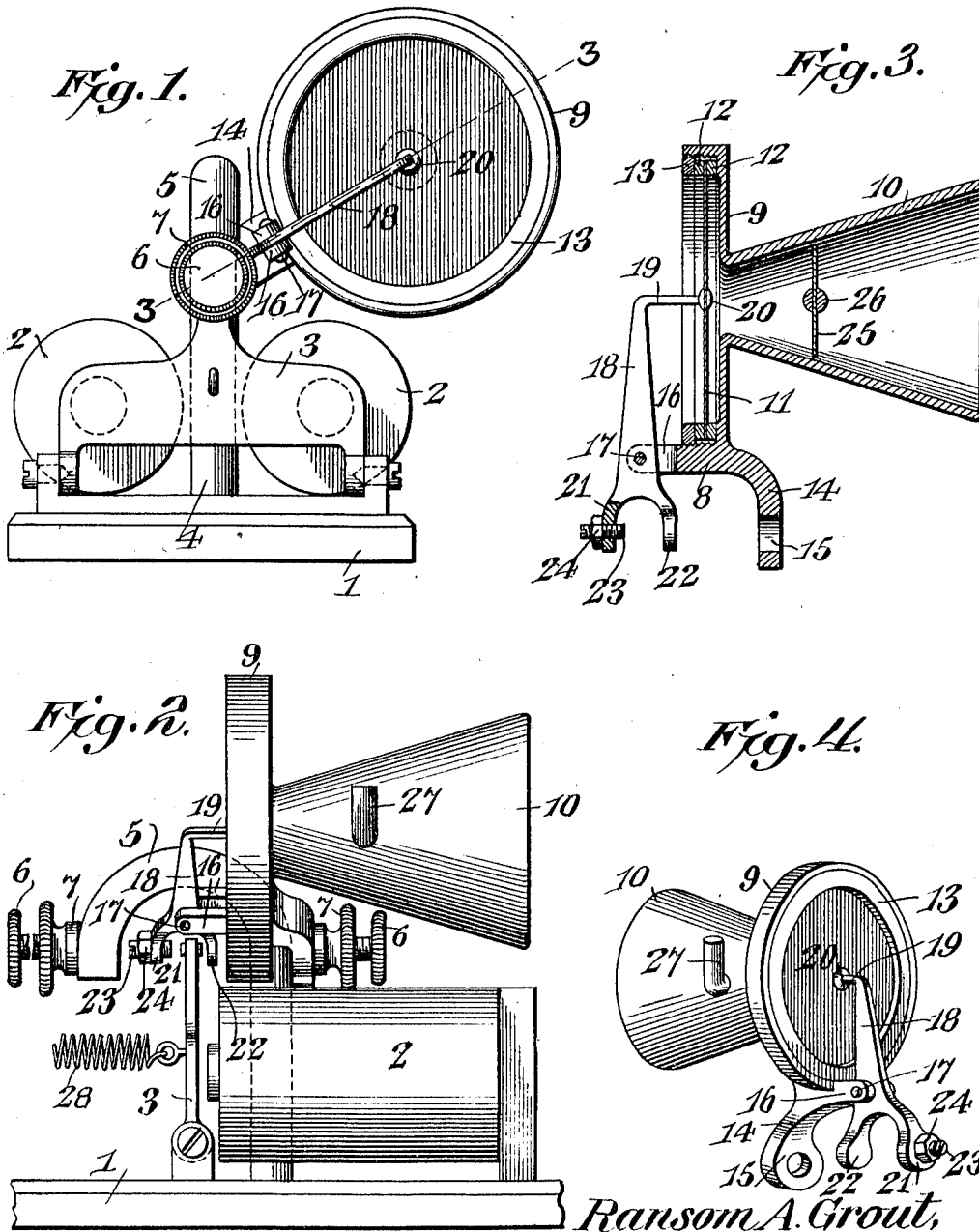


R. A. GROUT.
ATTACHMENT FOR TELEGRAPH INSTRUMENTS.
APPLICATION FILED SEPT. 10, 1912.

1,066,410.

Patented July 1, 1913.



WITNESSES

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RANSOM A. GROUT, a citizen of the United States, residing at Davenport, in the county of Scott and State of Iowa, have invented a new and useful Attachment for Telegraph Instruments, of which the following is a specification.

