

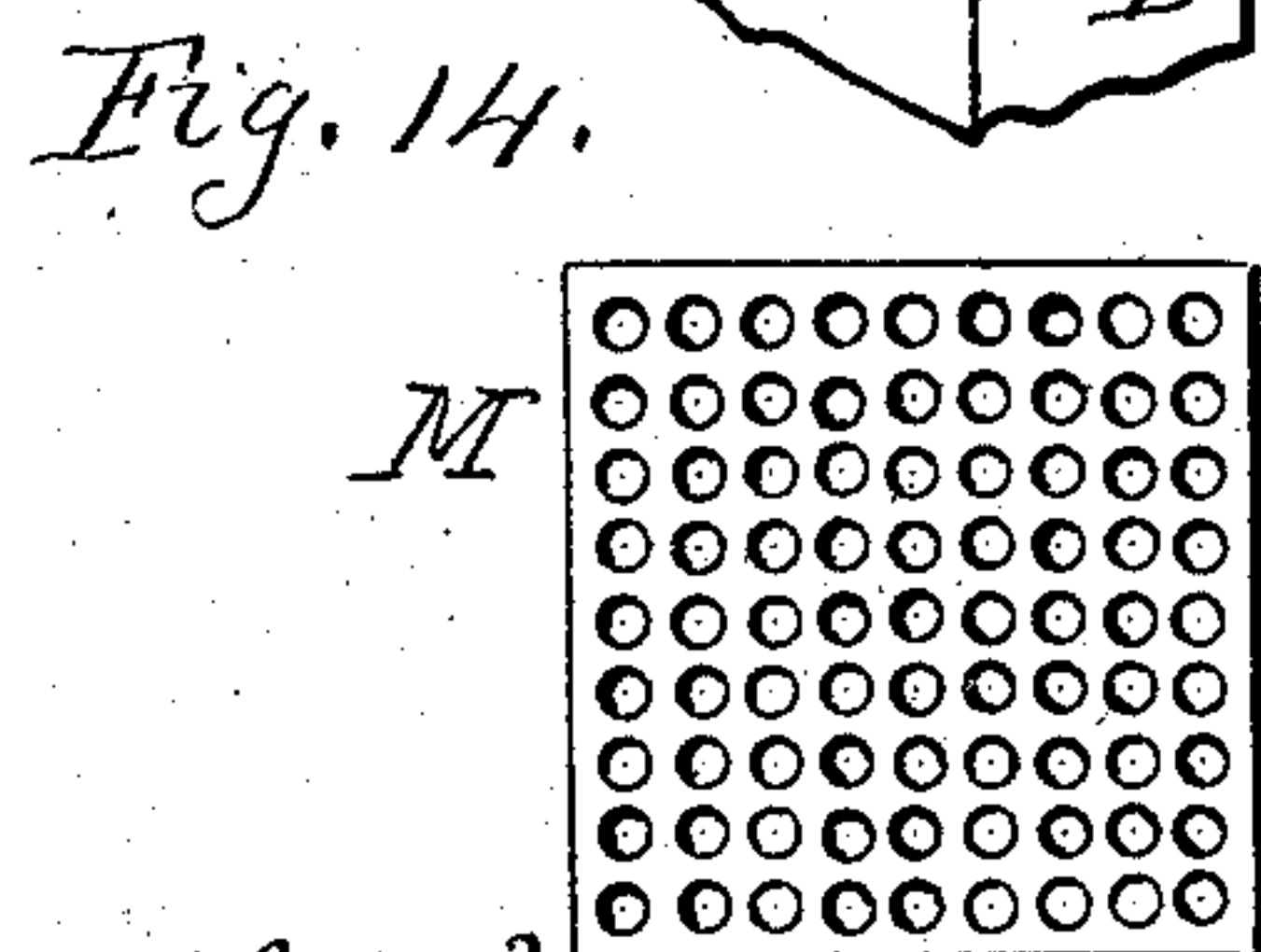
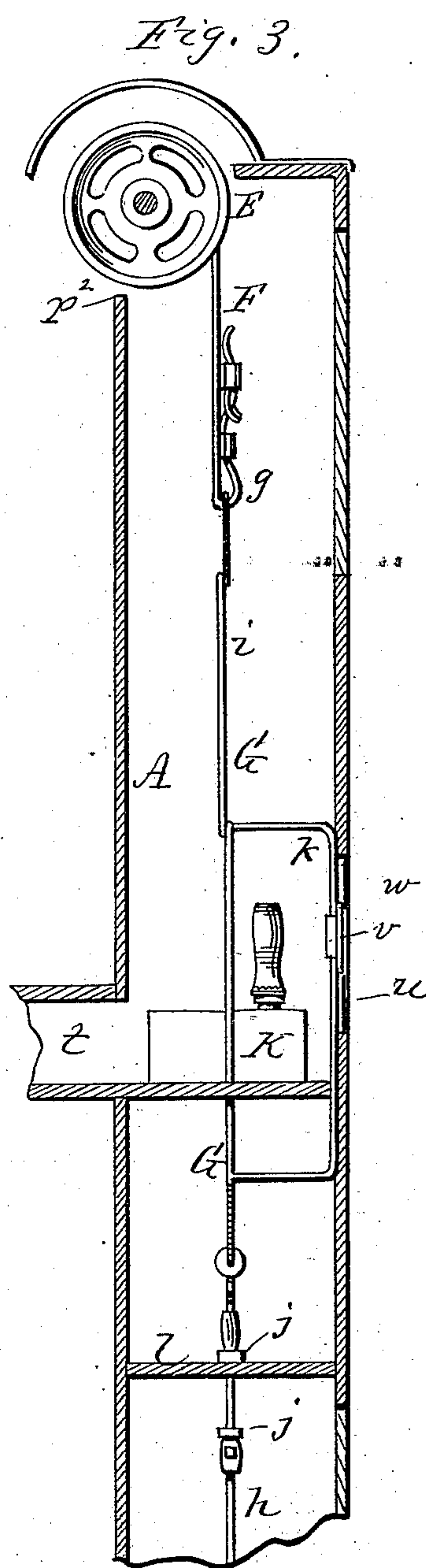
