

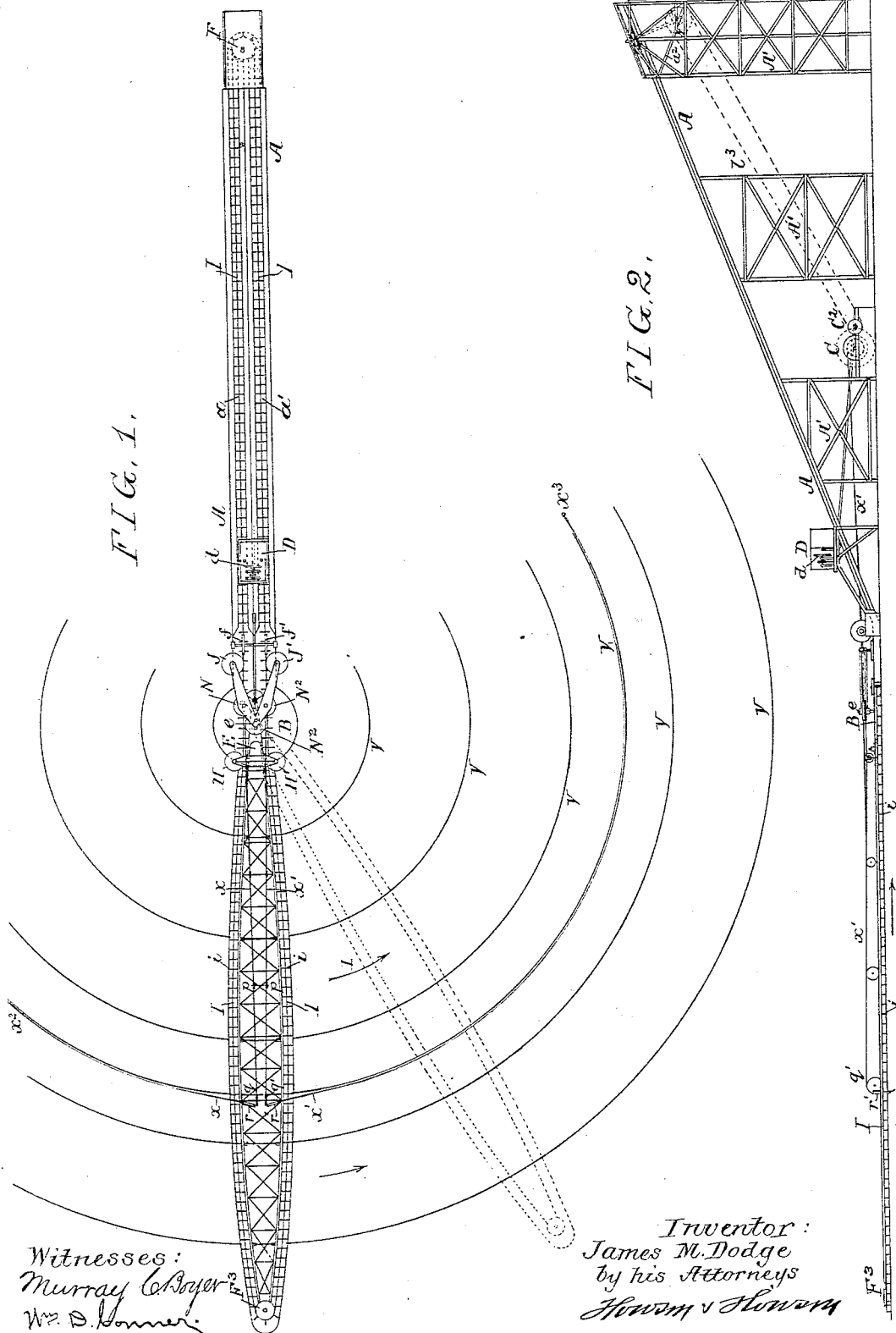
(No Model.)

6 Sheets—Sheet 1.

J. M. DODGE.
CONVEYING MECHANISM.

No. 476,616.

Patented June 7, 1892.



Witnesses:
Murray C. Boyer
W. D. Conner

Inventor:
James M. Dodge
by his Attorneys
Hewitt & Hewitt

(No Model.)

