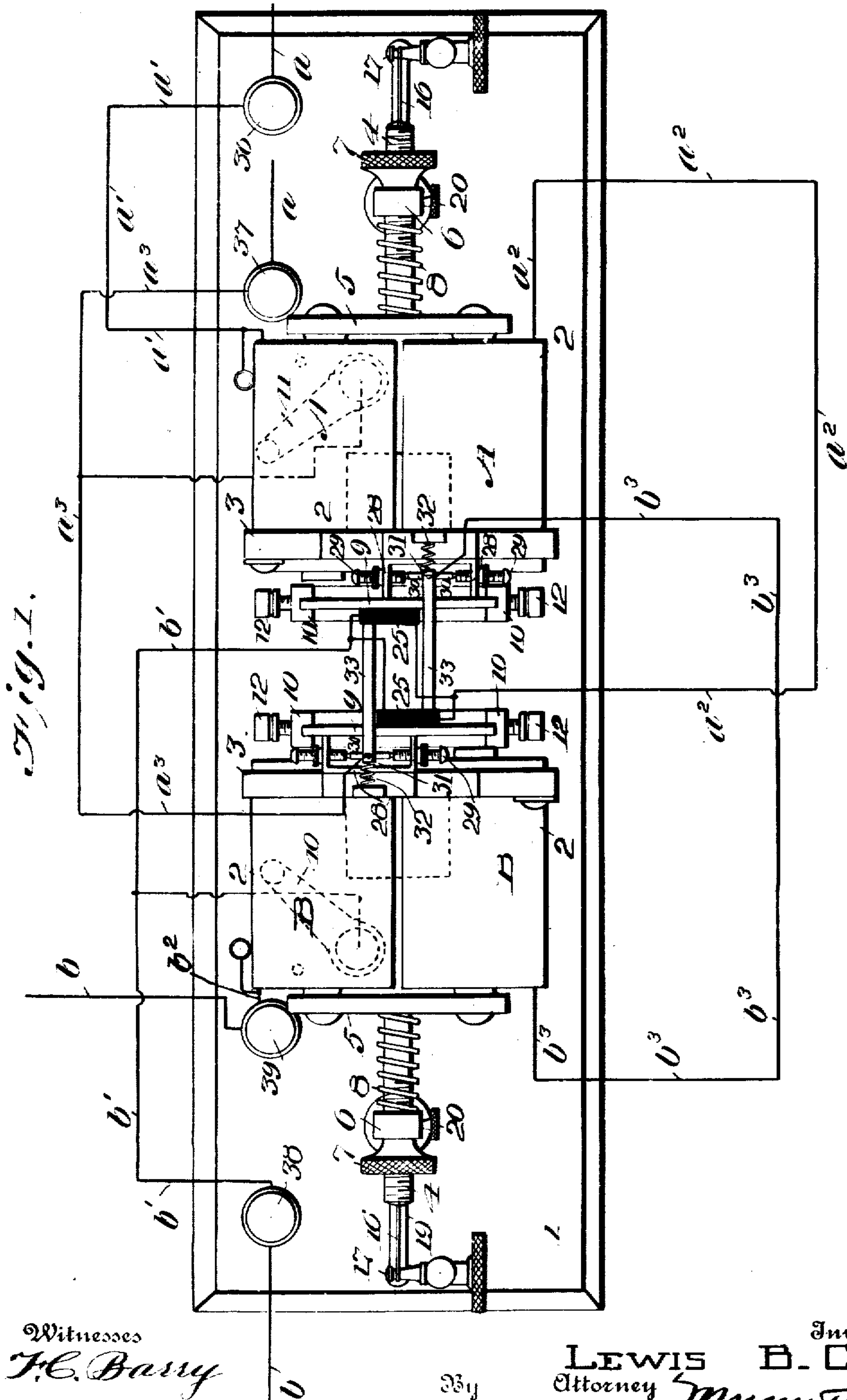


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TELEGRAPH REPEATER.
APPLICATION FILED FEB. 25, 1908.

Patented Nov. 24, 1908.
3 SHEETS—SHEET 1.



