(No Model.) 4 Sheets—Sheet 1.

S. A. COONEY.

FALL ROPE CARRIER.

No. 534,314. Patented Feb. 19, 1895.

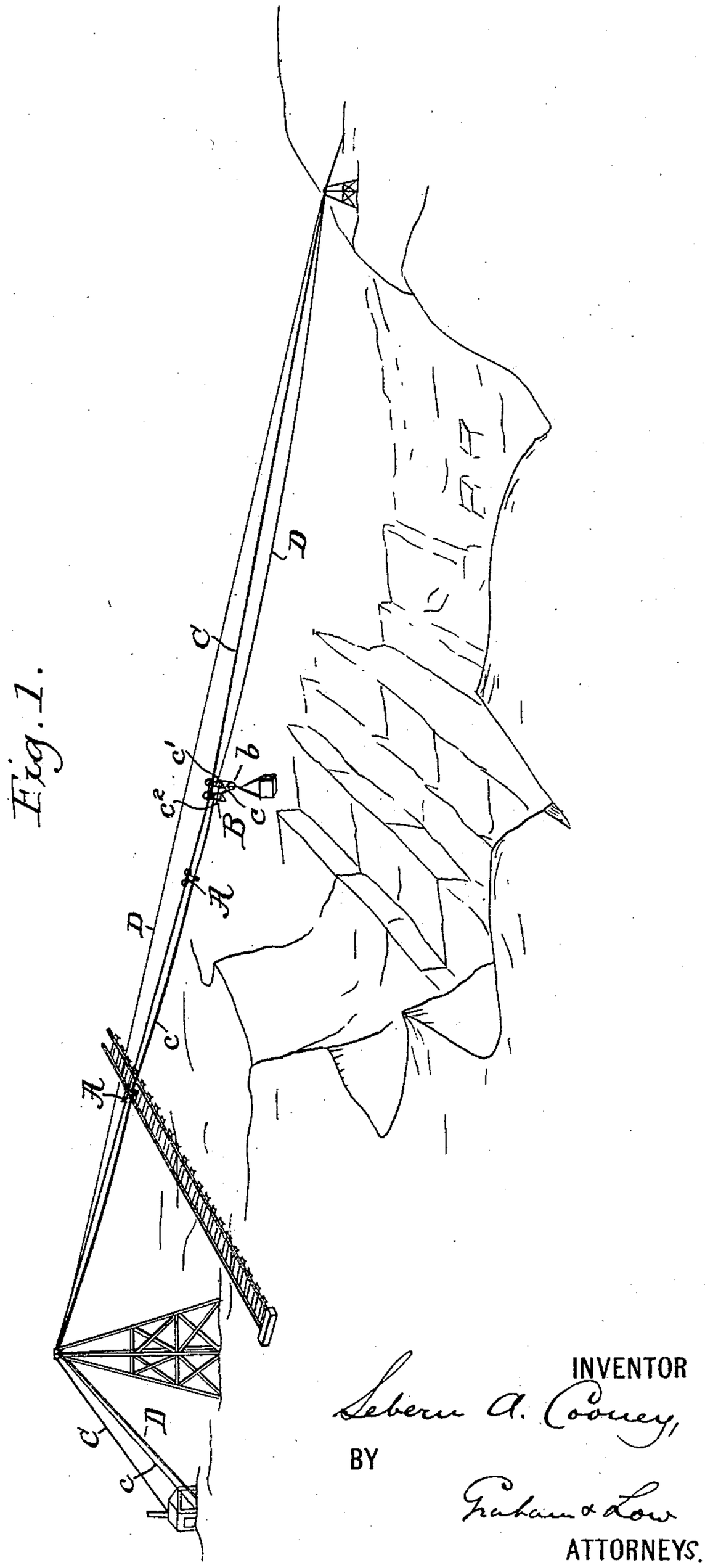

Fig. 1.

