(No Model.) 3 Sheets—Sheet 1.

A. SCOTLAND & H. F. BRINK.

AUTOMATIC RAILWAY SIGNAL.

No. 424,506. Patented Apr. 1, 1890.

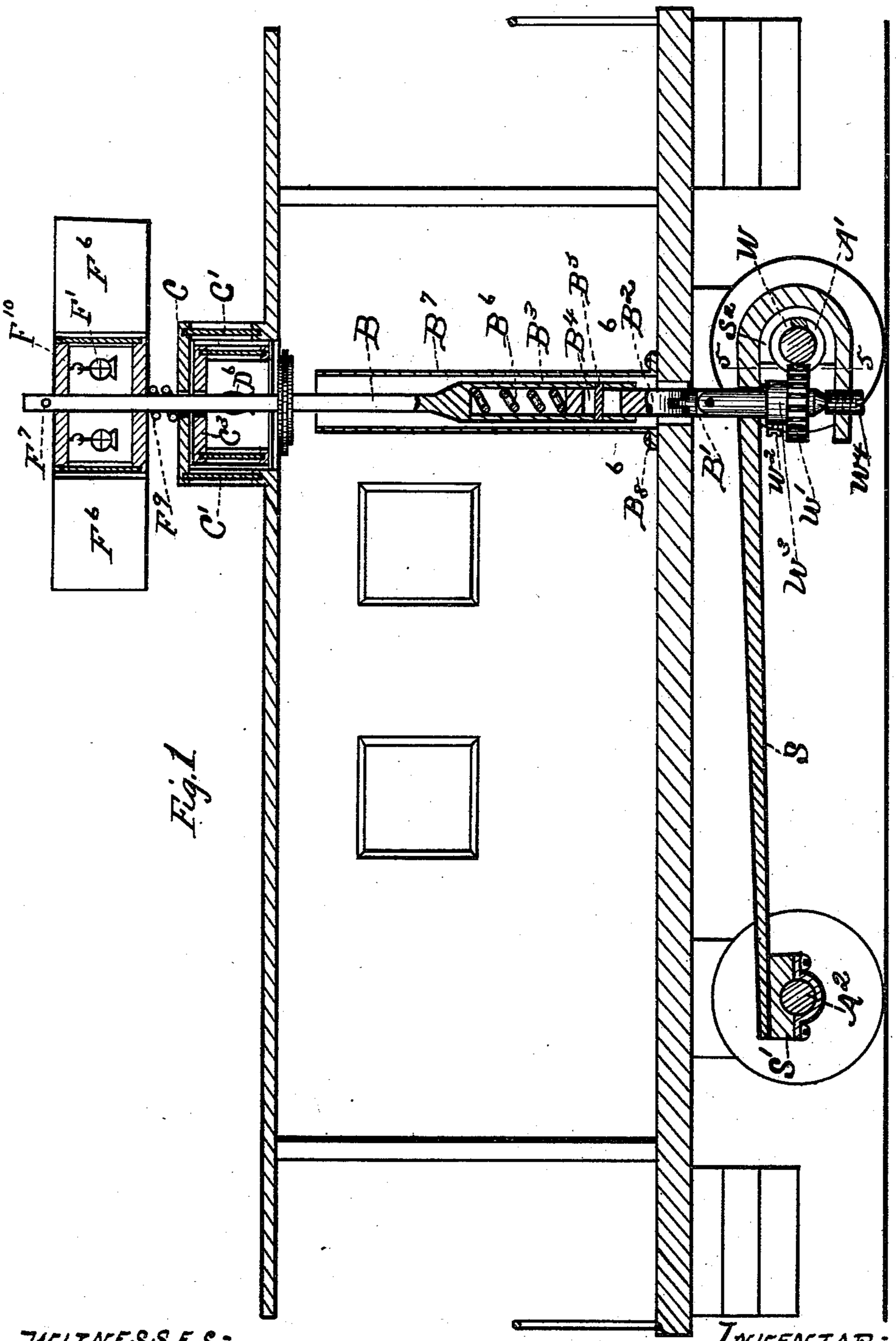

Fig. 1.

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N. PETERS. Photo-Lithographer. Washington, D. C.

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AUTOMATIC RAILWAY SIGNAL.

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Fig. 2.

