(No Model.) 2 Sheets—Sheet 1.

T. S. MILLER.

CONVEYING APPARATUS.

No. 496,203. Patented Apr. 25, 1893.

Fig. 8

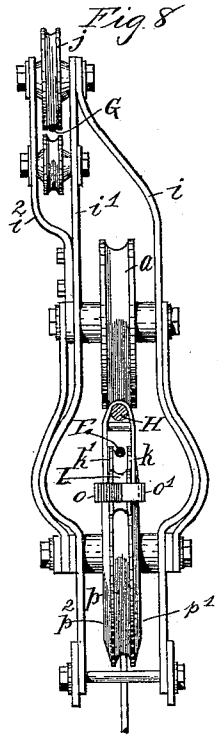


Fig. 7.

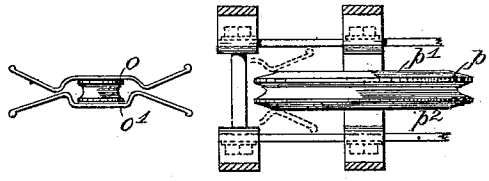


Fig. 9

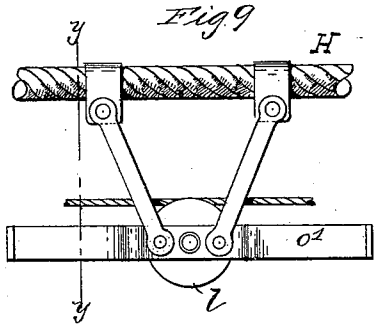


Fig. 10.

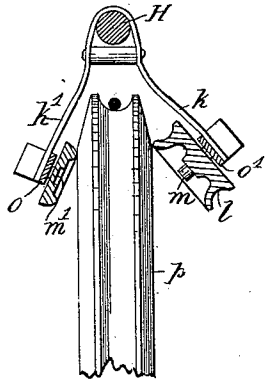
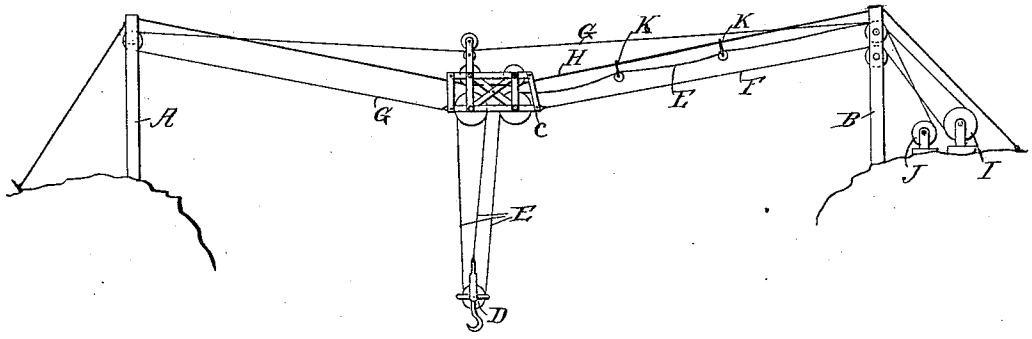


