

(No Model.)

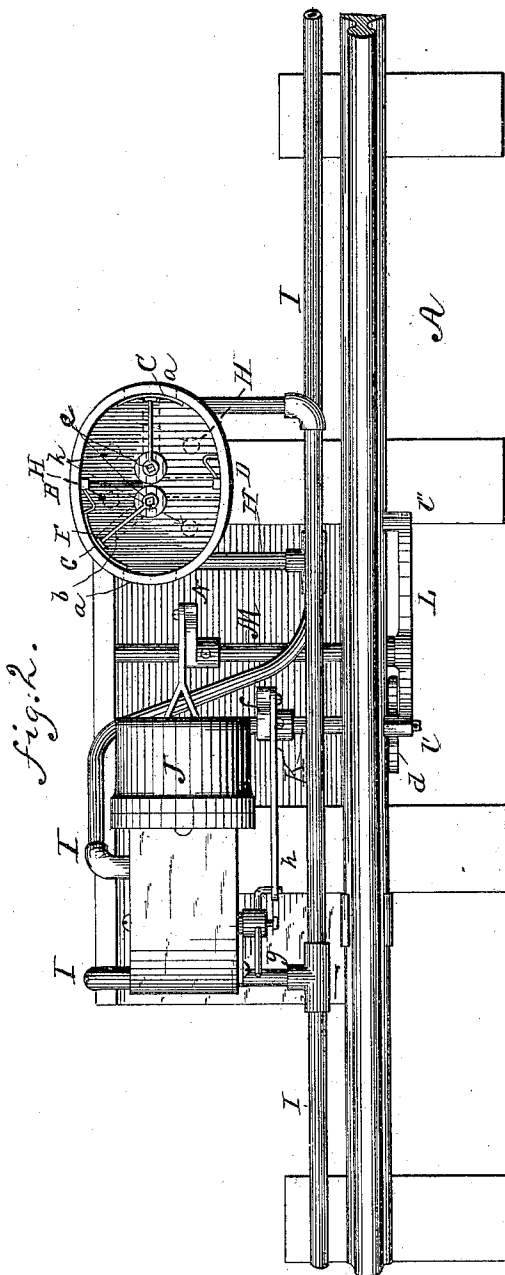
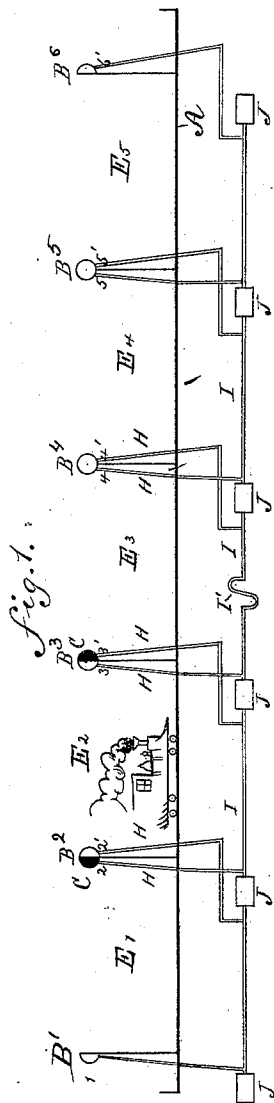
2 Sheets—Sheet 1.

W. C. BECKWITH.

RAILROAD SIGNAL.

No. 299,102.

Patented May 27, 1884.



WITNESSES:

A. B. Brown
W. X. Stevens

INVENTOR:

W. C. Beckwith
BY *Munn & Co*

ATTORNEYS.

