

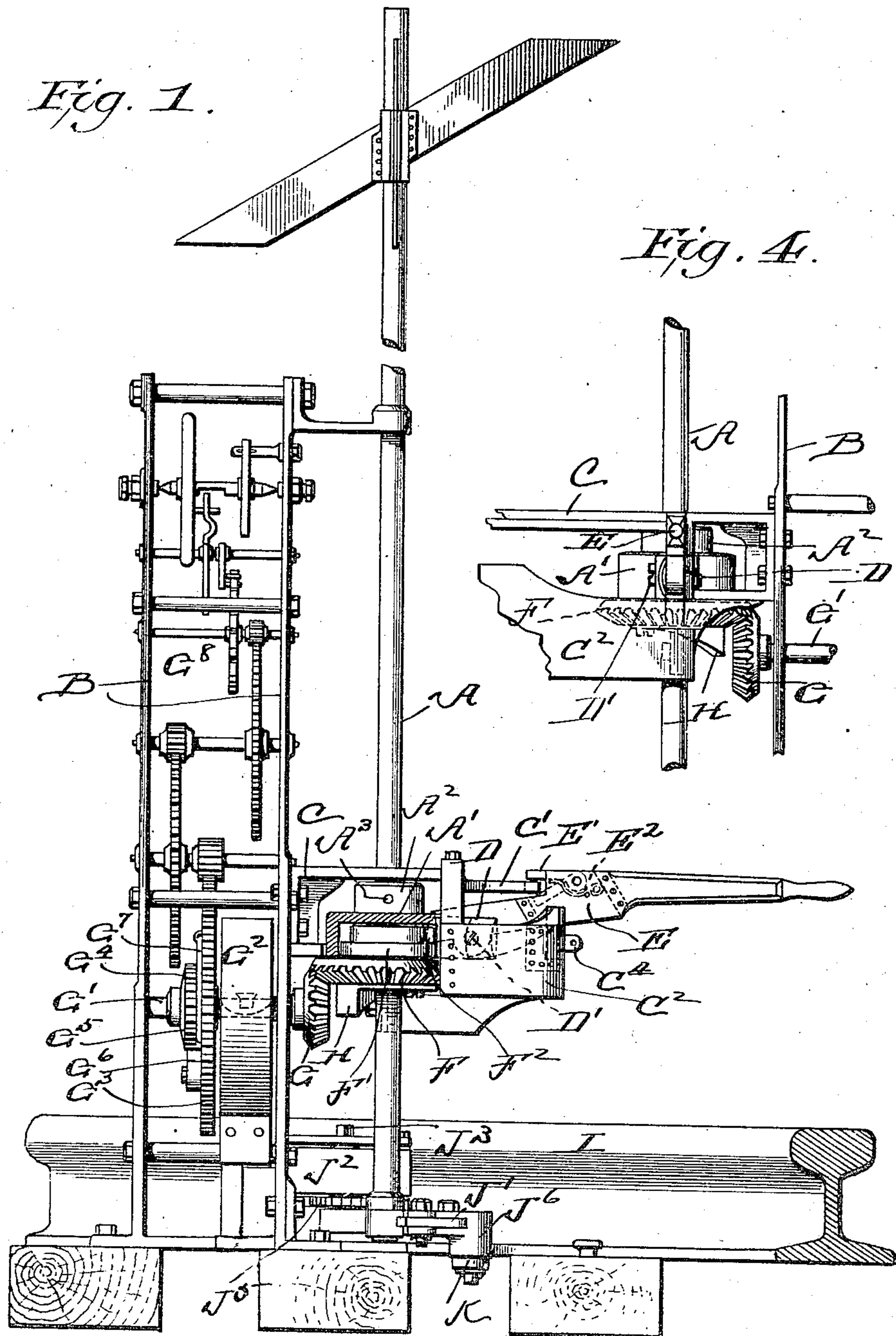
No. 843,575.

PATENTED FEB. 12, 1907.

A. N. BRADLEY.
AUTOMATIC SWITCH.

APPLICATION FILED DEC. 20, 1905.

