

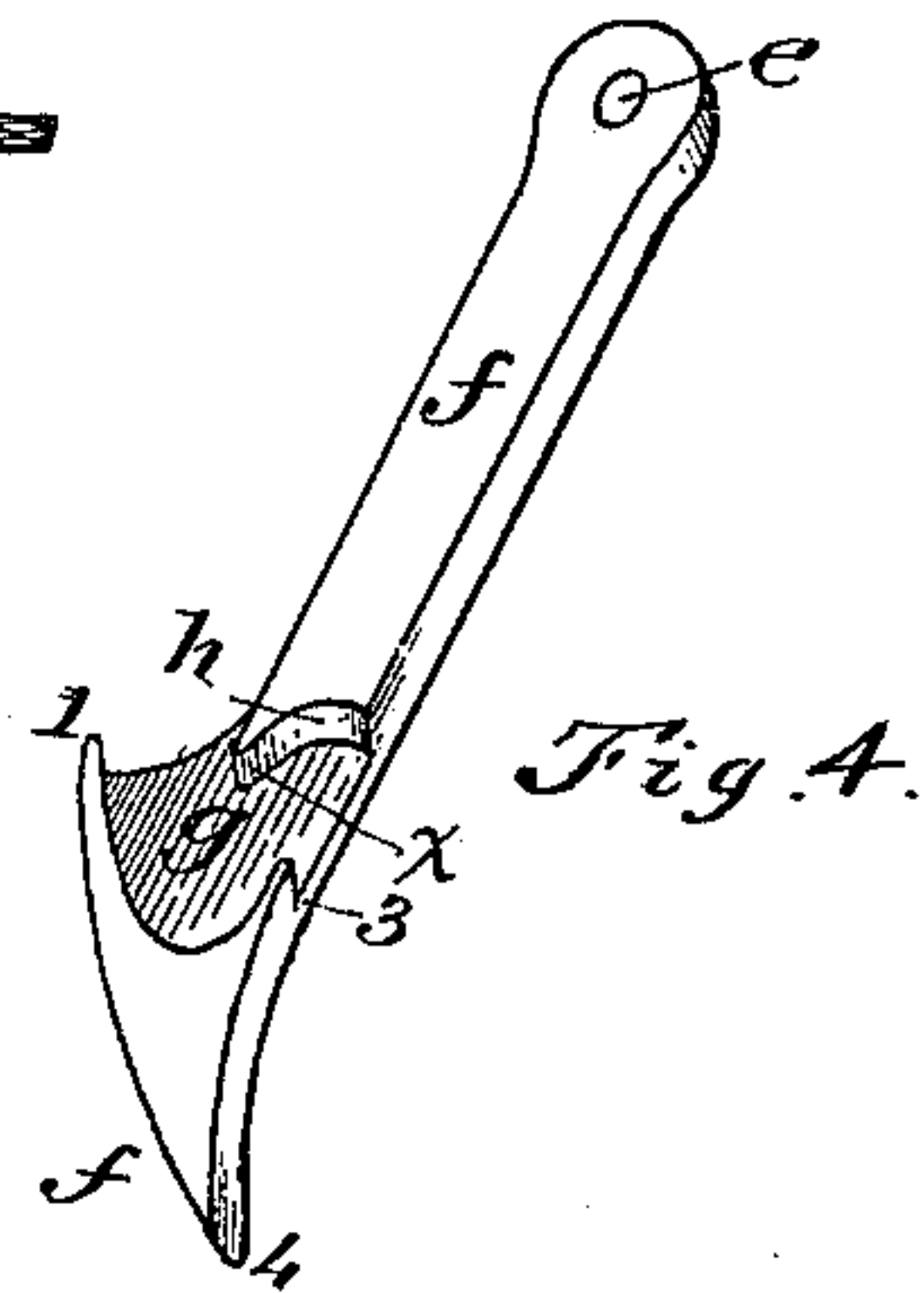