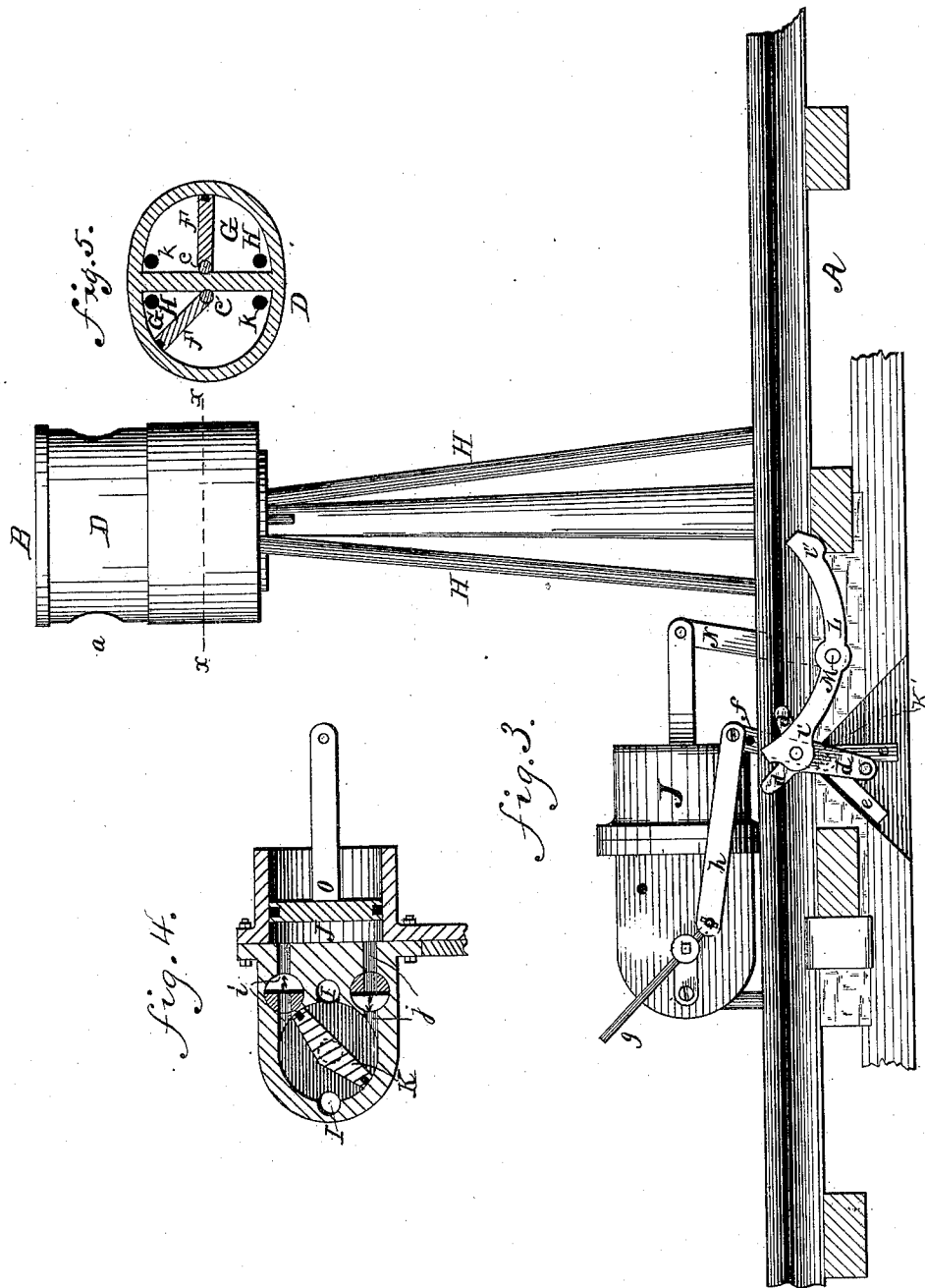
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UNITED STATES PATENT OFFICE.

WALTER C. BECKWITH, OF ALLEGHENY CITY, ASSIGNOR TO THE BECKWITH AUTO-PNEUMATIC RAILWAY SIGNAL COMPANY, OF PITTSBURG, PENNSYLVANIA.

RAILROAD-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 299,102, dated May 27, 1884.

Application filed August 15, 1883. (No model.)

To all whom it may concern:

Be it known that I, WALTER C. BECKWITH, a citizen of the United States, residing at Allegheny City, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Railroad-Signals, of which the following is a specification.

My invention relates to that class of signals used upon railroads which are divided into sections to notify trains in the front or rear of any passing train of its locality on the road; and it relates more particularly to improvements in the device patented to me May 8, 1883, and in another device on which I made application for Letters Patent on the 8th day of February, 1883.

The object of this invention is to provide means whereby the trains of either a single or double tracked railroad may be guarded against collision, and the crossings guarded against approaching trains.

To this end my invention consists in a novel system of operating danger-signals, and novel means for producing the operation, as herein- after described and set forth in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a diagram illustrating my system of signaling. Fig. 2 is a plan view of one of my signals and the operating-pump. Fig. 3 is a side elevation of the same. Fig. 4 is a longitudinal section of the air-pump, and Fig. 5 is a horizontal section at *xx*, Fig. 3.

A represents the railroad, B' to B⁶ any number of signal-stations at the ends of sections E' to E⁵, and C a signal which may be a light, a target, a vane, or any other suitable device capable of being shown by a simple movement and concealed by the reverse movement. As here illustrated, it consists of a target, C, adapted to swing within a shell, D, so as to be shown through an opening, *a*, therein, or to be concealed when away from the opening.

For the purposes of this specification we will suppose that when the target is shown the danger-signal is set, and when the target is concealed safety is indicated.

