

No. 741,918.

PATENTED OCT. 20, 1903.

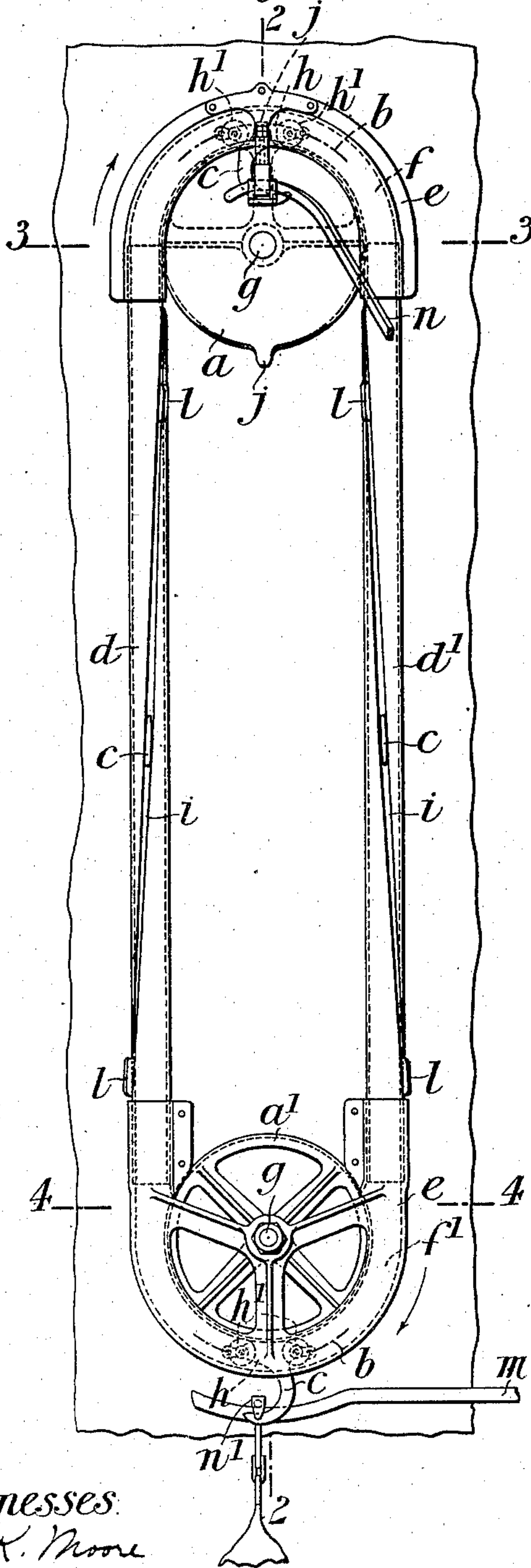
G. C. MACKROW & H. G. CAMERON.
ELEVATING OR HOISTING APPARATUS.

APPLICATION FILED SEPT. 15, 1902. RENEWED SEPT. 21, 1903.

NO MODEL.

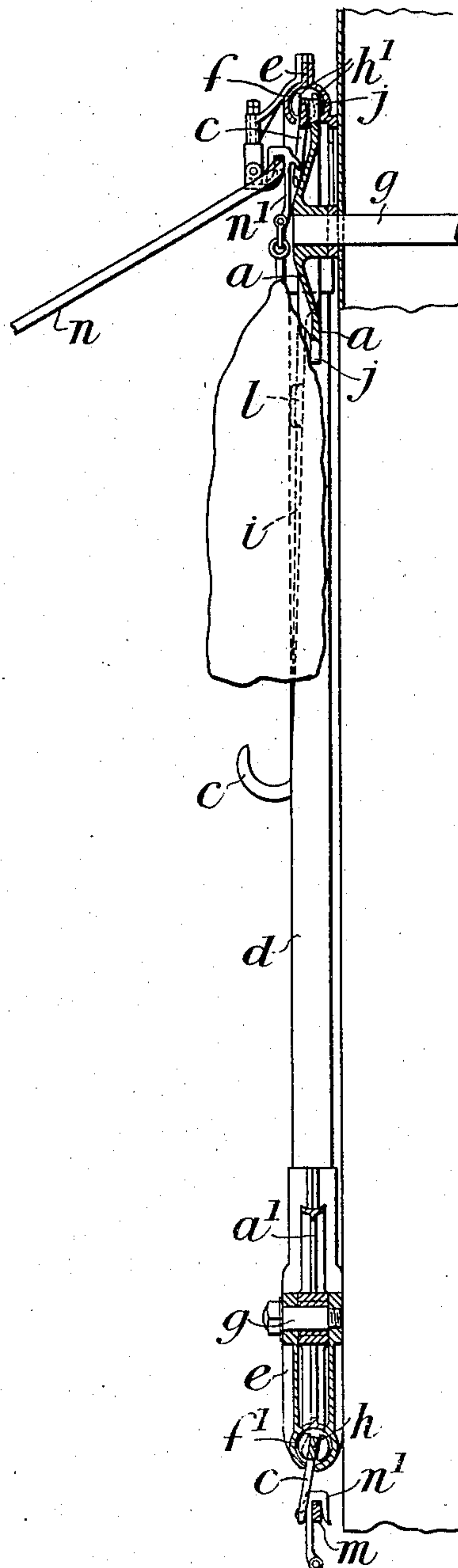
2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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Fig. 2.