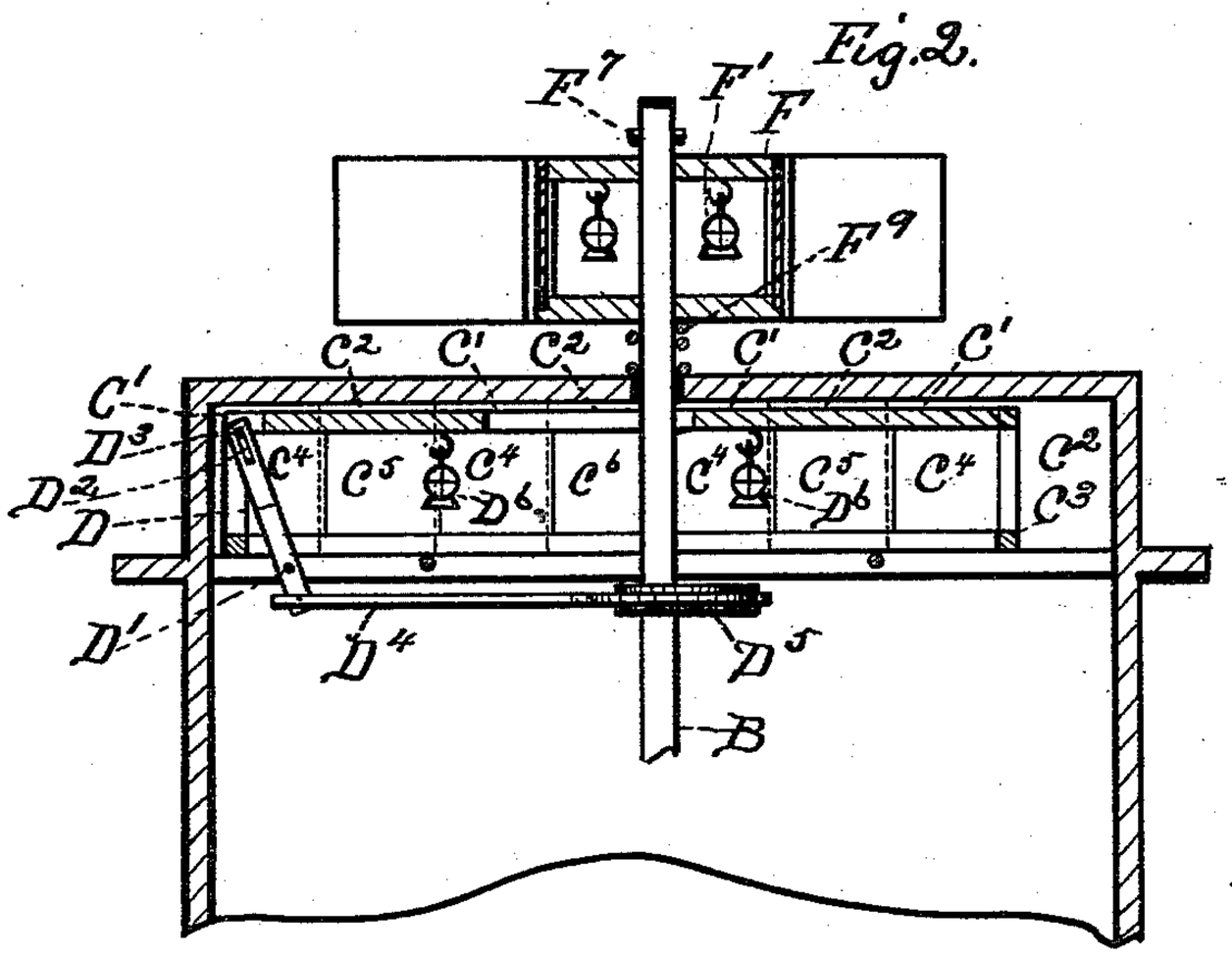
