No. 663,651. Patented Dec. 11, 1900.

A. M. ACKLIN & W. J. PATTERSON.

APPARATUS FOR ELEVATING AND HANDLING COAL.

(Application filed Nov. 11, 1898.)

(No Model.) 5 Sheets—Sheet 1.

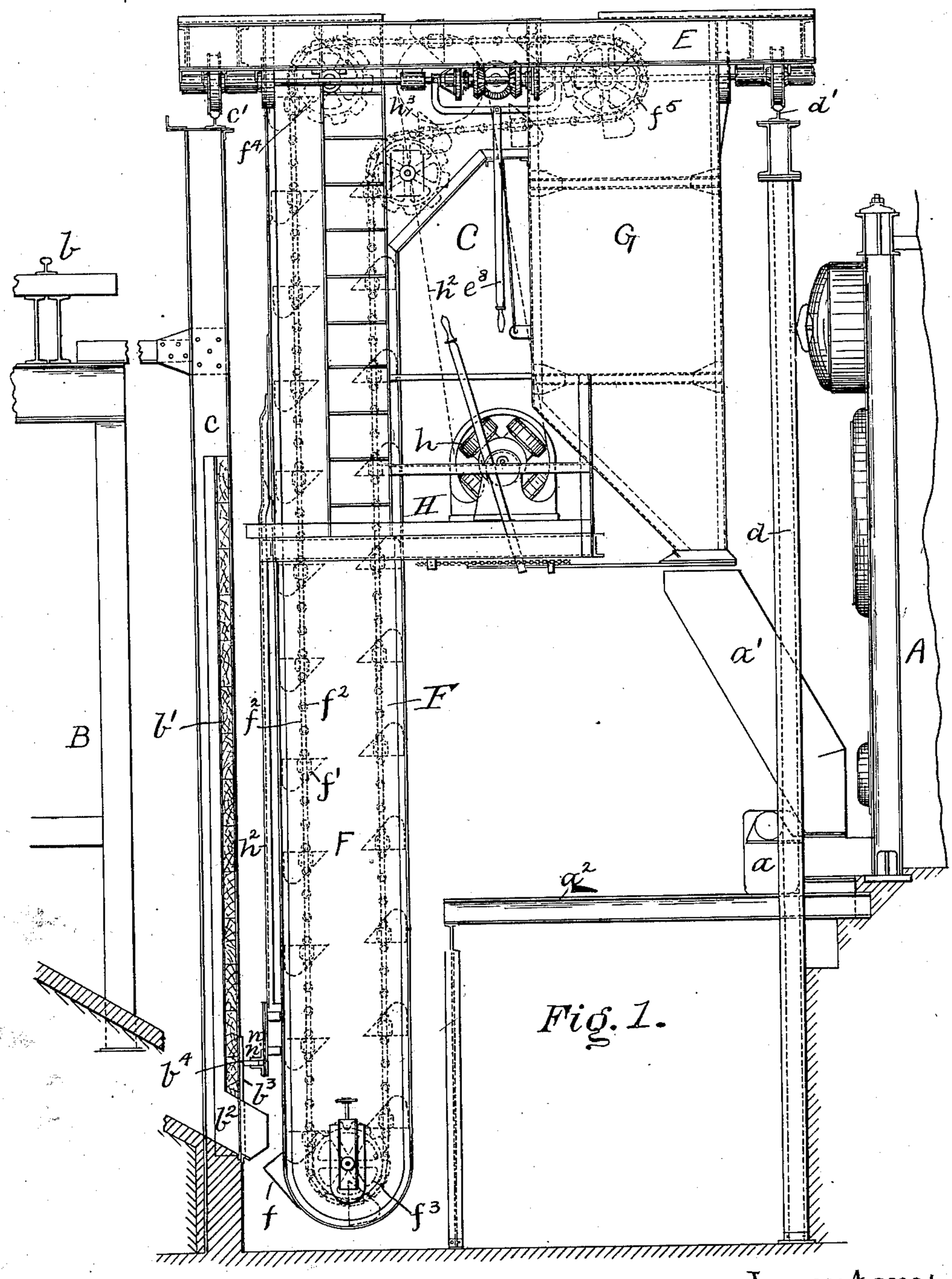

Fig. 1.

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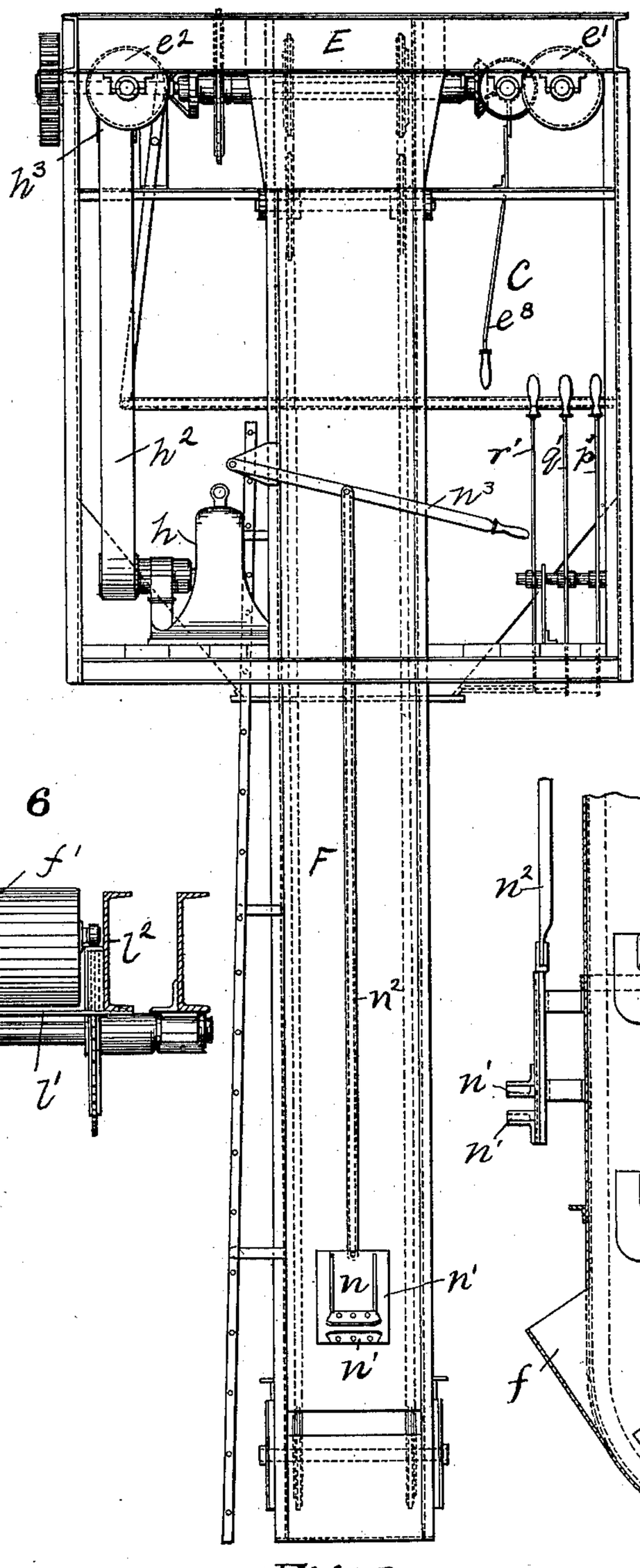


