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T. S. MILLER.

HOISTING AND CONVEYING APPARATUS.

No. 546,239. Patented Sept. 10, 1895.

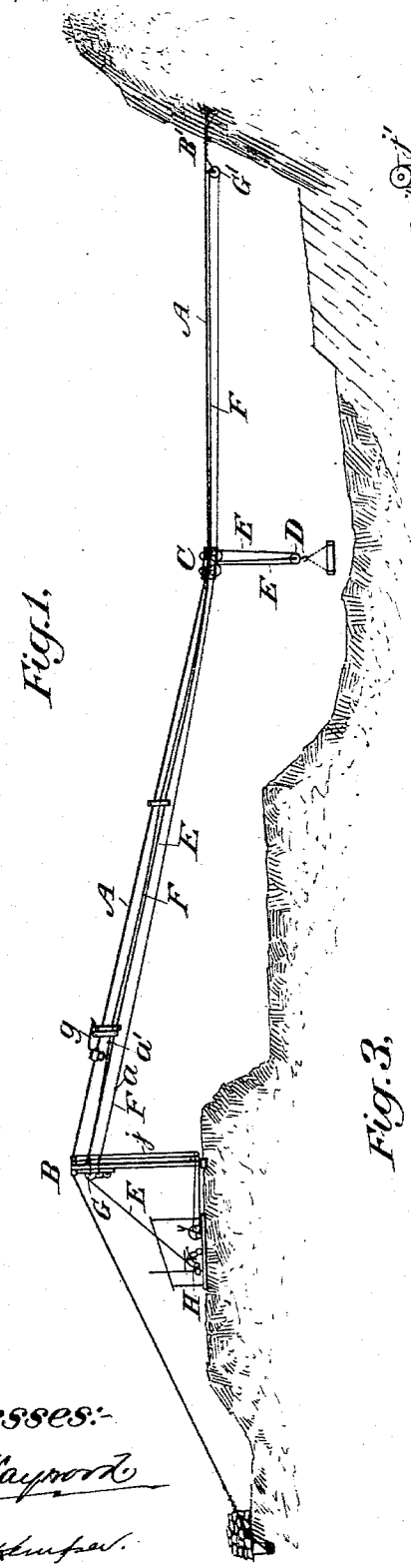

Fig. 1.

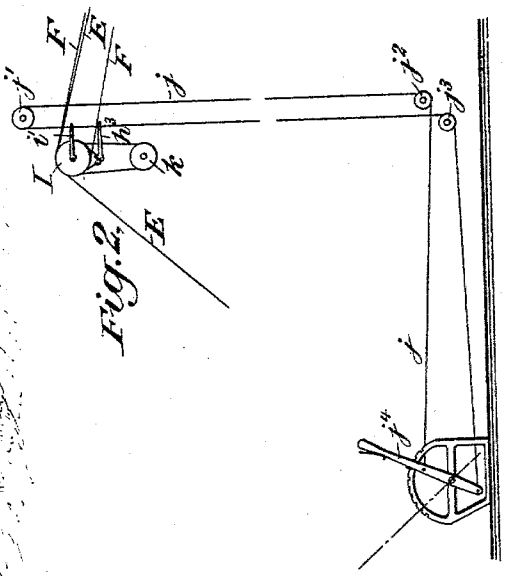

Fig. 2.