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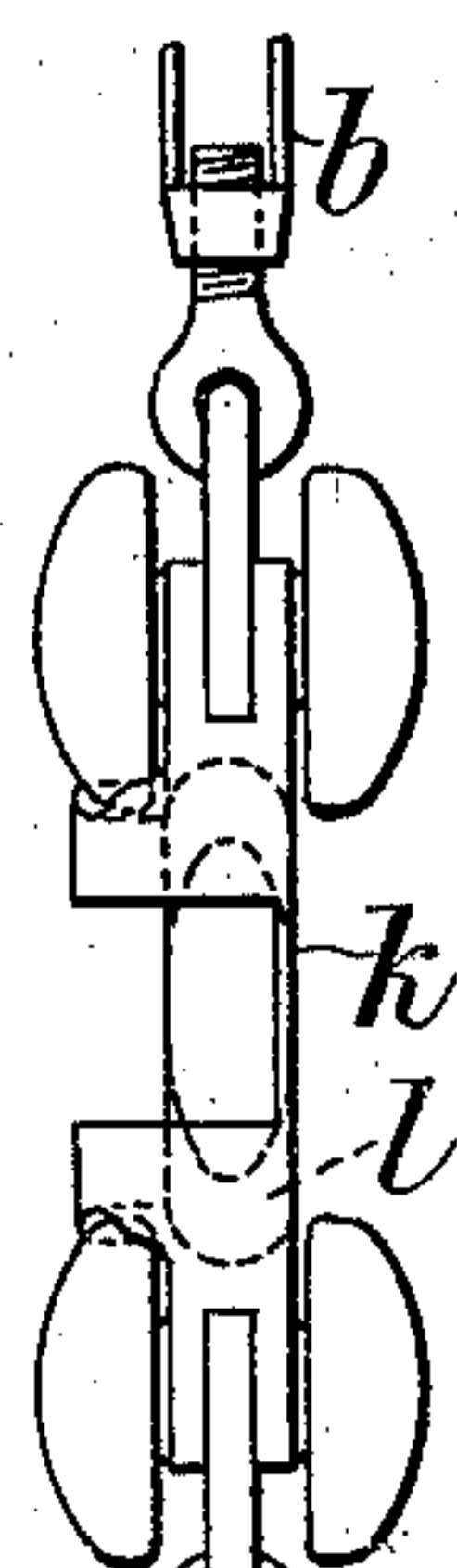
