A. N. TOWNE.
Train-Telegraph.

No. 163,549. Patented May 18, 1875.

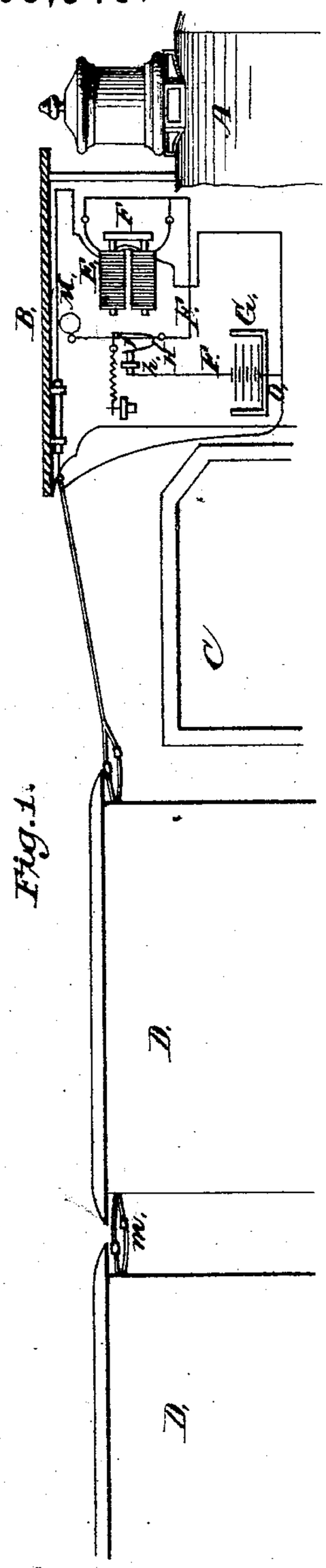

Fig. 1.