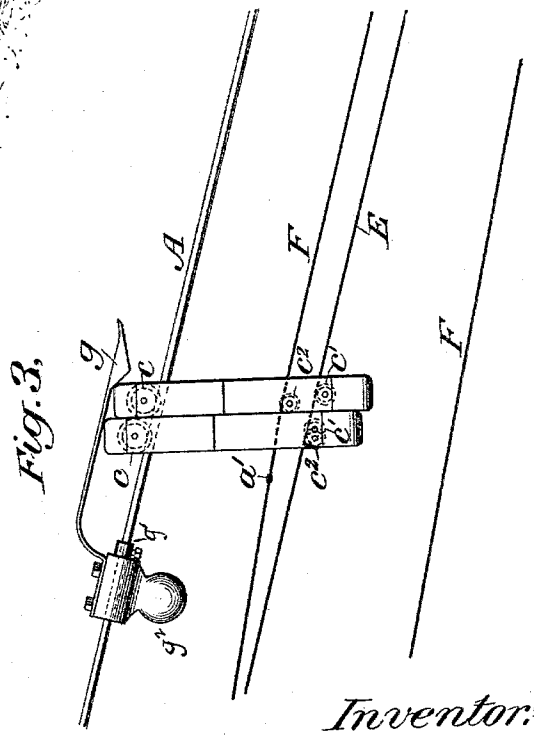

Fig. 3.

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Fig. 3.

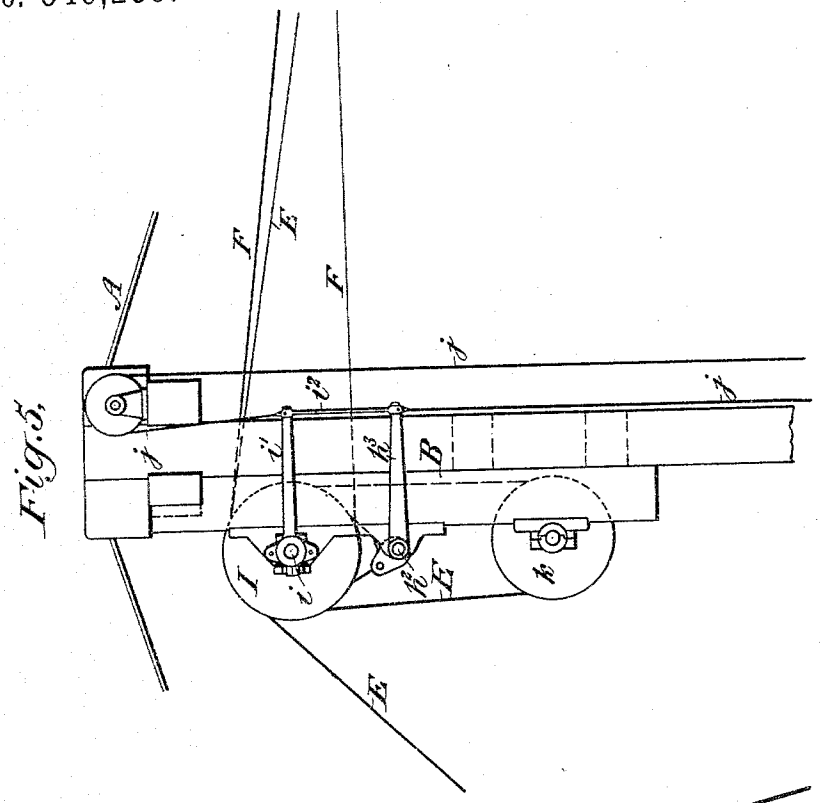
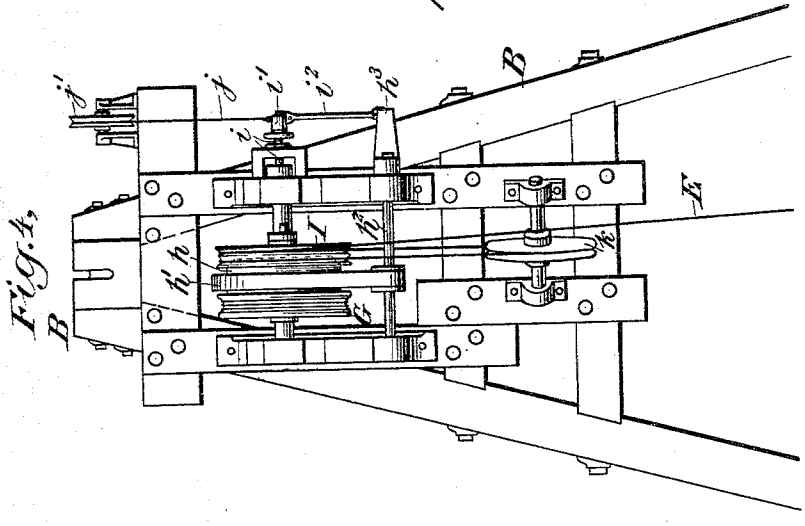


Fig. 4.



