

No. 659,573.

Patented Oct. 9, 1900.

W. P. BULLIVANT  
APPARATUS FOR LIFTING AND GRIPPING ROPES, CABLES, OR CHAINS OF ROPE  
OR SIMILAR RAILWAYS.

(Application filed Mar. 13, 1900.)

(No Model.)

3 Sheets—Sheet 1.

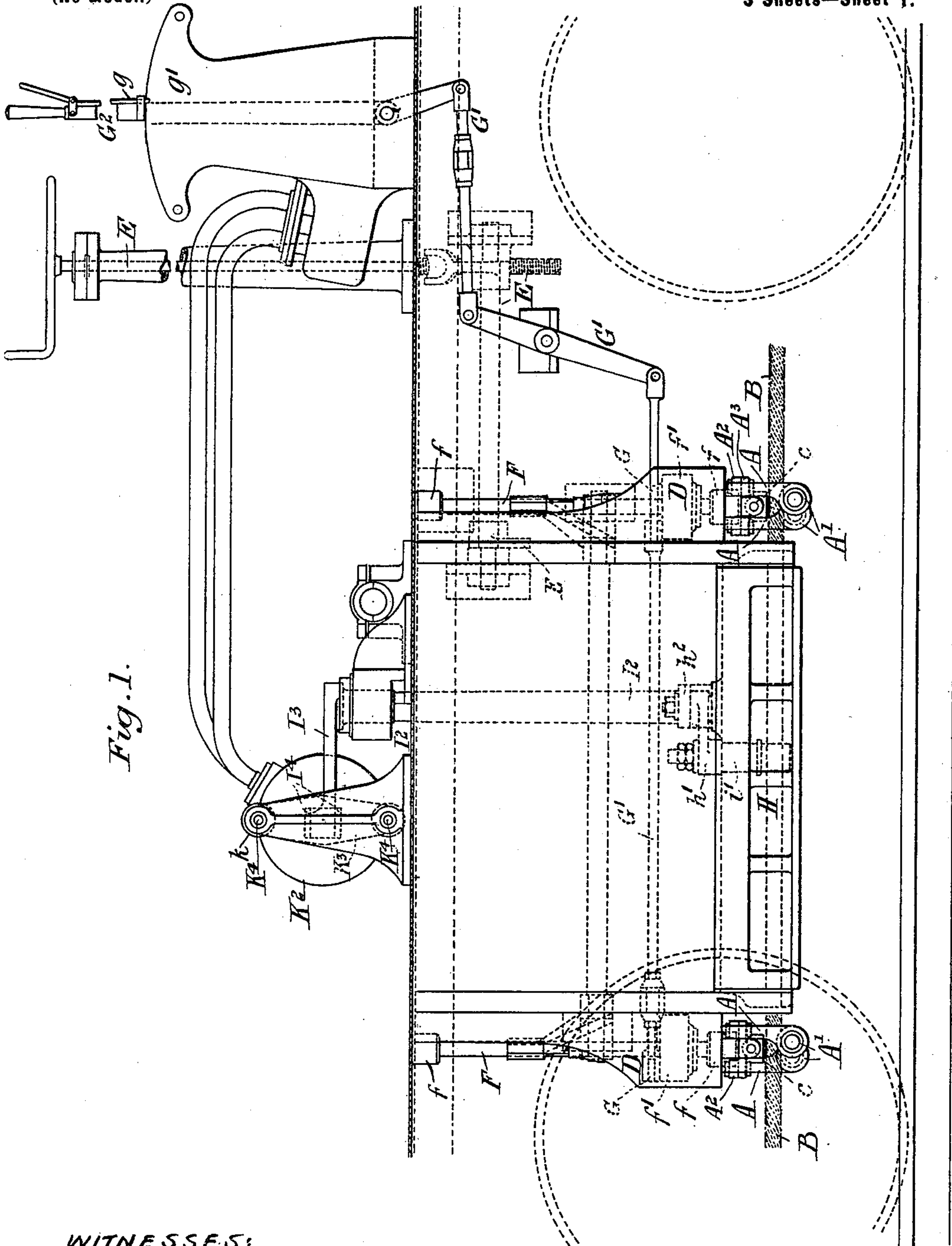


Fig. 1.

