

G. E. TITCOMB.
 PLANT FOR HANDLING AND STORING COAL.
 APPLICATION FILED APR. 7, 1911.

1,011,276.

Patented Dec. 12, 1911.

6 SHEETS—SHEET 1.

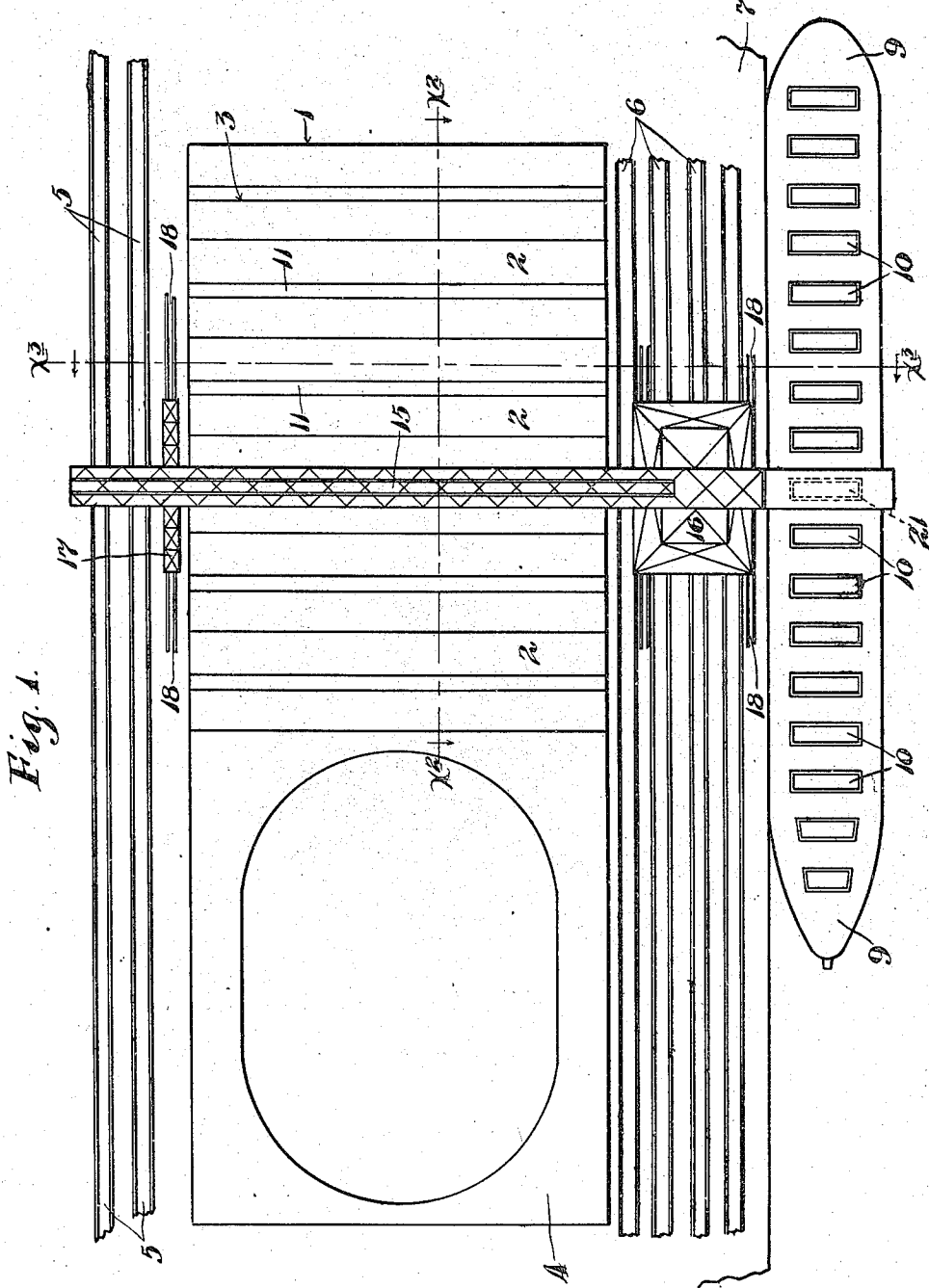


Fig. 1.

Witnesses.
 H. L. Opsahl.
 A. H. Opsahl.

