

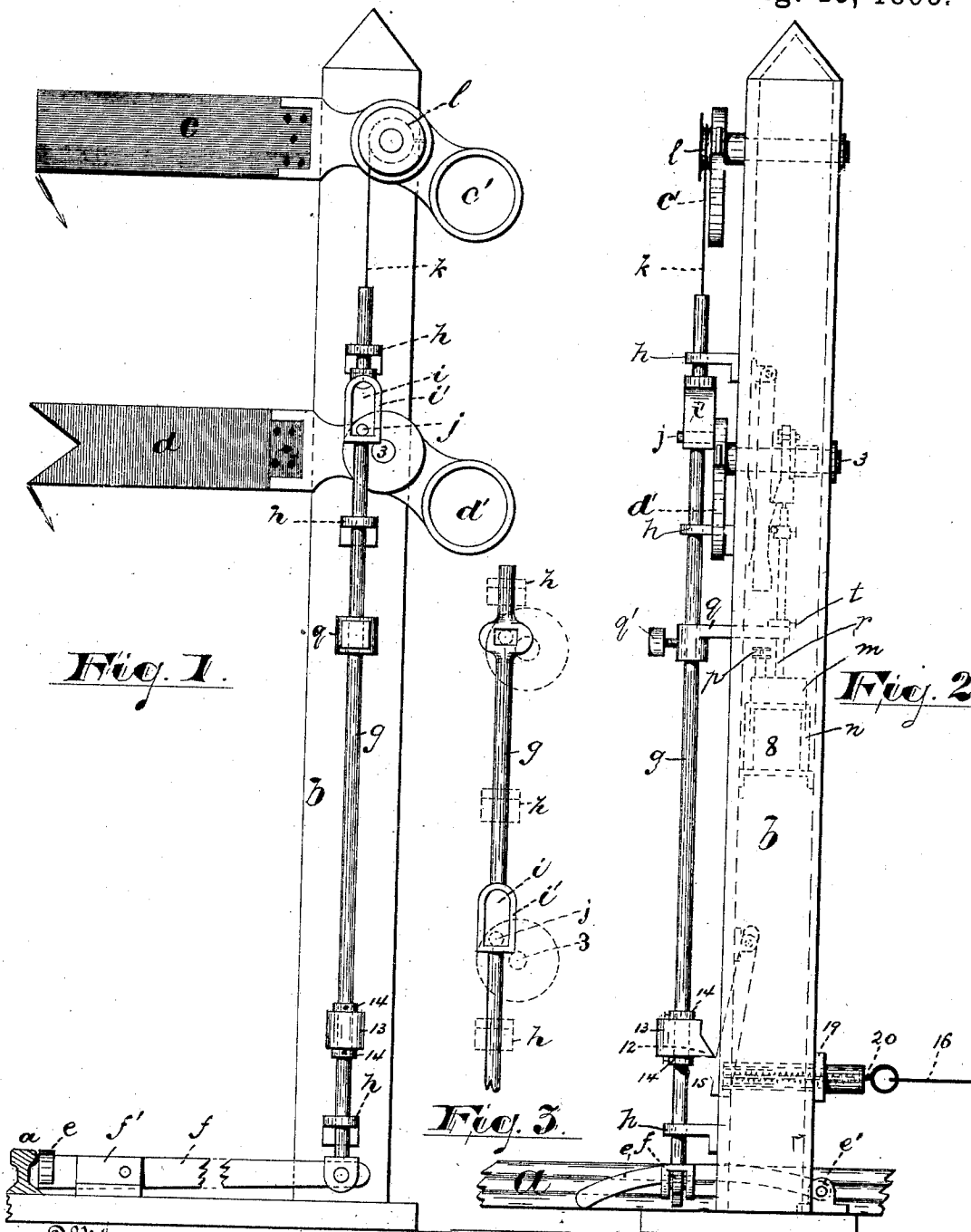
(No Model.)

2 Sheets—Sheet 1.

J. WAYLAND.
RAILWAY SIGNAL.

No. 503,299.

Patented Aug. 15, 1893.



Witnesses

Inventor=

Oscar A. Trichel
Jno. R. Sack

James Wayland,

By Archer Atty's.

