

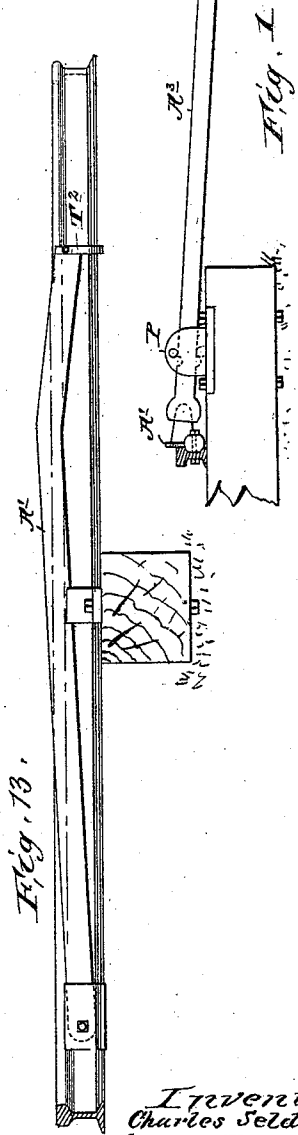
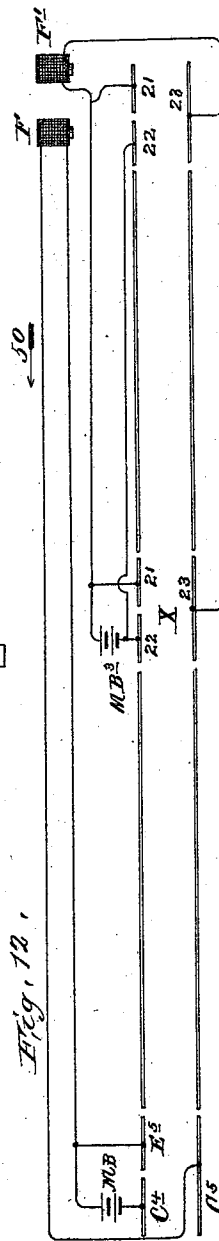
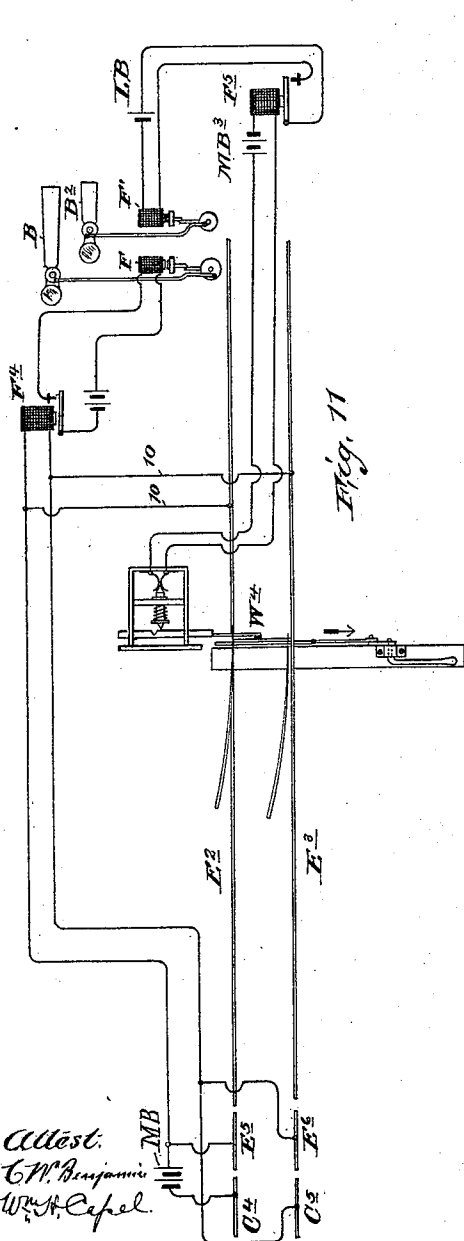
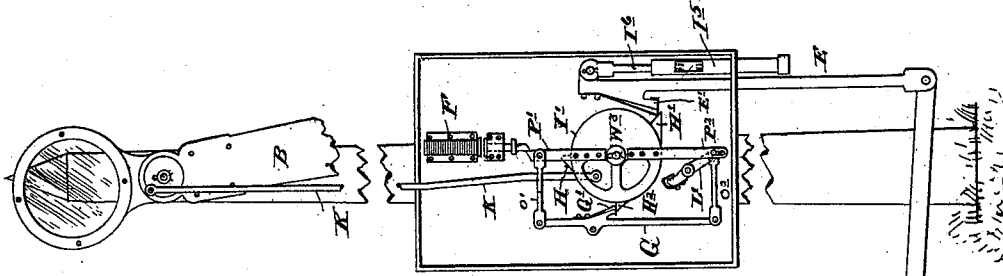
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7 Sheets—Sheet 1.

C. SELDEN & F. P. J. PATENALL.
RAILROAD SIGNAL.

No. 529,811.

Patented Nov. 27, 1894.



Inventors.
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Frank R. Patenall
by
O. L. Townsend
att'y