Fig. 2

Fig. 6

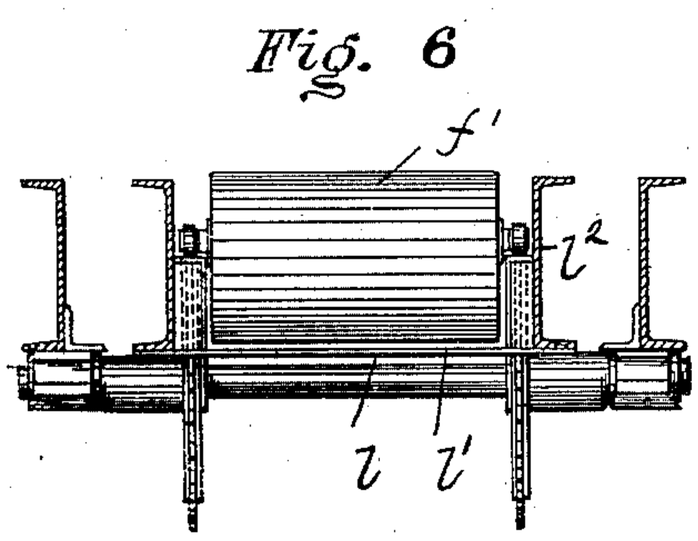
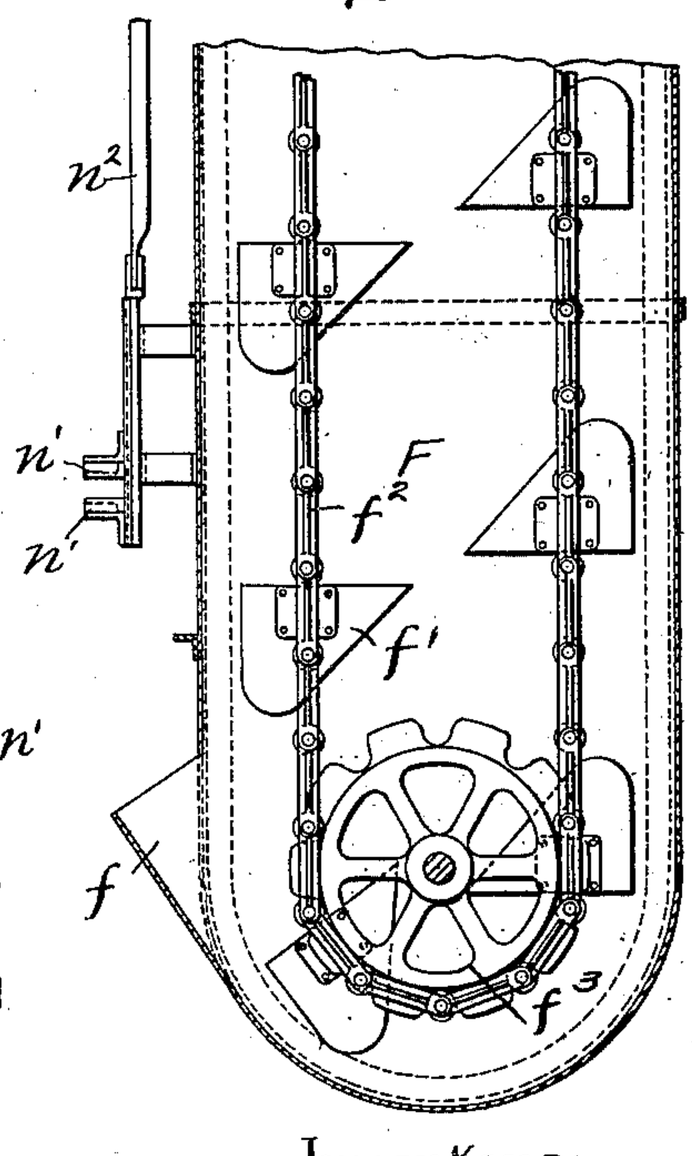


Fig. 5



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(No Model.) 5 Sheets—Sheet 3.

