No. 876,274. PATENTED JAN. 7, 1908.

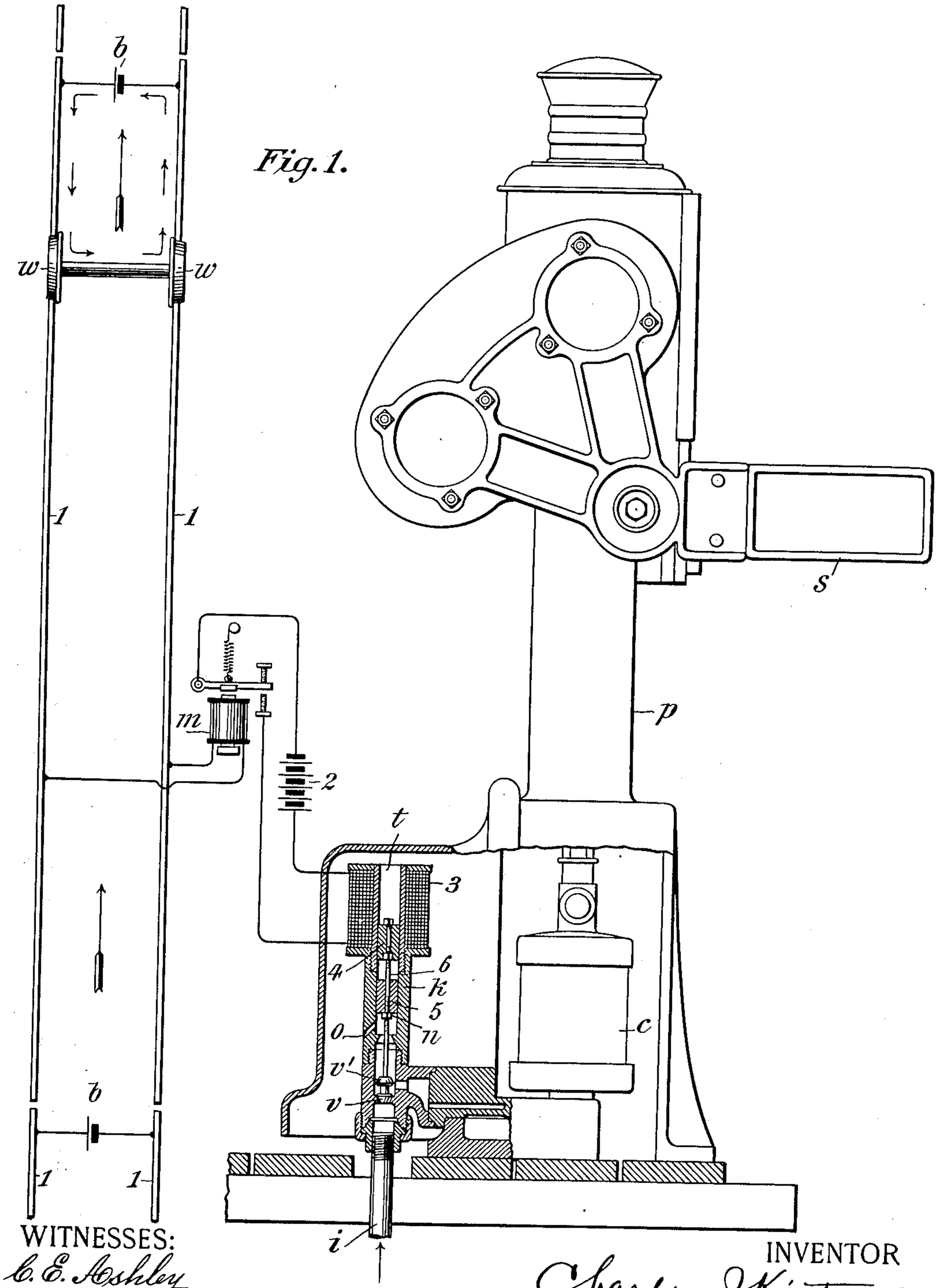
C. J. KINTNER.

ELECTRICALLY CONTROLLED RELEASING DEVICE.