Witnesses
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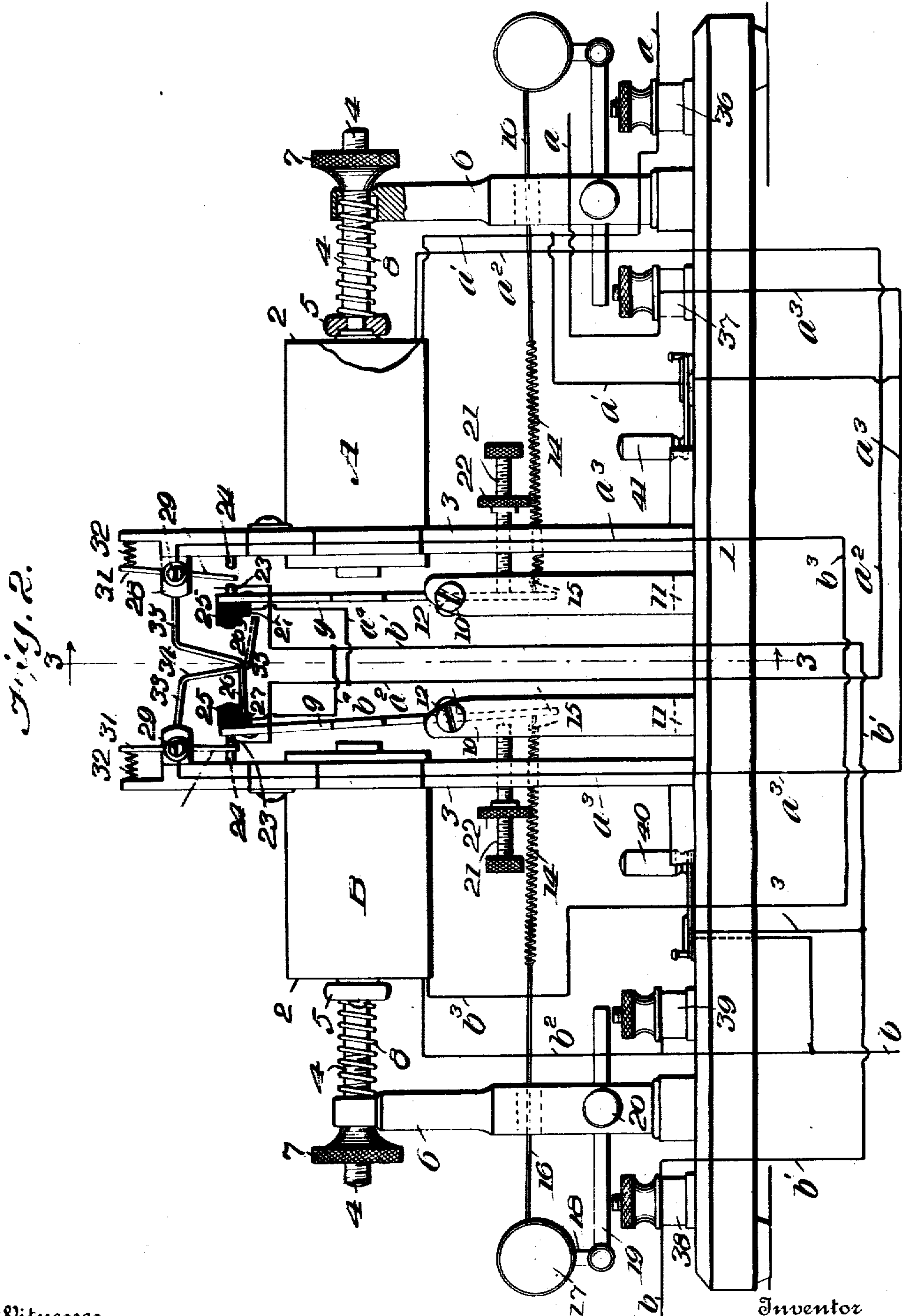
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3 SHEETS—SHEET 3.

Fig. 3.

