No. 721,043. PATENTED FEB. 17, 1903.

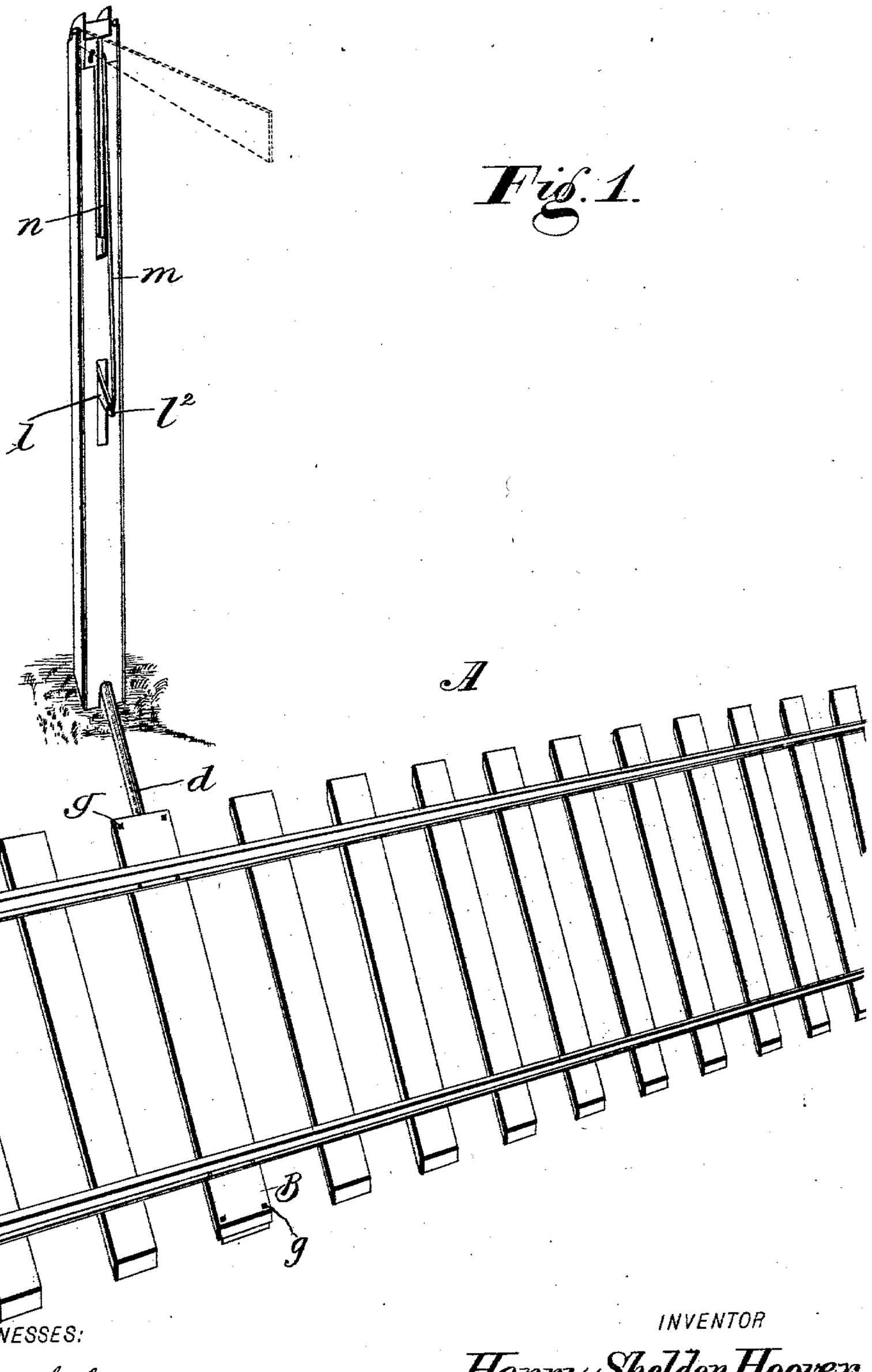
H. S. HOOVER.