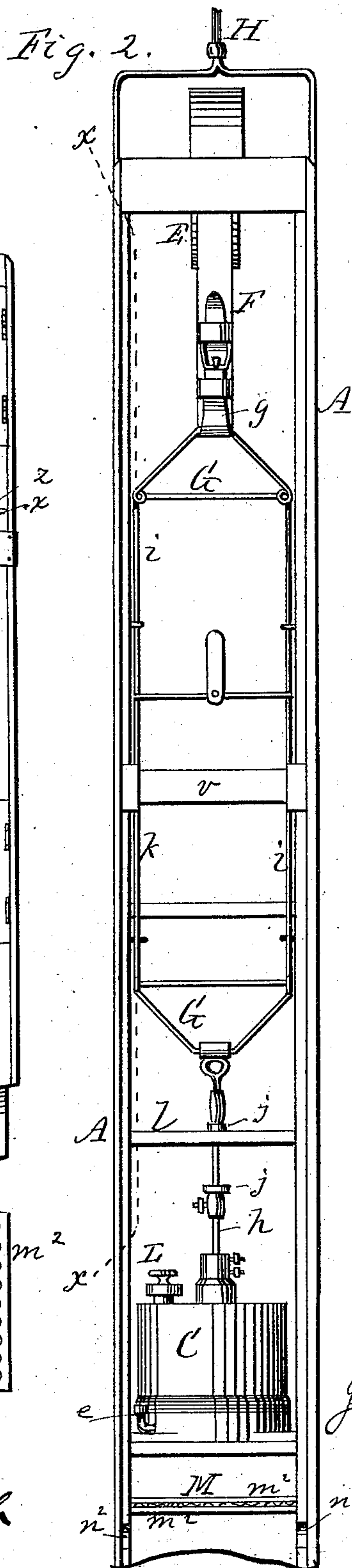
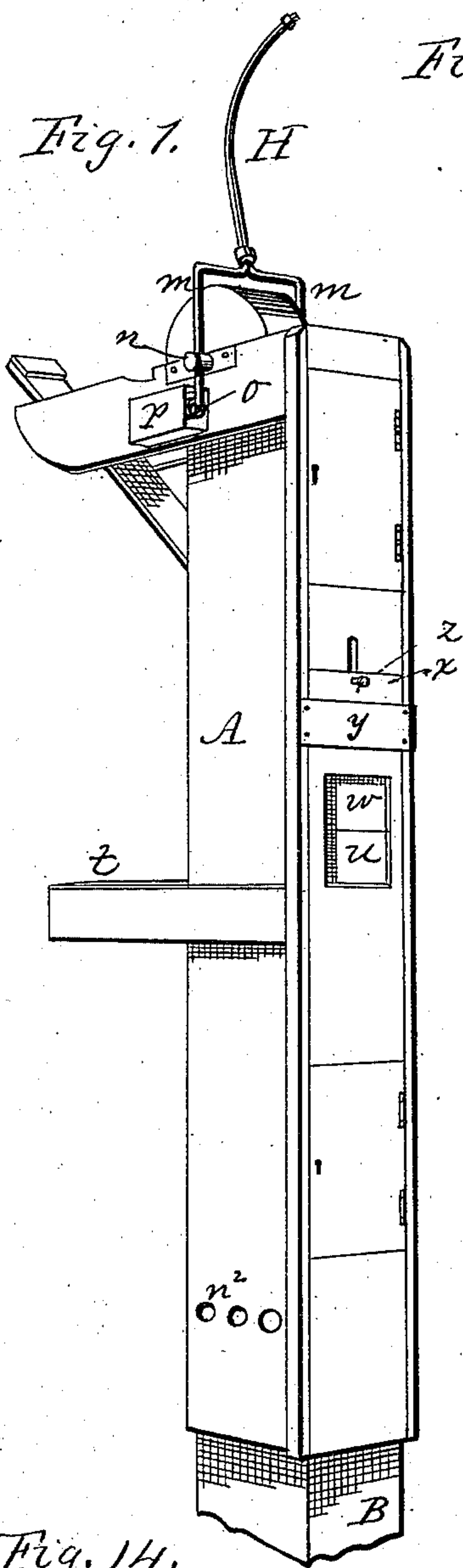
(No Model.)

