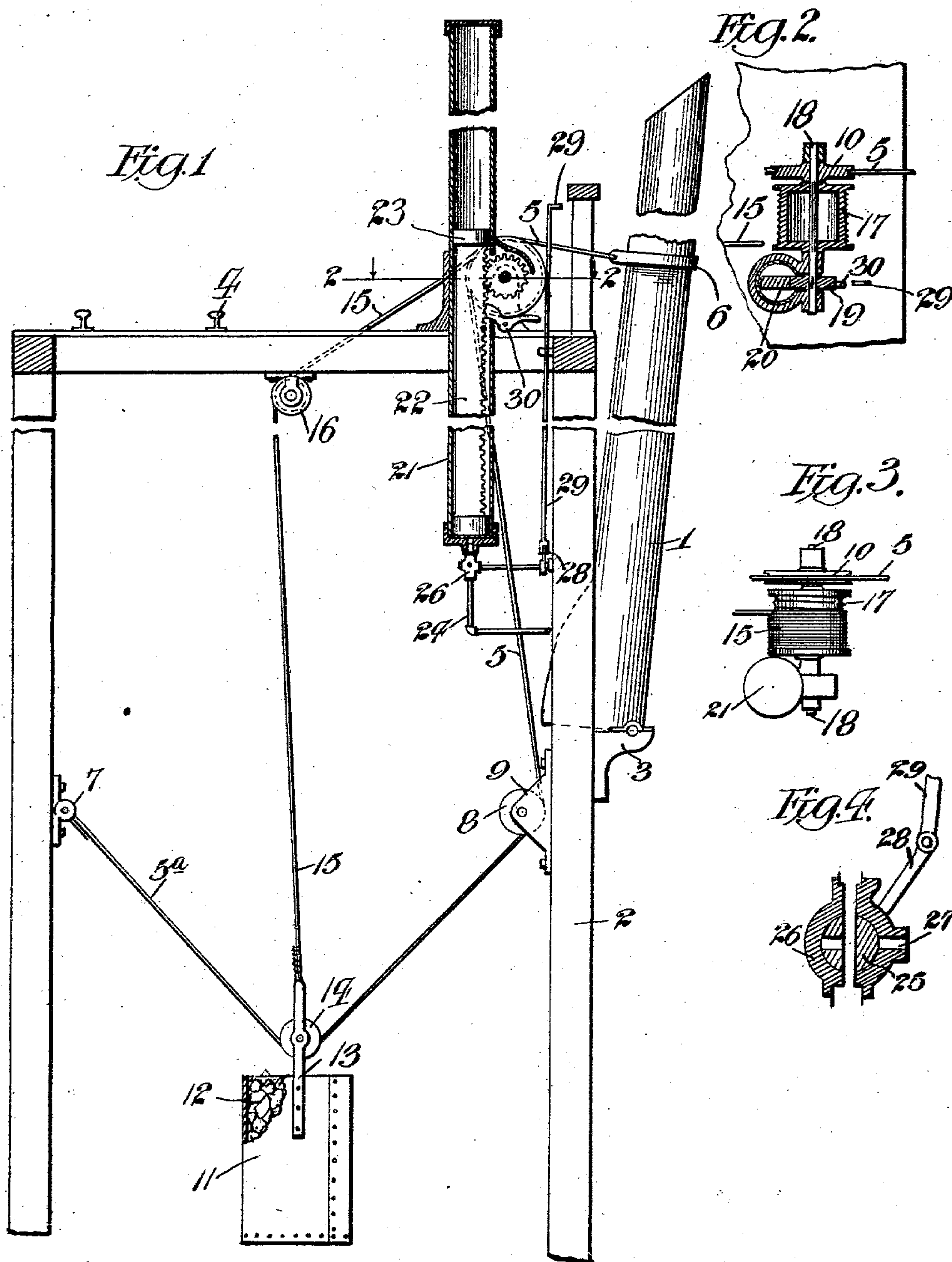


No. 745,433.

PATENTED DEC. 1, 1903.

H. GREER, JR.
ORE OR COAL CHUTE.
APPLICATION FILED JULY 9, 1903.

NO MODEL.



