

(No Model.)

3 Sheets—Sheet 1.

R. C. GREENERD.
COAL CONVEYER.

No. 584,112.

Patented June 8, 1897.

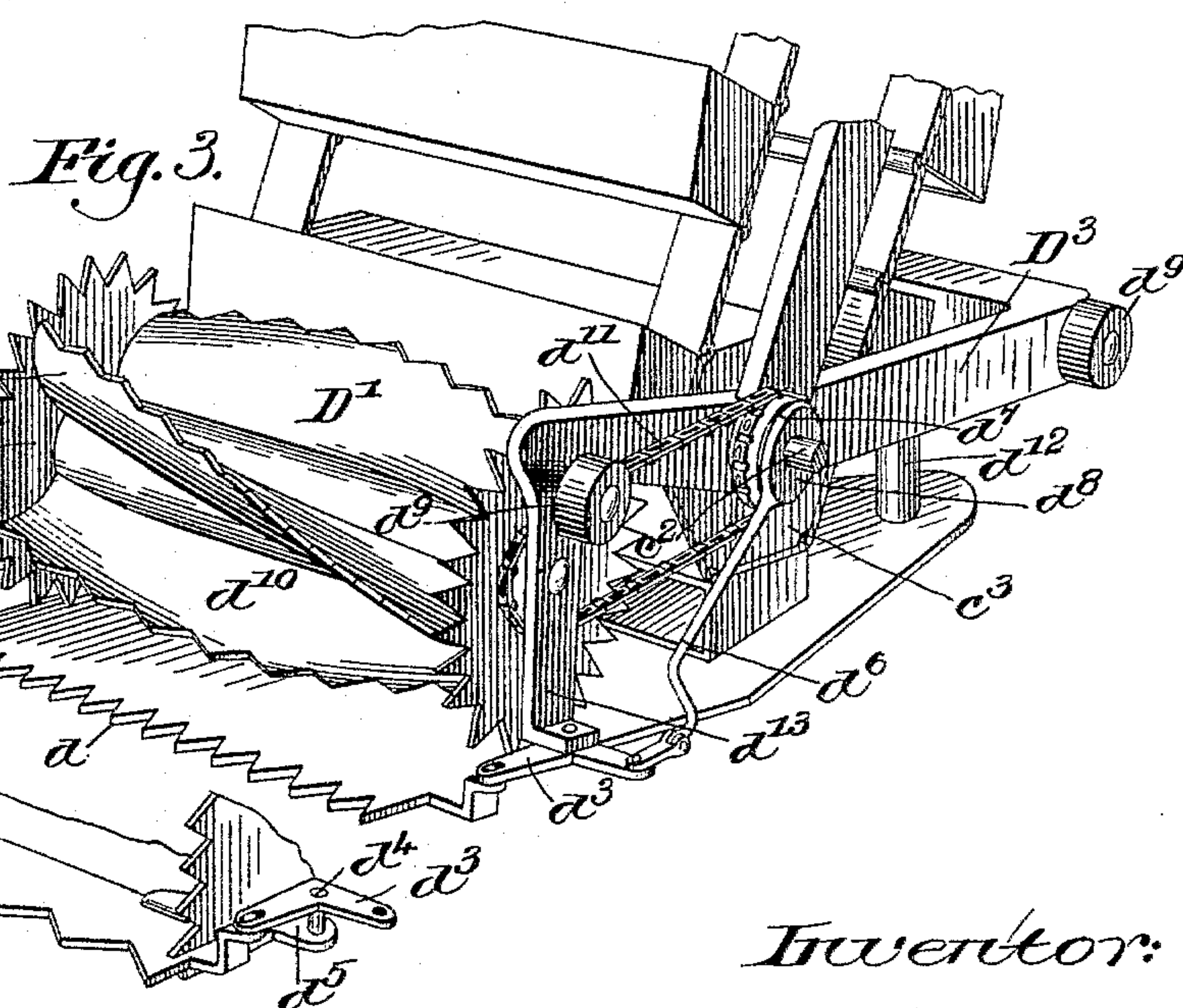
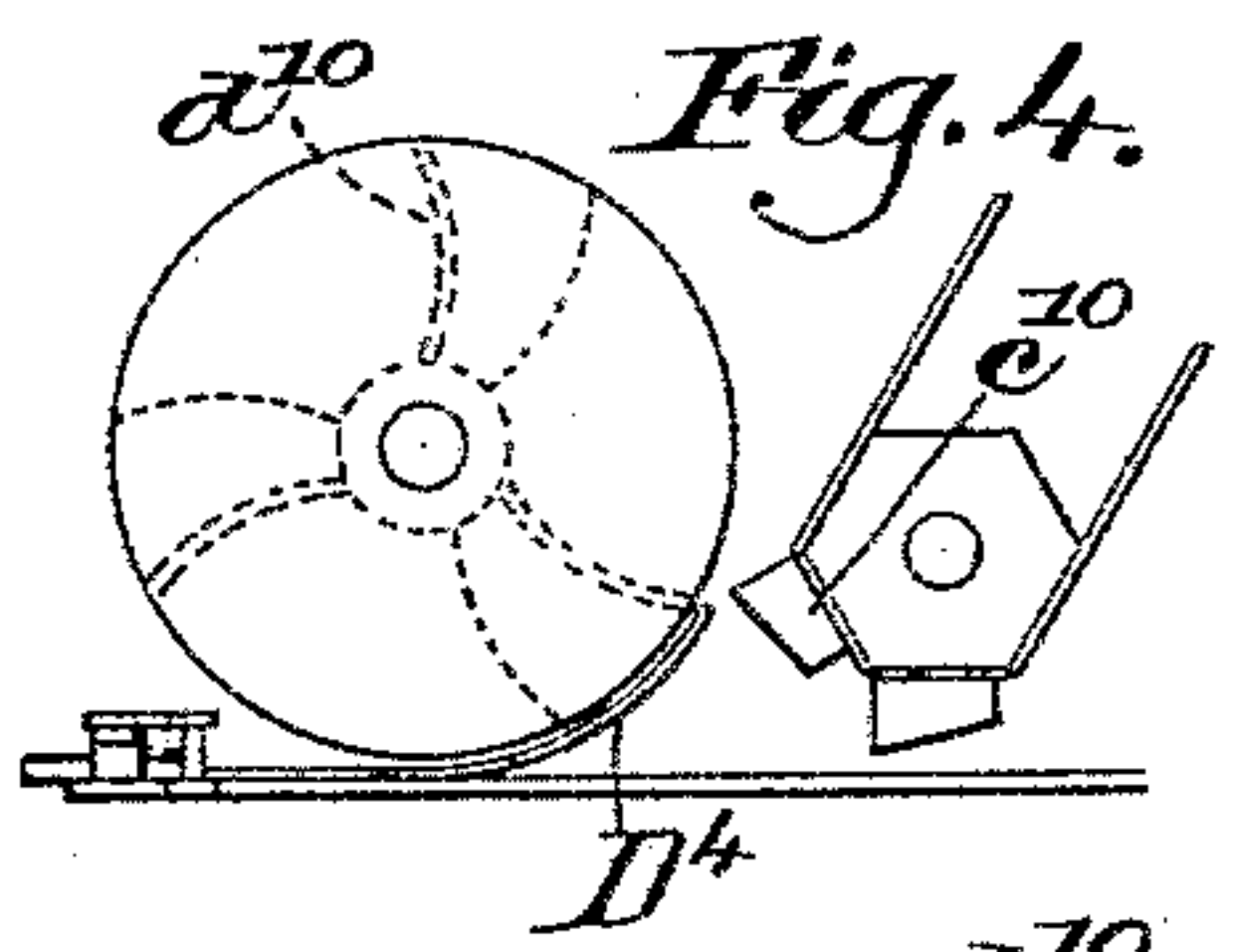