SIGNALING APPARATUS.

APPLICATION FILED AUG. 6, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

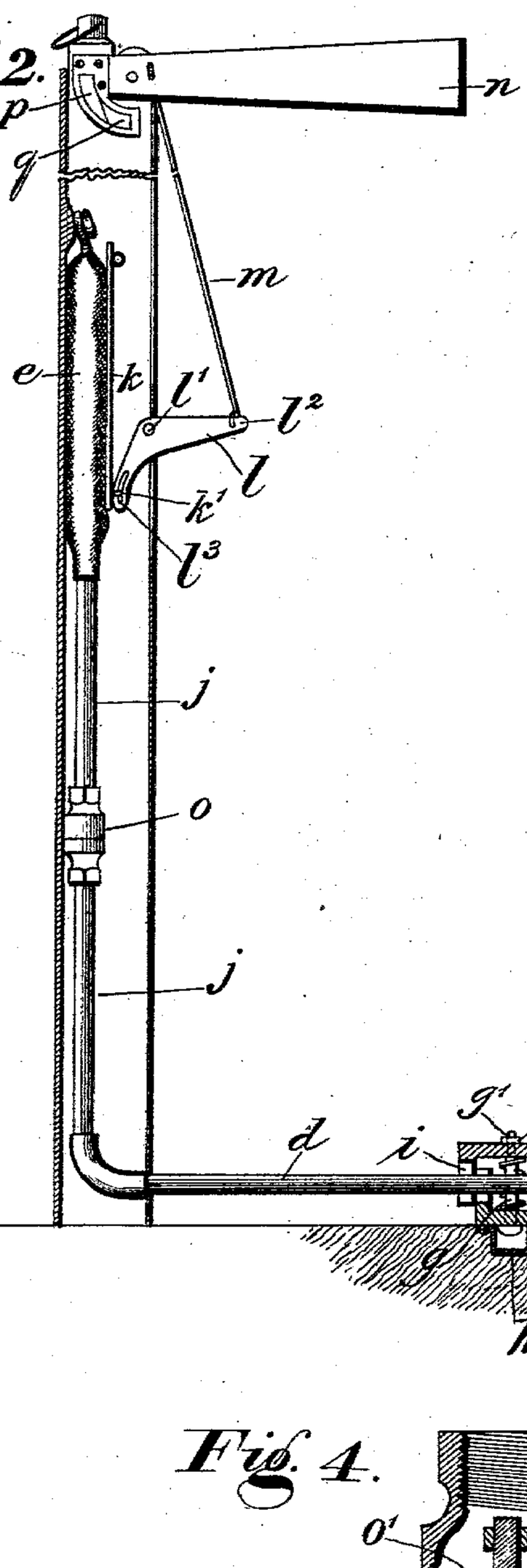


Fig. 3.