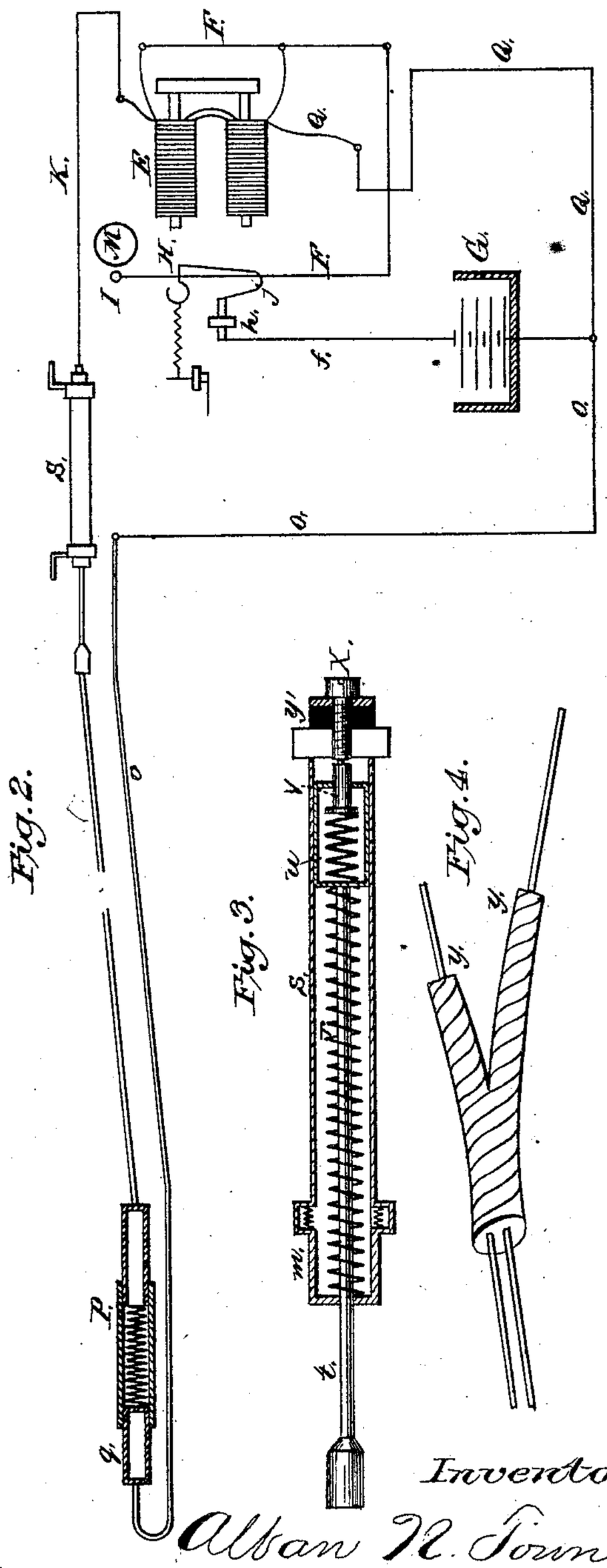

Fig. 2.

Fig. 3.

Fig. 4.

Attest:

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UNITED STATES PATENT OFFICE.

ALBAN N. TOWNE, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN TRAIN-TELEGRAPHS.

Specification forming part of Letters Patent No. **163,549**, dated May 18, 1875; application filed December 28, 1874.

To all whom it may concern:

Be it known that I, ALBAN N. TOWNE, of San Francisco city and county, State of California, have invented a Magnetic Signal Apparatus for Railway-Trains; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

My invention consists in certain improvements in electro-magnetic signaling apparatus, in combination with the ordinary signal-bell cord used on railway-trains, so that not only train-signals can be transmitted to the engineer from any part of the train by the conductor or other person, but which will also automatically sound a signal for the engineer in case one or more cars should become detached from the train, as hereinafter described and claimed.

In order to describe my invention so that others will be able to understand its nature and application, reference is had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 is a side elevation of my invention as attached to a railway-train. Fig. 2 is an enlarged view of the apparatus. Figs. 3 and 4 are enlarged detail parts of my device.

Let A represent a locomotive with its cab B and tender C, and D D one or more cars of a railway-train. Inside of the cab, at some convenient point, I place a differential magnet, E, and connect its coils by means of wires F with a battery, G, which may be located either inside of the cab or below it, as most convenient. One branch, Q Q Q, of the differential magnet makes a return circuit to the battery. The armature H is connected with a platina-faced screw, *h*, by a platina-faced spring, *j*, and the screw *h* is connected with the battery by a wire, *f*. A bell-hammer, *l*, is connected with the armature by a suitable handle, and a gong or bell, M, is secured at the proper point to receive the stroke of the bell-hammer, when the armature is caused to vibrate between the poles of the magnet and the platina-faced screw *h*. A wire, *o*, leads from the battery G, and passes through each car D of the train. After passing through the train, the wire is carried back again to the cab, and its opposite end is attached to the upper coil of the electro-magnet E. The particular location of the wires is immaterial, as they can be placed inside or outside, below or above the cars. I prefer to insert them in the body of a cord similar to the ordinary bell-cord, as shown at Fig. 4, so that by drawing upon the cord the signal can be sounded, as hereinafter explained. Between each two cars, and at any other point found desirable, I construct a short portion at the end of each section of the bell-cord, in two parts or branches, *y y*, as shown at Fig. 4, and through each branch thus formed I lead one of the wires *o*. The branches of each two sections of cord I then unite together by means of a suitable metallic coupling.

The coupling which I have represented in this application consists of a brass tube, *p*, which is attached to the end of one of the branches *y* of the rope, and a short metallic rod, *q*, attached to the end of the opposing branch of the next section. The tube and rod couple together by means of an ordinary bayonet-joint or other simple locking-joint, so that they can be connected or disconnected at pleasure.

