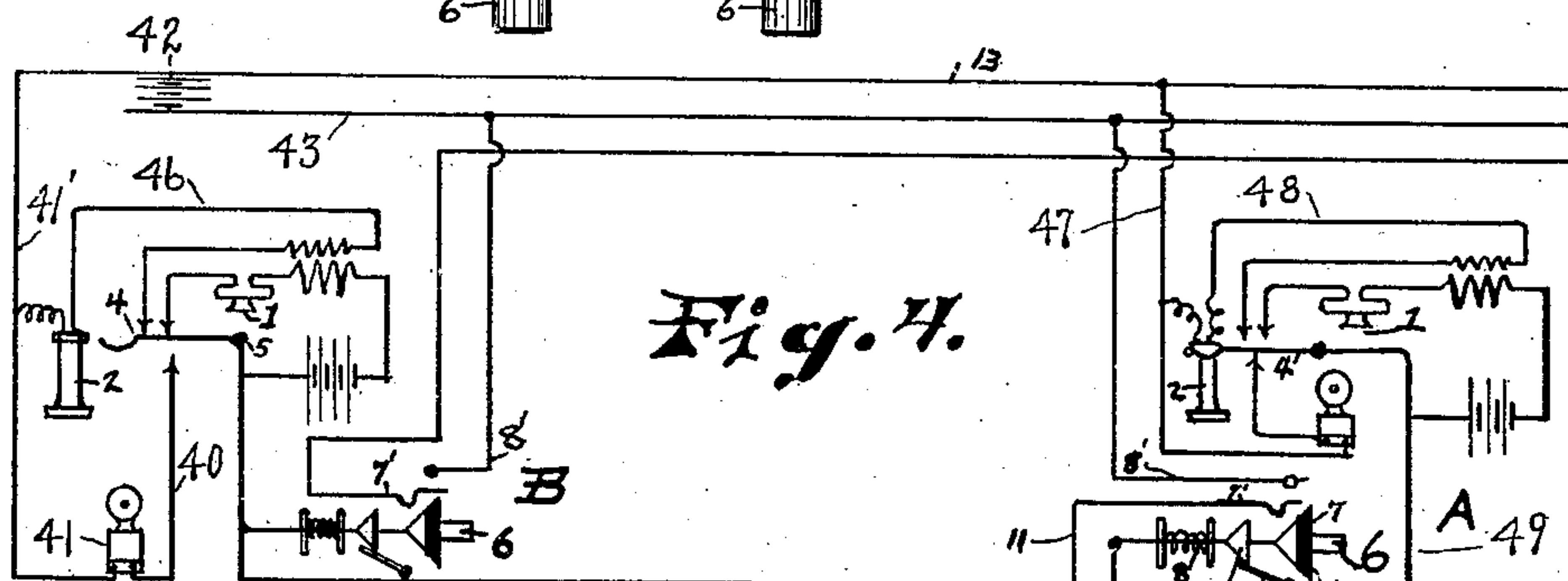
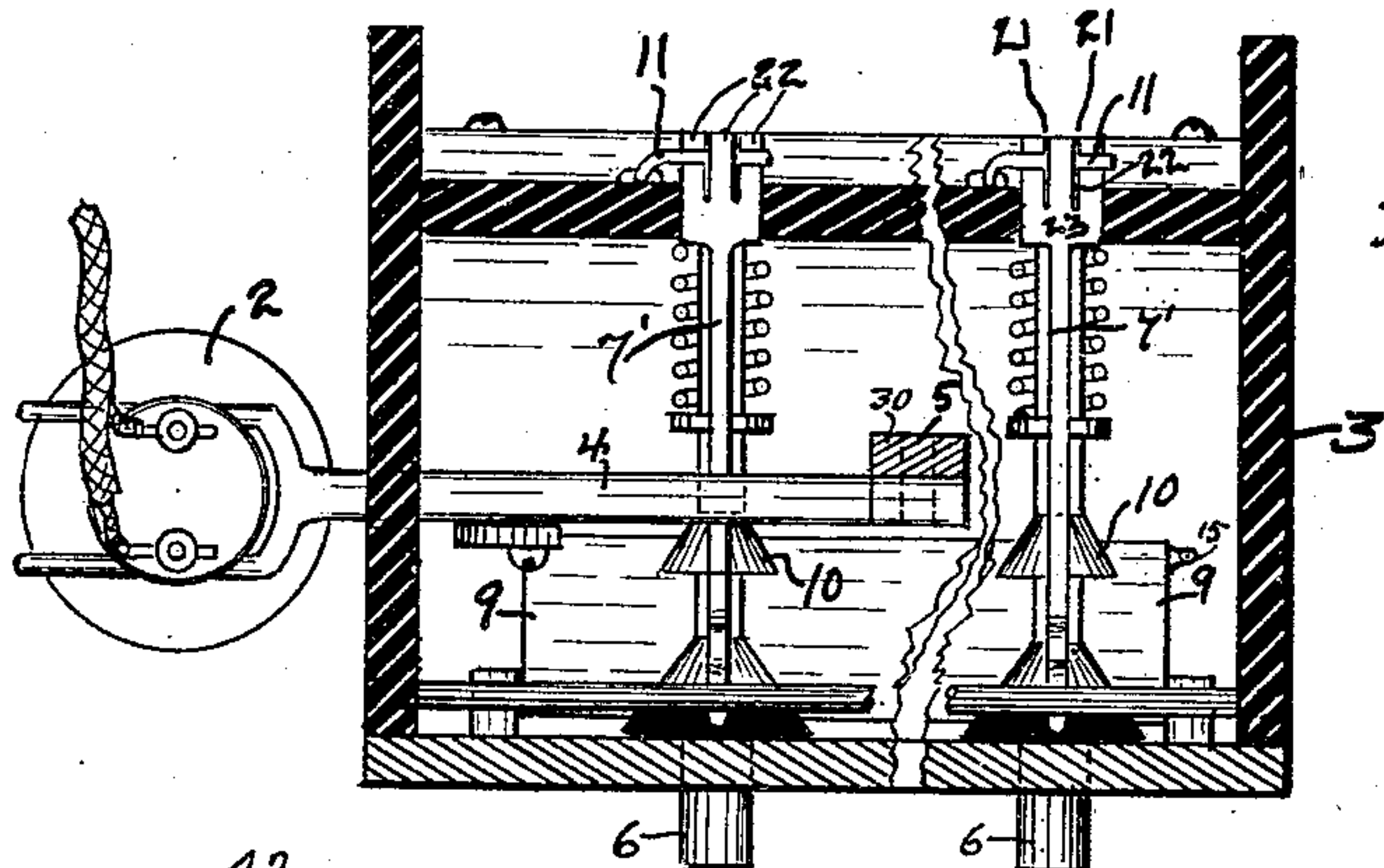