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T. S. MILLER.

HOISTING AND CONVEYING APPARATUS.

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Fig. 7,

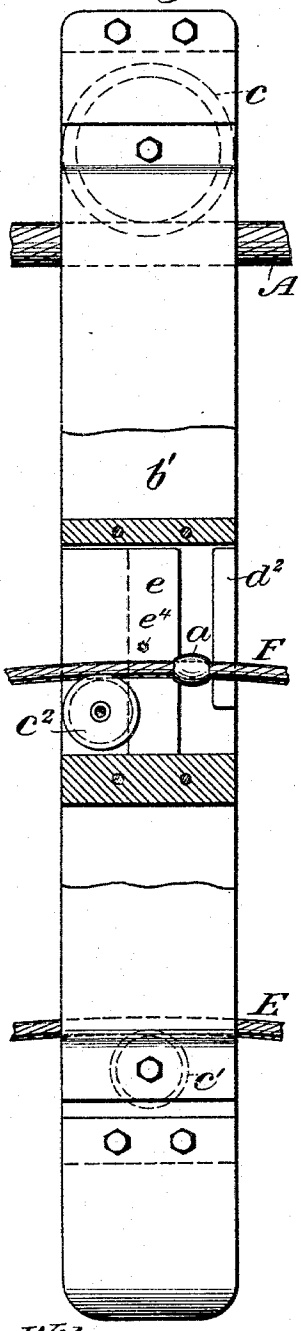


Fig. 6,

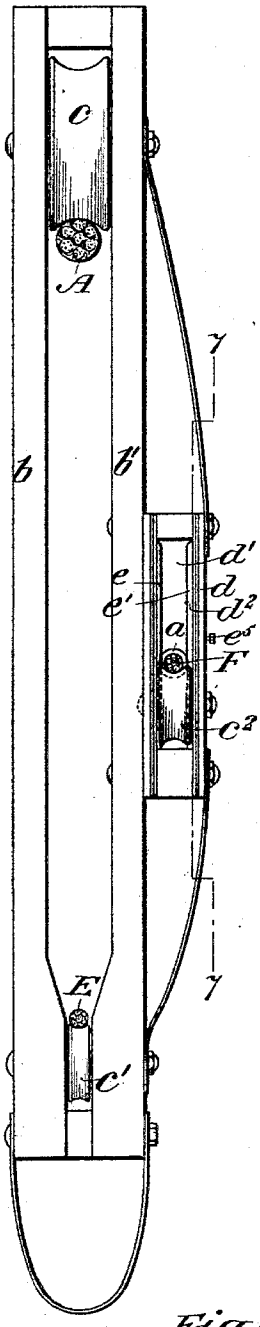


