No. 609,959. Patented Aug. 30, 1898.

A. H. DE CAMP, Dec'd.

E. A. & C. A. DE CAMP, Executors.

HOISTING AND CONVEYING APPARATUS.

(Application filed Jan. 8, 1895.)

(No Model.) 3 Sheets—Sheet 1.

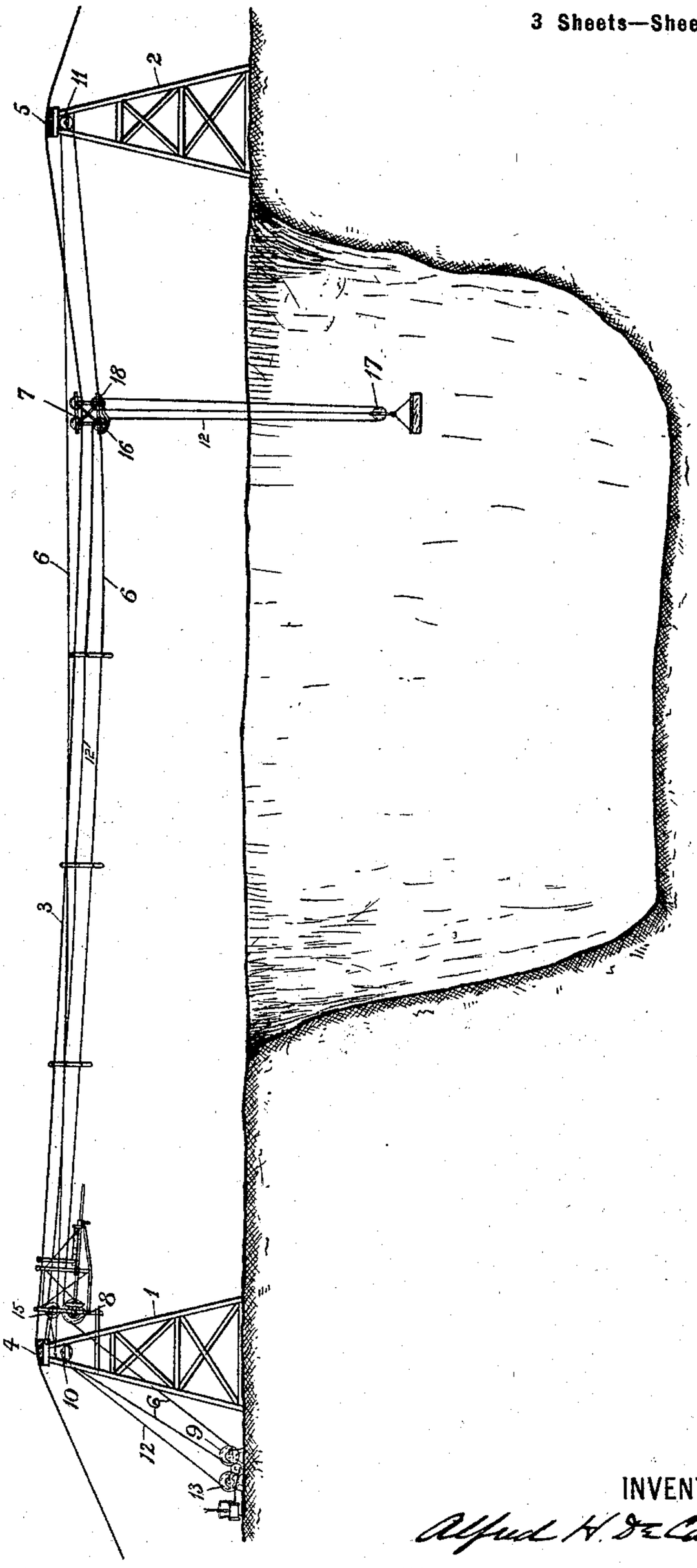

Fig. 1.

WITNESSES:

Thad H. Libby

John C. Fennie

INVENTOR

Alfred H. De Camp

BY

F. C. Lowthorp,

ATTORNEY

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FIG. 2.