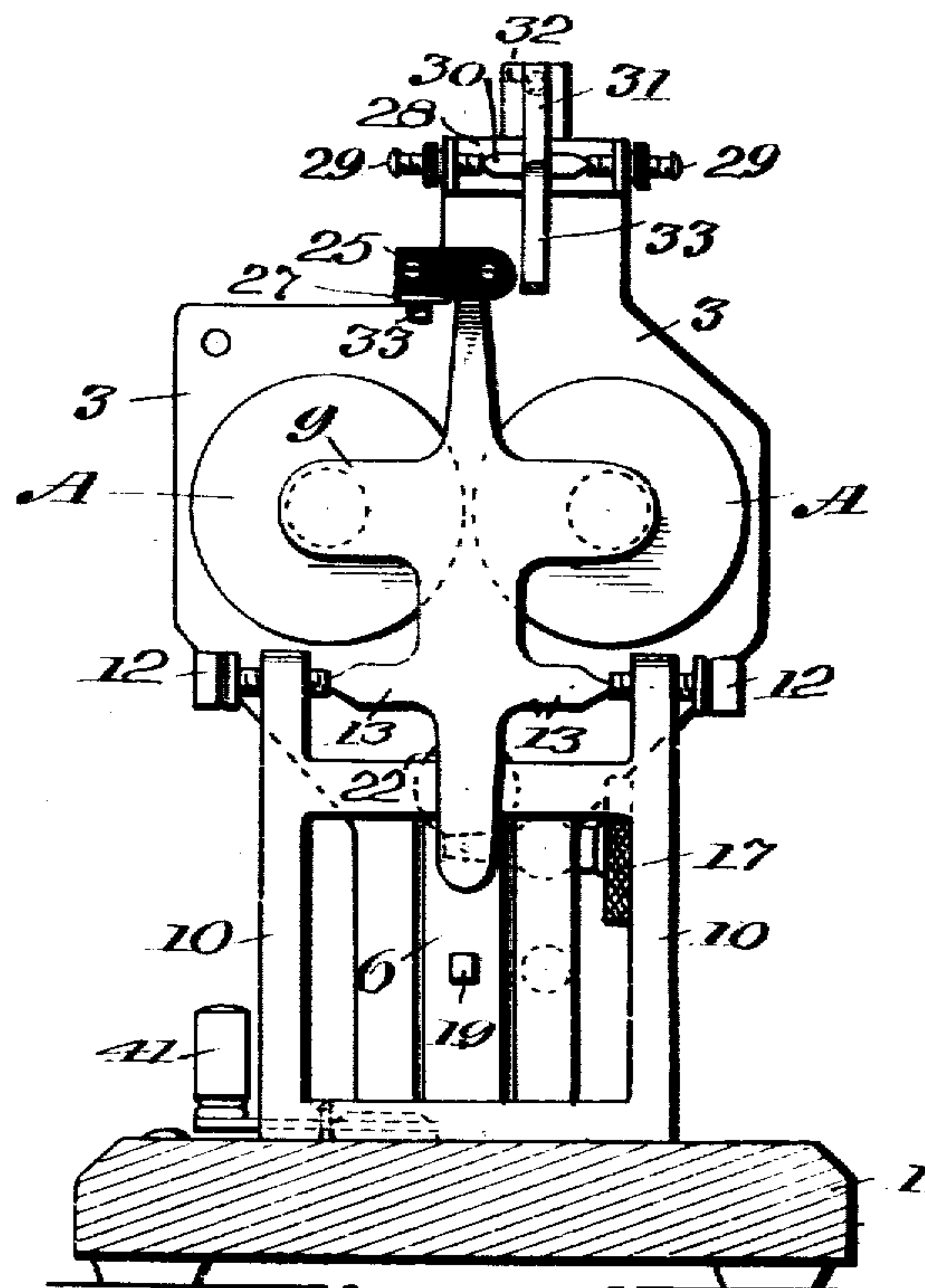
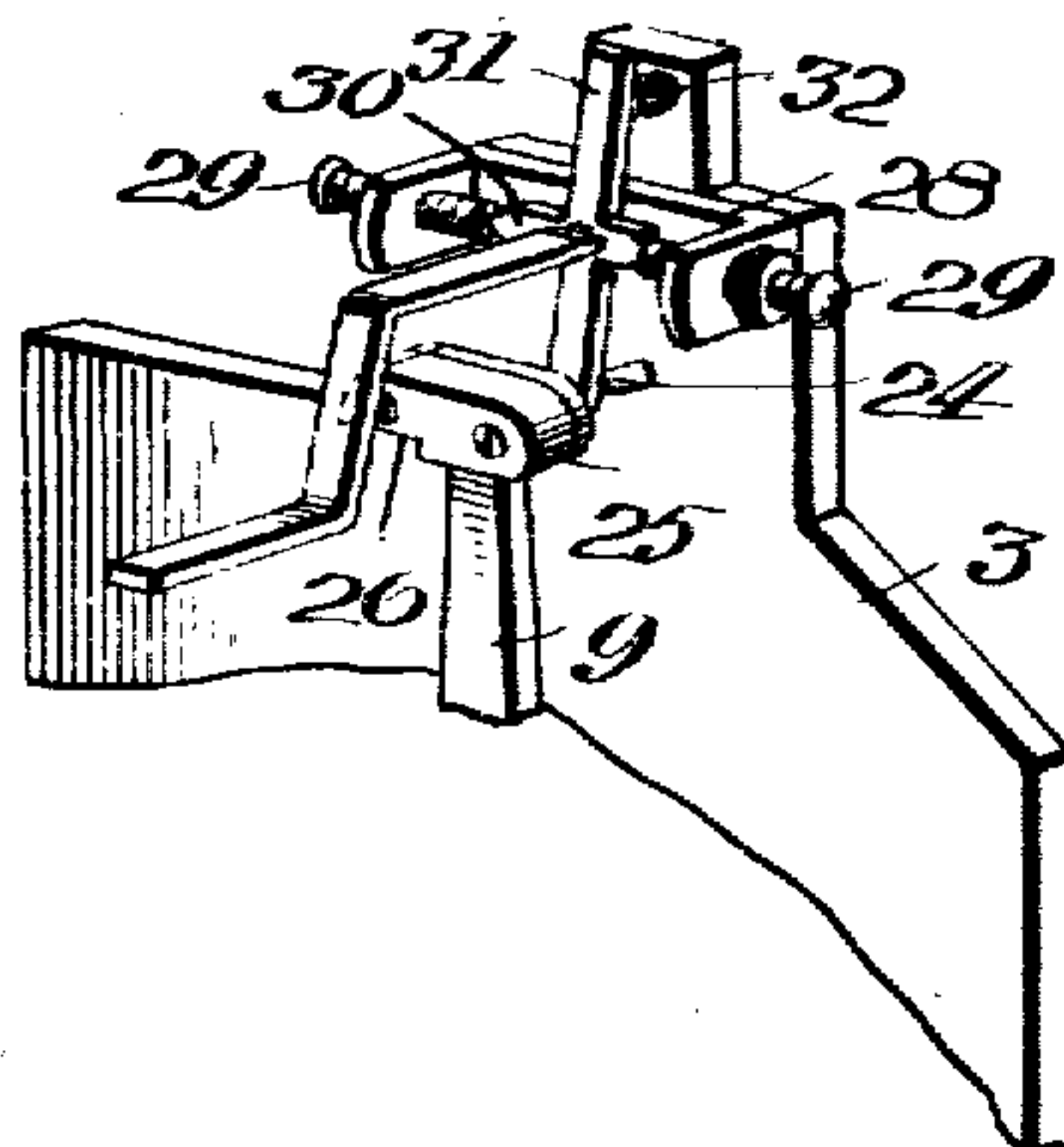