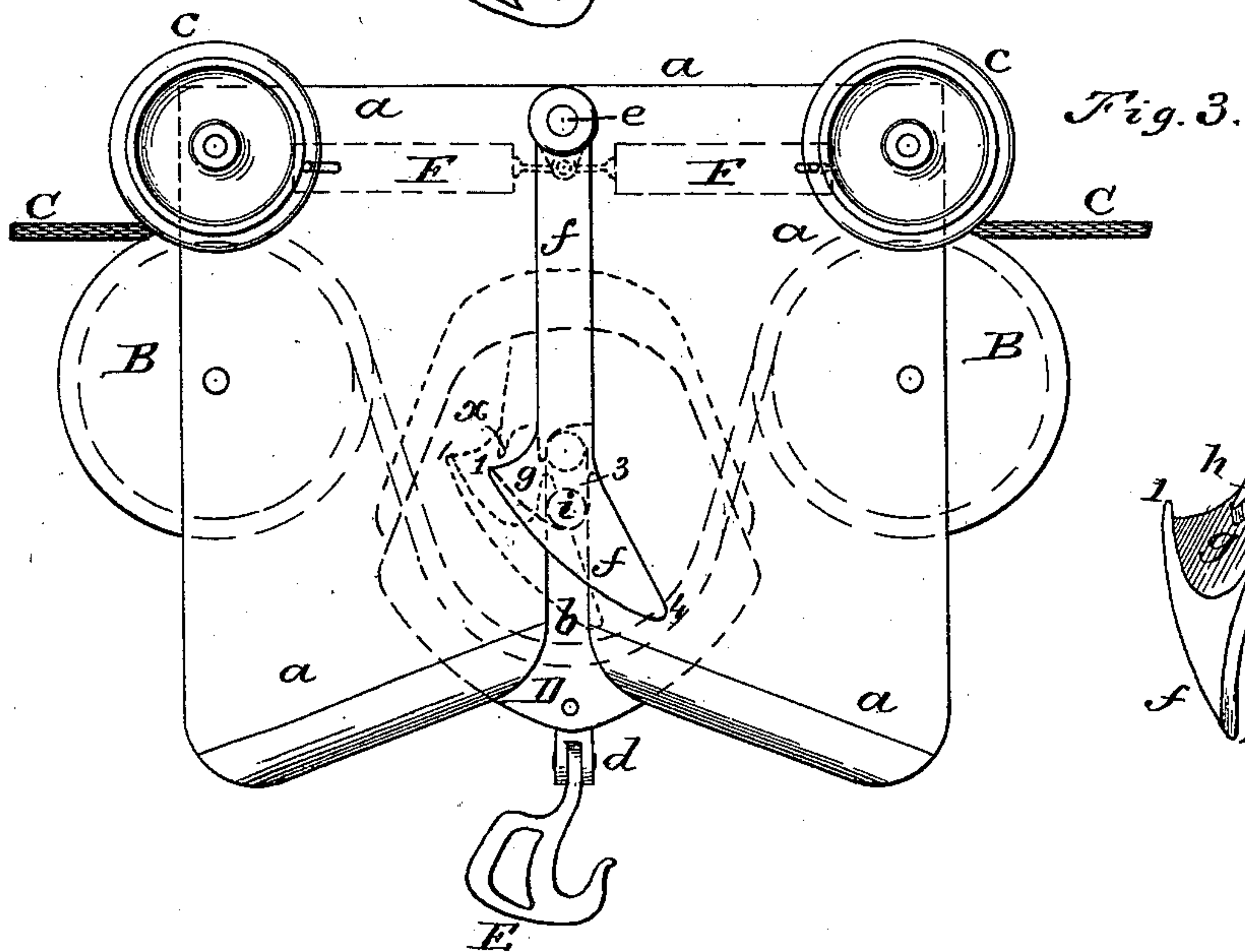
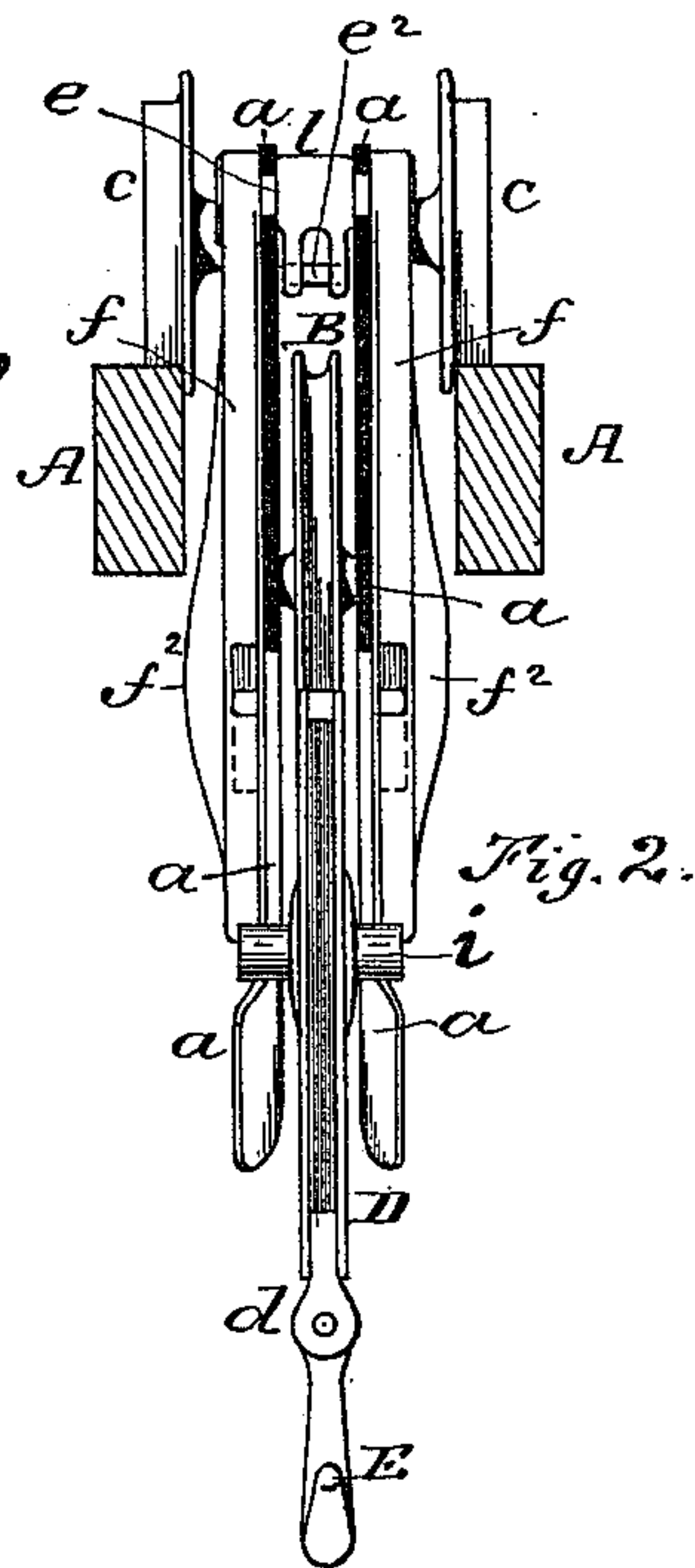