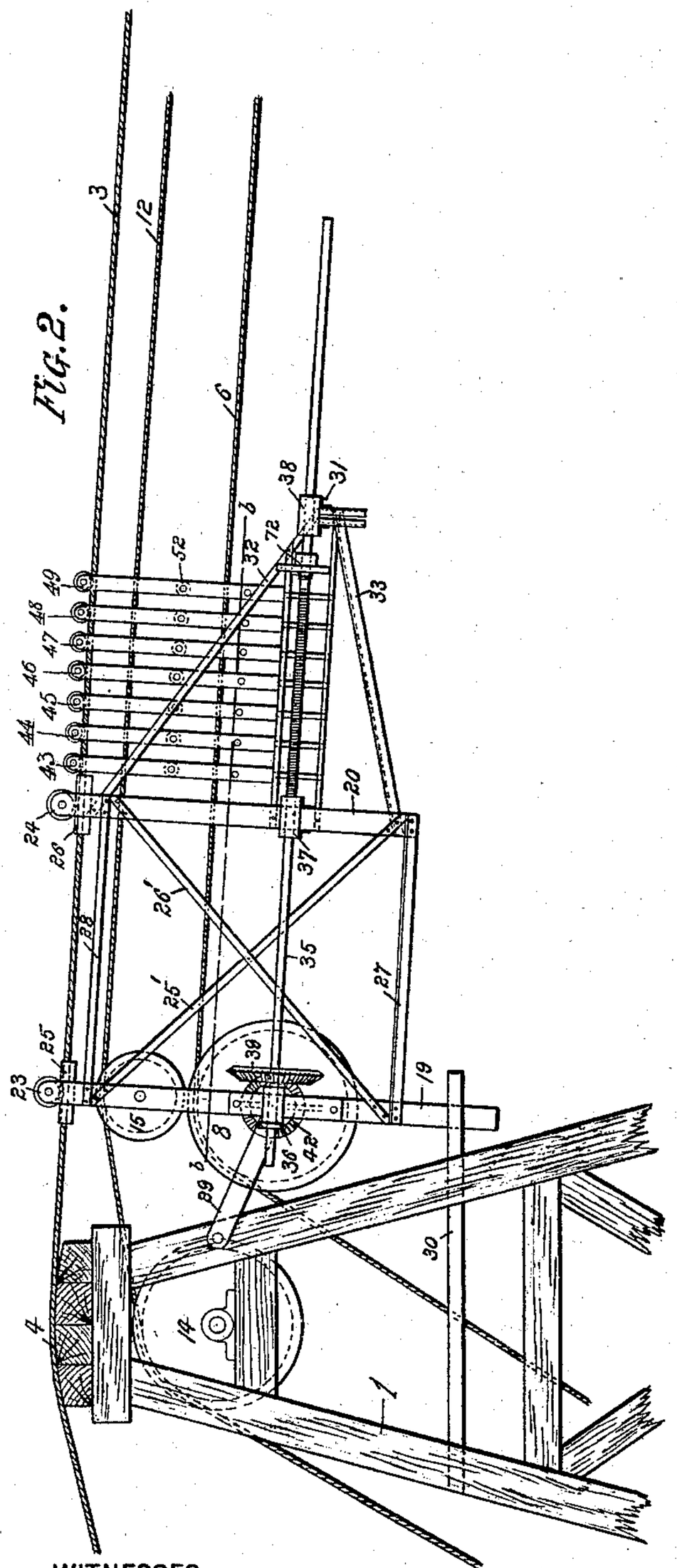

FIG. 3.