In my system of signaling I provide at each station, except the first and last, means for

showing danger-signals in both directions, operated independently of each other; but at the first and last sections signals are only needed to face to the end of the road. At each station I place a device which is acted on by a passing train to show the danger-signal facing to the rear, and to conceal the one facing ahead at that station, and to set the signal facing ahead at some station ahead, and to conceal the signal facing to the rear at some station in the rear. To accomplish this each signal is connected with two signal-shifting devices, one located at the same station as the signal, and the other at another station, and each shifting device is capable to show the signal when acted on by a train going one way, and to conceal the same signal when acted on by a train going the other way. A train advancing along a road provided with my system of signals will thus set the danger-signals facing ahead and to the rear in order as it advances, and in the same order will conceal the signals passed. A train does not set the danger-signals facing it on the same section. These signals are to be set by trains on the adjacent sections. If two trains approach a section in opposite directions, that train which first enters the section will set the signal at the opposite end of the section, thus stopping the other train from entering the same section. Suppose a train to start at the left, Fig. 1, and go toward the right, and suppose that each section, E' E², &c., represents the distance to be guarded: On passing the first station signal C', facing to the rear, will be set to notify trains in the rear that a train is on section E'. At the same time signal 2' will be set to notify an oppositely-approaching train that section E' is occupied. On passing station B² signals 2 and 3' will be set to guard section E² both ways, and signals 1 and 2' will be concealed because section E', guarded to the rear by signal 1, is now safe, and because another signal, 3', being set ahead, the signal 2' is not needed. As work-trains are obliged to run both ways on double tracks, and as trains are sometimes broken down, the same safeguards are needed on each track of double-track roads as on a single-track road. It is neces-

sary that there should be two independent signals at each station, in order that the one facing to the rear may have been set by any train ahead, whether receding or standing still on the next section, and in order that a signal should be set ahead of each to warn an oppositely-approaching train. Therefore, a single signal, even if it shows both ways, cannot accomplish the whole purpose of my double signals. In my system each track of double track roads should have my double signals; but the stations need not correspond on the two tracks, for there is no necessary connection between the tracks in this respect. While it is more convenient to have each pair of signals supported on one post, yet this is not a necessity to my invention, for it will frequently happen, on curves and in some other situations, that the signal facing one way may be seen best at a given spot, while the signal facing the other way may be seen best if placed at some distance therefrom, and yet both answer the purpose hereinbefore described.

To illustrate the field of application of my system of signaling, I will show its use in operating the signals in the order of alternate stations thus: The train passing station B¹ sets signals 1 and 3'. In passing station B² it sets signals 2 and 4'. In passing station B³ it sets signals 3 and 5', and conceals signals 1 and 3', and at station B⁴ it sets signals 4 and 6', and conceals signals 2 and 4'. In this method signal 2' would only be used by trains going the other way. Thus it will be seen that one signal facing forward and one signal facing backward are set to "danger," and one facing forward and one facing backward are set to "safety" by the train in passing each signal-station, as in the application of my system first described. The vane C of the signal is attached to the movable side of a bellows or to the piston F of an air-chamber, G, to be oscillated thereby, and to be thus swung to and from the aperture *a* in case D. This attachment is made by means of an arm, *b*, connecting said vane C with the shaft *c* of said piston F, shown in dotted lines in Fig. 2 and full in Fig. 5.

H is a pipe entering chamber G, to conduct air to and from it to oscillate the piston F, and thereby to show or conceal the signal. The space in rear of the piston is open for free passage of air through a hole, *k*. The pipes H, leading to all the signals, are branches of a main line pipe, I. This line-pipe communicates between the pumps J, located at the signal-stations, and is provided with crooks or offsets I' at suitable places to accommodate expansion and contraction by heat and cold. Each pump is provided with a four-way cock, K. Two of these ways connect with the pump. The way *i* is provided with a suction-valve and the way *j* with a pressure-valve, and the other two ways connect, respectively, with two ends of the pipe I, one going to the right and the other to the left along the road.

L is a lever fixed upon a shaft, M, which is journaled to rock in a bearing fixed to the rail. The two ends *l* and *l'* of this lever are alternately pressed down by car-wheels passing either way. Pressing down either end of the lever raises the other end.

