

516 597 To 516 622

in book back wards

See next Page

3 Sheets-Sheet 1.

(No Model.)

I. L. GREEN.
SEMAPHORE SIGNAL.

No. 516,597.

Patented Mar. 13, 1894.

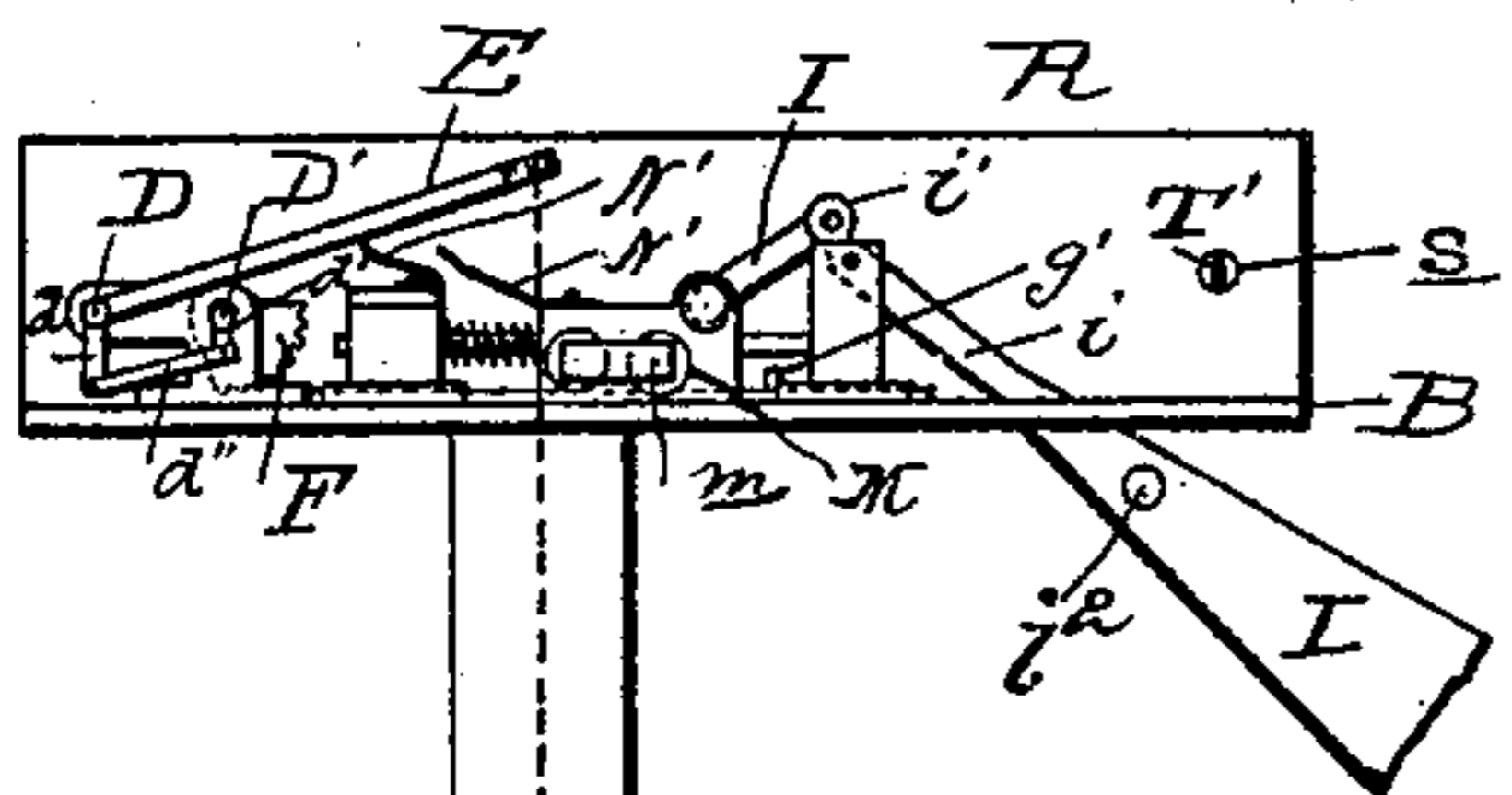


FIG. 1.

