

(No Model.)

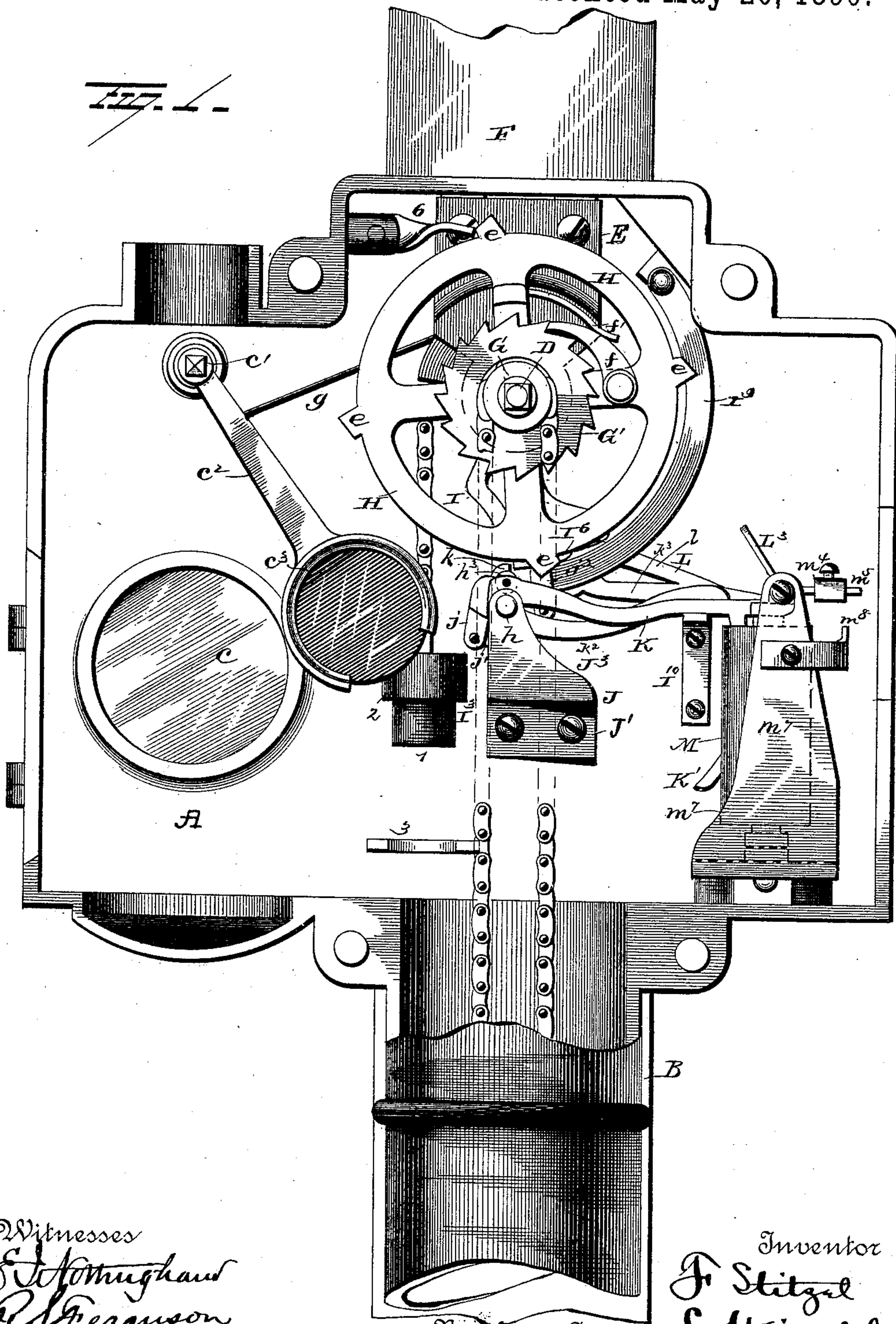
5 Sheets—Sheet 1.

F. STITZEL & C. WEINEDEL.  
ELECTRIC SEMAPHORE APPARATUS.

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No. 428,576.