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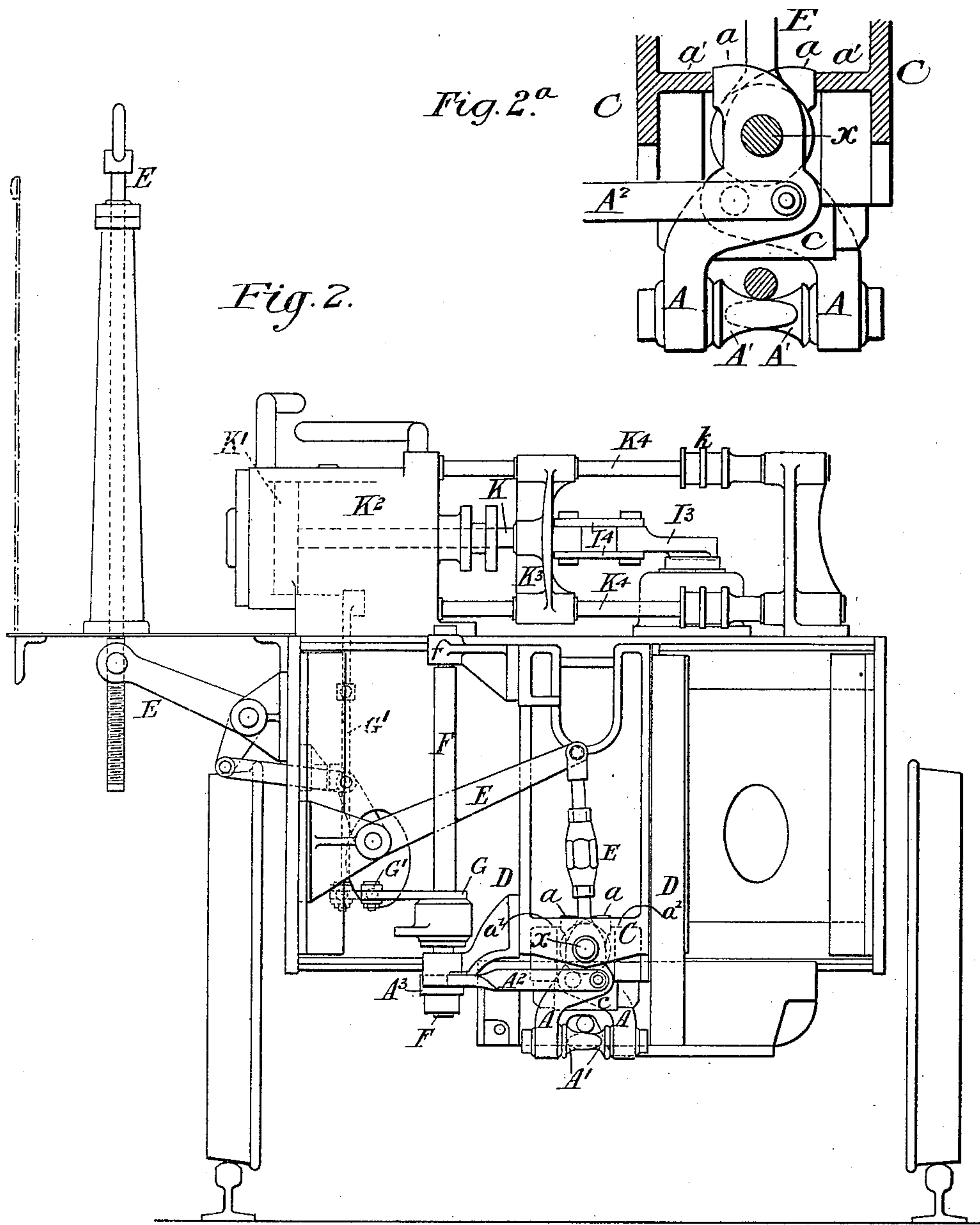
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3 Sheets—Sheet 2.



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3 Sheets—Sheet 3.