Fig. 9,

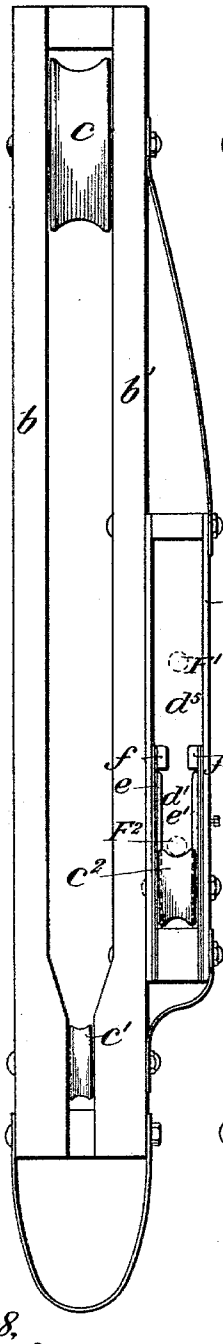


Fig. 10,

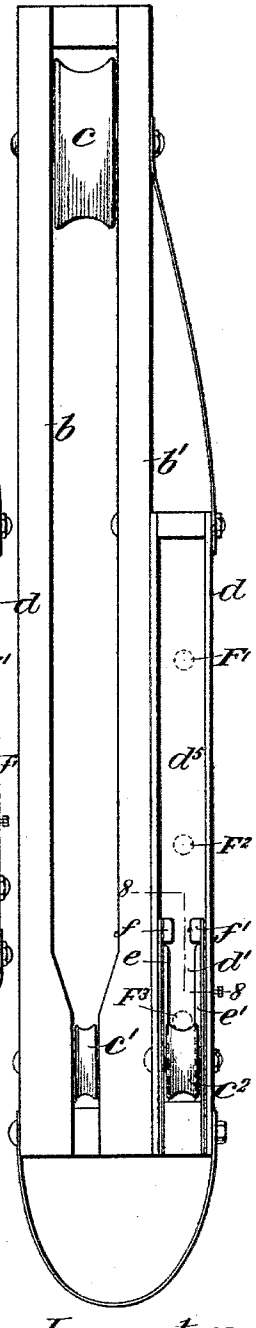
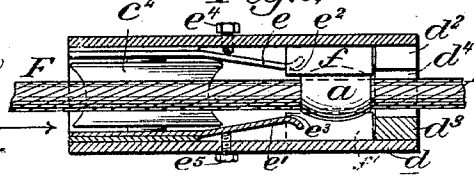


Fig. 8,



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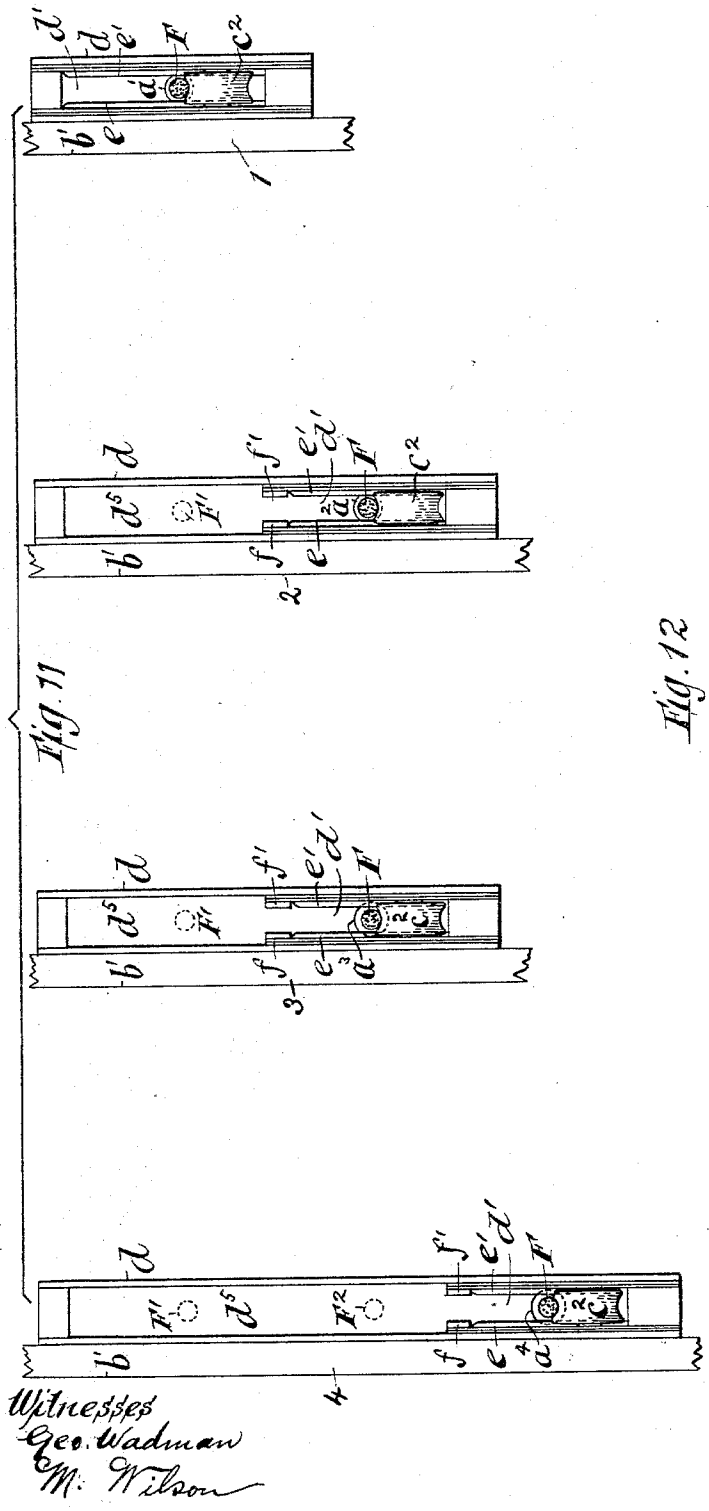