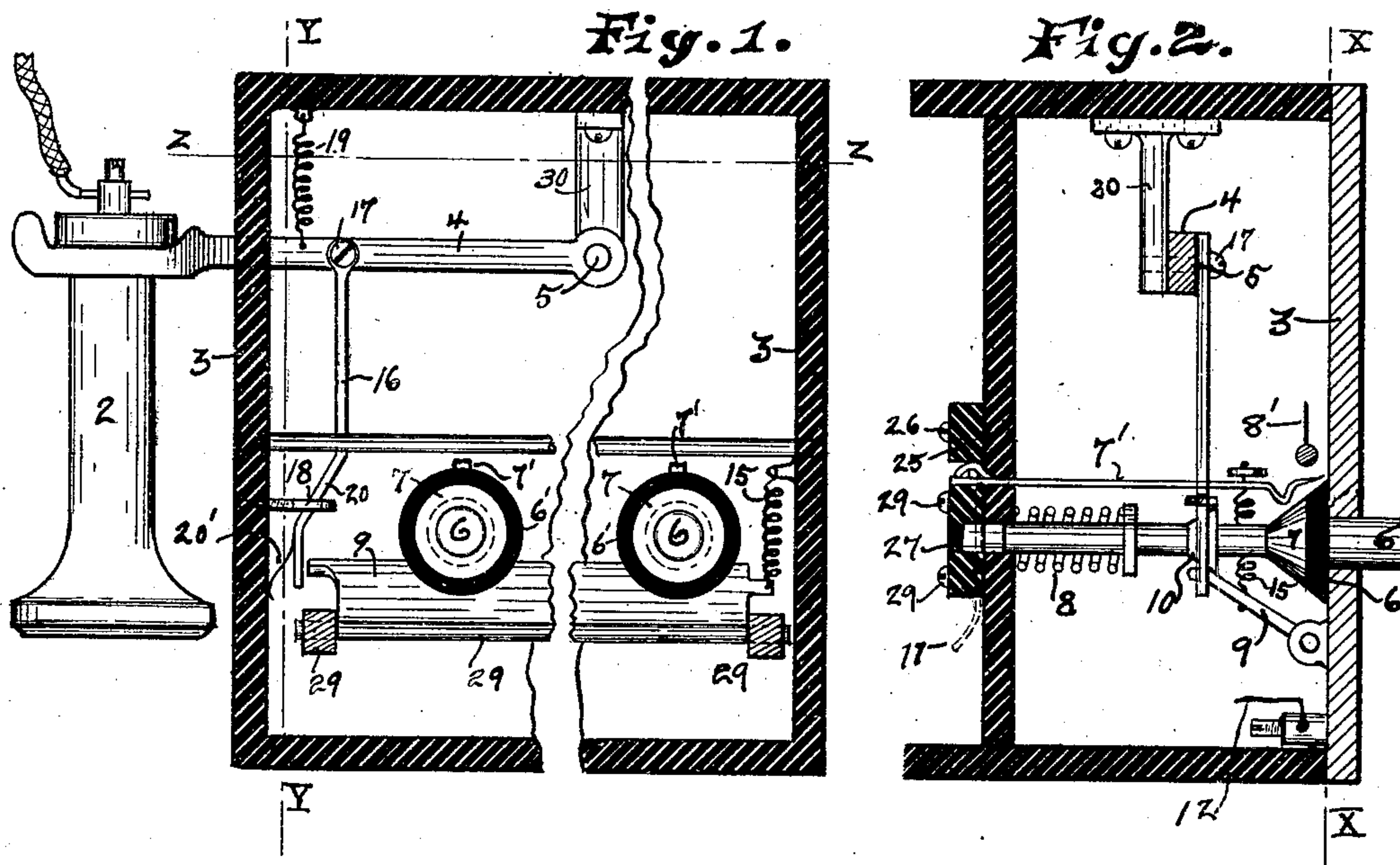