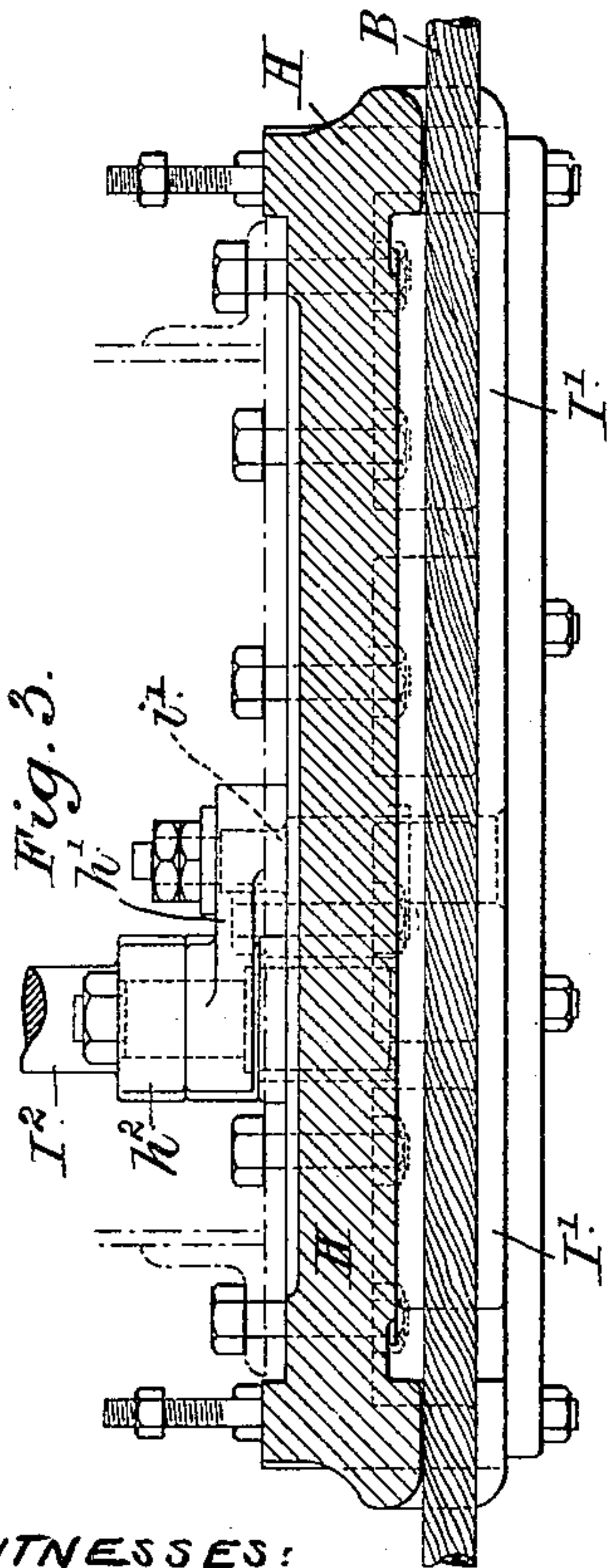
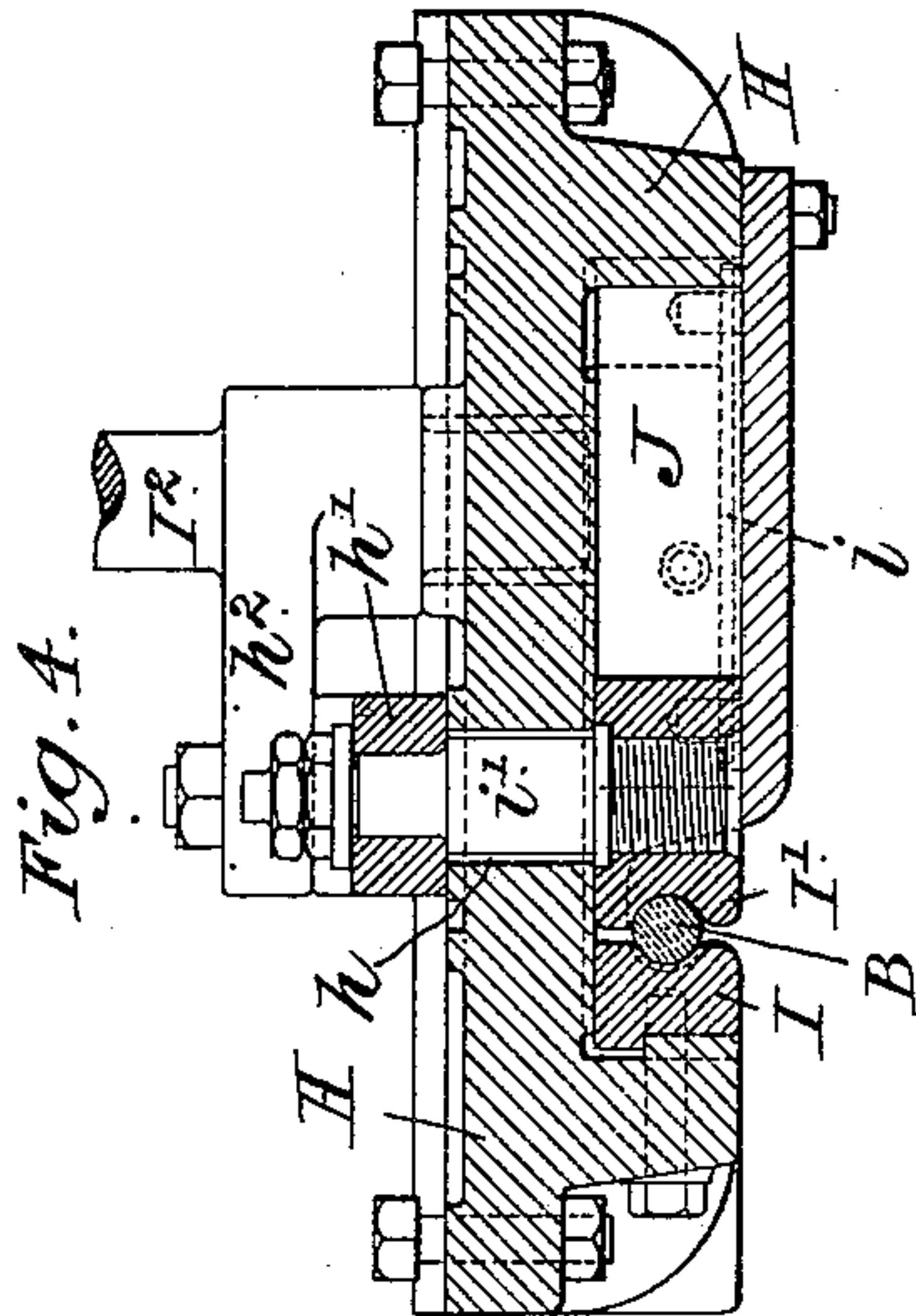
