(No Model.) 2 Sheets—Sheet 1.

T. S. MILLER.

CONVEYING APPARATUS.

No. 574,039. Patented Dec. 29, 1896.

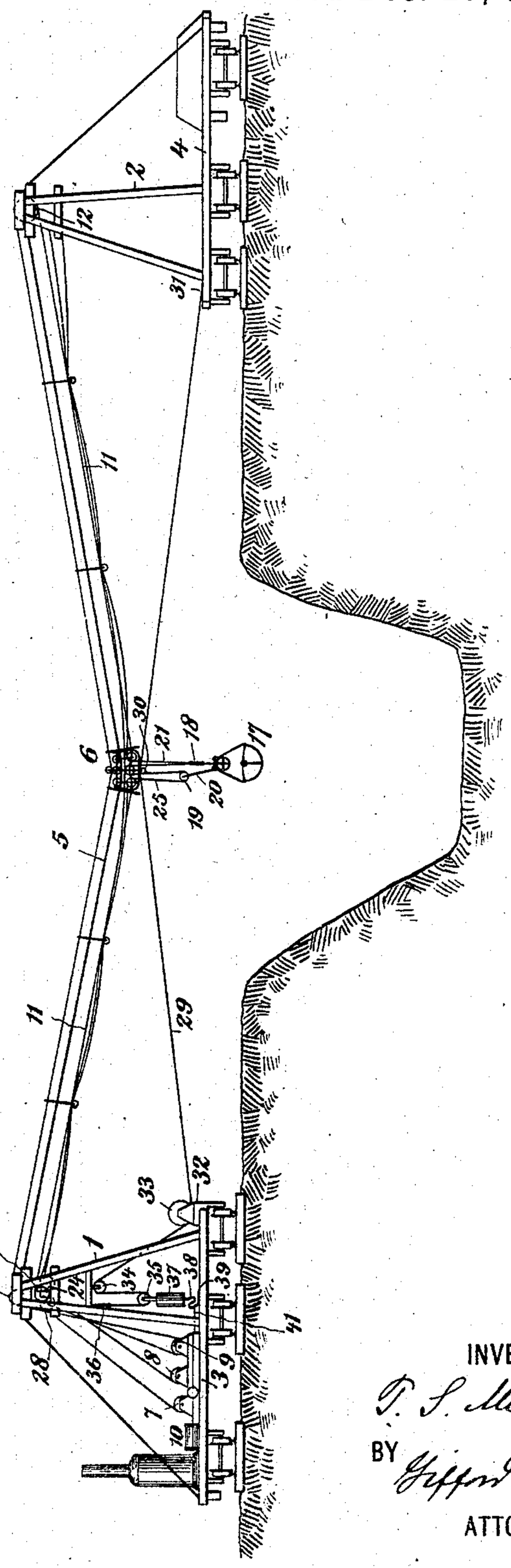

Fig. 1.

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Fig. 2.