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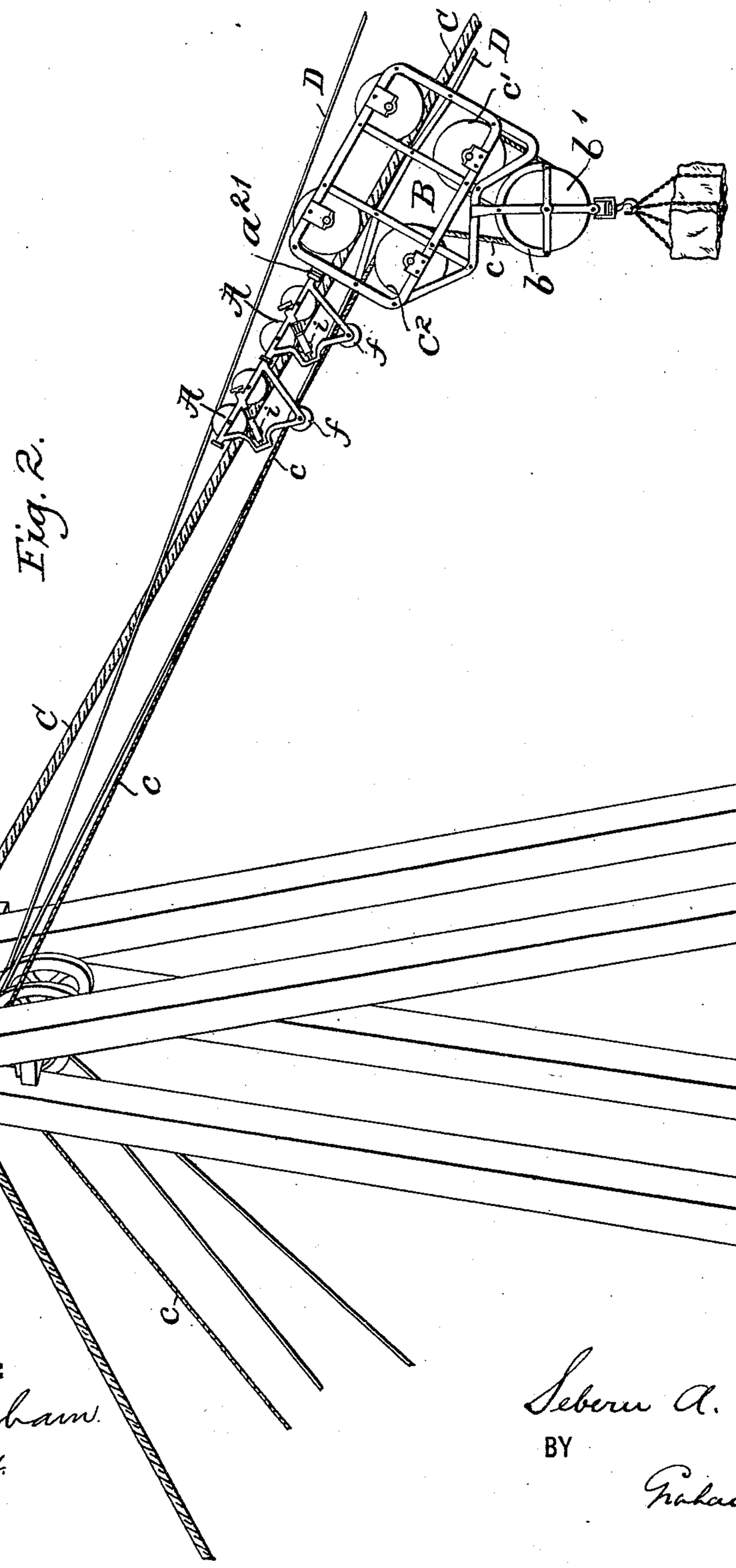

Fig. 2.

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FALL ROPE CARRIER.

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Fig. 4.