3 SHEETS—SHEET 1.



Witnesses
Wm. H. G. G. G.
E. B. McBath

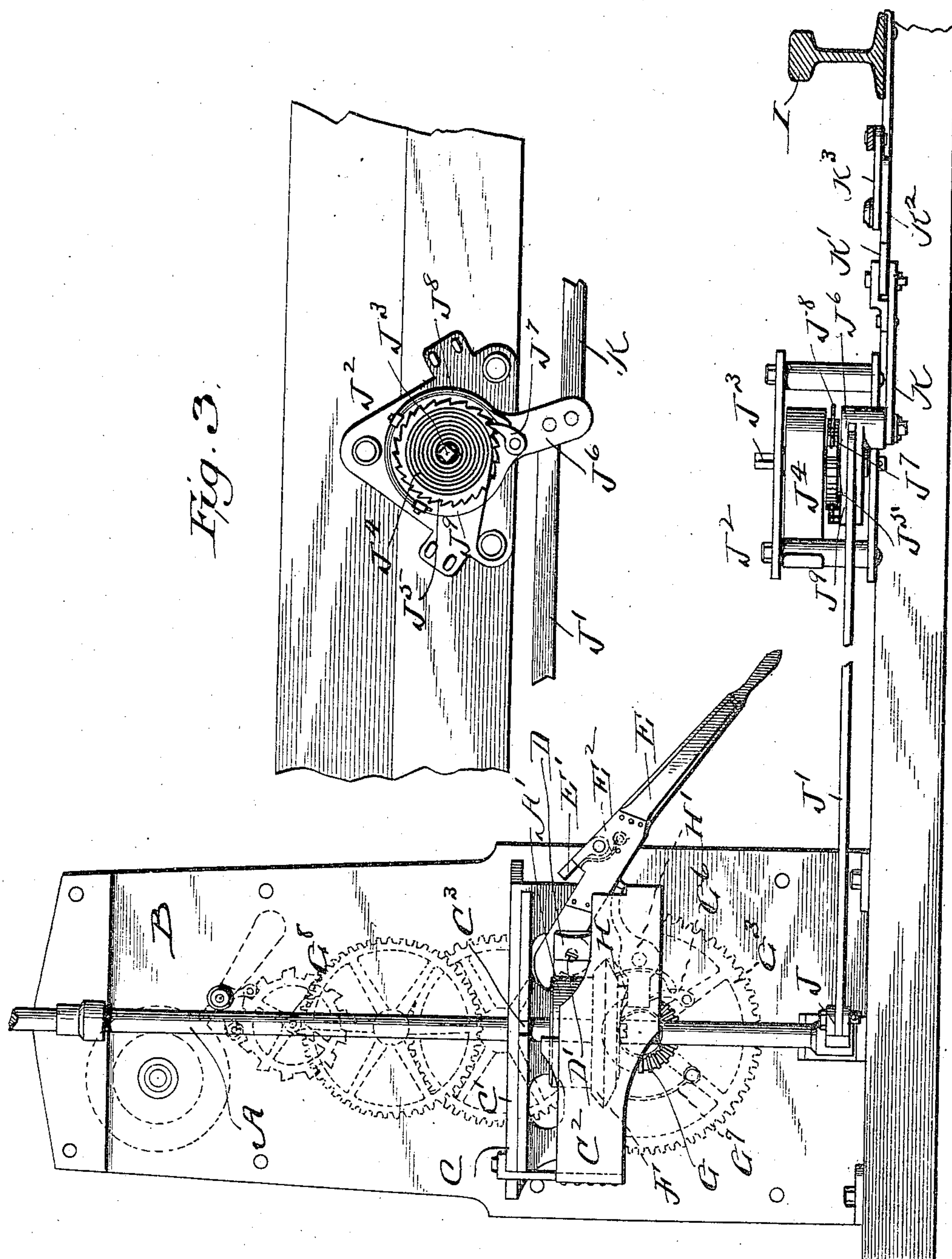
Inventor:
By *A. N. Bradley*,
O'Meara & Brock
Attorneys

No. 843,575.

A. N. BRADLEY.
AUTOMATIC SWITCH.
APPLICATION FILED DEC. 20, 1905.

PATENTED FEB. 12, 1907.

3 SHEETS—SHEET 2.



Witnesses
Wm. H. Hedges
E. B. McBeth

22

Inventor:
By *A. N. Bradley,*
O'Meara & Brock,
Attorneys

No. 843,575.