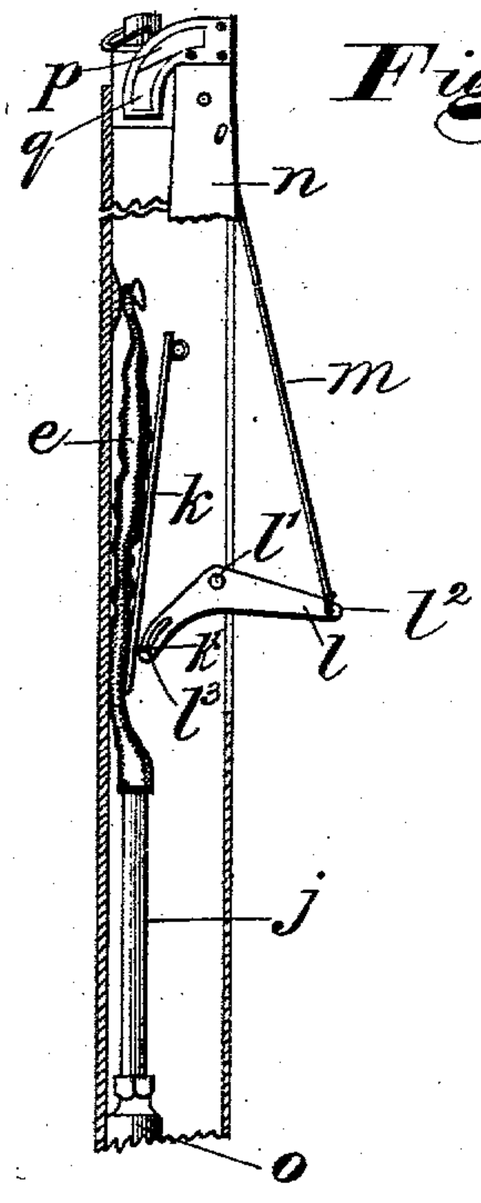
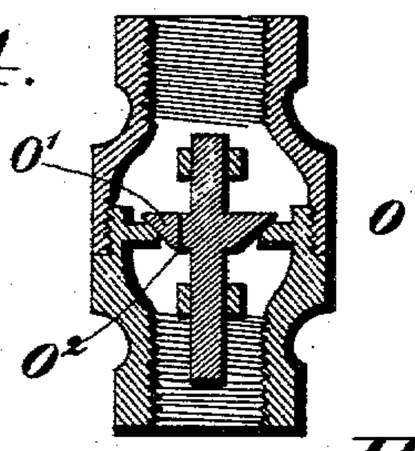


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY SHELDON HOOVER, OF SILVERCREEK, NEBRASKA.

SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 721,043, dated February 17, 1903.

Application filed August 6, 1902. Serial No. 118,624. (No model.)

To all whom it may concern:

Be it known that I, HENRY SHELDON HOOVER, of Silvercreek, in the county of Merrick and State of Nebraska, have invented a new and useful Improvement in Signaling Apparatus, of which the following is a specification.

My object is to provide a signal of very simple construction and operation that will be automatically operated to indicate to the engineer of a passing train how long it has been since a previous train has passed and will automatically return to its normal position after a predetermined time ready to be operated upon by the next train.

My device is operated by a passing train or engine and is entirely independent of human or electrical aid. When it is once properly adjusted and set to its work, there is no further expense for operation or maintenance.

My invention consists in certain novel constructions, combinations, and arrangements of parts, which will now be pointed out and claimed in the appended specification and illustrated in the accompanying drawings, which form a part of this application, and in which—

Figure 1 is a perspective view of my invention in operative position by a railroad-track and ready to be operated upon by a passing engine or train. Fig. 2 is a vertical cross-section taken through the signal-box and the telescoping tie, the parts in the position they assume immediately after an engine or train has passed over the telescoping tie. Fig. 3 is a partial view similar to Fig. 2, but showing the signal and the parts connected directly therewith collapsed or in the position they finally assume after the time limit within which the signal is set to operate has been reached or passed. Fig. 4 is a sectional view of the check-valve used with my device.

Referring to the drawings, A is a portion of a railroad-track equipped with my improved signaling device. B is the telescoping tie in said track and forms a housing or casing for the flexible bag or receptacle *c*, which is designed to be filled with a fluid, preferably of an antifreezing nature, such as alcohol or the like.

d is the pipe which connects the lower receptacle *c* with a smaller flexible bag or receptacle *e*, suitably located within the signal box or pole.

