(No Model.) 2 Sheets—Sheet 1.

G. C. YOUNG.

RAILWAY SIGNAL.

No. 512,644. Patented Jan. 9, 1894.

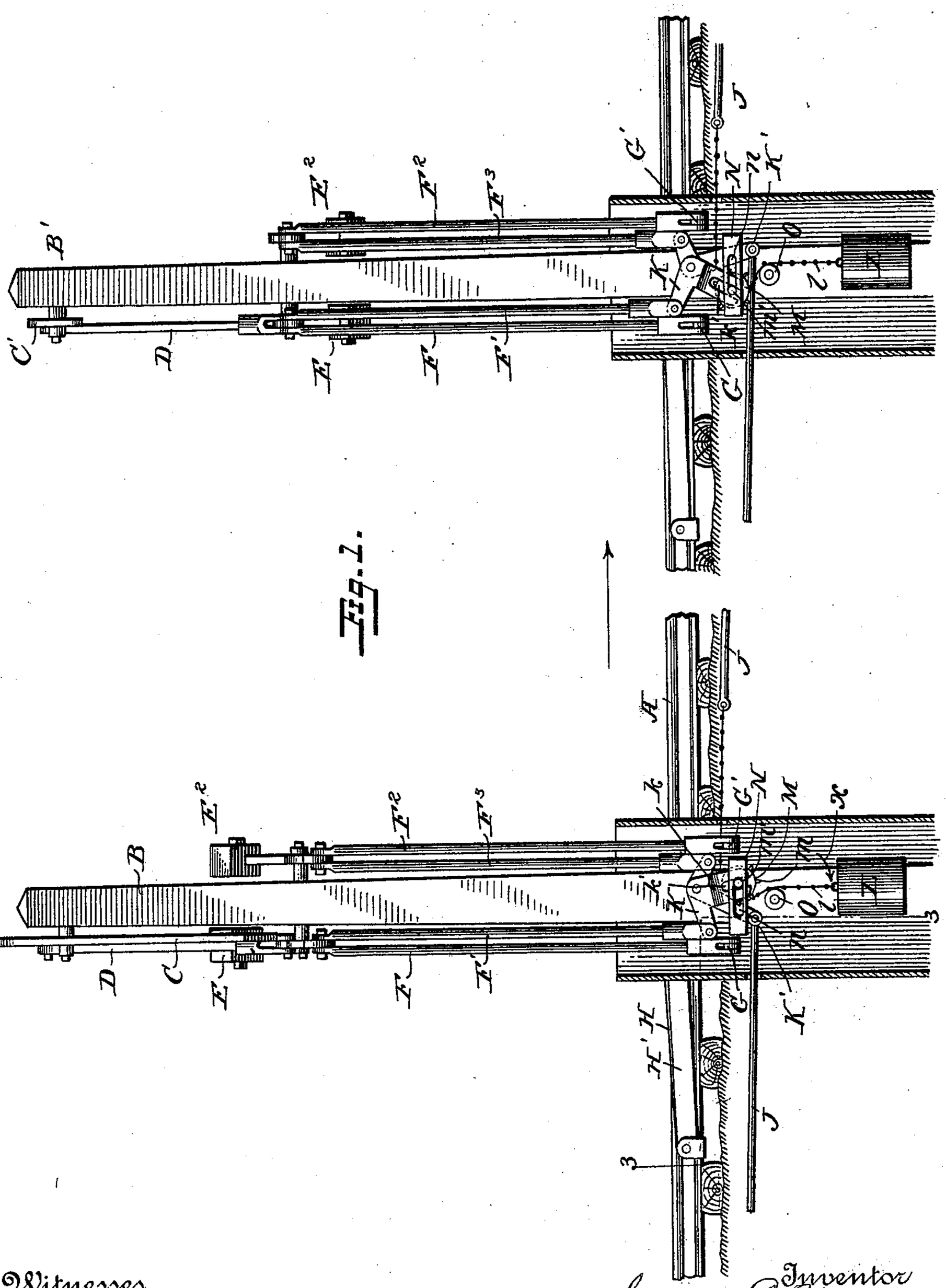


Fig. 1.

Witnesses
Jno. G. Hinkel.
A. N. Dobson

Inventor
George C. Young,
By Foster Freeman
Attorneys.

