

No. 612,297.

Patented Oct. 11, 1898.

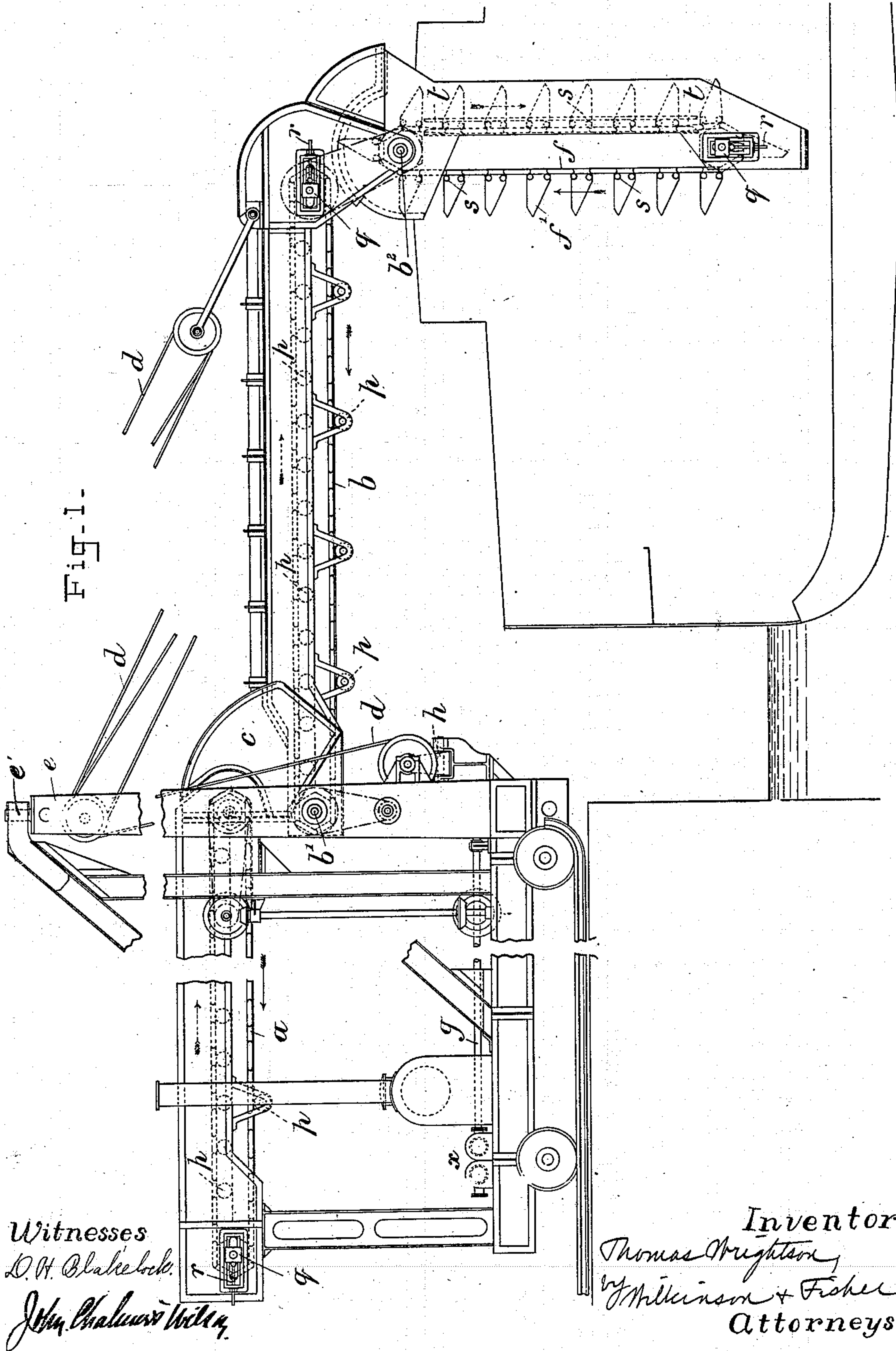
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APPARATUS FOR DISCHARGING COAL INTO SHIPS' HOLDS.

(Application filed Dec. 28, 1897.)

(No Model.)