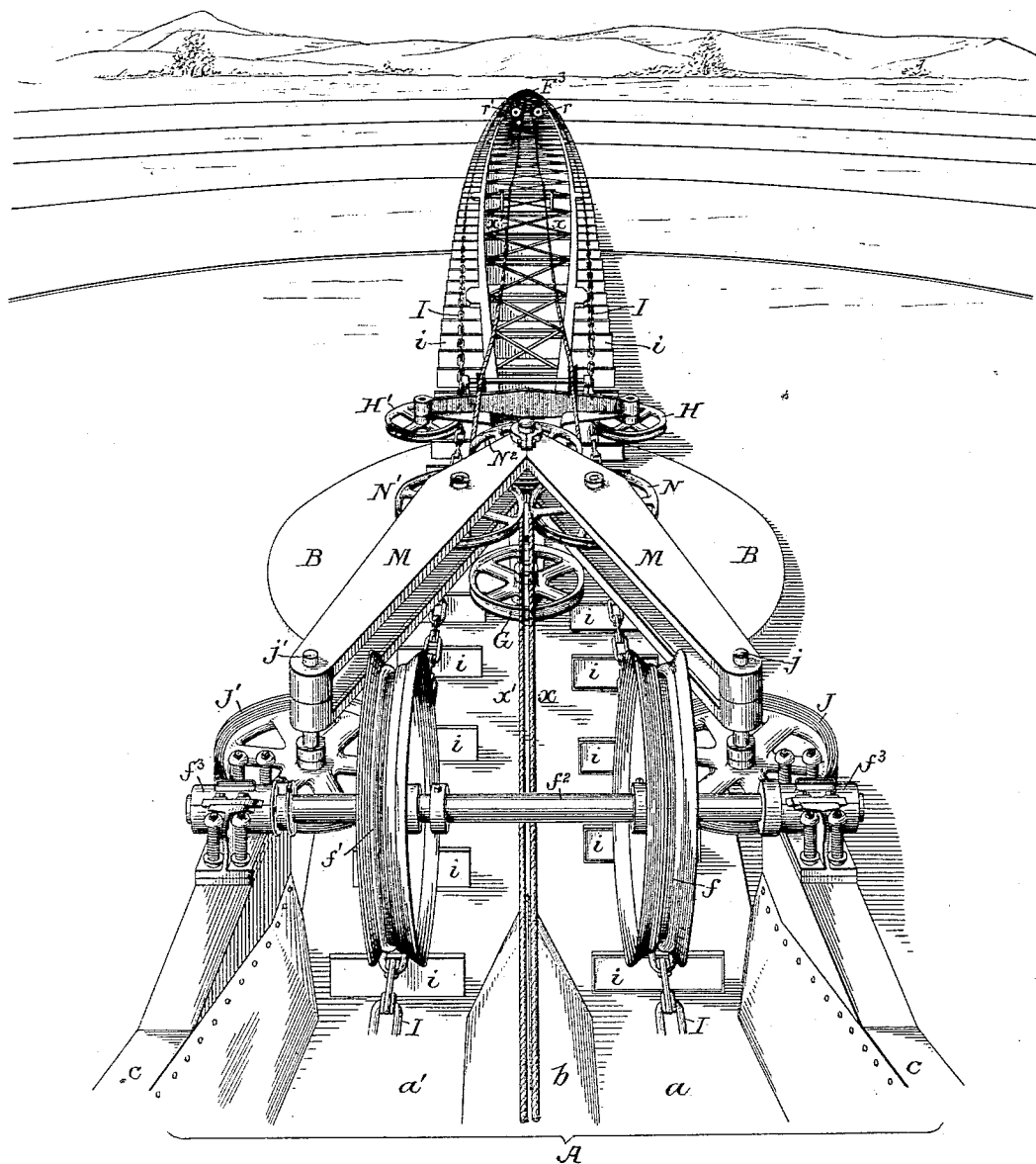
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FIG. 3.



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6 Sheets—Sheet 3.