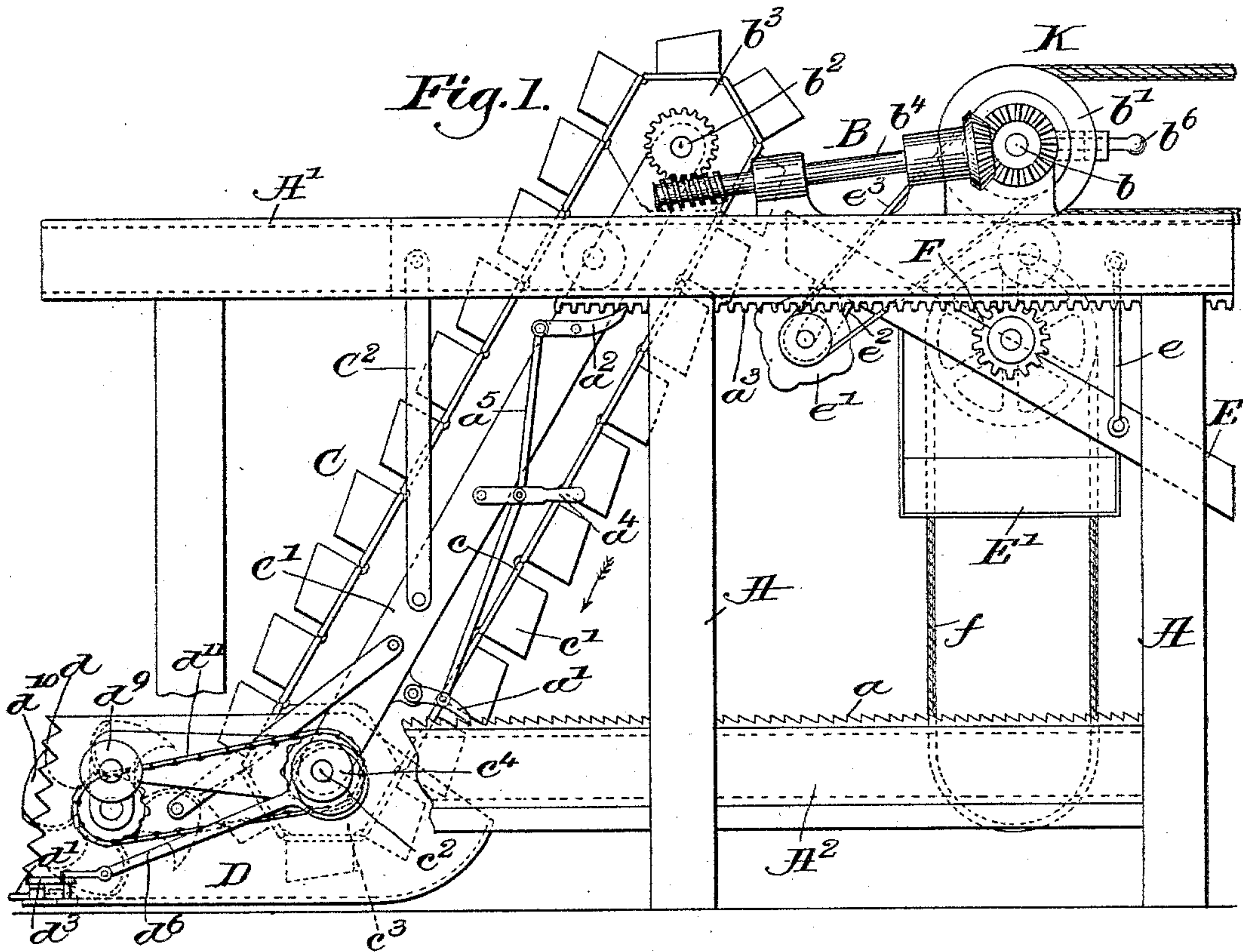
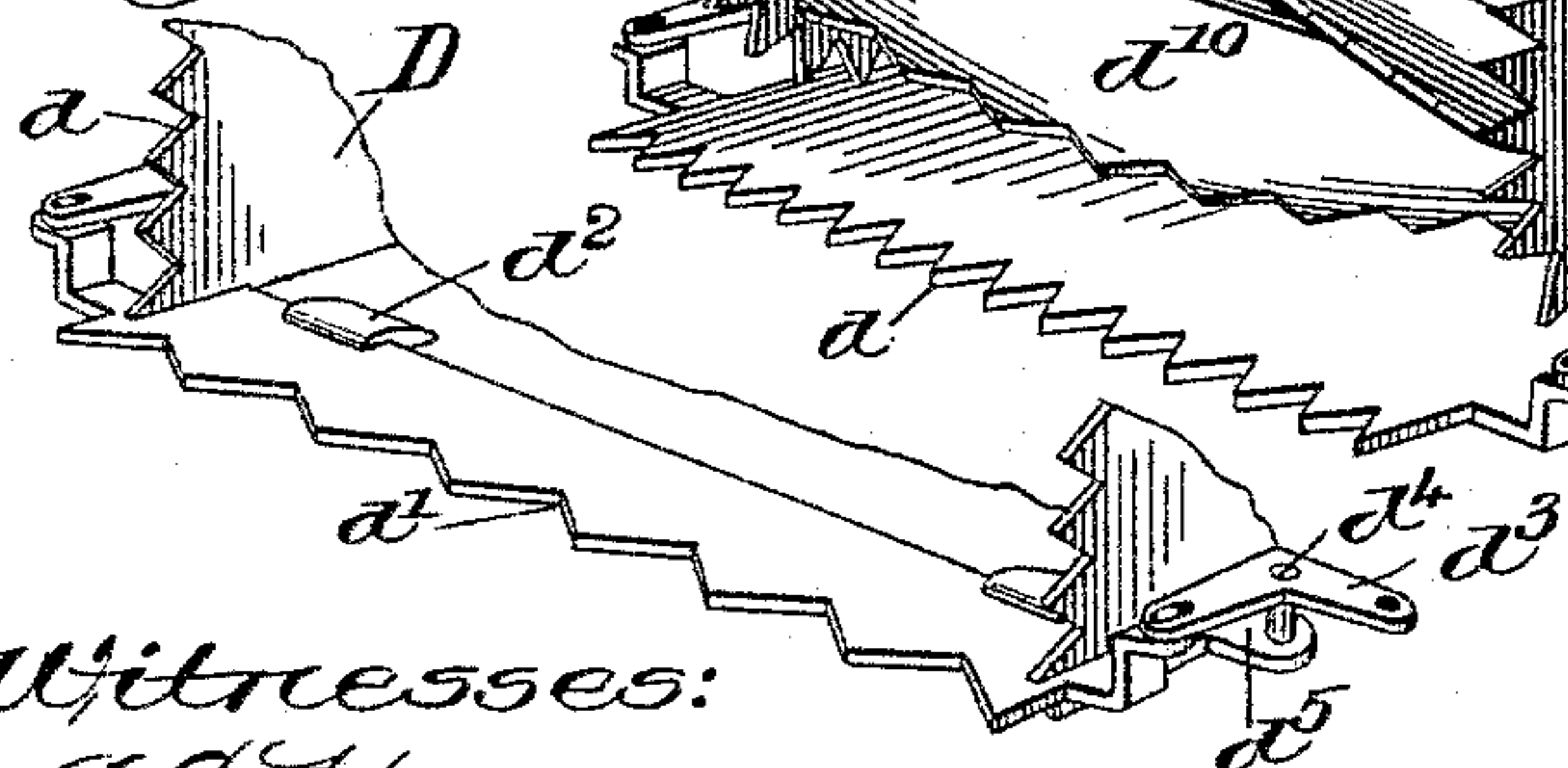