APPLICATION FILED APR. 20, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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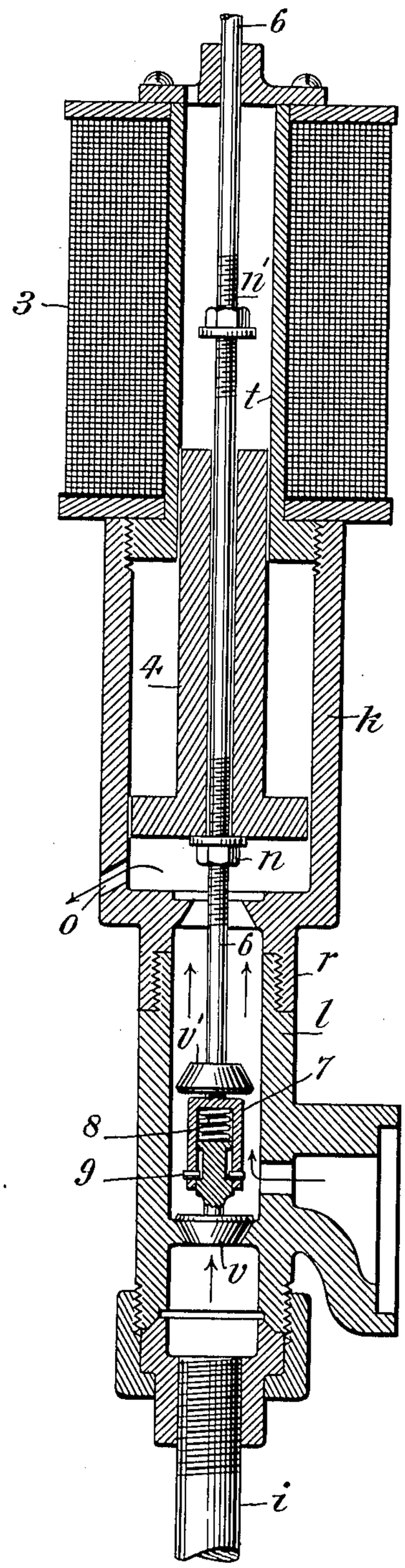

Fig. 2.

WITNESSES:

C. E. Ashley

M. F. Keating

INVENTOR

Charles J. Kintner

UNITED STATES PATENT OFFICE.

CHARLES J. KINTNER, OF NEW YORK, N. Y.

ELECTRICALLY-CONTROLLED RELEASING DEVICE.

No. 876,274. Specification of Letters Patent. Patented Jan. 7, 1908.

Application filed April 20, 1906. Serial No. 312,786.

To all whom it may concern:

Be it known that I, CHARLES J. KINTNER, a citizen of the United States, residing in New York, borough of Manhattan, county and State of New York, have made a new and useful Invention in Electrically-Controlled Releasing Devices, of which the following is a specification.

My invention is directed particularly to an electrically controlled releasing device for use in connection with railway signals and analogous appliances, and has for its object, to provide means, in the nature of a solenoid having a core operatively connected with a valve-stem or other appliance which it is desired to release, and adapted to operate in such manner that said core will impart a blow to the part to be released when the coils of the solenoid are disconnected from the circuit.

Referring to the drawings, Figure 1 is a diagrammatic view of a section of railway track and a part side elevational, part sectional view of a well known form of pneumatically controlled signal apparatus, illustrating the application of my invention to the certain or sure release of the controlling valves, the signal being displayed at danger, the relay circuit open, and the track circuit battery short circuited through one pair of car-wheels and the axle thereof. Fig. 2 is a full sized sectional view of a modified form of my improvement as applicable to the releasing and seating of valves, the valve from the source of air or other pressure supply being shown as seated.

In Fig. 1 of the drawings I have illustrated in part diagrammatic, part plan view a well known form of pneumatically controlled signal apparatus in which the application of the compressed air or gas and the release thereof is controlled by a section of track circuit and a relay battery, the relay battery in turn controlling the action of a solenoid which regulates the movement of the valves.

Referring to Fig. 1 of the drawings in detail, 1, 1 represents an insulated pair of track rails, *b* a track battery and *m* a relay magnet included in the track circuit, 2 being the relay battery including the signal controlling coil of a solenoid 3 adapted to control the inflow of the air through an inlet pipe *i* to the signal controlling cylinder *c* and operate the semaphore *s* supported by the signal post *p*.

The features so far described are well known and in general public use and the especial point of novelty of this feature of my invention lies in the providing of means for assuring absolutely the release of the valves when the signal should go to danger by its own weight, or by a counter-weight. To effect this result I supplant the well known form of electromagnet which is used to control directly an armature moved in one direction by the magnet and in the other by a spiral spring by a solenoid 3 having a two-part solenoid core 4, 5, each substantially one-half the length of the spool which supports the coil 3, said core being adjustably attached by a nut *n* to a brass or other non-magnetic valve-stem or rod 6, which supports at its lower end an inlet valve *v* adapted to be seated in a valve seat connected with the inlet pipe *i* and an outlet valve v^1 adapted to be seated in an upper valve seat connected directly with a vent or outlet opening *o*. The lower half 5 of the solenoid core has substantially the same length as the upper half, but is adapted to slide freely back and forth upon the valve-stem 6 and to be seated in its lower position upon an adjustable nut, as shown.