Fig. 1



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3

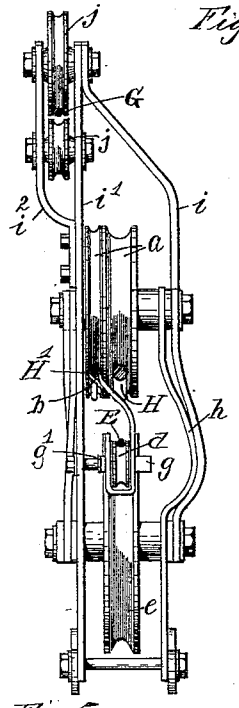


Fig. 2

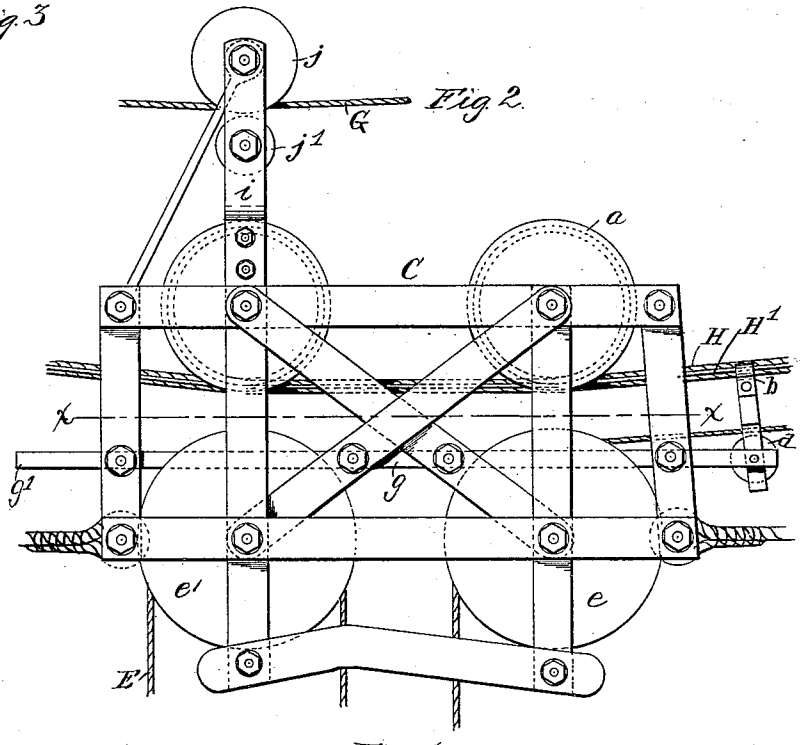


Fig. 5

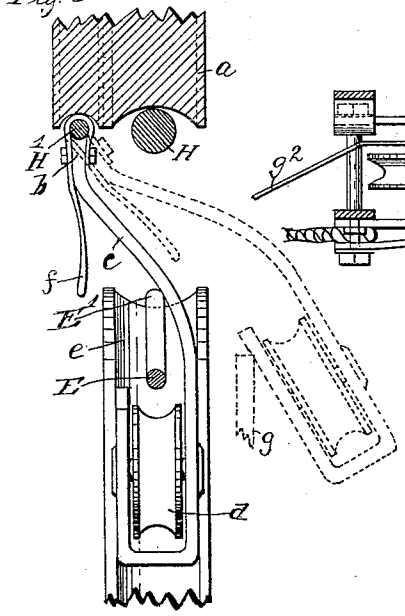


Fig. 4.

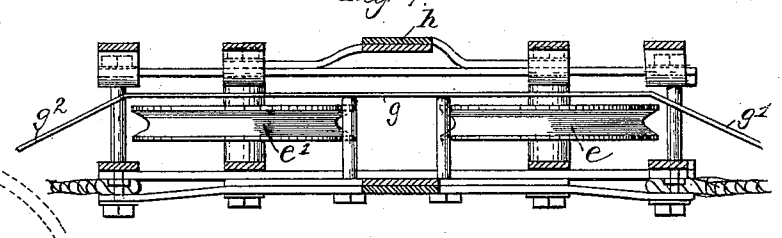
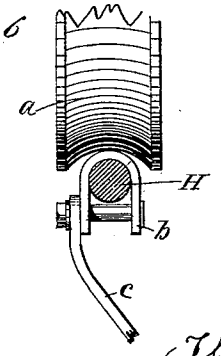


Fig. 6



Witnesses
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By his Attorneys
Gifford & Law

UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF NEW YORK, N. Y.

CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 496,203, dated April 25, 1893.

Application filed May 29, 1891. Serial No. 394,471. (No model.)

To all whom it may concern:

Be it known that I, THOMAS SPENCER MILLER, of New York, in the county and State of New York, have invented a new and useful Improvement in Conveying Apparatuses, of which the following is a specification.

In Letters Patent of the United States No. 447,892 and granted to me March 10, 1891, I have described a conveying apparatus in which the rope carriers which support the ropes for hoisting or hauling move on the cable and are located in their supporting positions by means therein set forth.

My present invention consists in a conveying apparatus in which the hoisting or hauling rope carriers are fixed upon or with respect to the cable or track, and it also consists in the provision for allowing the carriage to pass the rope carriers; and it also consists in the provision for temporarily dismounting the rope from the rope carrier support while the carriage which also supports the rope, is passing the carrier and for the remounting of the rope upon the rope carrier after the carriage has passed by on its return movement; and it also consists in the provision for supporting the return branch of the outward hauling rope at a level above the cable.

In the drawings, Figure 1 is a general side view of an apparatus containing my invention. Fig. 2 is a side view of the carriage and parts immediately adjacent thereto. Fig. 3 is an end view of the same from the right of Fig. 2. Fig. 4 is a horizontal section of the same through the line $x x$ of Fig. 2. Fig. 5 is a detail of the rope carrier and its support. Fig. 6 is a modified form of a method for suspending the rope carrier support. Fig. 7 is a sectional plan of the carriage and rope carrier in the modified form. Fig. 8 is an end view of the same from the left of Fig. 7. Fig. 9 is a side view of the modified rope carrier. Fig. 10 is a cross section of the same on the line $y y$ of Fig. 9 in its appended position as when passing the carriage.

