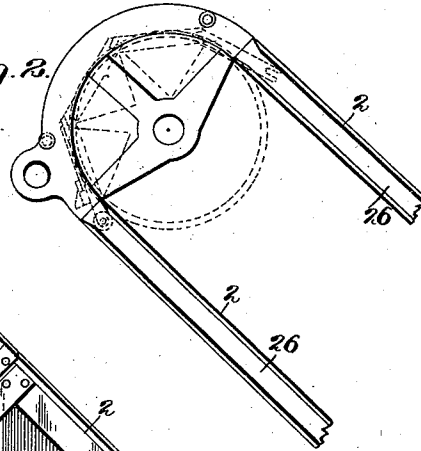
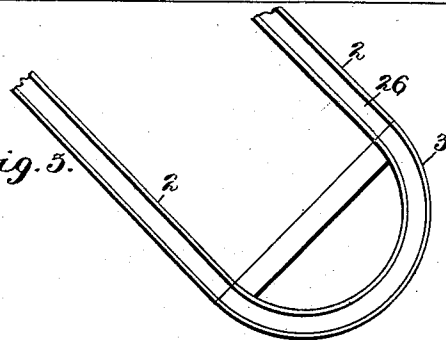


Fig. 3.



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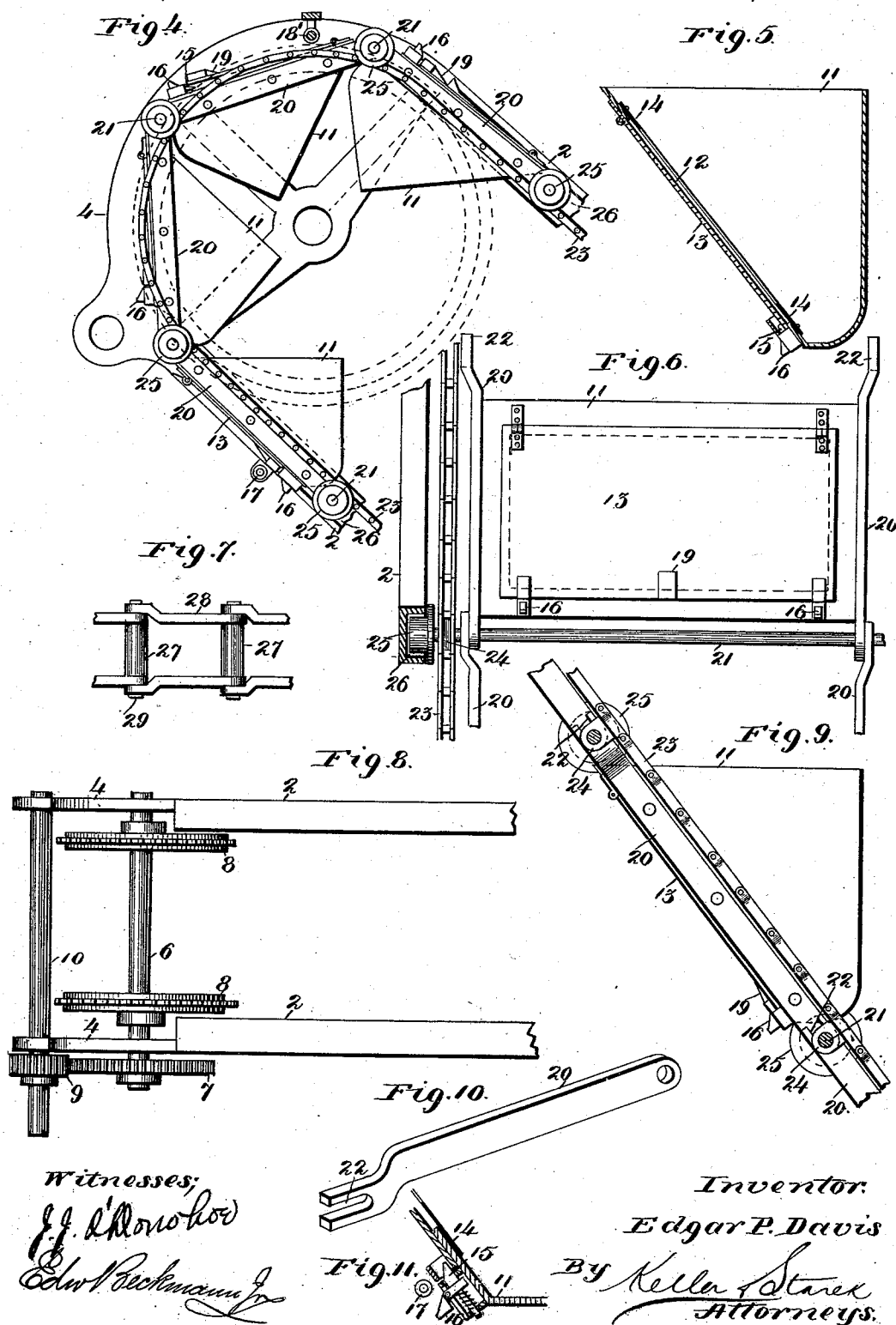
(No Model.)