No. 842,778.

PATENTED JAN. 29, 1907.

B. O. FOX.
TELEPHONE EXCHANGE SYSTEM.
APPLICATION FILED DEC. 11, 1905.



WITNESSES:

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TO MICHAEL S. SHERIDAN, OF MILWAUKEE, WISCONSIN.

TELEPHONE-EXCHANGE SYSTEM.

No. 842,778.

Specification of Letters Patent.

Patented Jan. 29, 1907.

Application filed December 11, 1905. Serial No. 291,177.

To all whom it may concern:

Be it known that I, BENJAMIN O. FOX, a citizen of the United States, residing at the city of Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Telephone-Exchange Systems, of which the following is a specification.

My invention relates to improvements in private telephone-exchange systems.

The object of my invention is to provide a simple and comparatively inexpensive telephone-exchange system by which parties located in the several different compartments of a business establishment are able not only to communicate directly with the stations located at the different compartments, but may also control the electric circuits between such stations without first calling up a central station, whereby the central station heretofore employed for closing the electric circuits between the several subordinate stations of a system is dispensed with.

The construction of my system and the devices located at the several stations of a system are explained by reference to the accompanying drawings, in which—

Figure 1 represents a vertical section drawn on line *xx* of Fig. 2. Fig. 2 represents a vertical section drawn on line *yy* of Fig. 1. Fig. 3 represents a horizontal section drawn on line *zz* of Fig. 1, and Fig. 4 represents a diagrammatic view comprising two stations of a single system.

Like parts are identified by the same reference characters throughout the several views.

Each station of a single system is provided with similar apparatus for receiving and transmitting messages, and each apparatus comprises, among other things, a transmitter 1, receiver 2, both of ordinary construction, supporting-frame 3, receiver-supporting arm 4, arm-supporting pivot 5, and a plurality of push-buttons 6. When a person at any given station—for example, at station A—wishes to call up a person at any of the other stations in the system—for example, station B—he first moves one of the push-buttons 6 inwardly to the extreme limit of its movement, whereby the conical-shaped flange 7, connected with said push-button, is brought in contact with the circuit-closing arm 7' and said arm 7' is brought in contact with the conductor 8', whereby an electric circuit