Fig. 11

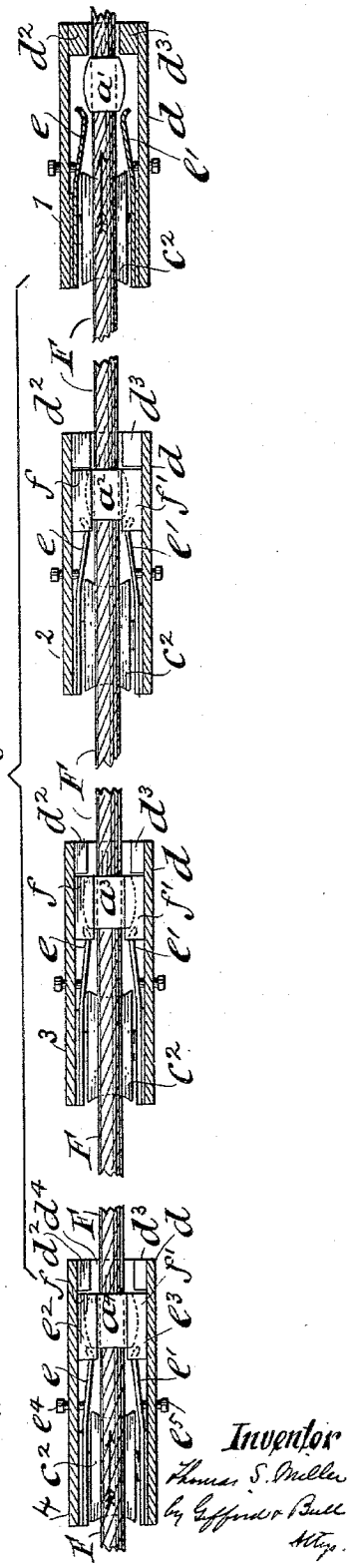

Fig. 12

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UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF SOUTH ORANGE, NEW JERSEY.

HOISTING AND CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 546,239, dated September 10, 1895.

Application filed April 17, 1894. Serial No. 507,890. (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 State of New Jersey, have invented certain new and useful Improvements in Hoisting and Conveying Apparatus, of which the following is a specification.

In Letters Patent of the United States granted to me March 10, 1891, No. 447,892, and Letters Patent granted to me August 19, 1890, No. 434,550, was described the employment, in conveying apparatus of stops in series for locating the rope-carriers at proper points across the span, upon which constructions my present inventions constitute an improvement.

In the accompanying drawings, Figure 1 is a general view of a cableway containing my inventions. Fig. 2 is a detail of the means for controlling the operation of the ropes. Fig. 3 is a detail showing the rope-carriers held at the head-support of the cableway. Figs. 4 and 5 are two views of the head-support of the cableway and the sheaves for supporting the fall and traveler ropes thereon. Fig. 6 is an end view of one of the rope-carriers. Fig. 7 is a longitudinal section of the same on the line 7 7 of Fig. 6. Fig. 8 is a horizontal section of the same on the line 8 8 of Fig. 10. Figs. 9 and 10 are end views of two other rope-carriers. Fig. 12 represents a horizontal section of four rope-carriers and two series of stops. Fig. 11 is a detail of each of said carriers viewed edgewise, showing also the relative elevations of the same when arranged in said series.