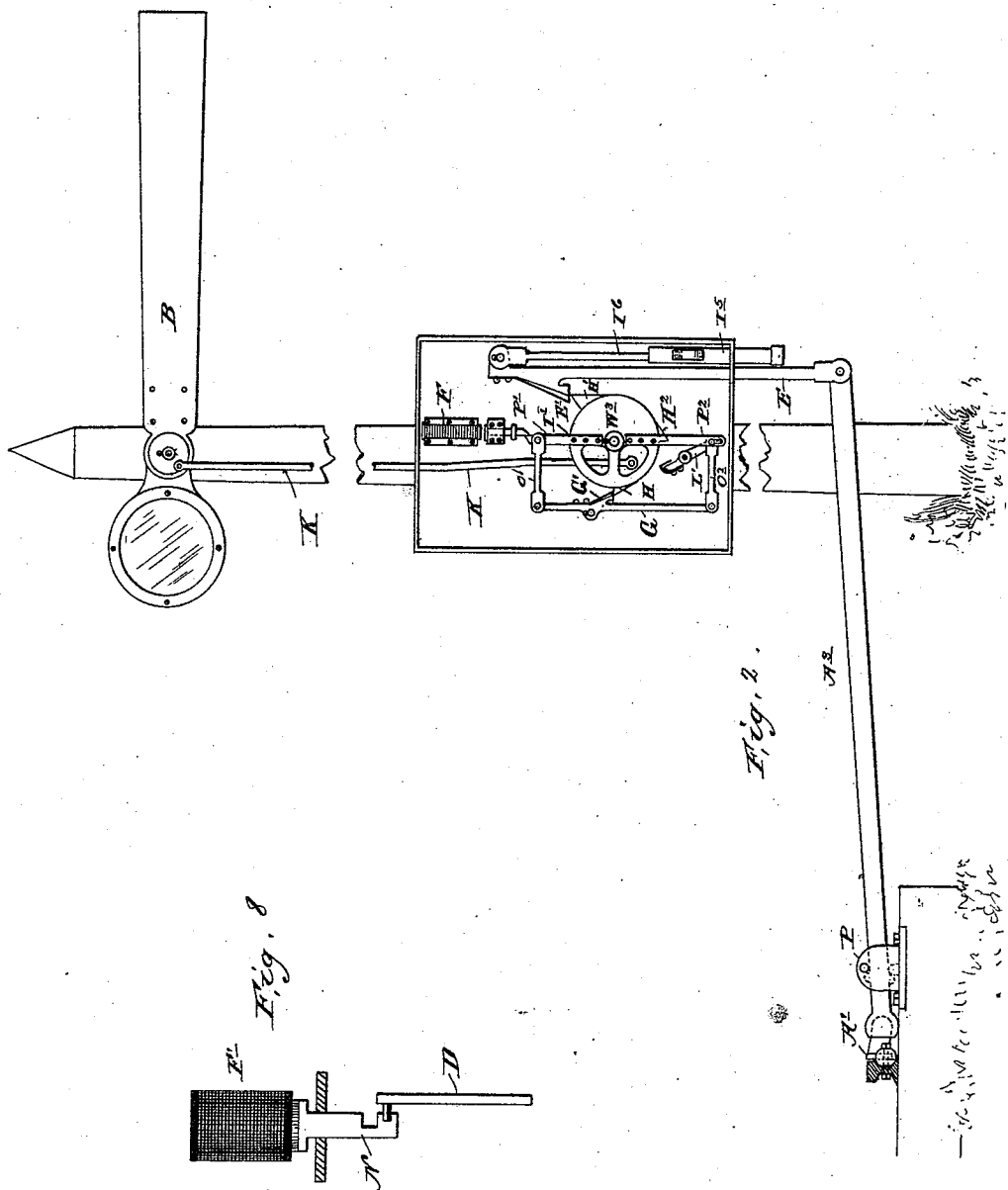
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7 Sheets—Sheet 2.

C. SELDEN & F. P. J. PATENALL.
RAILROAD SIGNAL.

No. 529,811.

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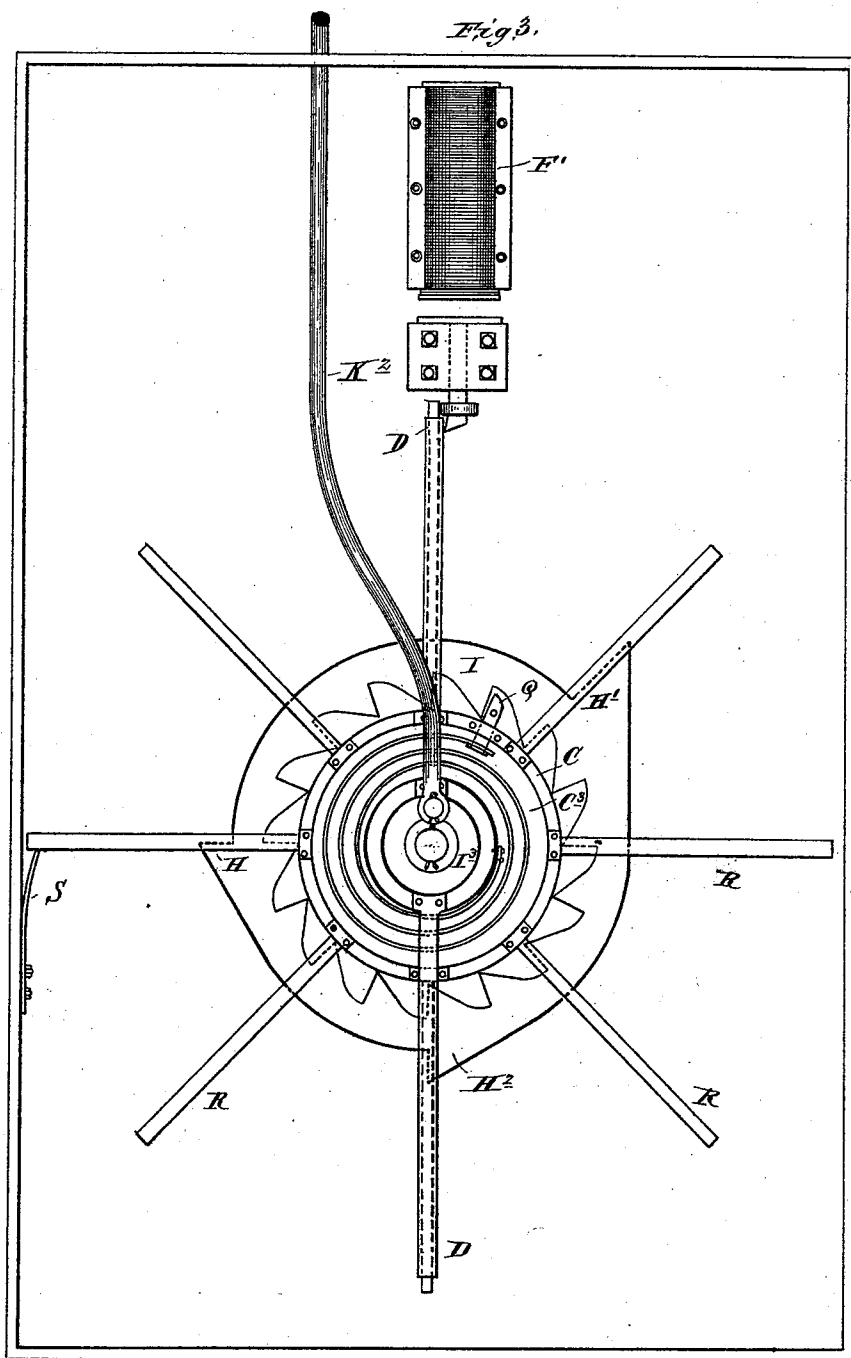
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7 Sheets—Sheet 3.

RAILROAD SIGNAL.

Patented Nov. 27, 1894.



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(No Model.)