2 Sheets—Sheet 1.

J. L. BOOTH.
RAILROAD SIGNAL.

No. 290,842.

Patented Dec. 25, 1883.



Attest.
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P. A. Hustich

Inventor.
Jonathan L. Booth
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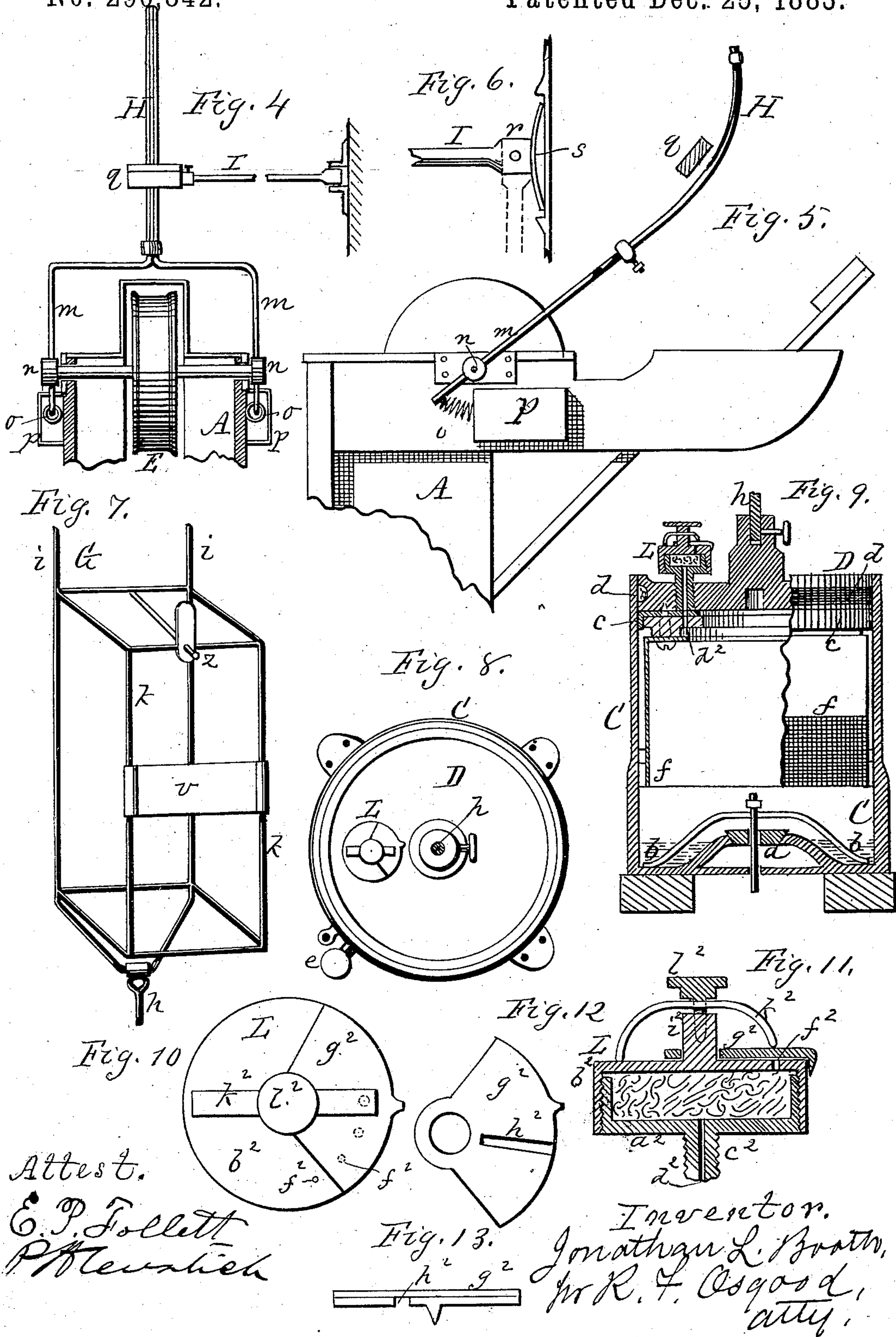
(No Model.)