Fig. 2.



Witnesses:
A. C. Harmon
Thomas J. Drummond.

Inventor:
Robert C. Greenerd
by Lerby Gregory.
attys.

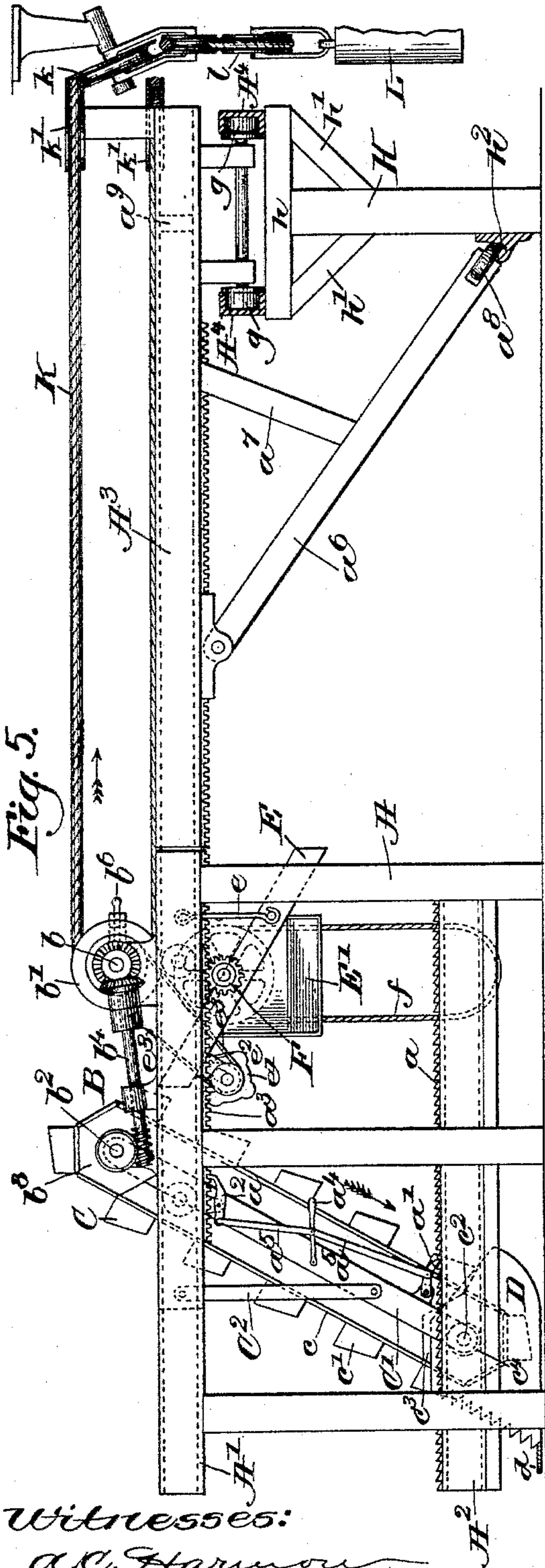
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R. C. GREENERD.