Patented May 20, 1890.



Witnesses  
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(No Model.)

5 Sheets—Sheet 2.

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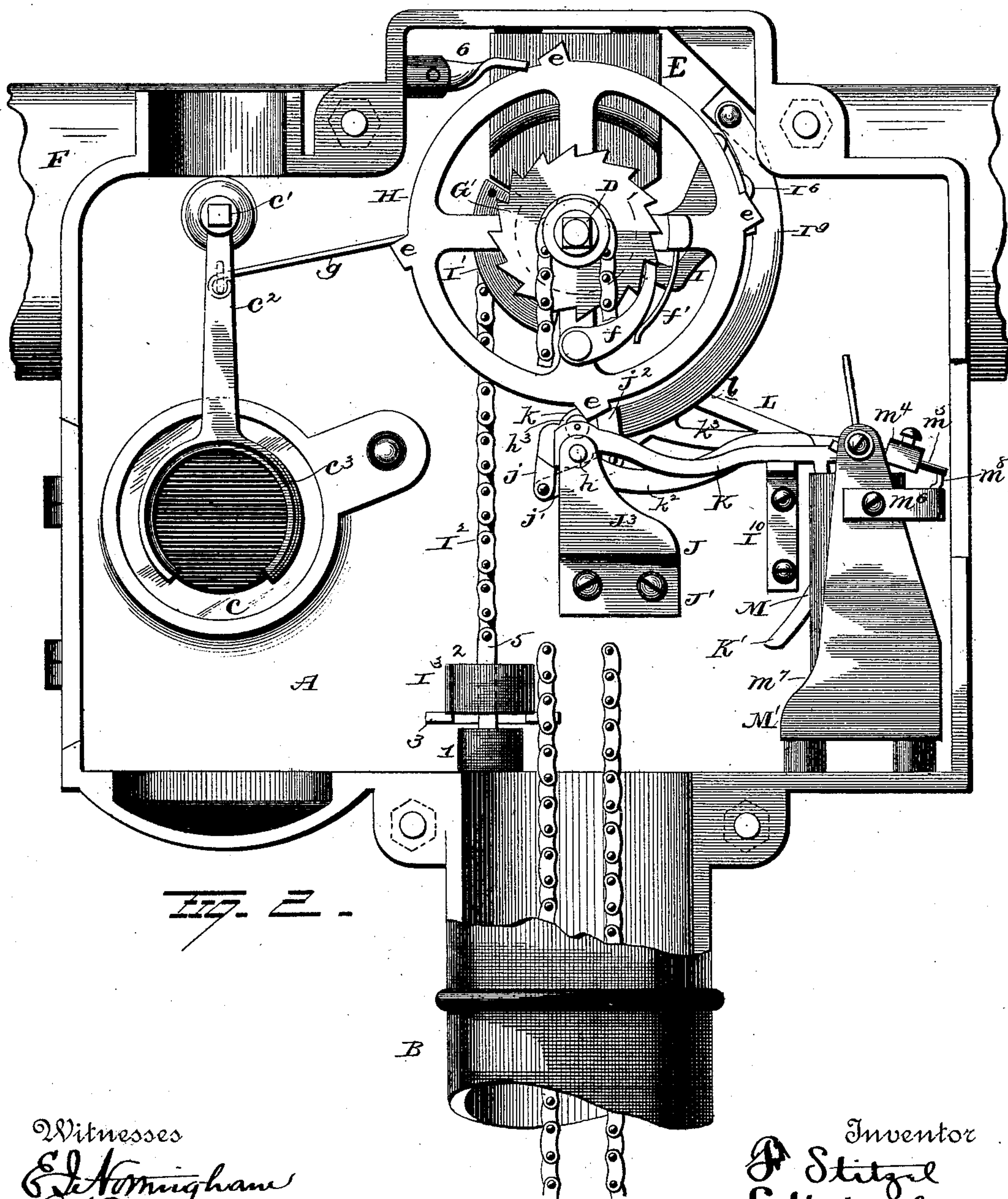