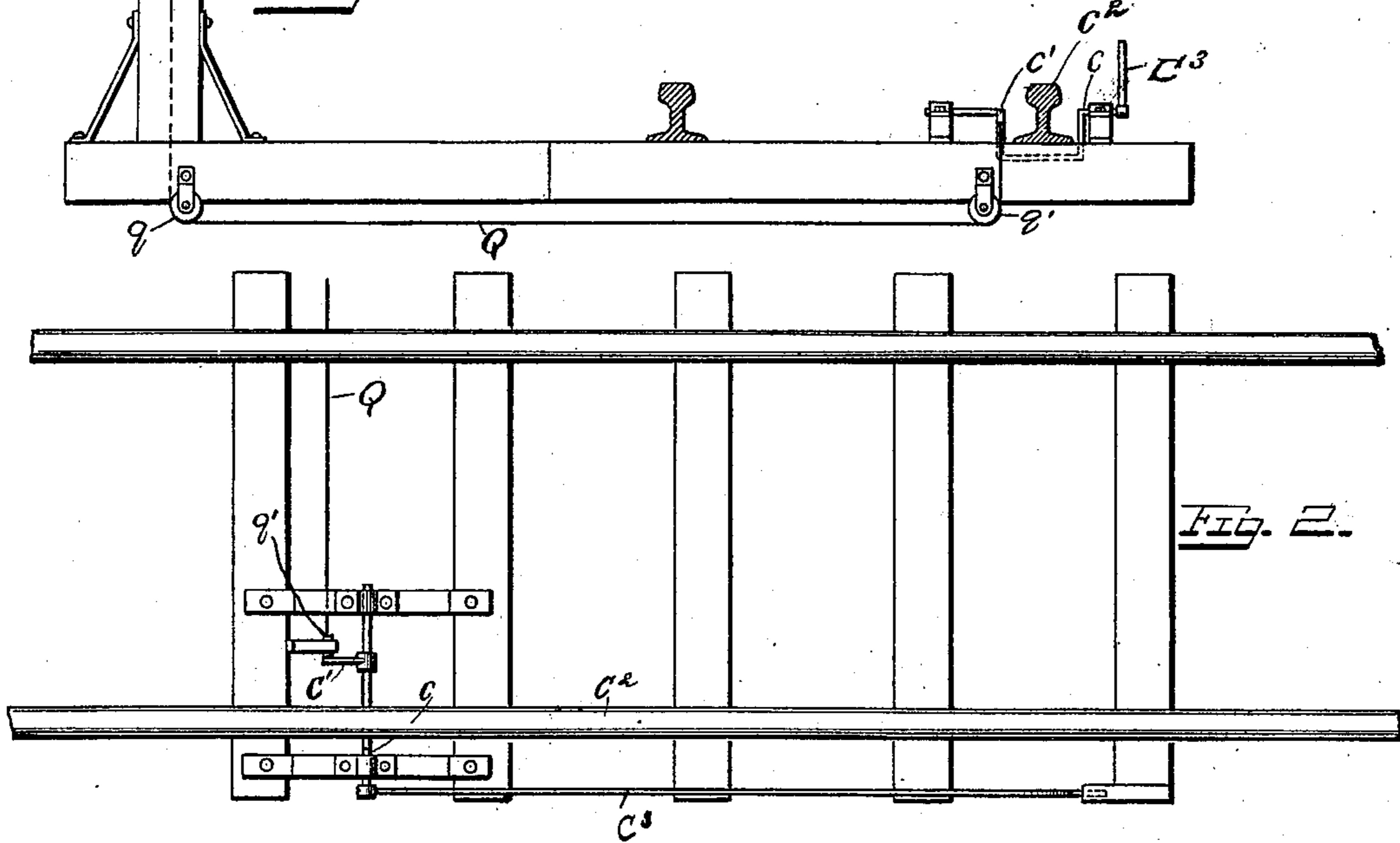


FIG. 2.

FIG. 5.