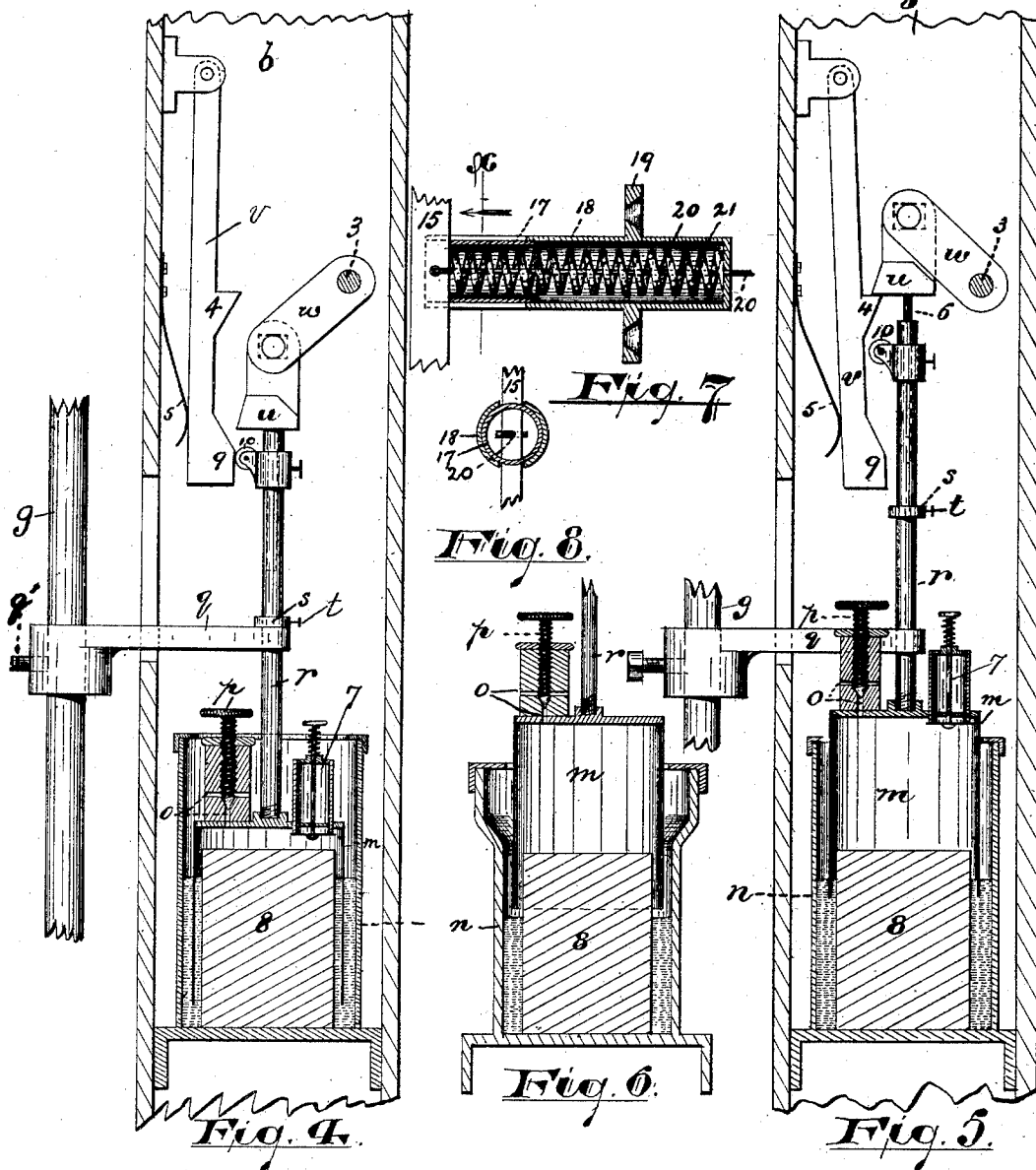
(No Model.)

2 Sheets—Sheet 2.

J. WAYLAND.
RAILWAY SIGNAL.

No. 503,299.

Patented Aug. 15, 1893.



Witnesses

Oscar A. Michel
Jno. R. Hall

Inventor

James Wayland,

By *Drake & Co.* Atty's.

UNITED STATES PATENT OFFICE.

JAMES WAYLAND, OF NEWARK, NEW JERSEY.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 503,299, dated August 15, 1893.

Application filed June 26, 1891. Renewed June 23, 1893. Serial No. 478,660. (No model.)

To all whom it may concern:

Be it known that I, JAMES WAYLAND, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Railway-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, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

The object of this invention is to more perfectly and certainly disclose to a railway engineer the relation of his train to the train next in front of him on the same track, and to thus reduce the chances of accident.

Further objects are to reduce the cost of construction, to simplify the apparatus whereby the same is rendered less liable to get out of order, and to secure other advantages and results, some of which will be hereinafter referred to in connection with the description of the construction of the component parts.