is closed between the station A and the signal-bell at station B through the following conductors: beginning with the switch-arm 7', conductor 11, receiver-hook 4, conductor 40 (the receiver-hook being down normally) to the bell 41, from thence through the conductor 41', battery 42, conductor 43 to the conductor 8' of station A, thus completing the circuit, when the bell at said station B is caused to ring so long as the insulated portion 6' of the flange 7 is in contact with said circuit-closing arm 7'. When, however, the push-button at station A is released, it is thrown back by the recoil of the spiral spring 8 until the pawl 9, which is pivotally connected with the supporting-frame, engages the retaining-flange 10. It will be understood that the flange 10 is electrically connected with the receiver 2 at station B through the push-button 6, flange 7, circuit-closing arm 7', and conductor 11, switch-hook 4, and conductor 46, and the circuit is closed from said receiver 2 back to the switch-arm 7' through the conductor 41', conductor 13, conductor 47, receiver 2 at station A, conductor 48, switch-hook 4, conductor 49, push-button 6, flange 7, and from thence to said arm 7', thereby completing the talking-circuit. This being done, the parties can carry on a conversation in the ordinary manner. When the party at station A has finished his conversation and has again placed the receiver upon the supporting-arm 4, the pawl 9 will be thereby brought out of engagement with the flange 10, when said push-button will be thrown back in its former position by the further recoil of said spiral spring 8.

It will be understood that the apparatus in each of the several stations is provided with a push-button for each of the stations in the entire system with which it is desirable to communicate and that each of the push-buttons is provided with a separate number or character indicating the particular station with which it is connected, whereby, for example, when a person at station A wishes to call up station 5 he would push a button at such station which has a number corresponding with the station number 5. So in like manner when a person wishes to communicate with any other station he will push in a button having a number corresponding with the number of such other station with which

he wishes to communicate, each of the several stations in the system being in like manner equipped with a separate push-button for each of the other stations and a separate electric conductor communicating between such push-button and such other station.

It will be further understood that the pawl 9 extends entirely across the supporting-frame 3 in close proximity to the several push-buttons, whereby when any one of said buttons is pushed in it will be caught and held in place by said pawl 9 until said pawl is disengaged therefrom by the weight of the receiver 2, acting through the arm 4. The pawl 9 is retained in its raised position preparatory to engaging the flange 10 of the several push-buttons by the spiral spring 15. Motion is communicated from the receiver-supporting arm 4 to the pawl 9 through the angular bar 16, which bar 16 is pivotally connected to the arm 4 by the screw 17. The lower end of the bar 16 is slidably connected with the frame 3 through the bracket 18, in which it has a vertical movement as the arm 4 is moved upwardly and downwardly. The arm 4 is moved upwardly by the recoil of the spiral spring 19 and downwardly by the weight of the receiver 2. It will now be understood that, assuming that one of said push-buttons has been pressed inwardly and caught by the pawl, it will be thus retained until released, as stated, by the downward movement of said arm 4; that as soon as the receiver 2 is removed from the arm 4 said arm 4 will be drawn upwardly by the recoil of the spiral spring 19, as stated, whereby the bar 16 will be drawn upwardly above the pawl 9; that as soon as said receiver 2 is again suspended from said arm 4 and said arm 4 moved downwardly by the weight of the receiver, as stated, said bar 16 will be brought against the upper side of said pawl 9, whereby said pawl will be forced downwardly and thrown out of engagement with the retaining-flange 10 of the push-button and said push-button will be released, when it will be thrown back to its normal position by the recoil of the spiral spring 8. When said arm 16 is being forced downwardly by the weight of the receiver, it will be simultaneously carried toward the left by contact of the angular bend or bearing 20 with said bracket 18, whereby when said pawl has been thrown out of contact with said flange 10 said bar 16 will be moved to the left and thrown out of engagement with said pawl and will remain out of engagement therewith until it is again raised by the upward movement of said arm 4, when the receiver 2 is removed therefrom.

It will be understood that the spring 20' has a tendency to throw said bar 16 toward the right and above the pawl 9 as it is being raised and the angular bend 20 of the bar 16 has a tendency to throw said bar 16 toward the left and out of contact with said pawl as

it is being forced downwardly, whereby when said pawl has been thrown out of engagement with the flange 10 of the push-button it is disengaged from the action of the bar 16 and free to be moved upwardly again by the recoil of the pawl-actuating spring 15, when it is in position to again engage the push-button.