4 Sheets—Sheet 1.



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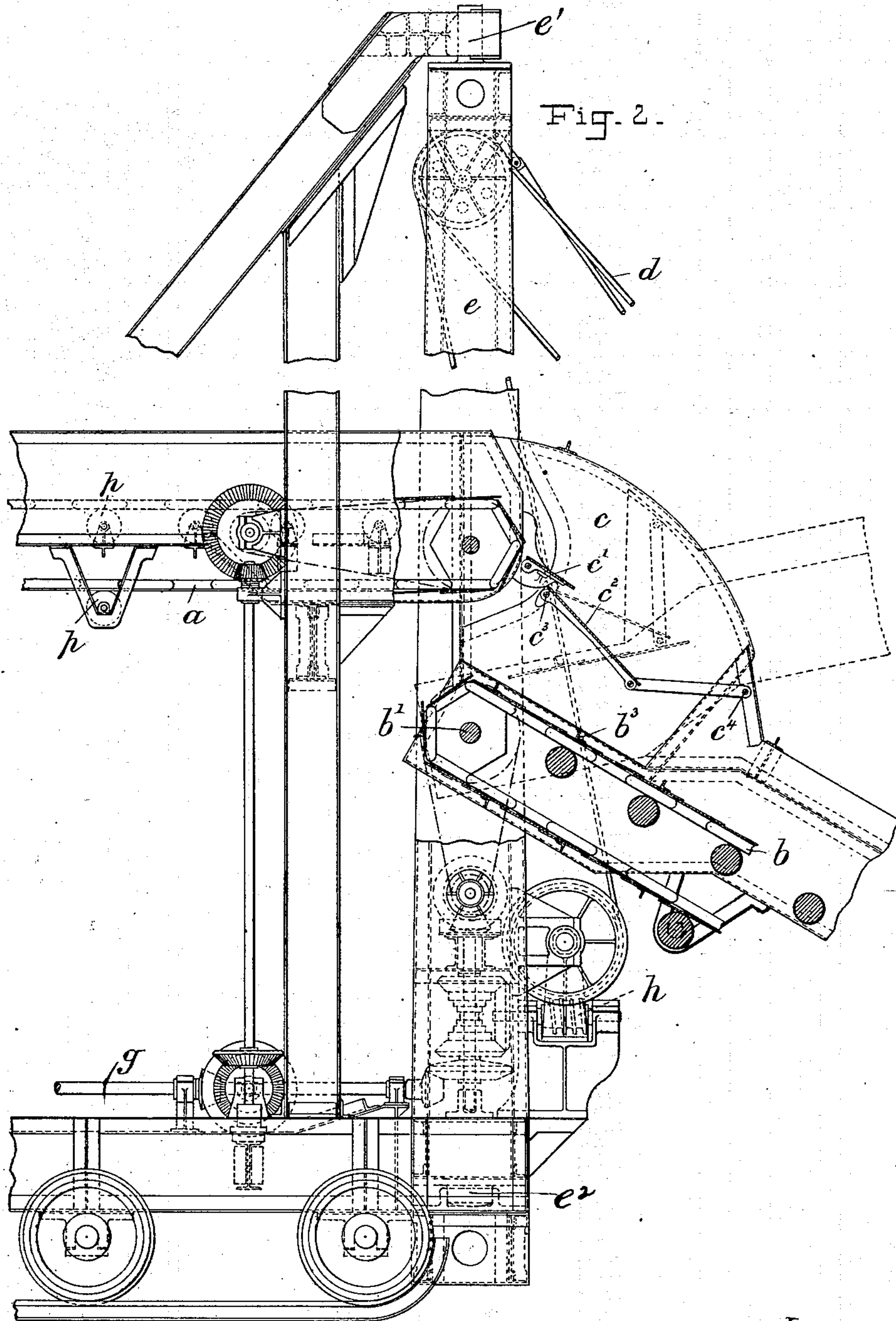
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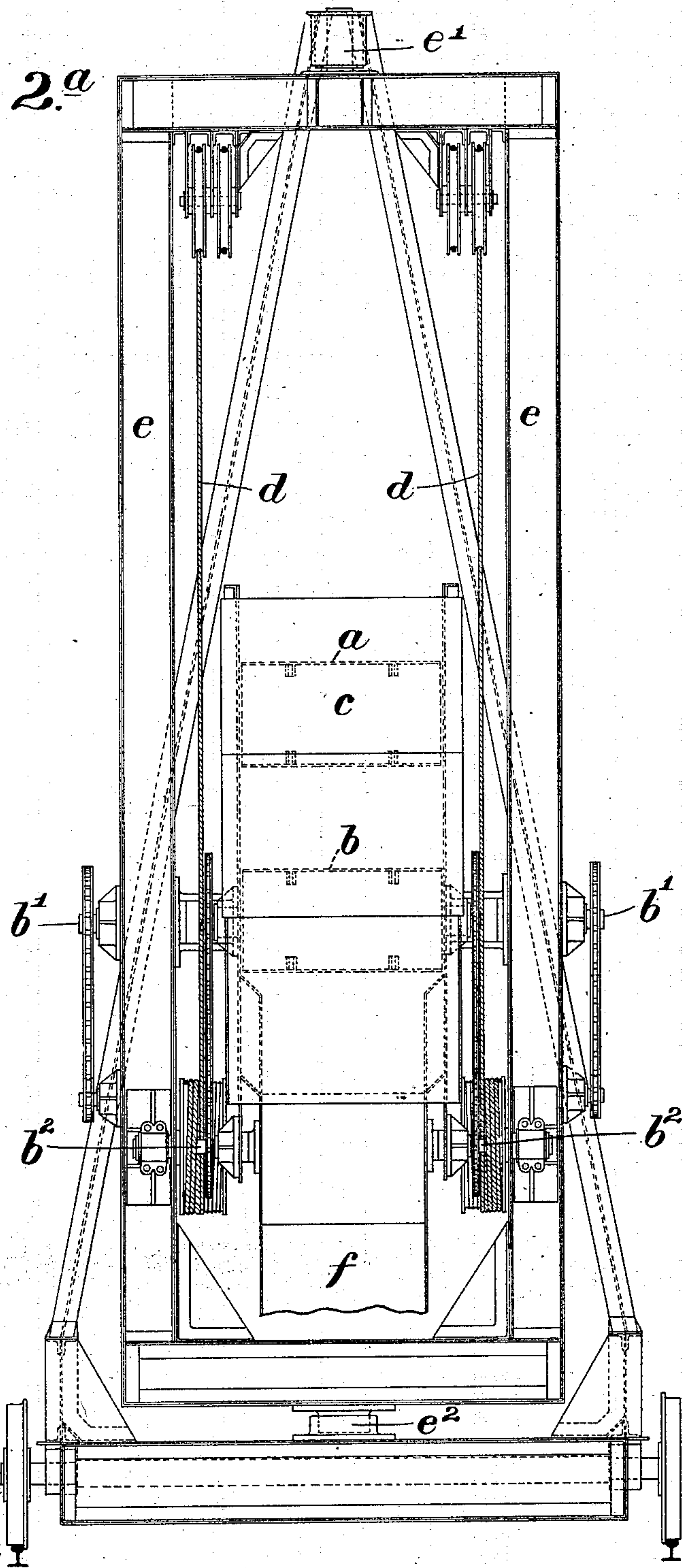
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Fig. 2.^a