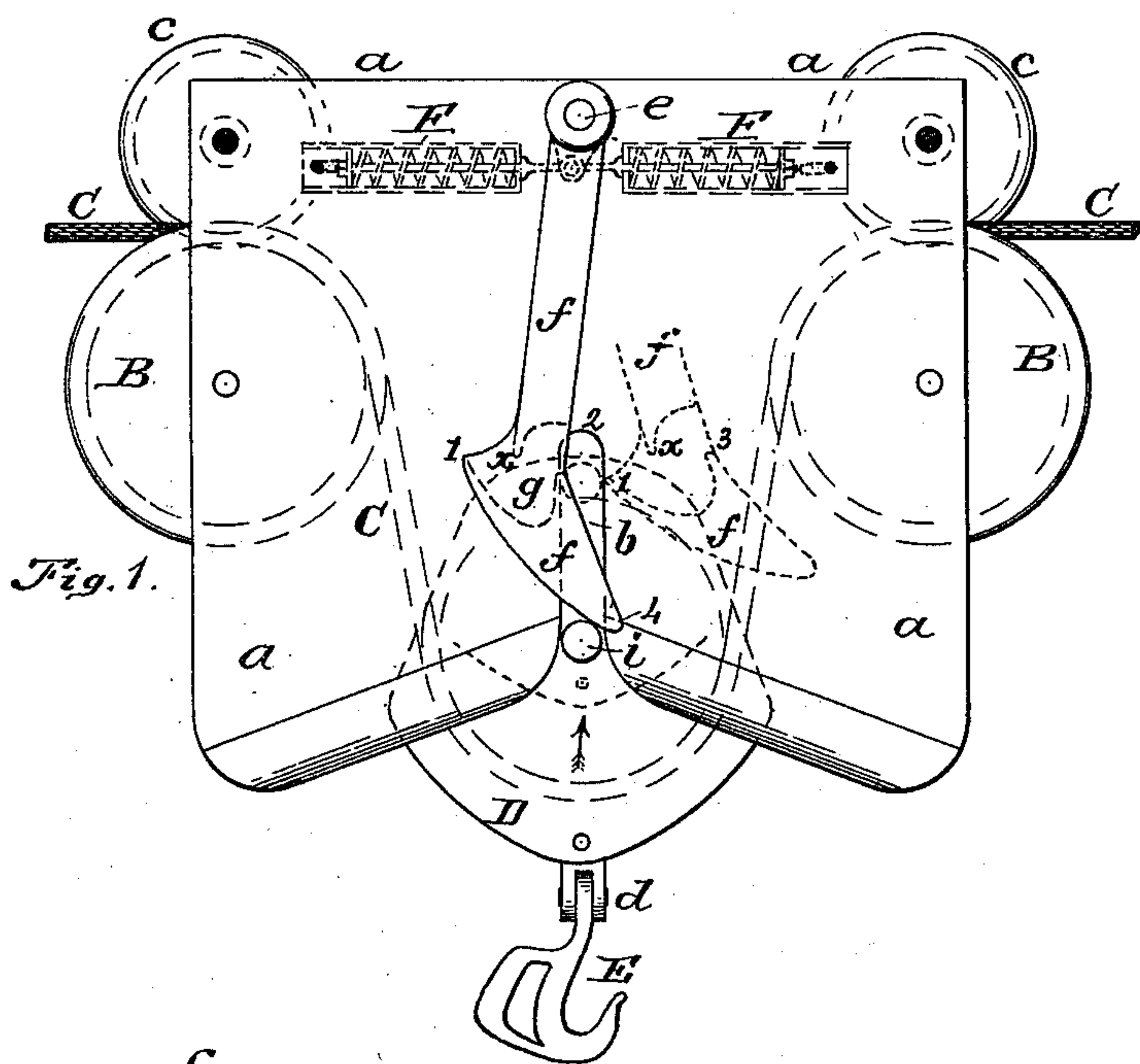
(No Model.)