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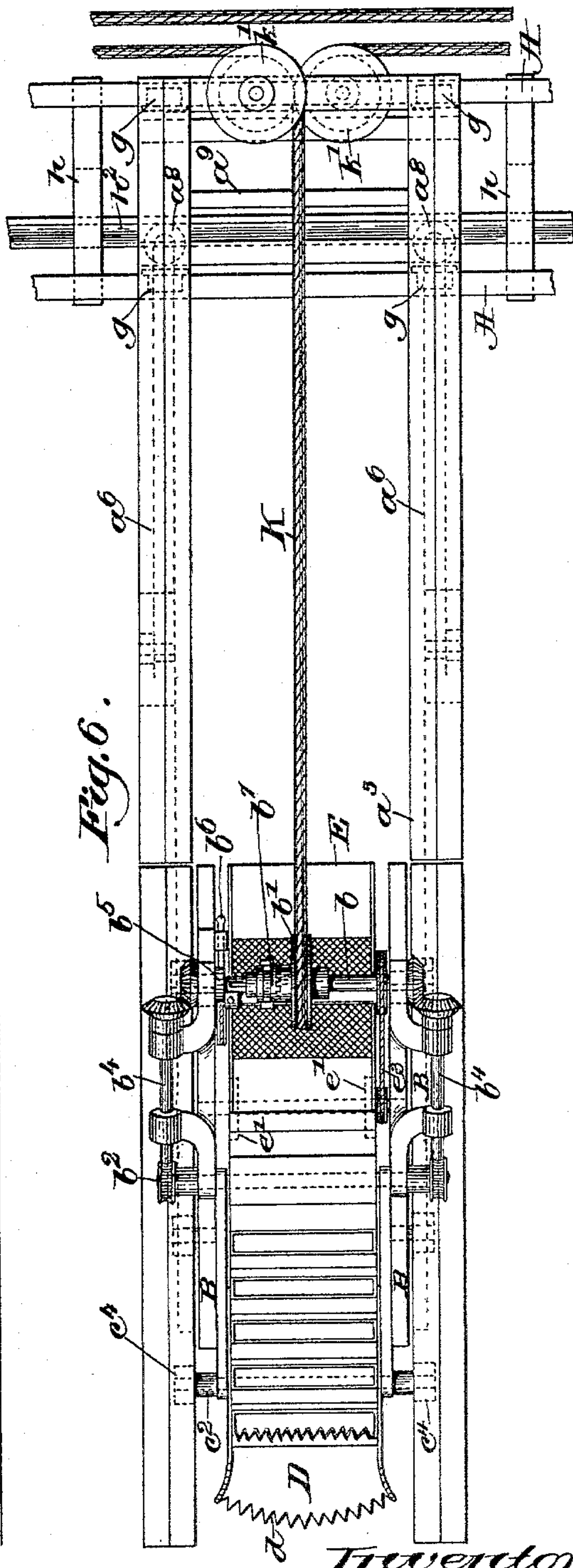
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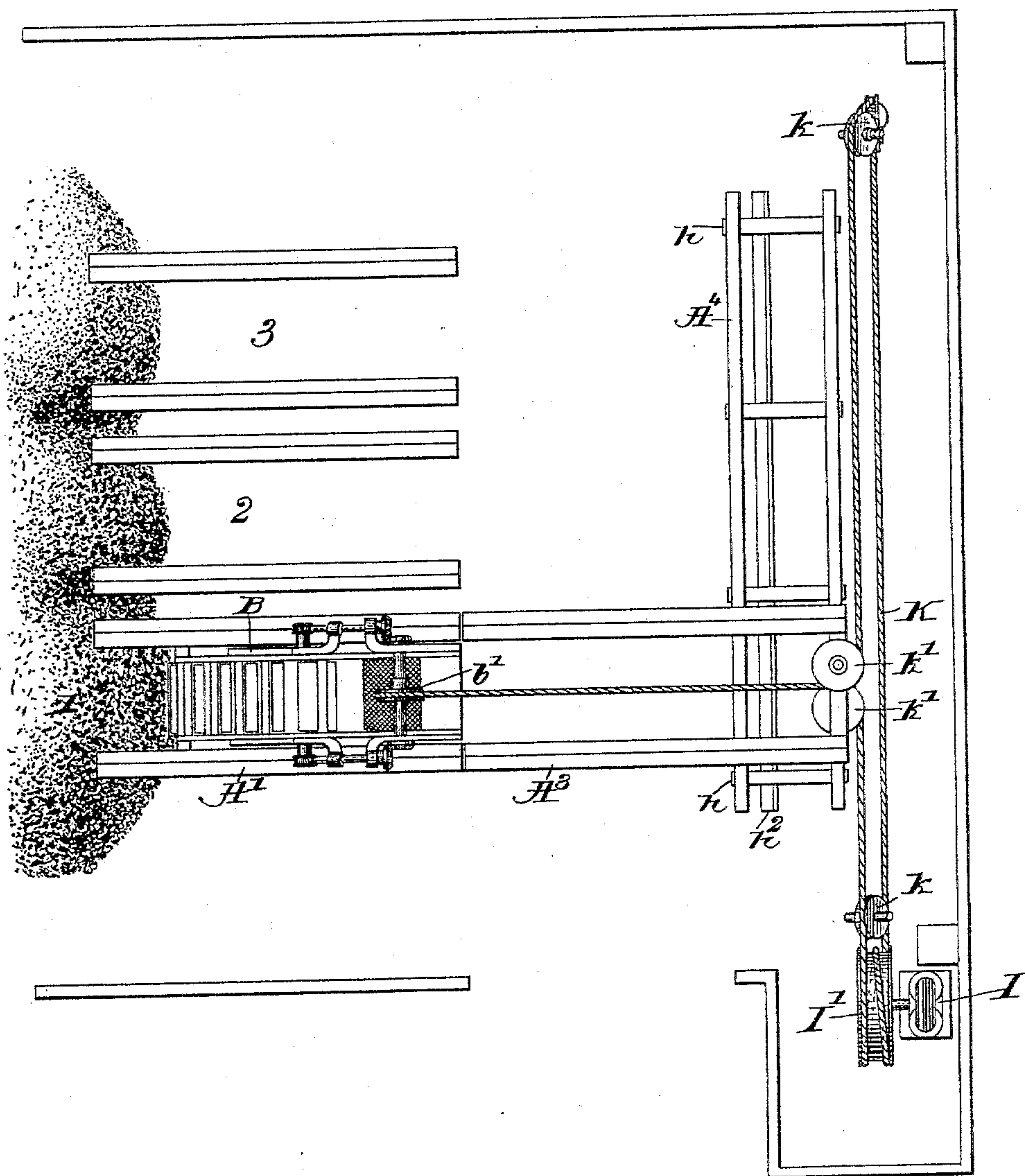
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Fig. 7.