Witnesses:
Mrs Allstadt
Edward A. Ciefeldt

Inventor:
Howard Greer Jr.
by Elliott & Hopkins
Attys

UNITED STATES PATENT OFFICE.

HOWARD GREER, JR., OF CHICAGO, ILLINOIS.

ORE OR COAL CHUTE.

SPECIFICATION forming part of Letters Patent No. 745,433, dated December 1, 1903.

Application filed July 9, 1903. Serial No. 164,760. (No model.)

To all whom it may concern:

Be it known that I, HOWARD GREER, Jr., 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 Ore or Coal Chutes, of which the following is a full, clear, and exact specification.

This invention relates to chutes for loading or unloading ore, coal, and other material, and more especially to that class of chutes employed on docks and similar places for conducting the material directly into the hold of a vessel, and in which use it is desirable to have the chute so constructed and arranged that its angle of inclination may be readily changed from the perpendicular or an upright position to a slant suitable for entering the vessel and inducing the material to slide, it being raised to a perpendicular or upright position when out of use to permit vessels to pass. These chutes as a rule are very heavy, and to guard against accident and to facilitate manipulation they are counterweighted; and this invention has for its primary object to provide improved and simple means whereby the counterweight may be readily raised or lowered at the desired speed for raising and lowering the chute and the power of the counterweight will automatically proportion itself to the varying pull of the chute as it traverses its arc of movement, so that the chute may be raised and lowered at a uniform rate of speed.

With these ends in view this invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said object and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawings and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a side elevation of the improved apparatus, partly in vertical section and partially broken away. Fig. 2 is a detail plan section taken on the line 2-2, Fig. 1. Fig. 3 is a detail plan view of the winding-drum and idler hereinafter described, and Fig. 4 is an enlarged detail sectional view of the controlling-valve.

In adapting chutes of the described character to dock use it is customary to support the

chute 1 at its lower end at the outer side of the dock-timbers 2 on any suitable bracket 3 at the required distance from the top of the dock to enable the end of the chute to be lowered into the hold or other part of the vessel to receive the material as the same is deposited into the upper end of the chute from the dock, usually from cars standing on track 4.

In carrying out this invention the chute is secured to one end of a cable 5 by any suitable means, such as band or bail 6, and the other end of this cable is fixed by any suitable fastening 7 to one of the upright timbers of the dock and preferably at a point considerably below the top of the dock, and a portion 5^a of this cable is held substantially horizontal by any suitable means, such as an idler 8, arranged laterally from the fastening 7 and preferably mounted in a bracket 9 on the opposite side of the dock to the fastening 7. From the idler 8 the cable 5 passes upwardly over an idler or sheave 10 for the purpose of holding this part of the cable substantially upright and preventing it from running against the edge of the dock as the chute 1 rises and falls throughout its arc of movement. Supported upon the horizontal portion 5^a of the cable 5 is a counterweight 11, which is preferably composed of a bucket or box filled with iron ore 12 or other suitable weighty material for obtaining the requisite pull on the cable 5 at the minimum expense. The bucket 12 is provided with bail 13, in which is journaled a sheave 14, supported directly upon the cable 5^a, whereby the cable may run with relation to the counterweight and the counterweight may ascend and descend in a perpendicular direction between the uprights of the dock. The chute 1 being oscillatory and its plane of oscillation being perpendicular, it will of course be understood that its pull upon the cable 5 will vary throughout its arc of movement, the pull increasing in direct ratio as it nears the horizontal, and vice versa, and it will also be understood that as the angle of the two branches of the cable 5^a leading upwardly from the sheave 14 varies the effect of the counterweight 11 or its pull on the chute 1 will accordingly vary, the pull increasing in direct ratio with the increase of such angle, and consequently as the chute 1 descends and such

angle grows wider the counterweight will become more effective and increase proportionately with the increase of the pull of the chute 1 on the cable 5 5^a, thereby rendering the speed of movement of the chute gradual and uniform.