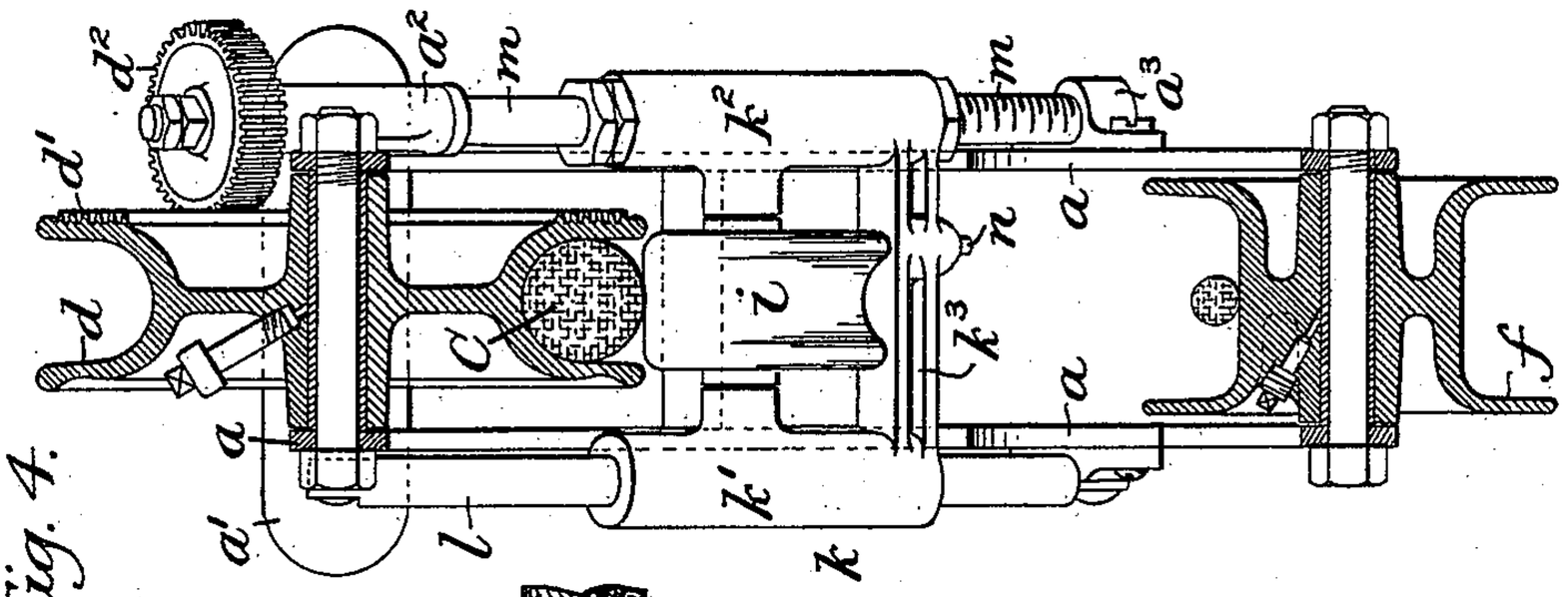