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FIG. 4^a

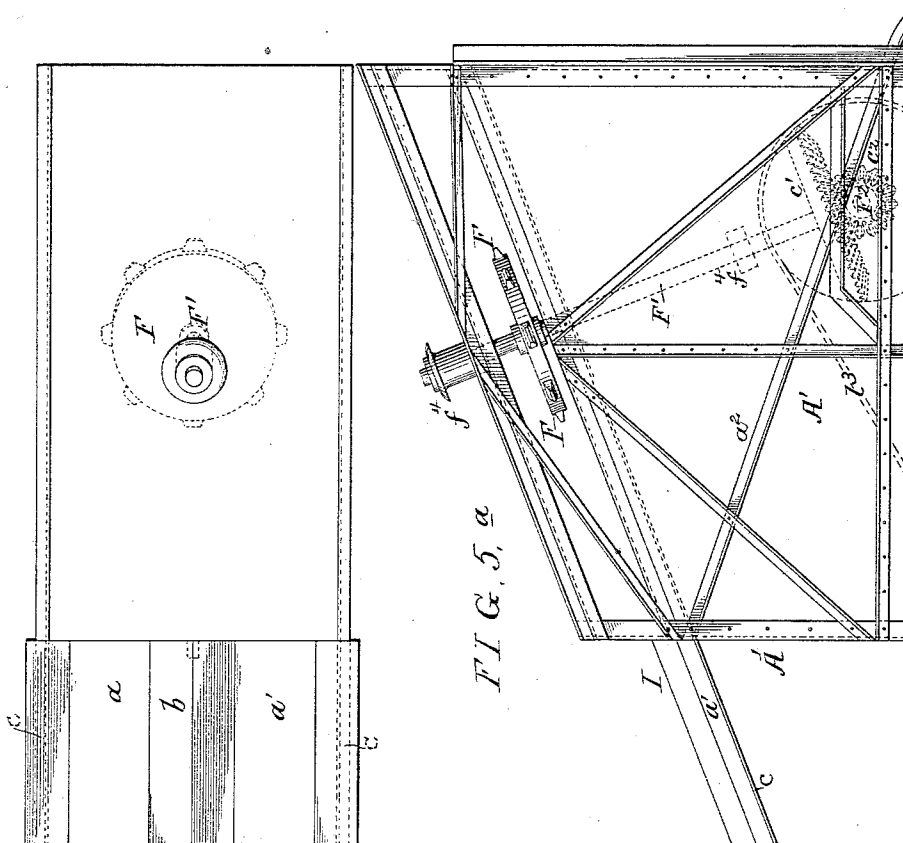


FIG. 4^b

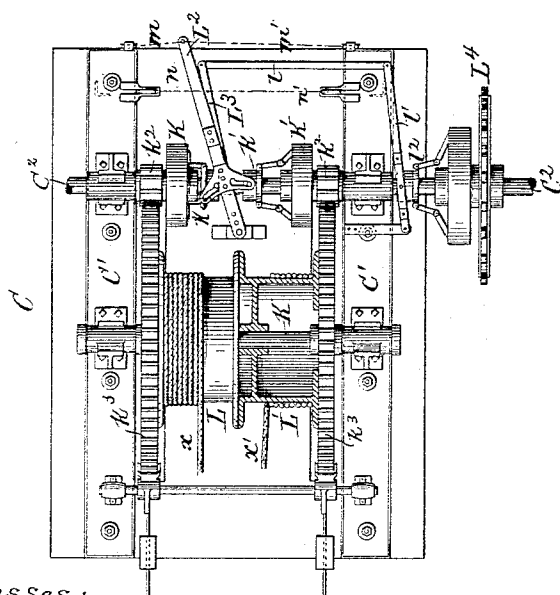
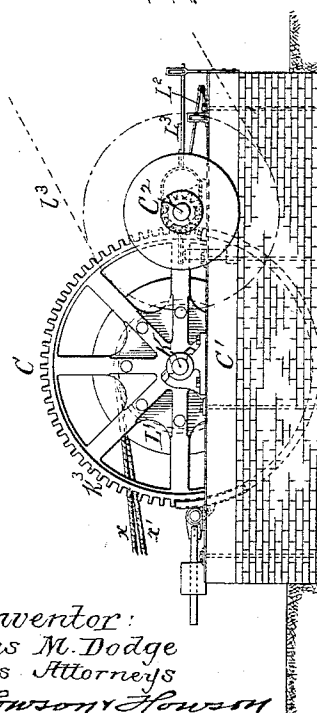


FIG. 5^b



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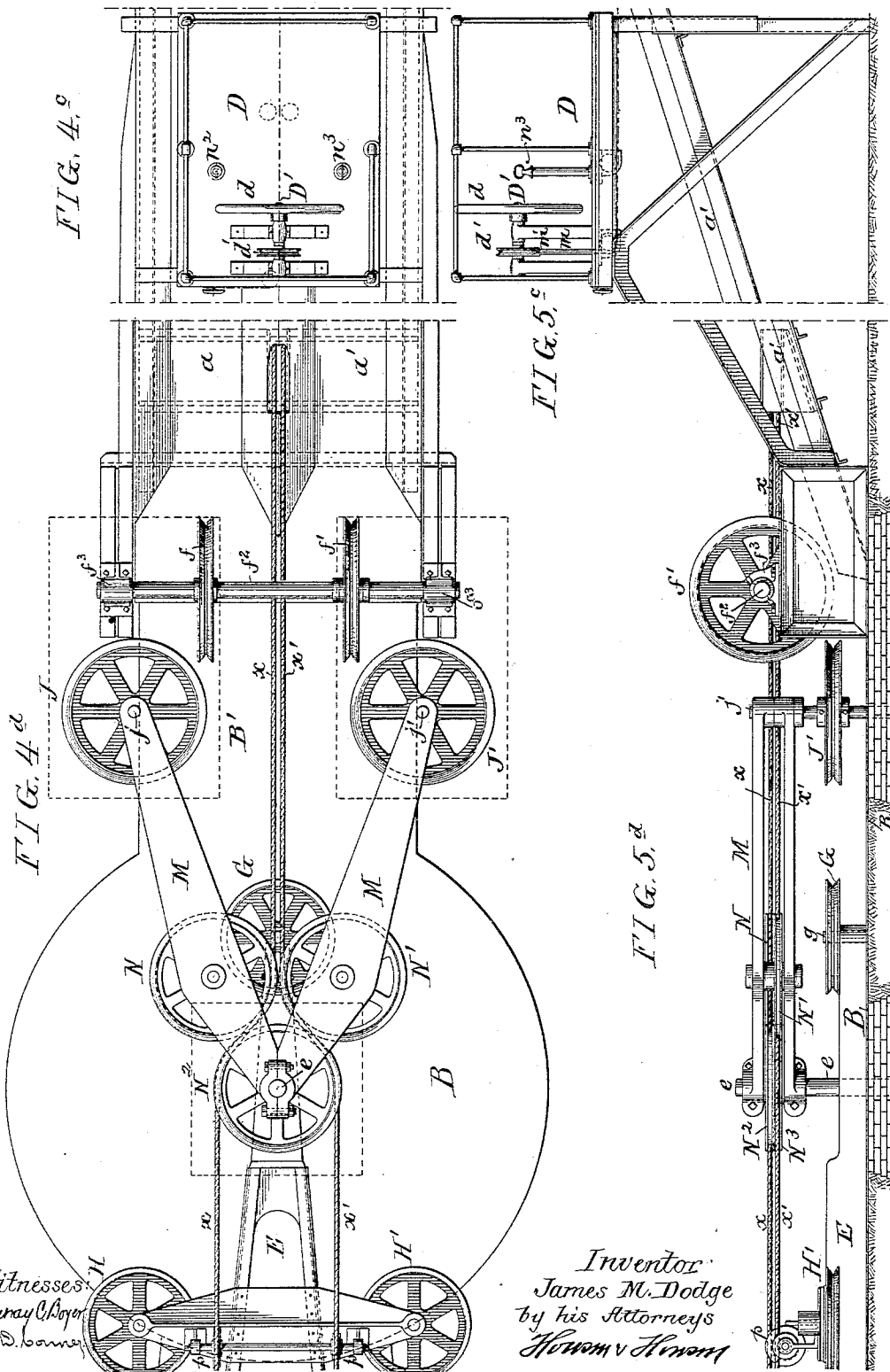
(No Model.)