The invention consists in the improved railway signal and in certain peculiar arrangements and combinations of parts, substantially as will be hereinafter set forth and finally embodied in the clauses of the claim.

Referring to the accompanying drawings in which like letters and numerals indicate corresponding parts in each of the several views, Figure 1 is a front elevation of the improved signaling apparatus. Fig. 2 is a side view of the same. Fig. 3 is a detail view of a certain lifting bar of modified construction. Figs. 4 and 5 are sectional details, on an enlarged scale, showing the construction of a pneumatic device for timing the fall of the "distance" semaphore and showing two positions of the same, and Fig. 6 is a similar view illustrating a modification. Fig. 7 is a sectional detail showing more clearly a lifting rod catch, and Fig. 8 is a section of the same on line *x*.

In said drawings, *a* indicates one of the rails of a railway track and *b* is a signal post arranged adjacent to said track and carrying or supporting two semaphore signaling boards or arms, the one marked *c*, being the "home"

signal and that marked *d*, being the "cautionary" or distance signal as will be hereinafter described. Said signal boards are pivoted on the said post in any ordinary manner so as to turn from the danger positions, shown in Fig. 1, to safety positions more nearly parallel with the post. In the case of the signal, *c*, in the preferred construction, the board is overbalanced by the weight, *c'*, and assumes the position of danger automatically, when released, but in the case of the signal, *d*, the board overbalances its weight, *d'*, and requires to be forced to its position of danger, by means controlled by the passing trains.

In Figs. 1 and 2, a lever, *e*, is shown which is adapted to be operated upon by the train passing over the track *a*. The said lever is fulcrumed upon a suitable fixture, *e'*, and engages a second lever, *f*, secured on fulcrum, *f'*, and extending at right angles to the first of said levers to the post, *b*, where it is fastened to a lifting rod, *g*, which extends vertically in its relation to the post, being held in proper relative position by suitable fixed bearings *h, h, h*. At or toward its upper end the rod is slotted, as at *i*, or is provided with a yoke, *i'*, into which a pin or projection, *j*, extends from the semaphore, *d*, the said pin having a limited play in said slot so that under certain conditions, hereinafter stated, the semaphore may move independent of the rod. Above the yoke, the rod, *g*, connects with the signal, *c*, the connection being the flexible cord or wire, *k*, which is arranged on the drum, *l*, and winds thereon when the semaphore rises, as will be understood.

Instead of the wire, I may employ a rigid connection, as indicated in Fig. 3, but I prefer the flexible cord or wire, in that the latter is more easy in its operations, a more continuous or unvarying draft is brought on the wheel or drum of the upper semaphore and the impact of rod or the train passing over the devices at the track is not imparted to the said upper semaphore nor do the vibrations of the lower semaphore affect the upper one.

At a suitable point in its length, the rod, *g*, connects by means of suitable mediate devices, with a pneumatic cylinder or bell, *m*, working in a trough, *n*, partly full of mercury or other suitable liquid. The said bell is pro-

vided with a small escape opening, *o*, which is preferably controlled by a valve, *p*, to regulate the speed of outflow of air. The connection, preferred, of the rod, *g*, and bell, *m*, is shown in Figs. 4 and 5, where the rod, *g*, is provided with an arm, *q*, set thereon by a screw, *q'*, and having a sliding relation, at its opposite end, with a rod, *r*, secured to the bell. Said rod, *r*, is provided with a shoulder, *s*, preferably an adjustable collar fixed by a set screw *t*. The upper end of the rod, *r*, operates a catch lever or arm, *v*, for holding the distance or cautionary semaphore, *d*, when thrown upward by rod, *g*, and arm, *q*, raising the bell, *m*, and rod, *r*, and the upper extremity of the latter engaging a bearing piece, *u*, on the crank, *w*, on the pivot 3, the said catch lever at the projection, 4, entering into contact with said bearing, *u*, to hold said semaphore, *d*, in its danger position. A spring, 5, preferably forces said catch lever into its catching relation.

