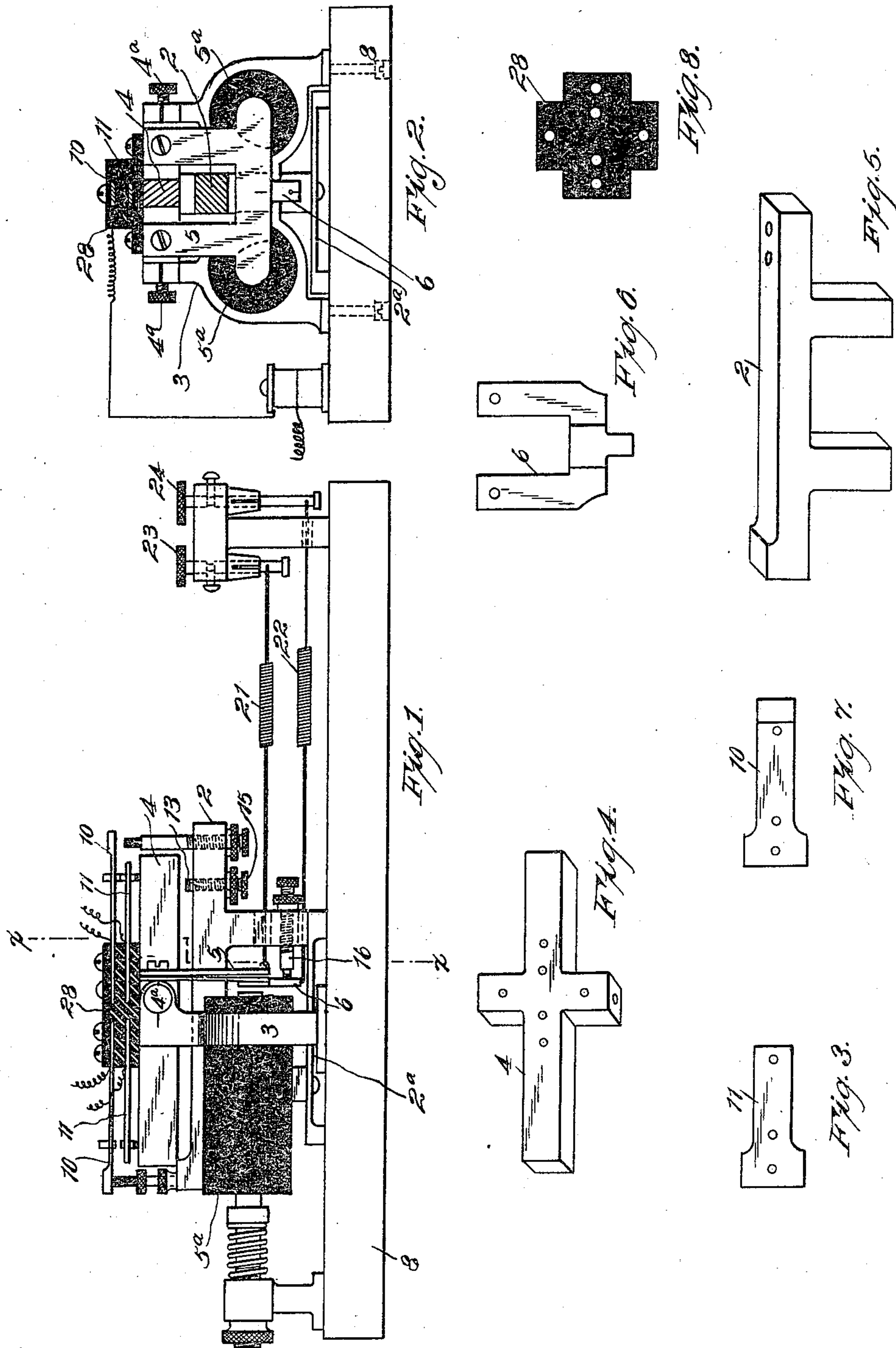


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TELEGRAPHIC APPARATUS.
APPLICATION FILED APR. 29, 1908.