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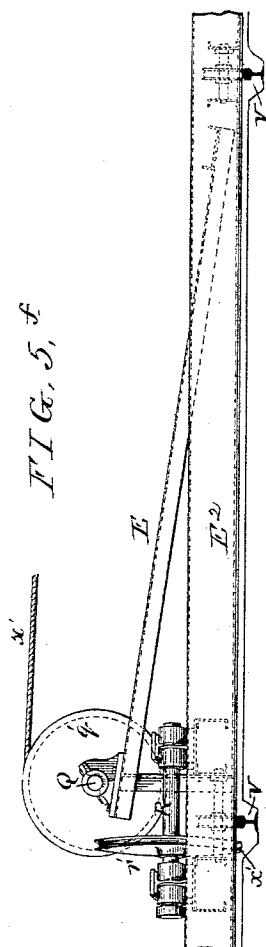
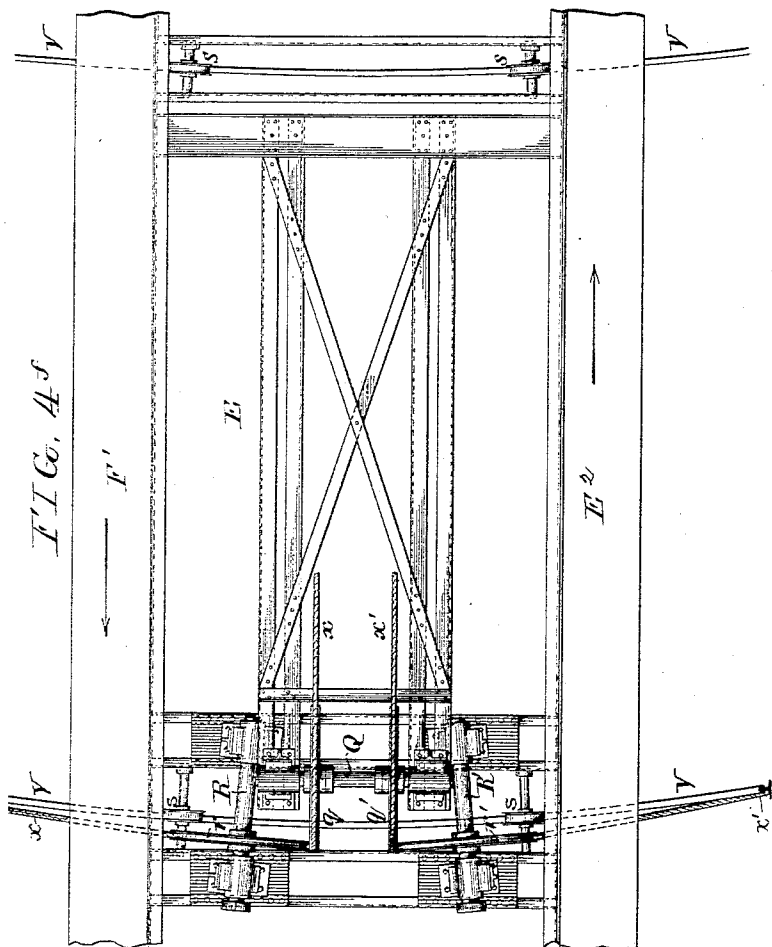
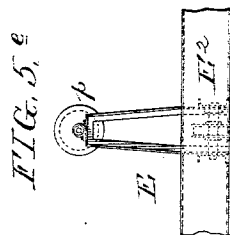
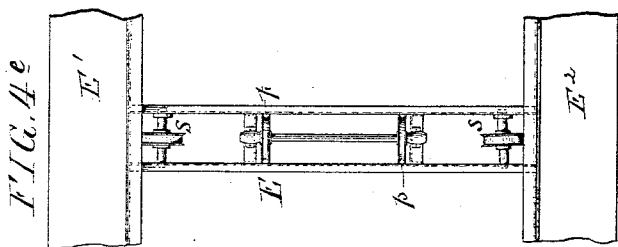
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6 Sheets—Sheet 5.