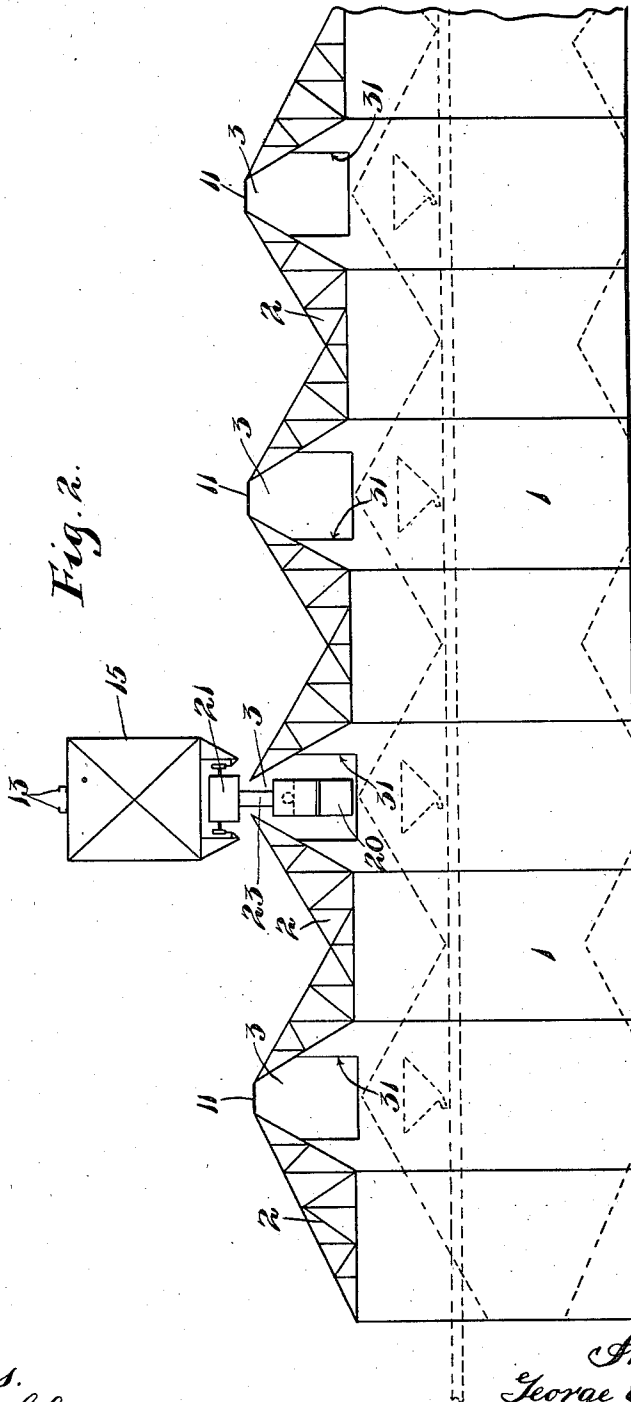
Inventor.
 George E. Titcomb.
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6 SHEETS-SHEET 2.



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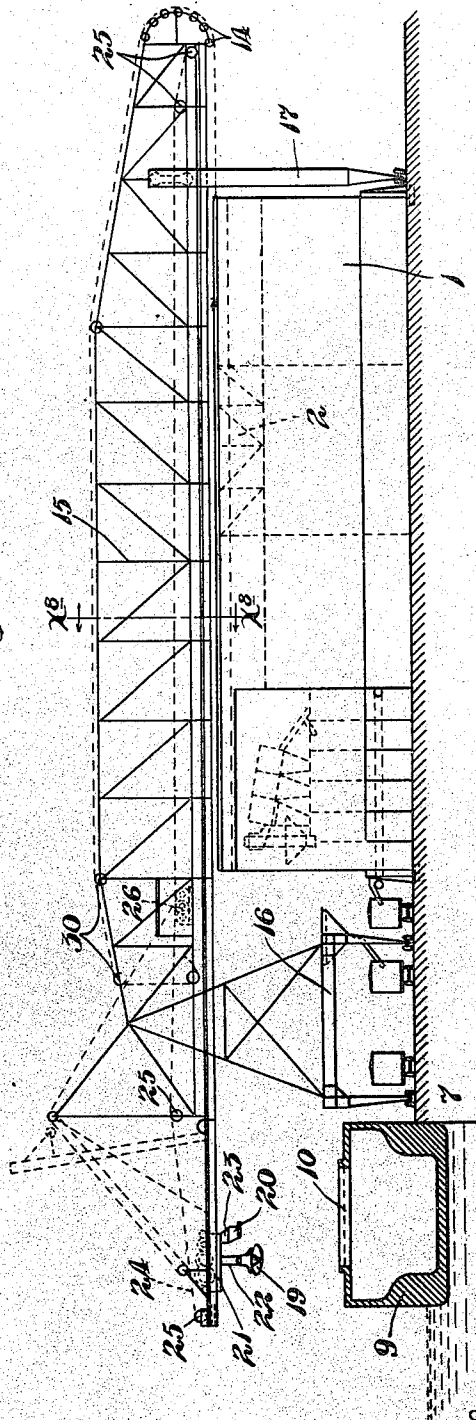
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6 SHEETS—SHEET 3.