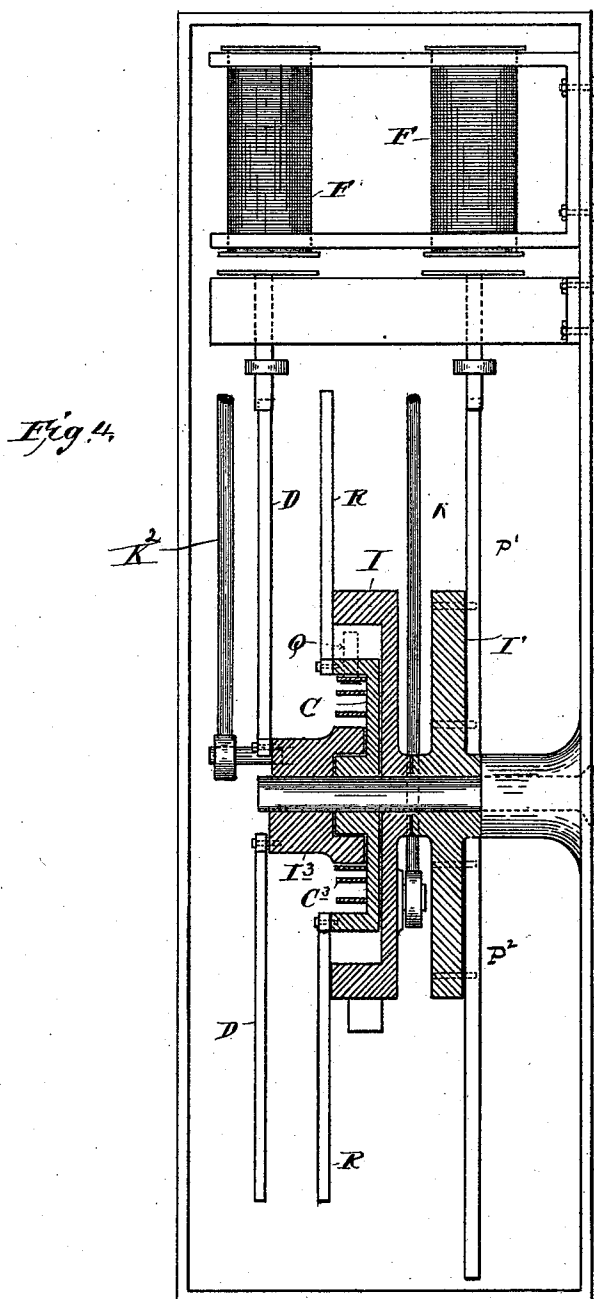
7 Sheets—Sheet 4.

C. SELDEN & F. P. J. PATENALL.

RAILROAD SIGNAL.

No. 529,811.

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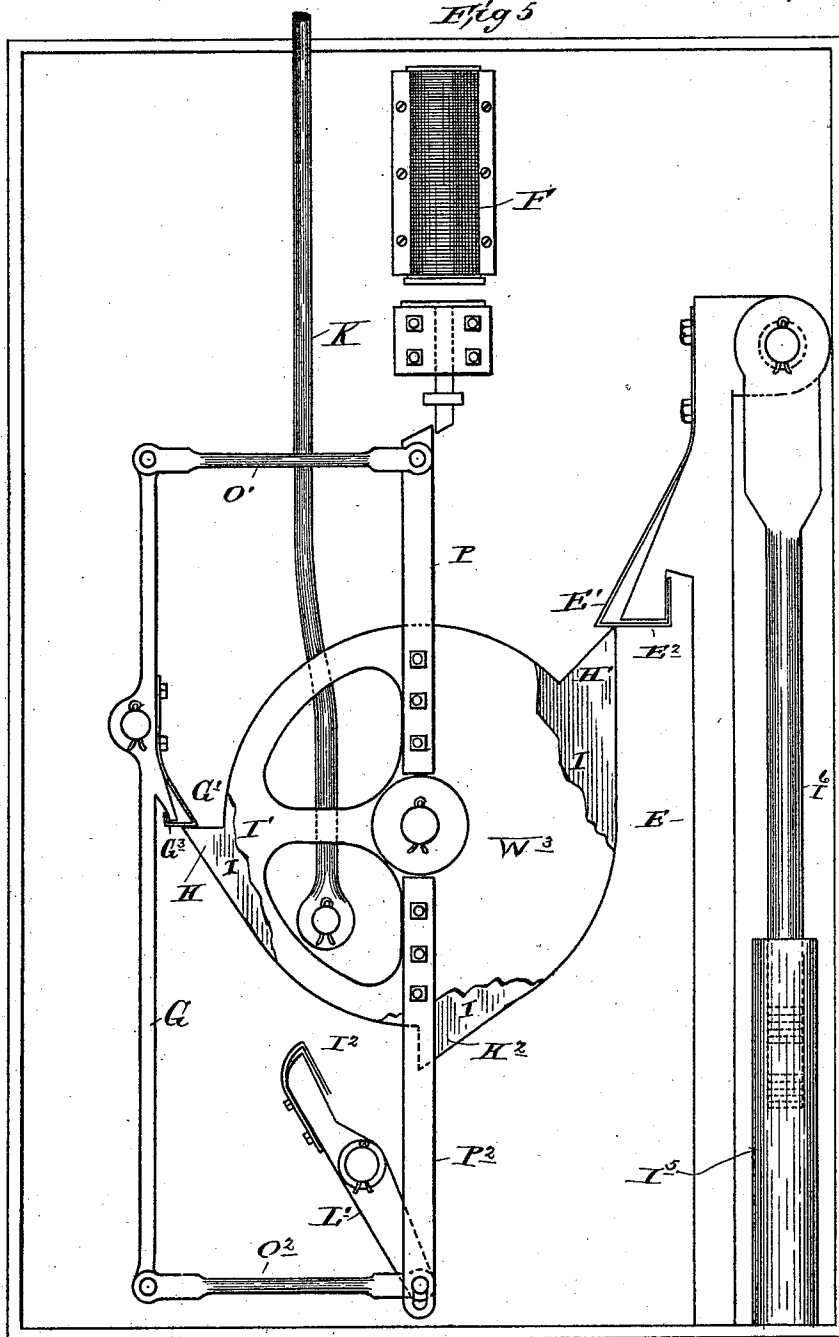
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RAILROAD SIGNAL.