My invention pertains, further, to the peculiar mechanism for connecting the several conductors 11, with the several circuit-closing arms 7', to the apparatus. This end is accomplished by forming a plurality of slits 21 in one end of said circuit-closing arm 7', when the conductor 11 is passed through said slits and between the respective fingers 22, formed by said slits 21, when said fingers are clamped around said conductor and retained in place by contact with the bar 25, which is secured against said fingers by the retaining-screws 26. When the end of the conductor 11 has been thus clamped between the fingers 22, it is carried downwardly between the wall of the inclosing frame 3 and the clamping-bar 27, when said clamping-bar is secured in place against said several conductors 11 by the retaining-screws 29. It will be obvious that by this arrangement any movement which may be communicated to the conductor will be resisted by the clamping-bar 27, and the tendency to disengage such conductors from the circuit-closing arm 7' will be entirely overcome. The pawl 9 is pivotally connected at its respective ends with the respective sides of the frame 3 by a rod operating in the supporting-bearings 29. The arm 4 is pivotally connected with the supporting-frame 3 by the bracket 30 and the pivotal bolt or pin 5.

It will of course be understood that all stations in the system are equipped in the same manner and that station B or any other station may call up station A in the same manner as station A may call up station B.

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

1. In a telephone-exchange system of the class described, the combination with each of the push-buttons of the several stations, of a contact-bearing adapted as said push-button is forced inwardly to move a circuit-closing arm in contact with the terminal of a conductor leading to a signal at a distant station, a second contact-bearing adapted as said button is released to be brought in contact with a retaining-pawl, a retaining-pawl adapted to engage the second contact-bearing of all the push-buttons in a single station and hold the same in a circuit-closing position until the receiver at such station is placed upon its supporting-arm, actuating means connected with the supporting-arm of a receiver for throwing said retaining-pawl out of engagement with the contact-bearings of the several

push-buttons as said receiver is placed upon its supporting-arm and means for releasing said pawl from engagement with the actuating means connected with said receiver-supporting arm as soon as said push-buttons have been released from said pawl, whereby said pawl may be drawn back to its normal position as soon as the contact-bearings of the push-buttons have been disengaged therefrom.

2. In a telephone-exchange system of the class described, the combination with the main supporting-frame 3, of the pawl 9, pivotally connected at its respective ends to said frame, a plurality of push-buttons 6, slidably supported in said frame, each provided with radial flanges or contact-bearings 7 and 10, circuit-closing arms 7' adapted to be thrown to their closed position by contact with said flange 7 as said push-buttons 6 are moved inwardly, pawl 9 adapted as said push-button is released from the hand of the operator to be brought into engagement with the flange 10 with any one of the push-buttons at such station and retain the same in circuit-closing position until said pawl 9 is disengaged therefrom, spring 8 adapted by its recoil to throw said push-button back to its normal position when released by said pawl, receiver 2, receiver-supporting arm 4, vertical bar 16, pivotally connected at one end with said arm 4, actuating-spring 19, adapted, when the receiver is removed from said arm 4, to move the latter to its raised position and bring the bar 16 above the pawl 9, bracket 18 having bearings for the angular bar 16 and bar-actuating spring 20', said bar 4 being adapted to be raised by the action of said spring 19 when

released from the weight of the receiver whereby said bar 16 is brought above the pawl 9 and in position to contact therewith as it descends, said bar 16 being adapted as it is drawn downwardly by the weight of the receiver to throw said pawl out of engagement with said push-buttons, and said bracket 18 being adapted when said pawl has been thrown out of engagement with said push-buttons to draw said bar 16 out of engagement with said pawl, whereby when said push-buttons have been thrown to their normal position said pawl 9 will be free to move back in its normal position, substantially as set forth.

3. In a telephone-exchange system of the class described, the device herein described for connecting the several conductors 11 with one end of the several circuit-closing arms 7' consisting in the combination with the one end of said circuit-closing arms, of a plurality of retaining-fingers 22 adapted to engage one end of said electric conductors, a clamping-bar 27 extending past the several circuit-closing arms 7' and the several electric conductors 11 of a single station and adapted to simultaneously clamp all the conductors of a single station and hold the same independently of the respective connections between said conductors 11 and said circuit-closing arms 7', all substantially as and for the purpose specified.

In testimony whereof I affix my signature in the presence of two witnesses.

BENJAMIN O. FOX.

Witnesses:

O. R. ERWIN,
JAS. B. ERWIN.