Fig. 3.



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6 SHEETS—SHEET 4.

Fig. A.

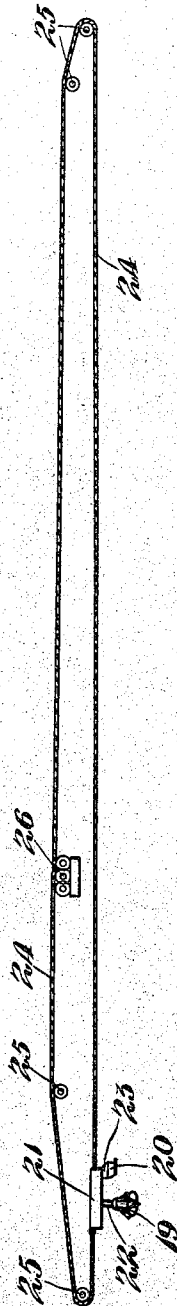
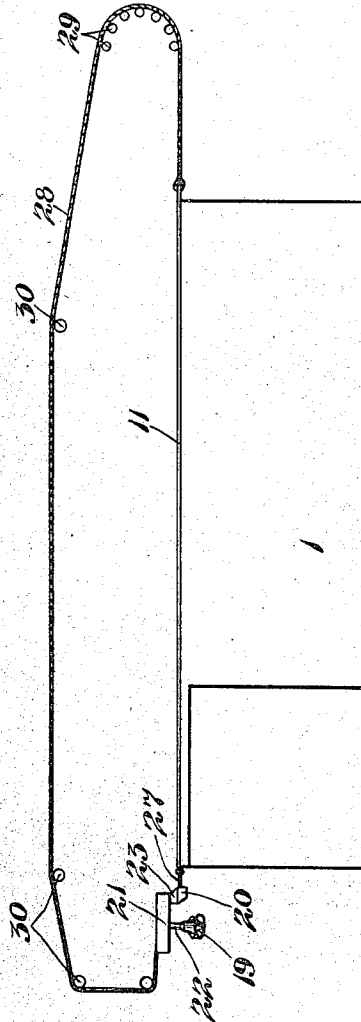


Fig. 5.



Witnesses.
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A. H. Opsahl.