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FIG. 4.

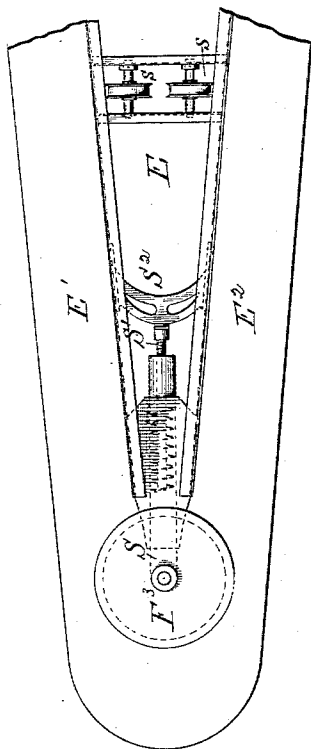


FIG. 5.

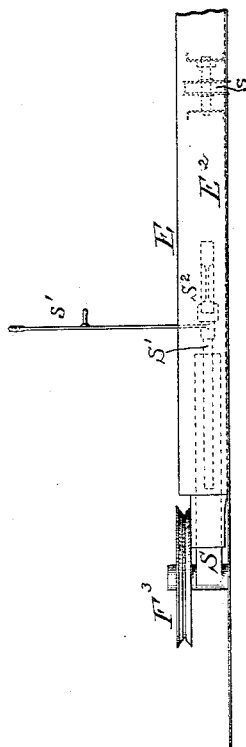


FIG. 6.

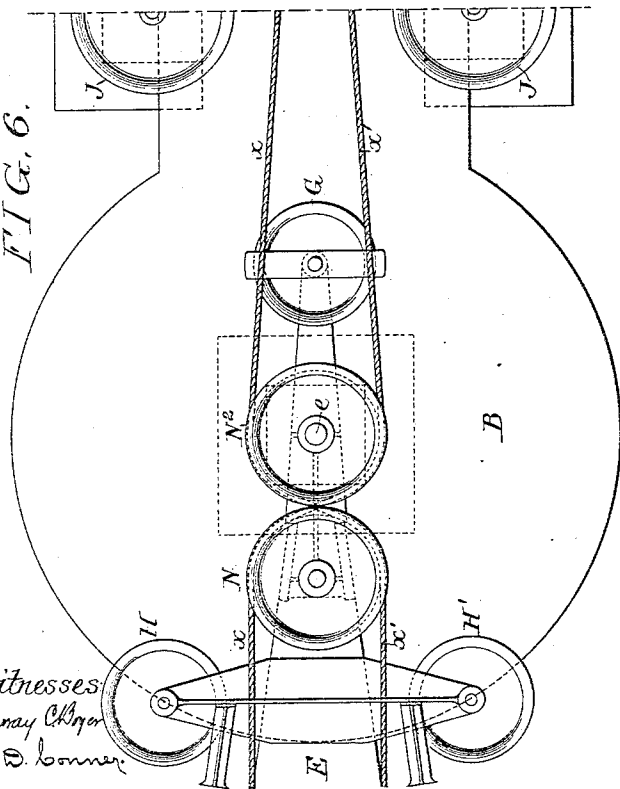
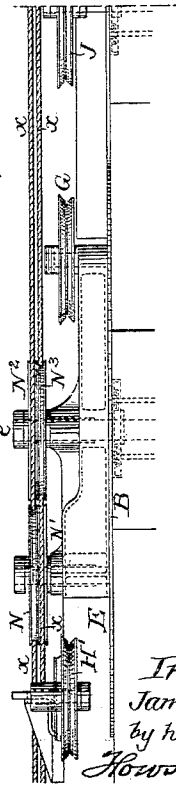


FIG. 7.



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UNITED STATES PATENT OFFICE.

JAMES MAPES DODGE, OF PHILADELPHIA, PENNSYLVANIA.

CONVEYING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 476,616, dated June 7, 1892.

Application filed November 17, 1891. Serial No. 412,192. (No model.)

To all whom it may concern:

Be it known that I, JAMES MAPES DODGE, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Conveying Mechanism, of which the following is a specification.

My invention relates to mechanism for conveying coal or analogous material from one point to another, my invention being especially adapted for removing the material from a pile, conveying it in a continuous stream, and delivering it at a terminal point to be carried away by hand or by machinery; or the material may be delivered directly to cars or boats, as circumstances require.

The object of my invention is, first, to so construct a conveyer using a flighted endless chain that the movable portion of the conveyer can be turned on its pivot without interfering with the operation of the chain.

A further object of my invention is to provide means whereby the pivoted portion can be moved laterally by an operator stationed at a given point, the movable section being entirely under his control.