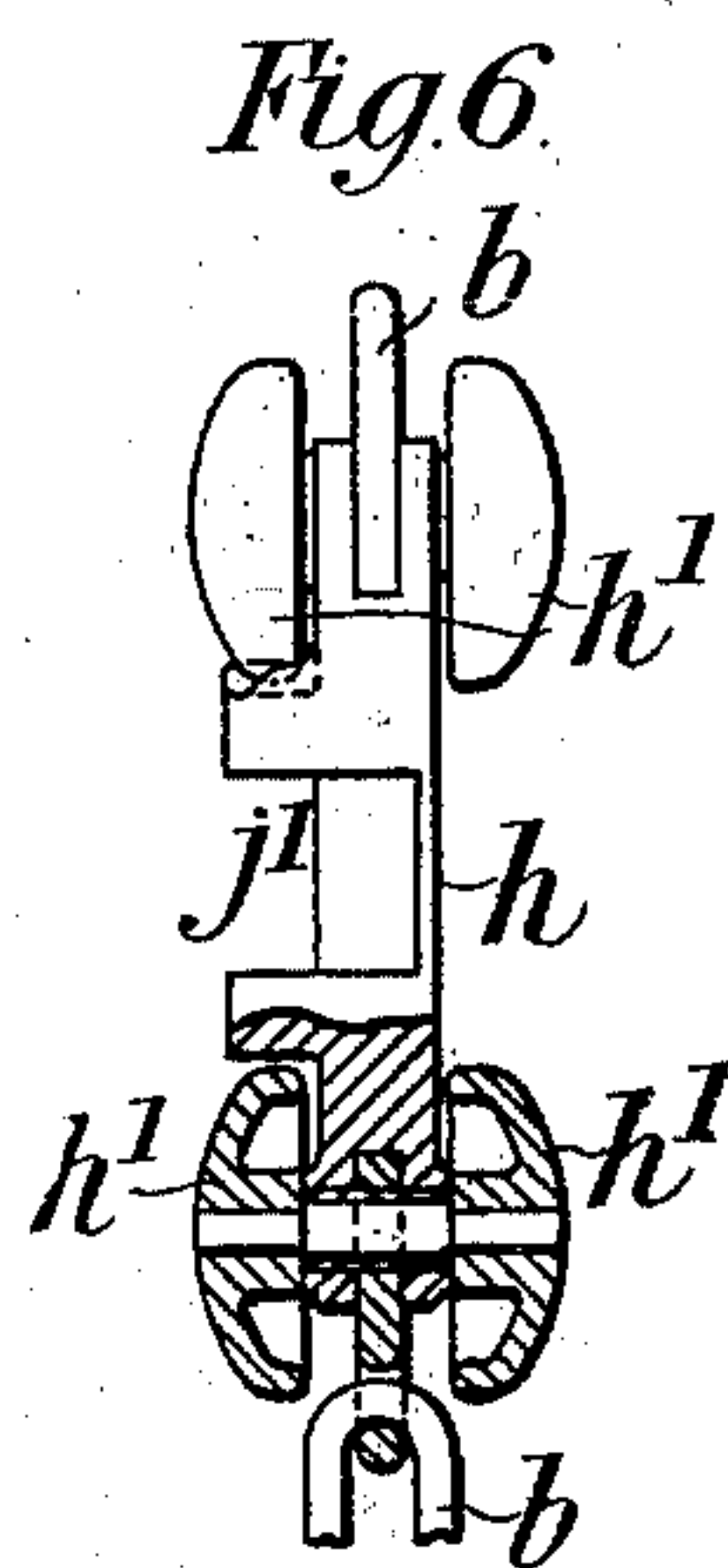
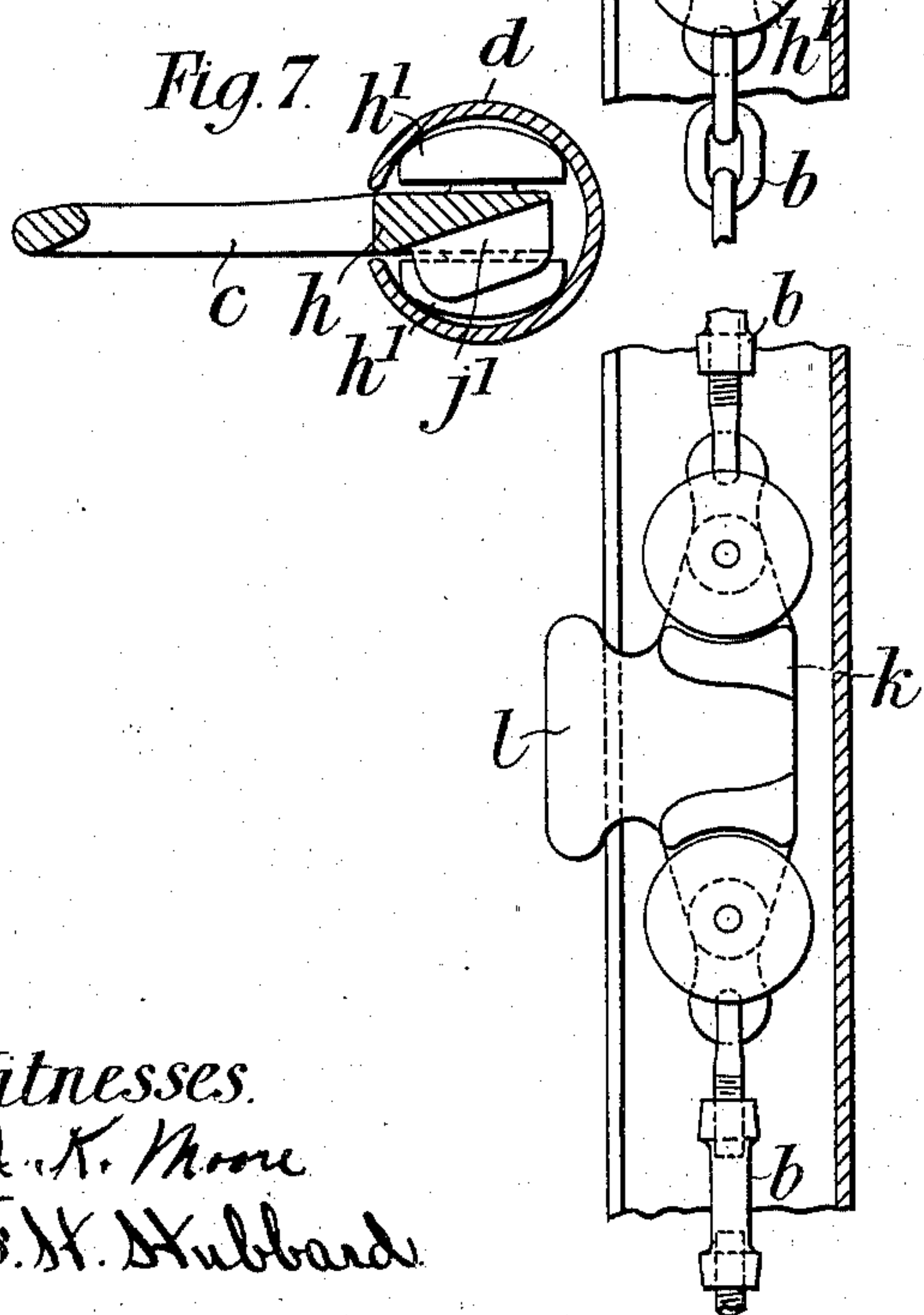