A. N. BRADLEY.
AUTOMATIC SWITCH.
APPLICATION FILED DEC. 20, 1905.

PATENTED FEB. 12, 1907

3 SHEETS—SHEET 3.

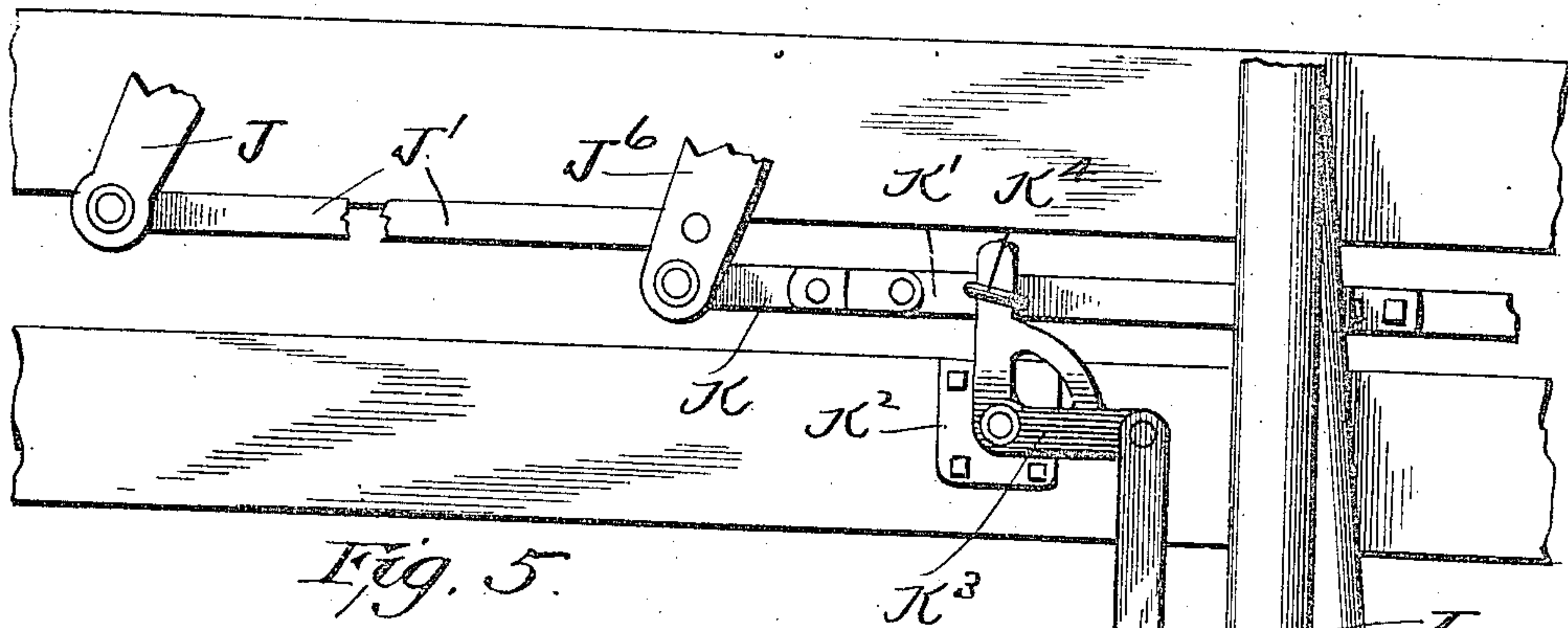


Fig. 5.