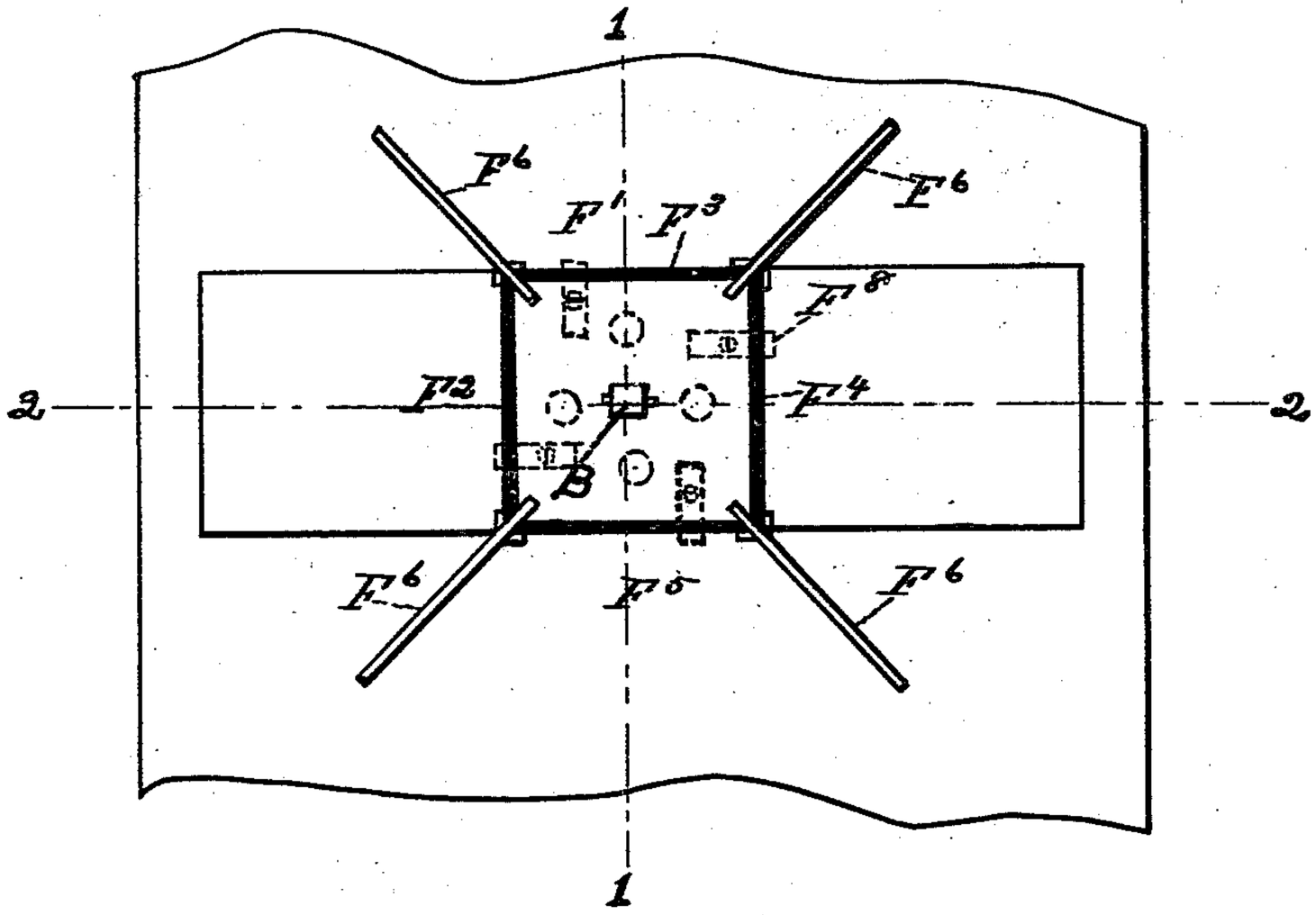