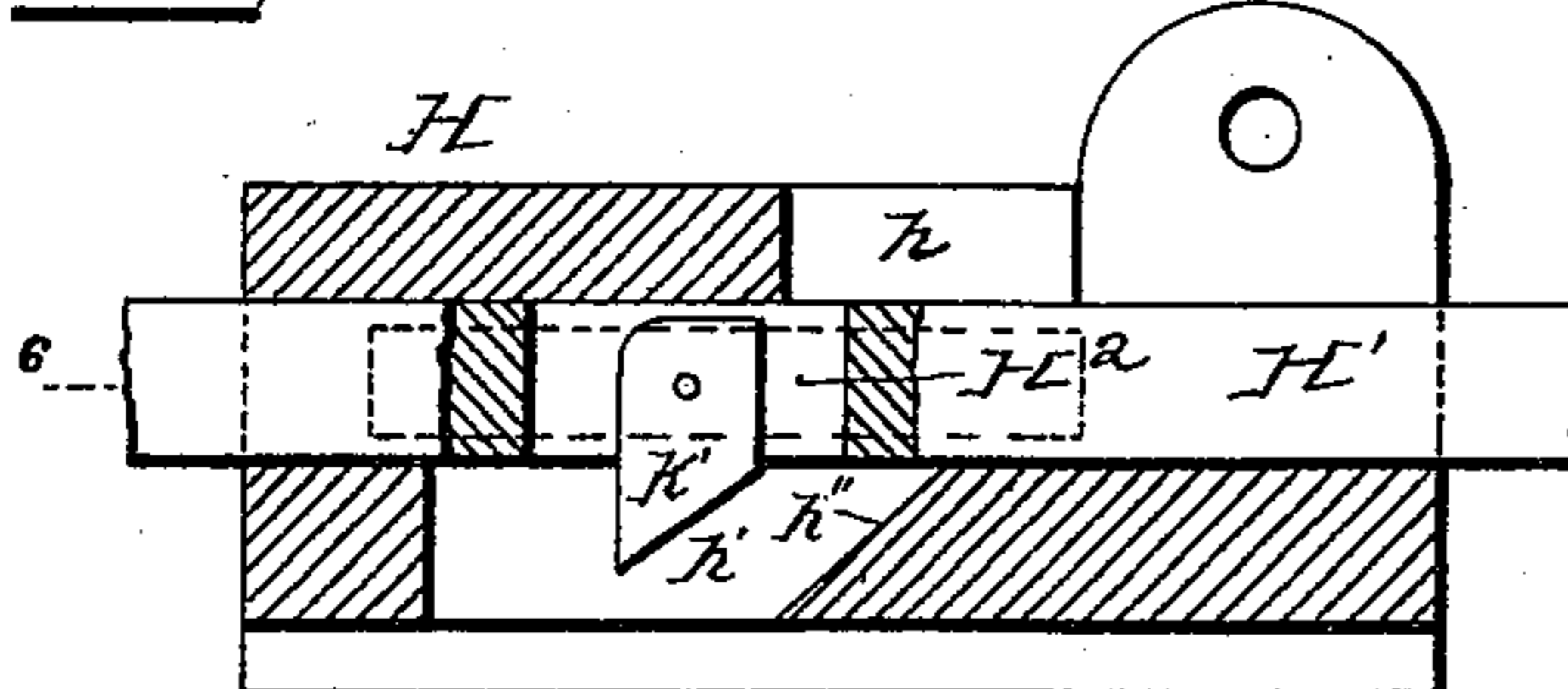
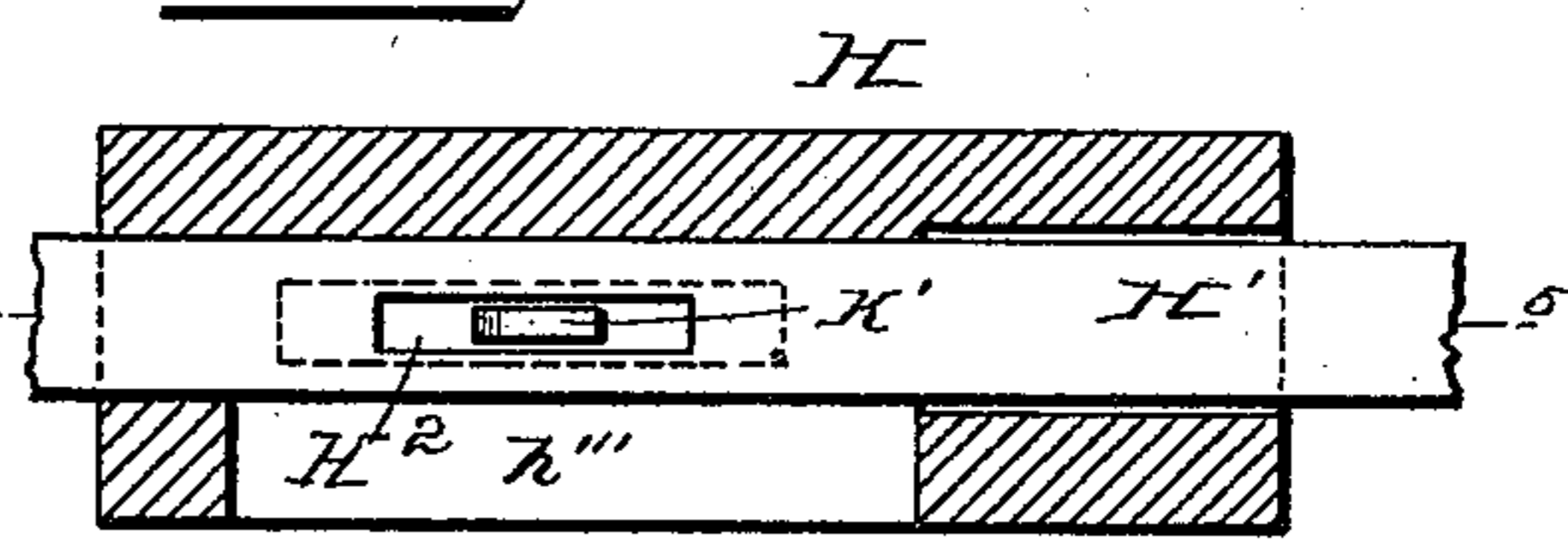


FIG. 6.



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FIG. 3.