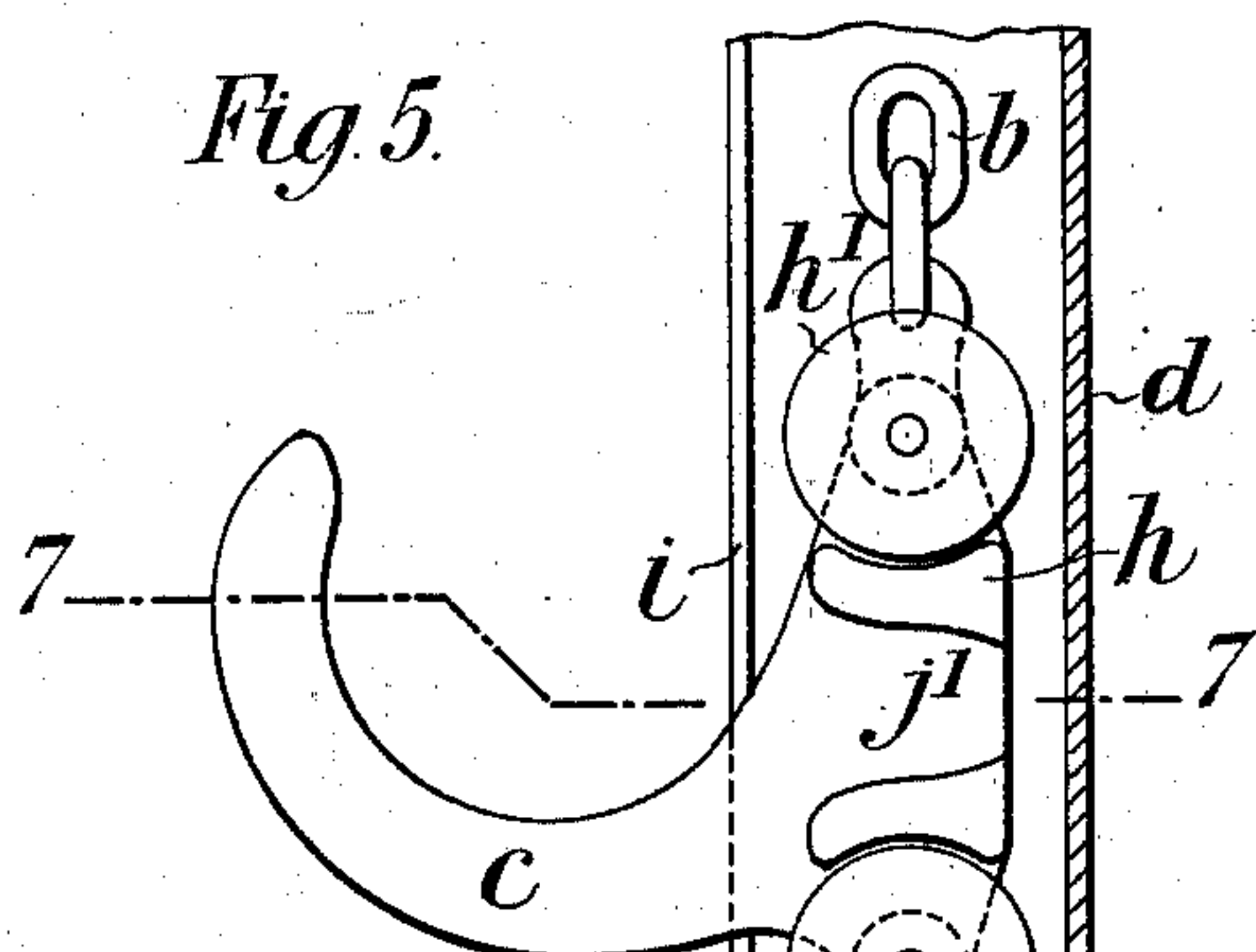
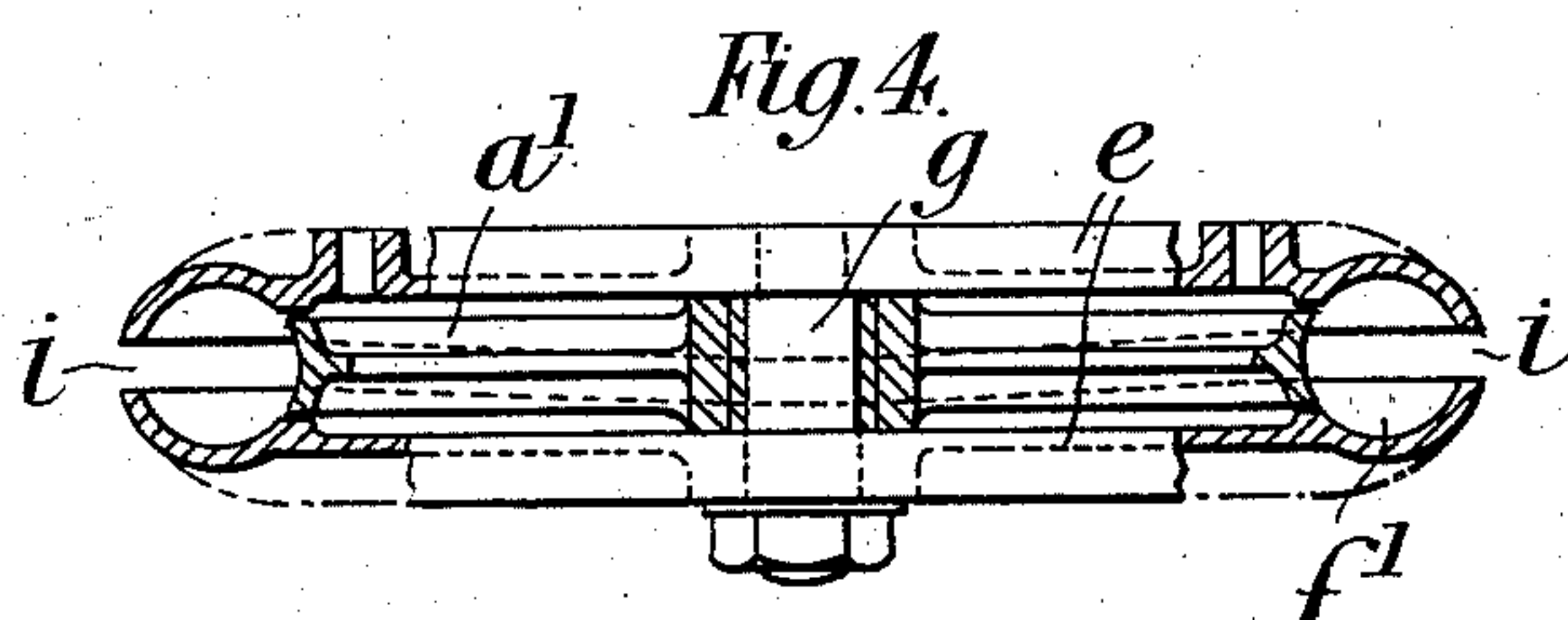