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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AUTOMATIC RAILWAY SIGNAL.

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Fig. 4.

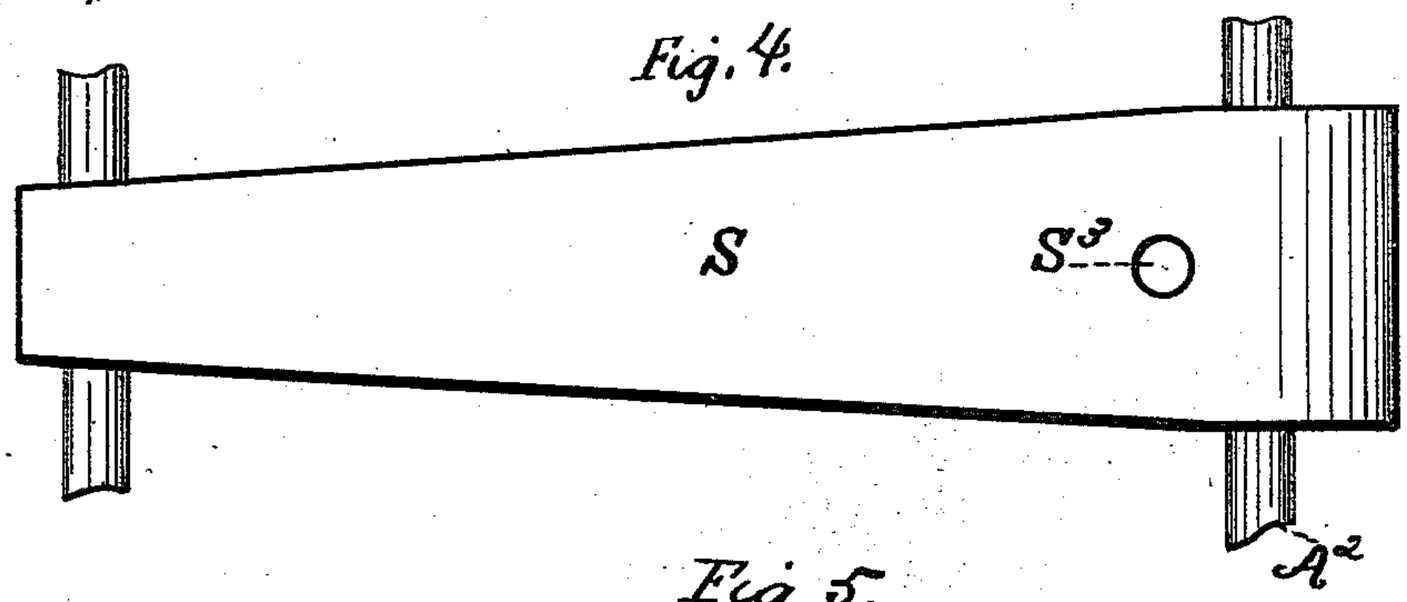


Fig. 5.

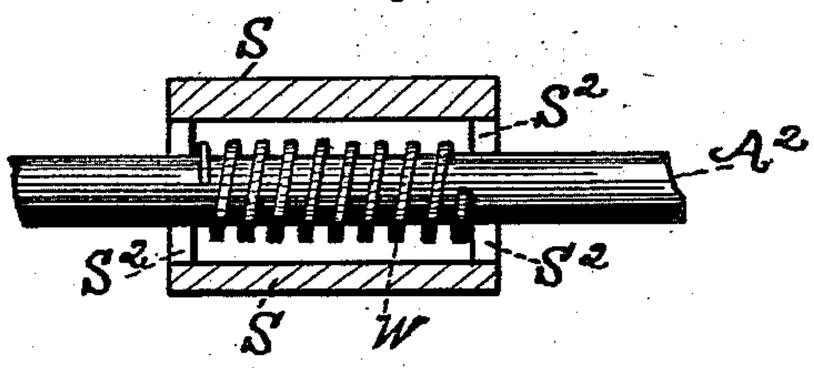


Fig. 6.

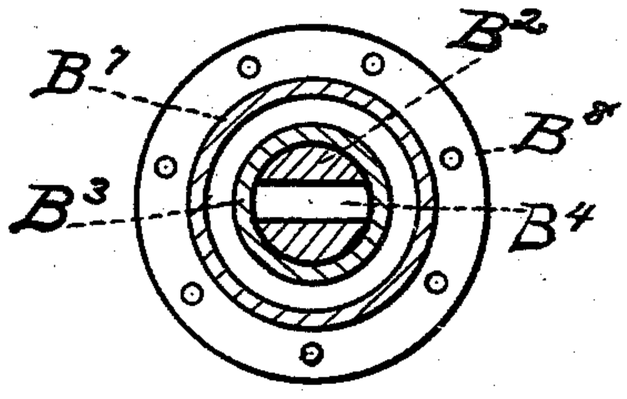
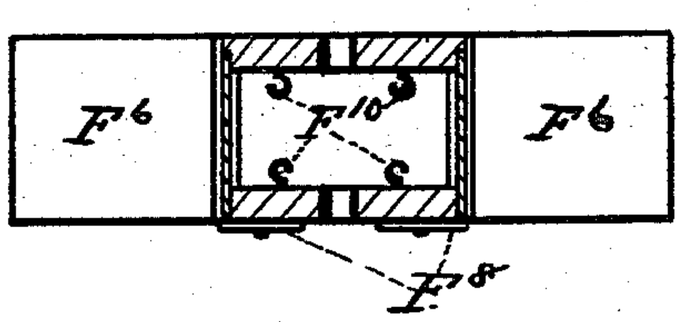


Fig. 7.