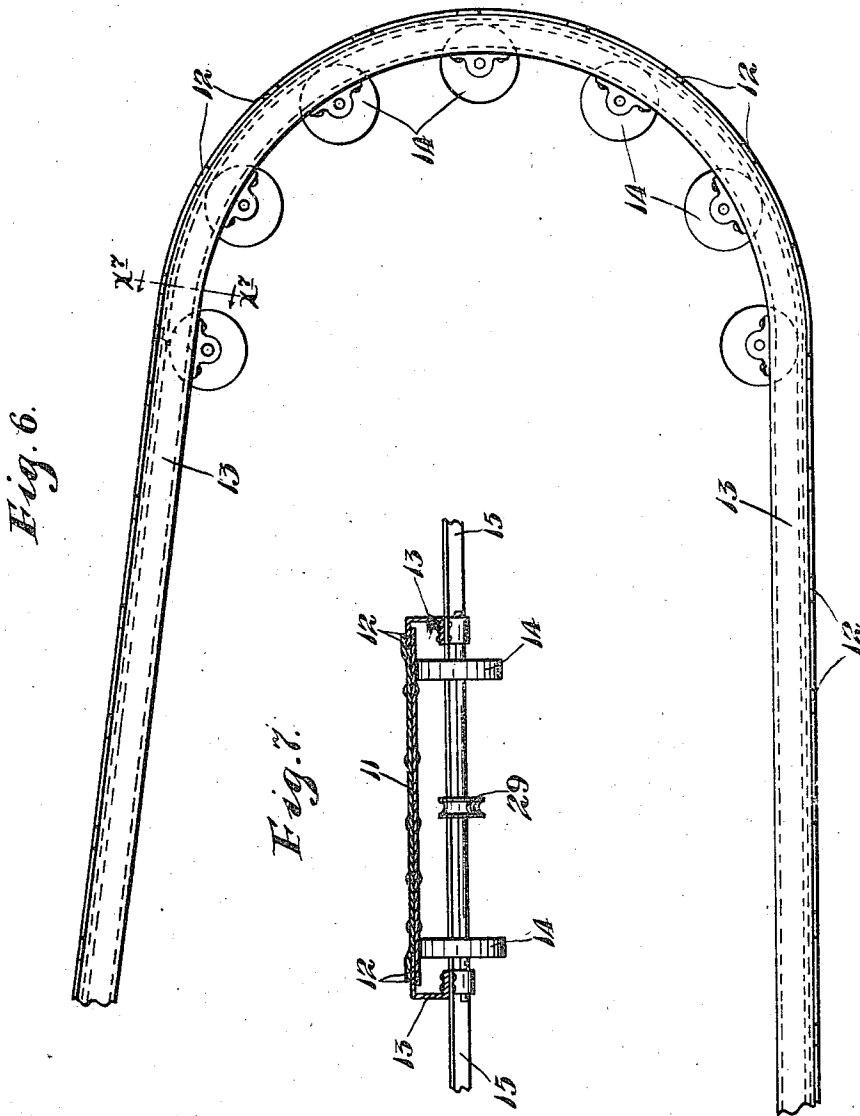
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6 SHEETS—SHEET 5.



Witnesses.
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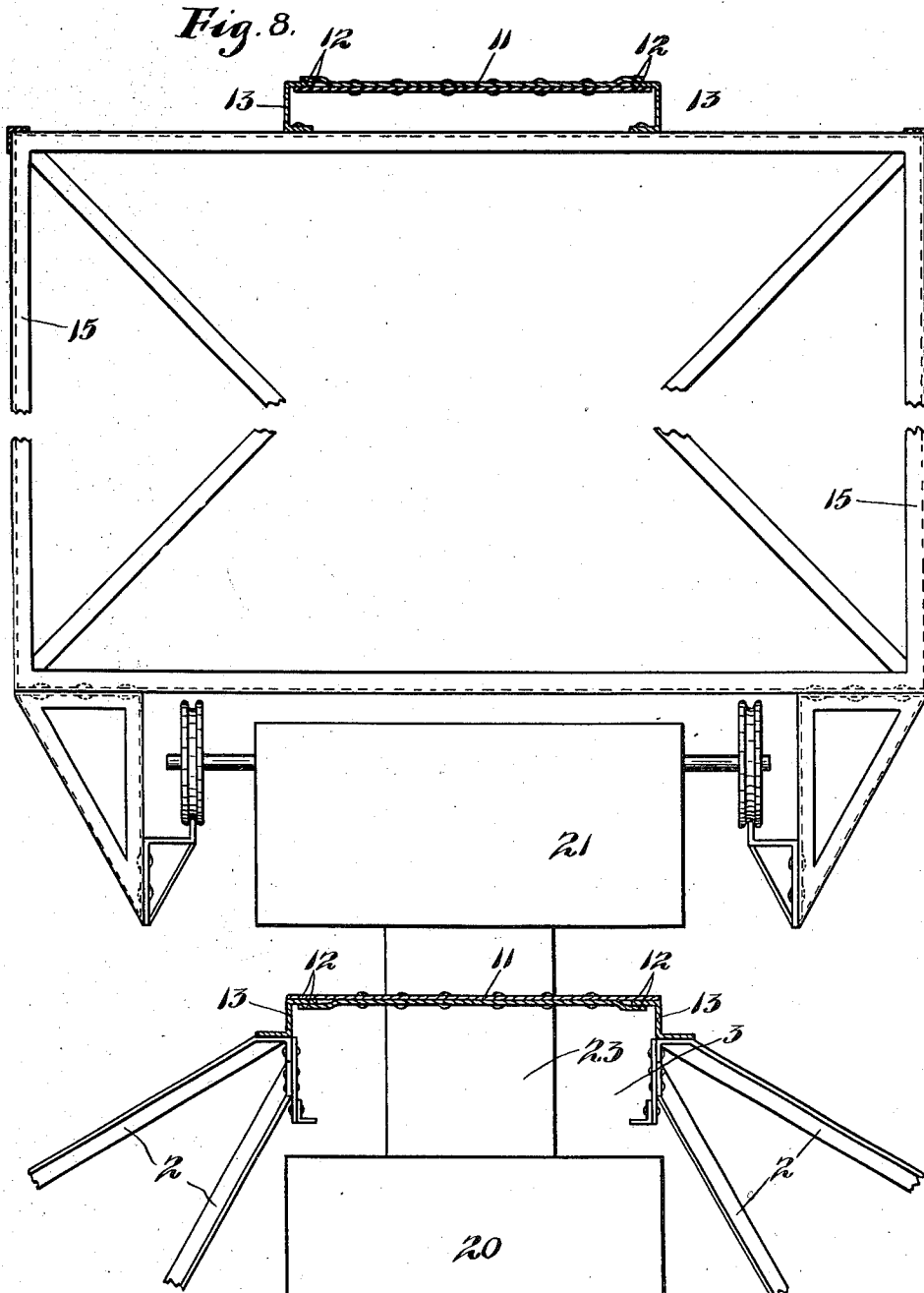
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6 SHEETS—SHEET 6.