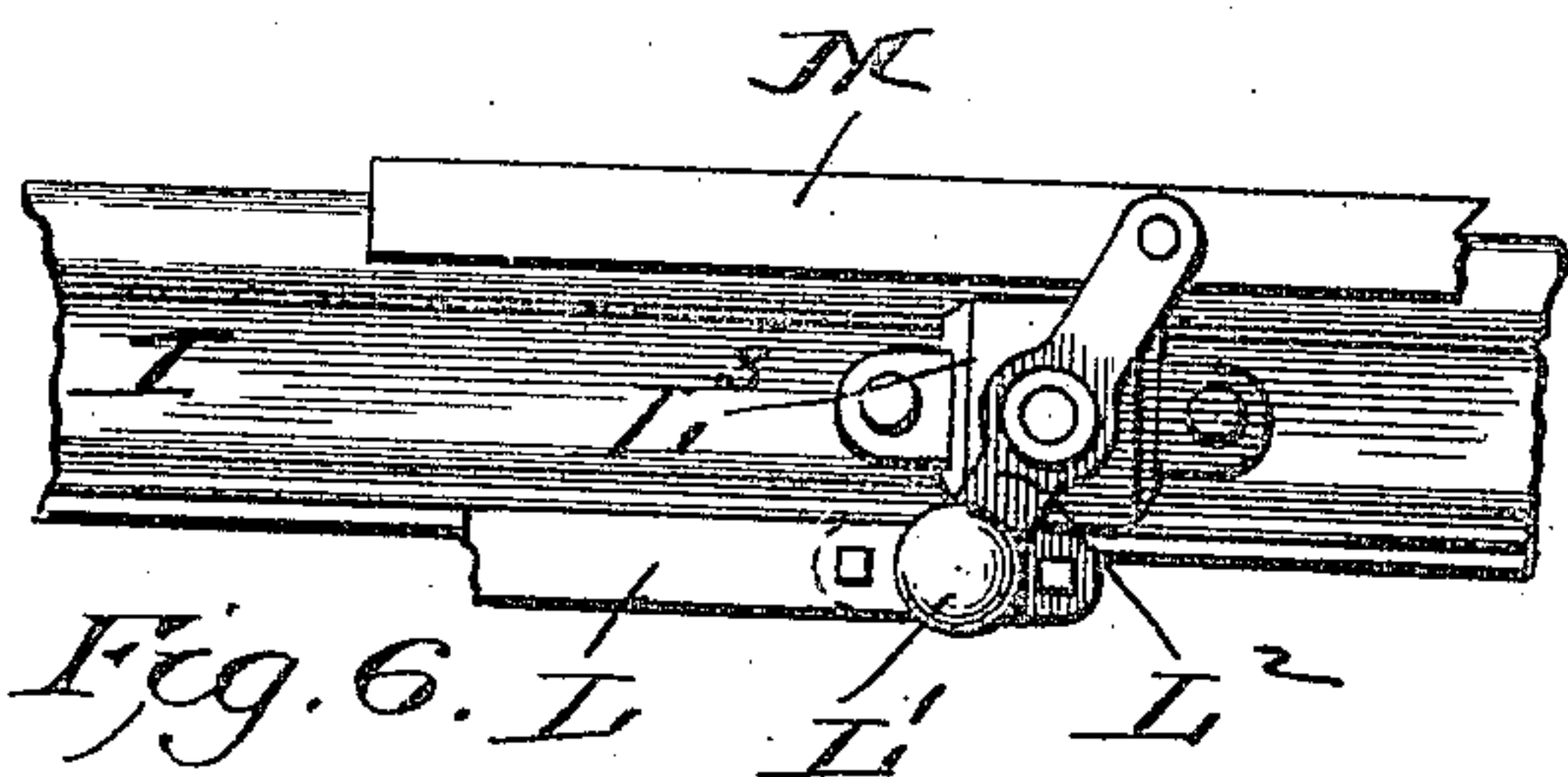


Fig. 6.