These objects I attain in the following manner, reference being had to the accompanying drawings, in which—

Figure 1 is a diagram plan view illustrating the complete apparatus, the details being omitted to avoid confusion. Fig. 2 is a side view of complete apparatus in diagram. Fig. 3 is a perspective view of the pivoted section, looking from the operating-stand. Figs. 4^a, 4^b, 4^c, 4^d, 4^e, 4^f, and 4^g are plan views, drawn to an enlarged scale, of different sections of the apparatus, showing the details of my invention. Figs. 5^a, 5^b, 5^c, 5^d, 5^e, 5^f, and 5^g are side views, drawn to an enlarged scale, of different sections of the apparatus, showing the details of my invention. Figs. 6 and 7 are plan and side views, respectively, of a modification of my invention.

I will state at the outset that my invention is based upon patents granted to me August 20, 1889, No. 409,568, for a "process of removing coal," and No. 439,487, of October 28, 1890, for a "machine for removing coal or analogous material."

I will first refer to the diagrams, Figs. 1 and 2. A is the stationary portion of the apparatus, and in the present instance consists of a

center plate B, inclined conveying-troughs *a a'*, supported on a suitable structure *A'*, these inclined troughs being of such a length and height that the material can be carried up and delivered onto the inclined chute *a²*. C is the steering apparatus, mounted in the present instance directly under the inclined conveying-troughs; but it will be understood that it may be situated at any convenient point, depending altogether upon the ground available and the position of the apparatus. This steering apparatus has two drums, on which are respectively wound the two steering-ropes *x x'*. These drums are thrown into gear with suitable driving mechanism by clutches operated from the platform D, on which is a steering-wheel *d*. E is the pivoted section, which is pivoted at *e* to the center plate B or to a fixed point independent of the center plate, and can be swung either to the right or left, as indicated by dotted lines, by operating the steering mechanism C. The ropes *x x'* pass from the steering mechanism around suitable rope-sheaves at the pivot-point and around rope-sheaves near the outer end of the pivoted section to anchors *x² x³* at the side, these anchors being at such a distance from the center that the pivoted section can be swung to its extreme positions. I is the endless-chain conveyer, having flights *i i*, which engage with the material and convey it along the apparatus. The chain conveyer I passes around the chain-wheel F at the rear, which in the present instance is the driving-wheel for the chain conveyer, the chain-wheel being mounted on a shaft *F'*, which is geared to the driving-shaft *F²*, driven from a suitable motor. The two runs of the chain pass down the two troughs *a a'* under sheaves *f f'*, mounted on a transverse shaft *f²*, adapted to bearings *f³* on the permanent portion of the machine. They then pass along the troughs *E' E²* on the pivoted section E to the return-wheel *F³* at the extreme end of the pivoted section E. The chain can travel in either direction; but if the pile of material to be removed is on the trough *E²* side of the conveyer the chain is moved in the direction of the arrows, Fig. 4^f, and will carry the material that flows into said trough to and over the turn-table B up the inclined trough *a'* to the chute *a²*, where

it is delivered to a bin or a car or boat, or to any conveyer, as the case may be. As the conveyer eats into the pile of material, it is moved in the direction of the arrow, Fig. 1, by drawing upon the rope x' and letting out slack on the rope x , thus moving the pivoted section transversely on its pivot e in the direction of the arrow 1. At the rear of the pivoted section E, beyond the pivot e , is a sheave G, mounted on a post g , carried by an extension of the pivoted section, and carried by the pivoted section are two side sheaves H H', journaled in suitable bearings, these sheaves being in line with the conveyer-chain I. On the fixed portion of the apparatus are sheaves J J', also in line with the conveyer-chain. The sheaves just described are guiding-sheaves for the endless chain when the pivoted section is moved off the center line—as, for instance, when the pivoted section is moved, as shown by dotted lines in Fig. 1, slack will occur on the inner run of the chain, as the distance between the two sheaves H' and J' will be shortened. Consequently this slack will have to be taken up. I do this by mounting the sheave G, above described, on the rearward projection of the pivoted section, which sheave engages with the outer run of chain, taking up the chain in proportion to the slack that would occur on the opposite side. Thus no matter in what position the pivoted section would be in the chain conveyer will always have an even tension.

I will now describe in detail the apparatus, referring in the first instance to Figs. 4^a and 5^a. The structure A' is preferably built of metal framing suitably stayed, as clearly shown in the drawings, and carries the stringers c c , on which are mounted the troughs a a' , these troughs being made of sheet metal in the present instance and are of the form clearly shown in the perspective view, Fig. 3, having a central partition b . The troughs have inclined sides and are a trifle wider than the blades or flights of the conveyer-chain, as clearly shown in said perspective view. The shaft F', as noticed in Fig. 5^a, is inclined, being at right angles to the line of the conveyer-chain, and is adapted to suitable bearings f^4 on the frame of the apparatus. In the present instance the shaft is provided with a bevel-gear c' , which meshes with a bevel-pinion c^2 on the shaft F², which has a chain-wheel, over which passes a drive-chain from any suitable motor; but is preferably driven from the driving-shaft C², Fig. 4^b. The inclined chute a^2 may be provided with a movable discharge-spout similar to those used in loading boats and cars, or may carry the material to a bin, from which the material can be discharged.

