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S. B. WILLIAMS
TRANSMISSION SYSTEM

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FIG. 1.

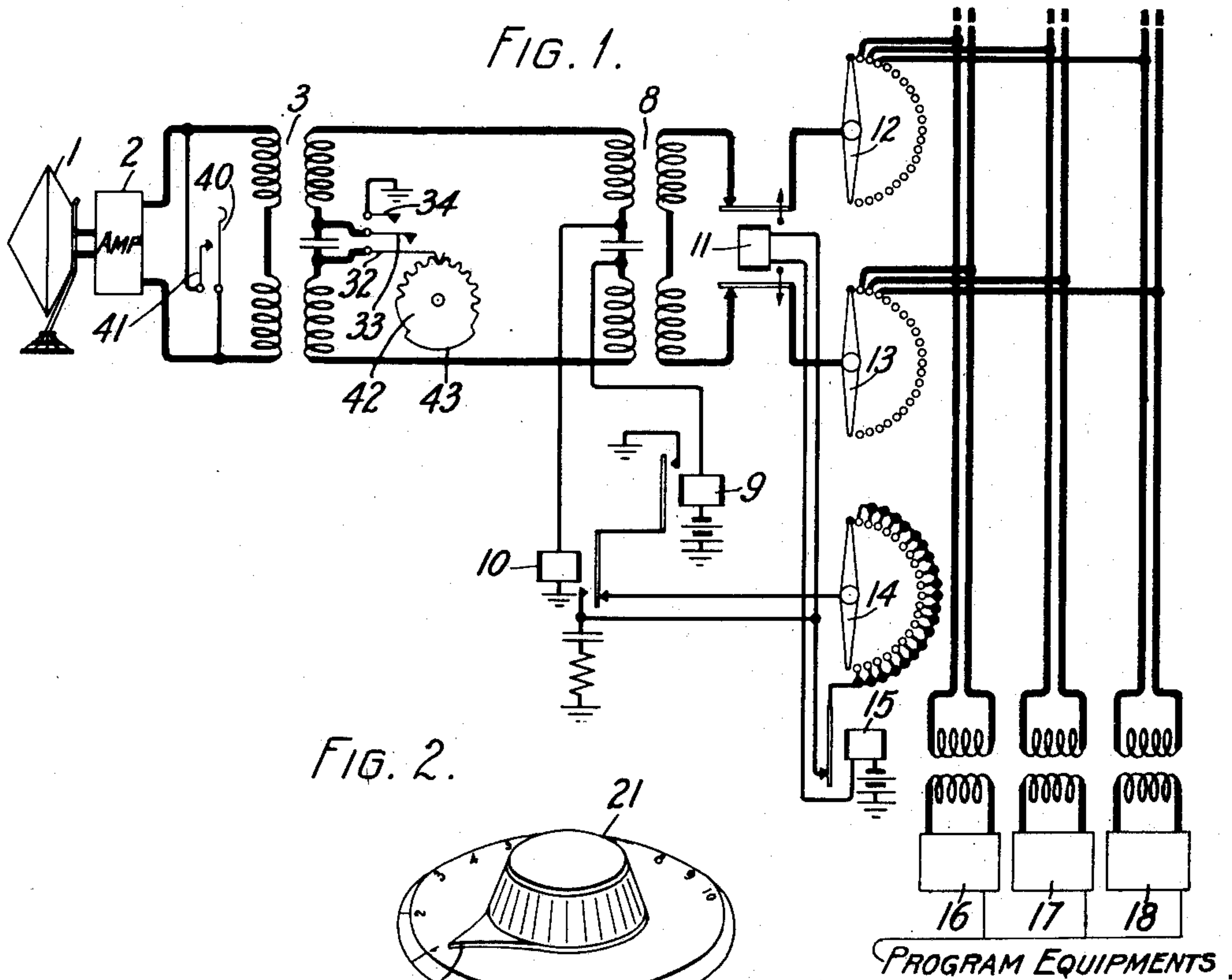
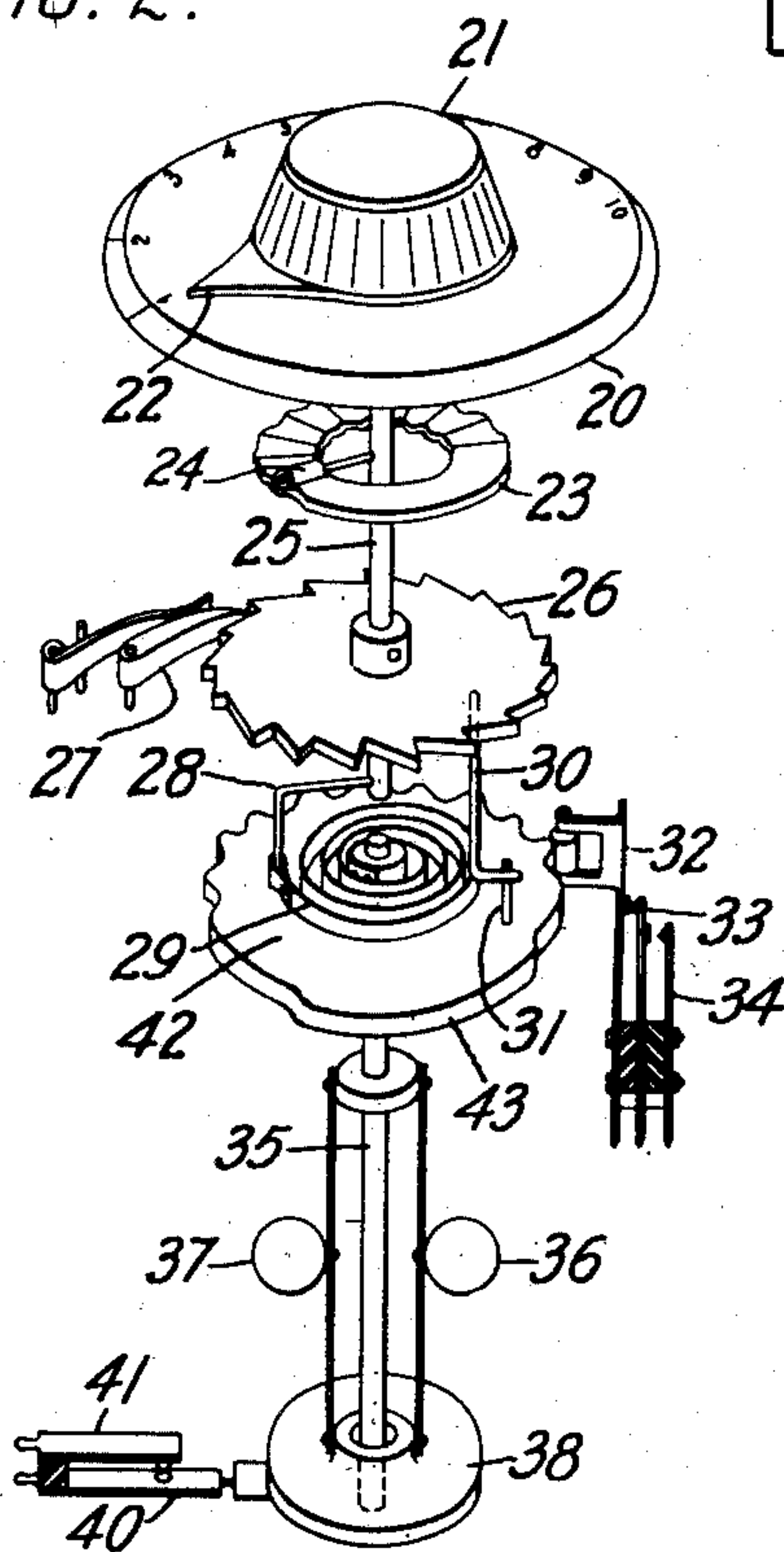