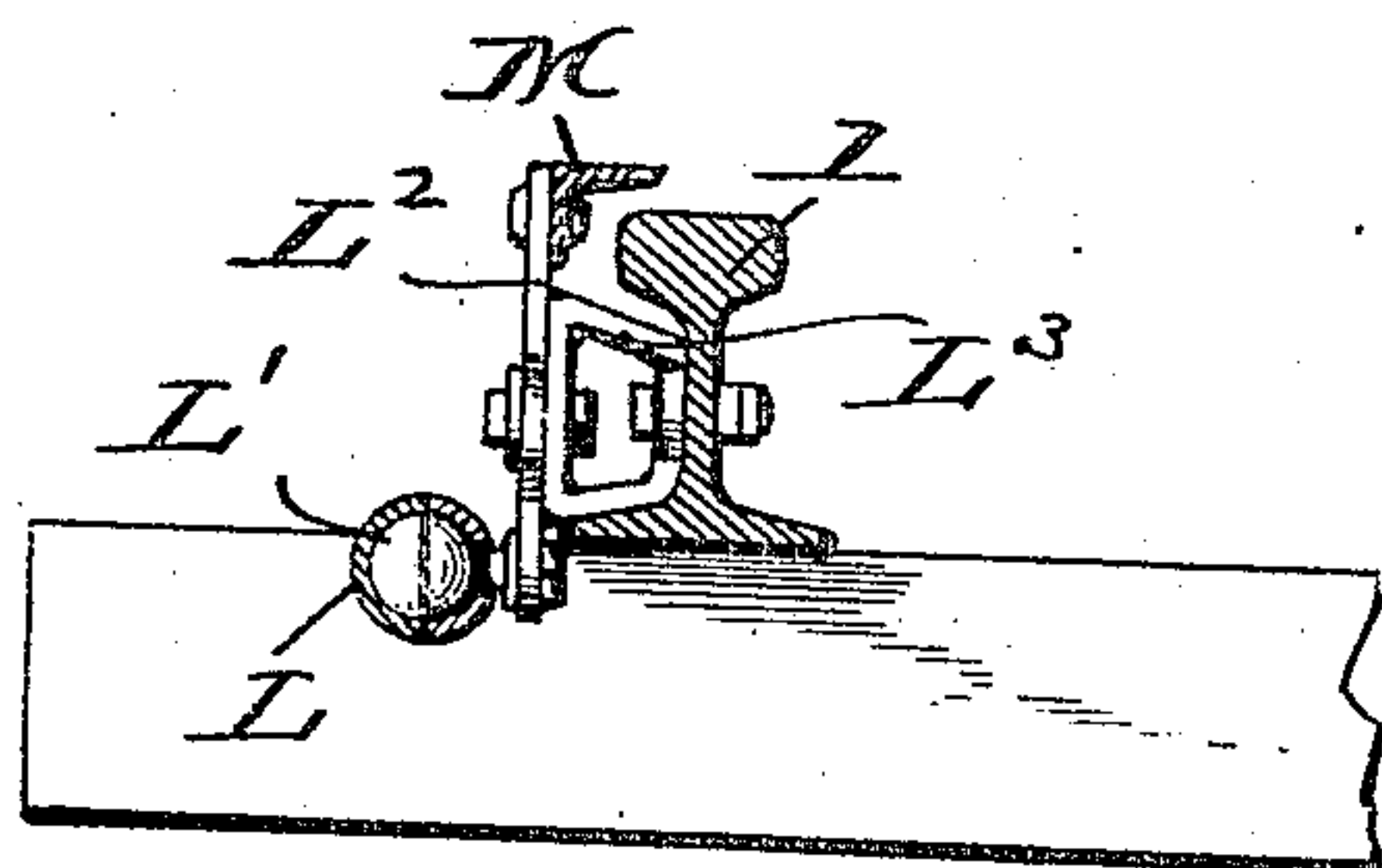
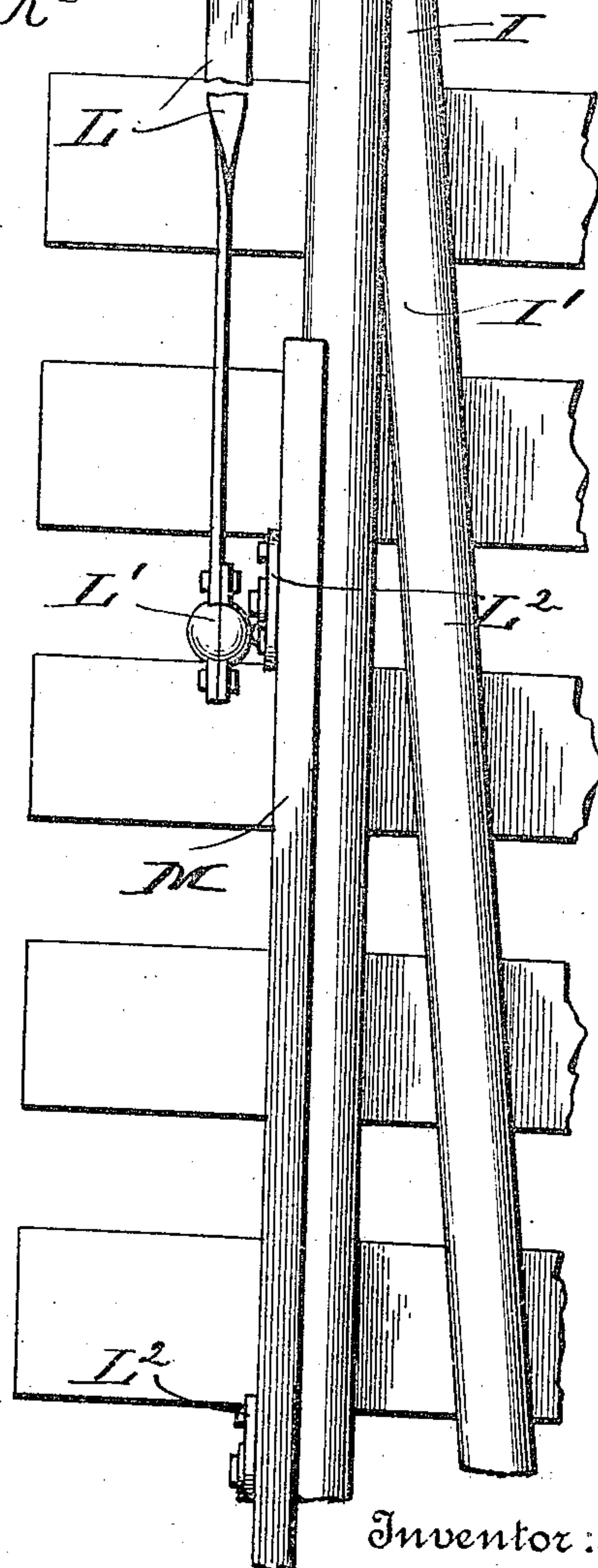


Fig. 7.