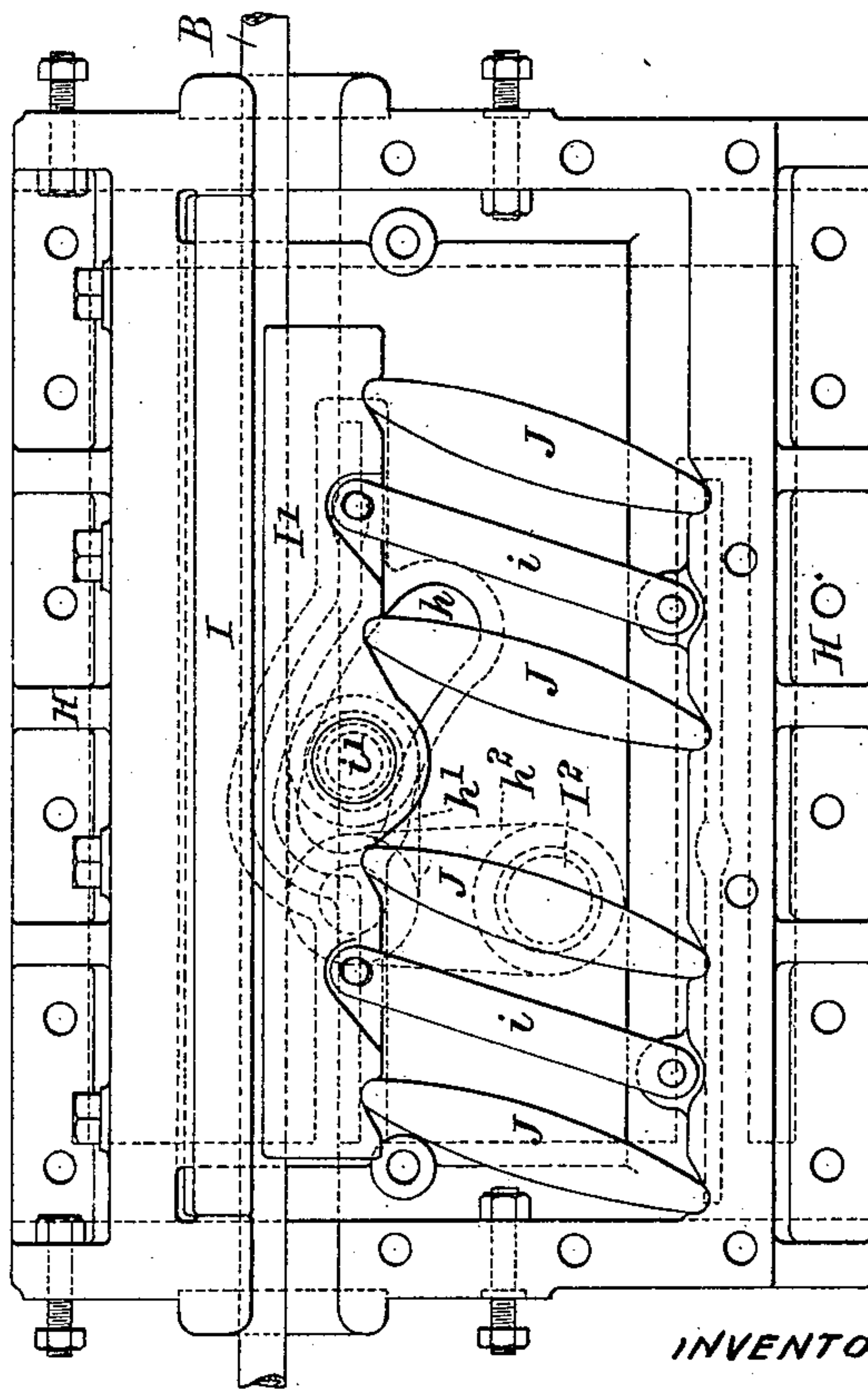