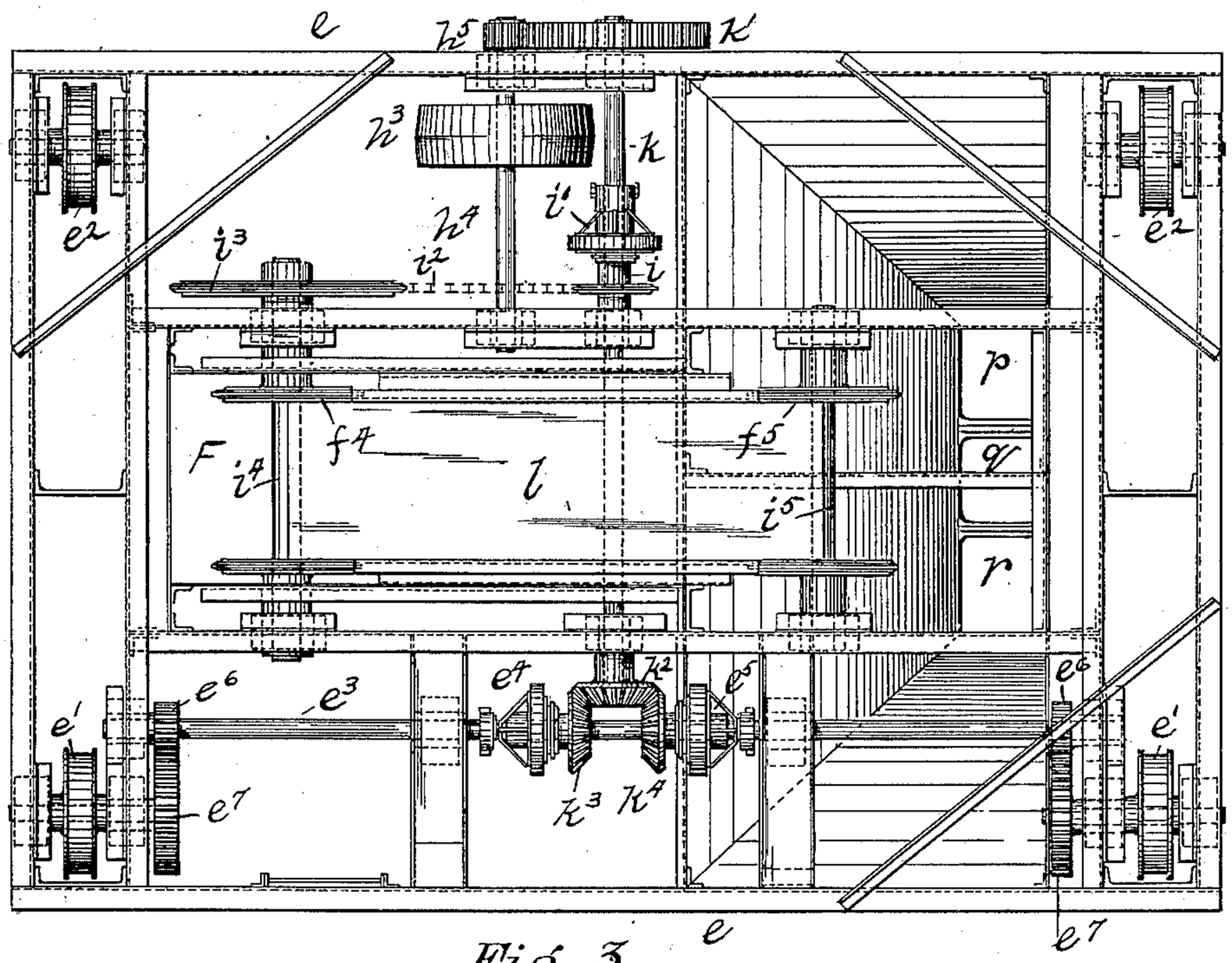

Fig. 3

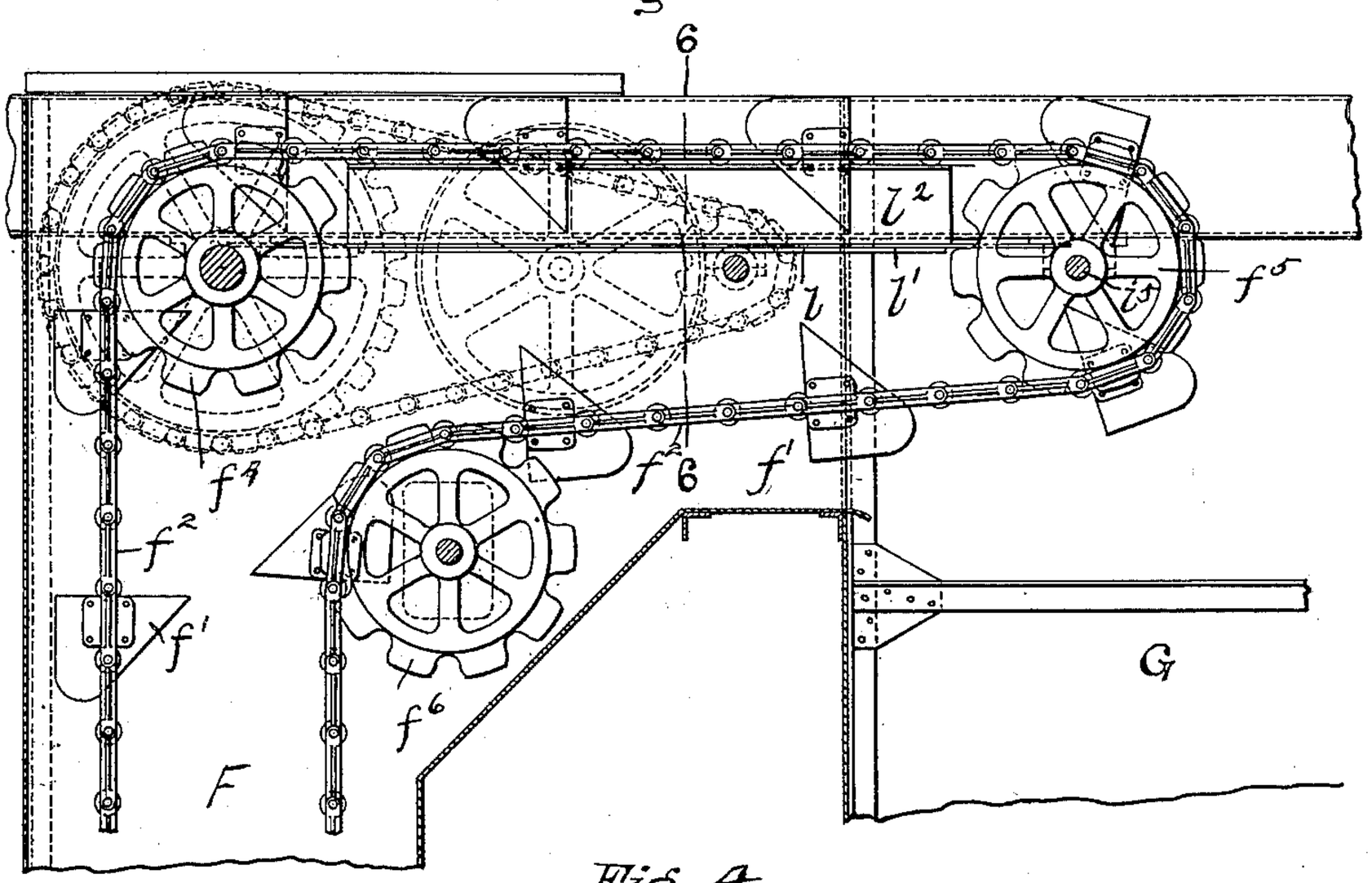

Fig. 4