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Fig 5



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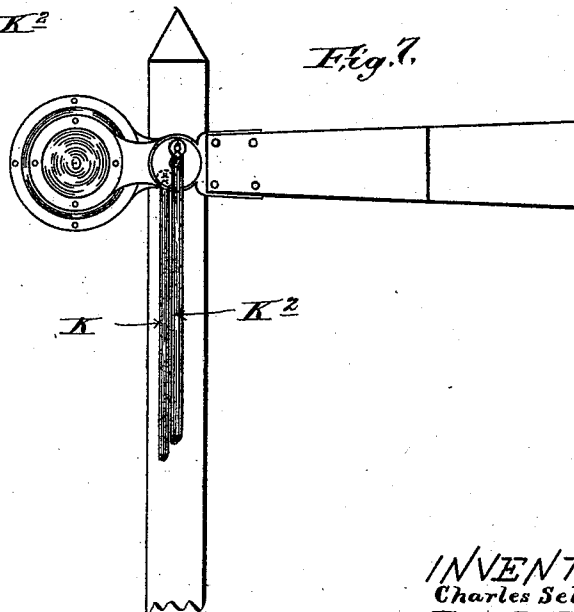
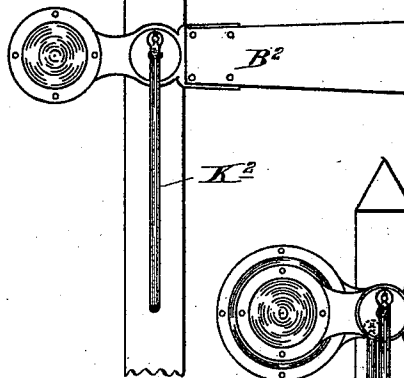
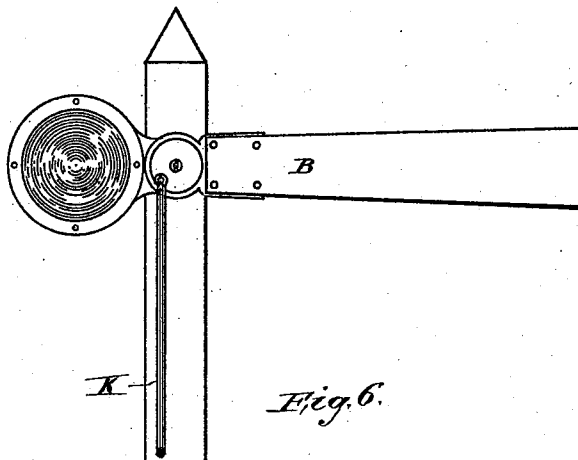
(No Model.)

7 Sheets—Sheet 6.

C. SELDEN & F. P. J. PATENALL.
RAILROAD SIGNAL.

No. 529,811.

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RAILROAD SIGNAL.

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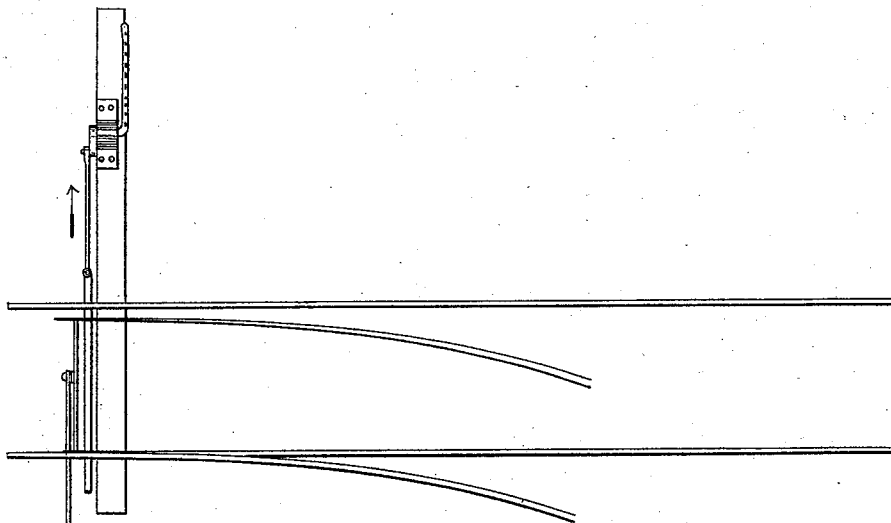


Fig. 9.

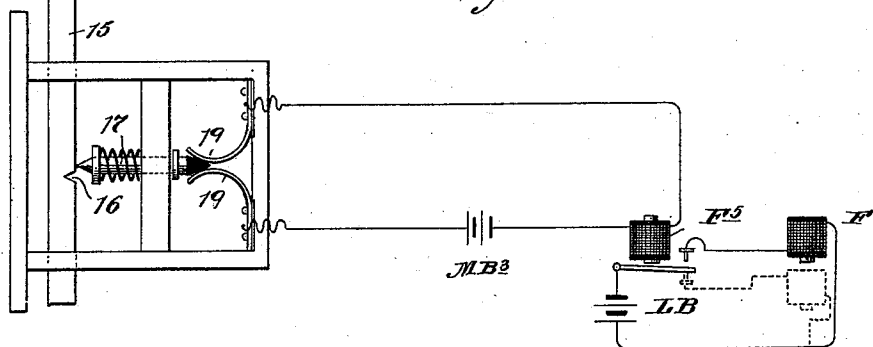


Fig. 10.

Attest
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MB3
F5
F'
LB
Inventors,
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by
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UNITED STATES PATENT OFFICE.

CHARLES SELDEN AND FRANK P. J. PATENALL, OF BALTIMORE, MARYLAND;
SAID PATENALL ASSIGNOR TO SAID SELDEN.

RAILROAD-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 529,811, dated November 27, 1894.

Application filed December 18, 1893. Serial No. 493,957. (No model.)

To all whom it may concern:

Be it known that we, CHARLES SELDEN and FRANK P. J. PATENALL, citizens of the United States, and residents of Baltimore, in the State of Maryland, have invented a certain new and useful Railroad-Signal, of which the following is a specification.

Our invention relates to railway signals of the class known as block signals that are set to "danger" as a train enters and to "safety" when it leaves said block, and is more particularly designed for use with mechanically operated signals or semaphores which are mechanically set by the train at one end of the "block" and are released from danger position by means of an electro-magnet operated from the opposite end of the block.

One of the purposes of our present invention is to provide means whereby an auxiliary signal at the entrance end of the block where the main signal is located, may be operated or controlled from a switch or cross-over or from other point within the block.

A further object of our invention is to simplify and improve the mechanism for releasing the main signal through the action of its controlling magnet, as will more particularly hereinafter appear.

The auxiliary signal which we herein term a "dwarf" or lap signal or semaphore will be described as operated in connection with a main block signal of the general character described in a patent to Charles Selden, granted January 16, 1894, No. 512,754. In that patent there is described a biased semaphore which tends to set itself at danger but is normally held in safety position by an overbalancing weight which is lifted by the action of a track lever. When this weight is lifted the counterbalance of the signal sets the latter to danger and the overbalancing weight with its connected parts as well as the signal, are held in such danger position by a catch that is released to allow the same to resume safety position when the train leaves the block. In this system the actuating power of the signal is practically the train operating through the track lever or similar mechanism.