Fig. 4.



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UNITED STATES PATENT OFFICE.

LEWIS B. CECIL, OF SANTA BARBARA, CALIFORNIA.

TELEGRAPH-REPEATER.

No. 904,936.

Specification of Letters Patent.

Patented Nov. 24, 1908.

Application filed February 25, 1908. Serial No. 417,640.

To all whom it may concern:

Be it known that I, LEWIS B. CECIL, a citizen of the United States, and a resident of Santa Barbara, in the county of Santa Barbara and State of California, have made certain new and useful Improvements in Telegraph-Repeaters, of which the following is a specification.

My invention is an improvement in telegraph repeaters and consists in certain novel constructions and combinations of parts hereinafter described and claimed.

Referring to the drawings forming a part hereof—Figure 1 is a diagrammatic plan view of the improved repeater and Fig. 2 is a side view partly in section. Fig. 3 is a section on the line 3—3 of Fig. 1, and Fig. 4 is a perspective view of the upper end of the bracket and connected parts.

The present embodiment of my invention comprises a base 1, upon which is supported two oppositely arranged relays A and B, said relays being similar in construction, and acting as transmitters. Each of said relays comprises the usual coils or magnets 2, supported by brackets 3, secured in any suitable manner to the base-board 1. The coils are adjustable in the bracket, by means of a threaded rod 4, connected with the bar 5, which connects the two magnets, and extending through a support or post 6, the outer end of the rod being threaded and engaged by a thumb nut 7, whereby the coils may be moved toward and from the supporting post, a spring 8 being arranged between the post and the bar 5 for normally moving the coil from the post.

The armature 9, is supported between the arms 10 of a U-shaped bracket 11 secured to the base, set screws 12 being threaded through the arms of the bracket and provided with depressions for engaging the trunnions 13 of the armature in the usual manner. A spring 14 is connected with a hook 15 at the lower end of the armature, and a thread 16 leads from the spring and winds upon a shaft 17 journaled in the angular portion 18 of a rod 19, which is slidable through an opening in the post 6, and is retained in its adjusted position by a set screw 20.