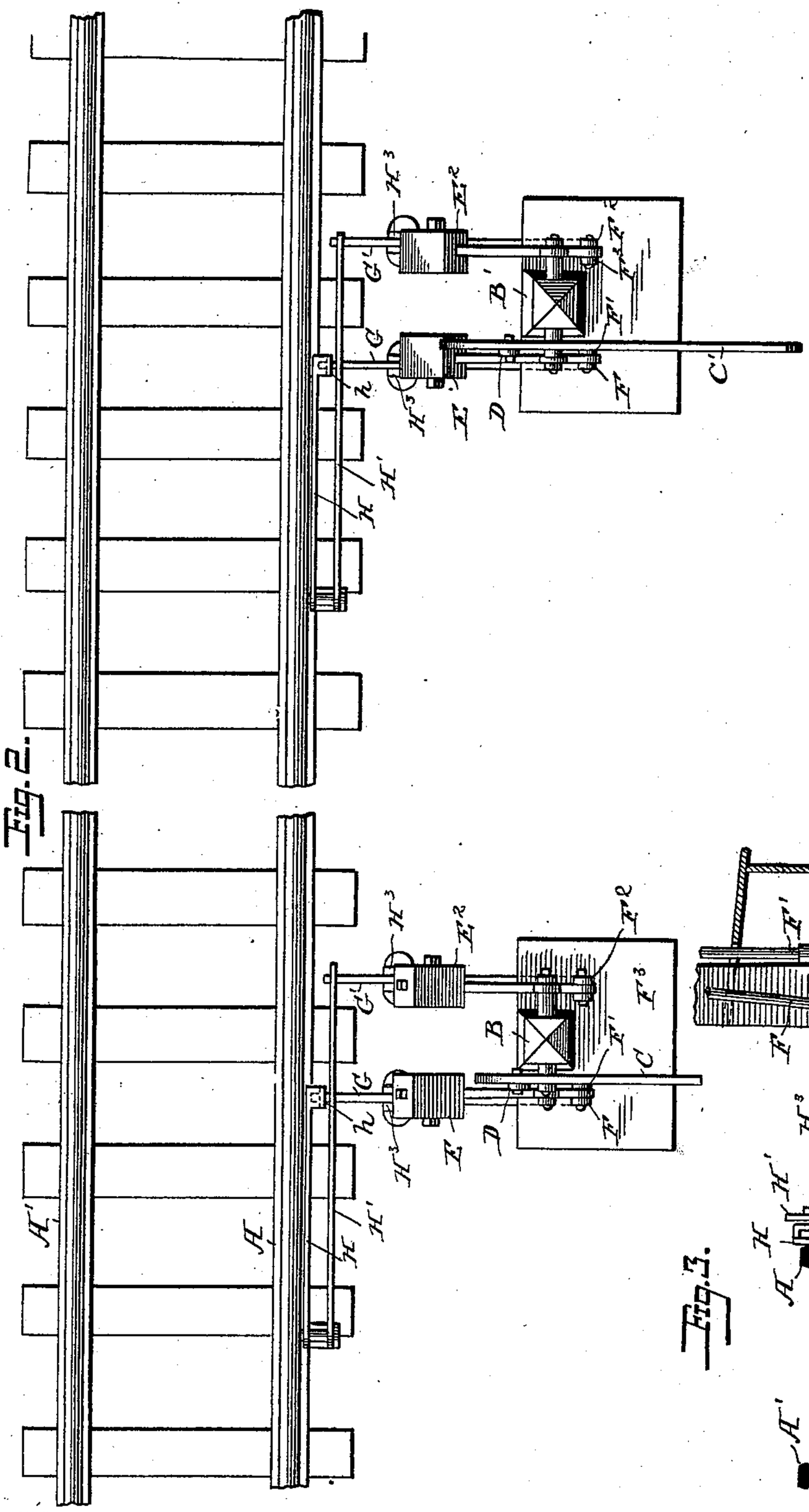
THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

G. C. YOUNG.

RAILWAY SIGNAL.

No. 512,644. Patented Jan. 9, 1894.



Witnesses
Jno. J. Hinkel
Alex. N. Dobson,

Inventor
G. C. Young
By
Fallon Freeman
Attorneys

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE C. YOUNG, OF WASHINGTON, ASSIGNOR OF TWO-THIRDS TO JOHN M. R. SHIMER AND GEORGE O. WILLEVER, OF PHILLIPSBURG, NEW JERSEY.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 512,644, dated January 9, 1894.