A is the cable which is supported at the head of the span by a tower B, and at the tail of the span by a support B′.

C is a load-carriage of known construction.

D is the fall-block.

E is the fall-rope.

F, I will call the "traveler-rope," because it causes the stops to travel. In the form shown in the drawings it is substantially an endless rope, being attached at each end to the load-carriage C, and being supported at opposite ends of the span upon the stationary sheaves G and G′.

H is the engine, including the rope-drum by which the fall-rope is operated.

a a′, &c., are stops which are so mounted as to travel toward and from the cable-support. As shown, they are mounted upon the traveler-rope F, and therefore follow the load-carriage C in its motions to and from the cable-support. They may be constructed in a single series of increasing size to engage with a corresponding series of increasing size openings in the rope-carriers, as in my patents above referred to; but I prefer to construct the stops in a plurality of series, in each of which series there shall be only a limited number of different sizes, so that the largest in any series shall not necessarily impair the running of the traveler-rope over its sheave or drum. For this purpose it is necessary to employ a new construction of rope-carrier, and I have illustrated in Figs. 6 to 10, inclusive, a form of rope-carrier which will answer for this purpose, which I will now describe, referring first to Figs. 6, 7, and 8.

b b′ are side plates secured together at top and bottom.

c is a wheel journaled at the top in these side plates and running upon the cable A.

c′ is a wheel journaled at the bottom in these side plates and upon which runs and is supported the fall-rope E.

d is a plate secured at one side of the plate *b′* so as to leave the vertical slot *d′* within which lies the traveler-rope F. At the forward end of this slot are the vertical cheek-pieces d^2 d^3 being so close together that the opening d^4 between them will not permit of the passage of the stop *a*. Below the traveler-rope F is a sheave c^2.

e e′ are spring cheek-pieces arranged vertically and having their free ends, as shown in Fig. 8, so as to leave sufficient space for the stop *a* between the extremities of said free ends and the cheek-pieces d^2 d^3. The spring cheek-pieces *e e′* are turned outward somewhat abruptly, as shown at their extremities. The lines e^2 and e^3 at which the spring cheek-pieces approach each other most nearly are slightly wider apart than the diameter of the stop *a*, which stop is rounded, as shown in Fig. 8. Therefore, as a stop passes into the slot *d′* in the direction of the arrow, Fig. 8, it will push the spring cheek-pieces *e* and *e′* apart and enter the space between them and the cheek-pieces d^2 d^3, as shown in Fig. 8, when

it can go no farther without carrying the carrier with it. When the stop moves in the reverse direction, the abrupt angle of the extremities of the cheek-pieces e and e' will oppose somewhat greater resistance to the passage of the stop a and will prevent the escape of the stop a until the carrier has been carried back to the starting point and its further motion positively arrested.

e^4 and e^5 are set-screws by which the opening between the spring cheek-pieces e and e' may be adjusted.

Now it is evident that if all the carriers were of precisely the construction shown in Figs. 6, 7, and 8, the stop a would carry with it the whole series of carriages by engaging with the first one that it reached; but it is necessary that it should pass through the first carriers that it reaches and propel the last one. To enable it to do so, the rollers c^2 and the slots d' above them are arranged at different elevations, the first in the series, Fig. 10, being lowest, the second, Fig. 9, being higher, and the last, Fig. 6, being the highest. At the top of the slot d' are arranged horizontal cheek-pieces f f', the space between which is such as to admit of the passage of the rope F, but not of the stop a. Above these cheek-pieces the plate d is extended parallel with the plate b', so as to produce a vertical slot d^5 sufficiently wide to freely admit of the passage of any of the stops. When, now, the three carriers, Figs. 6, 9, and 10, are collected at the head of the span, the rope F being supported by the sheave c^2 of Fig. 6, is held substantially in the position indicated in dotted lines at F' in Figs. 9 and 10. When the stop a has engaged with the parts of the first carrier, Fig. 6, as shown in Fig. 8, and carried it forward, the rope F will no longer be supported, as before, at the head of the span and will drop between the cheek-pieces f f' onto the sheave c^2 of Fig. 9, as indicated in dotted lines F^2. It will then also occupy the position shown in dotted lines F^2 in Fig. 10. When, now, the stop a' comes along and engages with the carrier of Fig. 9, the rope will fall between the cheek-pieces f and f' onto the sheave c^2 of Fig. 10, as shown in dotted lines at F^3. Thus the three stops a, a', and a^2 may all be of the same size and each engage with a separate carrier.