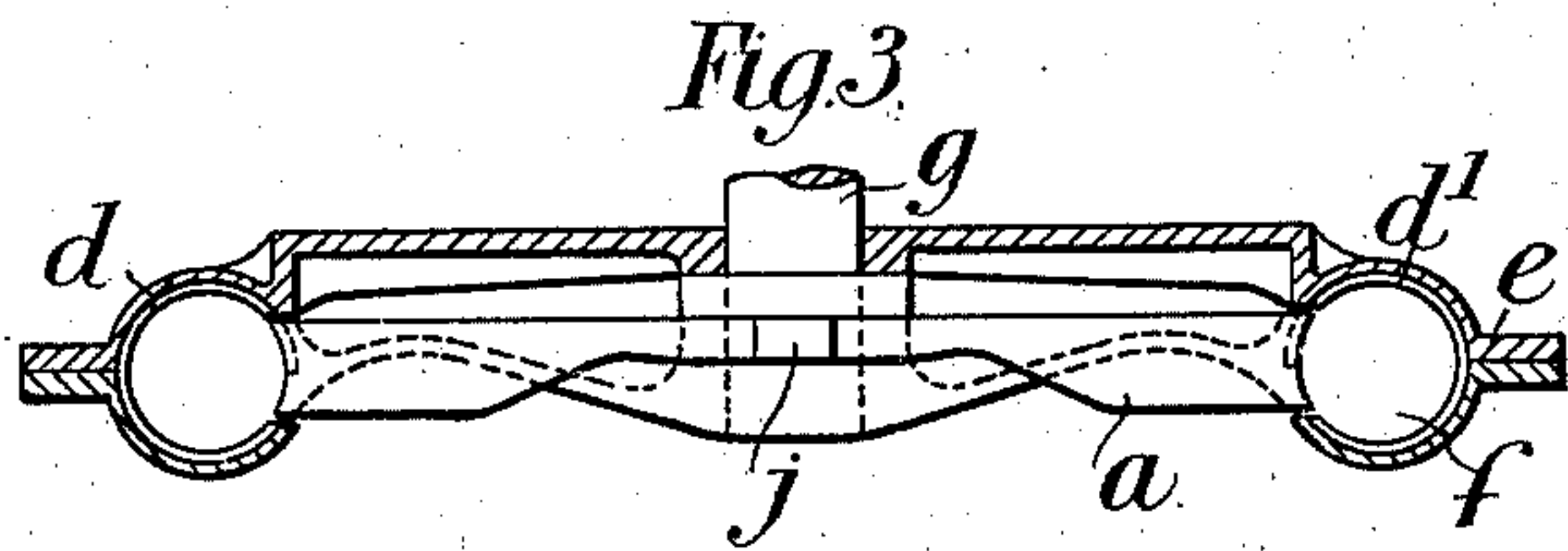
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NO MODEL.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