Fig. 2.

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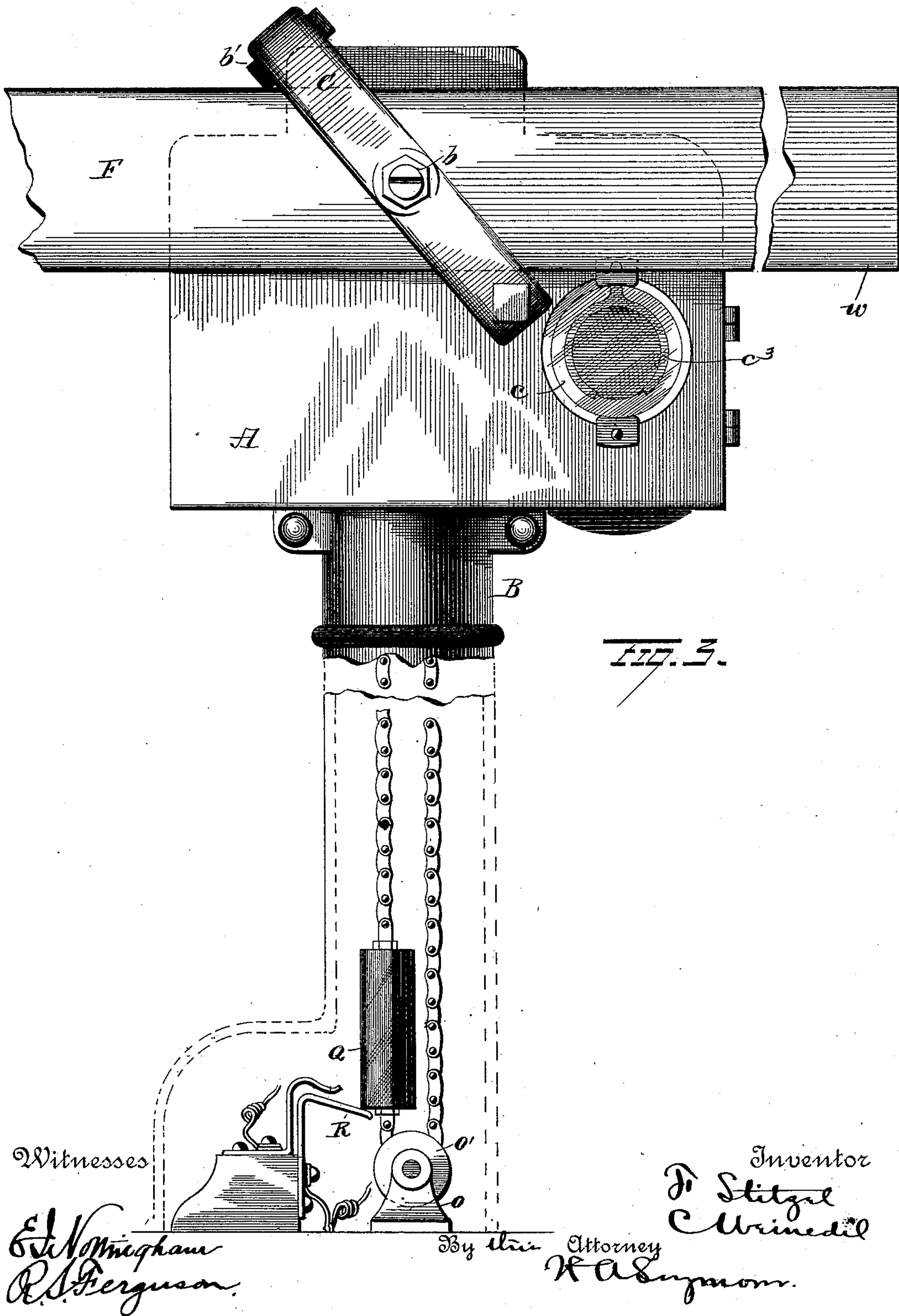
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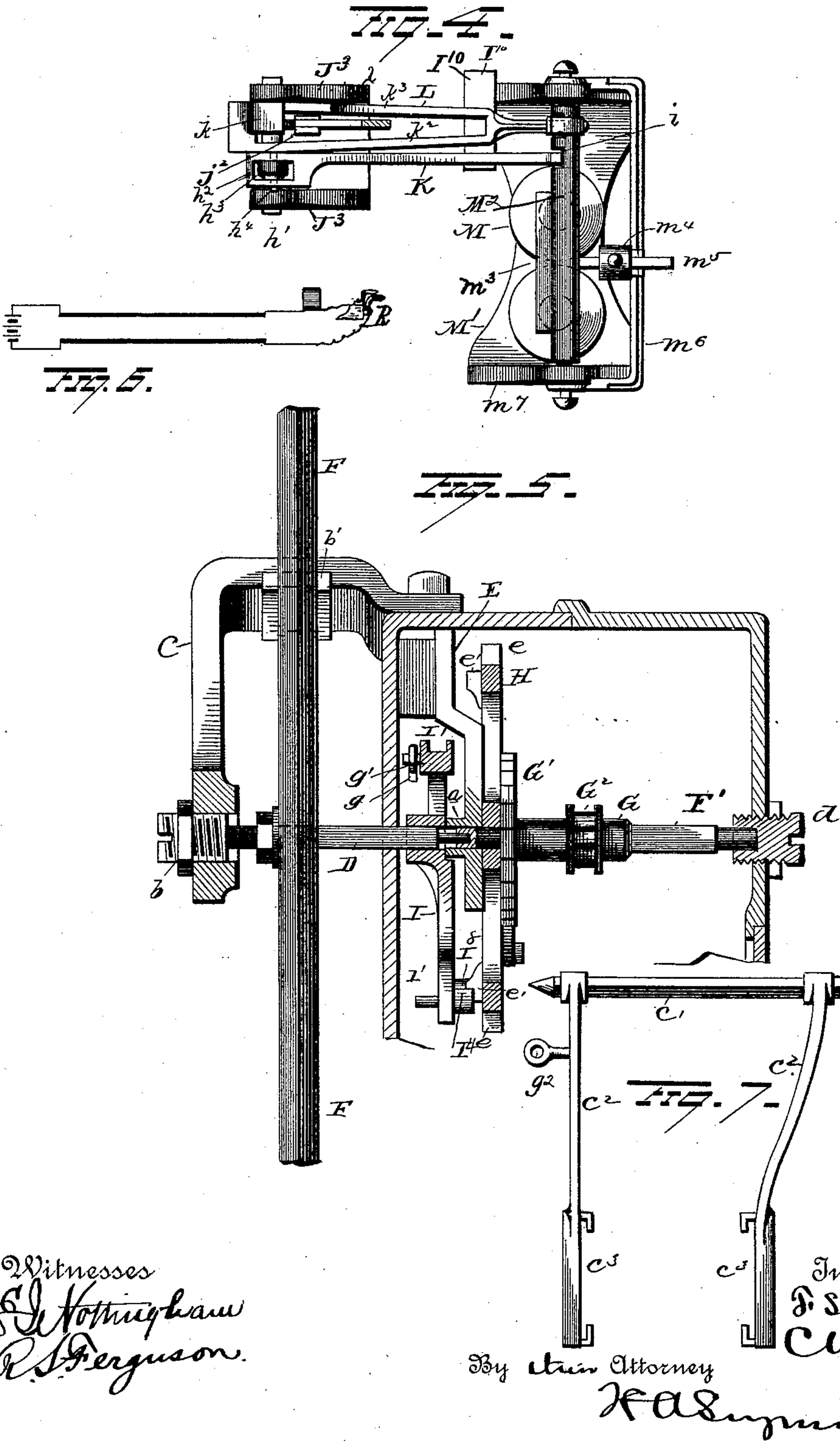
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5 Sheets—Sheet 4.