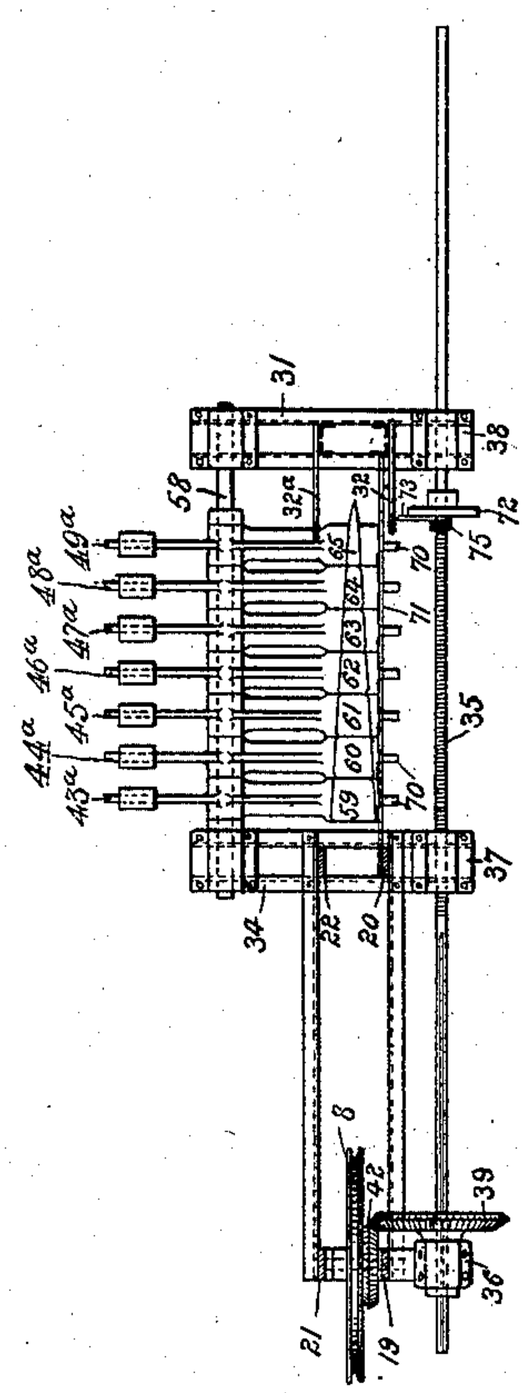

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Fig. 7.