2 Sheets—Sheet 2.

J. L. BOOTH.
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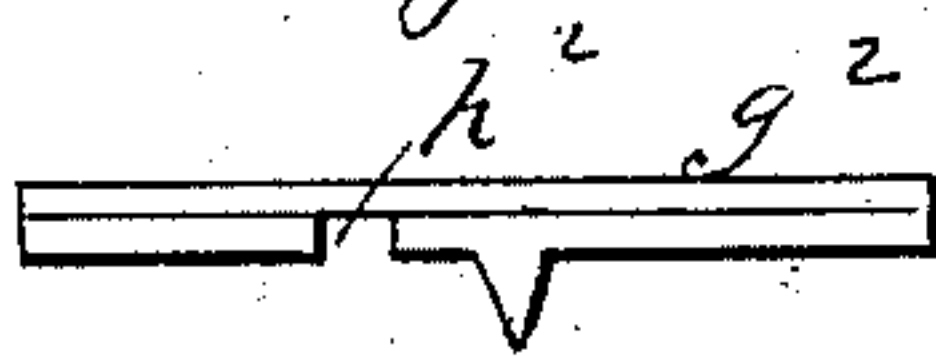
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Attest.

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Fig. 13.



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UNITED STATES PATENT OFFICE.

JONATHAN L. BOOTH, ROCHESTER, NEW YORK.

RAILROAD-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 290,842, dated December 25, 1883.

Application filed March 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, JONATHAN L. BOOTH, of Rochester, Monroe county, New York, have invented certain new and useful Improvements in Railroad-Signals; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of the signal-post and its attachments. Fig. 2 is a front elevation of the same enlarged, the front side being removed for the purpose of showing the interior mechanism. Fig. 3 is a section in line *xx* of Fig. 2. Fig. 4 is an elevation showing the tilting apparatus at the top of the standard or post, and the arm attached to the side of the car for operating the same. Fig. 5 is a side elevation of the parts shown in Fig. 4. Fig. 6 is a plan view of the arm attached to the side of the car. Fig. 7 is a perspective view of a portion of the wire-frame forming the connection inside the post. Fig. 8 is a plan of the air-cylinder. Fig. 9 is a vertical section of the same. Figs. 10, 11, 12, and 13 are detail views, showing the air-escape attachment on top of the piston of the cylinder, and the parts connected therewith. Fig. 14 is a plan of the air-filter.