A and B are the towers; C is the carriage; D is the fall block; E is the fall rope; F is the inward hauling rope; G is the outward hauling rope; H is the cable or track way; I is the drum for the inward and outward hauling ropes. J is the drum for the fall rope; K are the rope carriers, all of which are fixed upon the cable H or a stationary rope supplemental thereto, with proper spaces between them.

The first form of rope carrier which I will describe is shown in Figs. 2, 3, and 5. This form is fixed to a supplemental cable H′ running parallel with the main cable H at one side thereof, and which may be supported in the same manner as the main cable H by the towers A and B. It may however, be fixed directly to the main cable as shown in Fig. 6. In case the supplemental cable is used, the carriage wheel a will be provided with a supplemental groove as shown, within which the supplemental cable will engage, and which will serve to steady the supplemental cable and prevent vibrations of the same which would tend to interfere with the proper action of the rope carrier. As the carriage is run along the main cable the form of cable changes the load causing the lowest point of the cable to accompany the carriage. In order to preserve the parallelism of the auxiliary and main cables, a depression in the former must accompany the depression in the latter and this is accomplished by the supplemental groove of pulley a acting as a depressor for that purpose. Thus, the vertical position of the fall rope carrier follows the rise and fall of the main cable so that the fall rope carrier is supported in approximate parallelism to the main cable.

b is a clip by which the hanger c is suspended from the cable or supplemental cable, as the case may be. In either case, the point of support of the hanger c will be at one side of the cable H so as to give the hanger a tendency to swing toward that side and therefore to insure its roller support being brought, by the tendency of its own weight, into position to support the rope directly beneath the main cable, as will be more fully described hereinafter.

The hanger c is curved in the form shown, and contains near its lower end, the bearings of the rope supporting roller d. The position of the support of the hanger is such that its own weight and the weight of the supporting roller d will cause it to swing farther to the left than the position in which it is shown in full lines in Fig. 5; but the fall rope E occupying a position directly beneath the main

cable, will limit the movement of the hanger *c* to a position bringing the supporting roller below the main cable, and this is true whether the carriage is near the rope carrier or far away therefrom, because if the carriage is near the carrier the rope will be raised into the position E′ Fig. 5, on the sheave *e* of the carriage; and as the distance between the carriage and the rope carrier increases the rope will by degrees drop until it reaches the level of the groove supporting roller *d*, and as it drops it will be guided into that groove by following down the curved side of the hanger *c* which leads it directly into the groove of the roller. Therefore, as the rope vibrates up and down, the hanger will hug it closely and always have the supporting roller in position to catch it and prevent its sagging lower.

f is a guard which may be provided to insure against the rope jumping entirely out of the carrier, but which does not extend below the level of the groove in the carriage sheave *e*, so that an opening is left between the guard *f* and the roller *d* sufficient to enable the carrier to be swung laterally into the position shown in dotted lines, Fig. 5, without interfering with the position of the rope as it rests in the position E′ on the sheave *e* of the carriage.

It is evident that the construction of carrier above described would conflict with the movements of the carriage without further provision and I therefore provide the following mechanism for deflecting the carrier to one side of the carriage.

g is a guard piece running along the sides of the sheaves *e* and *e′* and provided with the deflecting ends *g′* and g^2 which extend laterally across the vertical plane of the main cable far enough to insure contact with the carrier in such manner as to deflect the same from the position shown in full lines of Fig. 5 into the position shown in dotted lines therein. The side frame *h* of the carriage is bowed outward, as shown in Fig. 3, sufficiently to admit of the passage of the carrier in its deflected position between the frame and the deflector *g*. The carriage frame however, may be wide enough to render the bowing of the frame unnecessary.

Upon the side frames of the carriage are secured the uprights *i i′* and i^2 in which are journaled the sheaves *j* and *j′*, as shown in Fig. 3, between which sheaves the return branch of the outward hauling rope G passes so as to be held above and preferably to one side of the cable and the other parts depending therefrom and thus be prevented from striking against those parts as it swings, as was liable to be the case where this rope as heretofore, was supported by the carriage substantially on a level with the other parts.