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UNITED STATES PATENT OFFICE.

ANDREW SCOTLAND AND HENRY F. BRINK, OF MALTAVILLE, NEW YORK.

AUTOMATIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 424,506, dated April 1, 1890.

Application filed May 16, 1889. Serial No. 310,972. (No model.)

To all whom it may concern:

Be it known that we, ANDREW SCOTLAND and HENRY F. BRINK, of Maltaville, in the county of Saratoga and State of New York, have invented certain new and useful Improvements in Automatic Railway-Signals; and we do hereby declare that the following is a full, clear, and exact description of the invention, that 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 the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

Our invention relates to improvements in automatic railway-signals; and it consists of the novel construction and combination of parts to be hereinafter described, and subsequently claimed.

Figure 1 of the drawings represents a central vertical longitudinal section of a caboose-car having our improved signal attached thereto, taken on the broken line 1 1 in Fig. 3; Fig. 2, a vertical transverse section taken on the broken line 2 2 in Fig. 3, showing the upper portion only of the car. Fig. 3 is a top plan view of the signal-boxes and a portion of the car. Fig. 4 is a top plan view of a support for the vertical shaft-bearings and a portion of the car-axles; Fig. 5, a vertical cross-section of the bearing-support, taken on the broken line 5 5 in Fig. 1, and showing in side elevation the shaft-actuating worm; Fig. 6, a horizontal cross-section of the shaft and inclosures taken on the broken line 6 6 in Fig. 1; Fig. 7, a central vertical section of the rotary signal-box detached and inverted.

A represents a caboose-car, which may be of any known general form, and is provided with a rotary shaft B, which extends vertically through the car. The lower end of the shaft may be connected with the car-axle in any known manner to impart to it a rotary movement. We have shown, as a preferred method, a worm-gear W, upon the axle A′, adapted to engage with a worm-wheel W′, fixed upon the lower end of the shaft, as by set-screw W^2, passing through the wheel-hub W^3. The lower end of the shaft is made cone-shaped, and has its bearing in the screw-threaded step W^4. The step is vertically adjustable in a support consisting of a metallic bar S, secured at one end to the car-axle A^2, as by a clip or box S′, and at the other end to the axle A′, having the worm-gear, as by flanges S^2, bearing upon the axle. The vertical shaft is passed down through the aperture S^3 and the worm-wheel to its step, the latter being screwed into a threaded aperture in the extreme end of the supporting-bar, which end is bent around the axle A′, as shown in Fig. 1. The vertical shaft is provided with a universal joint B′, which may be of any known form. The shaft above this joint is divided into two telescopic sections, the lower section B^2 being movable within and longitudinally of the hollow end B^3 of the other section. The lower section is provided with a transverse slot or slideway B^4 in its upper inclosed end, adapted to receive and form a slideway for the pin B^5, inserted in the shell of the hollow section and extending transversely of the same. When desired, a coil-spring B^6 may be inserted in the hollow section, so that the upper end bears upon the solid portion of the upper section to support it, while the lower end of the spring bears upon and is supported by the upper end of the lower inserted section, as shown in Fig. 1. It will thus be seen that while that portion of the shaft below the universal joint, upon which the gear-wheel is secured, is supported in a fixed position relatively to the axles, the telescopic sections are free to partake of the lateral movements of the car when connected with a moving train.

By having the shaft made in telescopic sections the upper section is free to partake of the vertical vibrations or movements of the car relative to the axles, which movements are considerable in cars mounted upon springs.

That portion of the shaft which is inclosed within the car may have an inclosing case, as the upright cylinder B^7, provided with an attaching flange B^8 at its lower end, by means of which it can be secured to the floor of the car, as by screws. The upper end of the shaft passes up through a turret C, fixed upon the

top of the car. The vertical side walls of the turret are made up of a series of panes of glass or other substance, which will permit of the passage of light through the same. The panes may differ from each other in color, and some are clear glass without perceptible color. We prefer to make alternate panes red and the other alternate panes of clear glass, as shown in Fig. 2, the red panes being marked C′ and the clear panes C^2. Within the turret is a rectangular frame or box C^3, the vertical walls of which are also composed of different colored or clear panes, adapted for the passage of light. The alternate panes C^4 are preferably clear, and the others of any preferred color, as successively white and blue, the panes C^5 being white and C^6 blue. The inner frame C^3 is adapted to slide back and forth longitudinally of the turret a distance equal to the width of a single pane. As a means for communicating to such frame a vibratory movement, we provide a lever D, fulcrumed upon a fixed part of the car, as at D′. One end of the lever is provided with the slot D^2, adapted to receive the pin D^3, fixed in the frame. The other end of the lever is pivoted to the rod D^4, which is actuated by the eccentric D^5, fixed upon the vertical shaft. It is obvious that a reciprocating movement of the frame, varying in rapidity with the velocity of the car, will thus be imparted through the eccentric-actuated lever D, shaft B, gear W′, and worm W, fixed on the car-axle.