Referring now to Figs. 4^b and 5^b, which illustrate the steering mechanism for the pivoted section E, on the frame C' of the steering apparatus C is mounted a driving-shaft C², which is driven in any suitable manner, and

on the shaft are two clutches K K', having sliding sections k k' . On moving these sections on the shaft the clutches will be locked to or unlocked from the said shaft. As shown in Fig. 4^b, the clutch K is locked to the shaft. Secured to each clutch are pinions k^2 , meshing with gear-wheels k^3 . These wheels are mounted on a shaft K², adapted to bearings on the frame C', and secured, respectively, to the two gear-wheels are drums L L'. On the drum L is wound the rope x and on the drum L' is wound the rope x' . L² is the shifting-lever for the clutches, and connected to this shifting-lever are two shifting-ropes m m' , which pass around sheaves and up to the wheel d' on the shaft D', on which is the steering-wheel d . (Clearly shown in Figs. 4^c and 5^c.) This shaft D' is mounted in suitable bearings in standards on the platform D, which is of such a height that the operator can stand on the platform and have full control of the entire apparatus. In the present instance the conveyer-chain is driven from the driving shaft C² through the clutch k^2 and drive-chain wheel L⁴ and a suitable drive-chain k^3 , adapted to a chain-wheel on the shaft F²; but it will be understood that other methods of driving may be resorted to without departing from my invention. L³ is a clutch-lever for operating the clutch k^2 to throw the conveyer-chain into or out of gear with the shaft C², the clutch-lever being connected to the lever l' by a rod l . Ropes n n' are attached to the lever L³ and pass over sheaves to pull-rods n^2 n^3 , respectively, which are on the platform D within easy reach of the operator, so that when the operator desires to stop or start the conveyer-chain he operates the pull-rods accordingly.

I will now describe the pivot-section of the apparatus, referring to Figs. 4^a and 5^a. As before remarked, the pivoted section E is pivoted at e , the pivot-pin in this instance projecting from the center plate B. This center plate, as shown clearly in Fig. 4, is flat, so that the material can be readily transferred over the center plate from the pivoted section to the fixed section, the blades of the conveyer resting upon said plate and guided by the wheels described above. The center plate has an extension D', connecting it in the present instance with the inclined chutes a a' . The wheels J J' are mounted on upright shafts, and extending from these shafts to the pivot e are frames M, two extending from each shaft j j' and connected together in any suitable manner at the pivot-point e . Between each set of frames M are the rope-sheaves N N', which receive the steering-ropes as they pass from the steering apparatus, (shown in Fig. 4^b), and on the pivot e are two rope-sheaves N² N³, receiving the ropes from the sheaves N N'. The ropes pass from these sheaves to a point near the end of the pivoted section, being supported at intervals by carrying-rollers p . These carriers p are mounted on transverse shafts adapted

to bearings on the pivoted section, as clearly shown in Figs. 4^e and 5^e. Thus it matters not in what position the pivot-section is turned the steering-ropes will always bear the same relation to each other, owing to the special arrangement of the wheels at the pivot-point.

Referring now to Figs. 4^f and 5^f, the ropes $x x'$ pass around rope-wheels $q q'$ on a shaft Q, adapted to bearings on a raised braced portion of the pivoted section and then pass nearly at right angles around wheels $r r'$, respectively, on shafts R R', adapted to bearings on transverse braces of the pivot-section. The ropes then pass to anchors $x^2 x^3$, (clearly shown in Fig. 1,) the ropes passing back of one of the curved rails V. Thus they are supported from the conveyer to the anchor, as clearly shown in Figs. 1 and 4^f. At intervals along the entire length of the pivot-section are traction-wheels s , as clearly shown in Figs. 4^e and 4^f, which travel upon concentric rails V, as clearly shown in Fig. 3. The conveying-chain I, as before remarked, passes in contact with the wheels H H' and around the wheel F² and along the troughs E' and E². The wheels H H' are adapted to a vertical shaft mounted in suitable bearings on the pivot-section near the pivot-point. (Clearly shown in Fig. 4^d.) The wheel F³ at the extreme end of the pivot-section is carried by an adjustable bearing S, acted upon by a set-screw S', which rests upon a brace S², as clearly shown in Figs. 4^e and 5^e. This screw S' can be operated by a handle s' , as clearly shown in Fig. 5^e. A spring is mounted between the screw and the bearing to keep the chain stretched. This construction is set forth and claimed in an application for patent filed by me on January 21, 1892, Serial No. 418,788.

In Figs. 6 and 7 I have shown a modification of my invention, in which the two wheels N N', instead of being on the fixed section, are mounted one above the other on the pivot-section directly in front of the wheels N² N³, the steering-ropes passing around these wheels in a manner clearly shown in Figs. 6 and 7, gaining the same result as the plan shown in Fig. 4^d. In some instances, where a single conveying-trough is used, the return run of the chain may return directly over the conveying-run, as illustrated in my patent, No. 439,487, of October 28, 1890; but I have found that the double form of apparatus is preferable, as it can be placed between two storage piles of coal and draw from either pile.

I claim as my invention—

1. The combination, in a conveyer, of the fixed section and the pivoted section, a vertical pivot therefor, so that it can be moved in a horizontal plane, with an endless conveying-chain passing around a guide at the end of the fixed section and around a guide at the end of the pivoted section and adapted to carry material from the pivoted section to the fixed section, substantially as described.