Witnesses:
"J. L. Spidau",
E. B. McCall

Inventor:
By A. N. Bradley,
E. Meana & Brock
Attorneys.

UNITED STATES PATENT OFFICE.

ALBERT N. BRADLEY, OF WASHINGTON, INDIANA.

AUTOMATIC SWITCH.

No. 843,575.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed December 20, 1905. Serial No. 292,635.

To all whom it may concern:

Be it known that I, ALBERT N. BRADLEY, a citizen of the United States, residing at Washington, in the county of Daviess and State of Indiana, have invented a new and useful Improvement in an Automatic Switch, of which the following is a specification.

This invention consists of a safety-switch device; and the object of the invention is to close a switch automatically after a train has entered or left a siding, thereby preventing the leaving of the switch in open position through the negligence on the part of the train-crew.

A further object of the invention is a switch-closing device which will automatically close the switch within a certain predetermined length of time after it has been opened, and a further object is to provide a safety device which will prevent the switch being closed by the time-closing mechanism in the event that a train is entering or leaving the siding at the expiration of the time limit, the switch-closing device operating as soon as the train has entered the siding or left it, thereby releasing the safety-locking attachment.

The invention consists of the novel features of construction hereinafter described, pointed out in the claims, and shown in the accompanying drawings, in which—

Figure 1 is a side elevation, portions being in section, showing the parts in position when the switch is closed and the main track cleared for the passage of trains. Fig. 2 is an elevation at right angles to that shown in the Fig. 1 and showing the parts in the position occupied when the switch is opened. Fig. 3 is a plan view of a spring mechanism, the top and sides of the housing being removed. Fig. 4 is a detail vertical elevation of parts shown in Fig. 1 as seen from the opposite side of Fig. 1. Fig. 5 is a plan view of a portion of the track-rail, the switch-point, and mechanism adjacent thereto. Fig. 6 is a detail side elevation of parts of the safety attachment. Fig. 7 is a transverse section through the parts shown in Fig. 6.

In the drawings, A represents a vertically-arranged shaft placed directly opposite the entrance of the switch, and adjacent the shaft A is a frame B. The frame B carries on the side next the shaft A a horizontal platform C, the front edge of which carries a horizontal guide-plate C', having a front curved edge, and arranged immediately below the

said guide-plate C' is a curved vertically-arranged guide-plate C², having an irregular cam-like upper edge. The plate C' midway its ends is notched on its front edge, as shown at C³, and the plate C² carries a staple C⁴, the object of which will appear hereinafter. Below the platform C is arranged a housing A', provided on its upper face with a boss A², through which the shaft A centrally passes, and a pin A³ extends through the boss and shaft.

The housing A' is slotted on its front side and carries two parallel arms D, spaced apart, and between these arms the inner end portions of a lever E is pivoted by a pin D', the inner end of the lever being adapted to work in the cut-out portion of the housing. The lever is provided with a guide-pin E', which is adapted to work in the notch C³ of the guide-plate C' and to slide along the upper face of the plate, and the pin is held normally in position by a spring E². A beveled gear F is loosely mounted upon the shaft A below the housing A', and the beveled gear is provided with a boss F', which extends up into the housing, and the upper portions of the boss is cut away circumferentially for about two-thirds of its circumference, thereby forming and leaving the shoulder F² upon the boss, which shoulder can be engaged by the inner end of the lever E when it projects into the housing. The beveled gear F meshes with a beveled gear G, which is carried by the outer end of the shaft G' journaled in the frame B, and this shaft carries a spring G², one end of which is secured to the shaft G', while the other end is riveted to any suitable part of the frame B. A gear-wheel G³ is mounted loosely upon the shaft G', and adjacent the said gear-wheel is a pinion G⁵, fixed upon the shaft G' and engaged by a pawl G⁶, carried by the gear-wheel G³ and held in engagement with the gear-wheel G⁵ by a curved spring G⁷. In the upper portion of the frame B, I arrange a clock-train, the lower ratchet of which G⁹ meshes with the gear-wheel G³. As the object of this clock-train G⁸ is simply to regulate and govern the unwinding of the spring G² and as any form of clock-gear trains suitable for this purpose can be used, no detail description of its small separate parts is thought necessary.