By having another series of carriers similar to Figs. 6, 9, and 10, but with the cheek-pieces e e' and d^2 d^3 farther apart, the series of stops a, a', and a^2 may pass freely through them and leave them to be picked up by another series of stops of greater diameter. This arrangement is shown in Fig. 12, wherein the series of stops a' a^2 are of the same size and large enough to engage with the rope-carriers 1 2, but not with either of the rope-carriers 3 4, whereas the series of stops a^3 a^4, being of large size, are large enough to engage with both of the rope-carriers 3 4. Thus when the rope F is running, as indicated by the arrows, Fig. 12, the small stop a' will pass successively through carriers 4, 3, and 2, but will engage carrier 1. The small stop a^2 will pass through carriers 4 and 3 and engage carrier 2. The large stop a^3 will pass through carrier 4 and engage carrier 3. The large stop a^4 will engage carrier 4. Thus each set of stops of the same diameter may pick up as many different carriers as there may be different elevations of the sheaves c^2, and this number of carriers may be multiplied as many times as the diameter of the stops is increased.

When the carriages are brought to the head of the span it is essential that there should be some means for holding them there until they are carried forward again by the stops. For this purpose I provide such a retainer arm or dog as is shown at g in Fig. 3, the acting surfaces of the head of which are beveled, so as to permit each carrier on its return to be carried into engagement with the retainer-arm before the cheek-pieces e and e' give way sufficiently to permit the stop to escape from the carrier. Obviously, the function of the retainer requires that the inclined or beveled surfaces be interposed between it and each rope-carrier, whether the rope-carrier be in contact with it on the outside or the inside; but I do not wish to be limited to having these inclined surfaces formed upon the retainer-head, as shown. The position of the retainer is fixed by a clamp g', and it is held from swinging underneath by a counter-weight g^2.

I will next describe a means whereby the traveler-rope F may be actuated by the fall-rope E or parts moving therewith.

The sheave I, over which the fall-rope passes, is mounted loosely upon the same shaft with the sheave G. Between these two sheaves is interposed a friction-clutch at h and the sheave G is provided with a hand-brake h' operated by the oscillation of the shaft h^2. i is the screw by which the sheave I is forced toward the sheave G to produce engagement of the friction-clutch h, and the usual spring (not shown) is interposed between the friction surfaces to repel them from each other. i' is a lever fixed upon the end of the screw i, and h^3 is a lever fixed upon the end of the shaft h^2. These levers are coupled together by the link i^2 and when moved in one direction the clutch h is thrown into engagement, and when moved in the other direction the clutch h is released and the brake h' is applied. j is a rope connected to the arms h^3 and i' and extending over the sheaves j', j^2, and j^3, as shown in Fig. 2, and connected with the lever j^4. By moving this lever the operator has complete control of the clutch h and brake h'. When, now, the lever j^4 is moved in position to cause the engagement of the clutch h, the driving of the sheave I by the fall-rope E will be transmitted to drive the sheave G and consequently the traveler-rope F in a corresponding direction. When, however, the lever j^4 is moved,

so as to release the clutch and apply the brake, the traveler-rope F will be held stationary while the fall-rope E may travel in either direction. To insure the driving of the sheave I by the fall-rope E an additional sheave *k* may be provided, around which and the sheave I the fall-rope E may take a turn, as shown in Figs. 4 and 5.