To hold the bearing piece, *u*, in proper alignment with the rod, *r*, I prefer to provide the same with a rod, 6, Fig. 5, which works telescopically in the rod, *r*, which last is made tubular for the purpose. I may provide the bell with an air inlet valve, 7, shown in Figs. 4 and 5, but to reduce the cost of construction I prefer to so dispose or graduate the depth of mercury as that the bell will be wholly withdrawn therefrom when thrown up and will receive a new charge of air from beneath, as shown in Fig. 6. Within the trough, *n*, the same is provided with a core, 8, which occupies the center space and thus reduces the quantity of liquid otherwise necessary. To release the semaphore, I have provided the lever, *v*, with a projection, 9, and the rod, *r*, with a co-operating projection, 10, preferably provided with an antifricition roller. As the air escapes through the opening, *o*, from the bell, the said bell and the rod, *r*, connected therewith slowly gravitate. When the projection, 10, reaches the projection 9, the lever, *v*, is forced laterally and the catch projection, 4, is withdrawn from the bearing, *u*, when the semaphore quickly turns to its safety position, showing that the train has advanced or has had time to advance to a point of entire safety beyond the following train and that said following train may advance without caution. The rod, *g*, is furthermore provided with a holding shoulder 12, Fig. 2, which is preferably formed on a weight, 13, secured on said rod by collars 14, 14. Said catch engages a spring catch 15 controlled by a rod or wire 16 which extends to the end of the "block" of the railway and is there operated by suitable mechanisms of any suitable construction adapted to be operated on by the train as it leaves said "block" so that said wire is drawn and the catch 15 disengaged from the shoulder 14, substantially as in prior devices. The catch is of peculiar construction and I desire to claim the same specifically herein. It consists of a lever or pivoted arm having the

catch projection thereon and a tubular case section, 17, which works in a co-operating section, 18, telescopically, the latter section being secured to the post, *b*, by ears, 19, Fig. 7, and screws or in any other suitable manner. Within the case, the extension, 20, of the wire or rod, 16, is longitudinally arranged and around the same, a spring, 21, which bears oppositely on the ends of the tubular sections. The spring, 21, tends to force the catch into its holding position shown in Fig. 2. The section, 18, extends, preferably, to the lever, 15, and is slotted to allow the said lever to work therein with the section 17. The said section, 18, thus serving as a guide for the lever and holding the same in proper operative relation to the co-operating parts.

In operating the invention, the parts work substantially as follows, when the parts are of the peculiar constructions and in the peculiar relations shown, but to which constructions and relations I do not wish to be understood as limiting myself:—The car passing over the track or rail, *a*, engages the lever, *e*, passing up the inclined upper surface and thus reducing the suddenness of the impact or blow. In turn, the said lever, *e*, forces the lever, *f*, downward, at one end, and, at the other, the said lever, *f*, is raised and with it the lifting rod, *g*, which latter controls the movements of the two semaphore signals, *c* and *d*, so that the latter both, simultaneously, pass to a position indicative of danger, the signal *c*, by the gravity of the weight *c'* over balancing the board and the signal, *d*, by the positive upward thrust of the rod, *g*, at the bottom of the yoke *j*. The upward movement of the rod *g* and the arm *q*, thereon causes the latter to lift the rod, *r*, connected with the pneumatic bell *m*. By this operation, the bell is charged with air and the bearing *u*, raised to a point where it will be caught by the projection 4 of the catch lever, *v*, and said lever is forced into holding relation by the spring 5. While the bearing, *u*, may be raised by the rod, *r*, the work is preferably done by the rod, *g*, engaging the projecting pin or lug, *j*, and turning the pivot, 3, with the semaphore, and thus turning the crank, *w*, and raising the bearing *u*. The rod, *r*, serves more especially in connection with the mechanisms for timing the fall of the signal *d*. The two signals being thus in their positions of danger, the same remain in position while the train traverses the block. At the end of the block the train comes into engagement with the means for drawing the cord, 16, when the catch 15 disengages the co-operating catch, 12, on the rod, *g*, and the latter is allowed to drop by its own weight, facilitated or rendered more certain by the weight, 13, thus drawing the semaphore, *c*, downward to its safety position. Because of the slot, *i*, the cautionary signal is not operated upon but remains in its danger position, thus indicating to the engineer of the next train that, while the next block is clear, the first train is

still within a distance or proximity requiring caution of him in operating his train. The dropping of the signal, *d*, is gaged by the bell opening or vent *o* controlled by the valve, *p*.
 5 As the air escapes the bell falls and with it the rod, *r*, and projection 10. When it arrives at the projection, 9, the lever, *v*, is forced against the spring 5, and the catch projection, 4, is forced from engagement with the bearing *u*, when the semaphore, *d*, is allowed to drop to its safety position, showing that the track is clear beyond even the cautionary limits.

