

No. 706,222.

Patented Aug. 5, 1902.

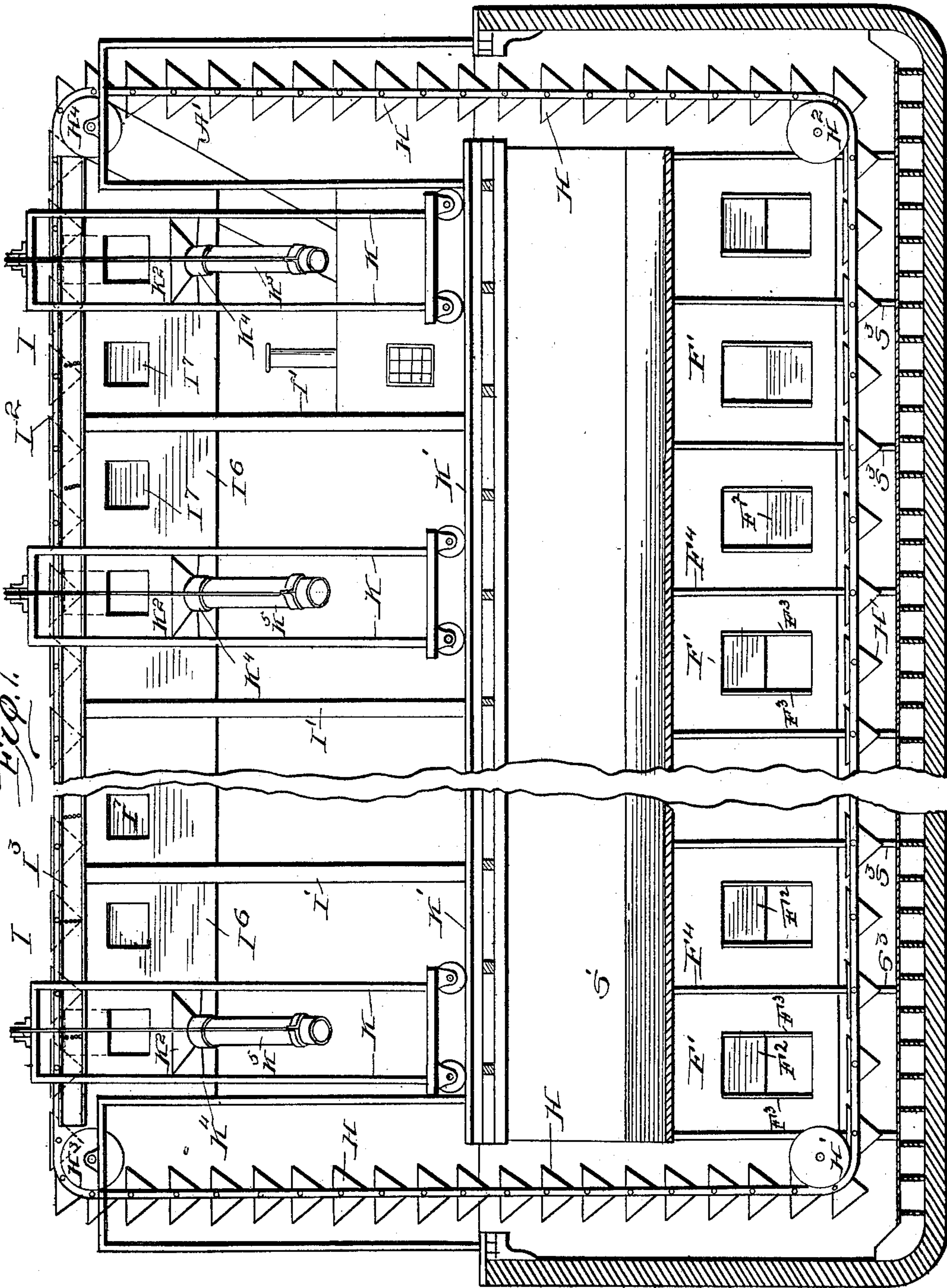
C. D. DAY.