3 Sheets—Sheet 1.

A. E. BROWN.
HOISTING AND CONVEYING MACHINE.

No. 408,456.

Patented Aug. 6, 1889.



Witnesses

J. Henry Kaiser
Victor J. Evans.

Inventor

Alexander E. Brown
By J. A. M. Intire
Attorney

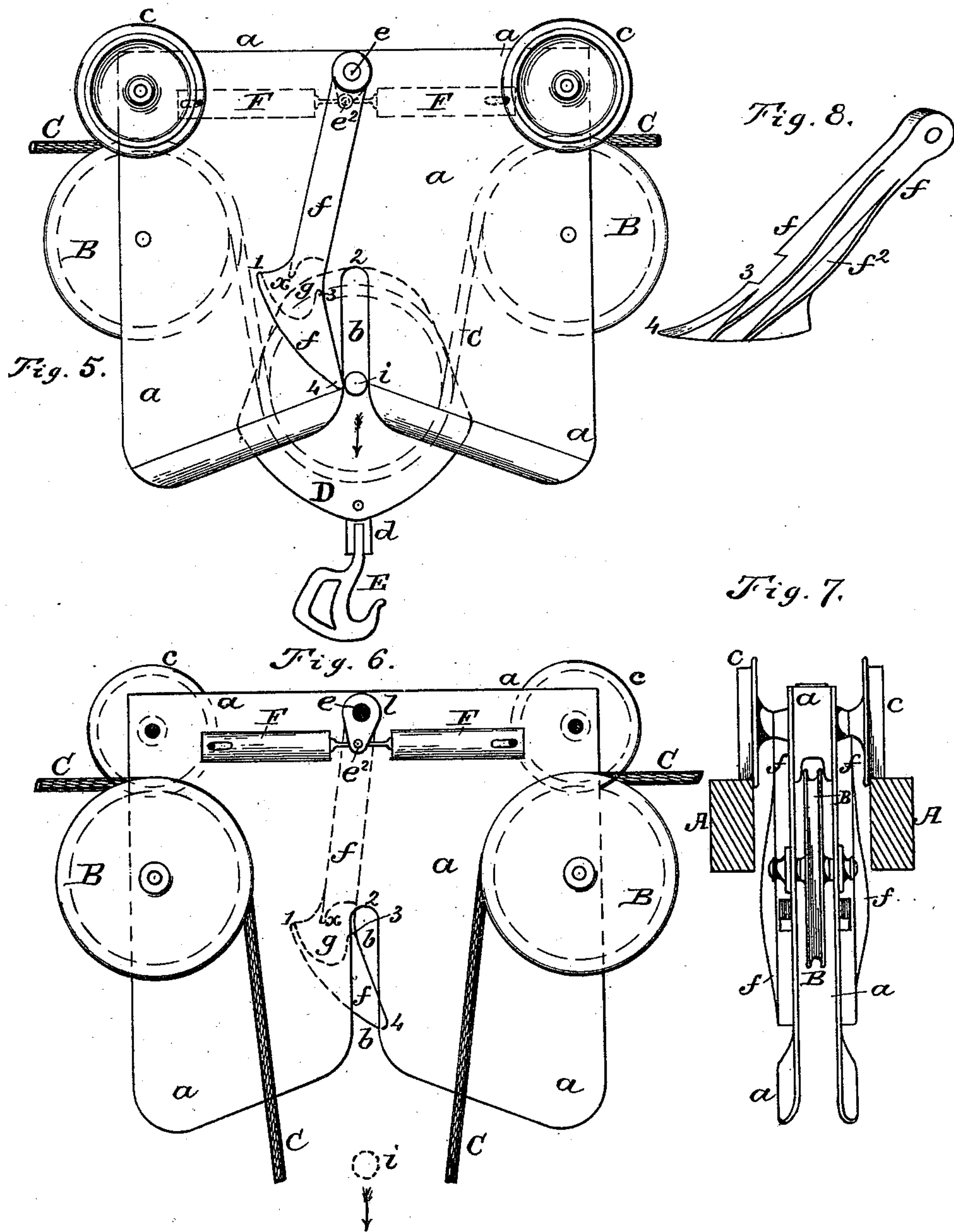
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3 Sheets—Sheet 3.

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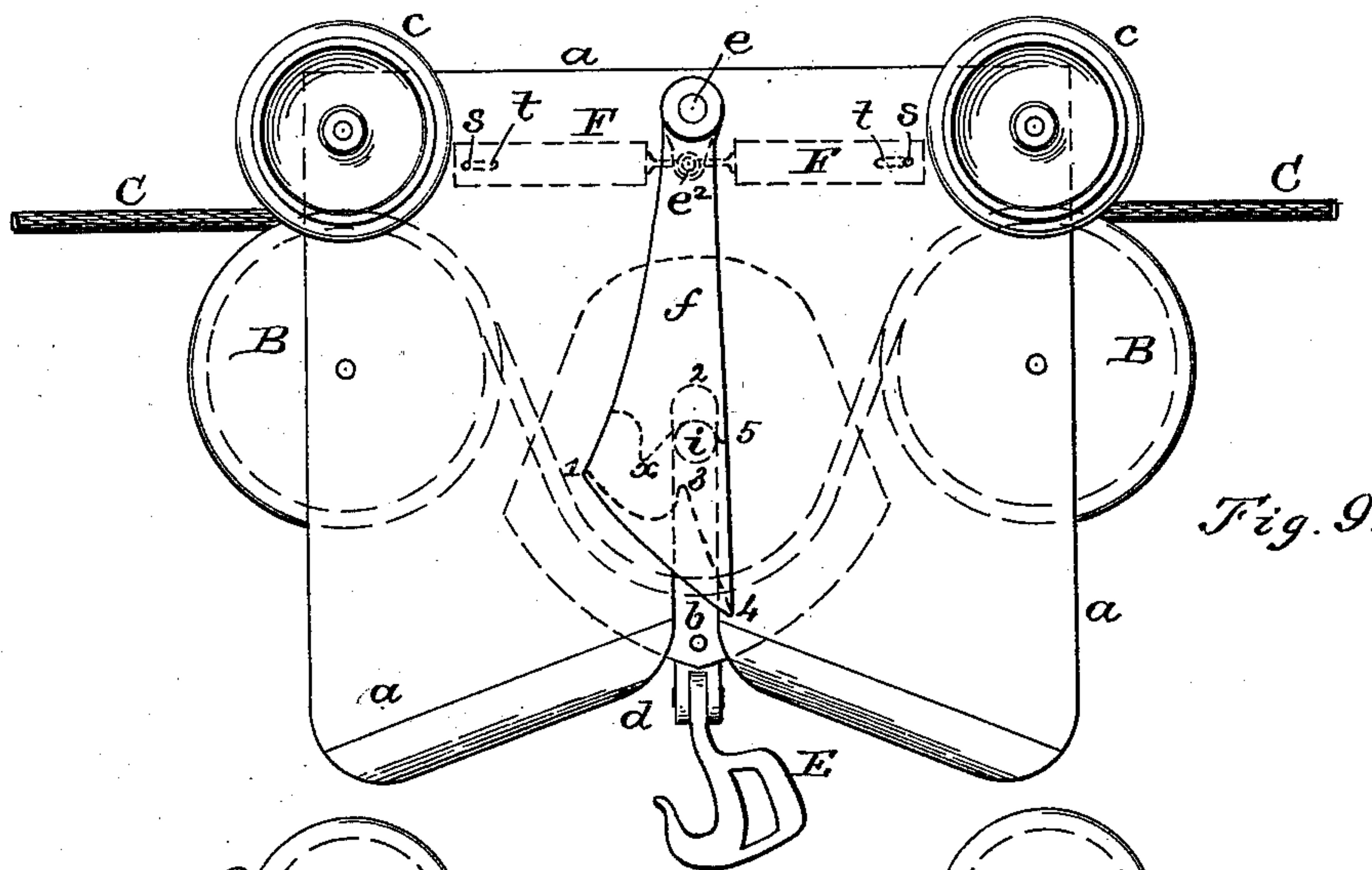