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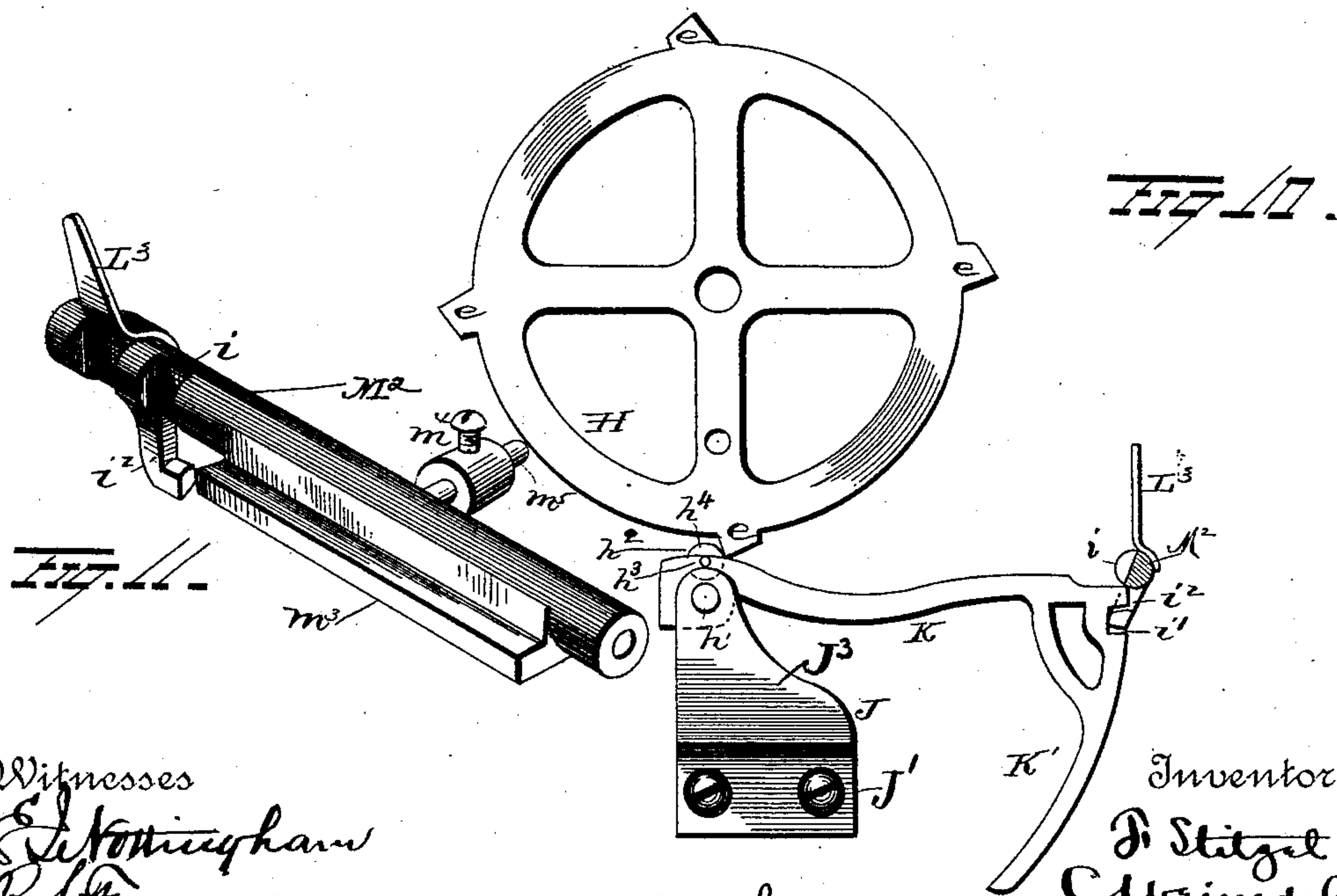
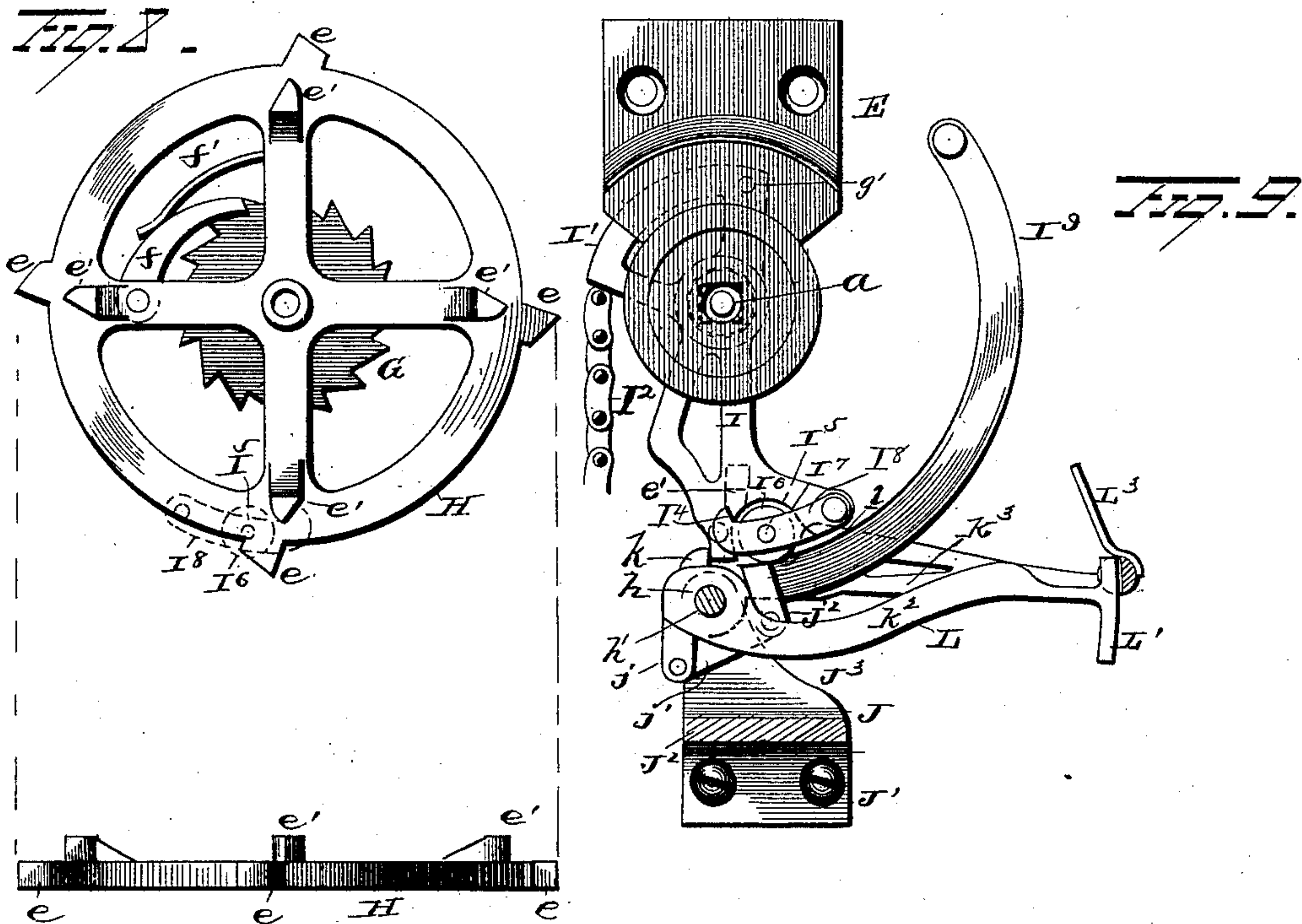
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5 Sheets—Sheet 5.