Any desired number of lanterns D^6 may be secured within the frame to send rays of light through the panes in the frame and turret.

When the frame and turret occupy the relative positions shown in Fig. 2, the alternate panes C′ would exhibit a red color, the first pane, marked C^2, counting from the left in Fig. 2, a white or shaded light, the second pane, marked C^2, a blue light, the third a white light, and the fourth or last pane, a clear unshaded light. When the frame is at its other limit of vibration, every other pane C^2 would exhibit a clear unshaded light, as the clear panes C^4 in the frame would coincide with them, and the other panes would present a variety of colors, from which it is obvious that we produce a flash light or lights at every reciprocating movement of the frame. It is only necessary, therefore, to note the rapidity of the flashes to determine approximately the velocity of the moving car. If the flashes cease, the car has come to a standstill. To determine the direction in which the car is moving, we provide a revolving box F, having a rectangular central aperture adapted to receive and fit the rectangular-shaped shaft B. The box may have any desired number of lanterns F′, secured upon the inside hooks F^{10}, and adapted to send rays of light through panes F^2, F^3, F^4, and F^5, which form the four vertical walls of the box. The box is also provided at its four corners with the wings F^6. The box rests upon the supporting coil-spring F^9, and is held upon the shaft by the pin F^7. When the car is moving in one direction, the box revolves in a certain direction which exhibits successively the panes F^2, F^3, F^4, and F^5, which represent, respectively, red, white, and blue, and a clear pane, which latter may be filled with any desired signal, as a number, picture, or other object. Should the direction of the car be reversed to travel backward, the revoluble movements of the panes would be reversed, the worm on the axle acting to turn the shaft in the opposite direction, and clear, blue, white, and red would successively appear instead of red, white, and blue, the order maintained by the forward movement of the car.

The wings F^6 serve to shorten the time during which the successive panes remain within the field of vision, and consequently prolong the interval during which one pane only is visible from any point in the same horizontal plane.

Should a train of cars start upon its return-trip without reversing the caboose it is only necessary to withdraw the pin F from the shaft, slip the signal-box therefrom, turn it over to the position shown in Fig. 7, and return it to its place on the shaft. The panes will then appear successively to an observer in the same order as when the train was moving in the opposite direction.

The buttons F^8 serve to hold the panes in place in the box when the box is in the position shown in Fig. 7. (Shown by dotted lines in Fig. 3.)

What we claim as new, and desire to secure by Letters Patent, is—

1. In an automatic railway-signal, the combination, with a worm-gear fixed upon an axle of a railway-car, of a vertical rotary shaft extending from such axle up through the car, a worm-engaging gear fixed upon the lower end of such shaft, an eccentric fixed upon such shaft near its upper end, a signal-turret, a signal-frame reciprocatory in such turret, and actuating mechanism connecting such frame with the eccentric, substantially as described.

2. In an automatic railway-signal, the combination, with a vertical rotary axle-actuated shaft extending from the axle up through the car, of a signal-box fixed upon the upper projecting end of the shaft, and having its vertical walls composed of signal-panes of different colors, and signal-screens fixed upon the box, one between each pair of panes, and projecting therefrom radially to the shaft, substantially as described.

3. In an automatic railway-signal, the combination, with a vertical rotary axle-actuated shaft extending from the axle up through the car, of a signal-box detachably supported by such shaft, and provided with means for maintaining a light when either side up, substantially as described.

4. In a railway-signal, the combination,

with a vertical rotary axle-actuated shaft extending from the axle up through the car, of a signal-box supported by such shaft to turn therewith, but free to slide longitudinally thereon, and a supporting coil-spring inclosing such shaft beneath the box, substantially as described.

In testimony whereof we have hereunto set our hands this 14th day of May, 1889.

ANDREW SCOTLAND.
HENRY F. BRINK.

Witnesses:
GEO. A. MOSHER,
CHAS. L. ALDEN.