Application filed December 9, 1892. Serial No. 454,675. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. YOUNG, a citizen of the United States, and a resident of Washington, Warren county, New Jersey, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

My invention relates to improvements in railroad signals, and it has for its object to provide mechanical means whereby a passing train operates signals to indicate the entrance of a train upon a certain portion or block of a road and also indicates when the blocks or sections are clear; and it has further for its object to provide means or mechanism whereby the expansion and contraction of the rod, wire or other connecting device between two signals, or between a single signal and its operating mechanism are compensated for. The invention consists in the features of construction, arrangement and mode of operation of parts substantially such as are hereinafter more particularly described.

Referring to the accompanying drawings wherein the general principles of my invention are illustrated, Figure 1 is a side view, partly in section, representing a portion of a railroad embracing two signal posts with which are combined the features of my invention. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section on the line 3—3 of Fig. 1, illustrating the compensating devices, and also portions of the track levers.

My invention is in the nature of improvements upon railroad signals of the general character illustrated in Patent No. 481,884, dated August 30, 1892, granted to myself and George O. Willever, although certain of the features of the invention are applicable to railway signals of a construction quite different from that illustrated in said patent.

In the drawings A, A′, represent the rails of a railway track and B, B′, the signal posts arranged at suitable points along the track. In the present instance B, designates the signal posts at the entrance of a block and B′ the post at the end thereof. Mounted on these signal posts are some proper signal devices, those represented being ordinary semaphores C, C′, although it is evident that other styles of signal devices may be used.

In this specification, I shall refer to the post B and the signal devices carried thereby as the rear signal station, and the post B′ and the signal devices which it carries as the forward signal station, as they bear these relations to the section of the railway situated between them, the train being supposed to travel in the direction of the arrow 2, Fig. 1. It will, of course, be understood that each one of the signal stations bears a double relation, that is to say, it is the forward signal station to one section of the road and the rear signal station to the adjacent section, but as this is common in signal block systems, a further description is not necessary.

The semaphores are connected by rods D, to weighted levers E, so that when the semaphores are free they will be automatically set to the danger position, insuring that in case of accident or other unexpected contingency, the section of the road controlled thereby will be automatically blocked until the proper condition of affairs has been restored.

In order to operate the semaphores automatically, that is to say, by the passing of a train, I connect them with a track lever, preferably through the medium of the following devices: F represents a rod connecting the weighted lever E with a cross lever G which is pivotally mounted in supports H^3 arranged between the track and the signal posts, so that the long arm of the lever is connected with the semaphore and the short arm thereof is in position to be acted upon by the track lever H.

The track lever H which is operated upon by the ordinary wheel of the locomotive or car, lies close beside the rail, and as it is undesirable to cut the rail, I extend the toe or projection *h* laterally away from the rail so that it passes down by the side of the rail flange and engages with the cross lever G, without in anywise interfering with the rail.

Each signal post has a weighted lever E^2 which is connected with a track lever H′ which lies by the side of the track lever H heretofore described. The track lever H′ lies

outside of the track lever H and is adapted to be operated by a tappet wheel carried by one of the cars, preferably the rearmost car of the train, so that when this car passes such lever and thus enters upon a new section of the road, it will operate the lever H′ and the signal devices which are connected therewith. The lever H′ operates a cross lever G′ which is connected with the weighted lever E^2 by the link F^2. The weighted lever E^2 when in its normal or lowered position carries the connecting parts into such position that the track lever H′ will occupy a depressed position.

In order that a semaphore at the block station in advance and in rear of the train may be suitably operated by the track levers with which the train engages, I connect the semaphore operating devices at one signal post with the signal operating devices which are arranged at a distance therefrom, by means of a chain, wire, rod, or similar device J. The rod or wire J is connected with the bell crank levers K, K′, mounted upon or near to the lower ends of the posts B, B′. The bell crank lever which is situated at the forward signal station is designated K′, and that which is situated at the rear station, K. It will be observed that there are two bell crank levers at each station, but that the lever K in each case is connected with the rear end of the connecting device J, and the lever K′ is in each instance connected with the forward end of such device J. The rear bell crank lever K is connected with the weighted lever E by a link F′, and the forward bell crank lever K′ is connected with the weighted lever E^2 by a link F^3. I have found that it is preferable to interpose bell crank levers, such as I have described between the weighted levers and the chain, rod or wire J rather than to connect the rod or wire directly with the weighted levers. The advantages of the bell crank levers is particularly apparent when in combination with a compensator such as I have shown in this case and will presently describe.