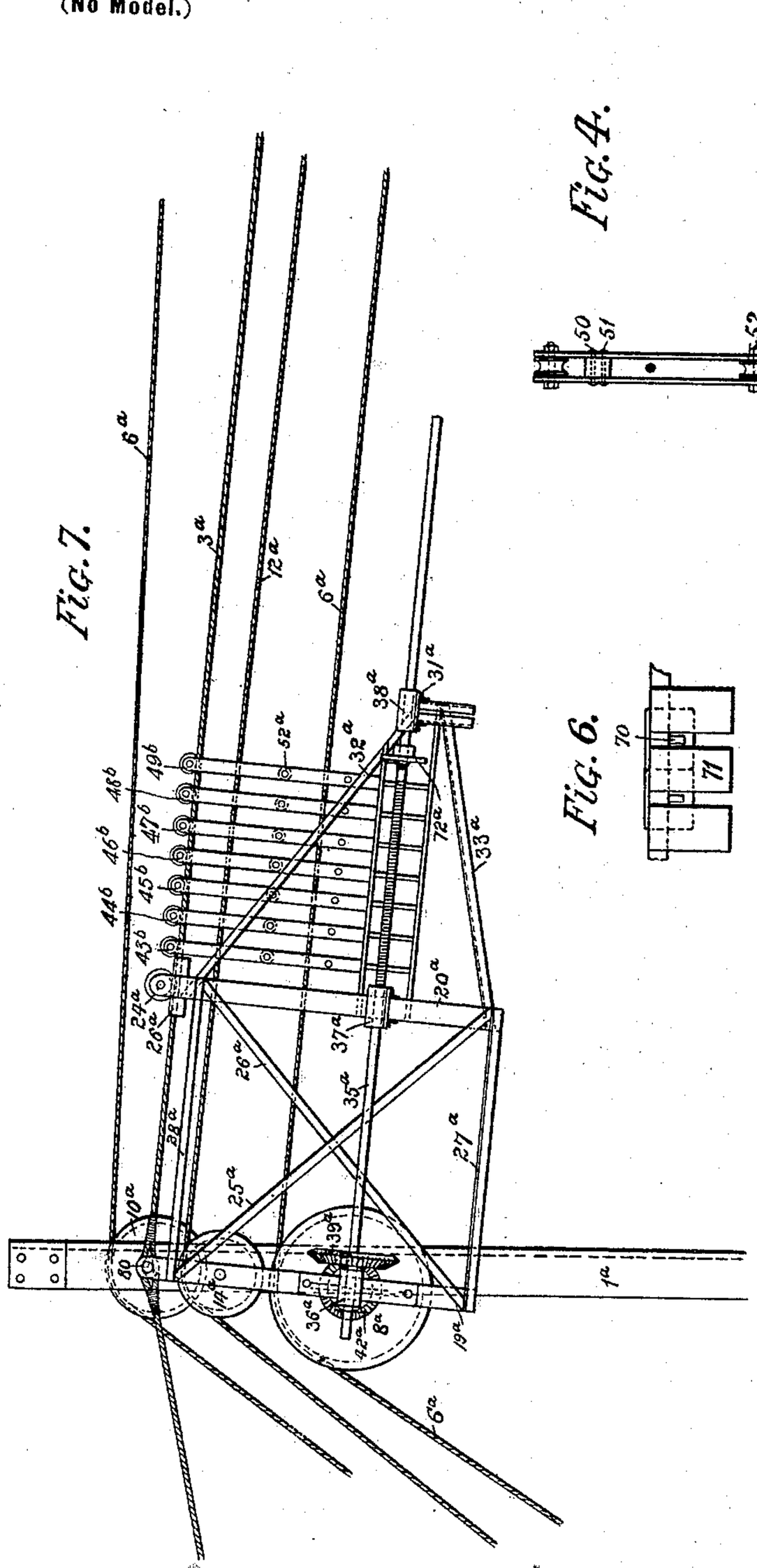


Fig. 4.

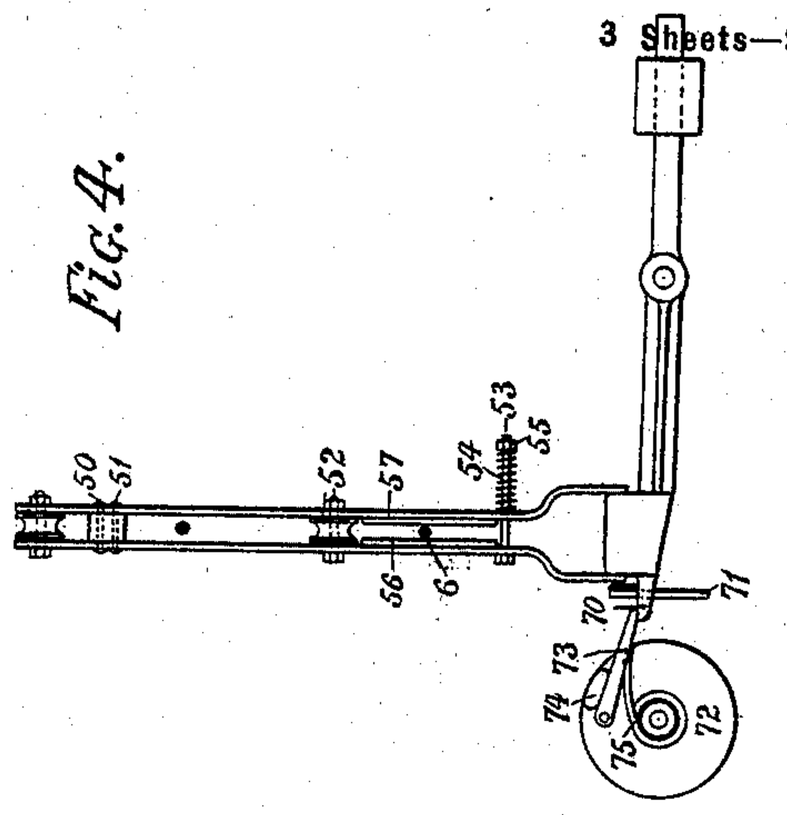
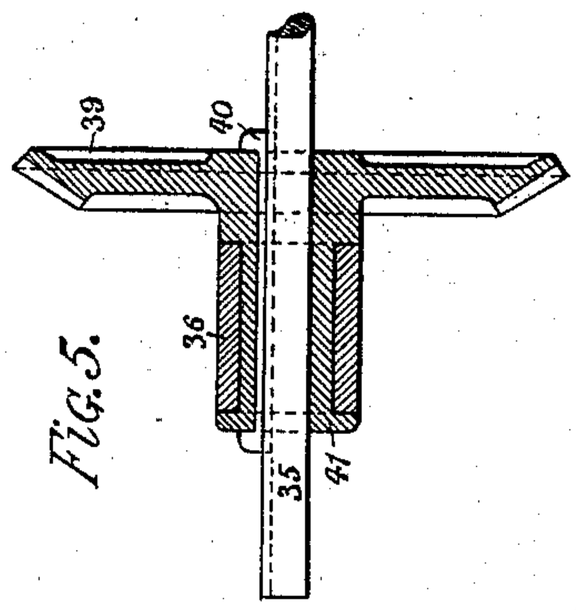