The telescoping tie B has springs *b* interposed between its upper and lower sections, which serve to hold them normally expanded from each other. These springs are preferably coil-springs, one being located in each corner of the tie. The tie is further provided with the bolts *g*, which are also preferably four in number and located in the corners of the tie. These bolts serve the double purpose of holding the spiral springs in proper operative position and location and also of preventing the two sections of the tie from separating too far from each other. In order that the nuts on the upper ends of these bolts may not project above the top section of the tie when the same is depressed, I provide the bolts at their upper ends with shoulders and reduced portions *g'*, as shown in Fig. 2. In each case the nut *f* is received on top of the upper section of the tie upon the reduced end *g'* of the bolt, while the shoulder of the bolt is drawn up tightly against the under side of said section, which arrangement makes the bolts a rigid part of the top section of the tie. The body of each bolt projects downwardly through the lower section of the tie and has its head immediately underneath said section. The holes in the lower section of the tie are made to fit the bolts loosely, so that the said bolts may move freely therein. To prevent the heads of these bolts from catching dirt or gravel when the top section of the tie is depressed, I provide the caps *h*, which are suitably secured to the under side of the lower section of the tie and are of sufficient depth to permit the necessary downward movement of the bolts. These caps serve the additional purpose of holding the lower section of the tie more firmly in the bed of the track. The registering slots *i* are provided in the lapping sections of the tie at the end next the signal. These slots permit the pipe *d* to enter the tie to connect with the flexible bag *c*, and the outer one of these slots is of sufficient length not to interfere with the upward-and-downward movement of the upper section of the tie.

From Fig. 2 it will be seen that the vertical portion of the lower section of the tie extends upwardly to within a short distance of the top section, so that the latter can only be de-

pressed a short distance. Hence it appears that while the upward movement of the top section is limited by the bolts *g* its downward movement is likewise limited to a very short distance by the upturned portion of the lower section of the tie, the reason of which will be referred to hereinafter. It will also be noticed that the depending portions of the upper section of the tie overlap the upwardly-projecting portions of the lower section.

The rails may be secured to the top section of the tie in any preferred way and when so secured also serve as powerful springs to bring the top section of the tie back to its normal position after it has been depressed; but should the fastening between the telescoping tie and the rail get broken or jarred loose the springs *b* will still insure the return of said upper section to its normal position.

The bag *c* when filled with fluid is of just sufficient thickness to be snugly received between the top and bottom sections of the tie. Hence it follows that when the top section of the tie is depressed pressure will be applied to the fluid within the bag, which will force a portion thereof to pass outwardly through the horizontal pipe *d* and upwardly through the vertical pipe *j* into the upper bag *e*, which is suspended in the signal-box with its lower end connected to the upper end of said vertical pipe. The upper bag *e* is suspended between the rear side of the signal-box and the flat bar *k*, which latter is pivoted at its upper end and at its lower or free end is adapted to cooperate with the free or inner end of the signal-operating lever *l*. This lever is a bell-crank pivoted to the signal box or pole at *l'* and is connected at its other end to the signal-operating rod *m*, through which it controls the movements and positions of the signal.

From the construction shown it is apparent that when a locomotive or a train passes over the telescoping tie the fluid will be forced out of the bag *c*, through the pipes *d* and *j*, into the bag *e*, which will inflate the same and cause the lower or free end of the bar *k* to move outwardly, which being in engagement with the inner end of the lever *l* will operate through the rod *m* to display the signal *n*, as shown in Fig. 2.

The lever *l*, just referred to, may, if desired, be provided at its inner end with a slot l^3, adapted to receive the staple *k'*, carried by the bar *k* at its lower end. By this arrangement the free ends of the bar *k* and the lever *l* are secured in proper relation to each other. However, if the slot and staple be omitted the device will still be thoroughly operative, as the weight of the signal will always hold the said lever *l* in engagement with the bar *k*.

When my signaling device is installed on a railroad, the telescoping tie B, the bags *c* and *e*, and the pipes connecting the same are placed in the position shown in Fig. 2, and a check-valve O in the pipe *j* is opened and the fluid is poured in thereat till the bag *c* and the pipes below said opening are filled. Then the check-valve is closed. At this time the upper bag is deflated and the parts operated by it, including the signal, will all be in the position shown in Fig. 3. When a train passes over the track, the top section of the telescoping tie will be depressed upon the lower bag *c*, and this will cause the fluid to rush upwardly through the valve into the upper bag *e* and inflate the same. This in turn will force the lower or free end of the depending bar *k* outwardly, which being connected as it is with the signal-lever *l* will cause the signal to assume the position illustrated in Fig. 2. In order that this effect may be produced with unerring certainty, even when a single locomotive passes at a high rate of speed, it is desirable that the pipes connecting the two bags should be comparatively large, as shown.