Witnesses:

A. C. Harmon

Thomas J. Drummond

Inventor.

Robert C. Greenerd

by Crosby Gregory

attys

UNITED STATES PATENT OFFICE.

ROBERT C. GREENERD, OF BOSTON, MASSACHUSETTS.

COAL-CONVEYER.

SPECIFICATION forming part of Letters Patent No. 584,112, dated June 8, 1897.

Application filed August 13, 1896 Serial No. 602,651. (No model.)

To all whom it may concern:

Be it known that I, ROBERT C. GREENERD, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Coal-Conveyers, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

My invention relates to improvements in devices for handling coal, being particularly intended for elevating coal from the sheds directly into the delivery-wagon.

With this end in view I have invented the hereinafter-described improvement, whereby the coal may be quickly raised, screened, and delivered into the wagon at any point in the coal-yard by means of a single stationary source of power. The mechanism is automatic in its operation and may be readily shifted longitudinally of the yard and transversely thereto in and out of the successive divisions or alleys of the shed.

My invention comprises various details of construction hereinafter set forth and includes improvements in the conveyer mechanism for enabling the latter rapidly to enter and convey the coal.

In the accompanying drawings, illustrative of the preferred form of my invention, Figure 1 is a side elevation, partly broken away, showing the elevator plow or shoe and feeding mechanism and a portion of the general operating mechanism. Fig. 2 is an enlarged detail in perspective, showing the movable entering edge of the shoe. Fig. 3 is a view in perspective of a modified form of shoe and feeding mechanism. Fig. 4 is a side elevation of further modifications relating to the shoe and feeding mechanism. Fig. 5 is a side elevation, partly in section, showing my invention in operative position in a yard, the feeding mechanism being omitted for clearness. Fig. 6 is a top plan view thereof, and Fig. 7 is a plan view of the yard intended to illustrate the plan of operation of my system.

In the drawings, A designates a suitable framework or track-support which may comprise the posts and beams of the coal-shed proper. This framework carries, preferably, two sets of tracks, which I will designate for

convenience as "shed-tracks"—an upper track A' and lower track A².

An elevator-carriage B is carried by the upper track and comprises suitable mechanism for operating the elevator C, this mechanism consisting in the present instance of a drive-shaft *b*, having a centrally-mounted drive-pulley *b'* thereon, and an elevator-shaft *b*², carrying sprocket-wheels *b*³ at each end and driven by intermediate shafts *b*⁴, geared at one end by bevel-gears to the drive-shaft *b* and at their other ends by worm-gearing to the elevator-shaft *b*². The elevator in the present instance consists of a sprocket-chain *c* and buckets *c'*, carried by side supports C', secured at their upper ends to the shaft *b*² and carrying at their lower ends a shaft *c*², provided with suitable sprocket-wheels *c*³, corresponding to the upper sprockets *b*³. The outer end of the shaft *c*² is provided with rollers *c*⁴ to run in the lower tracks A², in order to give steadiness and the required strength for rapidly elevating the coal, braces C² being provided, secured at one end to the support C' and at the other end to the carriage B.

In order to facilitate the handling of the coal and insure the rapid and effectual filling of the buckets as they are revolved in the direction of the arrow, Fig. 1, I have provided at the lower end of the elevator a plow or shoe D, preferably closed at its rear end and projecting forward at its front end, the sides thereof being preferably laterally bent somewhat, as indicated in Fig. 6, and the edges being deeply notched to provide coarse teeth *d* in order to gain easy access to the coal.

In order that the shoe may still more readily work its way into the opposing heap of coal, I have made provision to laterally reciprocate the front edge of the bottom of the shoe.

In Figs. 1 and 2 I have made the edge of the shoe in the form of a plate *d'*, movable in guides *d*² by suitable means, as by a bell-crank *d*³, pivoted at *d*⁴ to an ear *d*⁵, projecting from the shoe D, and operated by means of a link *d*⁶ and eccentric-strap *d*⁷ on an eccentric *d*⁸, fixed to rotate on and with the shaft *c*².

With the style of elevator and its buckets which I have herein selected to show in connection with my invention it is ordinarily

possible to use only a fourteen-inch bucket as a maximum, but by my improvements I make it possible to employ buckets of very much greater width. To this end I preferably provide a feeding mechanism D' , shown in Fig. 1 as journaled in the sides of the shoe D and in Fig. 3 as journaled in a supporting frame or bracket D^3 , the latter having rollers d^9 to run in the tracks A^2 .

The feeder consists, preferably, of a series of spirally-arranged blades or scoops d^{10} , shown as rotated by a sprocket-chain d^{11} , passing over sprocket-wheels on the feeder-shaft and lower elevator-shaft c^2 . Any other suitable operating mechanism therefor may be provided. The edges of the blades d^{10} will preferably have coarse teeth.

As the shoe D works its way into the coal the feeder D' enters with a sliding or shearing movement into the coal, loosening the bedded mass and scooping it up to be delivered into the buckets of the elevator. In the case of anthracite coal it is usually preferable for the feeder D' to carry the coal over, as shown in Fig. 3, but in handling soft or bituminous coal and coal screenings it is preferable to operate the feeder in the reverse direction, as shown in Fig. 4. In the latter case the blades d^{10} are slightly curved in an opposite direction to that shown in Fig. 3, and an upwardly-bent plate D^4 is provided, against and over which the feeder scrapes the soft coal into the buckets c^{10} , the latter in such case being smaller and closer together than in the construction shown in Fig. 3. As shown in Fig. 3, instead of having the edge merely of the bottom of the shoe reciprocate I have shown the bottom itself as reciprocated, it being pivoted at its rear end on a post d^{12} for this purpose and having the bell-crank d^3 mounted on a projecting arm d^{13} of the frame D^3 . In this construction the stationary sides of the shoe D are omitted, and movable and preferably rotating sides D^5 , notched and preferably secured to the ends of the feeder D, are provided to enter the coal and hold the same in to be rapidly caught by the feeder. These rotating or independent sides may be used in connection with the stationary bottom shown in Figs. 1 and 2, if desired.

The elevator may be advanced into the coal with remarkable rapidity by means of the several mechanisms above described.