FIG. 2.



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TRANSMISSION SYSTEM.

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This invention relates to transmission systems and its object is to improve systems for the distribution of programs to subscribers over physical lines.

5 A feature of the invention is a program distribution system in which a subscriber's combined program indicating dial and switch operating impulse transmitter is arranged to rotate in a single direction to
10 operate a switch at central office to select successive programs and also to act once during each complete cycle to restore the central office apparatus to normal.

15 In the drawing Fig. 1 illustrates a system including a subscriber's line, and a portion of the central office equipment.

Fig. 2 shows the details of the impulse transmitter and program indicator located at the subscriber's station.

20 By means of a specially constructed controlling dial, the subscriber to a broadcast service is enabled to select any desired one of a number of programs and to receive such program on a receiving set at his
25 premises. The subscriber's controlling instrument is arranged to transmit such operating impulses by rotating the control handle in a forward direction. This instrument also has a dial which serves as an index
30 to the particular program to which he is listening.

The construction of the combined impulse transmitter and indicator dial is shown in detail in Fig. 2. A control handle 21 is
35 attached to the shaft 25 to which is secured a ratchet wheel 26. A spring pressed pawl 27 cooperates with the ratchet 26 to prevent the control handle 21 from being turned in the reverse direction. A pointer 22, secured
40 to the handle 21, moves over a dial 20. The dial 20 has numerals or other designations to indicate the different programs available.

The shaft 25 carries a yielding roller 24 which moves over the serrated member 23 to
45 hold the shaft 25 firmly in any position to which it has been adjusted. The shaft 25 also carries an arm 28, one end of which is secured to a coil spring 29. The other end of the spring is fixed to a second shaft 35.
50 The two shafts are held in normal relation to each other by means of pins 30 and 31.

The shaft 35 carries an impulse wheel 42, which has a number of teeth corresponding to each position of the control handle 21,

and which also carries a cam 43, the purpose 55 of which will be explained hereinafter. On the lower end of the shaft 35 is mounted a governor comprising the weights 36 and 37 and the slidable ring 38. The impulse wheel 42 is so arranged that while the short im- 60 pulse teeth are passing over the spring 32, this spring successively engages and disengages the spring 33 to close an impulse circuit. Once per revolution the cam 43 en- 65 engages the spring 32 which causes a closure between the springs 32 and 33 and also a closure between the springs 33 and 34. Normally the springs 33 and 34 remain open.

In Fig. 1 is shown the subscriber's re- 70 ceiver 1, and an amplifier 2. This set is connected through a repeating coil 3, to the line leading to the central office, and there terminating in a switch having the brushes 12, 13, and 14. The central office switch has access to a number of different program 75 equipments 16, 17 and 18.

The operation of the system will now be explained. Assume the subscriber wishes to listen to the program being sent from the equipment 18. Knowing the name or num- 80 ber on his dial corresponding to this program, he seizes the handle 21 and rotates it until the pointer 22 reaches the proper position. During the rotation of the handle 21, the spring 29 is tightened, which imme- 85 diately causes the shaft 35 to rotate in the same direction to bring the pin 31 back into engagement with the stop pin 30. During rotation, the impulse springs 32 and 33 close and open a corresponding number of 90 times. On the first closure of the impulse springs, a circuit is completed from battery through the winding of relay 9, lower left winding of coil 8, thence over the lower side of the line, through the lower right winding 95 of coil 3, springs 32 and 33, to the upper right winding of coil 3 thence over the upper side of the line, the upper left winding of coil 8 and the winding of relay 10 to ground. With relays 9 and 10 operated, 100 a circuit is closed from ground through the front contacts of these relays, windings of slow release relay 11, winding of the stepping magnet 15, to battery. On the next opening of the line, relay 9 releases and 105 opens the circuit of magnet 15, which in turn releases and advances the brushes 12, 13 and 14 to the first position. For each suc-

ceeding impulse the brushes of the switch are advanced until finally they stand on the set of terminals corresponding to the program distributing equipment 18. During the sending of the impulses, relay 11 remains operated, but after the impulses have been transmitted and an interval elapses, this relay releases to complete a circuit from the program set 18, through the brushes 12 and 13 and the contacts of said relay to the right windings of coil 8.

When the shaft 35 first starts to rotate, the governor weights 36 and 37 raise the disc 38 to permit the spring 40 to move into engagement with the spring 41. The springs 40 and 41 serve to short-circuit the receiving set 1-2, during the sending of impulses. After the impulses have been sent and the shaft 35 comes to rest, springs 40 and 41 are again opened to render the receiving set effective. The program is now received at the subscriber's station and he may listen to it until it is completed or until he desires to listen in on some other program or to disconnect his line entirely from the central office equipment. To listen in on another program he merely continues to rotate the handle 21 until the pointer 22 reaches the desired program.