Our present invention provides means

whereby in connection with the said main semaphore, an auxiliary signal may be used which shall be operated by the same power stored in a spring or weight and released or controlled by a proper magnet or similar means controlled from the switch or cross-over or by any other device so that the auxiliary or dwarf signal may, by the action of said spring or weight, be set into and out of danger position. The invention is, however, alike applicable to main semaphores or block signals mechanically operated by other means than those described in the patent of Charles Selden before referred to.

In the accompanying drawings:—Figure 1 is a general side elevation of a device embodying our invention, the connecting parts for the "dwarf" or auxiliary signal, being omitted. Fig. 2, shows the same apparatus in "danger" position. Fig. 3, is a detail side elevation of the mechanism for the auxiliary or "dwarf" signal. Fig. 4, is a vertical cross-section through the mechanism consisting of the controlling disks or wheels. Fig. 5, shows an enlarged detail side elevation of the mechanism, the track lever and connections and the signal arms being omitted. Figs. 6 and 7, show two relative arrangements of the main and "dwarf" or auxiliary signals. Fig. 8, shows in detail a modification in the catch or lock for the auxiliary signal adapted for use when its controlling magnet is normally charged. Figs. 9 and 10, illustrate forms of device and arrangements of circuits for producing a momentary action of the magnet of the auxiliary signal through the operation of a railroad switch or other mechanism. Fig. 11, is a general diagram of circuits that may be used for operating the signals. Fig. 12, is a diagram illustrating the use of the auxiliary signal as a lap signal. Fig. 13, is a side elevation of the track lever.

For purposes of illustration only we shall describe our invention as carried out in connection with signals consisting each of the usual pivoted arm or blade that shows "danger" by its horizontal position and "safety" when depressed to a greater or less angle.

B, is the main semaphore arm or blade of a block signal pivoted, as shown, on a suit-

able support and provided with the usual lens and lantern for night use, and B^2 , is the similar arm or blade for the auxiliary signal.

K , is the connection rod by which arm B , is depressed to safety and K^2 , the similar rod for the auxiliary "dwarf" signal. Both signals are shown in danger position and both are so biased, as well understood in the art, that on breakage or failure of the connection rod or other portion of the mechanism by which they are held in safety position, they will, by their own bias, swing to danger position.

The main and the "dwarf" or auxiliary signals are mounted in any desired position with relation to each other either with their pivotal axes coincident, or one above the other.

I , is a pivoted disk or wheel with which the connection rod K , is joined by a crank pin or similar device whereby the signal arm or blade and the disk may be caused to move together.

G' , is a catch mounted on a lever G , and serving by its engagement with a lug tooth or similar device H , on disk I , to hold the disk and connected signal in danger position against the action of the overbalancing weight that acts upon the disk through the lug or projection H' , thereon, as will be presently described. When the catch releases the disk the weight operating downward upon the lug H' , turns the semaphore to safety.

H^2 , is another lug or projection on the disk that engages with the catch when the parts have moved to normal safety position under the action of the overbalancing weight.

The breakage of the catch or other parts holding the disk and semaphore in such position allows a sufficient further movement of the parts under the influence of the overbalancing weight, to cause the automatic disengagement or disconnection of the latter from the disk, whereupon the biasing force tending to set the signal to danger will assist itself and so set it.

E , is a rod which is supported on a disk I , by means of a lug or hook E' , on the rod resting upon the lug H' , of the disk. The rod E , or parts connected with it constitute the overbalancing weight that tends to set the signal and hold it in safety position. The removal of such weight either by the lifting of the rod E , or by the slipping of the hook E' , past the lug H' , frees the signal from such weight and the bias of the signal sets it to danger automatically. As will be seen the rod E , may be lifted freely away from engagement with the disk.

E^2 , is a spring applied to the hook E' , as shown, to allow it to freely pass the projection H' , when the rod is moved in an upward direction after having slipped down past the projection.

The position of the parts while the signal is in safety position is shown in Fig. 1, and the position when the rod E , has been lifted so as

to allow the signal to take the danger position is shown in Figs. 2 and 5.

A' , is any track lever for lifting the rod E , to permit the signal to take the danger position. The track lever is properly constructed to gradually take the blow or impact of a car wheel and is connected with the rod through a lever A^3 , fulcrumed from the lever stand P . The track lever A' , and the lever A^3 , are connected through a knuckle joint or other device, as shown in the drawings. The weight of the track lever A' partly counterbalances that of the rod E , and connected parts so that if the track lever be broken, a greater weight comes upon the rod E , or if the lever A^3 , should break between the track lever and the stand the weight of rod E , will pull down with greater force. If the lever A^3 , should break between the rod E , and the fulcrum the weight would be freed from the counterbalancing effect of the track lever and connected parts. This effect of this is to cause a greater strain upon the disk I , at the point of connection of rod E , therewith, and thus causes the hook E' to slip off the lug H' , whereupon the bias of the signal will set the latter to danger. The automatic disconnection of the overbalancing weight from the signal will obviously take place when the parts are in the position shown in Fig. 1, which is supposed to be the safety position. The rod E , should be allowed a slight lateral movement in its guides for the purpose of allowing this automatic disconnection.

When the rail A' , is depressed by the action of the car wheel the rod E , is raised to the position shown in Fig. 2, and the signal sets itself automatically to danger in which position the parts are locked by the action of the catch G' .

A keeper indicated at T^2 , is applied by preference to the rail or track lever A' , to act as a stop to keep the track lever from flying clear above the rail A . This stop is so adjusted, however, as not to interfere with the free play of the track lever so that if it goes up above normal or adjusted position, the signal will go to danger as before described by the overbalancing weight automatically disconnecting itself from the signal mechanism. In connection with the rod E , it is desirable to employ a dash-pot I^3 , the piston rod of which indicated at I^6 , is connected with rod E , in any proper manner. The catch G' , is freed to allow the weight E , to settle and set the signal to safety, through the action of an electro-magnet or other mechanism, as will be presently described. The lug G' , is likewise provided with a spring G^3 , in engagement therewith, as shown, to assist in the passage of the lugs on the disk I , past the catch in a reverse direction.

The parts as thus far described for operating on the main semaphore to cause it to move to danger or back to safety are substantially the same as those described in the prior

patent of Charles Selden, before mentioned, and afford a highly efficient means for operating said signal by the mechanical action of the train.

5 The dash-pot is suitably constructed to allow the bar E, to rise freely but to descend with a retarded movement, thus delaying the movement of the lug H², around to position to engage with the catch G'.