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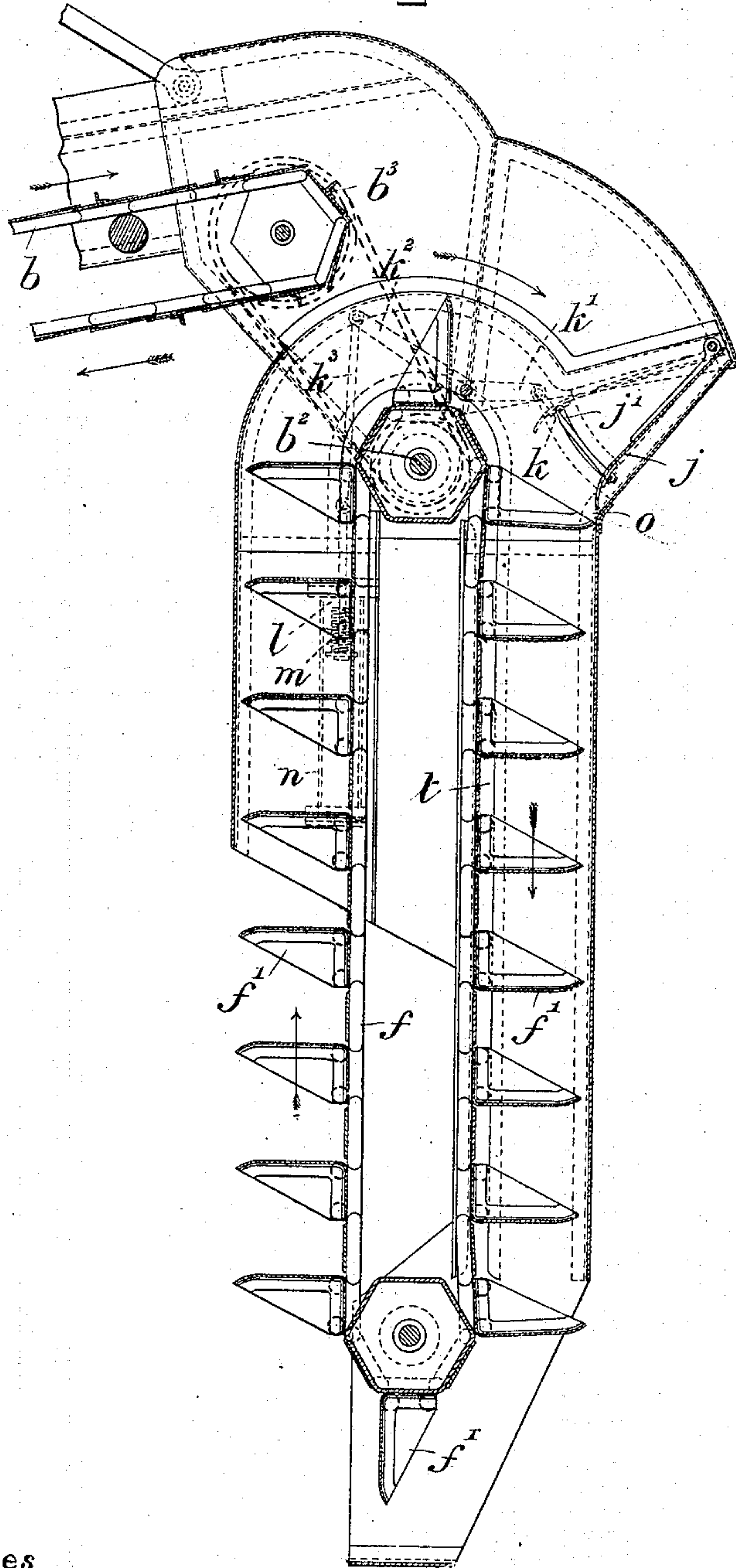
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Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS WRIGHTSON, OF NEASHAM, ENGLAND.