F. STITZEL & C. WEINEDEL.  
ELECTRIC SEMAPHORE APPARATUS.

No. 428,576.

Patented May 20, 1890.



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# UNITED STATES PATENT OFFICE.

FREDERICK STITZEL AND CHARLES WEINEDEL, OF LOUISVILLE, KENTUCKY.

## ELECTRIC SEMAPHORE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 428,576, dated May 20, 1890.

Application filed March 21, 1889. Serial No. 304,133. (No model.)

*To all whom it may concern:*

Be it known that we, FREDERICK STITZEL and CHARLES WEINEDEL, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Electric Semaphore Apparatus; and we 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.

Our invention relates to an improvement in electric semaphore apparatus for signaling railroad-trains, and more particularly to such as are adapted for use in connection with the "block system."

The object of our present invention is to provide a signaling device for exhibiting "danger" and "safety" signals along a line of railroad to denote whether or not a certain predetermined portion of said railroad is occupied by a train.

A further object is to produce a signaling apparatus for railroads actuated by means of weights and controlled by a train passing over the track, through the medium of suitably-arranged electrical devices.

A further object is to so construct a signaling apparatus for railroads that any amount of power may be stored for operating the device in cold climates and be controlled through the medium of a small amount of electricity.

A further object is to construct the mechanism in such a manner that when released to indicate "danger" all the weights used in the operation of the apparatus will operate to turn the signal to "danger."

A further object is to so construct and arrange the apparatus that all parts of the mechanism will be protected from exposure to the weather.

A further object is to provide a signaling apparatus having a visual signal-blade adapted to indicate "track occupied" or "track clear," according to the position which it assumes, and a lantern adapted to change color to impart the same information, both of said signals being operated simultaneously and by the same mechanism.

A further object is to produce a signaling device actuated and controlled by the combined force of weights and electricity, and

which shall be compact in construction and effective, sensitive, and sure in operation.

With these ends in view our invention consists in certain novel features of construction and peculiar combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front view of the device with a portion of the front plate removed to show the operating mechanism, said mechanism being in a position to hold the signaling devices at "safety." Fig. 2 is a similar view with the parts in a position to indicate "danger." Fig. 3 is a rear view. Fig. 4 is a plan view of the levers and magnets. Fig. 5 is an end view of the device with a portion of the frame-work removed. Fig. 6 is a view showing the arrangement of circuits. Figs. 7, 8, 9, 10, and 11 are detail views.

A represents the head or frame for containing the operating mechanism, and is supported at a suitable height on a hollow post or upright B, both of said parts being preferably made of metal.

Secured to the rear face of the head A is a diagonally-disposed yoke C, having a central screw-threaded boss at its center for the reception of a similarly threaded screw *b*, the inner end of which is made hollow to produce a bearing for one end of a shaft D. The shaft D passes through the rear wall of the head A, and is journaled at its inner end in a perforation *a* in a bracket or hanger E, secured to a projection on the inner face of the rear wall of the head A. Secured upon the shaft D (which is preferably made square throughout the greater portion of its length) at a point between the diagonal arm of the yoke C and the rear wall of the head A is a signal-blade F, which when made to assume a vertical position is designed to indicate "safety," and when in a horizontal position to denote "danger." One end of the blade will preferably be provided with a weight *w* to co-operate with other devices hereinafter described to bring the blade to danger. To prevent the signal-blade from coming into contact with the iron yoke and becoming marred thereby, a block of rubber *b'* will be secured to the upper short arm of the yoke and adapted to receive the edge of the blade as it moves from



one position to the other. The front and rear faces of the head are provided with openings  $c$ , in which are placed plates of white glass. A shaft  $c'$  is journaled between the front and rear walls of the head A, centrally over the openings  $c$ , and provided with depending arms  $c^2$ , which terminate at their lower ends in circular holders  $c^3$ , adapted to receive colored glass or other colored transparent material.

A lamp is placed in the head A between the openings  $c$  and between holders  $c^3$ . When the holders containing the colored material swing back from the openings  $c$  by means of mechanism hereinafter described, a white light will be displayed to indicate "safety;" but when said colored material is in front of or in line with the openings a colored (usually red) light will be displayed to indicate "danger."

The front wall of the head A is provided with a perforation in line with the perforation of bracket E for the reception of a screw  $d$ , said screw being made hollow throughout a portion of its length to form a bearing for one end of a shaft  $F'$ . The opposite end of the shaft  $F'$  is made hollow for a short distance, and of a size, externally, to pass through the perforation  $a$  of hanger E, the hollow portion being intended to receive the inner end of the shaft D. By thus journaling the shafts D  $F'$  in the bracket E, one within the other, much space will be saved and the number of parts reduced.

Fixed on the shaft  $F'$  is a collar G, having a ratchet-wheel  $G'$  secured to or made integral with its inner extremity, and a sprocket-wheel  $G^2$  at or near its opposite end for the reception of a sprocket-chain and weight, as explained further on in this description.

Loosely mounted on the shaft  $F'$  immediately in the rear of the ratchet  $G'$ , and of considerably larger size than the same, is a toothed wheel II, having four teeth or projections  $e$  projecting from its periphery at equidistant points. On the rear face of the wheel II, slightly removed from the periphery thereof and in line or approximately in line with the projections  $e$ , is a series of lugs  $e'$ , equal in number with said projections and having one face inclined. The opposite face of said wheel has pivoted to it a dog  $f$ , adapted to engage the teeth of the ratchet-wheel  $G'$  and cause said wheels to rotate together when the shaft  $F'$  is turned in one direction, and to ride over said teeth and prevent rotation of the wheel when the shaft turns in the reverse direction, said dog being held in engagement with the ratchet-wheel by means of a spring  $f'$ , secured at one end to the face of the wheel and bearing at its other end upon said dog.

Fixed upon the shaft D is a double arm I, having a quadrant  $I'$  fixed thereto at one end, said quadrant preferably having one face grooved for the reception of a rope or chain  $I^2$ , secured thereto at its upper end, an auxiliary weight  $I^3$  being suspended at the free end of the rope or chain  $I^2$ . This weight will preferably be made in two parts 1 2, one resting

upon suitable support 3 and the other upon the bottom of the head A, a rod 5 passing freely through a perforation in the upper weight, and secured to the lower weight in any preferred manner. With such construction, when the shaft D first begins to turn to display the safety-signal the weight 1 will be taken up, and when the shaft has nearly completed its turn the weight 2 will be taken up by the weight 1. By this means the momentum of the main weight, which operates the apparatus, as presently explained, will be broken and small battery-power will be required to hold the parts which control the signal.

The opposite end of the arm I from quadrant  $I'$  is broadened, and has pivoted to its side face at one end of the broadened portion a pivoted latch  $I^8$ , which lies parallel with the face of arm I and extends to the opposite end of the broadened portion thereof, where it is provided with a hook  $I^4$ , adapted to engage the lugs  $e'$  of wheel II. Thus when the wheel II is rotated its engagement with the double arm I will cause said arm and its shaft, to which it is made fast, to turn and change the position of the signal-blade F.