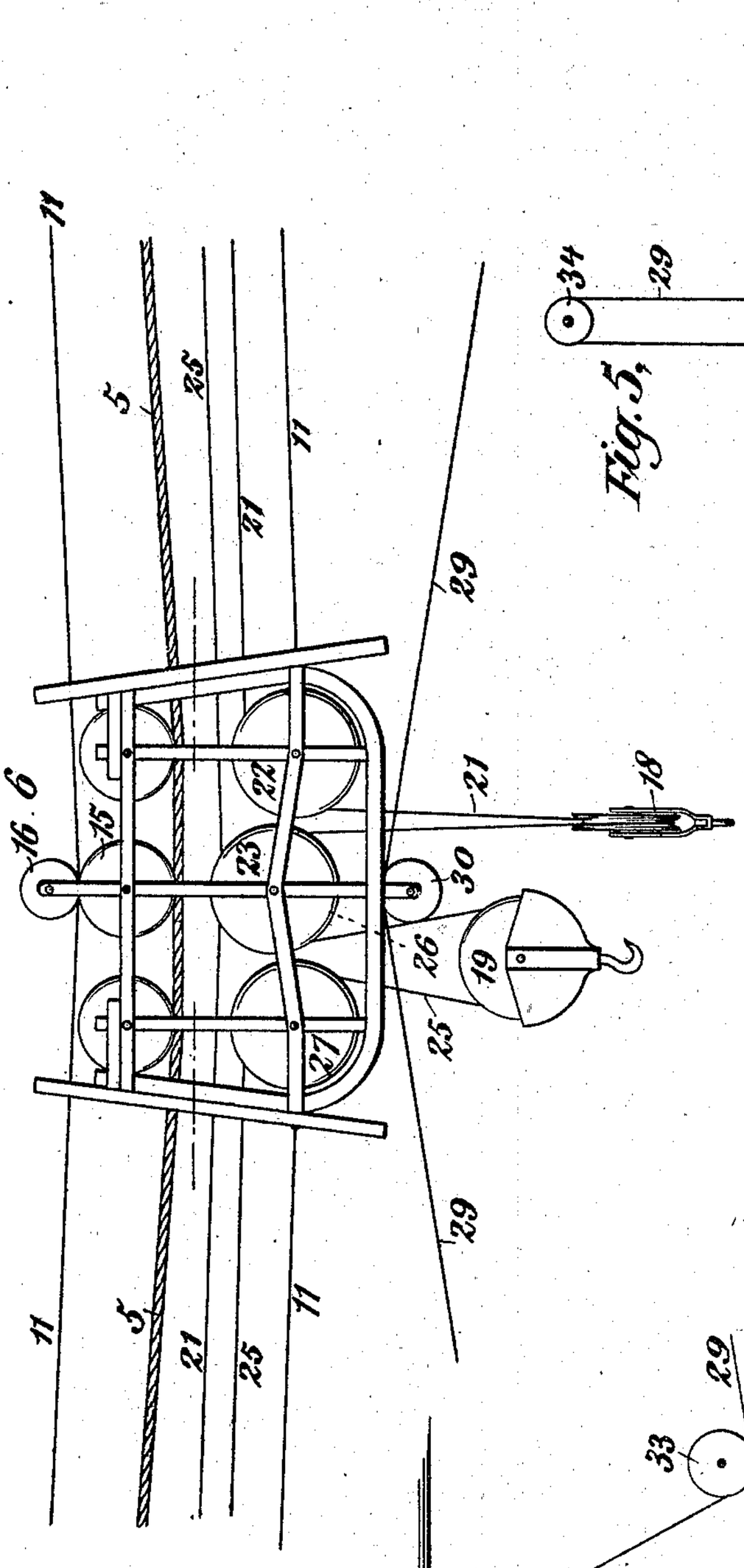


Fig. 5.

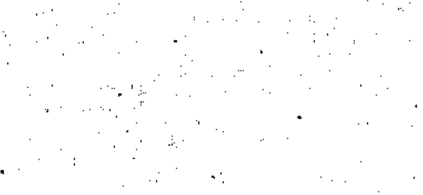


Fig. 6.

Fig. 3.

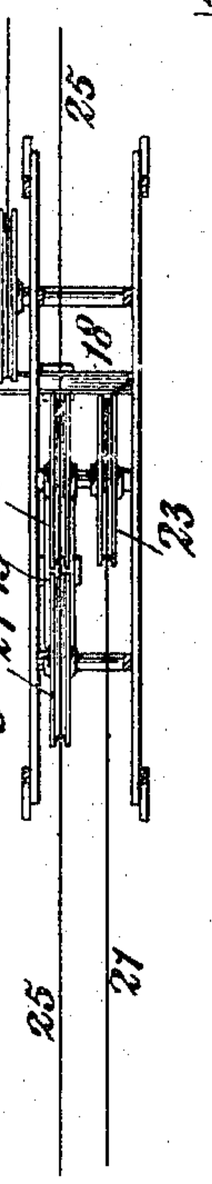


Fig. 4.

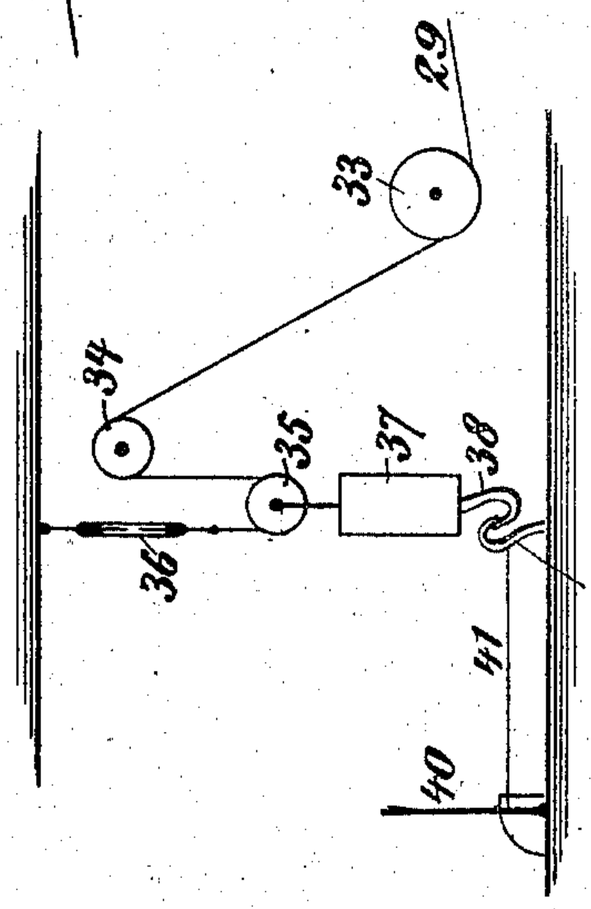
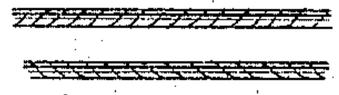


Fig. 7.