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(No Model.) 5 Sheets—Sheet 4.

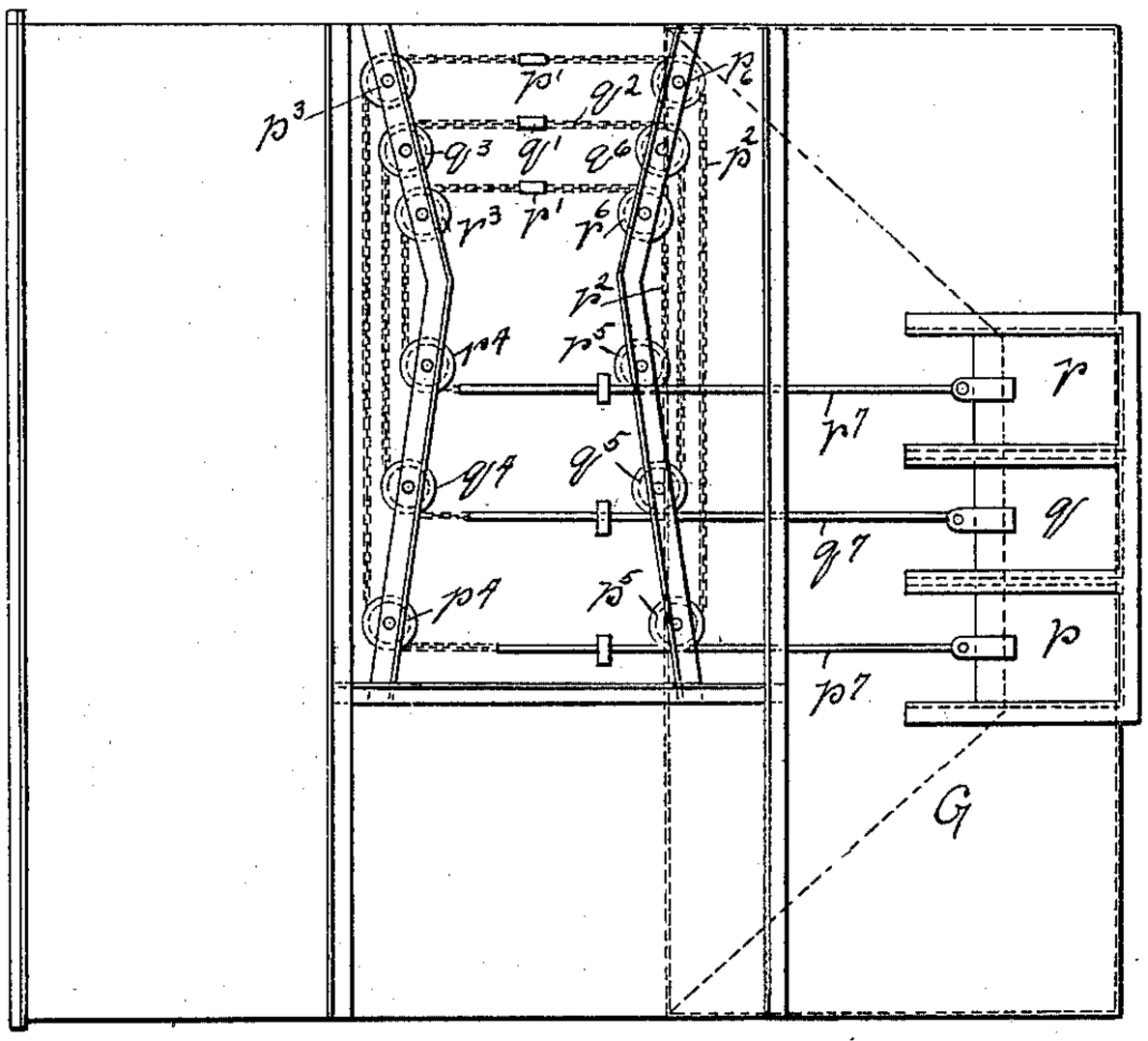

Fig. 7.