2. The combination, in a conveyer, of the fixed section having two troughs situated side by side, a pivoted section also provided with two troughs, a chain-wheel at the end of the fixed section, a chain-wheel at the end of the pivoted section, and an endless conveyer-chain adapted to pass around the two wheels and having flights adapted to the two troughs on the stationary section and the two troughs on the pivoted section, substantially as specified.

3. The combination of the inclined stationary section having inclined troughs thereon, a chain-wheel at the upper end of the said section, a section pivoted at the base of the inclined section and having at each side a trough, a wheel at the end of the pivoted section, and an endless chain adapted to pass around the two wheels and having flights adapted to the troughs, substantially as described.

4. The combination of the fixed section and the pivoted section, troughs on each section, a center plate at the pivot-point of the pivoted section, and a flighted chain conveyer adapted to the troughs in both sections and also adapted to travel over the center plate, substantially as described.

5. The combination, in a conveying apparatus, of the fixed section, the pivoted section, two independent troughs in each section, an endless-chain conveyer adapted to said troughs, a guide at the end of the fixed section, around which the conveyer-chain passes, a guide at the end of the pivoted section, around which the conveyer-chain passes, and two sets of wheels, one set on each side of the pivot, one set being carried by the pivoted section and the other set being fixed, substantially as described.

6. The combination of the center plate, an inclined fixed section, troughs thereon, a pivoted section, troughs on each side of said pivoted section, an endless-chain conveyer adapted to said troughs, a driving-wheel, around which the conveyer-chain passes, said driving-wheel being at the upper end of the fixed section, a wheel at the extreme end of the pivoted section, around which the conveyer-chain passes, and two sets of wheels for the conveyer-chain, one set on one side of the pivot being carried by the pivoted section and the other set on the opposite side of the pivot being fixed, with two wheels mounted in bearings above the conveyer-chain and situated between the fixed set of wheels and the inclined trough, substantially as described.

7. The combination of the fixed section, the pivoted section, troughs on each section, an endless-conveyer chain adapted to said troughs, mechanism for driving said chain, guides for the chain, and an extension of the pivoted section passing rearward from the pivot-point and carrying a take-up wheel which takes up the slack in the conveying-chain when the pivoted section is moved, substantially as described.

8. The combination of the flat center plate, a pivot, a fixed section, troughs thereon, a pivoted section, troughs on said pivoted section, a driven endless-chain conveyer adapted to said troughs and to the flat upper surface of the center plate, a rearward extension of the pivoted section beyond the pivot, a take-up wheel thereon for the conveyer-chain, guiding-wheels H H' near the pivot-point and carried by the pivoted section, and guiding-wheels J J' on the opposite side of the pivot in line with the fixed troughs, the whole so arranged that on the movement of the pivoted section to one side or the other the take-up wheel will take up the slack of the chain at the center plate on the run opposite the one conveying the material, substantially as specified.

9. The combination of the pivoted section, conveying mechanism, and a steering-rope anchored at the side of the pivoted section and extending to and along said section, with mechanism for drawing upon said rope to move the section toward the anchor, substantially as specified.

10. The combination of the pivoted conveying-section, the pivot therefor, a conveyer on said pivoted section, mechanism for driving said conveyer, steering-ropes $\alpha \alpha'$, and steering apparatus situated near the pivot end of the conveyer, said ropes passing from said steering apparatus along the pivoted section to a point distant from the pivot and then passing out from the pivoted section, one to an anchor on one side of the section and the other to an anchor on the other side of the section, so that upon drawing one rope the pivoted section will be moved in one direction and drawing upon the other rope the pivoted section will be moved in the opposite direction, substantially as specified.

11. The combination, in conveying apparatus, of the pivoted section, pivot therefor,

conveying-troughs on said pivoted section, conveyers adapted to said troughs, mechanism for imparting motion to said conveyers, steering-drums, driving-shafts, clutches for reversing the motion of said drums, an elevated platform, a shaft, a hand-wheel, a rope-wheel, ropes passing from said rope-wheel to the clutching mechanism, whereby on turning the hand-wheel the clutches can be operated, and steering-ropes passing from the drums along the pivoted section to a point at a distance from the pivot, one rope passing from the pivoted section to an anchor at one side, the other rope passing to an anchor at the opposite side, substantially as described.

12. The combination of the inclined fixed section, trough thereon, the pivoted section, trough on said pivoted section, an endless-chain conveyer adapted to said trough, mechanism for driving said endless-chain conveyer, steering-drums, clutches therefor for reversing the motion of said drums, mechanism for operating the clutches, steering-ropes passing from said drums through the center portion of the inclined section to the pivot-point, guiding-wheels N N' near the pivot, and guiding-wheels N² N³, mounted at the pivot for the steering-ropes, said steering-ropes passing from the wheels to a point distant from the pivot, with guiding-wheels at this point, around which the ropes pass, one rope being anchored on one side of the pivoted section and the other rope being anchored on the opposite side of the pivoted section, substantially as described.

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

JAMES MAPES DODGE.

Witnesses:

HENRY HOWSON,
EUGENE ELTERICH.