This invention has reference to improvements in attachments for telegraph instruments, and is designed to avoid the necessity of local circuits at telegraph receiving stations by the provision of a sound amplifying device so arranged that it may be attached to a commercial relay as found installed in telegraph offices without any change whatsoever in the structure of the relay.

It is customary in long transmission lines to provide delicately responsive relay receivers which may be actuated by weak currents coming over the line and in turn control strongly energized local circuits in which are included the sounders. The local circuits require electric energy, which is customarily furnished by the type of batteries known as gravity batteries, and such batteries not only require considerable attention, but in freezing weather must be protected against the action of frost, and this in small stations is a source of considerable expense. Again, in stations where there are a number of receivers it may happen that several of the receivers will be operating at one time, thereby causing confusion and it has been proposed to modify the sound of a receiver by a resonator box, provision being made for plugging in the loud receiver into the circuit over which the message to be received is coming. This, however, does not avoid the necessity of the local circuits at the receiving stations, since ordinarily the relays give so weak a sound as to be practically inaudible.

By the present invention there is provided a sound amplifier of a character to respond readily to the weak action of the relay to so intensify the effect of blows delivered by the armature of the relay as to cause sounds which are readily audible.

The present invention is in the nature of an attachment which may be applied to a relay with no change whatsoever in the structure of the relay as such relays are found in practically all telegraph installations now in existence. By this means the weak impact of the relay armature is acous-

tically intensified until it becomes plainly audible to the listener to an extent approaching that of a good sounder.

By the present invention provision is also made for so throttling or modifying the emitted sounds that some relays can be made to respond loudly, while others are cut down to a point where their sound is not obtrusive, while the effects may be changed at once at the will of the operator.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, with the further understanding that the invention is not limited to any exact conformity with the showing of the drawings but may be changed and modified in various ways, so long as such changes and modifications mark no material departure from the salient features of the invention.

In the drawings:—Figure 1 is an elevation of a portion of a relay of ordinary construction with the attachment of the present invention applied. Fig. 2 is a side elevation of the structure of Fig. 1. Fig. 3 is a section of the attachment on the lines 3—3 of Fig. 1, but removed from the relay. Fig. 4 is a perspective view of the attachment removed from the relay.

Referring to the drawings, there is shown a relay comprising a base 1, magnets 2, armature 3, post 4 with its crown arch 5 and adjusting screws and lock nuts 6 and 7, respectively, these being parts to be found in relays as ordinarily constructed.

The attachment illustrated in Figs. 3 and 4 comprises a frame member 8 which may be in the form of a ring with a closing wall 9 at one end having a central outstanding duct 10 expanding from the wall 9 toward the free end and providing a passage from the interior of the ring to the free end of the duct after the manner of the amplifying horns or sound conduits of acoustical instruments. Lodged within the ring 8 is a diaphragm 11 which may be held between supporting gaskets 12 secured in place by a clamp ring 13. Formed on one side of the ring 8 is an arm 14 offstanding from the wall or head 9 and terminating in an eye 15. The ring is also formed with a pair of spaced ears 16 on the side opposite the arm 14 and mounted between these ears by means of a pivot pin 17 is a lever 18, one

end 19 of which is reduced in diameter and bent at an angle to the main portion of the lever and is secured to the center of the diaphragm 11, as indicated at 20. Ordinarily the diaphragm 11 is made of mica and the terminal portion 19 of the lever 18 may be secured to the diaphragm in any manner, such as is practised in the talking machine art or in any other manner. That end of the lever 18 connected to the diaphragm constitutes the longer arm of the lever and the shorter arm is expanded and bifurcated terminating in two opposed spaced fingers 21 and 22. The finger 21 is traversed by a screw pin 23 held in adjusted positions by a lock nut 24.