10 We utilize the same power that is employed for mechanically operating the semaphore B, as a means for operating the semaphore B². This we do through storing up power in a spring or weight which is released to set the signal B², first into danger position and then into safety position or vice versa. The spring or weight in which the power is stored up is wound by some winding attachment applied to some portion of the mechanism for the signal B, preferably by connection with the disk I. The disk or wheel through which this power is applied to operate the signal B², through its connection rod K², is indicated at I³. This wheel is connected with the rod K², through a suitable crank pin or other device and turns on a suitable bearing concentric preferably with the disk I.

C³, is a spring which is wound up by the action of the disk I, and which is connected at one end to the wheel I³. The other end of said spring bears a hook or lug Q, which projects through a slot in the rim or flange of a wheel C, and engages with a winding ratchet formed at the inner edge of a countersink in the disk I, as clearly shown in the drawings. The tooth or lug Q, being freely supported on the end of the spring C³, it will be readily seen that on movement of the disk I, in one direction, the spring will be wound up, while on movement in the other direction the ratchet of the disk would slip over the end of the lug Q. A suitable pawl for keeping the spring wound up is furnished by the spring S, which engages the ends of the arms R, projecting from wheel C. As the spring is wound up the lug Q, gradually moves inward in a radial direction until finally the teeth of the winding ratchet may pass it even when moving in a direction to wind up the spring. By this means overwinding is prevented and the disk I, is free to move and operate the signal B, even after the spring is wound up.

The movement of the wheel I³, which causes the signal to move to safety or danger is controlled by means of an electro-magnet F', the armature of which, as clearly shown, carries a lug that is engaged by two diametrically placed arms D, carried by wheel I³. The momentary action of the magnet F', which allows an arm D, to escape produces, as will be obvious, a half rotation of the wheel I³, and a corresponding movement of the signal. At the end of the half rotation the movement of wheel I³, is stopped by the opposite arm D, which finds the catch of the armature in position to engage it. It will be obvious that this operation demands a momentary action

of the magnet F', but we do not wish to be understood as limiting ourselves to this special construction of devices for controlling the action of the "dwarf" or auxiliary signal under the influence of the stored power. It will be obvious that a second momentary action of the magnet F', will cause another half revolution of the wheel I³, and the restoration of the "dwarf" signal to the original position.

In the position of the parts shown the "dwarf" or auxiliary signal is held in danger position. The first action of the magnet F', causes it to be set to safety position and the next action restores it to danger position. The magnet F' may be in the direct circuit of any circuit controller, or may be in a relayed circuit thereof as will be obvious to those skilled in the art. It may be also operated either on a normally closed or a normally open circuit. The action just described presupposes that it is upon a normally open circuit. It will be obvious that the operation of it on a normally closed circuit would require but slight modification of the catch or detent. Thus for instance as indicated in Fig. 8, where the magnet is shown as normally charged, the arm D, might be provided with a projecting pin and the catch N, properly constructed so that while the armature of the magnet is raised the pin will be caught but when the armature drops, through breakage of the circuit in the magnet, then the cut away portion of the catch N, will come opposite the pin and allow the arm D, to revolve.

We do not limit ourselves to the use of the particular construction of winding mechanism shown for operation by the disk I, nor to the operation of said winding mechanism by any particular part of the mechanism for the main signal, but for the sake of simplicity we prefer to organize the parts, as shown, so that the disk I, may act directly upon the concentric winding wheel and concentric operating disk for the connection rod K².

The catch G', that controls the action of the disk I, is operated by a supplemental power released through the action of magnet F, and said supplemental power is wound up for the next action by the operation of the overbalancing weight or rod E, in setting the signal when the disk is released. The construction of devices for producing this action is described in the prior patent of Charles Selden, hereinbefore referred to, but our present invention consists among other things in an improved construction of devices for the same purpose.

The supplemental power to operate upon the catch G', is furnished by a disk I', mounted coaxially and concentrically with the disk I, and weighted at its part W³. From the disk I', project the two arms P', P², the upper one of which is normally locked by the projection extending downwardly from the armature of the magnet F. The arms P', P², are connected by links O', O², with the lever G, carrying the catch G'. The weight of the disk I', tends

obviously to move the arms and to swing the lever G, in a direction to disengage the catch G', from the lug H, of the wheel I. This movement takes place when the armature of the magnet F, rises to release the upper arm P'. The parts are restored to normal position or position shown in Fig. 5, by the action of a lever L', which is connected at one end with the arm P', and at the other end has a toe or projection I², adapted to be engaged by a lug H², on the disk I, when the latter is released and turned by the downward movement of the rod E.

The action of the parts is as follows, assuming that they are in the position shown in Fig. 5: When the armature of the magnet F, is raised the weight of the disk I', turns the arms P', P², and operates the catch G', thus releasing disk I. At the same time the lever L', is turned so as to move the end I², into the path of the lug or projection H², on the disk I. The disk I, being released turns under the action of the overbalancing weight E, and the projection H², upon said disk, by engaging with the end I², of lever L, swings the disk I', back to the position indicated in the drawings. This action results in the storage of power in the disk I', for acting upon the lug G', when the magnet F, again acts. The end I², of the lever L', is furnished with a spring as shown that will permit the lug H², to readily pass it in a reverse direction as it may be required to do, if the rod E, should slip away from disk I, while the parts are in the position shown in Fig. 1, at which time, as before explained, the disk I', rotates under the influence of the bias in the semaphore.

In the diagram Fig. 11, we have shown our invention as applied to one block of an electric block system. The means for controlling the operation of the magnet F, for the main block signal may be the same as those shown in the patent to Charles Selden, referred to above. The rails of the block are indicated at E², E³, and short lengths of circuit closing rails designed to bring the magnet F, into momentary operation when the train passes off said block are indicated at C⁴, C⁵. M, B, is the battery or other generator of electricity in the controlling circuit for the magnet F. The magnet F, may be in the direct circuit thereof or in a local circuit controlled by a relay magnet F⁴, as indicated, the latter being in the direct circuit. When the train passes onto the rails C⁴, C⁵, the circuit of the magnet F⁴, is closed and the magnet is energized thereby closing the local circuit of magnet F, provided there be no connection formed by a car or cars remaining on the rails of the sections E², E³. If a train should break and a car or cars should be left on the section E², E³, no effect will be produced by the closure of circuit at C⁴, C⁵, because of the neutralizing or diverting circuit from the main wires over the branch wires 10, connected to the block E², E³, and from one rail

to the other through the car wheels and axles. Another diverting circuit is formed by a short section of rails E⁵, E⁶, which serves to keep the magnet F, out of action until the last wheels of the train shall have left the short section E⁵, E⁶. The main signal B, is set when the train enters the section mechanically by devices before described and is released or restored to safety position when the train passes out of the block through the magnet F, freeing the catch of the signal mechanism. The "dwarf" or auxiliary signal is normally in safety position. The points of a branch or cross-over from which the "dwarf" signal is controlled are indicated at W⁴. When the points are set to allow a train to pass off the section which is protected by the signal B, the momentary action of magnet F', is produced by any desired means controlled by the switch or cross-over, thereby setting the "dwarf" signal to danger. When the switch points at W⁴, are restored to proper position, then the magnet F', is momentarily energized again and the "dwarf" signal resumes the safety position. The magnet F', may be in the main circuit or in a local circuit as shown.