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TELEGRAPHIC APPARATUS.

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Specification of Letters Patent. Patented Mar. 29, 1910.

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To all whom it may concern:

Be it known that I, HERBERT E. POWELL, citizen of the United States, residing at East Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Telegraphic Apparatus, of which the following is a specification.

My invention relates to certain new and useful improvements in telegraphic apparatus.

It consists of the combination and arrangement of parts and in details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a section of line $x-x$ Fig. 1. Fig. 3 is a plan view of lower contact piece. Fig. 4 is a perspective view of the cross-lever. Fig. 5 is a perspective of the sounder frame. Fig. 6 is a plan of the non-magnetic pieces. Fig. 7 is a plan of the upper contact piece. Fig. 8 is a plan of the insulation.

It is the object of my invention to provide a main line sounder that can be operated by weak telegraphic currents; to provide in the appliance a means for producing clear resonant signals that can be readily distinguished, and to provide a means whereby the adjustment of the retractile force will be automatically regulated in proportion to the varying needs of the attractive and retractile force. In the present drawings, I have shown one construction by which these objects may be attained.

8 is an insulation base on which the different parts are assembled.

4 is a cross-shaped single-piece lever which in one type is preferably made of aluminum, and which is pivoted at its center, and provided with a thin pliable U-shaped non-magnetic part 6, and single-piece magnetizable armature 5, both attached near the fulcrum to the lever at right angles therewith, in the order named, and having the free ends of the armature so disposed as to be attracted by the electromagnet 5^a when the main line circuit is completed. The armature 5 has attached to it a retractile spring 21, and the part 6 has attached to it a similar spring 22. These springs in turn are attached to turnable adjusting shafts having milled heads 23 and 24, by the turning of which the retractile force of these springs may be varied. The lever 4 with its local circuit or

other circuit attachments, is tiltable upon its pivot points 4^a, and is movable between stops near its ends, said stops being placed upon a sounder anvil 2, which is in turn attached to a reverberating plate 2^a, with projecting supporting corners, the anvil and plate being substantially or reasonably free from mechanical contact with the other parts of the relay. A metallic carriage or support 3, with split holder extensions for the pivot screws 4^a, mechanically separate from the sounder anvil and reverberating plate, holds the tiltable lever in line with the sounder anvil with which the lever makes mechanical contact near each end. The adjustment of the electromagnet with relation to the armature is made in the usual way. The adjustment of the single piece cross-shaped lever is made by a single screw 15 with the usual check nut to lock it. The adjustment of the U-shaped non-magnetic part 6 is made by a single insulation tipped limiting stop screw 16, with the usual check nut to lock it, placed on a limb of the sounder anvil, opposite and in line with the part extending below the armature. These above mentioned limiting stops (15 and 16) greatly simplify, and conduce to rapid and easy adjustment of these features of the appliance; they being easily accessible owing to the nature and simplicity of the design.

For circuits requiring other connecting apparatus, provision is made by means of attached interchangeable flat springs 10 and 11, which are electrically connected, each to a binding-post on the insulation base, by means of fine wires soldered to them, by which connection may be made with local sounders or other circuits. The interchangeable flat springs 10 and 11 are insulated as shown at 28, from the lever 4, and from the sounder anvil 2, by insulation tipped limiting stop screws having the usual check nut to lock them, placed one at each end of the anvil.

The helical springs 21 and 22 connected with the armature and U-shaped non-magnetic part 6, with the above mentioned stop screw 16, comprise the retractile force, or force of the returning movement of the armature, and cross-shaped sounder lever 4.

The sounder anvil 2 and plate 2^a are preferably made of phosphor bronze, or other alloy having suitable resonant qualities, and are mechanically separate from the other parts, except at the insulation base, at the

pivoted bearings through the action of the lever 4, or when contact of the moving system is made with the limiting stops described. The usual ebonite, or other insulation, is provided to insulate the electrical parts from the frame, and other metallic parts of the appliance.