Fig. 6.

Fig. 5.



WITNESSES:

Thad H. Libby

J. Thad Pennie

INVENTOR

Alfred H. De Camp

BY

F. C. Lowthorp.

ATTORNEY

UNITED STATES PATENT OFFICE.

ALFRED H. DE CAMP, OF TRENTON JUNCTION, NEW JERSEY; ESTELLE AUSTIN DE CAMP AND CLARENCE A. DE CAMP EXECUTORS OF SAID ALFRED H. DE CAMP, DECEASED.

HOISTING AND CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 609,959, dated August 30, 1898.

Application filed January 8, 1895. Serial No. 534,237. (No model.)

To all whom it may concern:

Be it known that I, ALFRED H. DE CAMP, a citizen of the United States, residing at Trenton Junction, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Hoisting and Conveying Machines, of which the following is a specification.

My improvement relates to that class of hoisting and conveying apparatuses in which shiftable supports are provided for sustaining the fall-rope during the operation of the apparatus.

As is well known to those conversant with the art, provision for the prevention of the sagging of the fall-rope is absolutely essential; and the object of my invention is to provide for such purpose simple supports of light construction and means for automatically and uniformly delivering and distributing said supports along the line of the way of the apparatus when and as they are required for use and collecting and storing them out of the path of the traveling carriage of the apparatus when they are not in use.

In the drawings forming a part of this specification, Figure 1 is a side view of a hoisting and conveying apparatus embodying my invention. Fig. 2 is a side elevation of a portion of such hoisting and conveying apparatus, showing the upper part of the end support thereof nearest the power-station and apparatus for delivering and distributing the fall-rope supports. Fig. 3 is a plan view of a portion of the apparatus shown in Fig. 2, taken on the line *b b* therein. Fig. 4 is a front elevation, on an enlarged scale, of one of my fall-rope supports, showing its operative connection with one of the pivoted parts used for opening and holding the supports. Fig. 5 is a detailed view showing the connection of the operating-shaft with its beveled gear and the bearing for the gear and the shaft, the gear and its hub and bearing being shown in vertical cross-section. Fig. 6 is a detailed view showing a portion of the guide-plate which maintains the pivoted operating parts in their normal positions; and Fig. 7 is a view of my fall-rope-support delivering and distributing apparatus attached to the terminal support of the conveying apparatus in a different manner from that indicated in Fig. 2.

In the drawings, 1 2 are the terminal supports of a hoisting and conveying apparatus. 3 is the way or tram-cable thereof, passing over saddles 4 5 on the tops of the terminal supports and anchored to the ground, said anchorages not being shown.

6 is a running-line which is attached at one of its ends to one end of the carriage 7 and carried thence over a sheave 8 (see Fig. 1) and thence down to a drum 9 at the power-station, around which drum it is wound several times and carried thence over the sheave 10 in the terminal support 1, and thence around a sheave 11 on the terminal support 2 and back to the other end of the carriage 7, to which it is attached.

7 is the hoisting-carriage, of the ordinary construction, which is well known to those conversant with the art, and 12 is the fall-rope, which is wound on the drum 13 at the power-station and carried over a sheave 14 on the terminal support 1, (see Fig. 2,) similar to the sheave 10 and located on the same shaft, and thence over a sheave 15, and thence over a sheave 16 on the traveling carriage 7, and thence around a fall-block 17, swinging below the carriage and back to and around the sheave 18 on the carriage 7, and thence down to the fall-block 17, to which it is attached.