APPARATUS FOR UNLOADING COAL.

(Application filed Mar. 26, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:  
J. M. Fowler Jr.  
F. T. Chapman

Inventor:  
Charles D. Day,  
By Lyons & Birney  
Attys

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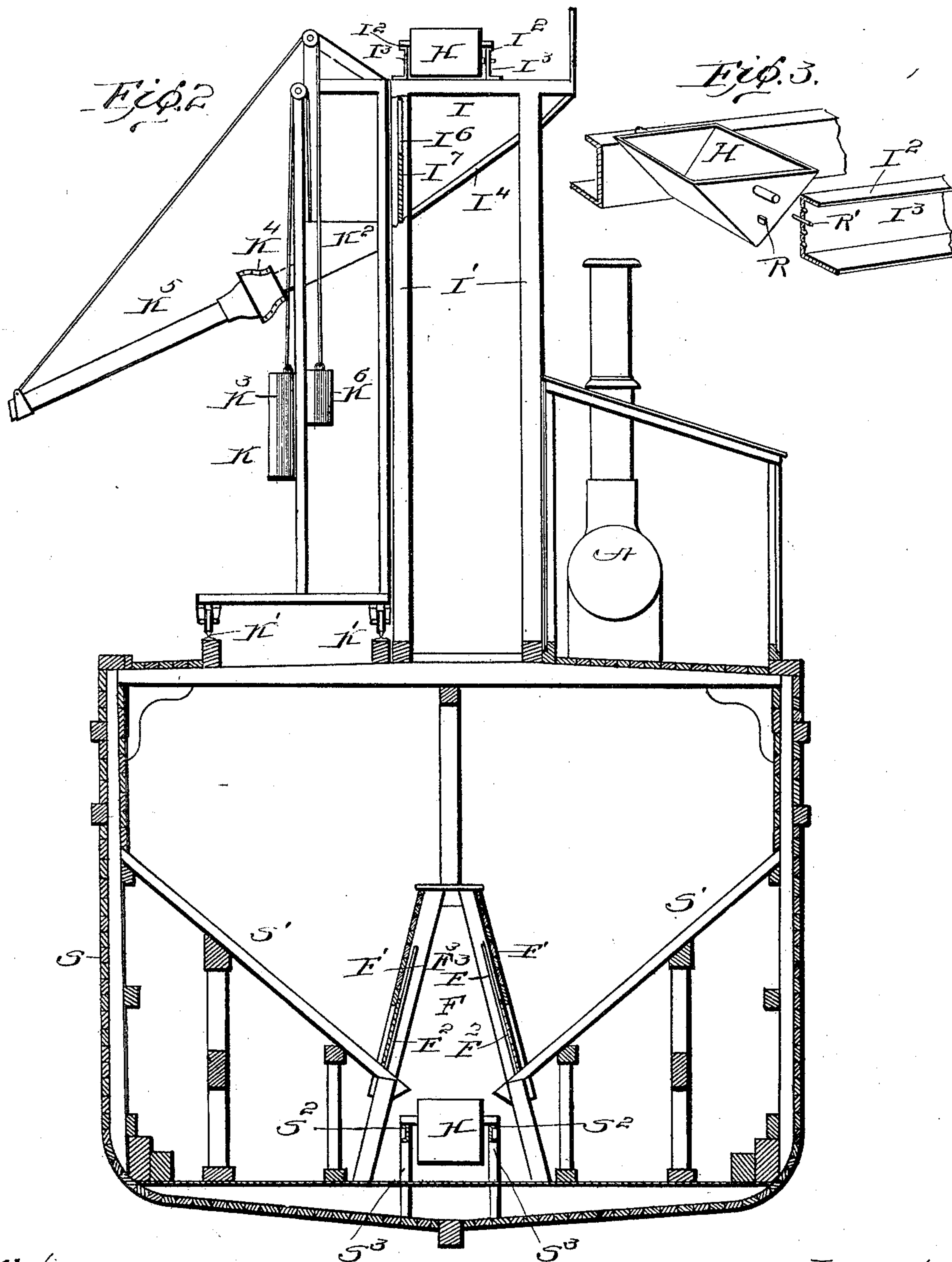
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# UNITED STATES PATENT OFFICE.