Fig. 9.

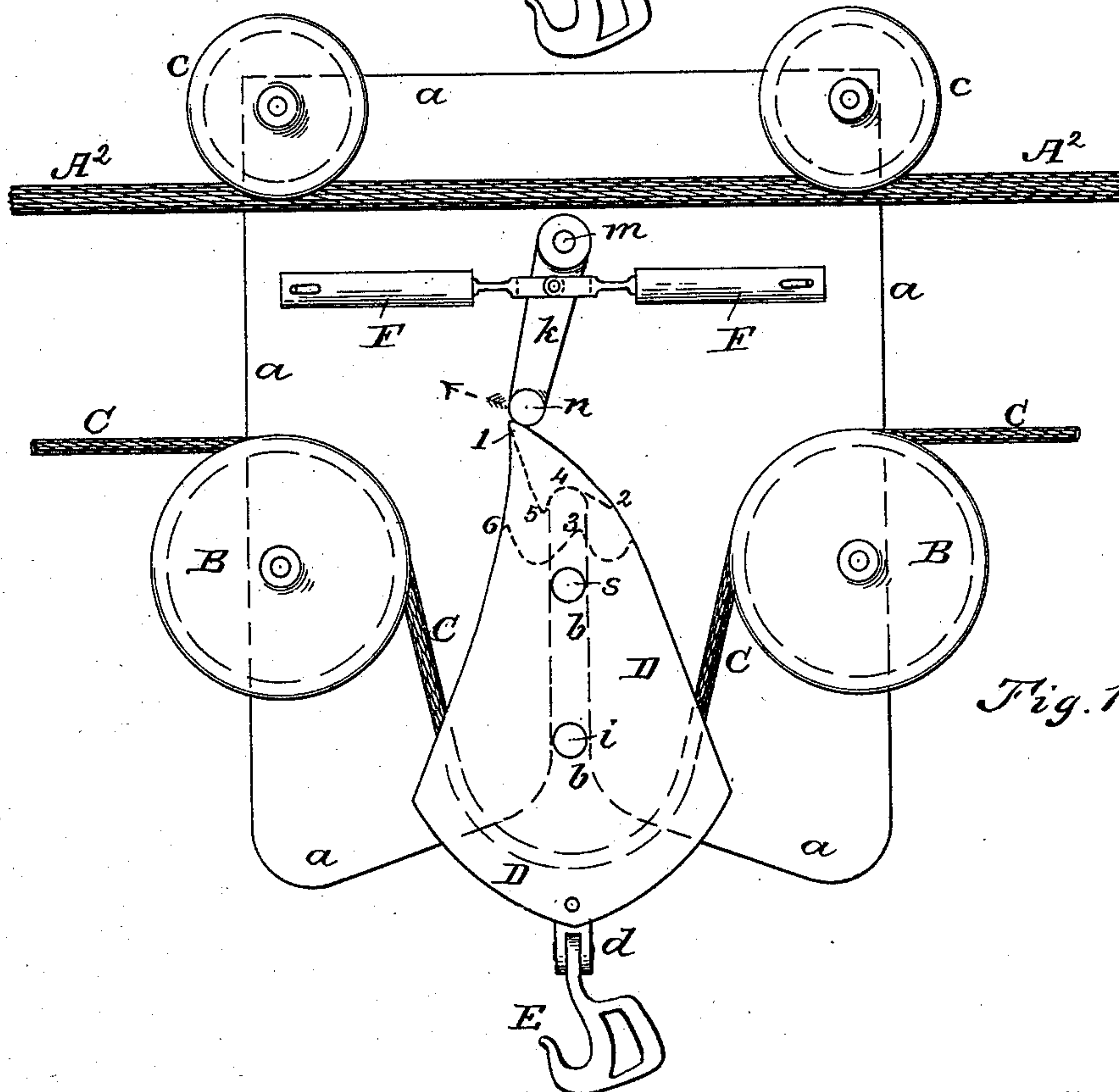


Fig. 10.

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UNITED STATES PATENT OFFICE.

ALEXANDER E. BROWN, OF CLEVELAND, OHIO.

HOISTING AND CONVEYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 408,456, dated August 6, 1889.

Application filed January 2, 1889. Serial No. 295,230. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Hoisting and Conveying Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My invention relates to a new and useful device or contrivance by means of which the securement to and releasement from the trolley or carriage of the sheave-block from which the load is suspended may be effected.