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UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF SOUTH ORANGE, NEW JERSEY.

CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 574,039, dated December 29, 1896.

Application filed November 30, 1895. Serial No. 570,608. (No model.)

To all whom it may concern:

Be it known that I, THOMAS SPENCER MILLER, a citizen of the United States, and a resident of South Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Conveying Apparatus, of which the following is a specification.

In the accompanying drawings, Figure 1 is a side view of an apparatus embodying my invention. Fig. 2 is a detail side view of the carriage and the ropes extending therefrom. Fig. 3 is a sectional plan view of the carriage on the line *x* of Fig. 2. Fig. 4 is a detail of a portion of the apparatus at the head-tower. Figs. 5 and 6 are two views of a modification of the last. Fig. 7 is a detail showing twist of fall-ropes.

1 is the head-tower; 2, the tail-tower; 3, the platform carrying the head-tower, engine, and drums; 4, the platform carrying the tail-tower; 5, the cable or track way; 6, the load-carriage; 7, 8, and 9, friction rope-drums; 10, the engine for driving the same; 11, a traction-rope connected at opposite ends with the load-carriage and extending around the sheave 12 on the tail-tower and over the sheaves 13 and 14 on the head-tower and around the rope-drum 9 and passing between the wheels 15 and 16 on the load-carriage.

17 is a self-filling or grab bucket of the kind ordinarily called a "clam-shell" bucket, which is held when in open position by the holding sheave-block 18, and is closed and held when in closed position by the closing sheave-block 19 acting through the ordinary closing-chain 20.

21 is the holding-rope by which the holding sheave-block 18 is supported. This holding-rope extends over the sheaves 22 and 23 on the carriage and the sheave 24 on the head-tower. It is made fast at one end to the tail-tower and at the opposite end to the drum 8.

25 is the closing-rope by which the sheave-block 19 is supported. It extends over the sheaves 26 and 27 on the carriage and over the sheave 28 on the head-support and is attached at one end to the tail-tower and at the other end to the rope-drum 7.

By reference to Fig. 3 it will be seen that the sheaves 23 and 26 are so placed with respect to the sheaves 22 and 27 that the sheave-blocks 18 and 19 will be held at right angles with each other, as shown in Fig. 2, thereby enabling them to be brought closer together.

29 is a holddown-rope that passes over a sheave 30, journaled to the frame of the load-carriage. One end of this holddown-rope is made fast near the base of the tail-tower, as at 31, and at its other end it is secured near the base of the head-tower, as at 32, by a suitable tension device, such as that shown in Fig. 3 or that shown in Figs. 4 and 5. The holddown-rope 29 thus inclines downwardly on opposite sides of the carriage and is thus in a position enabling the operator to hold down upon the carriage. By this means (auxiliary to the weight of the bucket) the carriage may be held at the elevation it assumes under the weight of the bucket and maintain it at that elevation after it has been relieved from the weight of the bucket by the descent of the bucket onto the ground. This avoids the loss of time heretofore experienced by the upward movement of the carriage upon being relieved from the weight of the bucket and also enables the full weight of the bucket to be employed for penetrating the material.

The device shown in Fig. 3 for regulating the tension upon the holddown-rope 29 may be described as follows: 33 is a sheave located near the base of the head-tower, under which the rope 29 passes. 34 is a sheave also mounted upon the head-tower over which the rope 29 passes. Thence the rope passes under the movable sheave 35, and its end is fixed to the tower by a turnbuckle 36. 37 is a weight suspended from the movable sheave 35. 38 is a hook fixed to the bottom of the weight, and 39 is a hook pivoted to a fixed support. 40 is a hand-lever for the operator, and 41 a connection between it and the hook 39.

When the apparatus is in use with the device shown in Fig. 3, as the load-carriage approaches the head or tail tower the weight 37 will be raised, and as the carriage approaches the center of the span the weight will drop. Throughout all the motions of the carriage the rope 29 will be held approximately taut by the weight 37. When the carriage is at the center of the span and therefore in the

lowest position permitted by the sag of the cable 5, the point of hook 38 will have descended below the point of hook 39 and its upward movement will cause the two hooks to engage. While the hooks are so engaged, they will hold the rope 29 against any ascent of the load-carriage due to the descent of the bucket onto the ground and the consequent lessening of the weight upon the main cable 5. When the loaded bucket is next lifted, the increased weight on the cable 5 will cause the pull between the hooks 38 and 39 to be lessened, and then the operator, by the lever 40, may pull the hook 39 out of engaging position, so as to permit the weight 37 to ascend as required by the travel of the load toward either tower. If the position of the delivery or receiving point is changed, the turnbuckle 36 may be used to adjust the position of the hook 39, so as to engage with the hook 38 at the proper position of the load-carriage.