My improvement relates to automatic signals for use on railroads, &c., and is designed to give warning, for a certain length of time after a train has passed, to any succeeding train that may follow. In this apparatus a signal-post is erected beside the track. An air-cylinder is located in the bottom of the post, in which rests a piston. A connection extends from the piston to the top of the post, and an arm is so connected with the top of the post that when struck and depressed by an arm from the car, the connection inside the post will be raised, and the signal with it, and it will remain raised a certain length of time, which is controlled by an air-escape provided in the piston, all as hereinafter described.

In the drawings, A shows the hollow signal post or standard, which stands beside the track, the same being attached to a solid post, B, set into the ground.

C is an air-cylinder, resting in a chamber at the bottom of the hollow post. This cylinder is closed at its bottom, except that it has a valve, *a*, opening upward; but it is open at

the top, and in it rests a piston or head, D, which moves up and down the full length of the cylinder. In the bottom of the cylinder, surrounding the valve, is an oil-receptacle, *b*, Fig. 9, in which rests a body of oil or other liquid that will not freeze. The piston has an inverted leather cup-packing, *c*, standing downward, which, in the up motion of the piston, will draw in or collapse, allowing easy movement, but in the down motion will expand under the pressure of the air in the cylinder and will prevent escape of the air at the sides and will cause the air to be forced through the air-escape, as will presently be described. Above this leather packing, and in the edge of the piston, which is grooved for the purpose, is a fibrous packing, *d*, whose purpose is to spread or wipe off the oil from the inside of the cylinder as the piston moves up and down. Attached to the bottom of the piston is a cylindrical hoop or band, *f*, of any suitable material, which will enable it to keep in form, of a little less diameter than the interior of the cylinder, the lower portion of which is preferably made of wire-cloth or is otherwise roughened, as shown in Fig. 9. When the piston descends, the hoop dips into the oil, and as the piston rises again the oil will be carried up by the hoop and the sides of the cylinder will be lubricated. In the downstroke of the piston the packing *d* will sweep the oil off and prevent its overflowing the piston. The oil-cup is filled through a nozzle, *e*, at the bottom of the cylinder and outside of the same.

At the top of the signal-post is a pulley or wheel, E, to which is attached a leather or other strap, F. When the pulley is turned, the strap will be wound up or shortened. At the bottom of the strap is an elongated loop, *g*, Figs. 2 and 3.

G is a wire frame-connection, extending from the strap through the length of the signal-post and having at its bottom a rod, *h*, which screws into or is otherwise attached to the top of the piston D. It will be seen that when the wheel at the top of the post is turned the strap F, the connection G, and with it the piston D, will be drawn up and air will be drawn into the cylinder C through the valve *a* in its bottom, and the cylinder will be charged, so that the confined air cannot escape except through the leak attachment, hereinafter described.

The wire frame-connection G has two sides, i i , which pass down the sides of the post, leaving the center clear, and midway of its length the frame has also a square-sided cage-projection, k , Fig. 7, which extends forward to the front of the post and carries the slides which operate the signal. The rod h has two stops, j j , Figs. 2 and 3, which, in the up and down strokes, strike a bar, l , and gage the stroke of the piston in the cylinder. The stops have rubber linings.

H is a curved arm, composed of steel-wire, standing upright above the post and provided at its bottom with branching sides m m , which embrace the wheel E and pass through the journals n n of the wheel, the ends projecting below and being connected with spiral or other springs o o , resting in housings p p , as shown in Figs. 4 and 5. These springs always draw the arm to the upright position shown in Fig. 1.

I is an arm attached to the locomotive or one of the cars of the train, and projecting laterally, so as to strike the curved arm H. When it strikes, the arm H will be thrown over and depressed, and the piston will be raised in the cylinder, as aforesaid. When the train has passed, the springs o o will bring the arm H to its upright position again. The elongated loop g allows the proper play between the strap F and the wire connection G, so that the strap can fall without affecting the connection. The arm I has at its outer end a flat-sided paddle, q , which strikes the signal-arm. At its inner end it has a square knuckle, r , which is pivoted to a casting at the side of the car. This knuckle rests against a flat curved spring, s , Fig. 6. The arm acts somewhat on the principle of a jack-knife. It is of such stiffness that when it strikes the signal-arm it will not be sprung; but if it should strike a solid obstruction it would spring by depressing the spring behind it, and would snap around against the side of the car, as indicated by the dotted lines, Fig. 6. The signal-arm H has a certain degree of spring or elasticity, and is made of the curved form shown, so that when it receives the shock it will yield to a certain extent, and will not be broken. A straight form of the arm would answer if the cars were always under rapid motion, as the arm would be thrown fully over by the impact; but to meet the necessity of slow-moving trains, the curve is necessary to enable the arm from the train to depress the standard-arm sufficiently to raise the piston in the cylinder.