Having thus described the invention, what I claim as new is—

1. In a railway signal, the combination of a home and cautionary semaphore arranged on a standard or post, a flexible connection, *k*, arranged therebetween, and connections with the railway governing the said semaphores, substantially as set forth.

2. In a railway signal, the combination of the home and cautionary weighted semaphores joined by a flexible connection and connected with the railway whereby the said weighted semaphores are controlled by the passing train substantially as set forth.

3. In a railway signal, the combination with a post, *b*, and semaphores *c*, *d*, pivotally movable thereon, a lever *f*, a rod, *g*, movable upward thereby and connecting with said semaphores, a pneumatic bell controlled in its initial operation by said rod and in its return operation adapted to release a catch, and said catch adapted to hold the semaphore, *d*, in a position of danger, a flexible connection *k* joining the said rod *g* and semaphore *c*, all said parts being arranged and adapted to operate substantially as and for the purposes set forth.

4. In a railway signal, the combination with a signal post and home and cautionary semaphores pivoted thereon, the home signal having a weight heavier than the blade and the cautionary semaphore having a blade heavier than the weight and also having a projection or pin *j*, of a rod *g* adapted to be operated at the passing of a railway train and provided with a slot, *i*, to receive said projection and having a flexible connection with the home semaphore, substantially as and for the purposes set forth.

5. In combination with a post, *b*, a "home" semaphore signal and a "cautionary" semaphore signal, the first being movable to a position indicative of safety by the gravity of a weight 13, and the latter by its own weight, a catch, 15, and a rod or wire, 16, extending away from said post and controlling the operation of the "home" semaphore, a catch, 4, and a pneumatic bell controlling said catch 4, and the cautionary semaphore, all said parts being arranged and adapted to operate substantially as and for the purposes set forth.

6. In combination, lever *f*, post *b*, rod *g*, flexible connection *k*, weighted semaphores *c*

and *d*, yoke *i'*, arm *q*, pneumatic trough containing quicksilver, bell *m*, rod *r* having shoulders, *s*, and projection 10, catch-lever *v*, spring 5, crank, *w*, of semaphore *d*, bearing *u*, adapted to be engaged by said catch lever, all said parts being arranged and adapted to operate substantially as and for the purposes set forth.

7. In combination, in a railway appliance, a pneumatic trough containing mercury, a bell in said mercury and having an opening, *o*, to allow the slow exit of air, and connecting means operable by the passing train for throwing the said bell entirely free of the mercury whereby the said bell is charged with air, and a catch connected with said bell for controlling the railway appliance substantially as set forth.

8. In combination in a railway appliance, a trough *n*, bell *m*, opening *o*, rod *r*, and means for raising the same, bearing, *u*, connected with the portion to be held temporarily, catch, 4, on lever, *v*, and projection 9, all arranged and adapted to operate substantially as and for the purposes set forth.

9. In a railway signal, in combination with the semaphore signals and rod controlling the same, a catch 13, a cooperating catch, 15, having tube section 17, a cooperating tube section, 18, arranged on a suitable fixture, a spring, 21, and rod 20, all arranged and adapted to operate substantially as and for the purposes set forth.

10. In combination with the semaphore signal and rod controlling the same, a catch, 15, having section, 17, a slotted tube section, 18, serving as a guide for the catch, and a spring arranged within said tube section, substantially as set forth.

11. In a railway signal, the combination with the home semaphore having a blade lighter than the weight thereof and having a wheel or drum at its pivotal center, a cautionary semaphore having a weight lighter than the blade thereof and a flexible connection with the said home semaphore, and means controlling the operation of said semaphores whereby they are operated at the passing of a train, substantially as set forth.

12. In combination with two weighted semaphores one of which has its blade heavier than the weight and the other having its weight heavier than its blade, a vertical rod having an elongated slot or opening, and having a flexible connection with the latter of said weighted semaphores a projection from the other of said semaphores working in said opening, the said rod being free to drop with one of said signals without affecting the other, substantially as set forth.

13. In a signal, the combination of the post *b*, rod *g*, and means for operating the same at the passing of the train, a cautionary signal having a blade heavier than the weight thereof and having a projection *j*, loop *i'* flexible connection *k*, home semaphore *c* hav-

ing the weight of heavier than the blade there-
of and having a pivotal drum on which the
said pivotal connection is secured, all said
parts being arranged and adapted to oper-
25 ate substantially as and for the purposes set
forth.

In testimony that I claim the foregoing I

have hereunto set my hand this 19th day of
June, 1891.

JAMES WAYLAND.

Witnesses:

CHARLES H. PELL,

E. IGLER.