When the apparatus is used with the modification shown in Figs. 5 and 6, the operator controls the holding of the rope 29 by a band-brake 42, applied to the sheave 33. By applying this brake when the carriage has reached any desired point he can cause the holddown-rope 29 to hold the carriage from any ascent while the bucket is lowered onto the ground and closed, so as to take up its load.

The operation of the apparatus is as follows: The carriage is moved by the traction-rope to the position beneath which the load is to be taken. The rope 25 is slack and the bucket is therefore open. The rope 29 is held either by the engagement of the hooks 38 39 or by the brake 42. The rope 21 is paid out, so as to allow the open bucket to fall and embed its jaws in the ground. The rope 25 is tightened, so as to close the bucket and hoist it from the ground. As soon as the bucket is clear of the ground the operator throws the hook 39 or the brake 42 out of engaging position. The hoisting is continued by the rope 25 until the proper elevation is reached, and the tension on the rope 25 is thereafter continued, so as to hold the bucket closed until the dumping position is reached. The load-carriage is run to the point of delivery. Then the rope 21 is held stationary while the rope 25 is paid out, thus releasing the closing-chain 20 and enabling the bucket to open and deposit its load.

In connection with the apparatus above described I have discovered another principle which is of general applicability, although particularly useful in connection with the above apparatus by reason of the close proximity of the two fall-ropes 21 and 25 and their fall-blocks 18 and 19. This principle consists in laying the ropes 21 and 25 so that their strands are twisted in opposite directions; that is to say, if the strands of rope 21 are twisted to the right hand, the strands of rope 25 are twisted to the left, and vice versa. By this inverse twist of these two ropes the turning of one fall-block, due to the tendency of one rope to untwist in one direction, is opposed to turning of the other fall-block, due to the tendency of the other rope to untwist in the opposite direction, and the two ropes are thereby prevented from twining around each other. This tendency of ropes to untwist is especially observable in the case of wire rope when new.

In my claims upon this feature I do not wish to be understood as limited, unless expressly so stated in the claims, to the use of two fall-blocks or to having the two fall-ropes by which the load is suspended unconnected with each other, though disconnected fall-ropes with two fall-blocks, as shown herein, are the preferable construction.

I claim—

1. In a hoisting apparatus, in combination, fall-rope supports, two fall-ropes pendent from said supports in proximity to each other and disconnected from each other below said supports; said fall-ropes being laid with their strands twisted inversely, substantially as described.

2. In a hoisting apparatus, in combination, fall-rope supports, two fall-ropes pendent from said supports in proximity to each other and disconnected from each other below said supports, and a separate fall-block for each fall-rope; said fall-ropes being laid with their strands twisted inversely, substantially as described.

3. In a conveying apparatus, in combination, a supporting-cable, a carriage thereon, a fall-rope, a holddown-rope and means for controlling the same, substantially as described.

4. In a conveying apparatus, in combination, a supporting-cable, a carriage thereon, a fall-rope, a holddown-rope, the head and tail towers, means near the bottom of each tower for holding said holddown-rope and means whereby the tension of said rope is controlled, substantially as described.

5. In a conveying apparatus, in combination, a supporting-cable, a carriage thereon, a fall-rope, a holddown-rope, a take-up connected with the same and mechanism whereby the movement of the same may be stayed, substantially as described.

6. In a conveying apparatus, in combination, a supporting-cable, a carriage thereon, a fall-rope, a holddown-rope, a sheave 33 under which it passes, a take-up device and means whereby the length of said rope is adjusted, substantially as described.

7. In a conveying apparatus, in combination, a supporting-cable, a carriage thereon, a fall-rope, a holddown-rope, a member on the carriage engaging the same and means for controlling said rope, substantially as described.

8. In a conveying apparatus, in combination, a cable or track way, two fall-ropes, two fall-blocks, a load-carriage containing a sheave for each of said fall-ropes; said sheaves being placed in different planes whereby said

fall-blocks are held in normal position at an angle with each other, substantially as described.

9. In a hoisting apparatus, in combination, two fall-ropes, and means for supporting the same in proximity; said fall-ropes being laid with their strands twisted inversely, substantially as described.

10. In a conveying apparatus, a supporting-cable, a carriage thereon, a fall-rope, a bucket suspended thereby and means whereby the sag of said fall-rope is maintained when relieved from the weight of the bucket, substantially as described.

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Witnesses:
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M. WILSON.