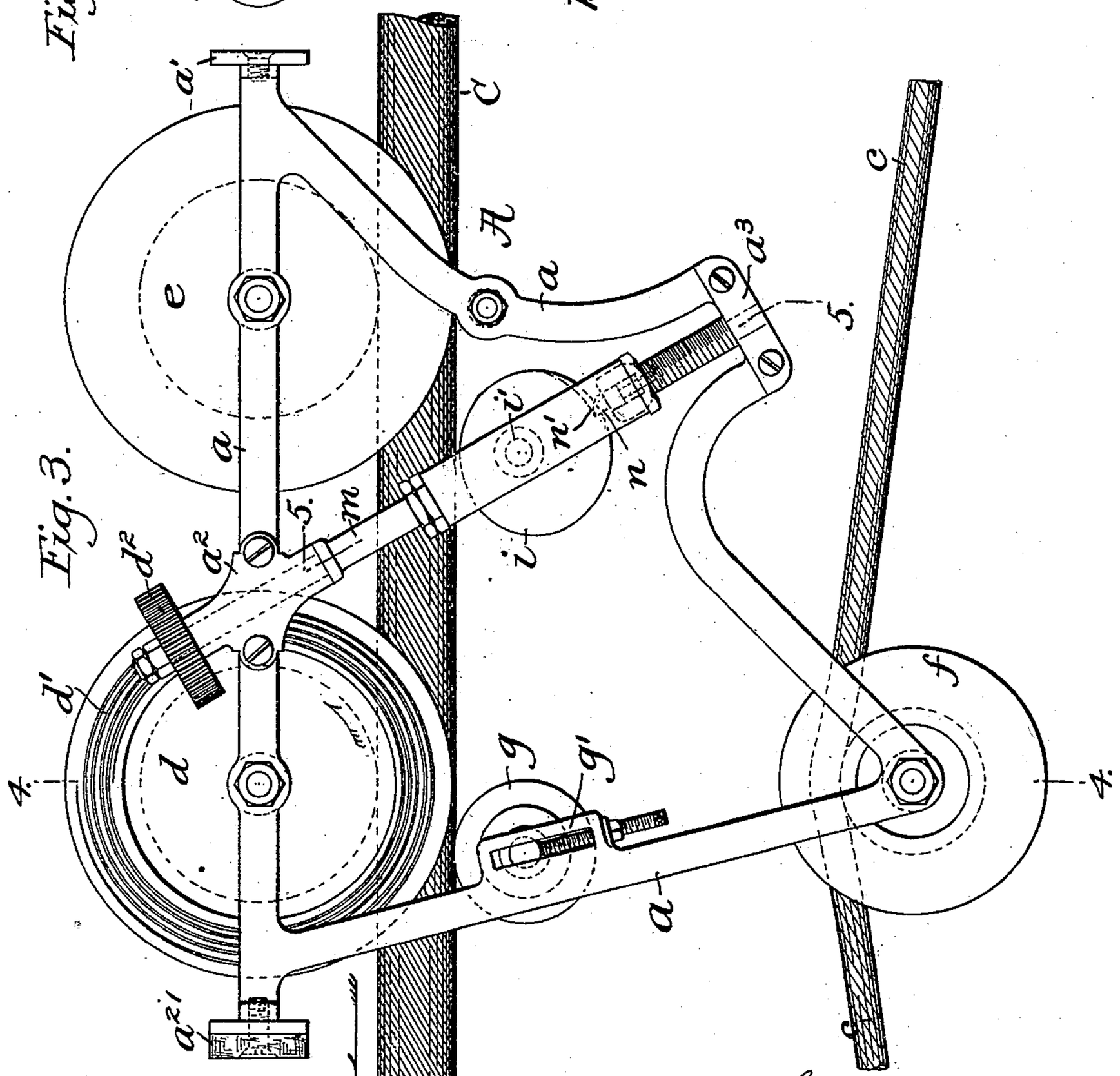


Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

S. A. COONEY.

FALL ROPE CARRIER.

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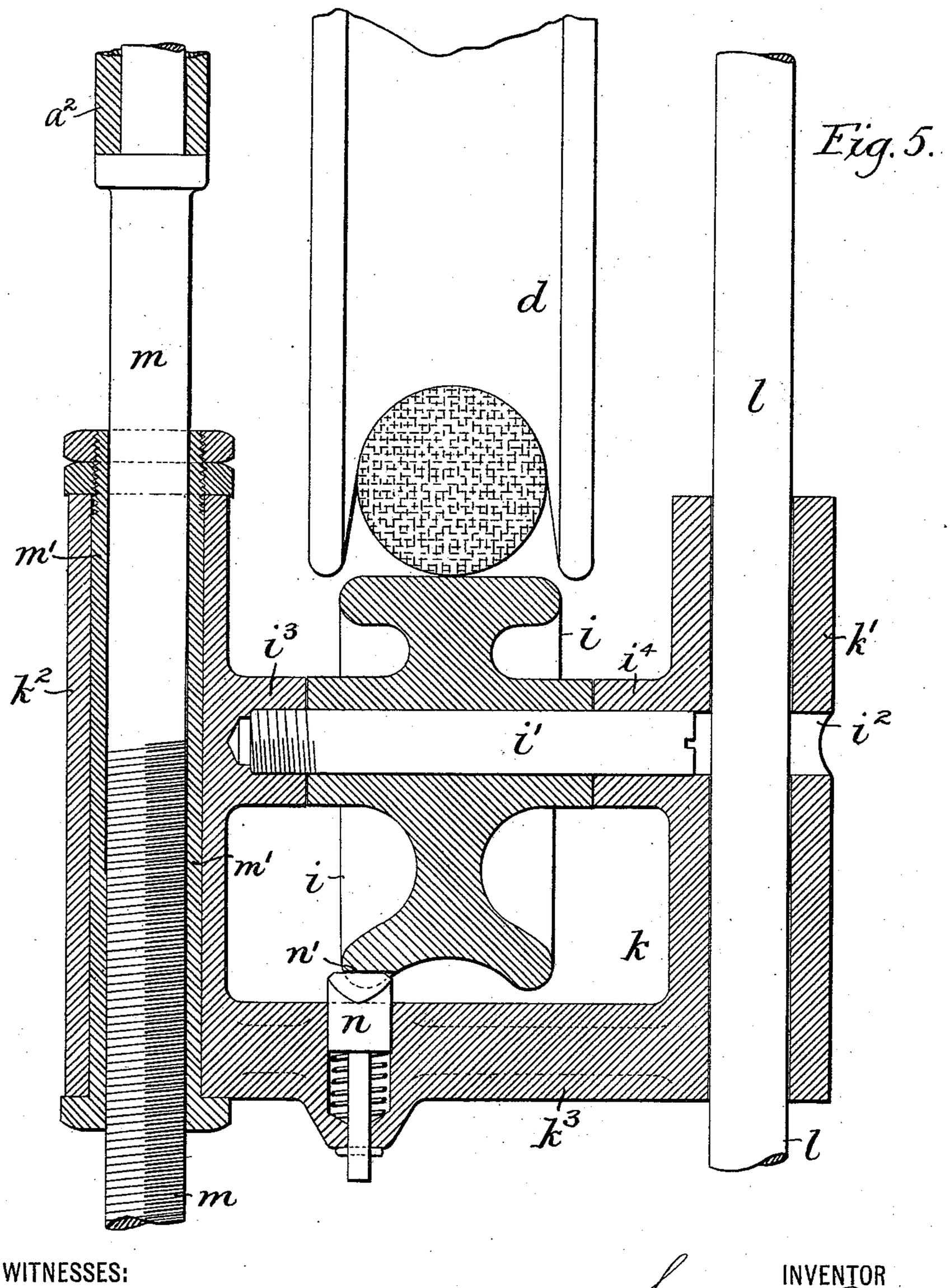

Fig. 5.

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UNITED STATES PATENT OFFICE.

SEBERN A. COONEY, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO THE JOHN A. ROEBLING'S SONS COMPANY, OF TRENTON, NEW JERSEY.

FALL-ROPE CARRIER.

SPECIFICATION forming part of Letters Patent No. 534,314, dated February 19, 1895.

Application filed August 9, 1894. Serial No. 519,896. (No model.)

To all whom it may concern:

Be it known that I, SEBERN A. COONEY, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Fall-Rope Carriers, of which the following is a specification.

This invention relates generally to aerial cableways in which a trolley with its load travels along a rope or cable that is stretched between distant points over, for instance, a comparatively narrow valley or quarry, which trolley carries means by which the load may be hoisted to the trolley so that the trolley and load may then be moved to the place for depositing the load.