GEORGE COLBY MACKROW AND HERBERT GEORGE CAMERON, OF LONDON, ENGLAND.

ELEVATING OR HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 741,918, dated October 20, 1903.

Application filed September 15, 1902. Renewed September 21, 1903. Serial No. 174,115. (No model.)

To all whom it may concern:

Be it known that we, GEORGE COLBY MACKROW and HERBERT GEORGE CAMERON, subjects of the King of Great Britain, residing at The Thames Iron Works Shipbuilding and Engineering Company, Limited, Orchard Yard, Blackwall, London, England, have invented new and useful Improvements in Elevating or Hoisting Apparatus, of which the following is a specification.

Our invention relates to elevating or hoisting apparatus of the kind wherein an endless chain or the like running over sheaves or pulleys is made use of and wherein means are provided for automatically disengaging the load from the said chain or the like when it reaches a certain point, the object of our invention being to improve the construction of this class of apparatus and to provide means whereby the load can be disengaged from the elevating-chain or the like more readily than heretofore.

In the accompanying drawings, Figure 1 is a front elevation of the apparatus. Fig. 2 is a vertical section on the line 2 2, Fig. 1. Fig. 3 is a horizontal section on the line 3 3, Fig. 1. Fig. 4 is a horizontal section on the line 4 4, Fig. 1. Fig. 5 is an elevation of a portion of the hoisting-chain, showing one of the lifting-hooks and intermediate trolleys. Fig. 6 is a sectional elevation at right angles to Fig. 5; and Fig. 7 is a section on the line 7 7, Fig. 5.

Our improved apparatus comprises upper and lower carrying-pulleys a a' , over which an endless chain b or the like (carrying hooks c , to which the load is to be attached) passes, and guide-tubes d d' , arranged in connection with the said pulleys and within which the chain travels, the said tubes being advantageously held in position at each end by two semicircular castings e e , adapted to clamp the tubes between them and to form upper and lower continuations thereof f f' , respectively, and also carrying the axles or shafts g g for the sheaves or pulleys. Each of the hooks c is attached to a kind of trolley h , having rollers h' h' , which runs within the guide-tubes, and a slot i is formed through the guide-tubes through which the hook proper,

c , extends. In order that the sacks or the like carrying the load and suspended from the said hooks shall not when the hooks are passing around the upper pulley and being gradually turned over to allow the load to slip off drag against the castings, we arrange that when the said hooks reach the upper end of the hoist they shall be turned axially, so that the hooks travel round in a path inside the pulley-rim, thereby allowing the bags to hang practically vertical, and to effect this we form the slot i in the guide-tube spirally, so that the said hooks, which at the lower end of the up-tube d project laterally therefrom, are gradually turned horizontally through an angle of about one hundred and eighty degrees before they reach the upper sheave or pulley. The slot in the down-tube d' is also formed spirally for again returning the hook to its normal position.

The upper sheave or pulley a , which, as shown, is the driving-pulley for the chain b , is formed with sprocket-teeth j , designed to engage with corresponding recesses j' , formed in the trolleys h , and, as in the drawings, the distance between each pair of hook-trolleys is greater than the length of half the circumference of the sheave a , so that one sprocket-tooth is moved out of engagement with one trolley before the other enters into engagement with the next following trolley, we provide intermediate of the hook-trolleys h dummy trolleys k , similar to the trolleys h , with which the said sprocket-teeth will engage, and these dummy trolleys are advantageously formed with external projecting blocks or pieces l , against which as the bags are being raised they will bear, so as to keep them more or less out of contact with the up-tube d .

Adjacent to the lower sheave a' is fixed a bar m , upon which the bags are suspended by means of hooks or rings in such a manner that as each hook c in turn passes around the said lower sheave it will engage with the hook or ring of a bag upon the bar and drag the bag therefrom for the purpose of elevating it, and we preferably so arrange the slot i in connection with the lower sheave that the hooks c instead of projecting vertically

beneath the same project somewhat laterally, as shown in Fig. 2, so as to more readily engage with the said bag hooks or rings.