In order that the depending arms  $c^2$ , carrying the colored material, may move in unison with the signal-blade, they are connected by a rod  $g$  with the quadrant  $I'$  of arm I, said rod being secured at one end to a pin  $g'$ , projecting from the rear face of the arm I near the upper portion of the quadrant in any preferred manner, and at the other end to a short arm  $g^2$ , projecting from one of the arms  $c^2$ .

Passing transversely through the pivoted latch  $I^8$  and projecting from the rear side thereof is a pin  $I^5$ , which forms the journal for a small roller  $I^6$ , for the accommodation of which a recess  $I^7$  is cut in the lower end of the double arm I. A semicircular plate  $I^9$  is pivoted at its upper extremity to an enlargement formed in the upper part of the head A and extends downwardly parallel with the arc of a circle described by the broadened end of the double arm I. This curved plate serves as a track upon which the roller runs, and thus prevents the improper disengagement of the latch  $I^8$  from the lugs  $e'$  of wheel II.

Secured to the interior of the rear wall of the head is a bracket J, comprising a depending plate  $J'$ , by which it is bolted, a second plate  $J^2$  at right angles thereto, and two uprights  $J^3$ , projecting upwardly from plate  $J^2$ . The uprights  $J^3$  are furnished near their upper ends with aligned perforations  $h$  for the reception of a horizontal shaft  $h'$ , upon which latter are mounted two vibrating levers K L. The lever K, mounted loosely on the shaft  $h'$  at the front end of the latter, is enlarged at the end through which the shaft passes, and provided at such enlarged end with a recess  $h^2$ , in which is journaled on an arbor  $h^3$  a small roller  $h^4$ , which serves as a stop, against which the projections  $e$  of the wheel II are adapted to abut, and be retained from rotating until the lever is permitted to be tilted



through the action of an electro-magnet M, with the armature-shaft of which the free end of lever K makes engagement, as explained farther on.

5 The magnets M are preferably placed on a stand M', having uprights  $m^7$  at each end projecting somewhat above the tops of the cores of the magnets, where they are perforated for the reception of screws or pins, which serve  
10 as bearings for a shaft M<sup>2</sup>. This shaft is provided with a flat under face immediately over the magnet-poles for the reception of a soft-iron armature  $m^3$ , the longitudinal edge of which projects beyond the shaft, and by  
15 means of which the shaft is given an oscillatory movement in one direction through the medium of the magnets M. When the magnets are demagnetized, the armature is of course released, and the shaft is caused to os-  
20 cillate in the opposite direction by means of an adjustable weight  $m^4$  on an arm  $m^5$ , projecting from the shaft M<sup>2</sup> in the opposite direction from the armature  $m^3$ . A yoke  $m^6$  is secured at its ends to the uprights  $m^7$ , and  
25 provided at or near its center with a small plate  $m^8$ , upon which the arm  $m^5$  is adapted to fall, and thus form a stop for said arm to limit the upward movement of the arma-  
ture  $m^3$ .

30 At a point on the shaft M<sup>2</sup> beyond the magnets M a notch  $i$  is made in said shaft, which, when the armature  $m^3$  is attracted by the magnet, will permit the passage through it of the free end of the lever K. When the  
35 armature is released and the shaft has oscillated in the reverse direction, the notch  $i$  will have moved out of alignment with the free end of the lever K, and said lever will be re-  
40 tained in a fixed position by engagement with the shaft M<sup>2</sup> until the magnet shall have again attracted its armature.

The free end of lever K is furnished with a downwardly-extending curved arm K', adapted to pass through the notch  $i$ , and thus  
45 guide the movements of the lever K. This downwardly-extending arm K' is provided at its upper end with a bend or notch  $i'$ , adapted to receive a small bent arm  $i^2$ , projecting from  
50 the shaft M<sup>2</sup>, and thus affords additional security against the upward movement of the arm K when the armature is released.

The arm L, mounted on the shaft  $h'$ , is made open through the greater part of its length—that is to say, it comprises two arms  $k^2$   $k^3$ ,  
55 joined together at their ends by means of cross-pieces, the whole preferably being cast in one piece, and adapted to receive a portion of the curved plate I<sup>9</sup> between them.

60 The arms L and K rest when in their normal positions upon a bracket I<sup>10</sup>, fixed to the interior of the head A.

The free end of the arm L is furnished with a cross-arm L', which is adapted to pass through a notch in the shaft M<sup>2</sup>, and is main-  
65 tained in a normal downward position by means of an upwardly and inwardly extending arm L<sup>3</sup>, secured to and projecting from

the shaft M<sup>2</sup>. When, however, the armature is released and the shaft M<sup>2</sup> permitted to os-  
70 cillate, the arm L<sup>3</sup> moves out of the path of the free end of lever L, and thus permits said lever to perform its function. It will be seen from this construction that if it should hap-  
75 pen that the weight on shaft M<sup>2</sup> were not properly adjusted, or the magnets become un- duly charged with residual magnetism, and  
80 thus cause the armature to stick and prevent the proper oscillation of the shaft M<sup>2</sup>, the cross-arm L' of arm L will engage the up- wardly-projecting arm L<sup>3</sup> and force it out of  
the way, and at the same time cause the shaft M<sup>2</sup> to complete its oscillation.

The enlarged end of the arm L, through which the shaft  $h'$  passes, is provided with a  
85 downwardly-projecting lug  $j$ , bifurcated at its lower end to receive one end of a link  $j'$ , pivoted therein. The other end of the link  $j'$  is pivoted between the bifurcated ends of a block  
90  $j^2$ , the other end of said block being secured to the lower extremity of the semicircular plate I<sup>9</sup>. Thus the semicircular plate I<sup>9</sup> is con-  
95 nected by means of a link with the arm L. A lug  $k$  projects upwardly from the arm L at its inner end, and is adapted to form a stop for the double arm I until said arm is released  
100 and caused to rock with the shaft D, such rocking of the arm causing, through the me-  
dium of link  $j'$ , the semicircular arm I<sup>9</sup> to move away from the pivoted latch I<sup>8</sup>, and thus permit its disengagement from the wheel H.  
105 The branch  $k^3$  of arm L is provided with a shoulder  $l$ , against which a pin  $l'$  on the rear face of the broadened end of the double arm I strikes on its upward movement, and causes the arm L to immediately assume its original  
position.