The operation of the appliance is as follows: When the line circuit is closed, the magnetism in the electromagnet overcomes the retractile force of spring 21 moving the armature up against the U-shaped non-magnetic part 6, thus overcoming the retractile force of spring 22 at the point of greater magnetic force, then continuing the movement until the limiting stop 15 brings the movable system to a standstill. When the line circuit is opened, owing to leakage of line current, sometimes the magnet still retains residual magnetism, and in order to overcome this the helical spring 22 is made sufficiently tense to start the armature and moving system until the adjustable stop 16 releases it, the spring 21 then comprising the retractile force, corresponding to the usual variable retractile force; this leaves the moving system free from the additional power of spring 22, thereby saving the available power necessary to operate the moving system. By pivoting the moving system (parts 4, 5 and 6) at or near its center of gravity, a further saving of the available power to operate it is effected. By placing the limiting stops on projections or extensions of the sounder anvil 2, the signals are rendered clearer and more resonant.

The reverberating plate 2^a is of the usual kind, but it is freer from incumbrances which are usually supported upon such plates, and which greatly reduce and deaden the effect.

By making use of one adjustment, for each limiting stop to the adjustments renders them more rapid and easier of accomplishment. By mounting the adjustable stops upon the anvil, they are rendered very simple and accessible; the oscillating lever and movable system are relieved of the weight of these adjustments, and the movements are correspondingly lighter and more responsive. The single adjustment for the lever conduces to rapid and accurate manipulation. The top of the lever is unincumbered and provides ample space for the flat insulated springs 10 and 11, the contacts and adjustments of which are also exterior to the lever.

The single piece cross lever 4 having sockets in the ends of the cross arm to receive the pointed pivot screws, overcomes the objection to devices assembled from separate parts, which often become loose, and out of adjustment. This cannot occur in the construction here shown.

In this combination of relay and sounder,

the horizontal disposition of the relay magnets, and the vertical oscillation of the lever 4, with the armature and associated part extending at right angles with the lever so that the outer end moves in the line of the magnetic axis, produces a simple compact, easily adjustable apparatus with few and easily adjustable parts.

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

1. In an appliance of the character described, an electromagnet, a lever fulcrumed near its center of gravity, with relation thereto, an armature connected with said lever near its fulcrum and at right angles therewith, a resonant member substantially mechanically separate from the other parts, and with points at opposite ends of said member, and in the line of movement of the lever, and with which the lever makes contact when oscillated.

2. In an appliance of the character described, an electromagnet, a single piece cross-shaped lever fulcrumed near its center of gravity, a single-piece non-magnetic part, and a single-piece armature of magnetizable metal having free ends, both fixed respectively to said lever near its fulcrum and projecting at right angles thereto, with the free ends of the armature in line with the magnet core, and a thick projection on the non-magnetic part, extending below the armature, at a point midway between said free ends of the armature, and in line directly below said cross-shaped lever, said thick projection of the said non-magnetic part being movable independently of the armature, and helical springs of variable tension, and attached, one to the armature midway between its free ends, the other to the projection on said U shaped non-magnetic part.

3. In an appliance of the character described, an electromagnet, a lever centrally fulcrumed and having an armature and independent auxiliary part fixed to it and extending at right angles therewith, with the free ends of the armature in line with the magnet core, an adjustable retractile spring attached to the armature, and a second adjustable retractile spring attached to the auxiliary part.

4. In an appliance of the character described, an electromagnet, a lever centrally fulcrumed and having an independent non-magnetic auxiliary part and magnetizable armature, both respectively fixed to the lever near its fulcrum and extending at right angles thereto, having the free ends of the armature in line with the magnet poles, and the free end of the auxiliary part extending below and behind the armature, an adjustable retractile spring attached to the armature, a second adjustable retractile

spring independently attached to the non-magnetic auxiliary, and adjustable stops to limit the movement of the moving system.