Witnesses.
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UNITED STATES PATENT OFFICE.

GEORGE E. TITCOMB, OF PHILADELPHIA, PENNSYLVANIA.

PLANT FOR HANDLING AND STORING COAL.

1,011,276.

Specification of Letters Patent.

Patented Dec. 12, 1911.

Application filed April 7, 1911. Serial No. 619,454.

To all whom it may concern:

Be it known that I, GEORGE E. TITCOMB, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Plants for Handling and Storing Coal; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to plants for the storage and handling of coal and more particularly to that type of plant wherein bridge tramways are employed in connection with large storage buildings at coal docks or similar shipping terminals or transfer stations.

Generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

At coal docks, where coal is handled in great quantities, anthracite coal is nearly always stored in inclosed buildings where it is protected from rain and snow and kept clean and in bright condition, while the bituminous coal is usually stored either on open dock or in an open-topped building. The buildings for containing the anthracite coal are usually divided into long connected sections and the roof of each section has usually been provided with a multiplicity of hatchways large enough to permit a large grab bucket to be lowered and raised there-through. Sometimes, also, local tracks have been arranged within storage houses and upon which are arranged to travel a car provided with grab buckets for delivering the coal to the proper place within the building and for reclaiming the coal.

In accordance with my invention, I provide continuous or open-ended hatchways in the roof of the coal storage building and in connection therewith provide a traveling bridge tramway equipped with a car which carries the grab bucket. The car on the bridge tramway is arranged to travel above the roof structure, but the grab bucket and

the operator's platform, both of which are carried by the car, are arranged to travel below the hatchways of the roof structure, so that the operator may see to properly control the raising and lowering movements of the bucket when the latter is within the building. The hatchways in the roof need not, therefore, be made as wide as the bucket or as the operator's platform, but only wide enough to clear the bucket supporting cable and a connection for supporting the operator's platform from the car.

The hatchways are normally closed by very large and long flexible steel ribbons that are arranged to slide to and from their normal or closed positions and which, furthermore, are arranged to be thus slid by a suitable connection to the bucket supporting car.

By traveling movements of the bridge tramway, the grab bucket may be alined with any one of the roof hatchways and may be operated at any point beneath any one of such hatchways. Furthermore, when desired, the bridge tramway may be moved entirely away from the anthracite building and used to handle bituminous coal, either in an adjacent building or upon an adjacent open dock.

The invention is further illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a diagrammatic plan view illustrating the invention; Fig. 2 is a diagrammatic vertical section taken approximately on the line $x^2 x^2$ of Fig. 1; Fig. 3 is a diagrammatic vertical section taken approximately on the line $x^3 x^3$ of Fig. 1; Fig. 4 is a diagrammatic view in elevation illustrating a cable connection for operating the tramway car; Fig. 5 is a diagrammatic view in elevation illustrating connections for operating any one of the hatchway closing ribbons from the bridge tramway car; Fig. 6 is an enlarged view in elevation, illustrating means for supporting and guiding the flexible hatchway closing ribbons when they are moved into open positions; Fig. 7 is a transverse section taken

on the line $x^7 x^7$ of Fig. 6; and Fig. 8 is an enlarged transverse section taken approximately on the line $x^8 x^8$ of Fig. 3, some parts being broken away.