Secured at the base of the hollow post B is a bracket O, having journaled therein a  
110 grooved pulley O'. A drive-chain passes about this pulley O', and is secured at one end to the lower end of a weight Q. The  
115 other end is then carried up into the head A and passed over the sprocket-wheel G<sup>2</sup>, and the free end of the chain is next fastened to the upper end of the weight, thus making in  
effect an endless drive-chain with an inter-  
120 posed weight. The post B being of considerable height, the weight will serve for some time without rewinding, as said weight moves but a short distance at each operation of the  
125 apparatus. When it is necessary to wind up the weight, it is simply necessary to pull upon the drive-chain from the base of the post, in-  
stead of having to climb the post to wind up the mechanism, as is usually the case. Should  
130 the weight reach the base of the post or become "run down" through the neglect of the attendant or from other cause, it or a projec-  
tion or stop on the chain will engage a cir-  
cuit-breaker R at the base of the post, which  
circuit-breaker is so connected with the main  
circuit to the magnets that it will cause the  
signal to be at once set at "danger."

The respective ends of the helices of the



magnets M are connected with the respective rails of the railroad-track at one end of the block of railroad. The other ends of the tracks of said block are connected with the respective poles of the battery. Thus it will be seen that the magnets M are normally energized and hold the signal at "safety," as will be seen from the following description of the operation of the apparatus.

When the parts are in the position to indicate "safety," as shown in Fig. 1, a train entering the block will short-circuit the battery by means of its wheels and axles, and thus cause the magnets to become demagnetized and release their armature. The armature being thus released, the shaft M<sup>2</sup> will turn sufficiently to move the arm L<sup>3</sup> out of the way of the free end of the arm L, which latter is forced upwardly by the engagement of the broadened end of the double arm I with the lug k on arm L. As this arm moves on its shaft h' it causes the semicircular plate I<sup>9</sup> to turn on its pivot through the medium of the link j' and move away from the pivoted latch. The free end of the latch will then become disengaged from the lug e' of wheel II. The double arm I will now be free to make a partial revolution, being impelled by the weight I<sup>3</sup>. The movement of the parts just described, with the exception of the backward movement of the double arm I, are caused by means of the force exerted upon the wheel II by the weight Q. As the double arm makes its backward movement, as above described, it carries with it the signal-blade F from a vertical or "safety" to a horizontal or "danger" position, and also forces the holders c<sup>3</sup> into alignment with the openings c in the head A. It will be seen from the above that all the weights, including the one on the signal-blade, co-operate to bring the signal to "danger," and that said weights are permitted to act the instant the battery becomes short-circuited, and the magnet thereby demagnetized. Now, when the train passes off the tracks of a block, the magnets are again energized, the armature attracted, and the shaft M<sup>2</sup> rotated to free the free end of the arm K and lock the free end of arm L. The force of the main weight upon the wheel II will now cause one of the projections on said wheel to engage the roller in the arm K and tilt said arm sufficiently to permit the passage of the said projection. The arm K then drops to its normal position by gravity and the wheel continues to rotate until another projection on wheel II comes near the lever K. As wheel II rotates, one of the lugs e' on its rear face comes in contact with the pivoted latch I', and thus carries the broadened end of the double arm with it until said broadened end engages the lug k of lever L, which forms a positive stop for it, the lever now being prevented from turning by means of the arm L<sup>3</sup> on shaft M<sup>2</sup>. During this movement of the double arm, which is fixed on the same shaft with the signal-blade, the blade will be carried to a vertical position, denoting

"safety." At the same time the holders c<sup>3</sup> will be withdrawn from the openings, and the apparatus will be set to indicate "safety," or "track clear."

It will be noticed that the wheel II always moves in the same direction, being retained from movement in the reverse direction by the engagement of the dog 6 with the projections on the periphery of the disk. This dog may be pivoted in the top of the head and in proximity to the wheel II. It will also be seen that all parts of the operating mechanism will be protected by the head A and hollow post B and not liable to become rusty from exposure to the weather.

In this apparatus we have adopted certain details of construction which are described in another case filed by us April 11, 1889, Serial No. 306,774, and we do not wish to be understood as claiming in this application such details *per se*, but only in combination with other features, which combinations we believe to produce a new apparatus.

Many changes might be made in the constructive details of our invention without departing from the spirit or limiting the scope thereof. Hence we do not wish to limit ourselves to the precise details of construction herein described; but,

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a railroad-signal frame, of a signal-blade and a wheel mounted in said frame, teeth projecting from the periphery of the wheel at equidistant points, mechanism for rotating said wheel to set the signal-blade in one position, electrically-operated devices for controlling the operation of said wheel, and an auxiliary weight for turning the signal-blade to the opposite position to indicate "danger," substantially as set forth.

2. In a semaphore, the combination, with a head, of two shafts mounted therein in the same horizontal plane, a visual signal-blade and a weighted arm secured to one of said shafts, a drive-chain passing over the other shaft, a wheel also on the latter shaft to engage the weighted arm, and devices for releasing the weighted arm from said wheel, substantially as set forth.

3. In a semaphore, the combination, with a head, of two shafts mounted therein, a visual signal-blade and a weighted arm secured to one of said shafts, a pivoted latch carried by said weighted arm, a weighted sprocket-chain passing over the other shaft to drive it, a wheel also on the latter shaft having projections to engage the pivoted latch, and devices for releasing the weighted arm from said wheel, substantially as set forth.

4. In a semaphore, the combination, with a head, of two shafts mounted therein, a visual signal-blade and a weighted arm secured to one of said shafts, a pivoted latch carried by said weighted arm, a roller carried by said



latch, a weighted sprocket-chain passing over the shaft, a wheel also mounted on the latter shaft and having projections to engage the pivoted latch, a curved guide-plate pivoted in the head to maintain the latch in engagement with the wheel, and devices for moving said guide-plate to disengage the latch from the wheel, substantially as set forth.