In order that the bags *c* and *e* may not be subjected to unnecessary pressure, the telescoping tie is so constructed, as already referred to, that when its upper member has been depressed sufficiently to give the proper inflation to the upper bag to display the signal the top section of said upper member will rest upon the upturned ends of the lower sections of the tie. In order that the required depression of the telescoping tie may be so slight as not to jar or otherwise interfere with the fastest trains, it is desirable that the bag *e* should be small as compared with the bag *c*, so that a very slight depression of the latter will sufficiently inflate the former.

The check-valve O which I employ has a large valve O' to permit the free upward passage of the fluid. This valve O' is provided with a very small opening or leak O^2, which permits the fluid in the upper bag to gradually leak out and work its way back into the lower bag and pipes. As the fluid leaks out of the upper bag the signal gradually descends, and when the fluid has all escaped into the lower bag and pipes the upper portions of the device assume the position shown in Fig. 3. If it is desired that the signal shall remain displayed a long time after a train has passed, the opening O^2 is made correspondingly small; if only a short time it is made larger.

From the foregoing it is apparent that when an engineman is once informed as to the predetermined length of time it requires for the signal to descend from the horizontal position (illustrated in Fig. 2) to the vertical position (shown in Fig. 3) he will be enabled to judge from the position of the signal how long it has been since a train has passed, and as a signal can be seen much farther than an ordinary dial my invention possesses a decided advantage in that respect over signals using dials.

For night service my signal is provided with any desired number of colored glasses to coöperate with the ordinary lamp. In Figs. 2 and 3 I have illustrated the signal as provided with two colors, the portion *p* being red and the lower portion *q* being green.

When the signal is in the position shown in Fig. 2, the flame of the lamp will be seen from an approaching train through the red glass. When it is in a dependent position, as shown in Fig. 3, the flame will be seen through the green glass. From the shape of the two pieces of glass and from the position of the line which divides them it will be seen that when the signal occupies an angle of about forty-five degrees about one-half the flame will be seen through the red glass and one-half through the green. Hence for practical purposes it is thought that two colors of glass will be sufficient.

In the construction of the different parts of my device I employ any kind of material that may be best suited to the requirements of the case—as, for instance, I may find it expedient to make the bar *m* of wood or some other material that will not be perceptibly expanded or contracted by heat or cold.

It will be understood that cylinders having pistons adapted to be operated by a fluid under pressure may be substituted in some instances for the bags *c* and *e* without departing from some of the broad principles of my invention; but I prefer the constructions as shown and before described.

Instead of the small aperture or leak in the stop-cock valve for the escape of the fluid from the upper bag to the lower a very small return-pipe may be used, in which case one end of said return-pipe would be in communication with the upper bag *e* at some point above the stop-cock and the other end would be in communication with the lower bag *c* at some point below said stop-cock; but the valve with the leak is my preferred construction for this purpose.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The improvement in signaling apparatus herein described consisting of the rails, a telescoping tie having upper and lower sections and located beneath the rails and having its upper section secured to the rails, springs within said tie holding its upper and lower sections normally separated from each other; bolts for securing the springs in proper position and location and for preventing too great a separation of the sections of the telescoping tie from each other, a flexible bag within the tie designed to be filled with a fluid and when so filled to be of a thickness equal to the space between the two sections of the tie, the signal-box, a smaller flexible bag located in the signal-box, registering slots in the end sections of the telescoping tie next the signal-box, a pipe connected to the flexible bag and extending outwardly through said slots and connecting with the upper bag, a check-valve within the said pipe and having a leak, a depending bar pivoted at its upper end and having its lower end free and resting against the smaller flexible bag adapted to move outward and inward therewith, a signal-operating lever pivoted near its center to the signal-box having its inner arm in engagement with the free end of the depending bar to move therewith, a signal-operating bar carried by the outer arm of said lever and connecting the same with the signal, and a frame at the rear end of the signal having an open space in the form of an arc, said space being provided with sections of transparent material designed to occupy a space in a line extending from the flame of the lamp to an approaching train, said sections of glass being separated from each other by an oblique line, all arranged as specified and for the purpose set forth.