Previous to my invention various so-called "automatic" hooks and other engaging devices have been devised and put into operation, designed to effect automatically an engagement between the load-supporting sheave-block and the trolley or carriage of the machine whenever the sheave-block was elevated to a certain position, and to permit the releasement of said sheave-block from the trolley whenever the load was again lifted to a certain extent by the hoist-rope, and then permitted to descend; but in all such contrivances with which I am familiar there has been no positive certainty of their proper action. Consequently there always existed a great liability of accidental descent when an engagement was to be effected.

I propose to provide for use a device or contrivance which shall be positive or certain in its action, and in the use of which it will be impossible, after having lifted the load-sustaining device to a certain elevation to effect an engagement of it with the trolley, for said load-sustaining device to accidentally descend without perfecting such engagement with the retaining device of the trolley or carriage; and it will be impossible again, after having lifted the load-sustaining device to a certain elevation in order to effect the disengagement of it with the trolley, for said load-sustaining device to descend without perfecting a disengagement with the retaining device of the trolley or carriage; and to this main end and object my invention may be said to consist, essentially, in a combination of devices, the construction and operation of which are

such, as will be hereinafter more fully explained, that when the engaging device of the load-sustaining medium shall have been elevated to or above a certain elevation (by the action of the usual hoist-rope) any immediate succeeding descent of the load must inevitably insure a positive engagement of said device with the automatic hook or engaging contrivance of the trolley or machine; and also when the said load-sustaining device is again lifted to a certain point any immediately-succeeding descent of the same must inevitably insure a positive disengagement of said device with the automatic hook or engaging device of the trolley or machine.

To enable those skilled in the art to which my improvement relates to make and use a hoisting and conveying machine containing my improvement, I will now proceed to more fully describe the latter, referring by letter to the accompanying drawings, in which I have shown my invention carried out in those forms in which I have so far successfully practiced it, and which are the best now known to me, although said improvement may be carried into practice, of course, under modifications not shown in the drawings.

In the drawings, Figure 1 is a side elevation of a known form of trolley or carriage adapted to travel on a rigid double-beam tramway and provided with one of the usual forms of hoist-rope and load-sustaining sheave-block and supplied with my improved means or contrivance for insuring the engagement and disengagement automatically of said sheave-block with the trolley. In said figure the beams of the elevated tramway are omitted for the sake of simplification in the drawings. Fig. 2 is a central vertical transverse section of the contrivance or machine shown in side elevation at Fig. 1, but showing also in section the beams of the elevated tramway. Fig. 3 is a view similar to Fig. 1, but with the automatic engaging devices and sheave-block represented in somewhat different relative positions. Fig. 4 is a perspective view of one of the automatic engaging hook-like devices detached. Fig. 5 is a view similar to Fig. 1, but with the automatic hook shown in a different position or stage of action. Fig. 6 is a vertical longitudinal section of the contrivance shown at

Fig. 5, but with the hoist-block omitted or supposed to be lowered out of sight. Fig. 7 is an end or edge view of the parts seen at Fig. 6 in side elevation. Fig. 8 is another view of the automatic hook device detached from the other parts of the machine. Fig. 9 is a view somewhat similar to Fig. 3, but showing a modification in the form of the automatic engaging hook. Fig. 10 is a vertical longitudinal section showing a slightly-modified form of trolley, such as adapted to run on a cable tramway instead of a rigid railway, and also illustrating the cable tramway and showing a modification of my invention or improvement with reference to the automatic engaging and disengaging devices.

In the several figures wherever the same parts occur they will be found designated by the same letters of reference.

Referring now more particularly to Figs. 1 to 8, inclusive, A represents the two beams of a double-track rigid elevated tramway, on which is mounted to travel in the usual manner, by means of its carrier-wheels *c*, a trolley composed, mainly, of two metallic plates or cheek-pieces *a*, of about the shape shown, and suitably united and supported from the truck of the carriage. Said trolley has mounted on suitable axles supported by its cheek-pieces or side plates *a* two sheaves or rope-wheels B, over and partially around which passes, in the manner shown, (and well known to those skilled in the art,) the hoist-rope C, which rope at its pendent loop also passes beneath and partially around the sheave or rope-wheel of an ordinary hoist-block D, from which depends the usual load-carrying hook E, which, as shown, has its upper end pivotally connected to the eye or loop *d* of said block. In the case shown the axle or spindle *i* of the rope-wheel of the sheave-block D projects outwardly at each side of the block, said projections constituting the engaging device of the block, by means of which said block is supported and released at pleasure, in a manner to be presently described. The cheek-pieces or side plates *a* of the trolley are formed with vertical cut-outs or slots *b*, in a well-known manner, for the accommodation of the lugs or the projecting spindle ends *i*, before mentioned. On each side of the trolley, exteriorly of its side plates *a*, is arranged a pendent hook-like device *f*, the upper end of which is pivotally connected with a stud *e*, which passes through the upper portion of the carriage. Fast on this stud is arranged, intermediately of the plates *a*, a hub-like device *l*, with depending arm-like portions, in which latter is arranged a cross-pin *e*², (see Fig. 2,) to which cross-pin or pivot are connected the ends of two spring draw-bars or centering devices F, the function of which devices is to draw and hold the pendent hooks *f* in certain positions, as will be presently explained. Each of said depending hook-like devices *f* has a peculiar cam-like conformation at its lowermost portion, and is also formed with a sort of grooved cam or

seat-like depression *g*, all as plainly shown in the drawings. (See particularly Fig. 4 and the dotted-in portions of some of the other figures.)