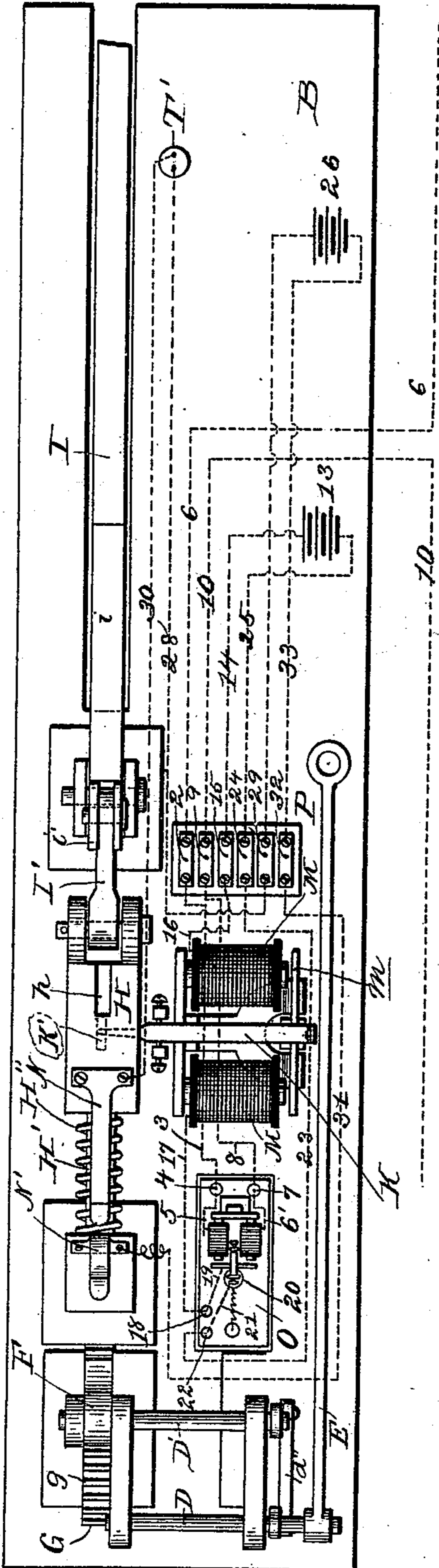
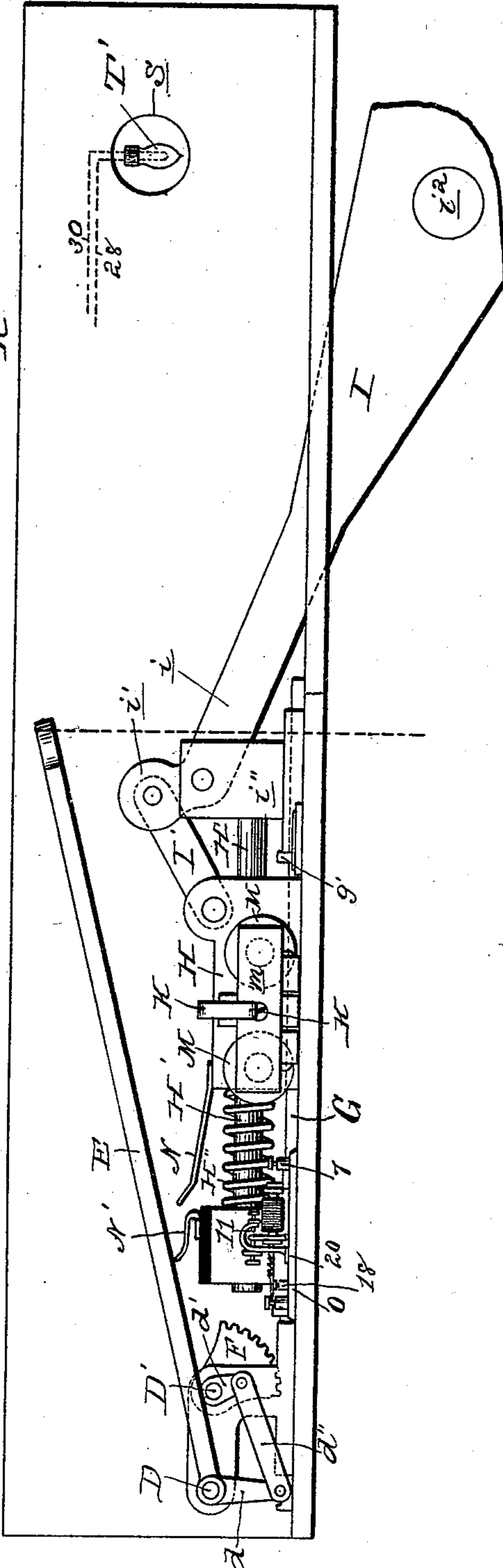


FIG. 4.



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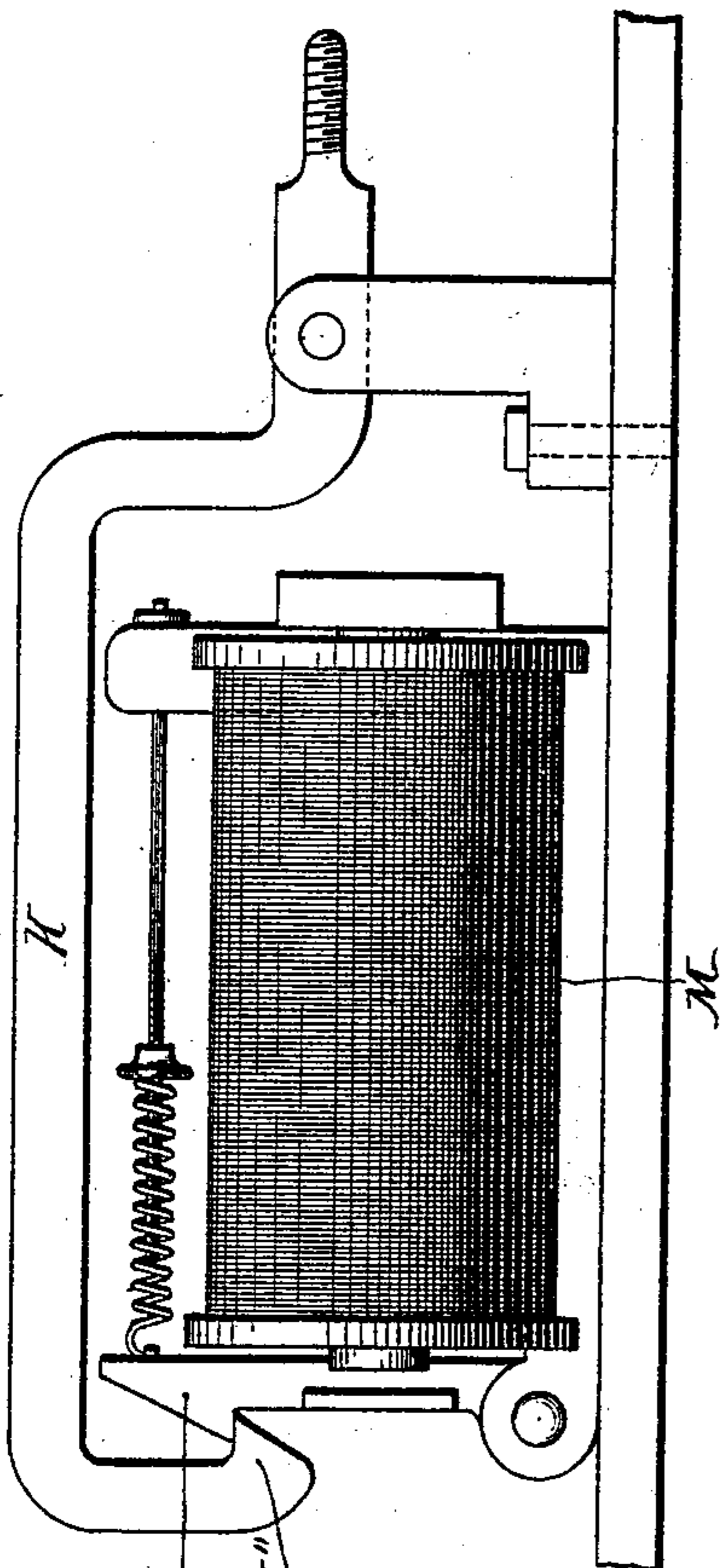


FIG. 7.