K is a lamp set into the hollow standard through a runway, t , Fig. 3. In front of the lamp is a red pane, u , fixed in the post. v is an opaque slide attached to the connection G, moving up and down with it, and resting between the light and the red pane. When the piston is raised in the cylinder, the slide is raised above the red pane, and allows the light to shine through and produce a red light, which is the signal of danger. When the pis-

ton is lowered in the cylinder, the slide obscures the red light, which is the signal of safety. Above the red pane u is a white or other light, w , which is used to show that the lamp is burning; and also in a four-track road it may be used in different colors to signal on another track. A red slide, x , and a cover, y , are used above the signal-lights, the red slide being attached to a stem, z , of the wire frame, and moving up and down behind the cover. This is for day use.

L is the device forming the air-escape attached to the piston. It consists of a cup composed of the receptacle a^2 and cover b^2 , screwed together and filled with cotton or other fiber, as shown in Fig. 11. At the bottom is a nozzle, c^2 , having an air-passage, d^2 . The nozzle screws through the top of the piston, and the air passes up from the cylinder through the passage, thence through the cotton where it is filtered or cleaned from dust; and thence it escapes out through one of a series of small perforations, f^2 f^2 , made through the top of the cup. The perforations are of graduated sizes, commencing with one so minute that a hair will hardly pass through. g^2 is a segmental plate which covers all the perforations through the top of the cup. The bottom of the segmental plate is lined with leather or other suitable packing material, so that when pressure is applied on top it will pack closely on the cup. In the segmental plate is made a groove or slot, h^2 , Figs. 12 and 13, which opens outward. The segmental plate turns on a vertical stud, i^2 , on the cover, and it is held down at any desired position by a spring-clamp, k^2 , tightened by a set-screw, l^2 . By loosening the set-screw the segmental plate can be turned to any desired position and fastened again.

The operation is as follows: The piston having been raised in the cylinder, as before described, the weight causes it to descend as fast as the imprisoned air in the cylinder can escape through the cup just described. As it passes through the small perforation in the top of the cup it enters the groove h^2 and escapes outward. By turning the segmental plate g^2 to bring the groove over a larger or smaller orifice, the length of time in which the piston will fall can be graduated exactly, as desired, and consequently the danger-signal can be exhibited the proper length of time to meet the necessities of the case.

M, Figs. 2 and 14, is an air filter or screen located in the hollow post beneath the cylinder C, for the purpose of straining the air and freeing it from dust before it enters the cylinder through the valve. This filter or screen consists of two wood plates, m^2 m^2 , with a cotton or other fibrous layer between them. The air is forced to pass through the perforations and the cotton, and is relieved of all dust and dirt and enters the cylinder in a pure state, hence will not contaminate the oil nor interfere with the working of the piston.

n^2 n^2 are wire screens covering openings in

the sides of the hollow post below the air-filter, by which the air is primarily sifted before entering the filter.

p^2 is a draft opening at the top of the post for allowing the heat to pass. The heat rising from the lamp will keep the parts at such temperature that they will not freeze up, and will also keep them dry.

On the passage of a train the piston will be raised in the cylinder and the red signal of "danger" will be exhibited a length of time equal to the time of the piston descending in the cylinder, which, as before described, may be graded as desired. While this signal is displayed a succeeding train is not to pass the signal.

If desired, the falling mechanism may be made to operate a wire or other connection to another signal at a distance in front or rear.

Various modifications may be made. The connection G may be made of other material besides wire. The wheel E may be in the form of a segment or crank. The strap F may be a chain or cord of any suitable kind. The wheel E may be covered by a housing of metal or any other suitable material. A stop with a rubber pad is used behind and below the curved arm to gage the stroke of the arm and break the shock when the arm is thrown back. If desired, the signal-post may be set at some distance away from the track, and the curved arm be carried up to the track in proper position to receive the stroke of the arm of the train by suitable connections. The arm H may be made straight and inclined instead of curved. The flexible strap F and the springs $o o$, by their connection with the arm H, allow the said arm to be brought to the upright position after the train has passed at once, and before the piston has commenced to fall in the cylinder, thus not interfering in the least with the operation of the signal.