From the above arrangement it will be evident that an electric current will be maintained through the wires *o* and *k*, magnet E, and wire Q as long as all of the wires remain connected.

This current, passing, as it does, from the battery through the coils of the magnet E and wires *o*, will render the magnet inactive, and the armature H will be held, by its spring, against the screw *h;* but should the train-current through the wires *o* become disconnected or broken, either by the rupture of the wire or otherwise, the current which passes from the battery through wires F, magnet E, and wire Q will cause the armature to vibrate between the poles of the magnet and screw *h*, thus alternately making and breaking the connection, and at each stroke causing the bell-hammer to strike the bell or gong M, and thus signal the engineer. At some point in the length of the wires *o* or bell-rope, preferably in the cab, I insert a compensating-spring, *r*, to provide for the shortening of the wire by contraction, and

to prevent any slight disturbance caused by turning curves, and by accidental strains upon the wires or bell-rope, from interfering with its operation. This spring I place in a barrel or cylinder, *s*, and this barrel or cylinder I secure to the ceiling of the cab, as represented. A spindle or rod, *t*, passes through the spirally-wound spring *r*, and this spindle has a short barrel, *u*, on its inner end, against which the end of the spring bears. Inside of this short barrel *u* is another spring, which operates against a piston in the cylinder, to force a short rod, V, out through the end of the barrel, as shown. When the spindle *t*, with its surrounding spring *r* and short barrel *u*, is inserted into the barrel or cylinder *s*, the point of the short rod V will first strike the opposite head of the cylinder and be compressed into the barrel *n*, when the end *m* is screwed upon the opposite or open end of the barrel, so as to confine the spring *r* in the cylinder. The wire *o*, which leads from the magnet or battery, is cut, and one end is attached to an insulated screw, *x*, on the permanent head of the cylinder *s*, while the other end is secured to the end of the spindle *t*, at the opposite end of the cylinder. The screw *x* is insulated by a packing or thickness, *y'*, of glass or other insulating material, which is placed between the screws *x* and the cylinder, so that the electric current will pass through the screw *x*, rod V, and spindle *t*, in order to pass from one end of the wire to the other.

By drawing upon the wire or bell-cord *o*, which is attached to the spindle *t*, the spring *r* is compressed, and the end of the short barrel *u* is drawn away from the opposite head of the cylinder *s;* but as the barrel moves away from it the spring in the barrel will force the rod V outward, and thus preserve the contact without breaking the circuit as long as the strain upon the wire or bell-cord is not strong enough to compress the spring *r* sufficiently to separate the rod V from the head of the cylinder.

By drawing with sufficient force upon this wire, the conductor or other person can compress the spring *r*, so as to separate the rod V from the head of the cylinder, and thus break the circuit for the purpose of signaling the engineer for train purposes.

Instead of employing two wires through the train to complete the circuit with the battery, a single wire could be used, and the return circuit made through the wheels of the cars and one of the rails of the track; or a steel brush could be arranged to move along one of the rails of the track, and complete the connection between the car and rail.

By the above-described or equivalent arrangement an electro-magnetic signal apparatus can be applied on railway-trains which will automatically sound a signal in case of a rupture of the train-wire, or by reason of a portion of the train becoming detached and separated from the forward portion, and which will also serve for ordinary signaling purposes.

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

1. A signal apparatus for railway-trains, consisting of two complete electric circuits connecting with the opposite poles of a differential magnet, one of which circuits passes through the entire length of the train, so that when the train-circuit is ruptured the remaining circuit will cause the armature of the magnet to vibrate back and forth and ring a bell, substantially as above described.

2. The insulated cylinder or circuit-breaker *s*, with its screw *x*, in combination with the spindle *t*, with its short barrel *u* and surrounding spring *z*, said barrel *u* having the projecting spring-rod V, substantially as and for the purpose above described.

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Witnesses:
JNO. L. BOONE,
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