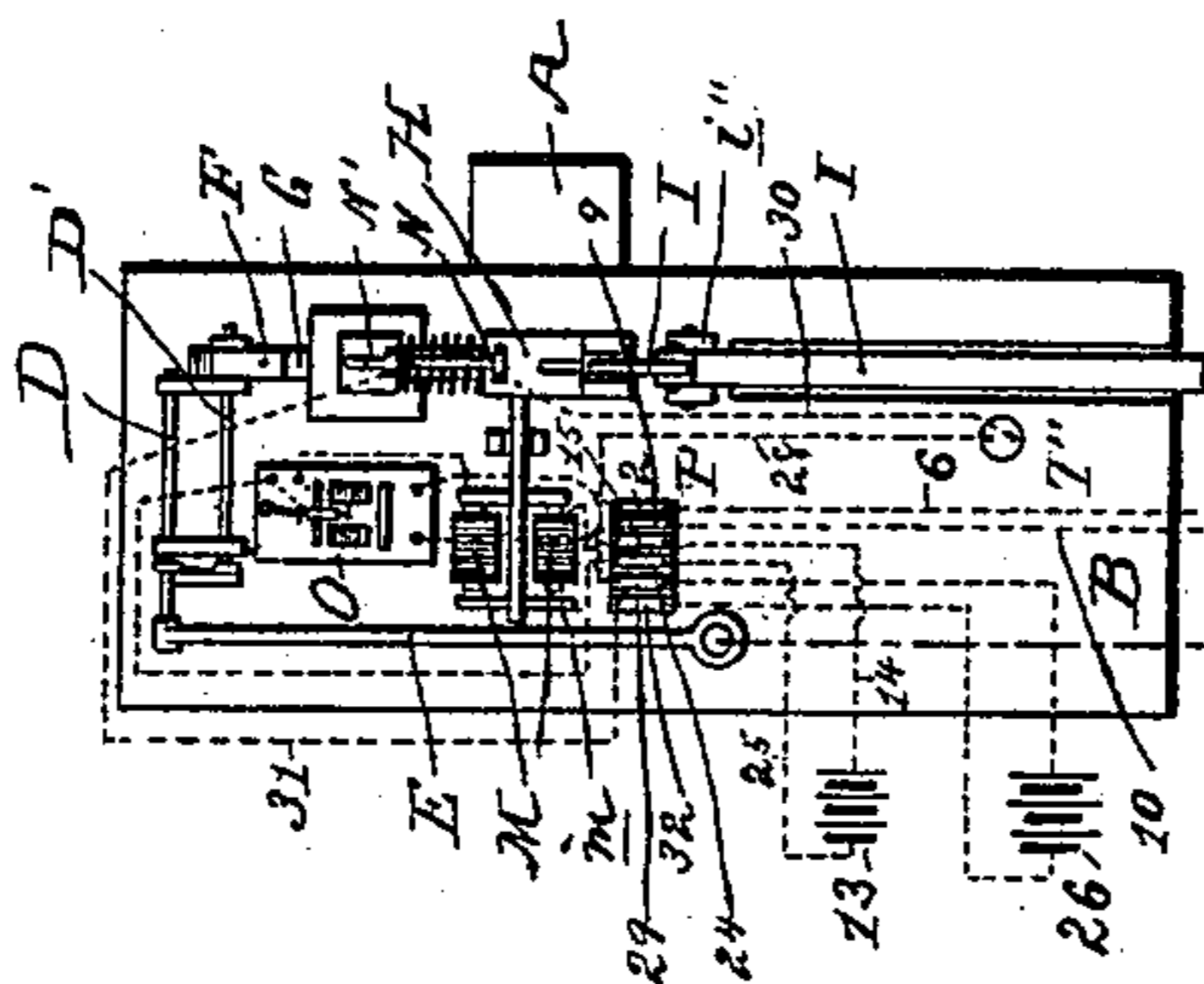
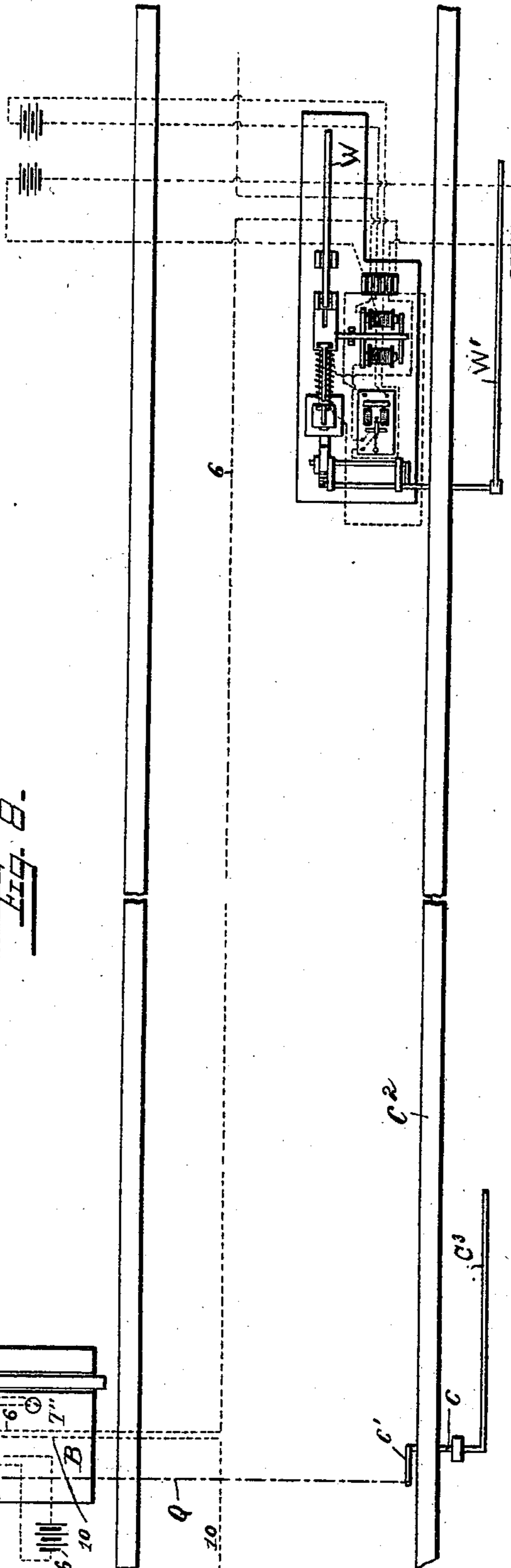