CHARLES D. DAY, OF BALTIMORE, MARYLAND.

## APPARATUS FOR UNLOADING COAL.

SPECIFICATION forming part of Letters Patent No. 706,222, dated August 5, 1902.

Application filed March 26, 1902. Serial No. 99,987. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES D. DAY, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Apparatus for Unloading Coal, of which the following is a specification.

The object of my invention is to produce an apparatus which is more particularly designed to discharge coal from barges or similar reservoirs into ships, and more especially into ships which have no deck-scuttles and are therefore fed through side ports; and the particular design of my invention is to produce an apparatus of such simple construction and of such ease of manipulation as will make the bunkering of ships rapid and readily controlled.

A principal feature of my invention resides in its capacity to readily bunker a ship at several different and readily-changeable points simultaneously or to bunker the same with an increased flow of coal at a single point. To this end I use a coal-barge or other similar reservoir having means in the shape of inclined planes for directing the coal to an endless bucket conveyer at the bottom. Above the top of the barge there is built a horizontal runway. The endless bucket conveyer runs along the bottom of the barge, where it receives its supply of coal, then proceeds vertically upward to the level of the horizontal runway, along which it passes and discharges, the empty buckets then traveling vertically downward to the bottom of the barge. There are a number of preferably equally spaced points along the runway, at any one of which the buckets may be discharged. When in operation, matters are so arranged that coal is simultaneously discharged from several buckets at a selected group of this number of points, which selected group of points may be and is changed from time to time as the operation of unloading progresses. Automatic tilting or tripping devices for the buckets are employed. These may consist of trips of varying heights secured at any desired but changeable points along the horizontal runway and stops cooperating therewith which are secured to the buckets. The stops on the buckets, however, are placed at different ele-

vation on the buckets, so that each stationary stop of a given height may tilt only those buckets which belong to the group of buckets which have their stops on the same horizontal plane. Thus one group of buckets of my endless conveyer will be tilted and discharged at one point of the horizontal runway and another group will be discharged at another point of the horizontal runway, and these various points along the horizontal runway at which the buckets are discharged may be changed from time to time as the conditions of loading require. Putting it in another way, buckets in each group of buckets will be simultaneously discharged at a group of points along the runway, which group of points is changed from time to time as the unloading progresses. Cooperating with this runway are a series of independent carriages which are separate and distinct from the runway and may be moved at any desired points of the runway. Upon these carriages are mounted chutes which are preferably vertically adjustable and into which the coal from the runway discharges. These carriages are independently movable, and they are simply moved to that group of points of the runway at which the buckets are tilted. The chutes on the carriages are also preferably universally mounted, so that the coal which comes therefrom may be delivered on either side or in front of the carriage. It will thus be seen that I can fill coal into the ship at as many points as there are carriages, and when the portions of the ship thus indicated have received a proper supply of coal I can move the carriages carrying chutes along to different points, which will merely necessitate changing the position of my tilting or tripping devices on the runway to correspond, thus giving a new group of points along the runway at which the buckets are simultaneously discharged. It will also be seen that I can nest two or more of the movable carriages together, and thus supply a double amount of coal to a desired portion of the ship. I may also use a tunnel in the bottom of the coal-barge having a series of doors through which the coal is fed from the inclined bottoms of the barge to the bucket conveyer in the bottom of the barge. These doors may be operated



by men in the tunnel, so that coal may be filled from various portions of the barges, at different times.

In the drawings, Figure 1 represents a longitudinal section of my apparatus. Fig. 2 represents a vertical cross-section of the same, and Fig. 3 represents a detail showing the tilting device on the bucket.

The barge or reservoir S is supplied with inclined slopes S', on which the coal rests. At the bottom of the slopes there is a track S<sup>2</sup>, along which the endless bucket conveyer moves. This bucket conveyer consists of a series of buckets attached to each other by bendable or flexible connections in any suitable manner.