Fig. 5.



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# UNITED STATES PATENT OFFICE.

WILLIAM PELHAM BULLIVANT, OF LONDON, ENGLAND.

APPARATUS FOR LIFTING AND GRIPPING ROPES, CABLES, OR CHAINS OF ROPE OR SIMILAR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 659,573, dated October 9, 1900.

Application filed March 13, 1900. Serial No. 8,503. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM PELHAM BULLIVANT, a subject of the Queen of Great Britain and Ireland, and a resident of 72 Mark Lane, in the city of London, England, have invented certain new and useful Improvements in or Relating to Apparatus for Lifting and Gripping the Ropes, Cables, or Chains of Rope or Similar Railways, (for which I have applied for a patent in Great Britain, No. 16,498, dated August 14, 1899,) which invention is fully set forth in the following specification.

My invention relates to apparatus for use on rope or similar railways, and has for its object to improve and render more effective and reliable the devices employed on locomotives, brake-vans, or other vehicles for lifting and gripping the ropes, cables, or chains of these railways.

I will describe my invention by reference to the accompanying drawings, in which—

Figures 1 and 2 are elevations taken at right angles to each other, showing the general arrangement of the apparatus. Fig. 2<sup>a</sup> is an enlarged sectional view of the lifting-jaws. Fig. 3 is a longitudinal vertical section of the gripping device drawn to a larger scale. Fig. 4 is a transverse section, and Fig. 5 is an under side view, of the same with the cover removed.

According to my invention I provide the locomotive or other vehicle with two manually-operated devices for lifting the rope, cable, or chain (hereinafter termed the "cable") and between these a cable-gripper operated by steam or other motive agent. I will for simplicity refer to the motive agent as steam.

The two cable-lifting devices are arranged to operate together and are of similar construction, and each comprises two pivoted jaws A, each carrying at its lower end a preferably-flanged and somewhat-pointed roller A' to pass beneath the cable B and lift it up to the level of the gripper. These jaws A are pivoted at *x* to a slide C, which is moved vertically in a fixed frame D by means, for example, of a screw-actuated lever-and-link mechanism E, controlled from any convenient part of the vehicle and arranged to op-

erate both lifting devices simultaneously. The two jaws A are connected by links A<sup>2</sup> to a two-armed lever A<sup>3</sup>, secured to a vertical sliding shaft F, mounted in bearings *f* on the slide C and passing through a bearing *f'*, secured to the fixed frame D, this last-named bearing *f'* serving to support a lever-arm G, which is keyed to the vertical sliding shaft F, so that the said shaft can move vertically, but not rotate relatively to the lever-arm G. The lever-arm is connected by lever-and-link mechanism G' with an operating-lever G<sup>2</sup> at any convenient part of the vehicle, the two sets of jaws being simultaneously operated by the same lever, a locking-bolt *g* and quadrant *g'* being, if desired, provided for retaining the jaws A in their open and closed positions.

The jaws A are provided at their upper ends with stops *a* to come into contact with suitable abutments *a'* on the slide to limit the inward movement of the jaws, and a roller *c* is provided on the under side of the slide C, which comes in contact with the cable B when the slide is lowered, and thereby indicates to the operator that the slide is in the position necessary to enable the jaws A to be closed preparatory to lifting the cable.