APPARATUS FOR DISCHARGING COAL INTO SHIPS' HOLDS.

SPECIFICATION forming part of Letters Patent No. 612,297, dated October 11, 1898.

Application filed December 28, 1897. Serial No. 664,078. (No model.) Patented in England January 17, 1896, No. 1,191.

To all whom it may concern:

Be it known that I, THOMAS WRIGHTSON, a subject of the Queen of Great Britain and Ireland, residing at Neasham, in the county of Durham, England, have invented certain new and useful Improvements in Machinery or Apparatus for Discharging Coal into Ships' Holds, (for which I have obtained Letters Patent of Great Britain, dated January 17, 1896, No. 1,191;) 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.

This invention relates to machinery or apparatus for discharging coal from a truck, hopper, or belt, or other receptacle for storage of coal on the stathes or quay side into a ship's hold.

The conditions under which coal usually has to be charged from the trucks into a ship's hold result in material damage to the coal from breakage, owing to the considerable and violent descent of the coal from one level to another. Existing arrangements also require a considerable amount of labor in trimming the coal to the parts of the hold away from the hatchway, involving a further breakage of the coal in shoveling and handling. Furthermore, the difference between the level of delivery from the truck or chute on the quay side or stathes and the level of discharge within the ship's hold varies, according to the state of the tide and other well-known causes, to such an extent that the discharging machine or apparatus must be adapted to accommodate itself to such differences of level or be comparatively useless for controlling the descent of the coal into the ship's hold.

The object of my invention is to construct a machine or apparatus which, while it can be readily adjusted to such differences between the levels of delivery and discharge, carries the coal down to the level of discharge within the ship's hold in such a way that a rapid discharge of the coal is effected without the usual breakage due to the free fall of the coal by gravity and the saving of much further cost and breakage of the coal due to trimming by hand-shoveling.

In order that my invention may be clearly

understood and readily carried into effect, I will now proceed to describe the same with reference to the accompanying drawings, in which the same letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a machine or apparatus for discharging coal into a ship's hold constructed in accordance with my invention. Fig. 2 is a part sectional elevation, drawn to an enlarged scale, showing the connection between the shore-belt and the intermediate belt. Fig. 2^a is an end elevation of the part shown in Fig. 2, illustrating the mounting of the masthead. Fig. 3 is a sectional elevation, drawn to an enlarged scale, showing the connection between the intermediate belt and the hanging belt. It will be observed that this intermediate belt is shown in the level position in Fig. 1, and in Figs. 2 and 3 it is inclined at such angles as are intended to be used when required.