FIG. 8.



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UNITED STATES PATENT OFFICE.

IRA LLOYD GREEN, OF KITTANNING, PENNSYLVANIA, ASSIGNOR OF FIVE-SIXTHS TO GEORGE M. FOX, WYTHINGTON REYNOLDS, AND CHRISTOPHER C. SHADLE, OF SAME PLACE, AND MARCUS D. WAYMAN, OF FORD CITY, AND JAMES M. PATTERSON, OF SHARPSBURG, PENNSYLVANIA.

SEMAPHORE-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 516,597, dated March 13, 1894.

Application filed July 22, 1893. Serial No. 481,216. (No model.)

To all whom it may concern:

Be it known that I, IRA LLOYD GREEN, a citizen of the United States, residing at Kittanning, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Semaphore-Signals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has relation to an improved semaphore, especially constructed for use in connection with the electrical railway signal patented to me January 24, 1893, (No. 490,626) but adaptable for use alone, as a semaphore, or in connection with signals of different constructions from that above referred to.

In the drawings the semaphore is shown in its connection with the track instrument of my railway signal, the instrument shown, however, embodying certain improvements which I have made to it, which improvements have been made the subjects-matter of separate applications for Letters-Patent, which applications are serially numbered 481,215 and 481,788.

In said drawings:—Figure 1 is a side elevation of my improved semaphore, and the mechanism in the path of the train for automatically raising the semaphore-arm to show that the block is occupied. Fig. 2 is a plan view of the means for raising the semaphore-arm. Fig. 3 is a plan view of the portion of the semaphore which is mounted on a post beside the track. Fig. 4 is a side elevation of the same. Fig. 5 is a longitudinal sectional view of the sleeve and its supporting rod, taken on the line 5—5 of Fig. 6. Fig. 6 is a horizontal section through the same mechanism, taken on the line 6—6 of Fig. 5. Fig. 7 is a side view of a part of the locking and releasing mechanism for the semaphore-arm, and Fig. 8 is a plan view of the semaphore and the track instrument for electrically releasing the semaphore arm as the train leaves the block within which the semaphore is located.

In my said patented railway signal, a train, as it enters a block, engages and depresses an end of a lever which is connected with an arm by such mechanism that when depressed said arm will be drawn rearward, the forward end of said arm being, by suitable means, raised simultaneously with the rearward movement thereof. Said arm is locked in raised position during the occupancy of a block by a train, and is electrically released as the train passes out of the block, and when released is forced to its original position by a suitable means with which the apparatus is provided. When the arm is raised it is in position to engage a mechanism carried by the locomotive of a train entering the block, and thereby closes an electric circuit through an alarm in the engineer's cab, whereby when the block is already occupied the engineer of a train entering the same is notified of the fact. The only notice, however, that the engineer received that the preceding train had passed out of the block was by the lowering of the arm above referred to. This was objectionable in certain instances, as it compelled the engineer to keep his train close to the track instrument at the entrance of the block, in order to be able to observe the movement of the arm, which, if the train was going at a high rate of speed, or the entrance to the block situated on or near a curve, required the engineer to reverse the direction of travel of the train, after having stopped the same when warned of the occupancy of the block, and to go back to the track instrument. To overcome this objection, and at the same time provide a device capable of use as a semaphore without other instrumentalities, such as the signal above referred to, is the object of my present invention.

To this end the invention consists in certain peculiarities in the construction, arrangement and combinations of the several parts substantially as hereinafter described and particularly pointed out in the subjoined claims.

Referring to the drawings:—A designates the post which supports the main portion of

my improved semaphore. Journaled in suitable bearings erected near one end of the bed plate, B, of my improved semaphore are two parallel transverse shafts, D and D', said shaft D' being provided at a suitable point with a toothed segment, F.

G designates a longitudinally-movable bar, having at one end a series of teeth, g, and near its opposite end a lug, g'.

H designates a sleeve, which is movably mounted on a rod, H', and in the event that the locking mechanism hereinafter described is employed is formed on its top with an opening, h, on its bottom rearward of said opening h with an opening, h', having an inclined inner wall, h'', and on one of its sides with an opening, h'''.