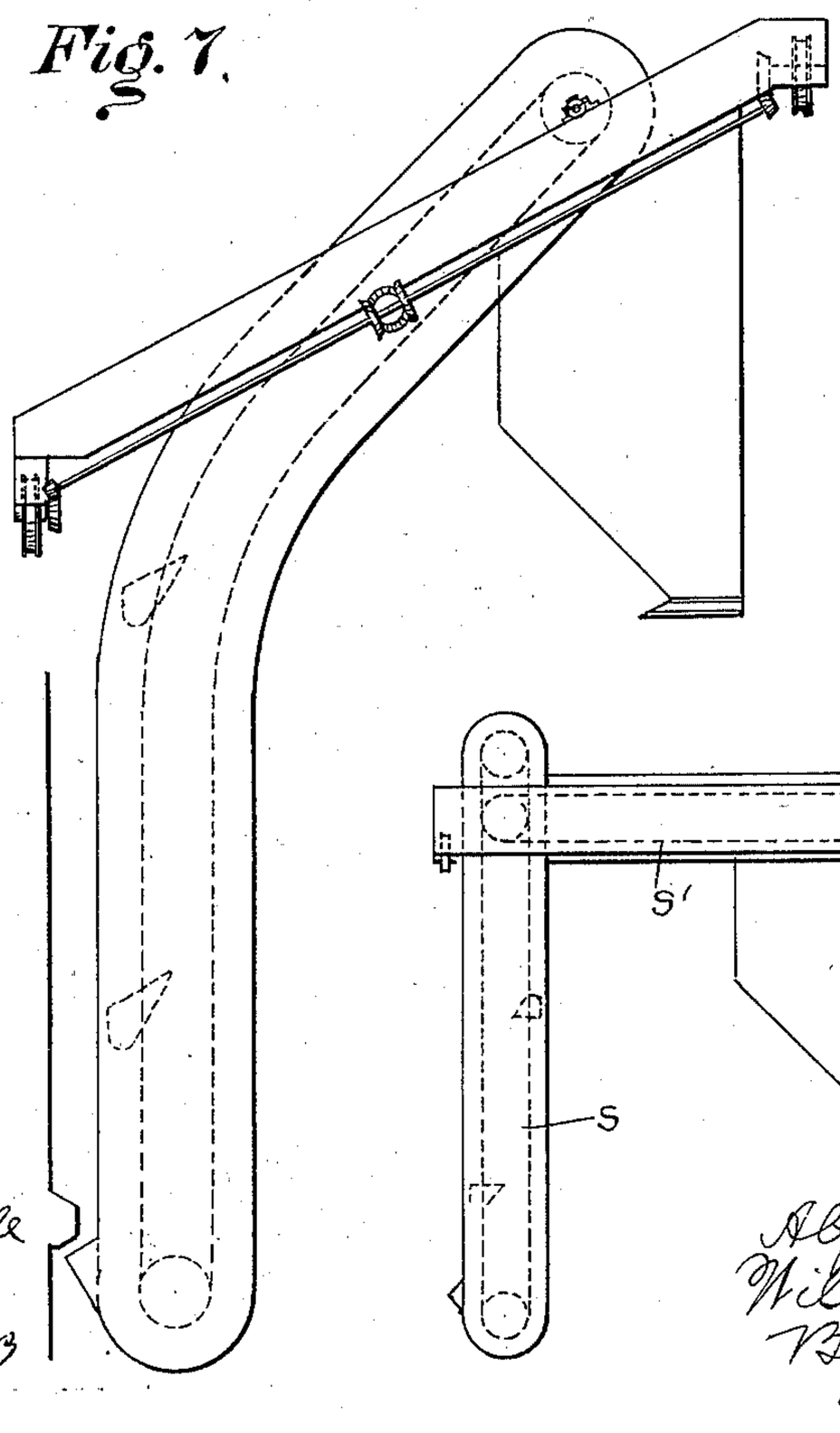

Fig. 8

Fig. 9

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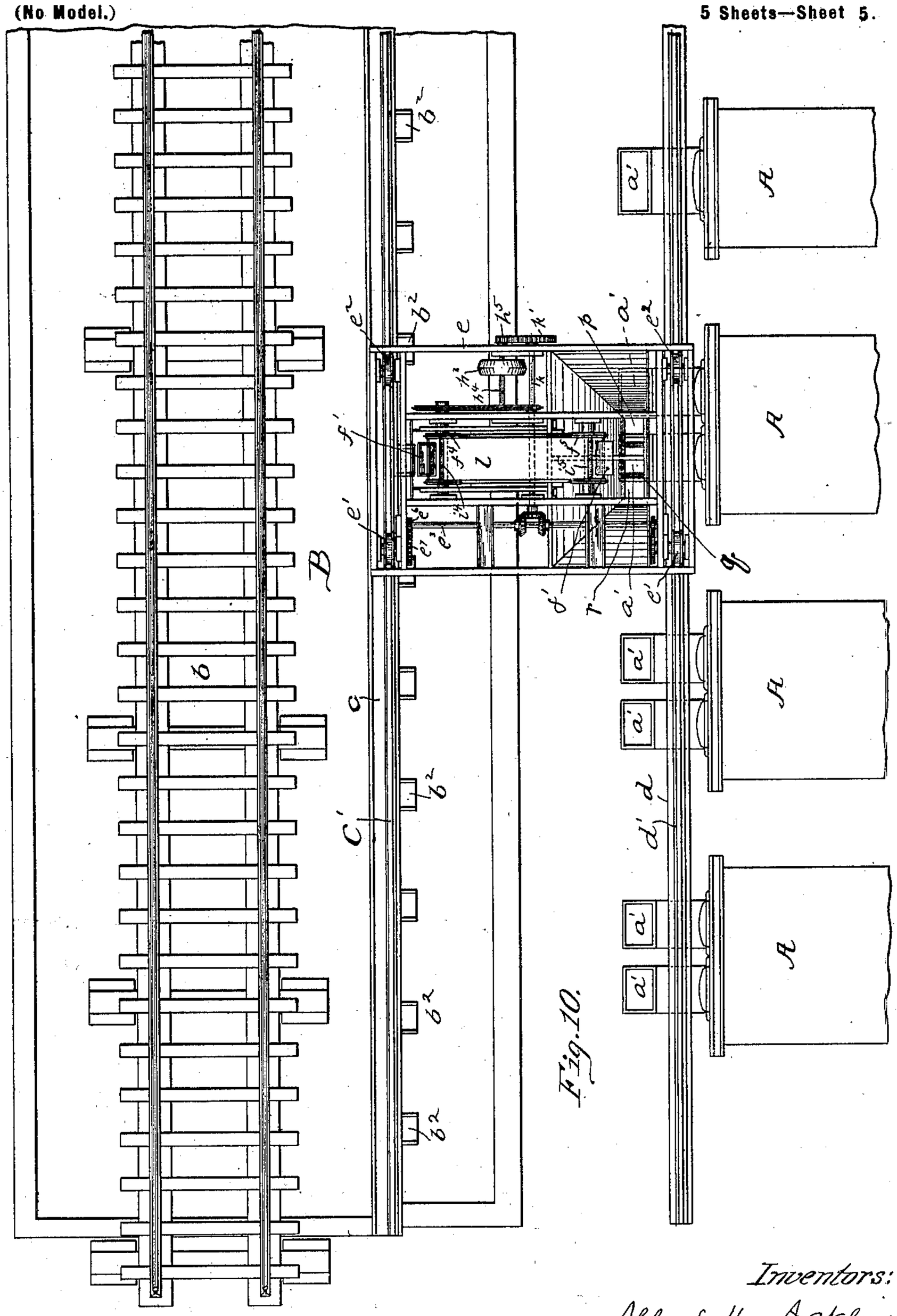

Fig. 10.