In carrying out my invention I use a system of endless belts arranged and operating together in the manner hereinafter described. This system of belts consists of a receiving or shore belt *a*, which extends for a considerable length, so that the coal can be discharged onto the belt *a* from the truck, hopper, or belt or other receptacle for the coal. This shore-belt may be level, as shown, or it may be inclined from the source of supply and the coal may be delivered onto it from a chute at any angle with an open end, so that as the coal accumulates on the belt it is drawn away gradually by the forward motion of the belt. An intermediate belt *b*, which, together with its framing, forms a jib, is placed contiguous to and is connected with or made continuous to the first or receiving belt *a* by means of a chute *c* or other equivalent end-to-end arrangement. This intermediate belt *b* is, with its frame, supported by a chain or rope *d* at its outer end, the chain or rope being passed over a derrick or masthead *e*, formed in connection with the framework of the structure and of suitable height to permit of the raising or lowering of the jib *b*, which works on a pin or hinged joint *b'* at the inner end. The jib may thus be adjusted to any required incline, like the jib of a derrick-crane. Provision is also preferably made to enable it to swing to a certain extent round to the right

or left and with it the masthead *e*. This mast-head comprises uprights *e e*, one on either side of the carrier, and in order that it may swing with the jib *b* it is mounted on pivots *e' e'* at the top and bottom, respectively, of the structure, as shown more particularly in Fig. 2^a. Another belt *f*, with its inclosed casing or trunk, is slung from a pivot or hinged connection *b'* at the outer end of the intermediate belt *b*, so that it can be drawn from the vertical position either backward or forward by suitable tackle. The system of endless belts being thus arranged relatively to each other, the coal is discharged onto the shore-belt *a* and is carried along on this belt and is teemed over and upon the jib-belt *b*, which may be furnished with a succession of cleats or ledges *b'*, as shown in Fig. 3, or their equivalents to enable the coal to lodge thereon and be carried along with the belt to be discharged onto shelves or trays *f'*, provided on the hanging belt *f*, from which it is deposited in the hold of the ship.

The shelves or trays *f'*, provided on the hanging endless belt *f*, may be of any form or construction which will adapt them to receive the coal as it falls from the second or intermediate belt *b*; but inasmuch as the second or intermediate belt is set to different inclines which vary considerably according to the states of the tide and from other causes, and in addition to this the bottom belt with its trunk is drawn out of the vertical in either direction required to trim the coal over a sufficient area of the ship's hold, I have devised an arrangement of trays or shelves specially adapted for the purposes of my invention. By this arrangement as each shelf or tray turns over the upper bend of the belt *f* into the position to receive the coal from the belt *b* above the next shelf or tray in succession comes up behind it, so that the two shelves or trays, with the intervening portion of belt and the fixed sides of the framing all taken together, form a temporary moving hopper of changing form, on the descending side of which the coal is lodged and carried down. The back tray of the hopper in turning over the bend of the belt becomes the receiver of another discharge of coal from the belt above, the next shelf or tray behind making up the form of a hopper, as before, and so on in continuous succession. The ledges or cleats *b'* on the jib-belt are preferably pitched in some cases to correspond with the succession of hoppers so formed by the shelves or trays on the bottom trunk-belt. The hanging belt *f* is driven from the intermediate belt *b* by suitable gearing, and the speed of the hanging belt is thus at all times adapted to that of the intermediate belt, provision being made that the belts are geared together so that the lineal velocity may have a distributing effect as the coal is passed from belt to belt. The first or receiving belt *a* and the second or intermediate belt *b* may both be driven by any suitable means, such as by an engine fixed in

position at *x*, the main shaft *g* of which drives the miter and bevel wheels connected to the driving-roller of each belt, which engine would also be available for working the derrick chain or guide *d* of the intermediate belt by means of the worm *h*, thrown in and out of gear, as required, and the same engine may, if desired, be used for turning the jib-belt about its inner end to the right or left; but it will be found convenient in practice to mount the engine on one platform with the framework and driving-gear of the first belt, the spindle *b'* of the inner or driving roller of the second or intermediate belt being journaled into the mast or center post *e*, erected at the outer end of the said platform to carry the guy or derrick-chain or rope. By mounting the platform on wheels also driven from the same engine or motor which works the belts my improved apparatus or machine becomes a locomotive which can be run into or out of position and operated as required from its own motive power, and an apparatus so constructed will of course be applicable generally for lowering materials from one level to another, in the manner hereinbefore described with reference to coal.