Mounted on the ends of the shafts at one side of the device are two cranks, d and d', said crank d having a greater throw than said crank d'. These cranks are connected by a link, d''.

Fixed on the end of the shaft D is a lever E the outer free end of which is connected with an operating mechanism located beside the track in position to be engaged by a train, as hereinafter more fully described.

I designates the semaphore-arm, which is fulcrumed at the junction of its longer member, i, and shorter member, i', to a suitable stand i''. Said shorter member, i', is connected with the sleeve, H, by means of the link, I', and said longer member, i, is provided with the colored glass, i².

C³ designates a lever which is located beside the track in the path of a trip or other suitable depressing mechanism (not shown) carried by a train. The rear end of this lever is secured to a shaft, C, which is mounted in suitable bearings, and is preferably bent, as shown, so as to extend underneath the rail, C², although if desired it may be made straight and extend through an opening formed in said rail. This shaft C, is provided with an extension, C', extending at right angles from it, and the free end of said extension is connected by means of a rope, cable or chain Q, with the outer free end of the arm E, said rope, cable, or chain extending over suitable pulleys, q, q'.

The operation of the parts thus far described is as follows: When a moving train reaches the lever C³ its trip engages said lever and depresses the free end thereof, thus partly rotating the shaft C and elevating its extension, C', which through its connection with the lever E, lowers the outer free end of said lever, thus causing the shafts D and D' and the toothed segment F on said shaft D' to turn. This toothed segment engages the rack-bar, H, and moves the same rearward a sufficient distance to bring its lug, g', into engagement with the outer end of sleeve, H, and to move the latter, through such engagement, rearward sufficiently far to raise the arm, I, to a horizontal position. As the shaft D is connected with the shaft D', by cranks

and a link, and as the crank on shaft D has a greater throw than the crank on the shaft D', it will be seen that the sleeve H and the semaphore-arm, I, will travel at a much greater rate of speed than said shaft D, whereby said semaphore-arm will be very quickly set into position to indicate that the block is occupied. As the horizontal position of the arm, I, indicates that the block is already occupied, and as said arm must be locked or held in such position during the occupancy of the block by a train I prefer to employ, although I do not limit myself to its use, an automatic locking mechanism consisting of a transverse bar, K, having at its inner end the trigger, K', and at its outer end a hook, K'', and the spring-pressed hook L, for engaging said hook, K''; said bar being fulcrumed near its inner end and having said inner end extended into the sleeve, H, through the opening, h, and also into the rod H', through an opening in the side thereof. In operation, as the sleeve H is drawn rearward its inclined wall, h'', will engage the inclined surface of the trigger K' and elevate the latter sufficiently to cause it to project through the opening, H², in the rod H' into the opening, h, in the sleeve, the bar K being, at the same time, forced from its normal inclined position into a horizontal position, in which latter position it is engaged and held by the spring-pressed hook, L, above referred to.

When my improved semaphore is used in connection with the track instrument of my railway signal, or with the track instrument of any other electrical railway signal, I prefer to employ as the releasing means for the semaphore arm, an ordinary telegraph relay, O, and an electro-magnet, M, said electro-magnet being situated adjacent to the hook L, and having its armature, m, secured directly to or connected with the stem of said hook. By this means when the electro-magnet is energized it will attract its armature and thereby pull said hook out of engagement with the locking bar, K, permitting a spring, H'', or other suitable means, to force the sleeve H forward, thereby lowering the arm I; said sleeve as it moves forward engaging the trigger K' and forcing the same downward and the outer end of the bar K upward, the latter thus being returned to its normal inclined position.

The main operating parts of my improved semaphore are inclosed within a suitable casing, R, having at a proper point a bull's-eye, or other suitable glass, s, white in color, (or said casing may be omitted and the glass s supported by a frame) and adjacent to said glass, s, is a lamp, S, for making the position of the arm visible in the night. When electricity is used this lamp is preferably an incandescent one, and the sleeve is then provided with a suitable plate N, designed to be brought by the movement of said sleeve into contact with a similar but stationary plate, N', and to thus close the circuit through the

lamp and thereby light the latter when the arm has been brought to horizontal position.

Reverting to my patented signal a train as it enters a block raises an arm of a track instrument, located at the entrance to the block, into position where it will engage a mechanism carried by the locomotive of a following train, and at the same time closes an electric circuit through the preceding track instrument thereby releasing the arm thereof and permitting it to be forced to its normal downward position. When my improved semaphore is used in connection with my said signal it will be located in the circuit between the track instrument at the entrance to one block and the track instrument at the entrance to the preceding block, at a distance of about one-fourth of a mile, more or less, from the track instrument at the entrance to the block within which it is located.