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UNITED STATES PATENT OFFICE.

ALFRED M. ACKLIN AND WILLIAM J. PATTERSON, OF PITTSBURG, PENNSYLVANIA, ASSIGNORS TO THE HEYL & PATTERSON, OF SAME PLACE.

APPARATUS FOR ELEVATING AND HANDLING COAL.

SPECIFICATION forming part of Letters Patent No. 663,651, dated December 11, 1900.

Application filed November 11, 1898. Serial No. 696,115. (No model.)

To all whom it may concern:

Be it known that we, ALFRED M. ACKLIN and WILLIAM J. PATTERSON, residents of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Elevating and Handling Coal; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to elevators for coal or grain or other loose material, its object being to provide a traveling elevator capable of receiving the coal from the bin or bunker and raising it and feeding it either directly into the receiving chutes or reservoirs located in line with the gates of the coal-bin or hold it and carry it from point to point, as may be necessary, while it provides not only for storage of the coal, but for distribution thereof and at different points in relation to the elevator-carriage, according to the requirements of the plant.

To these ends it consists, generally stated, in combining with the bins or bunker a traveling carriage having an elevator adapted to receive the coal or other material and raise the same and a reservoir on the elevator-carriage at the delivery end of the elevator in which the same may be stored when necessary or through which it may pass to the individual reservoirs or chutes, according to the necessities of the case.

It also consists in certain improvements in the means for opening the bunker-gates, in the means for operating the gates of the elevator-reservoir, and in certain other improvements, all of which will be hereinafter more fully set forth and explained.

To enable others skilled in the art to make and use our invention, we will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a side view, partly broken away, illustrating the plant. Fig 2 is a rear view. Fig. 3 is an enlarged top view, the buckets being omitted. Fig. 4 is an enlarged detailed view of the upper part of the elevator. Fig. 5 is an enlarged bottom view of the elevator. Fig. 6 is a cross-section on the line 6 6, Fig. 4. Fig. 7 is a bottom view of the carriage to illustrate the movement of the reservoir-gates. Figs. 8 and 9 are diagrammatic views showing modifications of the invention, and Fig. 10 is a plan view illustrating the general invention.

Like letters of reference indicate like parts in each view.

The invention is illustrated in connection with a plant for carrying coal from the ordinary bunkers from a bin to a battery of boilers containing automatic stokers, and as this well illustrates the advantages of the invention it will be described in connection with the same.

The battery of boilers is shown at A, the battery having the stokers a, and extending along the said battery at intervals corresponding with the different stokers to be supplied with coal are the individual chutes or coal-reservoirs a', which are to be filled from time to time, so as to maintain a supply for use in the boiler-furnaces. In line with the stokers a is the working platform a^2 of the boiler plant. The drawings show only parts of the coal bin or bunker B over which the track b passes, along which the cars travel to fill the bunkers. The outer wall of the bunker is formed in connection with the rear standard c, which supports the rear track c', on which the elevator-carriage C travels, the outer wall of the bunker being formed between the standards c, as at b'. At intervals in its side walls near the bottom of the bunker are the discharge-spouts b^2, which are controlled by gates b^3, having pins b^4 thereon, with which mechanism on the elevator-carriage engages, as hereinafter described. On the other side of the machine, extending along the boiler plant, are the standards d, supporting the track d', the track-rails c' and d' giving support to the elevator-carriage and being located at any desired distance apart, according to the requirements of the plant. The elevator-carriage is composed of the truck-frame E, traveling on the tracks c' d' and giving support to the different parts of the carriage, and the bucket-chamber F, elevator-reservoir G at the delivery end of the elevator, and working platform H. The truck E is of suitable beam structure, and it carries the driven truck-wheels e' and the loosely-running truck-wheels e^2 on the track, the driven truck-wheels being operated in the

following way: On the platform H is the motor h, which is preferably an electric motor and from which a band h^2 (shown on dotted lines) extends up to the pulley h^3 on the shaft h^4, mounted in the truck-frame and carrying the pinion h^5, meshing with the pinion k' on the shaft k. At the opposite end of the shaft k is the bevel-pinion k^2, meshing with the bevel-pinions k^3 k^4, running upon the shaft e^3, clutches e^4 e^5 on said shaft engaging with the pinion k^3 k^4, so as to rotate the shaft e^3 in either direction, and the said shaft having pinions e^6 meshing with gear-wheels e^7, secured upon the shafts carrying the truck-wheel e', the direction of movement of the carriage being thus controlled through said clutches by the hand-lever e^8.

The bucket-chamber F is formed of plate metal, and it hangs down from the truck in line with the coal bin or bunker, and, as shown in Figs. 1 to 6, it has the inclined mouth or chute F^7 in line with the bunker-spouts b^2. It carries a series of buckets f' on the chain f^2, this chain passing around the lower guide-sprocket f^3 and passing thence around the driven sprocket f^4 and around the guide-sprocket f^5 directly above the reservoir G and thence around the guide-sprocket f^6, over which the chains pass in their downward course.