As Figs. 9 and 10 show modifications, involving, however, substantially the same general principle of action or mode of operation as are illustrated in the preceding figures, I will, before proceeding to particularly explain Figs. 9 and 10, describe, by reference to the preceding figures, the general mode of operation of my improved machine.

At Figs. 1 and 2 each one of the automatic hook-like devices *f* is represented as being in its normal position, and it will be understood that the two hooks on the opposite sides of the trolley always move in unison. In other words, at Figs. 1 and 2 the hooks *f* are represented as in the positions which they naturally occupy when not acted upon in any manner by the engaging devices or projecting spindle ends *i* of the hoist-block D, and in said figures this hoist-block is represented as having just been elevated to a point at which these devices *i* are ready to begin action upon the engaging hooks or devices *f*. Now, as the ascent of the hoist-block D is continued, the projecting lugs *i* naturally ascending in a vertical plane, and, furthermore, being in the case shown confined to such vertical movement by the slots *b* of the side plates *a* of the trolley, the operation and effect of the ascending devices *i* are to move or swing the arms *f* into the position partially shown by the dotted lines at Fig. 1 until said devices *i* shall have passed the point *l*, or the upper extremity of the inclined lower cam-face of said hook-like device. After having passed farther up, so as to clear this point, (the extent of projection of the devices *i* beyond the exterior face of the plates *a* being a fraction less than the depth of the depression *g* in each of the devices *f*,) the tendency of the device *f* will be to resume its former position, (that seen in full lines at Fig. 1,) since by having been forced into the position indicated by the dotted lines the left-hand one of the spring draw-bars F will have had its spring compressed, so that it will act to cause the return of said device *f* to its original position. The complete return of the devices *f* to their original positions will, however, be obstructed by the presence of the devices *i*, which, it will be understood, have now ascended to such an elevation that in attempting to resume their normal positions those portions of the swinging devices *f* that are located above the point *x* will come into contact with the right-hand sides of said devices *i*, which contact will continue so long as said devices remain at the elevation to which they had to be lifted to clear the point *l*, and so long as they may be lifted higher; but as soon as the hoist-rope C is operated to permit any descent of the hoist-block D, the devices *i*, descending in contact with the left-hand surfaces of the swinging arms *f*, will

pass below the point x , and thus permit a further movement of the pendent hooks in the direction in which the spring of the left-hand draw-bar F still tends to pull them.

5 This draw-bar, however, cannot pull the pendent arms completely back to their original positions, because in their descent the devices i , coming against the left-hand surfaces of the upwardly-projecting points or stops 3 of the devices f , will obstruct the further movement of said devices, and the inevitable consequence of this enforced relative position of the devices i to the depressed or recessed portions g of the pendent hooks is that said devices i , as the descent of the sheave-block continues, must become seated within these depressed portions, or, in other words, must come to rest on the seat or depressed bearings thereof, as shown. Therefore, as
10 will be clearly seen, whenever the sheave-block shall have been elevated to any point which will insure the passage of the devices i above the points 1 of the hooks and the sheave-block then permitted to descend, its
25 descent must insure the positive engagement of the devices i with the hook-like portions or sustaining-seats at the vicinities of the recesses g .

Now, whenever it may be desired to effect
30 a disengagement or releasement of these devices i to permit the descent of the hoist-block and its load, it is necessary to again lift the hoist-block (through the medium, of course, of the hoist-rope C) until the devices
35 i shall have been raised to an elevation at which the upwardly-projecting stops or portions 3 of the pendent devices f can swing or pass beneath said devices i , when, by the action of the left-hand spring draw-bar F , the
40 devices f will be swung into their original positions, (indicated by the full lines at Fig. 1,) the devices i escaping, so to speak, to the right and free of the depressions g of the pendent hooks. According to the preferable
45 construction and that shown, when these devices i shall have been thus lifted a second time to this elevation they will come into contact with the upper ends or stop-like portions 2 of the slots b in the plates a . Then
50 the hoist-block D is free to descend, and if it be lowered the devices i will come into contact with the inclined surfaces of the devices f , that extend from the points 3 to the points 4, and by said contact will swing the arms f
55 to the left against the resistance of the spring of the right-hand one of the draw-bars F to a sufficient degree to permit the passage downward of the devices i beyond the points 4 of the pendent arms f , when said arms will be
60 returned to their normal position by the reaction of the spring in said draw-bar F , leaving the pendent arms in the first-stated positions and ready for a repetition of the operations just explained.

65 Of course it will be understood that in lieu of the particular means shown for insuring the disengagement of the parts, as just above

described, which means, it will be seen, consist, essentially, in, first, a suitable spring to pull the devices f to the left sufficiently to
70 insure the escape of the devices i from their seat-like bearings, (when said devices i shall have been lifted, as explained,) and, second, the cam-like or inclined surfaces that extend from the points 3 to the points 4 for inducing
75 a further swinging movement of the devices f , some other suitable means may be employed.