When I speak herein of "elevators," I desire it to be understood that I in no sense restrict myself to the form of endless chain and bucket herein shown, inasmuch as any other or desired conveyer may be used, and whether it actually elevates or not; and while I prefer to use together all the mechanisms described and to be described, yet it is to be understood that various details thereof may be used separately and with other mechanism.

The resistance offered by the compact mass or heap of coal is considerable, and therefore, in order to reduce the strain on the carriage and elevator to a minimum, I have provided

a ratchet a on the lower track and a pawl a' to cooperate therewith, in order that the frame or truck may receive the strains due to the tendency of the elevator to move backwardly when it is digging into the coal. Preferably also a dog a^2 is provided on the carriage B to cooperate with the rack-bar a^3 for the purpose of insuring steadiness of parts in the operation of the mechanism. The pawl a' and dog a^2 are operated by any suitable means, a common lever a^4 and links a^5 being shown for that purpose. The coal being elevated by the buckets c' is delivered to a screen E, which is suspended in any suitable manner, as by means of the rods e , from the carriage B, and is preferably given an intermittent or jogging motion by means of the cam e' , the screen being provided with slotted brackets e^2 to maintain the same in proper relation to the cam-shaft and the latter being driven by a belt e^3 from the drive-shaft b . By this means as the coal falls on the screen E it is thoroughly graded and screened before it is delivered to the wagon, the screened-out debris falling, preferably, into a chute E' , carried beneath the screen E.

In order to run the carriage B and elevator back and forth into different divisions of the shed, I have provided a cog-wheel F on the under side of the carriage, gearing into the rack-bar a^3 , a chain or rope f being provided for the purpose of operating the gear F from the ground.

Having loaded a sufficient amount of coal from one portion of the shed, it is desired to shift the loading apparatus to another portion of the shed, and accordingly I have provided a portable track A^3 , mounted on rollers g at its outer end, arranged to travel in a track A^4 , running lengthwise of the yard, which I will designate as the "yard-track." The yard-track is mounted in any convenient position, being herein shown as elevated, the post H, cross-tree h , and struts h' being provided for the purpose; also, preferably, the portable tracks A^3 will be braced at their outer ends by means of a brace a^6 and strut a^7 , the former having at its lower free end the roller a^8 , traveling on a suitable track, as h^2 , extending from post to post parallel to the track A^4 . The yard-track, shed-tracks, and portable track will all preferably be U-shaped, as shown in cross-section at the right of Fig. 1, this style of track being preferable for the purpose of keeping out the dust and also absolutely preventing the wheels from jumping the track and also maintaining them in proper operative position notwithstanding any strain or tendency to tip from the track that may be brought upon them. Beneath the tracks A^3 , I provide a continuation of the rack-bar a^3 , in order that the carriage B may be readily run out on the portable tracks, as by hand, if desired, and locked thereon firmly in position by means of the dog a^2 . Stops a^9 are provided in the tracks a^3 in order to limit the outward movement of the carriage.

The mechanism thus far described is operated by any suitable power, a dynamo I being herein shown (see Fig. 7) for that purpose and the traction being transmitted by means of a wire rope K. The latter passes from the driving-drum I' over a guide-pulley k at either end of the yard, being directed intermediately over the drive-pulley b' by means of guide-pulleys k' mounted on and to move with the portable tracks A^3 . A take-up of any suitable form, herein shown as a weight L suspended from a pulley l held in a loop of the driving-cable, is herein shown as provided at one end of the yard, in order to maintain the driving-cable under proper tension for driving friction on the driving-pulley b' , and also in order to take up the slack when the carriage B is moved out and in on the shed-tracks, or is moved out on the portable tracks.

The portable tracks, with the carriage B moved out thereupon, may be moved longitudinally of the yard by any suitable means, but I prefer to use the driving-cable K for this purpose. To that end I have fixed on the drive-shaft b of the elevator mechanism a toothed wheel b^5 , Fig. 2, which may be locked against rotation when desired by means of a movable bolt or dog b^6 . When the carriage B has been moved out onto the portable tracks, the shaft b is held against rotation by engaging the dog b^6 with the wheel b^5 , and thereupon the further movement of the driving-cable K will shift the portable tracks and elevator longitudinally on the yard-tracks.

I do not desire to be restricted in any way to the mechanism herein shown for locking the driving-shaft against rotation, inasmuch as any other suitable means may be provided for holding the driving-cable against movement relatively to the carriage for the purpose of shifting the latter by means of the cable back and forth along the yard-track.

In order that it may not be necessary to stop the driving-cable when it is desired to stop the elevating mechanism, I have mounted the drive-pulley b' loosely on its shaft and have arranged suitable clutch mechanism b^7 for engaging the same with its shaft whenever desired.