5 In an appliance of the character described, an electromagnet, a lever centrally fulcrumed, an independent non-magnetic auxiliary part and magnetizable armature fixed to it and extending at right angles therewith, with the free ends of said armature in line with the magnet poles, an adjustable retractile spring attached to the armature, a second adjustable retractile spring attached to the auxiliary part, and a resonant member with attached reverberatory plate, substantially free to vibrate, having contact points and limiting stops placed thereon in line with the movement of the movable system described.

6 In an appliance of the character described, an adjustable electromagnet, a cross-shaped lever centrally fulcrumed, having an independent non-magnetic auxiliary to an armature, and an armature of magnetizable material fixed to it and extending at right angles therewith, with the free ends of the armature in line with and adjacent to the magnet poles, an adjustable retractile spring attached to the auxiliary, a resonant member substantially mechanically free from the other parts and free to vibrate, with adjustable stops thereon, and a metallic carriage frame with split projections to hold and lock the pivoting screws that keep the cross-shaped lever in place, and to carry and hold in place the adjustable electromagnet; said carriage frame being substantially mechanically free from the resonant member.

7 In a telegraphic appliance of the character described, a resonant member, a centrally fulcrumed bar, contact points near the ends of the resonant member, a moving system including an armature, and a non-magnetic part secured to the centrally fulcrumed bar between the contact points and the center of oscillation of said bar.

8 In a telegraphic appliance of the character described, a resonant member, contact points located near the ends thereof, a centrally pivoted bar adapted to make contact with the said points, a moving system including an armature, a rocking bar to which said armature is fixed near the center of oscillation of said bar, and having its outer end extended to produce a lever action upon the bar.

9 In a telegraphic appliance of the character described, a centrally pivoted lever, an armature lever fixed near the center of oscillation, and extending at right angles with the pivoted lever, an electromagnet having its cores in line with the outer ends of the armature, a resonant member having contact points near its outer ends against which the lever strikes in its oscillation.

10 In a telegraphic appliance of the character described, the combination of suitable supports, a resonant member having extensions beyond said supports, said extensions being provided with contact points, a centrally pivoted oscillating lever having ends adapted to strike said contact points, and a reverberatory member to which the supports are fixed.

11 In a telegraphic appliance of the character described, a resonant member, a centrally pivoted electrically actuated lever, limiting stops and contacts between the resonant member and the outer ends of the lever, standards extending from said member at points nearer the center than the contacts, a reverberatory plate to which said standards only are fixed.

12 In a telegraphic appliance of the character described, the combination with a resonant member having supporting standards, and end extensions beyond the standards, of a centrally pivoted oscillating lever, limiting stops and contacts located between the ends of the lever and the projecting ends of the resonant member, a reverberatory plate upon which the sounder standards are supported, an electromagnet and armature by which the lever is oscillated, and a support upon which the electromagnet is mounted, said support being substantially independent of the reverberatory plate and resonant member.

13 In a telegraphic appliance of the character described, the combination of a centrally pivoted single piece cross-lever, a reverberatory support, a resonant member parallel with which said lever is pivoted, said resonant member being sustained upon the reverberatory support, contact points in the plane of movement of the ends of the lever, an electromagnet and an armature carried by the lever whereby said lever is operated.

14 In a telegraphic appliance of the character described, a main support formed in a single piece having pivoted bearings at opposite sides, a single piece cross lever having sockets at the ends of its central arms or trunnions, with which the pivot bearings engage, a resonant member and a reverberatory supporting plate therefor located within and independent of said support.

15 In a telegraphic appliance of the character described, the combination of a centrally pivoted cross-shaped bar having pivots at the ends of its transverse member, a fixed resonant member in line with the longer arm of the bar, contact points upon said member near its ends, and a reverberatory plate forming a support for the resonant member.

16 In a telegraphic apparatus of the character described, a resonant member, a reverberatory plate, standards by which the reso-

nant member is fixed to the plate, extensions
of both ends of said member beyond the sup-
porting standards, contacts near the ends of
said extensions, and an electromagnetically
5 actuated bar fulcrumed centrally with rela-
tion to the resonant member, and having
its ends adapted to strike the contact points
of said member.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit- 10
nesses.

HERBERT E. POWELL.

Witnesses:

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