The operation is as follows—, A pair of wheels *w* is shown upon one section of the track rails 1, 1 and the battery *b* in advance of the car is short circuited so that the armature of the relay magnet *m* is on its backstop; consequently, the circuit of the relay battery 2 is interrupted and the valve-stem and its supported solenoid cores 4, 5, together with the inlet valve *v*, are in their lower position with the valve seated, so as to cut off the inflow of air through the inlet pipe *i;* hence the outlet valve v^1 having been opened the air inclosed in the operating cylinder *c* has escaped through the exhaust outlet or vent *o*, as shown by the arrows, and the semaphore *s* by reason of its counter-weight has gone to danger in a manner well understood. As soon as the car leaves the section the relay circuit will again be closed and the coils of the solenoid 3 will be included in circuit with the battery 2, so that the upper half 4 of the solenoid core will move to the central part of the solenoid coil, unseating the valve *v* and carrying the valve v^1 upward. When the upper half of the core assumes the central position referred to in the solenoid 3 the upper end of the lower or movable half 5 of the solenoid core will be brought into the field of the solenoid and drawn into contact with the upper half 4

thereof, so that both halves will now move forward as one in an upward direction to the extreme limit and effectually seat the valve v^1 in its seat, thus cutting off the outflow of air; consequently, the semaphore *s* goes to safety under the influence of air in the cylinder *c* in a manner well understood. When the next car enters, the relay circuit will be again interrupted and both halves 4, 5 of the solenoid core will be demagnetized; but should the valve v^1 for any reason stick, the lower half of the core, by reason of its weight and of its loose sliding suspension upon the valve rod or stem 6 will act after the manner of a pile driver and fall with sufficient force against the adjustable nut *n* below it to release the valve so that all of the parts will now fall by their united weight and seat the valve *v*.

Referring now to Fig. 2 of the drawings, I have illustrated in said figure how my invention may be utilized with a single solenoid core. In this figure 3 represents the solenoid as before, 4 a single solenoid core having an enlarged lower end for giving it the necessary weight to impart a sufficient blow to release either of the valves, dependent upon its direction of movement. *t* represents a non-magnetic tube which surrounds the core, said tube having at its lower end a lengthened screw-thread part *w*. *k* constitutes an interconnecting sleeve between the part *w* and the valve chamber *l*, to which latter it is connected by screw-threads in the neck *r*. The interconnected screw-threaded parts *w*, *k*, *l* and *r*, together with the screw-nuts *n*, n^1 and the valve stem 6 permit of adjustment for varying the relative distances of throw of the core 4. *v*, v^1 are the valves, the former connected directly to the lower end of the valve-stem 6 and the latter to said valve-stem by a sleeve 7 and pins 9, 9, adapted to slide in grooves in the upper end of a second short valve-stem which supports the valve *v*, 8 being a spring located within the sleeve and having its opposite ends resting respectively against the inner surface of said sleeve and the upper end of the short valve-stem. *o* is the outlet or vent. In this figure of the drawings the valve *v* is resting in its seat and is yieldingly held in such position by the spring 8, the solenoid core 4 resting with its lower end upon the nut *n*, so that the entire weight of the valve-stem 6, the nuts *n*, n^1, solenoid core 4, valves *v* and v^1 sleeve 7, spring 8, and short valve-stem all tend to normally hold the valve closed from the source of air supply, not shown, but connected to the inlet pipe *i*, and upon the supposition that the coils of the solenoid 3 are in open circuit with the battery 2, see Fig. 1.

Upon closing the circuit of the battery 2 by action of the relay *m*, Fig. 1, or from any source of electrical energy or any other well known means, the solenoid core 4 is drawn quickly into its upper position and the valve *v* remains seated until the upper end of said core strikes the adjustable nut n^1. By this time it has received sufficient momentum to suddenly raise the valve-stem 6 and with it both of the valves *v* and v^1 to the upper position, so that the valve v^1 is seated and the vent *o* therefor closed; consequently, the air enters from below by way of the inlet pipe 1 and passes to the point where it is designed to utilize its pressure. On again interrupting the circuit of the battery connected with the solenoid coils 3, all of the parts descend together into the seated position shown, the spring 8 and the interconnected parts effecting a yielding seating of the valve without damage due to battering, and the weight of all of such parts being sufficient to actually hold the valve in its closed position. Should the valve-stem and the interconnected parts fail to start when the core 4 is demagnetized, by reason of the upper valve v^1 sticking in its seat, the core which is adapted to slide freely upon the nonmagnetic valve-stem 6 will fall independently in the same manner as did the lower half 5 of the two-part core shown in Fig. 1 and will strike with an effective blow the nut *n*, so that all of the parts will descend together and the valve *v* be effectually seated as before.