The invention more particularly relates to a fall-rope carrier for use with cableways whereby the fall-rope and it may be the traction rope is or are guided, supported and prevented from unduly sagging when stretched long distances; and it has for its object to provide automatic means by which the distance of travel of the fall-rope carrier and its ultimate stoppage shall be controlled and positively determined, as will more fully hereinafter appear.

The accompanying drawings illustrate a fall-rope carrier adapted to practically carry out the invention in its most complete form, provision being made for many adjustments for rendering the carrier long lived and substantially universal as regards distances it may be required to travel, which in some instances may not be needed in practice.

In said drawings: Figure 1 is a general view of a cableway illustrating the application and use of the improvements. Fig. 2 is an enlarged general view of a portion of the cableway showing the trolley and its load near one terminus of the way, and the fall-rope carriers in idle position. Fig. 3 is a further enlarged side elevation of the fall-rope carrier and a portion of the cableway. Fig. 4 is a vertical cross sectional elevation on the line 4, 4, of Fig. 3. Fig. 5 is a still further enlarged cross section on the line 5, 5, of Fig. 3.

In practice the fall-rope carrier A will be employed in connection with a trolley B that is supported by and drawn along a carrying cable C stretched between distant points as in Fig. 1. The trolley is connected to both ends of an endless traction rope D connected with the winding drum of an engine by which it is drawn back and forth over the cable C. The load is connected to the trolley B, through a fall block *b*, which is supported by a fall-rope *c* that is connected at one end fixedly to the fall-block *b* and passes over a trolley pulley *c'*, around the fall block pulley *b'*, and thence over a guide pulley c^2 to the terminus where it is connected to another winding drum of the engine. The fall-rope *c* is arranged to pay out as the trolley moves along the carrying cable to the point of stoppage, keeping the fall block and pulley *b'* up in close contact with the trolley and as soon as the trolley reaches the point at which the load is to be lifted and connected to the trolley the fall-rope continues to be paid out so that the fall-block is lowered to the load. The fall block is then connected to the load and the fall-rope is rewound on the engine drum to draw the fall block and load up to the trolley and as soon as the fall block reaches the limit of its upward movement and is in close contact with the trolley the trolley and load are ready to be drawn in to the terminus.

When the trolley is drawn out along the carrying cable to considerable distances from the terminus, the fall-rope *c* sags from the trolley to more or less extent according to the distance, and hence, owing to the weight of rope in the sag, interferes with the ready response, and in some cases wholly prevents the movement of the fall-block in gravitating from the trolley to the load upon the paying out of the fall-rope after the trolley has come to rest. To avoid these difficulties, a fall-rope carrier A is employed, arranged to travel along the carrying cable C, and support the fall-rope *c* at a point or points intermediate of the trolley B and the terminus so that undue sagging of the fall-rope is wholly prevented.

The fall-rope carrier A, see Figs. 2 and 3, consists of a triangularly shaped frame *a*, supporting a pair of grooved pulleys *d*, *e*, arranged to travel freely on the carrying cable C and also supporting at its lower end a grooved sheave *f* in which rests the fall-rope

c. The frame also supports a guard pulley *g* that is mounted in adjustable bearings *g'* below the carrying cable C to prevent the grooved pulleys *d*, *e*, from accidentally jumping the cable, and is preferably positioned more or less immediately under one of said pulleys so that such pulley is confined in firm contact with the carrying cable to better act as a driven means for the automatic carrier stopping device presently to be described. The ends of the frame in advance of both of the pulleys *d*, *e*, are provided with buffers *a'*, a^{21}, to receive the shock of contact with the trolley B and with coacting fall-rope carriers if more than one is used as in Fig. 2; one of the buffers a^{21} being of greater thickness than the other for direct contact with the trolley.