Within the amplifier 10 there is mounted a damper 25 on a pintle 26 journaled in the walls of the amplifier and outside of the latter formed into a manipulating handle 27, so that the damper or controller may be turned to any desired position. The parts are so proportioned that when the arm 14 is applied to the post 4, it may be clamped thereto by a screw 6 traversing the post in conjunction with a clamp nut 7 mounted on this screw, and then the finger 22 and the screw pin 24 will be in the path of the free end of the armature 3, after which by a suitable adjustment of the screw 24 and parts of the relay which are usually provided with adjustments, the armature may be so related to the lever 18 that when the relay magnets are energized the armature will be drawn into contact with, say, the finger 22, and when the magnets are de-energized the armature withdrawn by the usual spring 28 will make contact with the screw 23. These contactings of the armature with the finger 23 and screw 24 are by impact, so that a blow of considerable force is delivered to the lever 18 each time the armature is vibrated and a commensurate movement is established in the diaphragm 11, thus setting the air in vibration within the amplifier 10 to cause the issuance of a sound therefrom reinforced by the action of the amplifier, it being assumed that the valve or damper 25 is open. Ordinarily the sound produced by the armature 3 would be scarcely audible and practically inaudible in the presence of other sounds, but when the vibration of the armature is caused to act upon the air through the lever 18 and diaphragm 11, the sound is greatly intensified and issues from the delivery end of the amplifier 10 as a very perceptible sound clearly audible to a considerable distance. In fact, the sound is sufficiently intense to obviate the necessity of a sounder, such as is employed in the local circuit of the relay in ordinary telegraph stations.

It is to be observed that the attachment requires no change whatsoever in the ordinary relay, since parts already present in

such relay are utilized and no additional parts are needed, while the attachment is readily applied or removed, the arrangement being such that the device may be attached to the relay or removed therefrom without the use of any tools at all.

While the amplifier is shown in one piece with the head 9 and the latter in one piece with the ring 8, it will be understood that these parts may be otherwise constructed and assembled without in any way affecting the operation of the device.

The damper or controller 25 provides for the variation of the intensity of the produced sound to suit the individual tastes of the operator, or in the case of numerous sounders being present and possibly operating simultaneously all but the one relay receiving the message may be so muffled as to be inobtrusive, while at the same time ready at any instant to respond to its full power for the audible production of a message.

It will be observed that the device of the present invention is wholly in the nature of an attachment requiring no structural modifications at all in already installed instruments or already manufactured instruments, so that the present invention may be applied by any one without the necessity of using tools of any kind and bringing about the total elimination of local circuits in the telegraph offices. Furthermore, the weak impacts of the relay armature are transmitted directly to the sound producing diaphragm through an intermediate structure absorbing only a negligible amount of the energy of the actuated relay armature, wherefore, the sound produced is sufficiently intense for the purposes of the present invention rendering the weak and practically inaudible sounds of the relay armature clearly audible to the ear of the receiving operator.

In new installations the attachment represents but a small fraction of the cost of a local circuit, such as is usually controlled by the relay, while already manufactured relays may be utilized since the attachment as before stated requires no modification at all in the relays to be found upon the market.

What is claimed is:—

1. An attachment for telegraph relays comprising a diaphragm and a support therefor, an amplifier in operative relation to the diaphragm, means on the diaphragm support shaped for the attachment of the device to the relay by one of the contact screws of said relay, and a lever freely pivoted to the support and provided with stop fingers in the path of the relay armature on both sides thereof, said lever being connected to the diaphragm.

2. An attachment for telegraph relays comprising a ring-shaped body having an

amplifier formed thereon, a diaphragm mounted in said ring-shaped body in operative relation to the amplifier, and a lever pivoted on said ring-shaped body at one side thereof and at one end connected to the diaphragm, the other end of the lever being forked to straddle the armature of the relay when in position on the latter, the ring-shaped body being provided with an arm shaped for attachment to the relay by one of the contact screws of the latter with the forked end of the lever in straddling relation to the contact carried by the relay armature.

3. An attachment for telegraph relays comprising a ring-shaped body having a closing wall at one end formed with an axially extended expanding duct constituting an amplifier, a diaphragm mounted in the ring-shaped body and a lever freely pivoted on the ring-shaped body with one end connected to the diaphragm and the other end forked to straddle the contact end of the relay armature, one branch of the forked end of the lever carrying an adjustable contact screw, said ring-shaped body being formed with ears between which the lever

is pivoted and with an arm shaped for the passage of one of the contact screws of the relay to secure said attachment to the relay. 30

4. The combination with a relay provided with a crown arch and adjusting contact screws carried by said arch in the path of the relay armature, of a diaphragm support and diaphragm carried thereby, an amplifier 35 carried by the support, and a freely pivoted lever on the support having one end connected to the diaphragm and the other end forked to straddle the contact end of the relay armature, said diaphragm support being provided with projecting means to 40 which the lever is pivoted, and an arm related to the lever to position the latter in straddling relation to the armature lever when the arm is held against the arch by one 45 of the contact screws carried by said arch.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

RANSOM A. GROUT.

Witnesses:

CLYDE ALLEN,
M. T. MURRAY.