The gripper, which, as previously mentioned, is situated between the two lifters hereinbefore described, comprises a strong frame H, rigidly secured to the locomotive or other vehicle, and two gripping-jaws I I', the jaw I being rigidly secured to the frame H and the jaw I' being movable on the said frame. The movable jaw I' is connected to the frame H by hinged bars or radius-rods *i*, which maintain the parallelism of the jaws I I', and the lateral movement of the jaw I' for gripping the cable is effected by toggle-levers J, interposed between the back of the said jaw and the frame H. The movable jaw I' is provided with a stud *i'*, which projects through a curved slot *h* in the frame H and is connected through a link *h'* and arm *h*<sup>2</sup> to a vertical shaft I<sup>2</sup>, which is connected by a lever I<sup>3</sup> and link I<sup>4</sup> to the rod K of a steam-operated piston K', working in a cylinder K<sup>2</sup>, the steam for which is controlled by devices situated at any convenient part of the vehicle. The piston-rod K is preferably guided



by a cross-head  $K^3$ , working on guide-bars  $K^4$ , which are provided with buffers  $k$  to prevent or absorb shock.

Supposing the apparatus to be in its operative position with the jaws A open and that it is desired to lift and grip the cable B, the operator first lowers the before-mentioned slides C, so as to bring the rollers  $c$  thereon into contact with the cable, which thereby indicates to the operator that the jaws are in position to enable the rollers  $A'$  to pass beneath the cable. He thereupon closes the jaws A and raises the slides C, together with the jaws and cable, until the cable comes in contact with the gripper, the jaws I I' of which are open to receive the cable. Steam is then admitted to behind the piston  $K'$ , so as to cause the movable gripping-jaw I' to approach the fixed jaw I and grip the cable B and prevent it from slipping through the gripper, while maintaining a constant grip on the cable and preventing any momentary release of the gripper which might be due to difference in speed between the vehicle and the cable. To release the cable, it is only necessary to admit steam to the front side of the piston, which then operates to open the jaws of the gripper to allow the cable to fall to its normal position.

By operating the gripper by steam or equivalent motive agent, as hereinbefore described, the action of said gripper is rendered practically instantaneous, so that the destructive abrasive action on the cable which is incidental to the hand-operated grippers hitherto employed is reduced to a minimum.

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

1. For use in cable traction the combination of a stationary frame, motor mechanism and two jaws thereon for gripping the cable, one jaw fixed and the other horizontally movable, radius-links connecting the movable jaw with the stationary frame, toggle-levers between and bearing against the said movable jaw and frame, a stud projecting laterally from the movable jaw, a vertical shaft pivoted in the frame, lever-arms on the vertical shaft, links connecting the said lever-arms with the motor mechanism and stud, a slide vertically movable on the stationary frame, operative devices for raising and lowering the slide, two jaws pivoted on, and vertically movable with, the slide, flanged rollers

on the pivoted jaws, stops for limiting their inward movement, a roller on the under side of the vertically-movable slide, a vertical shaft movable with the slide, operative devices for turning, and a two-armed lever on, the said shaft, and links connecting the said lever with the pivoted jaws, substantially as set forth.

2. For use in cable traction, the combination with a stationary frame, motor mechanism and two jaws thereon for gripping the cable, one jaw fixed and the other horizontally movable, radius-links connecting the movable jaw with the stationary frame and toggle-levers between, and bearing against, the said movable jaw and frame, of a stud projecting laterally from the movable jaw, a vertical shaft pivoted in the frame, lever-arms on the vertical shaft and links connecting the said lever-arms with the motor mechanism and stud, substantially as set forth.

3. For use in cable traction, the combination with a stationary frame, of a slide vertically movable thereon, operative devices for raising and lowering the slide, two jaws pivoted on, and vertically movable with the slide, flanged rollers on the jaws and operative devices for opening and closing the said jaws, substantially as set forth.

4. For use in cable traction, the combination with a stationary frame, and a slide vertically movable thereon, operative devices for raising and lowering the slide, two jaws pivoted on and vertically movable with the slide, and operative devices for opening and closing the jaws, of stops on the jaws for limiting their inward movement, and abutments on the slide for the stops, substantially as set forth.

5. For use in cable traction, the combination with a stationary frame and a slide vertically movable thereon, operative devices for raising and lowering the slide and two jaws pivoted on and vertically movable with the slide, of a vertical shaft, bearings for the said shaft on the slide, a two-armed lever on the shaft, links connecting the said lever with the jaws, and operative devices for turning the shaft, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM PELHAM BULLIVANT.

Witnesses:

WILLIAM FREDERICK UPTON,  
RICHARD BUNDY.