It is desirable to have a preponderance of weight in the counterweight, so that when not restrained the counterweight will effect the elevation of the chute, and in order that the counterweight may be raised to permit the chute to descend by its own gravity as fast as the speed of ascent of the counterweight will allow the counterweight is attached to the lower end of a cable 15, which passes upwardly under the dock and partially around an idler 16, secured to the under side of the dock-timbers in any suitable way, and thence around and attached to a drum 17, keyed to a shaft 18, upon which, if desired, the idler 10 may also be journaled. Thus by rotating the drum the cable 15 may be wound and unwound and the counterweight raised and lowered at the desired speed. The drum 17 is thus actuated preferably by power mechanism, and to that end one extremity of the shaft 18 is secured to a pinion 19, which meshes with a rack-bar 20, arranged in a vertically-elongated cylinder 21, containing a piston 22, which is secured to the lower end of rack-bar 20, the upper end of the rack-bar being secured to a suitable guide 23, so that when the piston 22 is forced upwardly the cable 15 will be wound upon its drum 17 and the weight 11 elevated; and when the pressure employed under the piston for thus elevating it is allowed to escape the piston will descend under the influence of the counterweight as rapidly as the pressure is exhausted. The pressure for this purpose is preferably compressed air, which may be supplied to the lower end of the cylinder 21 from any suitable source through a pipe 24, in which is a three-way valve 25, arranged in a valve-housing 26, whose straightway ports are connected with the cylinder 21 and pipe 24, respectively, while an exhaust-port 27 is arranged to connect with one of the ways of the valve 25 when the pressure from pipe 24 is shut off. This valve 25 is provided with an operating-lever 28, and this in turn is connected to a handle or operating-rod 29, extending above the dock to a point convenient to the hand of the operator, and hence the supply and exhaust to and from the cylinder may be controlled at the will of the operator and the counterweight raised and lowered at any desired speed. In order that the counterweight may be held in its elevated position during the time that the chute is in use without necessarily depending upon the pressure below the piston 22, it is desirable to provide a locking-dog 30, pivotally arranged contiguous to the teeth of the rack-bar 22 and engaging therewith in such a manner that the rack-bar will be held against movement until the dog is deflected outwardly, which may

be conveniently done by the foot of the operator.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In an apparatus for the purpose described, the combination of a rising and falling oscillatory chute, a flexible connection secured to said chute and extending for a part of its length horizontally a counterweight supported on said horizontal portion, and means for raising said counterweight.

2. In an apparatus for the purpose described, the combination of a rising and falling oscillatory chute, a flexible connection fixed at one end and attached at the other to said chute, a sheave for holding a portion of said connection substantially horizontal, a counterweight supported on said horizontal portion between said fixed end and sheave, and with reference to which weight said horizontal portion is movable lengthwise, and means for raising and lowering said counterweight.

3. In an apparatus for the purpose described, the combination of a rising and falling chute, a counterweight attached to said chute for elevating it, a pressure-cylinder, a piston in said cylinder a rack-bar secured to said piston, a pinion engaging said rack-bar, and means operatively connecting said pinion to said counterweight.

4. In an apparatus for the purpose described, the combination of a rising and falling chute, a counterweight for elevating said chute, a pressure-cylinder, a piston therein, a rack-bar secured to said piston, a pinion engaging said rack-bar, a drum secured to said pinion, and a cable secured to said counterweight and wound upon said drum.

5. In an apparatus for the purpose described, the combination of a vertically-movable hinged chute, two pulleys or sheaves arranged one above the other, a cable passing over the upper one of said pulleys and under the lower one and having its lower extremity carried laterally from the latter pulley and fixed, a counterweight supported on said cable between its fixed end and the lower one of said pulleys, a drum, a pulley arranged above said counterweight, a cable wound on said drum and passing over the last said pulley and attached to said counterweight, and means for operating said drum.

6. In an apparatus for the purpose described, the combination of a rising and falling chute, a counterweight therefor, a pressure-cylinder, a piston therein, a toothed bar secured to said piston, a dog arranged to engage said bar for locking said piston against movement, and means operatively connecting said piston with said counterweight for raising it.

HOWARD GREER, JR.

Witnesses:

F. A. HOPKINS,
M. B. ALLSTADT.