I make no claim hereinafter broadly to effecting the release of a valve or other retaining or holding appliance for maintaining a railway signal or analogous device in its upper or normal position against an applied force, as gravity, as this feature constitutes the subject matter of claims embodied in a prior patent numbered 829,969, granted to me on the 4th day of Sept. 1906, the present application being directed generically to the application of a solenoid and its weighted core in sliding relation to a valve stem or other releasing device for effecting the release of an applied source of energy, whether in railway signals or other appliances in which it is desired to utilize such devices, and my claims are generic as to the application of this principle of the solenoid when applied in the manner described.

In the before-mentioned patent I have shown and described releasing devices for assuring the release of a railway signal by the hammering or impact action of a supplemental armature upon the control armature of an electromagnet of the horse-shoe type, and when combined with a releasing device for an electrically actuated railway signal, and have shown also in said patent a two-part horse-shoe magnet adapted to such a use. The solenoid structure herein described and claimed I regard as of specifically more advantageous application, in that the range of impact action of the falling solenoid core gives better results than the horse-shoe magnet and the combined inter-

acting armatures. I, therefore, desire it understood that my claims hereinafter are designed to be of such scope as to include all uses in analogous arts of a combined releasing device having a vertically disposed movable part operatively connected to the part to be released and having a sliding connection with a solenoid core in such manner that additional impacts are imparted to the movable part at either one or both extremes of the movement of the core; thus assuring both the release to be effected and the locking or other action designed to be effected.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is—

1. A railway signal adapted to be held in a definite position by a source of applied energy; in combination with a release device for regulating the application of said energy to the signal, and a control solenoid having its core so connected to the release device that should said device fail to operate when the coils or windings of the solenoid are disconnected from a controlling source of electrical energy said core will fall and by its weight impart to the release device a blow adapted to effect the operation thereof, substantially as described.

2. A railway signal operatively connected to a source of a compressed gas, air, or liquid, and provided with an inlet and an outlet valve, both operatively connected to the core of a solenoid included in a control circuit; said core being so connected to both valves that when drawn upward by the coils it surely unseats the inlet valve, by reason of its impact in one direction due to the action of the coils, and releases the outlet valve in the other direction by reason of the action of gravity, substantially as described.

3. An electrically controlled release device adapted to effect the application and discontinuance of a source of applied energy, embracing releasing means so connected to a solenoid core that when the solenoid is energized it effects an application of the energy, and when said solenoid is deënergized its core falls by its own weight and gives to the releasing means a blow which surely actuates it, substantially as described.

4. A release device for effecting the application and discontinuance of a source of applied energy, embracing means for permitting the energy to act on a motive device; means for releasing the energy after it has been utilized and a solenoid having its core so connected to both of said means that when drawn upward by the coils it permits the energy to act on the motive device, and when released by demagnetizing the coils it cuts off the energy from the source of supply and releases the applied energy acting on the motive device, the arrangement being such that the solenoid core gives to one of said means a blow due to the action of the coils on the core as it is moved upward and a similar blow to the other means due to the weight of the core in the other direction as it moves downward, substantially as described.

5. Means for controlling the application and use of a source of energy, embracing a solenoid and solenoid core; a double or duplex control device operatively connected to the solenoid core in such manner that when the solenoid core is magnetized the simultaneous release of one part of the control device and the active operation or closure of the other part thereof is surely effected by an impact or blow due to the descending core and attached parts, and when operated in the other direction on energizing the solenoid coil the action is in reverse order and is due to a second impact or blow, substantially as described.

6. A release device embracing two release parts adapted one to admit of the application of a source of energy to a translating device and the other to the release of said energy and in reverse order; in combination with a solenoid core operatively connected to said parts and having sliding movement in relation thereto; together with a solenoid surrounding said core, the arrangement being such that by reason of the sliding action of the core a blow or impact is effected in either direction should the parts fail to move of their own accord, substantially as described.

7. A duplex release device embracing two valves, one being provided with a yielding and the other with a fixed connection to a common valve-stem; in combination with a solenoid having a core adapted to slide for a definite distance between stop devices on the valve-stem, substantially as described.

8. Means for controlling the admission and release of air or gas to a pneumatically controlled signal or analogous device, embracing an inlet and an outlet valve and a common or interconnecting valve-stem; in combination with a solenoid having a core slidingly connected to the valve-stem and adapted to impart a blow thereto when moved in opposite directions by the action of the solenoid and gravity, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES J. KINTNER.

Witnesses:
M. TURNER,
M. F. KEATING.