2. In signaling apparatus, a laterally-compressible bag suitably located within a railroad-track and adapted to contain a fluid and to be depressed by a passing train to expel the fluid, a yielding receptacle into which said fluid is received when thus expelled, suitable means for the passage of said fluid between the receptacles, and means for utilizing the operation of the latter receptacle for operating the signal as specified and for the purpose set forth.

3. In signaling apparatus, the combination with a yielding bag located beneath a railroad-track and adapted to be filled with a fluid and to be depressed by a passing train to expel the fluid, of the signal-box and a second or receiving yielding bag located within the signal-box, and designed to receive the fluid when expelled from the first bag, suitable means of communication between the two bags, a pivoted bar having a free end resting against the upper bag and adapted to move outwardly and inwardly therewith as the bag is filled and emptied and a signal-operating lever connected at its free end to the free end of the said depending bar, whereby the signal is displayed when the upper bag is inflated.

4. In a signaling apparatus, a yielding casing or housing located beneath a railroad-track; a yielding receptacle within said housing, designed to be filled with a fluid and to be depressed by the action of a passing train upon said housing to expel the fluid, a signal-box and a second receptacle located within the signal-box and receiving the fluid when expelled from the first receptacle, a pipe connecting the two receptacles, a check-valve within said pipe designed to permit a free upward rush of the fluid through said pipe and a very slow return of the same, and means cooperating with the upper receptacle for displaying the signal when the former is inflated, whereby the signal is displayed, when the lower bag is depressed by a passing train, and is gradually lowered as the expelled fluid slowly returns to the receptacle from which it was violently expelled as set forth.

5. In signaling apparatus, an elongated inflatable bag compressible transversely, a signal-controlling lever operated by the transverse expansion of said bag, and means for utilizing the weight of a passing train to in-

flate the bag as specified and for the purpose set forth.

6. In signaling apparatus, a telescoping tie adapted to be slightly depressed by a passing train, a yielding bag of large horizontal area located therein, means for holding the sections of the tie normally separated from each other, a signal-box, a flexible receiving-bag located in the signal-box, a pipe connecting the two bags, and means operated by the receiving-bag to display the signal when the latter is inflated, whereby a slight depression of the tie serves to fully inflate the small bag and thereby display the signal.

7. In signaling apparatus a pivoted signal having a plurality of sections of transparent material arranged concentric to said pivot and designed to be successively displayed before a light as the signal changes its position; said transparent sections being separated from each other by a line tangential to the pivot-point of the signal as specified and for the purpose set forth.

8. A signal apparatus comprising an expansible and compressible track-section, an expanding and contracting receiving-section in communication with the track-section, and arranged to be inflated and deflated when the track-section is depressed and released, and a signal arranged for operation by the receiving-section as set forth.

9. In signaling apparatus, an elongated laterally-yielding receiving-bag combined with the signal, and a pivoted bar depending alongside of said bag, and pivoted at its upper end whereby its lower end may move outward as the receiving-bag is inflated, and intermediate devices between the movable end of said bag and the signal, as specified.

10. In signaling apparatus, the combination with the signal and the signal-box, of the receiving-bag suspended within the signal-box, means whereby the said bag may be inflated by a passing train, and means whereby the said bag may operate the signal as shown and described.

11. In signaling apparatus, a signal having a plurality of sections of glass of contrasting colors separated from each other by an oblique line as set forth.

12. In a signaling apparatus the combination of a bag extending lengthwise beneath and transverse the track, and adapted to be compressed transversely by a passing train; a receptacle connected with said bag, and adapted to receive fluid therefrom when the bag is compressed and means whereby said receptacle can operate a signal.

HENRY SHELDON HOOVER.

Witnesses:

GEO. H. BRUCE,

WILLIAM BREEN.