5 The numeral 1 indicates the building for the storage of anthracite coal, the same having in its trussed roof structure 2 a multiplicity of continuous or open-ended and parallel hatchways 3.

10 The numeral 4 indicates an open-topped building for the storage of bituminous coal and which, as shown, is adjacent to the building 1. As shown, both of the buildings 1 and 4 are located one between railway

15 tracks 5 and 6 and at the side of a dock 7. The numeral 9 indicates a barge which, as shown, is anchored adjacent to the dock 7 and is provided with hatchways 10 preferably spaced apart one-half the distance between the continuous hatchways 3 in the

20 roof 2. The flexible steel or metal ribbons 11, which normally close the so-called continuous hatchways 3, are provided, at suitable intervals, with transverse rigidly secured metal cleats 12, the ends of which are bent to form between them and the ribbon, seats that receive the intumed flanges of steel or iron guide beams 13 that are rigidly secured

25 to the trussed roof structure at the edges of the said tramways 3. At one side of the building 1, or, in other words, at one edge of the roof 2, the guide beams 13 are given approximately a semi-circular upward bend

30 or turn and are then brought backward over the roof far enough to afford a guide and support for the respective ribbons 11. The bent portions of the guide beams 13 are provided with anti-friction wheels 14 that reduce the friction incident to bending of the ribbon over the same.

35 The numeral 15 indicates the bridge structure which extends across the storage buildings and is mounted to move laterally over the same, being supported in the usual way by towers 16 and 17 arranged to travel on the customary tracks 18.

40 The numeral 19 indicates the grab bucket and the numeral 20 the operator's platform, both of which are carried by the car 21 which is mounted to travel in the customary way on suitable tracks supported by the tramway bridge 15. The bucket 19 is supported in the customary way from the car

45 21 by an operating cable 22 and the operator's platform 20 is connected to the said car by a relatively narrow connection 23 (see Figs. 2, 3, 5 and 8).

50 The car 21 is connected to and is given its traveling movements from a cable 24 which is arranged to run over suitable guide sheaves 25 on the bridge structure and is operated from a so-called trolleying ma-

chine and boom hoist of the usual construction, indicated as an entirety by the numeral 26.

To one end of each hatchway-closing ribbon is attached a very short cable 27 and to the other end is attached a long cable 28. The long cable 28 is arranged to run over 70 guide sheaves 29 and 30 suitably supported by the guide beams 13 and occupying relative positions diagrammatically illustrated in Fig. 5.

When one of the ribbons 11 is to be moved 75 from its normal or closing position into an inoperative or open position, or vice versa, the ends of the cables 27 and 28 are attached to the car 21 by suitable hooks or other devices, diagrammatically shown in 80 Fig. 5, and then, by means of the said car, the said ribbon may be positively forced into the desired direction. The ribbon must, of course, be moved by a drawing rather than by a pushing action. When 85 the ribbon has been moved into an open position, its cables will be disconnected from the car and the car is then free to move independently of the ribbon as required to properly deposit the coal in the building or 90 to reclaim or remove coal therefrom.

It will, of course, be understood that the building 1, at that side which is adjacent to the main tower 16, just below the several hatchways 3, must have openings of suffi- 95 cient size to permit the raised bucket 19 and operator's platform 20 to pass therethrough into or out of the building. Such openings are, in Fig. 2, shown at 31, and they may be normally closed by shutters or doors not 100 shown.

In this specification, the term "car" has been used in a broad sense to include any kind of a traveler movable on a bridge or tramway; the term "grab bucket" or 105 "bucket" describing the device carried by the car for raising and lowering the coal or other material, is used in a broad sense to include any kind of a device which will accomplish this result; and the elongated 110 flexible strips which normally close the continuous or open-ended hatchways are, for convenience, designated as "ribbons", but this term, also, is used in a broad sense.

The engine or motors for causing the 115 tramway bridge to travel over the building and their coöperating connections have not been referred to because they are well understood by all persons familiar with this class of mechanism. Also, the construction 120 of the bridge and towers are well known and, hence, require no particular consideration for the purposes of this case.

The arrangement above disclosed and illustrated in the drawings adapts a single 125 bridge tramway for a large range of use and

effects a very large saving in the cost of a plant of this character by making one bridge tramway answer where two, under the old plan, would be required.