To drive the elevator with buckets, we employ the sprocket-wheel i, mounted on the shaft k, with which the clutch i' engages, and the chain i^2, extending from this sprocket-wheel to the sprocket i^3, secured on the shaft i^4, which carries the driving-sprockets f^4. It will be noticed that the elevator-chains, with their buckets, travel horizontally across the upper part of the carriage until drawn over the reservoir G, the extent of this horizontal travel of course depending upon the width of the carriage. The buckets as they rise would naturally dump or deposit their load in passing around the driving-sprockets f^4; but it will be noticed that extending between the shaft i^4, carrying said sprocket, and the shaft i^5, carrying the guide-sprocket f^5, there is the trough l, over which the buckets travel, so that the coal is carried horizontally along said trough and deposited into the reservoir G. The construction of the trough, which is composed of the bottom plate l' and the beams l^2, is clearly shown in Fig. 6.

As the elevator-carriage travels along in front of the bunker, it is of course desirable that all the means for operating the bunker-gates shall be under the control of the operator on the carriage, and we provide means for accomplishing this as follows: On the rear face of the bucket-chamber F, mounted with guides thereon, is the sliding plate n, which carries the catch n', formed of lips extending backwardly therefrom, the outer ends of these lips being flared, as shown in Fig. 2, so that as the carriage travels along the bunker the gate-pins b^4 of the bunker-gates will pass within the catch n', being directed therein by the flaring ends of said lips, and be in position to be raised by the sliding plate n. For this purpose the strap n^2 extends up from the sliding plate n to the hand-lever n^3 on the working platform, and it is only necessary for the carriage to be moved along in front of the bunker, the gate-pins at each gate thereof passing within the catch n', and when it is desired to open any one of these gates the lever n^3 is raised and locked in raised position, so opening the bunker-gate, when the coal will pass down into the lower part of the bucket-chamber F, being directed into the same by the incline f^7.

As shown in the several drawings, the elevator-carriage has the reservoir G, above referred to, which extends for the full width of the carriage, as fully shown in Fig. 3, and overhangs the chutes a'. This reservoir enables the operator to carry a large body of coal along with the elevator and makes it practicable to receive the coal from a bin not in line with the hopper or reservoir to which the coal is to be fed by the elevator and to carry the same to and discharge it into any one of the individual hoppers or reservoirs a' needing the supply. This is a great advantage not only in receiving coal from bunkers distant from the boiler plant, but even where it is found that the bunker in line with any particular reservoir is empty the coal can be carried on the elevator from another bunker to the individual reservoir requiring supply.

The individual reservoirs are generally narrow, and if the elevator-reservoir were made at such incline as to discharge the coal through the same the capacity of the elevator-reservoir would be small. It is also sometimes difficult on account of the structure of the supporting-frame and for other reasons to bring the machine into line both with the bunker-gate and the individual reservoir. To provide for these contingencies, we form two or more reservoir-gates, such as the gates p q r at the base of the elevator-reservoir, and by so doing we increase the width of the reservoir and increase its capacity, while any one of the three gates can be brought above any individual reservoir into which the coal is to be fed, according as desired or according to the relative positions of the bunker-gates to that individual reservoir. These several gates are operated by the hand-levers p' q' r'. It is difficult, however, to operate these reservoir-gates without causing the lever connections to interfere, and for that reason we have arranged the operating mechanism as follows: Mounted on the under face of the elevator-platform, as shown in Fig. 7, are a series of pulleys around which chains pass and which connect the hand-levers with levers or straps operating the gates. For example, the chain p^2 extends around the guide-rollers p^3 p^4 p^5 p^6 and is connected to the straps p^7. Within said circuit so formed by the chains p^3 is another like circuit formed

by the chain q^2, passing around the pulleys q^3 q^4 q^5 q^6 and connected to the strap q^7, while within this second circuit is the chain r^2, passing around the pulleys r^3, r^4, r^5, and r^6 and connected to the strap r^7, and in this way the several gates can be operated without interference with each other and by a like short movement of the individual levers.

In employing the elevator constructed as above described by means of the motor h on the working platform it is moved along the track between the coal-bunker and battery of boilers until brought opposite to the bunker-gate through which it is to draw the coal. One of the gates of the elevator-reservoir is in this way brought over the individual reservoir or chute belonging to the particular stoker to be charged. According to the location of this individual reservoir or chute and its coincidence with one or the other of the reservoir-gates p, q, or r the elevator is adjusted to bring one of said gates over the individual reservoir or chute. As the elevator has moved across the bunker-gate its catch n' of the sliding plate n is passed over each side of the guide-pin b^4, as shown in Fig. 1, and the operator then raises the guide by means of the hand-lever n^3, and by the shifting of the lever controlling the clutch i' he starts the elevator-chain movement, and while the coal passes from the bunker-gate over the guideway f into the bottom of the bucket-chamber it is received in buckets and lifted, thereby being carried up vertically to the top of the elevator-carriage, then horizontally along the trough l, and the coal is deposited in the reservoir G, from which it will pass down through the reservoir-gate coinciding with the individual reservoir and feed the coal into such reservoir or chute. When it is filled, the operator has only to close that particular reservoir-gate, and the coal continued to be carried up will be carried into the reservoir G and stored there. The several gates on the bottom of the elevator-reservoir provide for adjustment of the movable carriage, so as to receive the coal from a bunker not in direct line with the stoker-reservoir and feed it properly thereto without the necessity of storing the coal in the elevator-reservoir. This elevator-reservoir, however, provides for the holding of a large body of coal, which can be obtained at any particular bunker, even though the same may not be in line with any part of the battery of boilers, and carrying the same to and feeding it into the stoker reservoir or chutes, as desired. The machine overcomes the necessity of distributing the coal evenly throughout a continuous bunker extending in line with the battery of boilers, while all of the parts are under the control of the operator as he stands on the motor-platform. When he desires to move to another bunker-gate, he simply closes down the bunker-gate b^3 by means of the sliding plate n with its catch n', through the movement of the clutch-lever e^8 moves the elevator-carriage along to the desired position, opens another bunker-gate, and proceeds to lift the coal therefrom into the elevator-reservoir, either discharging it directly from the same or storing it therein, to be carried to another point. In the filling of any individual stoker-reservoir which is not in line with any of the bunker-gates he can draw from the side the coal maintained in the elevator-reservoir, discharging the same without the necessity of even running the chain and its buckets, which would temporarily prevent the running of same.