Suspended from the tram-cable 3 near the terminal support 1 is a framework consisting of four upright members 19 20 21 22, 19 20 being shown in side elevation in Fig. 2 and all four of said members 19 20 21 22 being shown in horizontal cross-section in Fig. 3. These upright members 19 20 21 22 are fastened to and suspended by two horizontal cross members which are supported by the small grooved rollers 23 24 upon small protecting-pieces 25 26, fastened upon the tram-cable 3. These upright members are also braced by the diagonals 25′ 26′ and the horizontal braces 27 28, and the whole framework is connected to the terminal support 1 by two pivoted links, one of which, 29, is shown in Fig. 2. The lower end of the upright mem-

ber 19 is held within a forked guide 30, fastened upon the terminal support 1, which guide 30 is provided to prevent the lateral swaying of the framework. Outside of one end of this framework is a horizontal transverse frame 31, which is held in its position by the braces 32, 33, 32ª, and 33ª, attached at their other ends to the uprights 20 and 22. A similar horizontal transverse frame 34 is attached to the uprights 20 and 22.

35 is a shaft threaded in its middle portion and supported in boxes 36 37 38, placed upon different members of the framework above described. The middle box 37 is internally threaded. This shaft 35 is longitudinally grooved upon its end which carries the beveled gear 39, slidingly fixed upon said shaft 35 by a feather 40, as shown in Fig. 5. The gear-wheel 39 has a hub 41, which turns within the box 36, said hub carrying within it the shaft 35. The box 36 is doubled (see Fig. 3) to act also as a bearing for the axle of the sheave 8, upon which axle is rigidly fixed the beveled pinion 42, which meshes with the beveled gear 39.

The fall-rope supports 43, 44, 45, 46, 47, 48, and 49 are swung upon small grooved rollers which travel upon the tram-cable 3 and are formed of two depending iron bars which are attached together by two rivets 50 and 51, as shown in Fig. 4. About midway of their length there is passed through them a pivot upon which is supported a grooved roller 52. At their lower ends these iron bars diverge from each other, as shown in Fig. 4, and just above their point of divergence is fixed a bolt 53, upon which is placed a stiff spiral spring 54, which is held in place by an adjustable nut 55, placed upon the end of the bolt. Upon the inside of the two iron bars forming each fall-rope support are placed two wearing-strips 56 and 57, made of metal and removable at pleasure.

Supported by the horizontal transverse frames 31 and 34 is a round rod 58, on which are pivotally mounted the operating-pieces 43ª, 44ª, 45ª, 46ª, 47ª, 48ª, and 49ª. These operating-pieces are shown in plan view in Fig. 3 and one of them is shown in side elevation in Fig. 4, and they are counterweighted, as shown. On their ends projecting within the framework they have formed upon their respective upper faces wedge-shaped raised portions or projections 59, 60, 61, 62, 63, 64, and 65. Each of these operating-pieces is provided at its end with a tongue 70, which tongues project toward the threaded portion of the shaft 35. These tongues 70 play into slots formed in a longitudinal bar or plate 71, supported by the horizontal transverse frames 31 and 34 and shown in side elevation in Fig. 6 and in plan view in Fig. 3 and in vertical cross-section in Fig. 4. This slotted bar 71 holds the tongues 70 in line when in their normal position, preventing their rising beyond their desired position, and also prevents lateral play of the operating-pieces. On the shaft 35 is rigidly fixed a disk 72, and upon said disk is fixed a pivoted finger 73, which is held in its normal position by a lug 74, near the periphery of the disk 72, and a spring 75, which is wound upon the hub of said disk and plays against the finger.