5 Coal handling plants of the character above described are usually constructed on an enormously large scale. For instance, the bridge tramway structure illustrated in the drawings was taken from the working
10 drawings of a plant in which the bridge is five hundred feet in length.

What I claim is:

1. The combination with a building having a continuous or open-ended hatchway,
15 of a traveling bridge tramway extended above said building, and a bucket supported for traveling movements on said tramway for cooperation with the said hatchway when alined therewith.

20 2. The combination with a storage building having a continuous or open-ended hatchway in its roof structure, of a traveling bridge tramway extended over said building, a car arranged to travel on said tram-
25 way, and a bucket carried from said car by connections arranged to travel in said hatchway.

3. The combination with a storage building having parallel continuous or open-
30 ended hatchways in its roof structure, of a bridge tramway extended over said building parallel to said hatchways and arranged to travel transversely thereof, a car arranged to travel on said tramway, and a
35 bucket carried from said car by connections arranged to travel in the alined hatchway with the said bucket below the said hatchway.

4. The combination with a storage building having parallel continuous or open-
40 ended hatchways in its roof structure, of a bridge tramway extended over said building parallel to said hatchways and arranged to travel transversely of said hatchways, a
45 car arranged to travel on said bridge tramway, and a bucket and an operator's platform supported from and below said car by connections arranged to travel in the
50 alined hatchway with the said bucket and platform below the said hatchway.

5. A building having a hatchway in its roof structure and provided with a ribbon normally closing said hatchway but arranged to be slid endwise to open up said
55 hatchway.

6. The combination with a building having a continuous or open-ended hatchway in its roof structure, of a flexible metal ribbon normally closing said hatchway but
60 mounted for endwise sliding movements on curved guides to thereby open up said hatchway.

7. The combination with a building hav-

ing a continuous or open-ended hatchway in its roof structure and provided with ribbon guides extending along the sides of said hatchway and curved upward and extended
65 backward over said hatchway, of a flexible metal ribbon normally closing said hatchway but movable on said guides into a position to open up said hatchway.

8. The combination with a building having continuous or open-ended hatchways in its roof structure, of ribbons normally closing the respective hatchways but arranged
75 to be slid to open up said hatchway, a traveling bridge tramway extended over said building parallel to said hatchway and movable transversely thereof, a car arranged to travel on said bridge tramway, and
80 means for connecting said car to said hatchway closing ribbon, whereby movement of the car will force the same from one position to another.

9. The combination with a building having continuous or open-ended hatchways in its roof structure, of ribbons normally closing the respective hatchways but arranged to be slid to open up said hatchway, a traveling bridge tramway extended over said
85 building parallel to said hatchways and movable transversely thereof, a car arranged to travel on said bridge tramway, a bucket carried by said car, and a bucket operating cable supporting said bucket from
90 said car and arranged to travel and work in the alined open hatchway.

10. The combination with a building having parallel continuous or open-ended hatchways in its roof structure, of ribbon guides extending along the edges of said hatchways and curved upward and back-
100 ward, flexible metal ribbons normally closing said hatchways and mounted to slide on said guides, a cable attached to one end of each hatchway ribbon and passed over
105 guides to the opposite side of the building, a bridge tramway extended over said building parallel to said hatchways and arranged to travel transversely thereof, a car arranged to travel on said bridge tramway and adapted to be connected at will to any
110 one of the ribbon cables and to the opposite end of any such ribbon, whereby the said hatchway ribbons may be positively moved
115 endwise by movements of the said car.

11. The combination with a building having parallel continuous or open-ended hatchways in the roof structure, of ribbon guides extending along the edges of said
120 hatchways and curved upward and backward, flexible metal ribbons normally closing said hatchways and mounted to slide on said guides, a cable attached to one end of each hatchway ribbon and passed over
125 guides to the opposite side of the building,

a bridge tramway extended over said building parallel to said hatchways and arranged to travel transversely thereof, a car arranged to travel on said bridge tramway
5 and adapted to be connected at will to any one of the ribbon cables and to the opposite end of any such ribbon, whereby the said hatchway ribbons may be positively moved
10 endwise by movements of the said car, a bucket and an operating cable supporting

said bucket from said car and arranged to travel and work in the aligned open hatchway.

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

GEORGE E. TITCOMB.

Witnesses:

JNO. J. RIGHTER,
F. K. COURTNEY.