In the use of the fall-rope carrier it is necessary to be able to automatically control its stoppage on the carrying cable so that it will occupy a position at some point intermediate between the trolley B and the terminus of the cableway so that it will act to properly support the fall-rope and allow it to pay out or be drawn in freely. For this purpose the carrier A is provided with a stopping device *i* which in the present and preferred form is represented by an eccentrically mounted roll or cam pivotally mounted in a frame just below said cable and normally out of contact therewith so as to be in no danger of touching the cable until the desired time. With this stopping device means are provided for automatically bringing it into action, which means when the device is in the form of a pivotally mounted cam as in the present instance is arranged to automatically bring the cam into frictional contact with the cable so that such contact will thereupon cause the cam to rotate more or less to firmly clamp the cable or cause it to be wedged between the cam and one of the carrying pulleys *d*, *e*.

The stopping device or cam *i* is carried b a frame *k* adapted to move with the cam to and from the cable C. This frame consists of a pair of inclined sleeves *k'*, k^2, connected together by a transverse bar or bars k^3, the cam *i* being mounted to rotate between the sleeves on a suitable cross pin *i'*. See Fig. 5. The frame *k* is guided in its movements by a fixed inclined rod *l* secured to one side the carrier frame *a*, see Fig. 4, and by another inclined rod *m* mounted in bearings a^2, a^3, secured to the opposite side of the frame *a*. The rod *l* is embraced by the sleeve *k'* and the rod *m* by the sleeve k^2. One of the rods as *m* forms a convenient means of moving the frame *k* and cam *i* vertically on the rods and for this purpose the rod *m* is a screw-threaded one mounted to rotate in its bearings a^2, a^3, and its screw-threaded portion engages a nut formed by a screw-threaded bushing *m'* fixed within the sleeve k^2 by a flange at one end and a pair of lock nuts at the opposite end of the bushing, as in Fig. 5; so that by rotating the screw rod *m* the frame and cam may be raised or lowered bodily to and from the cable C. The pin *i'* and cam *i* it may be stated are assembed before the frame *k* is mounted on the inclined rods *l* and *m*; the pin *i'* being passed through an opening i^2 in the sleeve *k'* and screwed into a female threaded hub i^3 on the inner side of the sleeve k^2, another hub i^4 supporting the opposite end of the pin allowing the head of the pin to rest on the inner side of the rod *l* when the frame is in place, which thus effectually prevents the pin ever loosening sufficient to drop the cam *i* out of place.

To rotate the screw threaded rod *m* one of the carrier wheels or a wheel or roll revoluble during the travel of the carrier, such as the wheel *d*, is provided on its side with a helical screw-thread or worm *d'* adapted to engage with and slowly rotate a worm wheel d^2 fast to the upper end of the screw-threaded rod *m*. See Figs. 3 and 4. The arrangement of the driving worm *d'* is such that as the carrier A travels along on the carrying cable C in the direction of the arrow, Fig. 3, the rod *m* will be slowly rotated to gradually move the frame *k* and cam *i* upward on the rods *m* and *l* bringing the cam toward the cable C; and as soon as the frame has been raised sufficient to have brought the cam in contact with the cable, the duty of the cam raising devices has been subserved, and the cam by reason of its eccentricity and now rotated by contact with the cable has its greater diameter brought against the cable with the effect of tightly wedging the cable between said cam and the overlying carrier wheel, in this instance the wheel *e*.

In practice the distance of movement of the stopping device frame *k* from its down position to its raised position with the stopping device brought into action and the length of the worm *d'* will be sufficient to allow the fall-rope carrier A to travel out on the carrying cable to longest distance ever required; and should the carrier be required to stop at a point short of the extreme distance to which it is adapted to travel the carrier wheel *d* may be rotated the required number of times to advance the worm *d'* and have raised the frame *k* a more or less distance toward its upper position before the carrier is allowed to start in its movement along the carrying cable C.