The operation of my device is as follows: When the conveying apparatus is about to be started up, the receptacle used for transporting loads is suspended close under the traveling carriage, which is located on the tram-cable near the terminal support 1, and the fall-rope supports are in the position shown in Fig. 2. The drum 9, on which the running-line 6 is wound, is put in motion to draw the carriage out upon the line of the tramway, and the drum 13 is turned at the same speed to unwind the fall-rope. The motion of the running-line 6 is imparted to the sheave 8, over which it passes, and the beveled pinion 42, rigidly fixed to the axle of the sheave 8, is turned with the sheave and imparts its motion to the beveled gear 39, slidingly fixed upon the shaft 35, which imparts its motion to said shaft. Said shaft, being threaded to screw in the box 37, gradually moves in toward the terminal support 1, sliding within the gear 39, and as it moves forward the disk 72, which is rigidly fixed to the shaft 35, moves with it until the finger 73 on the disk 72 is brought in contact with the tongue 70 on the operating-piece 49ª and depresses said operating-piece until the wedge-shaped projection 65 on the face thereof is drawn down from between the diverging ends of the fall-rope support 49. The withdrawal of this wedge-shaped piece 65 brings into action the spiral spring 54 on said fall-rope support 49, which spring drives together as far as possible the two iron bars composing the frame of said fall-rope support 49 and brings the pieces 56 and 57 into frictional contact with the running-line 6. The friction of these pieces upon the fall-rope is so strong as to cause the running-line to drag the support 49 with it in its progress, the small grooved roller at the top of the fall-rope support running upon the tram-cable 3. As the operation of the mechanism is continued the disk 72 continues to travel toward the terminal support 1 with the shaft 35, upon which it is fixed, and the finger 73 next comes in contact with the tongue 70 of the operating-piece 48ª, which in turn is depressed and frees the fall-rope support 48, which is forced into frictional contact with the running-line 6 and carried with it in its course, as is the support 49. This operation is continued until the motion of the drum 9 ceases upon the arrival of the traveling carriage at its destination. The revolution of the drum 13 is continued to let out the fall-rope, and the receptacle is dropped in the usual manner to the ground to be loaded, the various fall-rope supports being spaced along the line of the tramway, as indicated in Fig. 1, and sustaining on their respective rollers 52 the weight of the fall-rope suffi-

ciently to permit the lowering of the receptacle without difficulty. When the receptacle is loaded, reverse motion is given to the drum 13 and the receptacle is raised to the desired height beneath the traveling carriage, and the drum 9 is then set in reverse motion to wind the running-line 6, and the revolution of both drums is continued in the usual manner until the carriage is drawn in to the point of discharge. As the carriage progresses toward the support 1 the several fall-rope supports are drawn into their stations within the framework shown in Fig. 2. If all the fall-rope supports have been drawn out and spaced upon the line of the tramway, the first to arrive at its station is the support 43. As will be readily understood, the divergence of the lower ends of the frames of the fall-rope support 43 is greater than the divergence of the frames of any of the other of the fall-rope supports, and the lower ends of these frames or bars of the fall-rope support 43 pass without difficulty the wedge-shaped projections 65, 64, 63, 62, 61, and 60 on the several operating-pieces (which have been restored to their normal positions by their counterweights immediately the pressure of the finger 73 has been removed from their respective tongues) when it reaches the wedge-shaped projection 59 on the operating-piece 43^a and is wedged thereon, thus separating the two bars of its frame sufficiently to take the friction-pieces 56 and 57 out of contact with the running-line 6, which proceeds on its way, leaving the fall-rope support 43 in the position indicated in Fig. 2. The next fall-rope support 44 when brought in lodges in the same way upon the wedge-shaped projection 60 of its operating-piece, and so on. All the fall-rope supports lodge upon their respective wedge-shaped projections and are left in their respective stations, as shown in Fig. 2. It will be readily understood that when the motion of the drums 9 and 13 is reversed to draw the traveling carriage in to the point of discharge the reverse movement of the running-line causes a reverse revolution of the sheave 8 and through the gear connected therewith a reverse revolution of the shaft 35 and disk 72. As this disk 72 travels back past the tongues 70 of the operating-pieces the finger 73 comes in contact with these tongues on their under sides, and as the operating-pieces are held in their horizontal positions by their counterweights and the slotted plate 71 the projecting end of the finger 73 is pressed in upon the face of the disk to its periphery against the force of the coiled spring 75, which spring instantly restores the finger to its normal projecting position when the end of the finger has passed the tongue 70 with which it has come in contact. When the disk 72 reaches the position in which it is shown in Fig. 2, the traveling carriage has been brought to its point of discharge and the apparatus is ready for reverse operation.