A back stop comprising a screw threaded rod 21 is threaded through each of the brackets 3, for engaging the lower end of the armature for limiting the backward mo-

tion thereof, and a lock nut 22 is provided for locking the rod in its adjusted position. The upper end of each of the armatures, is provided on the face toward the magnet with which it coöperates with a contact point 23, coacting with the contact point 24 on a lever 31, to be described, and on its opposite face with a block 25 of rubber or other insulating material, having at its lower outer corner a notch 26, for a purpose to be presently described, and the lower face of the block is provided with a plate 27 of conducting material.

At the upper end of each of the brackets 3, is provided a pair of spaced lugs 28, through which are threaded set screws 29, having depressions in their inner ends for engaging the trunnions 30, of the lever 31, whose lower end extends between the contact point 23 and the bracket 3 as shown in Fig. 1. The upper end of the lever is engaged by a spring 32, whose other end is connected with the bracket 3 before described, the spring acting normally to move the lower end of the lever away from the bracket. An arm 33 of resilient material extends from the center of the lever 31, at approximately a right angle, the said arm being bent downward as at 34, and again horizontally as at 35, and the free end of the arm is adapted to engage the notch 26 in the block 25 before mentioned, whereby to retain the armature in contact with the lower end of the lever and to retain said lower end of the lever in contact with the contact point 24.

It will be evident from the description, that when the armature of the relay A is open as shown in Fig. 1, the spring 32 will draw the upper end of the lever 31 toward the bracket 3, thus swinging the arm 33 upwardly into position to engage the notch 26 of the armature on the relay B, thus retaining said armature in closed position regardless of the condition of the magnets of such relay. A like condition will obtain with the relay A when the relay B is open.

In the operation of the device, the main line *a* is connected with the relay A, and the branch line *b* is connected with the relay B. One end of the main line is connected to a binding post 36, on the base, and a wire *a'* extends from the binding post to the coils of the relay A, the return wire *a''* from the coils being connected with the armature 9 of the relay B. The other end of the main

line, is connected with a binding post 37 on the base, and a wire a^3 leads from the said binding post to the bracket 3 of the relay B, and to the lever 31 corresponding to said relay, it being understood that the said lever is of conducting material and electrically connected with the bracket. It will be evident that when the armature of the relay B is operated, the main line circuit will be opened and closed, due to the contact and separation of the contact point 23 of the armature and the lower end of the lever. The engagement of the arm with the block on the armature of the opposite relay prevents the lower end of the lever swinging far enough outwardly to engage the contact point 23.

One end of the branch line b , is connected with a binding post 38 on the base, and from this binding post a wire b' leads to the armature 9 of the relay A. The other end of the branch line is connected with a binding post 39, and a wire b^2 leads from the binding post 39 to the coils of the relay B, the return wire b^3 from the coils being connected with the bracket 3 of the relay A, through which the current passes to the lever corresponding to the relay, the lower end of the lever and the contact point 23 thus serving as terminals for the branch circuit. It will be evident from the above description, that when the armature of the relay A is operated the branch line will be opened and closed.

Since the bracket of the relay B is connected with the main line wire, the arm 33 which is of conducting material is also connected therewith. When the lever 30 is released from the armature and the lower end thereof is permitted to swing upward under the influence of the spring 32, the horizontal portion 35 of the said arm will be lifted into engagement with the notch 26 of the block 25 on the relay of the armature A, thus locking said armature in closed position. The same condition is found when the armature of the relay A is open as shown in Fig. 1, the arm 33 connected with the bracket of the relay A swinging into position to lock the armature of the relay B in closed position. The plate 27 of conducting material on the lower face of the blocks 35, is connected, the one on the armature of the relay B with the branch line by a shunt b^4 , and the one on the block of the armature of the relay A with the main line by a shunt a^4 . The above described connection is a safety connection, to prevent the breaking of the circuit in case both armatures should open at once, in which case the arms would engage the plate of the armature on the opposite relay, to close the circuits. Switches 40, 41, are arranged to cut out the different relays, the switch 40 having one post connected with the wire b' and the other with the wire b^2 on the relay B, and the other 41 having its posts con-

nected with the wires a' and a^3 of the relay A.

When the main line is in operation, makes and breaks in the circuit are repeated on the branch line through the contact of the contact point 23 on the armature A with the lower end of the lever 30. When the branch line is working, the makes and breaks in the circuit are repeated on the main line by means of the contact point 23 and the lower end of the lever 31 on the relay B, and in either case, the arm 33 on the bracket of the relay which is working, keeps the armature of the relay which is not working from operation.