When our apparatus is to be employed for lifting goods from one floor to another, the bags may simply slip off the hooks *c* by gravity when the latter are passing around the upper sheave and thence be transferred in any desired manner. When our hoisting apparatus is used in connection with apparatus for transferring coal and other goods by means of a traveling rope from one point to another—for instance, from one ship to another or from the land to a ship, or vice versa—for example, by apparatus of the kind forming the subject of former Letters Patent granted to us, No. 676,143—we arrange in connection with the upper sheave a shunt-bar *n* of the kind forming the subject of former Letters Patent granted to us, No. 674,651, onto which the load is delivered and down which it gravitates onto a traveling rope. In this case we suspend the bags or sacks from double hooks, such as *n'*, one part of each hook being designed to engage with the shunt-bar and the other for engagement by the hooks of the elevator. The shunt-bar is arranged in such relation to the upper sheave *a* that just before the hook of the elevator has reached such a position that the load would slip off the duplex hook rides onto the shunt-bar. The end of the said shunt-bar adjacent to the sheave is curved so that the continual pull of the elevator-hook *c* causes the duplex hook to ride on the said curve and to be disengaged from the said elevator-hook, the said duplex hook being then free to slide down the shunt-bar under the action of gravity, the portion of the duplex hook with which the elevator previously engages finally engaging with the traveling rope.

A roller is advantageously placed in that part of the duplex hook with which the shunt-bar engages to facilitate the movement of the said hook upon the shunt-bar.

In some cases the shunt-bar instead of being arranged in connection with a traveling rope extends from the top of the elevator to the deck of a ship or quay onto which goods are to be delivered, so that as the load is released from the elevator and deposited on the said bar it will slide down the same by gravity to the desired point.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In an elevating or hoisting apparatus the combination with upper and lower sheaves of an endless chain, hooks attached to the said chain for carrying the load and means whereby the hooks, before they pass around the upper sheave will be turned so as to run on the inner circumference of the said upper sheave, substantially as described.

2. In an elevating or hoisting apparatus the

combination of two sheaves, a chain, a tubular guide inclosing the said chain, and a slot in the said tubular guide through which the hooks upon the chain project, the said slot being formed spirally so that the hooks in passing around the lower sheave will project beyond the periphery of the same and in passing around the upper sheave will be within the periphery of the same, substantially as described.

3. In an elevating or hoisting apparatus the combination with an endless chain running upon sheaves (one of which sheaves is formed with sprocket-teeth) through a tubular guide provided with a spiralslot, of trolleys attached to the said chain, hooks secured to the said trolleys and projecting through the slot in the tubular guide and recesses in the said trolleys with which sprocket-teeth engage, substantially as described.

4. In an elevating or hoisting apparatus the combination of two sheaves, an endless chain running around the said sheaves, trolleys attached to the said chain and carrying hooks, spirally-slotted tubular guides through which the vertical portions of the chain run and castings for clamping the said upper and lower ends of the said tubes, the said castings having formed in them semicircular passages which form continuations of the said tubes and carry axles for the sheaves, substantially as described.

5. In an elevating or hoisting apparatus, the combination with sheaves, of an endless flexible carrier engaging said sheaves, guides having inclined portions arranged adjacent to and longitudinally of portions of said carrier between said sheaves and lifting devices secured to said carrier having provision for torsional movement with respect to said carrier, and having guiding portions for engaging said guides, substantially as described.

6. In an elevating or hoisting apparatus, the combination with sheaves, of an endless flexible carrier engaging said sheaves, a tubular casing engaging a portion of said carrier and provided with a longitudinal guiding-recess and a lifting device secured to said carrier and having guiding portions for engaging said guiding-recess, substantially as described.

7. In an elevating or hoisting apparatus, the combination with sheaves, of an endless flexible carrier engaging said sheaves, tubular casings engaging portions of said carrier between the sheaves and provided with a longitudinal guiding-slot, and a lifting device secured to said carrier and having guiding portions adapted to engage said guiding-slot, substantially as described.

8. In an elevating or hoisting apparatus, the combination with sheaves, of an endless flexible carrier engaging said sheaves, tubular casings engaging portions of said carrier between the sheaves, and each provided with a longitudinal guiding-slot, casings surrounding portions of said sheaves and provided

with guiding-slots forming continuations of the slots in said tubular casings and a lifting device secured to said carrier and having guiding portions engaging said slots, substantially as described.

9. In an elevating or hoisting apparatus, the combination with sheaves, of an endless flexible carrier engaging said sheaves, tubular casings engaging portions of said carrier between the sheaves and each provided with a longitudinal guiding-slot, casings surrounding portions of said sheaves and provided with guiding-slots forming continuations of the slots in said tubular casings and lifting

devices secured to said carrier at intervals, and provided with guiding devices engaging said slots, and devices secured to said carrier between said lifting devices provided with portions projecting through said slots for holding the loads carried by said lifting devices out of contact with said casings, substantially as described.

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