When the connecting rod or wire J is of great length, it is necessary that a compensating device of considerable power should be combined therewith; and it is also desirable that the force of such compensating device should be taken off the levers and links connected with the signal operating devices to as great a degree as possible. It is also desirable that the compensating devices should be located adjacent to the signal posts so that the various parts of the signal mechanism which are liable to get out of order, shall be arranged in proximity to each other, and for other reasons which will hereinafter appear.

L represents a weight suspended from the end of a chain *l* by which it is united with the end of the rod, wire or cable J, the chain *l* forming, in effect, a part of the connection J between the signal and the signal operating devices. The chain *l* passes around a wheel M which is mounted in a stationary support N. The preferred construction and arrangement of the wheel M is that shown; that is to say, it is a wheel of small size provided with spurs or sprockets *m* with which the links of the chain *l* engage, supported upon a shaft *m′* which is mounted in slots *n* in the support N. The wheel M has connection with the signal operating devices through the rear bell crank lever K, and the parts connected therewith, the arm *k* of the lever being slotted, at *k′* to engage with the shaft or axle *m′* of the wheel, so that as the lever is rocked the wheel M is also moved longitudinally in the support N. In order that the lever K may have a better engagement with the wheel M, I provide it with an arm k^2 parallel with the arm *k* and slotted at its lower end so that it will engage with the axle or shaft of the wheel M upon the side of the wheel opposite to that occupied by the arm *k*.

O is a deflecting device, preferably in the form of a roller, situated in such position that when the lever K moves in the direction indicated by the arrow *x* in Fig. 1, carrying with it the wheel M, the chain *l* below the wheel is caused to engage therewith and to be deflected so that it engages a greater portion of the circumference of the wheel M than when the chain hangs straight down from the wheel.

The wheel M is free to turn in its support and does so turn as the wire or rod J contracts or expands. It is also free to be moved longitudinally, such movement taking place when the connecting device J is moved in one direction or the other for the purpose of shifting the signal or signals.

As the wire or rod J is connected with the signal at one end through a wheel which is free to revolve, it is necessary that some provision be made to prevent the rotation of the wheel when the wire or rod is moved to change the position of the signal and that the wheel should move bodily with such rod or wire with little or no turning motion, else the weight L will be merely raised or lowered, the wheel M turning meantime without the lever K being moved. Such a provision is made by reason of the small size of the wheel M and its loose connection with the signal moving parts.

When the forward wheel of a locomotive or a car strikes the track lever H, the semaphore C situated adjacent to such track lever is immediately set to the danger position. At the same time, the bell-crank lever K, through its connection with the weighted lever E by means of the link F′ is moved from the position indicated at the left hand of Fig. 1 to that indicated at the right hand thereof, such movements carrying the small spur wheel M from one extreme position in the slot *n* to the other. This movement of the bell-crank lever is necessarily quick and as a result the connecting rod J as a whole is moved to the left, which shifts the forward bell-crank lever K′ at the signal station in advance of the train to the position indicated at the left

hand side of Fig. 1, thus elevating the weighted lever E^2 and setting the outer track lever H′ in its raised position at such advance station. Owing to the suddenness of these movements, the wheel M does not turn to any considerable extent, but is moved bodily, and this results not only from the quickness of the movements, but also from the fact that the arms k, k^2 of the bell-crank lever K bear upon the shaft m' of such wheel and act as a brake thereto. The laying of the flexible portion l of the connecting device J over a large portion of the circumference of the wheel M by reason of the engagement of such flexible portion with the deflecting device O further insures that the wheel M shall not turn, but rather shall be moved laterally as a whole.