I claim—

1. A telegraph repeater, comprising in combination with the main line and the branch line circuits a base, a pair of oppositely arranged relays on the base, one of said relays having its coils interposed in the main line circuit, and its armature connected with one end of the branch line circuit, the other relay having its coils interposed on the branch line circuit and its armature connected with one end of the main line circuit, a non-conducting block provided with a notch on the rear face of each armature, a conducting plate on the lower face of each block, a lever pivoted on each relay and having one end interposed between the adjacent armature and its cooperating contact point, each of said levers having an arm projecting therefrom and extending toward the armature of the other relay, a spring engaging the upper end of the lever and acting when the adjacent armature is open to move said arm into engagement with the notch of the block of the other armature to lock said armature in closed position, the lever on the branch relay being connected with the other end of the main line circuit, and the lever of the main line relay being connected with the other end of the branch circuit, and the conducting plate on the armature of the main line relay having a shunt connection with the branch circuit and the conducting plate on the armature of the branch line relay having a shunt connection with the main line circuit.

2. A telegraph repeater, comprising a main line and a branch line relay, a non-conducting block on the armature of each relay, a lever pivoted on each relay and having one end interposed between the adjacent armature and its cooperating contact point, each of said levers having an arm projecting therefrom and extending toward the armature of the other relay, a spring engaging the upper end of the lever and acting when the adjacent armature is open to move said arm into engagement with the block on the other armature to lock said armature in closed position, the lever and the armature of the branch relay forming the terminals of

the main line circuit, and the lever and the armature on the main line relay forming the terminals of the branch line circuit.

3. A telegraph repeater, comprising a main line and a branch line relay, a lever pivoted on each relay and having one end interposed between the adjacent armature and its cooperating contact point, each of said levers having an arm projecting therefrom and extending toward the armature of the other relay, a spring connected with the lever and acting when the adjacent armature is open to move said arm into engagement with the other armature to lock said armature in closed position, the lever and the armature of the branch relay being adapted to serve as terminals for the main line circuit, and the armature and lever of the main line relay being adapted to serve as terminals for the branch line circuit.

4. A telegraph repeater comprising a main line relay and a branch line relay, a repeating device on the main line relay and connected with the branch circuit, a repeating device on the branch line relay and connected with the main line circuit, and means in connection with the repeating devices of each relay for engaging the armature of the other relay and locking the same in closed position when the armature of the first relay is open.

5. A telegraph repeater comprising a main line relay and a branch line relay, a repeating device on the main line relay and connected with the branch circuit, a repeating device on the branch line relay and connected with the main line circuit, means in connection with the repeating devices of each relay for engaging the armature of the other relay and locking the same in closed position when the armature of the first relay is open, and means for preventing interruption of either circuit when both relays are open simultaneously.

6. A telegraph repeater, comprising a main line and a branch line relay, a lever pivoted on each relay and having an end interposed between the adjacent armature and its cooperating contact point, a spring acting to move said lever from the contact point, the lever and the armature of the branch relay being adapted to serve as terminals for the main line circuit and the armature and lever of the main line relay

being adapted to serve as terminals for the branch line circuit, means in connection with each lever for preventing movement of the other relay when the relay adjacent to said lever is open, and for limiting the outward swinging movement of the end of the lever interposed between the armature and the contact point.

7. A telegraph repeater, comprising a main line and a branch line relay, a yieldingly mounted lever on each relay and having one end interposed between the adjacent armature and its cooperating contact point, means for retaining the lever out of contact with both the armature and the contact point when the armature is open, the lever and the armature of the branch relay being adapted to serve as terminals for the main line circuit, and the armature and lever of the main line relay being adapted to serve as terminals for the branch line circuit, and means for preventing the simultaneous opening of both relays.

8. A telegraph repeater, comprising a main line relay and a branch line relay, a repeating device on the main line relay and connected with the branch circuit, a repeating device on the branch line relay and connected with the main line circuit, and mechanical means in connection with the repeating devices of each relay for locking the armature of the other relay in closed position when the armature of the first relay is open.

9. A telegraph repeater comprising a main line and a branch relay, a repeating device in connection with each relay, and mechanical means in connection with each repeating device for locking the armature of the other relay in closed position, when the armature of the first relay is open.

10. A repeating device comprising opposed relays, a repeating device in connection with the armature of each relay, and means in connection with each of said repeating devices for positively engaging and closing the armature of the opposite relay when said first named relay is open.

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