5. In a semaphore, the combination, with a head, of two shafts mounted therein, a visual signal-blade and an arm secured to one of said shafts, a grooved quadrant on one end of said arm, a weighted chain secured thereto, a pivoted latch on the other end of the arm, a weighted chain passing over the other shaft to drive it, a wheel mounted on the latter shaft and having projections to engage the pivoted latch, and devices for disengaging said latch from the wheel, substantially as set forth.

6. In a semaphore, the combination, with a head, of two shafts mounted therein, a visual signal-blade and an arm secured to one of said shafts, a weight suspended from one end of said arm, a pivoted latch at the other end thereof, a chain passing over the other shaft to drive it, a wheel also mounted on the latter shaft and having projections thereon to engage the pivoted latch, mechanism for tripping the pivoted latch to release the arm, and an electro-magnet to control the operation of said tripping mechanism, substantially as set forth.

7. In a semaphore, the combination, with a head, of two shafts mounted therein, the end of one shaft rotating in the hollow end of the other, a signal-blade and a weighted arm secured to one of said shafts, a latch pivoted on one end of said arm, a weighted chain passing over the other shaft to drive it, a wheel also mounted on said shaft and having projections to engage the pivoted latch, and devices for tripping the latch, substantially as set forth.

8. In a semaphore, the combination, with a head, of two shafts mounted therein, a signal-blade and an arm mounted on one of said shafts, a quadrant on one end of said arm, a weight suspended from said quadrant and made in two parts, one part to be engaged and lifted by the other, a pivoted latch at the other end of said arm, a chain passing over the other shaft to drive it, and a wheel on said shaft, having projections to engage the pivoted catch and tripping mechanism for said latch, substantially as set forth.

9. In a semaphore, the combination, with a head, of two shafts mounted therein, a signal-blade and a weighted arm secured to one of said shafts, a pivoted latch carried at one end of said arm, a sprocket-wheel and ratchet-wheel secured to the other shaft, a weighted chain passing over the sprocket-wheel to drive the shaft, a wheel having projections on its periphery and lugs on its face for engaging the pivoted latch, said wheel being loosely mounted on the latter-named shaft, a spring-sustained dog on said wheel to engage the ratchet-wheel to cause said wheels to rotate together

in one direction, and tripping mechanism for releasing the pivoted latch from the wheel having projections, substantially as set forth.

10. In a semaphore, the combination, with a yoke, a shaft mounted at one end in said yoke and at the other end in the semaphore-head, and a signal-blade carried by said shaft, of elastic material secured to the yoke and adapted to receive and cushion the signal-blade when it is turned to assume either a vertical or a horizontal position, substantially as set forth.

11. In a railroad-signal, the combination, with a head having openings for the emanation of light, of a shaft mounted therein, a signal-blade and a weighted arm carried by said shaft, and holders for transparent material, pivoted in the head in proximity to the openings therein and having pivoted connection with the weighted arm, whereby said holders will be controlled by the movements of said arm, substantially as set forth.

12. In a semaphore, the combination, with a head, of two shafts mounted therein, a visual signal-blade and a weighted arm secured to one of said shafts, a pivoted latch at one end of said weighted arm, a wheel having projections mounted on the other shaft, means for propelling said shaft and the wheel, tripping mechanism for the pivoted latch, an arm mounted to vibrate in a bracket and carrying a roller with which the projections on the periphery of the wheel engage, and an electro-magnet for releasing said arm and holding the tripping mechanism, substantially as set forth.

13. In a semaphore, the combination, with a head, of two shafts mounted therein, a visual signal-blade and a weighted arm on one of said shafts, a pivoted latch on the weighted arm, a wheel having projections mounted on the other shaft, means for driving said shaft and wheel, tripping mechanism for the latch, a vibrating arm to hold the wheel from rotation, a shaft with which said arm engages, an armature on said shaft, and a magnet for oscillating the shaft to release the vibrating arm and wheel, substantially as set forth.

14. In a semaphore, the combination, with a head, of two shafts mounted therein, a visual signal-blade and a weighted arm secured to one of said shafts, a pivoted latch on one end of said arm, a wheel having projections mounted on the other shaft, means for rotating said shaft and wheel, a pivoted curved plate to bear upon the pivoted latch, an arm mounted in a bracket, a link connecting the curved plate and the latter-named arm, a shaft carrying an armature, an electro-magnet, and an arm on said shaft for holding the tripping mechanism, substantially as set forth.

15. In a semaphore, the combination, with a head, of two shafts mounted therein, a visual signal-blade and a weighted arm secured to one of said shafts, a pivoted latch on said arm, a wheel having projections mounted on



the other shaft, a pivoted curved plate to bear upon the pivoted latch, an arm mounted in a bracket, a lug thereon against which the weighted arm abuts, a link connecting the  
5 curved plate and latter-named arm, a shaft carrying an arm to normally hold this arm, an armature and a weight on the latter-named shaft, and a magnet for actuating said armature, substantially as set forth.

10 16. The combination, with the tracks of a railroad-block, of a semaphore carrying signaling devices and an electro-magnet, said tracks and magnet being in a normally-closed circuit, actuating mechanism for the  
15 signaling device, a weight for propelling said actuating mechanism, and a circuit-breaker connected with the main circuit with which said weight engages when run down, whereby the circuit is opened and the signal set at  
20 "danger," substantially as set forth.

17. The combination, with the tracks of a railroad-block, of a semaphore carrying signaling devices and an electro-magnet, said tracks and magnet being in a normally-closed circuit, actuating mechanism for the signal- 25 ing device, a weighted chain for propelling said actuating mechanism, and a circuit-breaker connected with the main circuit with which a stop or projection on said chain engages, whereby the circuit is opened and the 30 signal set at "danger," substantially as set forth.

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

FREDERICK STITZEL.  
CHARLES WEINEDEL.

Witnesses:

H. L. KRIEGER,  
JOHN MAAS, Jr.