When the train passes out of the section or block to the left of the post B′, the operating or tappet wheel at the rear of the train engages with the outer track lever H′ which causes the cross lever G′ to be depressed and the weighted lever E^2 to be thrown into the position shown at the right hand end of Fig. 1. These movements are rapid and cause the connection J between the bell-crank lever K′ and the bell-crank lever K at the station in rear thereof to be moved as a whole, and the compensating devices to pass from the position shown at the right hand end of Fig. 1, to that shown at the left hand end thereof. It will thus be seen that whenever the train imparts a movement to the connecting device J, the wheel M is caused to move bodily in a lateral direction without turning to any considerable extent upon its axis; but it will also be understood that the wheel will freely turn upon its axis and without moving laterally as a whole whenever the movements of the connecting rod or cable J are very slow, as in case of those movements resulting from the changes of temperature. Therefore, whether the compensating device be in the position shown at the right hand end or at the left hand end of Fig. 1, it will operate as a perfect compensating means for the connection J. It will also be understood that by the use of a compensating device such as I have shown and described herein the weight of the compensator is very largely taken off from the signal devices which therefore move with correspondingly greater freedom, the weight being mainly borne by the shaft m' of the wheel M.

I claim—

1. The combination of the two separated signals, the track levers, the connections between the track levers and the signals, the connecting rod, wire or cable between the signal stations, the bell crank levers to which the opposite ends of the said connecting rod, wire or cable are secured, and the connecting devices between the signals and the said bell crank levers, substantially as set forth.

2. The combination of a signal, the operating devices therefor situated at a distance from the signal, the connecting rod or wire between the distant operating devices and the signal the said rod being connected with the signal, and there being situated between the said rod and the said operating devices, a flexible portion of the connecting rod, and a wheel over which the said flexible portion passes, the weight suspended from the flexible portion of the connecting rod or wire, and the lever interposed between the said wheel and the said operating devices for the signal, substantially as set forth.

3. The combination with the signal, the operating devices therefor, and the connecting rod or wire, of a compensating device consisting of a weight suspended from a wheel which has a lateral motion in its support, and a lever having one arm connected directly with the said wheel, and the other arm connected with the signal operating mechanism, substantially as set forth.

4. The combination with the signal, the operating devices therefor, and the connecting wire or rod J, of a compensating device consisting of a weight connected to a flexible part of the rod or wire, over a wheel over which said flexible part of the wire or rod passes, mounted in slots in a stationary support, and a connection between the said wheel and the operating devices for the signal arranged to move it laterally in the slots, the wheel being also free to turn or rotate to allow compensation being made for contraction and expansion of the rod or wire, substantially as set forth.

5. The combination with the signal, the operating devices therefor, and the connecting wire or rod J, of a compensating device consisting of a weight connected to a chain at the end of the rod or wire, a wheel of small size and provided with spurs with which the links of the said chain engage and having its shaft mounted in slots in a stationary support, and a connection between the said wheel shaft and signal operating devices whereby as the signal is moved, the wheel is also moved laterally and causes a pull upon the rod or wire the wheel being free to turn to permit of compensation for contraction and expansion of the rod or wire being made, substantially as set forth.

6. In a compensating device for a signal, the combination with the signal and the rod or wire J, of the chain at the end thereof, the wheel provided with spurs or sprockets over which the chain passes, its shaft being mounted in slots in a stationary support, a weight hung on the end of the said chain, an arm connected with the signal and engaging with the said wheel whereby as the signal is operated, the wheel is moved laterally and a deflecting stop with which the chain engages as the wheel is moved in one direction by the signal for causing the chain to encircle the wheel to an increasing extent as it is moved, substantially as set forth.

7. The combination with the signal, the rod F connected therewith, the rod or wire J hav-

ing a flexible portion at one end, the wheel over which the flexible part of the rod or wire passes, mounted in slots in a stationary support, the weight connected with the end of the said flexible part of the wire or rod J, and a bell crank lever connected with the said rod F and having a slotted arm which engages with the wheel whereby it is moved laterally as the signal is moved, substantially as described.

8. The combination with the signal, the rod F connected therewith, the bell crank lever connected to the end of the rod F and having the two slotted arms, the connecting rod or wire J having a chain at its end, the small wheel M provided with spurs or sprockets with which the links of the chain engage, having its shaft mounted in slots in a stationary frame, the slotted arms of the bell crank lever engaging with the shaft of the wheel, and the weight hung from the chain, substantially as set forth.

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

GEORGE C. YOUNG.

Witnesses:

J. S. BARKER,

A. E. T. HANSMANN.