I have shown these improvements applied to a cableway with an inclined cable, and the outward running of the carriage will be assisted by the downward inclination of the cable; but I do not wish to limit myself to this nor do I wish to limit myself to the use of a cable as a trackway.

I claim—

1. In a conveying apparatus, in combination, a cable or trackway, a load carriage to travel thereon, a series of stops of substantially similar size, a rope carrying the same, a series of rope carriers and means whereby the position of the stop carrying rope is varied with respect to various rope carriers of the series, whereby only one of the series of stops will occupy the proper position with respect to each rope carrier to engage the same, substantially as described.

2. In a conveying apparatus, in combination, a cable or trackway, a load carriage to travel thereon, a plurality of series of stops in each of which series the individual stops are substantially similar in size, a stop carrying rope, a series of rope carriers and means whereby the position of the stop carrying rope is varied with respect to various rope carriers of each series, whereby only one of each series of stops will occupy the proper position with respect to each rope carrier to engage the same, substantially as described.

3. In a conveying apparatus, in combination a cable or trackway, a load carriage to travel thereon, a rope carrier, a clamp attached to the cable or trackway near one end of the span, an arm projecting from said clamp toward the middle of the span and a projection on said arm extending into the path of the rope carrier; the contact surfaces between said projection and said rope carrier on both sides being inclined to the line of travel of the rope carrier, substantially as described.

4. In a conveying apparatus, in combination a cable or trackway, a load carriage to travel thereon, a rope carrier containing a wheel *c* to run upon the cable or trackway, a retainer adapted to bear down on said rope carrier above said wheel and means engaging with said rope carrier, whereby the same is caused to run upon said wheel out of engagement with said retainer, substantially as described.

5. In a conveying apparatus in combination, a cable or trackway, a load carriage to travel thereon, a series of rope carriers each provided with a wheel *c* running on the cable or trackway, a projection and means whereby the same is yieldingly held in the path of the rope carriers, the surfaces of contact between said projection and each of said rope carriers on both sides being inclined to the line of travel of said rope carriers, substantially as described.

6. In a conveying apparatus, in combination, a cable or trackway, a load carriage to travel thereon, a series of stops, a stop supporting rope, a series of rope carriers provided with rests for the said rope at different elevations and each having adjacent to its rest a constricted opening expanding into a larger opening; whereby when the rope lies on the rest it will be within the constricted opening adapted to engage a stop but otherwise the stop may pass by, substantially as described.

7. In a conveying apparatus in combination, a cable or trackway, a load carriage to travel thereon, a fall rope, a traveler-rope and means whereby the motions of the fall rope may be communicated to said traveler-rope, substantially as described.

8. In a conveying apparatus, in combination, a cable or trackway, a load carriage to travel thereon, a fall rope, a traveler-rope, a sheave whereon said traveler rope is supported, a sheave over which said fall rope passes and a clutch mechanism interposed between said sheaves whereby the motion of one may be communicated to the other, substantially as described.

9. In a conveying apparatus, in combination, a cable or trackway, a load carriage to travel thereon, a traveler rope, a fall rope, sheaves whereon said ropes are respectively supported, clutch mechanism interposed between said sheaves and a brake mechanism whereby said traveler-rope sheave may be held, substantially as described.

10. In a rope carrier for a conveying apparatus in combination, the side pieces, means, as the cheek-pieces d^2 and d^3, whereby the passage between the side pieces is partially closed and a spring mechanism, as the cheek-pieces *e* and *e'*, whereby the passage is also partially closed, substantially as described.

11. In a rope carrier for a conveying apparatus, in combination, the side pieces having a slotted opening between them, an obstruction, as the cheek-pieces *f* and *f'*, whereby said slotted opening is divided horizontally, an obstruction, as the cheek-pieces d^2 and d^3, whereby said slotted opening is partially closed at one end below said obstruction, *f f'*, substantially as described.

Signed at New York, in the county of New York and State of New York, this 5th day of April, A. D. 1894.

THOS. SPENCER MILLER.

Witnesses:
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