In order to insure that the switch at the central office is in synchronism with the substation dial, the dial is so arranged that once per revolution it causes the switch to restore to normal. As the control handle 21 is turned from the last program position toward the first program position, the cam 43 presses the spring 32 against the spring 33 and the latter spring against the spring 34. The closure between these springs results in applying ground potential to both sides of the line. This causes the operation of relay 9 and the release of relay 10. With this condition, a circuit is closed through the contact of relay 9, back contact of relay 10, brush 14, and its associated terminals, contact of magnet 15, winding of relay 11, winding of magnet 15, to battery. The magnet 15 interrupts its own circuit and steps the brushes 12, 13, and 14 back to normal position. The closure by the cam 43 is sufficiently long to permit the switch to restore. After the cam 43 has passed under the spring 32, the spring drops into a notch opening the contacts. This notch may represent the normal position in which no program is selected.

The receiving set at the subscriber's station has been shown in diagrammatic manner but it is to be understood that it may be of any suitable type.

What is claimed is:

1. In combination, a central office having an automatic switch therein arranged to take a plurality of successive settings without releasing, circuits selectable by said

switch, a subscriber's line leading to said switch, a transmitter at the substation adjustable to any of a plurality of positions to send a corresponding number of impulses over the line, means responsive to said impulses to set said switch to select a desired circuit, a dial on the transmitter indicating the circuit selected, and means controlled by the transmitter once during a complete operation for restoring the automatic switch.

2. In combination, a central office having an automatic switch therein, circuits selectable by said switch, a subscriber's line leading to said switch, a transmitter at the substation adjustable to any of a plurality of positions to send a corresponding number of impulses over the line, means for retaining the transmitter in its adjusted position; means responsive to said impulses to operate the switch to select one of said circuits, indicating means adjustable with the transmitter to indicate the circuit selected, and means controlled by the transmitter during each complete cycle of operation to restore said automatic switch.

3. In combination, a central office having an automatic switch therein arranged to take a plurality of successive settings without releasing, a plurality of program sending equipments selectable by said switch, a subscriber's line leading to said switch, a transmitter at the substation adjustable to any of a plurality of positions to send a corresponding number of impulses over the line, means responsive to said impulses to set said switch to select a desired program, a receiving set at the substation for receiving the selected program, an indicating device adjustable with the transmitter to indicate the program being received, and means controlled by the transmitter for restoring said automatic switch.

4. In combination, a central office having an automatic switch therein, program distributing equipments selected by said automatic switch, a subscriber's line extending to said switch, a transmitter at the substation movable to any of a plurality of positions to send impulses over the line, said transmitter remaining in the position last used until moved to a new position, means responsive to said impulses to operate said switch to select a desired program, a dial on the transmitter indicating the program selected, and means controlled by the transmitter during each cycle of operation for restoring the automatic switch to normal.

5. In combination, a central office having an automatic switch therein, program equipments selectable by said switch, a subscriber's line, a transmitter at the substation rotatable in one direction only to successive positions to send over the line a number of impulses corresponding to the amount of ro-

tation, means responsive to the impulses for setting said switch to select a desired equipment, an indicating device on said transmitter for designating the program selected, and means controlled by the transmitter while moving from its last to its first position to restore said automatic switch to normal.

6. In combination, a central office having an automatic switch therein, circuits selectable by said switch, a transmitter at the substation adjustable to different successive positions, a pair of impulse springs actuated by the transmitter during each adjustment to send a corresponding number of impulses over the line, means responsive to said impulses to actuate said switch to select a desired circuit, a dial on said transmitter indicating the circuit selected, and a second set of contacts closed by the trans-

mitter for restoring said automatic switch to normal.

7. In combination, a central office having an automatic stepping switch therein arranged to advance from one selective position to another, circuits selectable by said switch, a subscriber's line leading to said switch, a transmitter at the substation adjustable to a plurality of positions to send a corresponding number of impulses over the line, means responsive to said impulses to set said switch to select a desired circuit, a dial on the transmitter indicating the circuit selected, and means controlled by the transmitter during each cycle of operation for insuring that said switch is stepping in accordance with the numbers on the dial.

In witness whereof, I hereunto subscribe my name this 5th day of August A. D., 1927.

SAMUEL B. WILLIAMS.