2 Sheets—Sheet 2.

E. P. DAVIS.
WATER AND SAND ELEVATOR.

No. 534,551.

Patented Feb. 19, 1895.



Witnesses;

J. J. O'Rourke

Edw. Beckmann

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Edgar P. Davis

By Kella Starex
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UNITED STATES PATENT OFFICE.

EDGAR P. DAVIS, OF OMAHA, NEBRASKA, ASSIGNOR OF THREE-FOURTHS
TO ALEXANDER HOGELAND, OF LINCOLN, NEBRASKA, AND WILLIAM
H. MOORE AND JESSE T. BAKER, OF ST. LOUIS, MISSOURI.

WATER AND SAND ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 534,551, dated February 19, 1895.

Application filed February 2, 1894. Serial No. 498,839. (No model.)

To all whom it may concern:

Be it known that I, EDGAR P. DAVIS, of Omaha, Nebraska, have invented certain new and useful Improvements in Water and Sand Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in water and sand elevators and consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my complete invention. Fig. 2 is a view of one side of the upper end of the frame. Fig. 3 is a view of one side of the lower end of the frame. Fig. 4 is an enlarged view of one side of the upper end showing the position of the buckets passing said end. Fig. 5 is a detail vertical section of one of the buckets. Fig. 6 is a plan view of the bottom of one of the buckets with parts attached thereto. Fig. 7 is a plan view in detail of a portion of the chain. Fig. 8 is a plan view of the upper end of the frame with sprocket and gear wheels attached. Fig. 9 is a side elevation of one of the buckets with parts attached thereto. Fig. 10 is a perspective of one of the plates which is secured to the bucket; and Fig. 11 is a detail in section showing the spring catch for the hinged bottom of the bucket.

The present invention is an improvement on the construction covered by Letters Patent granted to A. Hogeland, Nos. 402,160, April 30, 1889, and 436,036, September 9, 1890, for water and sand elevators, and is designed to overcome certain objections inherent in said constructions, to simplify the apparatus, reduce the friction of the several parts and make other changes presenting specific advantages to be hereinafter more fully referred to.

The present device is devoid of the lower sprocket wheels, continuous tracks being substituted in lieu thereof. The weights of the descending buckets are fully utilized to balance the ascending ones which latter by virtue of the specific construction here employed discharge the water, sand or whatever may

be their contents, at a level relatively higher from the base of the elevator than was done in the old apparatus, and in addition, the contents being discharged before the bucket reaches its highest point, less power is required to carry the bucket from the point of discharge to its highest position than to carry a partially empty bucket to a like position as is done under the old construction.

Generally stated, the invention comprises a supporting and carrying frame having parallel channel bars on opposite sides serving as guides for the wheels of the traveling buckets and made continuous by properly curved connecting terminal pieces at the lower end of the frame; a terminal casting at the upper end connecting the channel bars and forming bearings for the shafts of the sprocket wheels at that end and such other gearing for imparting the necessary motion to the several parts; supports or props for the frame to give the latter its proper inclination; a series of buckets having hinged bottoms for the bodily and quick discharge of the contents of the same; suitable fastening devices for the bottoms; means attached to the frame against which the fastening devices are brought in contact for releasing said bottoms; additional means also secured to the frame for closing the bottoms after the discharge of the contents; gaskets for insuring a water-tight joint for each bottom when closed; plates secured to the buckets on either side and projecting above and below the same forming bearings for the shafts located between the buckets; wheels carried by the ends of said shafts and moving in the channel tracks; sprocket chains passing over the sprocket wheels and secured to the shafts for connecting the several buckets; and other features more fully hereinafter described.

In detail the apparatus may be described as follows:

Referring to the drawings, 1 represents the supporting and carrying frame which is composed of four parallel channel bars 2 suitably secured together which assist in guiding the buckets in a manner to be hereinafter described. To the lower ends of the bars 2 and made continuous therewith are two segmental

castings or terminal pieces 3 which are also channeled, thus forming a continuous track for the truck wheels of the buckets as best shown in Fig. 3.

5 4 represents two castings which are secured to the upper ends of the bars 2 but are not necessarily provided with channels, being employed principally to connect said bars and form bearings for the shafts of the
10 sprocket wheels and gearing necessary to impart motion to the several parts.