The battery or generator for energizing magnet F', on the local is indicated at L, B. The relay in the main circuit from W⁴, is indicated at F⁵, and the battery at M, B³.

It will be quite obvious that the main circuit for the relay F⁵, may be either normally open or normally closed, the arrangement of the relay contacts being correspondingly varied to produce a momentary action of magnet F'. Forms of devices and arrangements suitable for this purpose are indicated in Figs. 9 and 10.

15, is a slide bar connected with the switch and having in its side a recess 16, adapted to receive the end of a spring actuated plunger 17. The opposite end of the plunger works between a pair of springs 19, which are in turn connected to the circuit of a battery M, B³, and relay F⁵. The spring of the plunger tends to carry the end thereof away from the space between the springs 19. With the switch open or closed the devices stand in the position shown but in passing from one position to the other of the switch mechanism the plunger is allowed to fall momentarily into the slot 16, and thus allow the springs 19, to momentarily make connection and close the circuit of the relay F⁵. The end of the plunger which works between the springs should be of insulating material. When the magnet F⁵, is energized, its armature is drawn up and closes the circuit of the battery L, B, but normally such local circuit is broken because in the normal position of the parts the plunger is raised by the bar 15 and held in position to separate the contact springs 19. The converse of this arrangement is indicated in Fig. 10. In this case the plunger is normally in position to permit the springs 19, to come into connection with one another

and close the circuit of the battery M, B³, thereby exciting the relay F⁵, and holding up the armature lever of the latter whose back contact is the circuit closing contact for the local containing magnet F'. The bar 15, carries the stud 20, adapted to engage with the plunger and raise it against the influence of its spring so as to separate the springs 19, and break the circuit of the relay F⁵. When the switch is in either of its positions of rest, the end of the plunger is located at one side or the other of the stud or projection 20, but in throwing the switch to open it or to close it the stud 20, momentarily raises the plunger and causes a momentary breakage of the circuit at the springs 19. In both the arrangements Figs. 9 and 10, as thus far described, it will be observed that the locals are on normally open circuit so that if the local battery should fail the signal could not go to danger when required. We prefer, therefore, to arrange the locals as normally closed circuits so that if the local battery fails it will automatically cause the signal to go to danger independently of the action of the devices controlling the main line circuit. This arrangement of local we have indicated in Fig. 9, by the dotted lines connected with the relay armature and circuit of battery L, B. Under this arrangement when the circuit of the main line is closed the circuit of the battery L, B, would be broken through the signal magnet and the latter would cause the signal to be set to danger. The same thing would happen if the local battery or circuit should fail. The same arrangement we have indicated in Fig. 10, in connection with the normally closed main line circuit. The local is closed as before and as indicated by the dotted lines, so long as the main line remains closed. The breakage of the main line causes the signal to go to danger by breakage of the local. Similarly, if the local battery or circuit therefor, should fail, the signal would go to danger as also if the main line battery or circuit therefor should fail. It is obvious that this arrangement is the preferable one for use either with the auxiliary signal or with the magnet controlling the main signal. The arrangement of the detent for the controlling magnet, whether of the main or of the auxiliary signal, in such manner that the signal may be released when the magnet is operated on normally closed circuit and its circuit is broken, has already been indicated.

Various other arrangements will suggest themselves to electricians as suitable for the purpose of causing a momentary action of the magnet of the auxiliary signal through the operation of a railroad switch, a draw-bridge or other railway devices.

One way of utilizing the auxiliary signal as a lap signal is indicated in the diagram Fig. 12. In this instance both the magnets F and F', are in the direct controlling circuit, no relay being employed. The diagram indicates

a single block and the direction in which the train passes is indicated by the arrow 50. When the train enters the block the main signal is set as already explained and the magnet of the auxiliary signal is momentarily energized to cause the auxiliary semaphore to come to danger. When the train reaches the point X, which may be at the center of the block or any other desired point, as circumstances may require, the magnet F' is momentarily energized again thus causing the auxiliary signal to come to safety, the main signal remaining at danger. This condition of the signal indicates caution allowing the train to enter the block, but under reduced speed. When the train leaves the block the main signal comes to safety, as before explained, both signals being now at "safety" or "clear." When the auxiliary signal is used in this manner it is obvious that the blades or arms should be on separate centers, as indicated in Fig. 6. Where no caution signal is required, and the auxiliary signal is to be used only to designate an open switch, then the semaphore arms or blades may be on the same center and one signal lamp will do for both.

The means for producing the momentary operation of the two signals when one is used as a "lap" signal may be of any desired character. A circuit closing rail suitable for the purpose is indicated in the diagram. M, B³, is the main battery for the magnet F'. At the entrance end of the block are located short sections of rail 21, 22 and 23, insulated from one another. The wheels and axles of the train close the connection from 22 to 23, as also from 21 to 23. The short section 21, is placed in advance of section 22, and serves to short circuit the battery from the magnet F', until the last pair of wheels on the train leaves the rail 21, after which the momentary connection formed by said pair of wheels from 22 to 23, causes a momentary action of the magnet F'. As will be seen from the diagram this short circuiting action of the rail 21, is due to the fact that it is connected into the circuit of magnet F', between the same and one pole of the battery. The short circuiting connection to the opposite pole is formed by the continuation of the rail 23, extended to be opposite rail 21. The operation is substantially the same as in the case of the circuit closers C⁴, C⁵, E⁵, E⁶, in Fig. 11. A similar momentary action of magnet F' is caused at the point X, by the same arrangement of insulated rails of short lengths connected to the circuit of the battery M, B³. These devices are merely typical of any means for causing a momentary action of the magnet F'. At the exit end of the section the momentary action of magnet F' is produced by the operation of the insulated rails C⁴, E⁵, C⁵, the latter being extended in this case to include the short length E⁶, of Fig. 11.