The operation of my improved coal-handling mechanism is as follows: When it is desired to load a wagon with coal from the division 1 of the shed, the carriage is run into that division of the shed, as shown in Fig. 7, and is forcibly run into the coal heap and locked in position by means of the dogs $a' a^2$, engaging the racks $a a^3$, as shown in Fig. 1. The beveled or notched teeth of the shoe D enable the latter to be readily forced into the coal heap and likewise the notched edges of the buckets give ready access to the latter to the coal. The coal being elevated by the buckets is deposited on the screen E, which is agitated by means of the cam e^2 , thereby screening and grading the coal, the debris being deposited at one side by means of the

chute E' and the coal being delivered at the lower end of the screen into the wagon. Having loaded a wagon, supposing it is desired to load the next wagon from the coal in division 2 of the shed, the drive-pulley b' having been previously disengaged from driving relation with its shaft by means of the clutch b^7 when it was desired to stop the elevator, the dogs $a' a^2$ are disengaged from their racks and ordinarily the pull of the take-up L and of the cable will be sufficient to run out the carriage and elevator onto the portable tracks A^3 without further manipulation. However, the gear F, operated by the rope f , may be brought into service for this purpose, and the carriage B, having reached the stops a^9 on the portable tracks, is locked into position and the bolt b^6 is engaged with the wheel b^5 of the drive-shaft, so as to positively hold the same against rotation. The driving-pulley b' is then engaged with the drive-shaft b and is likewise held against rotation by means of the bolt b^6 , so that the continued movement of the driving-cable K in the direction of the arrow, Fig. 1, serves to move the portable tracks and carriage along the yard-tracks A^4 to the desired position opposite the division 2 of the shed. The clutch b^7 is then disengaged from the driving-pulley b' and the carriage B is moved back into the division 2 by means of the gear F and hand-rope f , being secured in place, as before, by means of the dogs $a' a^2$, operated by the hand-lever a^4 .

Many changes and modifications in the details, arrangement, and combination of parts of my invention may be resorted to without departing from the spirit and scope of my invention.

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

1. An apparatus for handling coal, comprising a yard-track extending longitudinally of the yard, an elevated portable track mounted to move thereon, and two shed-tracks, one above the other, combined with a carriage mounted to move on said upper shed-track and on said portable track, and a portable elevator mechanism having wheels adapted to run on said upper shed-track and on said portable track, provided at its lower end with rollers to run on said lower track, substantially as described.

2. In an apparatus for handling coal, a yard-track, and a shed-track extending transversely thereto, combined with a portable elevator-carriage, an elevator carried thereby, and operating mechanism therefor, said mechanism embracing a driving-wheel and its shaft on the carriage, an endless driving-cable, stationary guide-pulleys therefor adjacent the yard-track, and means to render said moving cable immovable at will relatively to said carriage, whereby said cable may be continuously driven and used to drive the said operative mechanism or to shift said carriage at will, substantially as described.

3. In an apparatus for handling coal, the combination with a suitable portable elevating mechanism, of a yard-track, and stationary shed-tracks arranged transversely thereto, a horizontal rack-bar fixed on and along said shed-tracks and a dog carried by the elevating mechanism, and means to operate the same to engage said rack-bar, substantially as described.

4. An apparatus for handling coal, comprising a yard-track extending longitudinally of the yard, an elevated portable track mounted to move thereon and two shed-tracks, one above the other, and a ratchet or rack-bar fixed on said upper and lower tracks respectively, combined with a carriage mounted to move on said upper shed-track and on said portable track, and an elevating mechanism provided at its lower end with rollers to run on said lower shed-track, and dogs carried by said elevating mechanism to engage said rack-bars and hold the elevator against backward movement, substantially as described.

5. In an apparatus for handling coal, a yard-track, a stationary shed-track arranged transversely thereto, and a portable track mounted to run on said yard-track, a carriage, an elevator, a screen pivotally mounted on said carriage to receive the coal from said elevator and deliver the same to a wagon, as desired, and means to impart a jogging movement to said screen, substantially as described.

6. The combination with a coal-elevator, of a shoe coöperating therewith, said shoe having the front edge of its bottom notched, and means to laterally reciprocate said front edge, substantially as described.

7. The combination with a coal-elevator, of a shoe coöperating therewith, said shoe having the front edge of its bottom formed by means of a plate movable in guides provided therefor on the body of the shoe, said plate having coarse teeth at its front edge to wedge into the coal, and means to reciprocate said plate, substantially as described.

8. A shoe, comprising a bottom, and inde-

pendent sides, said sides and bottom being provided with coarse teeth adapted to wedge into the coal, means to reciprocate the front edge of the bottom, and means to move the side independently of said bottom, substantially as described.

9. A shoe, comprising a bottom, and disk-like sides independent of said bottom, said sides and bottom having coarse teeth adapted to wedge into the coal, means to reciprocate the toothed edge of the bottom, and means to rotate the sides, substantially as described.

10. The combination with an elevator, of a feeder to gather and deliver the coal to the elevator, said feeder having a plurality of blades rotatably mounted, each blade having a plurality of coarse wedge-shaped teeth on its outer edge to work into and loosen the coal, supports for the feeder, and means to rotate it, substantially as described.

11. The combination with an elevator, of a feeder to gather and deliver the coal to the elevator, said feeder having a plurality of spirally-arranged blades rotatably mounted, and constituting with each other a series of buckets with closed bottoms to hold and convey the coal to the elevator, said blades also having coarse, wedge-shaped teeth on their edges to work in and dislodge the coal, supports therefor, and means to rotate it, substantially as described.

12. The combination with an elevator, of a shoe, said shoe having a bottom, and sides, the latter being movable, means to move them, and a feeder between said sides, said feeder comprising a plurality of radially-mounted blades, adapted to rotate and deliver the coal to the elevator, and means to rotate said feeder, substantially as described.

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

ROBERT C. GREENERD.

Witnesses:

GEO. H. MAXWELL,
ADDIE FARNUM DANIELS.