At its lower end the shaft A carries a bifurcated crank-arm J, in the bifurcation of which is pivoted an end portion of a bar J', and between the shaft A and the switch is ar-

ranged a suitable housing J^2 . This housing is provided with a vertical shaft J^3 , having an upper squared end, which projects through and above the top plate of the housing, and within the housing upon its bottom plate is arranged a disk J^9 , which has a horizontally-extending arm J^6 , and upon the disk J^9 is placed a ratchet J^5 , fixed to the shaft J^3 , and a coil-spring J^4 is coiled upon the said ratchet and has one end secured to the shaft J^3 and the opposite end to a post of the housing.

The arm J^6 carries a pawl J^7 , which engages the teeth of the ratchet J^5 when the arm is moved in one direction, and the pawl is held in such engagement by a curved spring J^8 . On its under side, adjacent its free end, the arm J^6 has a downwardly-extending boss, to which is pivotally connected a link K . It will also be understood that the arm J^6 is slotted horizontally and longitudinally and that the forward end of the bar J^7 is pivotally connected to the arm J^6 within the said slot. The link is pivoted to a switch-operating rod K' . Adjacent said rod a plate K^2 is secured to one of the cross-ties, and a bell-crank K^3 is pivoted upon said plate, and one arm of the bell-crank works through the staple K^4 , arranged diagonally upon the upper face of the rod K' . To the opposite arm of the bell-crank a bar L is pivoted at one end, and the opposite end of the bar L is connected a ball and socket L' to one end of a lever L^2 , which lever is pivoted midway its ends to a casting L^3 , carried by the outer side of the web of a siding-rail I . The upper end of the lever L^2 is pivoted to an angled bar M . The angled bar M is forty-five or more feet in length, and when the switch is opened or closed the horizontal portion of the bar rests upon the tread portion of the rail I , the bar assuming the position shown in Figs. 6 and 7 during the throwing of the switch-point.

In Fig. 5 the rail I is one of the track-rails forming the outer set of rails of a siding, and the movable rail I' , which is connected to the switch-point rod K' , is a main-track crossover-rail, and when the parts are in the position shown in Fig. 5, the switch is closed and is open by throwing the main-track rail I' away from the siding-rail I .

In operation the switch is closed—that is, the parts are in the position shown in Fig. 5 when the lever E is in the position shown in Fig. 1. To open the switch, the lever is moved along the guide-plates C' and C^2 and thrown downwardly into the position shown in Fig. 2, this downward movement being permitted by the cut-away of the upper edge of the plate C^2 . This movement of the lever E carries with it the housing A' and also rotates the gear F , as the inner end of the switch E by reason of its being pivoted to arms carried by the housing A' and by bearing upon the shoulder F^2 forms the locking

connection between the gear F and the shaft A . The rotation of the gear F by this movement of the lever E rotates the gear G , the shaft G' , and winds the spring G^2 . The rotation of the shaft A , which rotation is only partial, throws the bar J forwardly—that is, in the direction of the track—which moves the arm J^6 in the same direction, and the pawl J^7 engages and rotates the ratchet J^5 , and the spring J^4 is wound by such turning of the ratchet J^5 , as it will be remembered that the shaft J^3 has the ratchet J^5 fastened thereon. The movement of the arm J^6 will move the link K of the switch-rod K' and will throw the movable rail I' away from the rail I , so that a train can enter or leave the siding. The movement of the link K' will also throw the bell-crank K^3 and parts connected thereto, thus shifting the angled bar M longitudinally with respect to the track. It may be stated here that the bar M is supported at distances of about five feet by levers L^2 , carried by the castings L^3 , similar to those shown in Figs. 5 and 6; but it will also be understood that only the lever L^2 nearest the bell-crank K^3 is connected to the rod or bar L .

When the lever is thrown into the position shown in Fig. 2, its inner end will be elevated, and as it will no longer bear against the shoulder F^2 the beveled gear F will no longer be locked to the shaft A , and under the tension of the spring G^2 it will now commence unwinding, the bevel-gears G and F will rotate in a reverse direction to their rotation during the movement of the lever E .

The guide-plate C^2 carries a dog H' , which is engaged by a lever E when the lever is in the position shown in Fig. 2, and the under face of the bevel-gear F carries a cam H , which is adapted to be brought by reverse rotation of the bevel-gear F into engagement with the inner end of the dog H' . The cam H can be adjusted upon the bevel-gear so that any desired time limit will expire before this reverse rotation brings the cam H and dog H' into engagement, as it will be obvious that under the influence of the clock-train G the unwinding of the spring G^2 will be comparatively slow.