While we have termed the signal B³, a "dwarf" or auxiliary signal we do not desire

to be understood as limiting ourselves to the use thereof in connection with another signal as said signal B², might be employed alone or without the other and power stored by the action of a passing train through the mechanism already described, that is to say, the main signal B, its operating rod and connections and the catches, detents and magnet used in connection with disk I, might be dispensed with leaving the disk I, to operate solely in conjunction with the weight of the rod E, or similar weight sustained thereon, as a part of a mechanism for storing power in a spring W, the power thus stored to be employed either for operating a signal mechanism of the kind described or for operating any other device from power stored by the action of the passing train. When thus employed each train as it passed would lift the weight formed by rod E, and allow the disk I, to turn by any suitable counter weight properly applied as, for instance, in the manner that the counter weight of signal B, is applied. After the weight has been lifted and the track lever freed from the action of the wheels the weight in descending would turn the disk I, and its ratchet would wind up the spring or other power as already explained. The power thus stored could be employed for running an alarm bell at a crossing, the power being released by any suitable device as well understood by those skilled in this art, or the power might be employed for operating crossing gates as well as railroad signal apparatus.

It would be desirable in case the winding apparatus is employed in this manner without the use of the catches described as used in connection with the main signal, to employ a suitable stop to prevent the weight E, from falling below the point where it would engage with the lug H'. Such stop would render it unnecessary for the catch E', to pass the lug H', at each upward movement. This part of our invention, to wit: the devices for storing power by any suitable winding mechanism aside from the use of what we term the main signal may be stated briefly to consist in winding up the operating power through the operation of an actuating weight which is lifted by the action of a passing train and in restoring itself to normal position operates the winding mechanism.

What we claim as our invention is—

1. The combination, substantially as described, with a mechanically operated railroad signal, an auxiliary or "dwarf" signal operated by power stored from the main signal mechanism, and means for controlling said auxiliary or "dwarf" signal from switch points or devices within the block controlled by the main signal.

2. The combination, substantially as described, of a railroad signal biased to take the danger position, an overbalancing weight tending to throw the same into safety position, means for lifting the said weight by the

action of a passing train, an auxiliary or dwarf signal, an operating power therefor, and winding mechanism actuated from the main signal mechanism, as and for the purpose described.

3. The combination, substantially as described, of the main signal and its actuating or controlling disk I, a train operated overbalancing weight engaging with said disk, an auxiliary signal, an actuating wheel therefor, an operating spring or its equivalent, as described, connected with the latter, and a winding device for said spring actuated by the main signal apparatus.

4. The combination, substantially as described, of the main signal, its actuating disk I, the overbalancing weight connected with the track lever, the "dwarf" signal, and a power winding ratchet upon the disk I, for the dwarf signal.

5. The combination, substantially as described, of the main signal and its operating disk, the overbalancing weight actuated by the train, the "dwarf" signal, an operating wheel therefor, a spring for actuating said wheel, an electro-magnetically controlled catch governing the movement of said wheel, and a winding device actuated by the disk of the main signal.

6. The combination, substantially as described, of the main signal or semaphore, the disk I, connected therewith, a "dwarf" signal, an actuating wheel for the latter, a spring connected to said wheel, and a winding device for said spring actuated by the wheel I.

7. The combination, substantially as described, with a main and auxiliary or "dwarf" signal, of the concentric actuating disks or wheels, and an intermediate actuating device for the "dwarf" signal in which power is stored by the movements of the disk of the main signal, and a magnet for intermittently releasing said power to cause the operation of the "dwarf" signal.

8. The combination, substantially as described, of the disk I, connected with the main signal, a "dwarf" or auxiliary signal, an actuating spring for the latter having a projecting lug or tooth engaging with an interior winding ratchet on the main disk, as and for the purpose described.

9. The combination with a semaphore, and a controlling or actuating disk therefor, of a lever carrying a catch or detent for engagement therewith, an auxiliary power wheel coaxial with said controlling disk, an electro-magnetically governed catch for said auxiliary power wheel, and links connecting said power wheel with the lever carrying the catch for said controlling disk.

10. The combination, substantially as described, of the semaphore, the coaxially and concentrically mounted disks I, I', a rod E, sustained by one of said disks and tending to rotate the same, a catch G', engaging with the same disk, a magnet and catch controlling the operation of the other disk, and arms

or projections from the latter connecting with the catch for the first named disk.

11. The combination, substantially as described, of the main rotating disk and signal, 5 of the auxiliary weighted disk I', mounted coaxially and concentrically with the first, a catch for the signal disk, links connecting the catch lever with the weighted disk, and a restoring lever also connected with said 10 weighted disk, and adapted to be moved by the latter into the path of the signal disk, as and for the purpose described.

12. The combination, substantially as described, of a disk I, actuated by the passing 15 train and connected with the semaphore, the disk I', having one or more arms P', P², connected with the catch lever G, a catch carried by said lever and engaging with the disk I, a lever L', connected with one of the arms P', 20 P², and a projection carried by the disk I, and adapted to engage with the lever L', to restore the disk I', to normal position during the operation of the signal by its actuating power.

13. The combination with a railroad signal 25 and its operating power, of a winding mechanism for the latter, an actuating weight for said winding mechanism, a track lever connected to said weight and operated by a passing 30 train for lifting the weight independently of the part upon which it normally rests, and means for moving said part into a position to support the elevated weight.

14. In a railroad signal apparatus, an operating power such as a spring, a detached 35 reciprocating actuating weight for winding up said power, means connected to said weight for lifting it independently of the part with which it is normally engaged, means for moving said part into a position to support the 40 lifted weight, and a catch for normally holding the signal apparatus from action by its operating power.

15. The combination, substantially as described, of a disk I, weight rod E, connected 45 to and lifted by a track lever and engaging with projections on said disk, a spring C, intermediate winding mechanism between the spring C and disk I, a wheel I³, mounted concentrically with said disk and connected with 50 said spring, a catch or detent for normally holding the said wheel stationary, and a signal connected to said wheel.

16. The combination, substantially as described of the signal operating disk or wheel 55 I, mechanism for winding up a spring or weight thereby, a second signal operated by said spring, a detached actuating weight for the disk I, and means for lifting said actuating weight by the action of a passing train. 60

17. The combination of two associated signals, an actuating device for one of them controlled by a spring, an actuating device for 65 the other controlled by a train-operated weight, means for connecting the two actuating devices in a manner such that the operation of the latter shall wind the spring of the former.

18. The combination, substantially as described, in a railroad signal, of an operating 70 power for one signal, a catch for normally holding the latter out of action, a winding mechanism for said operating power, an actuating disk for said operating power and for 75 a second signal, an actuating weight sustained by said disk, and means for lifting the weight by the action of a passing train, as and for the purpose described.

Signed at Baltimore, in the State of Maryland, this 20th day of November, A. D. 1893. 80

CHARLES SELDEN.

FRANK P. J. PATENALL.

Witnesses:

GEO. W. HAULENBEEK,

E. J. SILKMAN.