At Fig. 3 the devices i are represented as seated in the depressed portions g of the arms
80 f , so as to support or sustain the sheave-block D and its pendent weight during the transverse movements of the trolley or carriage, and in this figure the elevated position (in dotted lines) of the sheave-block shows the
85 devices i raised to the positions at which the arms f (there shown in full lines) are free to and will move, by virtue of the spring action of the left-hand draw-bar, into the position indicated in dotted lines in said figure, in
90 which position, as already just above explained, the devices i will be free to descend and push the pendent hook still farther toward the left as the sheave-block D is lowered.
95

At Fig. 5 it will be seen that the parts are in the relative positions which they occupy, for instance, before the devices i have passed the lowermost points 4 of the pendent arms, while at Fig. 6, the sheave-block being sup-
100 posed to have descended until the devices i are some distance below the trolley, the pendent devices f have been caused to resume their original position, such as seen, also, by the full lines at Fig. 1.
105

At Fig. 9 I have shown a modification of my invention, in which, in the first place, the slots b are extended higher up, so that the upper ends or abutment-surfaces 2 are located so high up that the engaging devices i
110 will never come into contact therewith, and in which modification, in the next place, the automatic hook devices f are constructed or shaped so that in raising the sheave-block for the purpose of disengagement the devices i
115 will come to a stop against or will interlock with the depressed portions of the arms f , in such manner that a subsequent slight descent of these devices i must occur to permit the points 5 to pass over said devices i be-
120 fore the pendent arms f can be swung toward and into their normal or natural positions by the left-hand one of the spring draw-bars F . Although the mode of operation will be substantially the same, so far as certainty of ac-
125 tion is concerned, I deem the form in which my invention is shown carried into effect in the preceding figures as preferable to the modification shown at this Fig. 9.

At Fig. 10 I have shown a still further modification of my invention, in which, instead of
130 having the peculiarly-shaped cam-like devices formed in, or as parts of, the pendent arms, these devices are formed on or rigidly attached

to the sheave-block D, one at each side of the upper portion of the same, and pendent arms *k* are hung upon the pivotal points *m* and are provided simply with laterally-projecting lugs or engaging devices *n*, all as clearly shown, and all in such manner that when the sheave-block is elevated its cam-like devices will come into contact with the laterally-projecting devices *n* of the pendent arms *k*, and swinging said arms to the right will force the devices *n* to travel in contact with the upper inclined faces of said cam-like devices from the points 1 to the points 2, when by the pulling action of the spring draw-bar F at the left-hand side of the figure the arms *k* will be moved in the direction indicated by the arrow, thus permitting said devices *n* to come into engagement with the peculiarly-shaped depressed portions of the cam-like devices of the sheave-block, such engagement, however, preventing any further upward movement of the sheave-block and insuring a positive engagement of said devices with the seating depression 4 as soon as the sheave-block shall have been permitted to descend; nor can any such permission to descend be given to the sheave-block without insuring this engagement between the devices *n* and the engaging cam-like devices of said block. In order to lower the block, it is only necessary to again lift it to a sufficient extent to permit the devices *n* to pass beneath the points 5, which they are forced to do by the continued pulling action of the spring draw-bar at the left-hand side of the figure, and as soon as the devices *n* shall have passed these points 5 there is no impediment to the free descent of the sheave-block, the latter in its continued downward movement inducing its cam-like devices to operate upon the devices *n* as they travel from the points 5 to the points 1 in such manner as to force said devices *n* still farther to the left (and beyond their normal positions) against the tension of the spring draw-bar F to the right of the figure, said devices *n* and their pendent arms *k* resuming their natural or normal positions by the action of said spring after the sheave-block D shall have passed entirely out of contact with the devices *f*. Thus it will be seen that it is not at all material whether the projecting devices or male members of the engaging mechanism be on the sheave-block and the female members or depressed seat-like bearings in a part of the apparatus attached to the trolley, or vice versa. In this figure the form of trolley or carriage is slightly different from that seen in the preceding figures, as it is designed to run, as shown, upon a cable tramway A² instead of upon a rigid track A—such as shown in the preceding figures.

Of course in carrying my invention into effect other modifications than those shown and alluded to may be adopted, if found expedient.

It is desirable and important in the con-

struction and arrangement of the tubular spring devices F that they be made so as to act upon the pendent arms *f* to bring them to and hold them at their proper positions without any fluctuations or vibrations beyond such points. In the form of devices shown I accomplish this desirable end by having each one of the draw-bar devices composed, as shown, of a simple cylinder having a compressible spiral spring arranged therein and the rod or draw-bar combined therewith in the usual manner, each of the tubular devices, however, instead of being stationary, being adapted to have a proper extent of longitudinal movement or sliding motion by reason of their being mounted near their more distant extremities upon pins or studs *s s*, which engage with longitudinal slots *t* in the cylinders. By this means it will be understood that when either one of the springs is compressed by the pull of the pendent arms *f* the other cylinder, instead of having its spring also compressed, will be moved bodily without any effect on the spring, and so as not to exert any force tending to cause the arms *f* to teeter. This peculiar construction and operation of the spring draw-bars for centering the vibratory arms, so to speak, may of course be applied to any and every sort of vibratory devices wherever it may be important to prevent any fluctuation or unnecessary vibratory motion of said arms.

What I claim as new, and desire to secure by Letters Patent, is—

In a hoisting and conveying machine, the combination, with the hoist-block or load-supporting device and with the trolley or carriage, of an automatic contrivance for effecting an engagement between said load-supporting device and said trolley, and for also permitting a disengagement of these parts, composed of the following instrumentalities, viz: first, projecting engaging devices on one of the parts to be brought into and thrown out of engagement with each other; second, suitable seats or depressed bearings on the other one of said parts for the accommodation of said engaging devices; third, suitable stops which operate to insure the descent of said engaging devices into said bearings or seats whenever said devices are lowered immediately after having been elevated to or above a proper point, and, fourth, means which insure a complete separation of the said engaging devices and the said seats whenever the former are elevated from engagement with said seats to or above a proper point, all substantially as hereinbefore set forth.

In witness whereof I have hereunto set my hand this 14th day of December, 1888.

ALEXANDER E. BROWN.

In presence of—

GEORGE C. WING,
J. P. SMITH.