A tunnel F, formed of walls F', is built over the bottom ends of the slopes S'. The walls F' are supplied with apertures closed by doors F<sup>2</sup>. These doors are vertically movable in proper guides F<sup>3</sup>. When the doors are in the lowermost position, the apertures in the walls F' are closed. A man who may move about in the inside of the tunnel F can open and close preselected doors F<sup>2</sup> at will.

Above the top of the barge is secured the horizontal runway I, supported on standards I'. The buckets run on tracks I<sup>2</sup> at the top of the angle-irons I<sup>3</sup>. The endless conveyer is supported at the four points at which it changes its direction of motion on travelers H' H<sup>2</sup> H<sup>3</sup> H<sup>4</sup> in a manner which is well understood and need not be further described.

In order to tilt the buckets, I divide them into as many groups as there are carriages carrying chutes—in the present case four. On the side of each bucket in the first group below the trunnion about which the bucket tilts I secure a stop R at the same distance below the trunnion in each bucket of the same group. On the side of each bucket of the second group of buckets I secure a stop at a distance below the trunnion different from that of the first group, but the same for all the buckets of the second group. The angle-iron I<sup>3</sup> is supplied with a number of sets of four apertures, one above the other, at heights corresponding to the stops R on the buckets. Through these apertures are inserted trips R' to cooperate with the stops on the bucket. It will thus be seen that by properly placing the trips R' one group of buckets can be tilted at one given point and another group of buckets at another given point along the horizontal runway. These stops and trips constitute my differential tilting or tripping devices. It is obvious, however, that there may be employed other forms of tripping or tilting devices which are capable of a differential action—that is to say, of tripping one group of buckets at one point and another group of buckets at a different point along the horizontal runway. From another point of view these stops and trips constitute one means which may be employed for simultaneously discharging the buckets of several groups of buckets at a predeter-

mined but changeable group of points along the runway.

The bottom of the horizontal runway is an open-work structure, so that the coal which is discharged from the buckets immediately falls on the incline I<sup>4</sup> and sliding down this incline is carried through apertures in the wall I<sup>6</sup>. The apertures in the wall I<sup>6</sup> are closed by gates I<sup>7</sup> when coal is not to be discharged therethrough.

Coöperating with the differential trips and the chutes or inclines I<sup>4</sup> are my carriages K, carrying chutes K<sup>2</sup>, which receive the discharge from the buckets and transfer it to the vessel to be loaded. These carriages K have been shown as four in number, though a greater or less number could be used. They preferably travel on tracks K'. The chutes K<sup>2</sup>, which they carry, are preferably balanced by a counterweight K<sup>3</sup>, so that the chute may be raised or lowered at will and kept in any desired vertical position at which it is placed. Connected to the chute K<sup>2</sup> by a universal joint K<sup>4</sup> is a spout K<sup>5</sup>, which may be raised and lowered or swung from side to side and kept in any preselected position by a counterweight K<sup>6</sup>.

An engine A furnishes power for the belt A', which drives the traveler or pulley H<sup>4</sup>, to impart motion to the endless conveyer.

I may also build partitions F<sup>4</sup> between adjacent gates F<sup>2</sup>, running to the inclined bottoms S' in the barge, so as to divide the coal-carrying portion of the barge into sections. Similarly I may build partitions between the gates I<sup>7</sup> over the inclines I<sup>4</sup> under my horizontal runway.

I may also use any appropriate devices to trim the surface of the coal in the buckets as it is fed into them from the inclined bottoms S' of the barge. Such trimming device, however, forms no part of my invention, and I have therefore not undertaken to show it in the drawings. Again, it will be noticed that the tracks S<sup>2</sup> are raised a short distance above the bottom of the barge and are mounted on pillars S<sup>3</sup>. This insures that any coal which accidentally falls to the bottom of the barge between the tracks S<sup>2</sup> will not lie in the path of the buckets as they travel along, which might otherwise trip them. Any coal which has fallen to the bottom of the barge below the buckets and between the tracks S<sup>2</sup> can be cleaned out from time to time by workmen.