Secured to the frame 1 at a suitable distance from the upper end thereof is a support or prop 5 the lower end of which rests
15 upon a suitable foundation and which is designed to give the proper inclination to the conveyer, this in the present instance being about forty-five degrees the parts being proportioned and designed to suit this inclination.
20 Journalled in the castings 4 is a transverse shaft 6 one end of which projects a suitable distance beyond one side of the frame 1 and to which is fixed a gear wheel 7; and also fixed to said shaft between said castings are
25 two sprocket wheels 8 over which the endless chains pass for imparting motion to said chains. Meshing with said gear wheel 7 is a pinion 9 which is fixed to a shaft 10 journalled in the castings 4, and to which shaft 10 motion is imparted from any suitable source.
30

11 represents the buckets which are substantially the same in form as those shown in the patents above referred to, but differ from these in details of construction now to be described.
35 The buckets 11, or more properly the bottoms of the same are provided with openings 12 for the rapid discharge of their contents, and covering said openings and hinged to the outside of the buckets are doors 13 of a size sufficient to cover or overlap the edges of the openings; and secured to the inside of the buckets and overlapping the joints formed by the edges of the openings and the hinged doors are rubber or other suitable flexible strips or gaskets 14 which form
40 a water-tight joint, the overlapping edge of each strip being pressed against the edges of the hinged bottoms by the contents of each bucket. Secured to the buckets 11 are spring catches or bolts 15 which secure the hinged
50 doors 13 in a closed position, and forming a part of each bolt is an extension 16 which is adapted to come in contact with any suitable bar or tripping device 17 secured to the
55 frame 1 for releasing or withdrawing said bolts and allowing the doors 13 to open as they successively pass the releasing device 17, whereby the contents of the buckets is discharged upon a suitable trough or apron 18.
60 (See Fig. 1.) After the buckets have discharged their contents the doors 13 will automatically close by gravity, but to insure said closing I secure to the frame 1 an additional positive closing device 18' with which the
65 wedge-shaped lug 19 forming a part of each hinged door successively comes in contact as the buckets make their circuit.

Secured to the opposite sides of each bucket and adjacent to the bottom of the same are plates 20 the ends of which project a suitable
70 distance above and below the bucket, said projecting ends forming bearings for the transverse shafts 21 between each bucket. One end of each plate is provided with an opening for the passage of the shaft 21, and
75 the opposite end is bent outwardly (or toward the frame 1) and provided with a fork 22 which embraces the next succeeding shaft of the series, which passes through the opening of the adjacent end of a corresponding plate
80 of said series, whereby movable connection is made between each bucket the fork allowing for sufficient play between the buckets as the latter pass around the curved ends of the frame.
85

23 represent two sprocket chains which pass over the sprocket wheels 8 and are provided with bearings 24 which embrace the shafts 21 loosely as best shown in Fig. 9. Carried by the ends of the transverse shafts 21 are wheels
90 25 which move in and are guided by the channels or tracks 26 formed in the bars 2 of the frame 1.

In Fig. 7 I have shown a preferred form of sprocket chain which is composed of rollers
95 27 and links 28 united by pins 29, but do not limit myself to any precise construction as any suitable chain may be used for the purpose.

It will be apparent that the hinged bottom
100 or door of each bucket allows the contents to discharge suddenly and bodily when the point of discharge has been once reached by each bucket. The discharge is almost instantaneous, whereas under the old construction
105 each bucket described a conspicuous fraction of the entire path before the contents was fully discharged, thus relatively lowering the elevation of the discharge apron or trough. Under the old construction too, it is necessary
110 to keep raising each bucket from the beginning of its discharge to the completion of said discharge, requiring just so much driving power to accomplish the purpose, whereas by the present construction the discharge being
115 instantaneous, less power is necessary to elevate an empty bucket than one partially empty. There is also a reduction of friction by reason of the omission of the lower pair of sprocket wheels.
120

It is to be understood that I do not limit myself to the precise details of construction, any and all equivalents falling within the scope of my present invention.

Having described my invention, what I
125 claim is—

1. In an elevator, a suitable frame, suitable tracks on said frame, a series of buckets adapted to travel in the path of said tracks, wheels interposed between each pair of buck-
130 ets, shafts for said wheels, suitable plates secured to the sides of each bucket adjacent to the bottom thereof, a fork at one end of each plate, a suitable opening at the opposite end

forming a bearing, each shaft being adapted to pass through the bearing of one plate and between the fork of the next succeeding plate, and thus form a yielding connection between the buckets, substantially as set forth.

2. An elevator comprising a suitable frame, channel bars formed in the same, curved connecting terminal pieces at the lower ends of the channels, wheels movable within the channels, a shaft for each pair of wheels, buckets located between said shafts, plates secured to said buckets at opposite sides one end of each plate having an opening for the support of one shaft, and the other having a fork for

embracing the next succeeding shaft of the series, sprocket chains secured to said shafts, castings secured to the channels at the upper end forming bearings, wheels mounted in said bearings over which the sprocket chains pass, and means for imparting motion to said wheels, substantially as set forth.

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

EDGAR P. DAVIS.

Witnesses:

JEFF W. BEDFORD,
H. S. McDONALD.