To accomplish satisfactory results—such as certainty of action, durability, economy, and requiring but little attention in a signal governing the running of railroad-trains—many adverse circumstances are met—such as the heat, dust, and fog of summer, the cold, ice, and snow of winter; and no signal can be a success unless it can overcome all such difficulties and others not enumerated. It is believed that the apparatus before described obviates these difficulties. The device L forms a chamber in which the air can settle and deposit the dust before escaping.

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

1. In a pneumatic signal, the combination, with the hollow vertical post A, of the air-cylinder C, the piston D, moving freely therein, the air-escape attachment L on top of the piston, the wire connection G, attached to the piston and extending upward through the post, the strap F, provided with the loop g , attached to the wire, the pulley E, over which the strap

passes, and the curved spring-arm H, attached to the pulley, as shown and described, and for the purpose specified.

2. In a pneumatic signal, the combination, with the wire connection G, extending up through the hollow post, of the cylinder C, provided with an oil-receptacle in its bottom, and a piston, D, to which the wire connection is attached, said piston resting in the cylinder, and provided with a hoop or band, f , for dipping into the oil, and a packing, c , for preventing escape of the confined air, as herein shown and described.

3. In a pneumatic signal, the combination, with the wire connection G, extending up through the hollow post, of a cylinder, C, provided with an air-inlet valve in its bottom, a piston, D, to which the connection is attached, resting in the cylinder, an air-escape attachment on top of the piston, provided with a series of perforations of graduated sizes, and a segmental plate for changing the escape of the air from one perforation to another, as set forth.

4. In a pneumatic signal, the combination, with the wire connection G, extending up through the hollow post, of a cylinder, C, provided with an air-inlet valve in its bottom, a piston, D, to which the connection is attached, resting in the cylinder, and an air-escape attachment consisting of a cup provided with a fibrous packing through which the air is filtered, the cup having a series of graduated perforations, and a segment-plate, g^2 , resting over the perforations and changeable to different positions, as and for the purpose specified.

5. In a pneumatic signal, the combination, with the wire connection G, extending up through the hollow post, of a cylinder, C, provided with an inlet-valve, a piston, D, to which the connection is attached, resting in the cylinder, an air-escape, L, attached to the piston and provided with a series of perforations of graduated sizes, and a segment-plate, g^2 , resting over said perforations, and provided with a channel, h^2 , which, by being shifted from one perforation to another, changes the amount of escape of air from the cylinder, as herein set forth.

6. In a pneumatic signal, the combination, with the wire connection G, of the cylinder C, provided with an inlet-valve, a piston, D, resting in the cylinder, an air-escape, L, attached to the piston and provided with a series of perforations of graduated sizes, a segment-plate, g^2 , provided with a channel, h^2 , resting over the perforations, and a spring-clamp, k^2 , and set-screw l^2 for securing the segment-plate at any adjustment, as herein set forth.

7. In a pneumatic signal, the combination, with the hollow post A and with the cylinder C, piston D, and wire connection G, located in the hollow post, of the air-filter M, resting in the post below the cylinder and covering the passage to the cylinder and serv-

ing to filter the air before it reaches the cylinder, as herein shown and described.

8. In a pneumatic signal, the combination, with the hollow post A and with the cylinder 5 C and piston D, of a wire connection, G, attached to the piston and extending up through the post, said connection consisting of side wires, *ii*, running at the sides of the post, which allow the insertion and removal of the lamp 10 between them, and a cage, *kk*, of rectangular form, which projects forward to the front of the post and carries the shield *v*, as shown and described, and for the purpose specified.

9. In a pneumatic signal, the combination,

with the pulley E, strap F, and wire connection G, connected with the piston in the cylinder, of the curved spring-arm H, attached to the pulley, and the reacting springs *oo*, attached to the lower ends of the arms, as shown and described, and for the purpose specified. 15 20

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JONATHAN L. BOOTH.

Witnesses:

JNO. R. FANNING,

A. BROOKS BOOTH.