In Figs. 8 and 9 we have shown diagrammatic views of other forms of the elevator-carriage with its elevator mechanism. Fig. 8 illustrates such a construction in which on account of the shape of the building, such as where it has an inclined roof, it is not practicable to carry the entire body of the elevator-carriage to the same height. In this case the elevator-carriage is made inclined, as shown, and travels on tracks arranged one above the other, and to provide for lifting the load to the highest point to discharge the same into the reservoir G the bucket-chamber is made part vertical and part inclined, the chain and buckets, which are indicated by dotted lines in the diagrammatic figure, carrying the coal up to and around the upper sprocket, which is driven a suitable way, the coal being thus deposited in the reservoir. In Fig. 9 is shown another diagrammatic view illustrating another suitable construction or modification of the elevator, in which a vertically-moving chain, with its buckets, as at s, is provided to lift the coal above a horizontally-moving chain, with its buckets, as at s', the coal being carried by the horizontal chain over into the reservoir G. These figures are added to indicate possible changes in the construction of the elevator part of the apparatus.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination with a stationary supply-bin having a discharge-opening, and a stationary chute or reservoir, of an overhead traveling carriage running on tracks between the bin and chute, elevator mechanism supported by the carriage, and a reservoir supported by the carriage at the delivery end of the elevator and adapted to discharge into the chute, substantially as set forth.

2. The combination with a stationary supply bin or bunker having a series of discharge-openings arranged at intervals, and a series of stationary receiving chutes or reservoirs, of a carriage running on tracks between the bin and chutes, elevator mechanism supported by the carriage, and a reservoir supported by the carriage at the delivery end of the elevator, said reservoir overhanging the stationary chutes and having a discharge-opening in its bottom.

3. The combination with a stationary supply-bin having a series of discharge-gates ar-

ranged at intervals, and a series of stationary chutes or reservoirs, of an overhead traveling carriage running on tracks between the bin and chutes, elevator mechanism supported by the carriage, and a reservoir supported by the carriage at the delivery end of the elevator and overhanging the stationary chutes, said reservoir having a discharge-gate in its bottom, adapted to discharge into the chutes, substantially as set forth.

4. The combination with a traveling carriage supported on an elevated track and having a reservoir adjacent to one side, a stationary supply bin or bunker located at the side of the track remote from the reservoir, and provided with a discharge-opening, and a stationary receiving chute or reservoir located at the other side of the track, of chain-and-bucket conveyer mechanism operating both vertically and horizontally between the bunker-outlet and the top of the carriage-reservoir and a trough for the horizontal path of the buckets, substantially as set forth.

5. The combination of a bunker having an opening therein, a gate controlling said opening, a carriage running on a track in front of said bunker, elevator mechanism supported by said carriage, and mechanism on said carriage adapted to engage with the bunker-gate and open same, substantially as set forth.

6. The combination with a bunker having an opening therein, a gate controlling said opening, of a carriage running on a track in front of said bunker, elevator mechanism supported by said carriage, a sliding plate on said carriage adapted to engage with the bunker-gate, and mechanism for raising and lowering said sliding plate, substantially as set forth.

7. The combination with a bunker having an opening therein, a gate controlling said opening, of a carriage running on a track in front of said bunker, elevator mechanism supported by said carriage, a sliding plate on said carriage adapted to engage with the bunker-gate, said bunker-gate being provided with a projection and said plate having a catch adapted to pass above and below the same, and mechanism for raising and lowering said sliding plate, substantially as set forth.

8. The combination with a bunker having an opening therein, a gate controlling said opening, of a carriage running on a track in front of said bunker, elevator mechanism supported by said carriage, a sliding plate on said carriage, said bunker-gate being provided with a pin and said sliding plate having lips adapted to pass above and below said pin, the lips flaring at their outer ends, substantially as set forth.

9. The combination with a suitable elevated track, of an elevator-carriage traveling thereon, having a depending bucket-chamber at one side and a reservoir at the opposite side, a chain having buckets and traveling through said bucket-chamber and in an approximately horizontal path between the top of the bucket-chamber and the top of the reservoir and a substantially horizontal trough through which the buckets move between the bucket-chamber and the reservoir, substantially as set forth.

10. The combination with a suitable elevated track, of an elevator-carriage traveling thereon, having a depending bucket-chamber at one side and a reservoir at the opposite side, a chain having buckets and traveling through said bucket-chamber, a substantially horizontal trough extending from the top of the bucket-chamber to the reservoir, means for guiding and moving the buckets through the bucket-chamber and the trough and a stationary chute over which the elevator-reservoir travels, substantially as set forth.

11. A traveling elevator, a reservoir carried by said elevator, one or more sliding gates in the bottom of said reservoir, operating-straps connected to said gates, chains connected with said straps, guide-pulleys around which said chains pass and levers connected with said chains, substantially as set forth.

12. A traveling elevator, a reservoir carried thereby, one or more sliding gates in the bottom of said reservoir, operating-straps connected with said gates, chains connected with said straps, guide-pulleys around which said chains pass, and levers connected with said chains, the chain system for operating one gate being arranged within the chain system for operating another gate, substantially as set forth.

13. The combination of an elevated track, with a traveling elevator provided with a truck running on said track, a bucket-chamber depending from said truck on one side of the carriage, a reservoir depending from the truck on the other side of the carriage, three sprocket-wheels located at the upper end of the bucket-chamber, two of which are journaled in a substantially horizontal plane, a horizontal trough extending between said two sprocket-wheels, and a chain provided with buckets and supported and running on said sprocket-wheels.

In testimony whereof we, the said ALFRED M. ACKLIN and WILLIAM J. PATTERSON, have hereunto set our hands.

ALFRED M. ACKLIN.
WILLIAM J. PATTERSON.

Witnesses:
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ROBERT C. TOTTEN.