I will now describe the modification of the carrier shown in Figs. 7, 8, 9 and 10. Here, instead of deflecting the carrier wholly to one side as the modification previously described, it is, as it passes the carriage, split in two parts; one part being deflected to one side and the other to the other side. The carrier consists of two hangers *k* and *k′* adapted in the normal position, to support the roller *l* centrally below the main cable H. They are shown in the drawings as spring arms and any arrangement which will admit of their separating at the bottom and will give them a tendency to return together, will answer. Upon the bottom of one of these hangers, as *k*, is permanently mounted one journal of the roller *l* and the opposite journal *m* is provided with a bearing at *m′* on the lower end of the hanger *k′* so arranged that when the lower ends of the hangers approach each other, the journal *m* will rest in the bearing *m′*; but that when the hangers are thrown apart, there shall be no attachment to prevent the journal separating from its bearing as shown in Fig. 10. A guard piece *o* is connected with the hanger *k′* opposite the roller bearing and a guard piece *o′* is similarly connected with the hanger *k*. These guard pieces extend horizontally fore and aft but are bent, as shown in Fig. 7, so as to deflect the lower ends of the hangers *k* and *k′* and the parts connected therewith on either side of the fall rope sheaves, as *p*, of the carriage. For this purpose also, the edges of the sheave *p* are beveled, as shown in Fig. 7, so that when the guard pieces *o* and *o′* strike the edge of the sheave *p*, they will, by their own formation and the formation of the sheave itself, be deflected as indicated in dotted lines of Fig. 7, carrying the roller *l* and its journals on one side of the sheave *p* and the bearing *m′* on the other side thereof.

The beveling of the edges of the sheave *p* forms substantially deflector pieces *p′* and p^2 which, as shown, are a part of the wheel itself; but they being a part of the wheel itself is not necessary. In fact, they may in some cases be omitted entirely, dependence being then placed upon the deflecting action of the guard pieces attached to the rope carrier.

I do not intend to limit myself to the details of the construction which I have shown and described, since I am aware that mechanical skill would enable them to be varied to a large extent without departing from the principle of my invention.

I claim—

1. In a conveying apparatus a cable or trackway, means whereby the same is supported at each end of the span, a carriage to travel thereon, an outward hauling rope, sheaves at opposite ends of the span and below the cable supports whereby the outward hauling rope is supported, a drum at the engine whereby the outward hauling rope is actuated, and a support for said outward hauling rope mounted upon said carriage above the central level of the cable or trackway and constructed to encompass said rope on two sides; whereby the outward hauling rope is extended from below the cable at each end to above the cable at the carriage and is

thereby held and steadied comparatively straight notwithstanding the sagging of the cable, substantially as described.

2. In a conveying apparatus in combination, a cable or trackway, a carriage to travel thereon, a rope support upon said carriage, a rope support at one end of the cable or trackway, a rope carrier and means whereby said rope carrier is suspended with capacity for vibrating at one side of the vertical plane passing through said rope supports thereby giving the rope carrier a tendency to rest laterally of said plane against the side of the rope and means for causing the deflection of the rope carrier, substantially as described.

3. In a hoisting and conveying apparatus, in combination, a cable or trackway, a carriage to travel thereon having a side frame and a fall rope sheave mounted thereon, a fall rope, a fall rope carrier and means whereby said carrier is deflected between the said fall rope sheave and the carriage frame, substantially as described.

4. In a conveying apparatus in combination a cable or trackway, a carriage to travel thereon, a hauling rope extending to the carriage, a rope carrier supported at one side of the vertical plane of said rope, and means whereby the lower part of said rope carrier is deflected onto the opposite side of said plane as it is passed by the carriage, substantially as described.

5. In a conveying apparatus in combination, a cable or trackway, a carriage to travel thereon, a rope carrier, a supplemental cable side by side with the first named cable or trackway whereby said rope carrier is supported independently of the first named cable or trackway, a wheel mounted upon said carriage and running upon said first named cable or trackway and a wheel mounted upon the carriage side by side with the first named wheel and running upon said supplemental cable or trackway, substantially as described.

6. In a hoisting and conveying apparatus a load carriage, a fall rope whereby the load is suspended from said carriage, a cable stretched between two supports, an auxiliary rope disconnected from the cable and stretched above the fall rope between the cable supports parallel or nearly so with the cable and a fall rope carrier engaging with said auxiliary rope whereby the carrier is supported independently of the cable, substantially as described.

7. In a hoisting and conveying apparatus, a load carriage, a fall rope whereby the load is suspended from said carriage, a cable or trackway whereby said carriage is supported, an auxiliary rope parallel or nearly so with the cable or trackway, a fall rope carrier engaging with said auxiliary rope whereby it is supported independently of said cable and means upon the load carriage whereby said auxiliary rope is depressed as the cable is depressed under the load, substantially as described.

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