In Fig. 7 I have shown a modified form of attaching my fall-rope-support discharging and distributing apparatus to the terminal support of the tramway. In this figure I have shown the terminal support 1^a with the tram-cable 3^a pivotally attached to it upon a bolt 80, to which said bolt are suspended the uprights shown as 19 and 21 in Fig. 3, one of which, 19^a, appears in Fig. 7. The sheave 8^a, over which passes the running-line 6^a, and the sheaves 10^a and 14^a, over which pass, respectively, the running-line 6^a and the fall-rope 12^a, swing within the standard 1^a. The construction and operation of the device is otherwise the same as that shown in Fig. 2.

My device may of course be modified in various ways without departing from the spirit of my invention—as, for instance, the discharging device may be operated by an independent belt running from one of the drums or a pulley connected with the operating-engine, or the fall-rope supports may be discharged into operative connection with an independent running-line (be it a rope, belt, or chain) moving over sheaves on the supports of the apparatus and driven by the operating-engine, and many other minor modifications may be effected. I do not, therefore, wish to be confined to the specific construction shown and described; but

What I claim is—

1. In a hoisting and conveying apparatus, a way, a rope-support movably mounted upon said way, and a running-line, in combination with mechanism stationarily located relatively to the way and movement to and fro thereon for automatically discharging said rope-support into connection with said running-line; substantially as shown and described.

2. In a hoisting and conveying apparatus, a way, a rope-support movably mounted on said way and a running-line, in combination with mechanism stationarily located relatively to the way and movement to and fro thereon for automatically discharging said rope-support into connection with the running-line, and means on said rope-support whereby it may fixedly engage said running-line; substantially as shown and described.

3. In a hoisting and conveying apparatus, a way, a rope-support movably mounted on said way, and a running-line, in combination with mechanism stationarily located relatively to the way and movement to and fro thereon for automatically discharging said rope-support into connection with the running-line, and means whereby the said mechanism may be operated by the running-line; substantially as shown and described.

4. In a hoisting and conveying apparatus, a way, a series of fall-rope supports having rollers whereby they are movably mounted upon said way, a fall-rope, and a running-line, in combination with mechanism stationarily located relatively to the way and movement to and fro thereon for automatically discharg-

ing said fall-rope supports into connection with the running-line, and means on said fall-rope supports whereby they may fixedly engage said running-line and sheaves mounted on said fall-rope supports for sustaining the fall-rope thereon; substantially as shown and described.

5. In a hoisting and conveying apparatus, a way, a series of fall-rope supports movably mounted on said way, said fall-rope supports having sustaining-sheaves for the fall-rope, and having adjustable frames embracing the running-line of the apparatus, in combination with mechanism stationarily located relatively to the way and movement to and fro thereon for automatically receiving said fall-rope supports and releasing them from the running-line and for discharging them at intervals upon said running-line in gripping contact therewith, the fall-rope and the running-line; substantially as shown and described.

6. In a hoisting and conveying apparatus, a mechanism stationarily located with reference to the way and movement to and fro thereon for operating the fall-rope supports, said mechanism comprising a threaded operating-shaft, gearing connected with said shaft, a sheave, and a running-line, the latter in its movement over the sheave effecting the operation of the various parts; substantially as shown and described.

7. In a hoisting and conveying apparatus, a mechanism stationarily located with reference to the way and movement to and fro thereon, said mechanism comprising a sheave rigidly connected with its axle, a sliding threaded shaft connected by gears with the axle of said sheave said shaft having a finger-piece adapted to contact with pivoted operating-pieces, said operating-pieces having wedge-shaped projections adapted when in their normal position to contact with and expand the frames of the fall-rope supports of the apparatus, and the fall-rope supports, said supports having adjustable frames, springs adapted to close said frames toward each other, and sheaves for sustaining the fall-rope of the apparatus, in combination with said fall-rope and the running-line, the latter in its movement over the sheave effecting the operation of the various parts; substantially as shown and described.

8. In a hoisting and conveying apparatus, a way, a rope-support movably mounted on said way, and a running-line, in combination with a mechanism stationarily supported relatively to said way and movement to and fro thereon for automatically receiving and discharging said rope-support into connection with the running-line; substantially as shown and described.

ALFRED H. DE CAMP.

Witnesses:
JNO. T. WOODHULL,
F. B. STEVENS, Jr.