N is an arm fixed upon the same shaft M, connecting it with the piston O of the pump J. The latch *d* is pivoted upon one arm of the lever L to set the cock K when trains come from the right, so that the action of the pump will suck air from one direction in pipe I and press it in the other relative to the pump, thus passing the air along pipe I in one direction; and when trains come from the left the latch will be oppositely acted on and will set the cock the opposite way, so that the action of the same pump will force the air in the opposite direction. Suppose a train to start upon the road at the left, and that the signals are all to be set by pressure, and concealed by suction, signals 1 and 2' will be set by the same pressure. In passing station B² signals 2 and 3' are set by pressure, while signals 1 and 2, being connected to the opposite side of the cock of pump J of station B², will receive suction and be concealed. Thus in passing each station the rear signal at that station will be set and the forward one concealed. At the station in the rear the rear signal will be concealed, and at the station ahead the forward signal will be set. The head-signals for going to the right being the rear signals for going to the left, it becomes necessary to change the pump-cocks, whenever the direction of the trains changes, that the signals may be set and concealed in their proper rotation both ways; and for this purpose I use the device controlled by the latch *d*, consisting of the forked lever *e*, which operates the cock K by means of its shaft K', an arm, *g*, connecting rod *h* and arm *f*, which device is the subject of the former application, Serial No. 84,428, filed February 8, 1883, and will here be referred to only in theory, the details of its operation having been formerly described. When all trains go in one direction on a track, the four-way cock and the shifting device are not needed. In that case the pipe I will be set in the relation to the valves due to the direction to be run and left with a permanent open way in place of cock K.

Instead of setting the signals by pressure and concealing them by suction, the relation of the vanes to the signal-pistons may be changed to operate vice versa.

In my method of connecting the main line pipe with a pump at the end of each section, and connecting each signal with the main line by a single branch pipe, I am able to use any kind of a single-acting pump or bellows, instead of the piston described, to set the signals, and the simplest form of pump to move the air for operating the signals. To adapt this means of signaling to guard crossings it is only necessary to fix a single signal near the crossing and connect it with two operating-pumps

placed at a suitable distance each way on the road, so that each train will set the signal on approaching the crossing and conceal the signal when passing the opposite pump.

5 At any point along pipe I or in the bellows or pumps, safety-valves may be placed to permit air to escape when too much is forced in by long trains.

10 What I claim as my invention, and desire to secure by Letters Patent, is—

1. A series of pumps located along a railroad and a line of pipe joining said pumps, in combination with two sets of signals independent of each other, one set facing each way 15 along the road, and branch pipes connecting with the main pipe adjacent to pumps, one branch connecting with a signal facing one way and another with a signal facing the other way, substantially as and for the purpose 20 specified.

2. On a railroad divided into sections or blocks, a pump located at or near each end of a block, and a line-pipe connecting said pumps, in combination with two independent 25 signals, facing in opposite directions, at each end of a block, and branch pipes connecting the two signals facing outward at the ends of a block with the line-pipe, which connects the pumps located at the ends of said block, 30 substantially as described.

3. On a railroad divided into sections or blocks, a pump located at or near each end of a block, and a line of pipe connecting said pumps, in combination with two independent 35 signals facing in opposite directions, stationed at each end of a block, and branch pipes connecting the two signals of a station with the line-pipe at opposite sides of the pump at that station, as shown and described.

40 4. A series of railway-signals arranged with two oppositely-facing independent signals at each station, connected with a line-pipe, one of said signals at each station being constructed to be exposed by pressure and the other to 45 be concealed by suction, or vice versa, the air

to expose the first being drawn from the second, as shown and described.

5. Two independent oppositely-facing signals at each of two or more stations along the road, constructed to be exposed by pressure 50 and concealed by suction, or vice versa, and a series of pumps, and a line of pipe connecting them with each other and with the signals, constructed to be operated by a passing train to draw air from one portion of the line- 55 pipe and the signals connected therewith, and to press the same air into another portion of said line-pipe and into the signals connected therewith, substantially as described.

6. A series of signals consisting of two sets 60 of oppositely-facing independent signals, arranged along a railroad, in combination with a series of pumps, also arranged along said road, a line-pipe connecting said pumps, branch pipes connecting said signals with the 65 pressure and suction of said pumps, as described, and means for operating said pumps by the action of a passing train, whereby a train passing in one direction will alternately 70 expose and conceal said signals in outwardly-facing pairs, and a train passing in the other direction will also alternately expose and conceal the same signals, but in the reverse order, as shown and described.

7. A series of railway-signals arranged with 75 two oppositely-facing independent signals at each station, and a series of pumps located one at or near each of said stations, and pipes connecting said signals with said pumps, substantially as described, whereby the passing 80 of a train in either direction will act by pressure and suction to set to "danger" the outward-facing signals of the section on which the train is entering, and will conceal the signal facing to the rear at a station to the rear of 85 the train, by the operation of a single pump.

WALTER C. BECKWITH.

Witnesses:

THOS. TELFORD,

THOS. A. ARMSTRONG.