The operation of my invention will now be understood. Power is supplied to the belt A' to set the conveyer in motion. Workmen in the tunnel F open as many of the doors F<sup>2</sup> as may be necessary to fill the buckets H traveling in the bottom of the barge. The coal in these buckets is raised vertically upward to the horizontal runway I, and each of the four groups of buckets is tripped by the trips R' at that group of points opposite which the carriages K are placed—that is to say, the first group of buckets will be tripped at a point opposite the first carriage K, the sec-



ond group of buckets will be tripped at a point opposite the second carriage, &c. Each gate I', adjacent to a tripping device R', is open, so that the coal which has been discharged from the tilted bucket may fall into the chute K<sup>2</sup> on the carriage K. From the chute K<sup>2</sup> the coal passes into the spout K<sup>5</sup> and thence into the vessel. At the start the chute K<sup>2</sup> may be placed in position near the bottom of the carriage K, so that as the pile of coal which has been fed into the vessel from the spout K<sup>5</sup> increases in height the chute K<sup>2</sup> may be raised to compensate therefor. It is also clear that I may have any one or more of my carriages in operation without having all of them in operation. So, too, I may nest any two or more of the carriages by placing them side by side, so that two or more spouts K<sup>5</sup> may simultaneously feed coal into the vessel to be loaded. This I consider a most important feature of my invention.

It will be observed that the carriages K are independently movable. When it is desired to move one of these carriages along, so as to load coal at another point, it is merely necessary to close the appropriate gate I', to open another appropriate gate I', and to change the appropriate trip R' from its old to its new position.

The number of buckets H and gates F<sup>2</sup> and I' which I have shown is merely conventional. I have, for the purpose of not having the drawings on too small a scale, shown less of these parts than would generally be used in practice. So, too, I have shown but three carriages in the drawings, since the fourth carriage would come at that position of Fig. 1 which has been broken away. Finally, I have not undertaken to show the struts or braces of the apparatus, nor have I undertaken to show any mechanical details except those which will assist in a rapid and easy comprehension of the principle of my invention.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An apparatus for unloading coal comprising a reservoir, a runway mounted thereabove, an endless, grouped bucket conveyer passing from the bottom of the reservoir along the runway, means for simultaneously discharging the buckets of several groups of buckets at a predetermined but changeable group of points along the runway, and a number of movable carriages carrying chutes placeable at this group of points to receive and transfer the discharge from the buckets, substantially as described.

2. An apparatus for unloading coal comprising a reservoir, a runway mounted thereabove, an endless, grouped bucket conveyer passing from the bottom of the reservoir along the runway, differential tilting devices at a preselected but changeable group of points along the runway for discharging different groups of buckets at these points, and a number of movable carriages carrying chutes

placeable at this group of points to receive and transfer the discharge from the buckets, substantially as described.

3. An apparatus for unloading coal comprising a reservoir, a runway mounted thereabove, an endless grouped bucket conveyer passing from the bottom of the reservoir along the runway, stops fixed in different positions on different groups of buckets, trips at a preselected but changeable group of points along the runway to cooperate with the stops each to tilt and discharge a given group of buckets, and a number of movable carriages carrying chutes placeable at this group of points to receive and transfer the discharge from the buckets, substantially as described.

4. An apparatus for unloading coal comprising a reservoir with inclined bottoms and a tunnel having gates cooperating therewith, a runway mounted above the reservoir, and endless, grouped bucket conveyer passing from below the inclined bottoms of the reservoir along the runway, means for simultaneously discharging the buckets of several groups of buckets at a preselected but changeable group of points along the runway, and a number of movable carriages carrying chutes placeable at this group of points to receive and transfer the discharge from the buckets, substantially as described.