The operation of my invention when used with my said railway signal is as follows:—The train having entered the block and set the arm, W, of the track instrument thereat, continues on to lever C³, depresses the same and raises the arm I, in the manner hereinbefore described, and then continues to the end of the block where it operates in a similar manner on lever W' of a track-instrument thereat, raising the arm, W, thereof and at the same time closing an electrical circuit which will automatically release the similar arm of the preceding track instrument. As above stated my semaphore is located in this circuit, so that its magnet, M, will be energized, and its locking mechanism released from the sleeve, H, (permitting the semaphore-arm to be forced to its normal position, by the spring H' above referred to) when the circuit is closed. The circuit from said track instrument to said magnet is as follows:—Passing from said track instrument over wire 6, it enters strap 2 of a connecting board, P, with which the semaphore is provided, passes thence, by wire 3, to binding post 4 of the relay O, thence, by wire 5, through the magnets of said relay, and thence, by wire 6', to binding post 7, from which it passes, by wire 8, to strap 9 of the connecting board, and from said strap, by wire 10, to the preceding track instrument; thus when the circuit is closed at the succeeding track instrument, the magnets of relay O is energized, and the armature of the latter is pulled against the point 11, and closes the circuit through the electro-magnet M, the current then taking the following course: Starting from one pole of battery 13, it passes over wire 14, to strap 15 of the connecting board, thence by wire 16 to the magnets, through said magnets and by wire 17 to the binding post 18, by wire 19 to the armature of the relay, through contact point 11 and stand 20, by wire 21 to binding post 22, thence, by wire 23, to strap 24, and thence by wire 25 to the other pole of the battery. The lamp circuit is as follows: Starting at battery 26, the current travels to the strap 29 of the connecting board, P, thence by

wire 28 to and through the lamp, thence by wire 30 to contact plate N, which is now in engagement with contact plate N', through said latter contact plate, thence back, by wire 31, to strap 32, and thence by wire 33, to the other pole of the battery.

It will be observed that my improved semaphore possesses many features in common with my said patented track instrument, and also with the improvements thereon made by me, which improvements as above stated are made the subjects-matter of separate applications for patents filed by me. I, therefore do not wish to be understood as claiming broadly any of such features which are common to the said track instruments and the semaphore; nor do I limit myself to the precise construction herein shown and described as many of the parts may be varied or entirely omitted without departing from the spirit of my invention.

It will readily be understood that by the employment of my improved semaphore it is not absolutely essential that the alarm mechanism in the engineer's cab, covered by my said patent, be used as the semaphore will serve a useful purpose without other warning instrumentalities, but if said alarm mechanism is used, a double means is provided for calling the engineer's attention to the fact that he is entering a block already occupied, if such is the case—a visible and an audible one in his cab, and a visible one exterior thereto. It will also be seen that the employment of this semaphore in connection with my track instrument will obviate the necessity of the return of the train to the entrance to the block, when the engineer has received warning that the block is occupied, in order that he may receive notice when said block has been vacated, thus saving time.

Having thus described my invention, what I believe to be new, and desire to secure by Letters Patent, is—

1. In a semaphore, the combination of a lever, a sleeve, connected with said lever and moved longitudinally by depression of the rear end thereof, a semaphore arm, fulcrumed near one of its ends, and a link connecting said arm and sleeve, substantially as described.

2. In a semaphore, the combination of a lever, located in the path of a train, a lever, E, having its free end connected with said first-mentioned lever, a sleeve, connected with said lever E and moved rearward by depression thereof, a semaphore arm, fulcrumed near one of its ends, and a link connecting said arm and sleeve, substantially as set forth.

3. In a semaphore, the combination of a semaphore arm, fulcrumed near one of its ends, a longitudinally-movable sleeve, connected with said arm, a shaft, connected with said sleeve and having a crank on one of its ends, a supplemental shaft adjacent to said first-mentioned shaft, a crank on one end thereof, a link connecting said cranks, the crank of the supplemental shaft having a

greater throw than the crank of the other shaft, and a lever on the end of the supplemental shaft.

4. In a semaphore, the combination of a semaphore arm, fulcrumed near one of its ends, a longitudinally-movable sleeve, connected with said arm, and a lever for moving said sleeve rearward and thereby raising said arm to horizontal position, a lever in the path of the train, a shaft to which said latter lever is secured at one end, an extension from said shaft, and a rope connecting said extension with the free end of the first-mentioned lever, as specified.

5. In a railway signal, the combination of a track instrument, located at the entrance to a block, and a semaphore located in the block in advance of said track instrument, said semaphore and track instrument each having an operating lever located in the path of a moving train, and said semaphore having its arm connected with its said lever, an automatic locking mechanism and an electrical releasing mechanism for said semaphore arm, said semaphore being located in the electric circuit from said track instrument to a preceding one, substantially as described, whereby the semaphore-arm will be mechanically set, by the train when it reaches the lever thereof, into position to indicate that the block is occupied, and electrically released by said train as it passes out of the block, as specified.

6. In a semaphore, the combination with the casing or frame, having a glass, a longitudinally-movable sleeve, a lever for moving said sleeve rearward, a semaphore arm connected with said sleeve and raised to horizontal position by the rearward movement

thereof, said arm having a colored glass which will register with the glass in the casing or frame when the arm is in raised position, contact plates brought into engagement with each other simultaneously with the raising of said arm, and an electric lamp adjacent to said glass of the casing or frame and in the circuit with said contact plates.

7. In a semaphore, the combination of a lever, a sleeve connected with said lever and moved rearward by depression of the free end thereof, a semaphore arm connected with said sleeve and raised to horizontal position by the rearward movement of the same, a means for locking said arm in raised position, and means for electrically releasing said arm, substantially as described.

8. In a semaphore, the combination of the semaphore arm fulcrumed near one of its ends, a sleeve, a link pivotally connecting an end of said arm with said sleeve, and means for moving said sleeve rearward and thereby raising said arm to horizontal position.

9. In a semaphore, the combination with the semaphore arm, fulcrumed near one of its ends, a sleeve, a link pivotally connecting an end of said arm with said sleeve, and a means for moving said sleeve rearward to raise said arm, of, a means for locking said arm in raised position, and means for releasing said locking mechanism to permit the arm to assume its normal position.

In testimony whereof I affix my signature in presence of two witnesses.

IRA LLOYD GREEN.

Witnesses:

THOS. MCMASTER,
JAMES S. MATEER.