Assuming that the parts are so adjusted that the cam will engage the dog H' within five minutes of the opening of the switch, the switch will be closed at the expiration of the time named in the following manner: The cam H will depress the dog H' and raise the lever E , which when in the position shown in Fig. 2 has fallen in a slot or against a square shoulder of the guide-plate C^2 , thereby firmly holding the shaft A against rotation and the parts connected to the shaft. The lifting of the lever E frees the shaft A and parts connected thereto, and the spring J^4 now unwinds and throws back the arm J^6 , thus restoring the link K , rod K' , rail I' ,

bell-crank K^3 , and other parts to their normal position. It will be obvious, however, that if a train was delayed in getting into or out of a switch and that the time limit expired as the train was entering and leaving the switch the train would be derailed. To prevent this is the object of the safety attachment shown in plan view in Fig. 5, and the bar M is of such length that while a train is entering or leaving the switch one truck is always upon the bar, and it would be therefore impossible for the spring J^4 to act until the last truck of the train had cleared the bar M.

By means of the staple C^4 the lever E can be locked in the position shown in Fig. 1 by the ordinary chain and padlock. The mechanism for automatically closing the switch at a predetermined time does not prevent the lever E being raised by hand, so that, if desired, the switch can be closed at any time.

It will be obvious from the above description that after a switch is opened it will be automatically closed after a train has passed over the switch, and there is no danger of the switch being left open by failure of a switchman to go back and close it.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A device of the kind described comprising a vertical shaft, a housing fixed to said shaft, a guide-plate through which the shaft passes and having an edge cut out, a lever movable along said guide-plate and adapted to rotate the housing, a spring, a gear-train actuated by movement of the lever in one direction to wind the spring, a bar secured to the shaft and at right angle thereto, a switch-point operatively connected to said bar, and means for automatically returning the parts to their normal position at the expiration of a predetermined time.

2. A device of the kind described comprising a rotatable vertical shaft, a frame arranged adjacent said shaft, a platform carried by the frame, the said shaft passing loosely through the platform, guide-plates carried by said platform, a housing secured to said shaft and slotted, a lever pivotally connected to said housing to permit vertical movement of the lever, with respect to the housing, the inner end of the lever working in the slot, the said lever being adapted to travel upon the guide-plate and to rotate the housing and shaft, a beveled gear loosely mounted upon the shaft and having a boss extending into the housing, said boss being provided with a shoulder adapted to be engaged by the inner end of the lever, a spring

carried by the frame, a beveled gear meshing with the first-mentioned bevel-gear and adapted to wind said spring, a bar carried by the shaft, a switch-point operatively connected to said shaft and means for returning the switch to its normal position.

3. The combination with a switch-point, means for closing the switch, a spring arranged between the switch-point and the closing mechanism, means for winding said spring during the closing of the switch, means for locking the said spring for a predetermined time, the unwinding of said spring restoring the parts when unlocked to their normal position, and a bar arranged parallel to the track and movable lengthwise by the unwinding of the said spring, the said bar being in position to be engaged by wheels of a train entering said switch.

4. A switch-closing device comprising a rotatable shaft, an arm connected to said shaft, a switch-point-operating bar pivoted to said arm, a lever adapted to partially rotate the shaft and close the switch-point, means for locking said lever against movement when the switch is closed, an adjustable cam adapted to unlock said lever, a spring wound by rotation of the shaft during the closing of the switch and adapted by its unwinding to actuate the cam, and a second spring wound by action of the switch-closing bar adapted to restore the parts to their normal position upon the releasing of the lever.

5. A device of the kind described comprising a switch-opening mechanism, said mechanism locking the switch in open position, a spring wound by the action of the said mechanism means driven by the said spring for unlocking the switch within a predetermined time, and means for closing the said switch when unlocked, said switch-closing means comprising a spring, and means for automatically increasing the tension of said spring, when the switch is open.

6. The combination with switch-opening mechanism, means for locking the said switch in open position, a spring wound by action of the switch-opening mechanism, means for controlling the unwinding of the said spring, means actuated by the unwinding of the spring for unlocking the switch, spring-actuated means for closing the switch, and an angled bar adapted to overlap a portion of the rail-tread, said bar being movable lengthwise, and means connecting said bar to the switch-operating means.

ALBERT N. BRADLEY.

Witnesses:

ROBERT RUSSELL,
JOHN T. MYERS.