The eccentrically mounted cam *i* rests normally with its shorter diameter toward the cable, as in Fig. 3, and is held from any tendency to backward rotation by a spring seated detent *n* carried by the cross-piece k^3 of the frame and arranged to engage a notch *n'* in the cam *i*, as in Figs. 3 and 5.

The fall-rope carrier A after coming to a stop on the cable C rests in such position with its sheave *f* supporting the fall-rope until the trolley B in its travel with its load to the terminus of the cableway strikes the carrier A and carries it bodily backward along the cable. In so doing the cam *i* is first rotated backward by frictional contact with the cable

to release its hold thereon and presents its short diameter to the cable, in which position the cam is held by the detent *n*. During the backward travel of the carrier A the revolution of the wheel *d* with the worm *d'* causes the screw-threaded rod to be rotated to lower the frame *k* and cam *i* from operative position, and if the trolley B is to repeatedly stop on the carrying cable at substantially the same point the one adjustment of the worm *d'* with respect to the position of the frame *k* and cam *i* will be sufficient for repeated movements of the fall-rope carrier; the backward travel of such carrier acting to reset the cam ready for the succeeding forward travel.

It is to be understood that while the herein described construction and arrangement of the means for bringing the carrier stopping device automatically into action are to be preferred, especially by reason of the slight duty devolving on the driving worm, it is obvious that the invention is not necessarily limited thereto, as skilled mechanics may readily suggest modified structures serving with more or less effectiveness the purpose of the particular structure herein delineated.

What is claimed is—

1. The combination of a fall-rope carrier having means for supporting fall or other equivalent rope, a stopping device for the carrier, and an automatically operating driver carried by the carrier for bringing the stopping device into action, as set forth.

2. The combination of a fall-rope carrier, a stopping device for the carrier, a traveling worm mounted on the carrier and connections between the worm and stopping device for bringing the latter into action, as set forth.

3. The combination of a fall-rope carrier, an eccentrically mounted cam normally out of action, and an automatically operating driver carried by the carrier for bringing the cam into action, as set forth.

4. The combination of a fall-rope carrier, an eccentrically mounted cam normally inactive, a traveling worm mounted on the carrier and connections between the worm and cam for bringing the latter into action, as set forth.

5. The combination of a fall-rope carrier, an eccentrically mounted cam, the carrier wheel having a driving worm, a worm wheel in mesh with said worm and connections between said worm wheel and the cam for moving the latter into active position, as set forth.

6. The combination of a fall-rope carrier, an eccentrically mounted cam, a detent preventing rotation of the cam in one direction, a driving worm and connections with the cam for moving it into active position, as set forth.

7. The combination of the carrier-frame, a stopping device frame movable substantially vertically on said carrier frame, a stopping device carried by said movable frame and normally inactive, and an automatically operating driver carried by the carrier frame for moving the movable frame and bringing the stopping device into action, as set forth.

8. The combination of the carrier frame, the inclined rods, a movable frame mounted on said rods, a stopping device carried by said frame, and normally inactive, and an automatically operating driver for moving the movable frame and bringing the stopping device into action, as set forth.

9. The combination of the carrier-frame, the inclined rods one of which is screw-threaded, a movable frame mounted on said rods and having a nut engaging the threads of one of the rods, a stopping device carried by said frame, and an automatically operating driver for rotating the screw-threaded rod and moving the frame with the stopping device, as set forth.

10. The combination of the carrier-frame, a movable frame mounted in the carrier-frame, a stopping device carried by the movable frame, a screw-threaded rod engaging a nut on the movable frame, a worm wheel and worm for rotating said rod, as set forth.

11. The combination of the carrier-frame and its wheels, a movable frame mounted in the carrier-frame, an eccentrically mounted cam carried by the movable frame and normally inactive and a worm and worm wheel for moving the movable frame and bringing the cam into action, as set forth.

In witness whereof I have hereunto signed my name in the presence of two witnesses.

SEBERN A. COONEY.

Witnesses:

GEO. N. GRAHAM,

W. H. GRAHAM.