Referring to Fig. 2, in which I have illustrated in detail an arrangement of chutes for breaking the fall of coal between the shore-belt and the jib-belt, *c'* is a narrow chute hinged on the fixed framing of the shore-belt *c'*. The under chute is supported on the two arms *c'* and *c'*, the former pivoted upon the cheek-plates at each side of jib and the latter upon the jib itself in such a way that as the jib is made to rise the under chute *c'* moves upward round center *c'*. The dotted lines show the position of chute when the jib is in its highest working position.

Referring to Fig. 3, in which I have illustrated to an enlarged scale an arrangement which may be adopted for diminishing and controlling the fall of coal into the trays of the vertical belt, *j* is a hinged baffle guided in a slot *j'* and controlled by a system of levers *k k' k' k'*, attached to a weight *l*, hanging upon a spring *m* and moving in a dash-pot *n* at either side of the framework. Another object of the baffle is to prevent the coal getting in between the corner of the chute at *o* and the under lip of the descending tray. The shore and jib belts are furnished with rollers *p* for guiding same, and slide-blocks *q* are furnished on all the belts connected to adjustable spindles *r* for adjusting the tension on the said belts. In order to enable the trays or shelves of the hanging belt to retain their rigidity when charged with coal, I furnish them with small rollers *s*, which enter into a groove *t* in the framework on the descending side as the hanging belt revolves.

The nature of my invention will be fully understood from the foregoing description; but the construction and combination of parts can be modified and varied without depart-

ing from the essential features thereof. For instance, it may be desirable in some cases, and especially where the difference between the levels of delivery and discharge is only moderate, to construct what has been described as the receiving and intermediate or jib belts in one long belt, which may be rigid to the outer end and capable of being tilted to different inclines or may be constructed with part of its length free to lift up and down, like a separate jib-belt, suitable provision being made to convey the belt round an angle or joint.

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

1. In an apparatus for discharging coal into a ship's hold, the combination with a series of endless carriers pivotally connected with the receiving end of each at a lower level than the adjacent discharging end of the preceding carrier; gearing between said carriers; and means for varying the angular relations of said carriers; of adjustable hinged plates arranged and operating between the adjacent ends of said carriers whereby the fall of the heavy particles in passing from the end of one carrier to the other, is broken, substantially as described.

2. In an apparatus for loading coal into a ship's hold, the combination with a supporting-frame, an endless carrier mounted upon said frame and adapted to receive the material to be conveyed; and uprights mounted upon said frame; of a chute pivotally mounted in said uprights; an endless carrier mounted in said chute; means for swinging said chute vertically; a chute pivotally suspended from the swinging end of said first chute; an endless carrier provided with buckets mounted in said pendent chute; a housing inclosing the adjacent ends of said chutes; a hinged baffle-plate mounted in said housing and acting as a guide for the material passing down

the vertical carrier, and a yielding device acting upon said hinged baffle-plate in opposition to the force of the pressure of such material upon said plate, substantially as described.

3. In an apparatus for discharging coal into a ship's hold, the combination with a supporting-frame; an endless carrier mounted thereon; a swinging chute pivoted at one end upon said supporting-frame beneath the delivery end of said carrier, and means for supporting and swinging said chute; an endless carrier running through said chute; a pair of cheek-plates mounted upon the sides of said carriers at their adjacent ends; an inclined plate hinged between said cheek-plates for the passage of the material from the first to the second carrier; links pivoted to said swinging chute and to said hinged plate, and arranged to vary the inclination of said plate as the vertical inclination of said swinging chute is varied; a pendent chute pivotally suspended from the swinging end of said swinging chute, and an endless carrier running through said pendent chute, substantially as described.

4. In an apparatus for loading coal into a ship's hold, the combination with a supporting-frame; a chute pivotally mounted in said frame; an endless carrier running through said chute; and means for swinging said chute vertically and horizontally; of a second chute pivotally suspended from the swinging end of the first chute; an endless carrier provided with buckets, running through said pendent chute, and means for breaking the fall of the material as it passes from the end of the first chute to the pendent chute, substantially as described.

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

THOMAS WRIGHTSON.

Witnesses:

GEORGE JAMES CLARKSON,
EDWARD THOMAS ELCOAT.