5. An apparatus for unloading coal comprising a reservoir, a runway mounted thereabove, inclines and a series of gates below the runway, an endless grouped bucket conveyer passing from the bottom of the reservoir along the runway, means for simultaneously discharging the buckets of several group of buckets at a preselected but changeable group of points along the runway so that it may pass down the inclines and through such gates as are open, and a number of movable carriages carrying chutes placeable in front of the group of open gates, substantially as described.

6. An apparatus for unloading coal comprising a reservoir, a runway mounted thereon comprising a pair of angle-irons having tracks, an endless grouped bucket conveyer passing from the bottom of the reservoir along the runway, stops fixed in different positions on different groups of buckets, trips passing through apertures in the angle-irons at a preselected but changeable group of points along the runway to cooperate with the stops each to tilt and discharge a given group of buckets, and a number of movable carriages carrying chutes placeable at this group of points to receive and transfer the discharge from the buckets, substantially as described.

7. An apparatus for unloading coal comprising a reservoir, a runway mounted thereabove, an endless grouped bucket conveyer passing from the bottom of the reservoir along the runway, means for simultaneously discharging the buckets of several groups of buckets at a preselected but changeable group of points along the runway, and a number



of movable carriages carrying vertically-adjustable chutes placeable at this group of points to receive and transfer the discharge from the buckets, substantially as described.

5 8. An apparatus for unloading coal comprising a barge, a runway mounted there-  
above, and endless, grouped bucket conveyer  
passing from the bottom of the barge along the  
runway and back to the bottom of the barge,  
10 means for simultaneously tilting and thus  
discharging the tiltable buckets of several  
groups of buckets at predetermined but  
changeable groups of points along the run-  
way, and a number of movable carriages car-  
15 rying chutes mounted on the barge and place-  
able at a given group of points to receive and  
transfer the discharge from the buckets, sub-  
stantially as described.

9. An apparatus for unloading coal com-  
20 prising a barge, a runway mounted there-  
above, and endless grouped bucket conveyer  
passing along the bottom of the barge and  
thence along the runway and back to the bot-  
tom of the barge, stops fixed in different posi-  
25 tions on different groups of buckets, trips at a  
preselected but changeable group of points  
along the runway to cooperate with the stops,  
each to tilt and thus discharge a given group  
of buckets, and a number of movable car-  
30 riages carrying chutes mounted on the barge  
and placeable at this group of points to receive  
and transfer the discharge from the buckets,  
substantially as described.

10. An apparatus for unloading coal com-  
35 prising a barge, a runway mounted there-  
above, inclines and a series of gates below the  
runway, an endless, grouped bucket conveyer  
passing along the bottom of the barge and  
thence along the runway back to the bottom  
40 of the barge, means for simultaneously tilting

and thus discharging the buckets of several  
groups of buckets at a preselected but change-  
able group of points along the runway so that  
it may pass down the incline and through such  
gates as are open, and a number of movable 45  
carriages carrying chutes mounted on the  
barge and placeable in front of the group of  
open gates to receive and transfer the dis-  
charge from the buckets, substantially as de-  
scribed. 50

11. An apparatus for unloading coal com-  
prising a barge, a runway mounted there-  
above, and endless grouped bucket conveyer  
passing along the bottom of the barge up to  
and along the runway and back to the bottom 53  
of the barge, means for simultaneously tilting  
and thus discharging the buckets of several  
groups of buckets at a preselected but change-  
able group of points along the runway, and a  
number of movable carriages carrying chutes 60  
mounted on the barge and placeable at this  
group of points to receive and transfer the dis-  
charge from the buckets, substantially as de-  
scribed.

12. An apparatus for unloading coal com- 65  
prising an endless grouped bucket conveyer,  
means for simultaneously discharging the  
buckets of several groups of buckets at a pre-  
selected but changeable group of points and  
a number of movable carriages carrying 70  
chutes placeable at this group of points to re-  
ceive and transfer the discharge from the  
buckets, substantially as described.

In testimony whereof I have signed my  
name to this specification in the presence of 75  
two subscribing witnesses.

CHARLES D. DAY.

Witnesses:

A. J. HARPER,  
PAUL MASSON.