Feb. 18, 1936. G. B. SCHEIBELL 2,031,075

SELECTIVE PROGRAM SYSTEM

Original Filed March 12, 1931 6 Sheets-Sheet 1

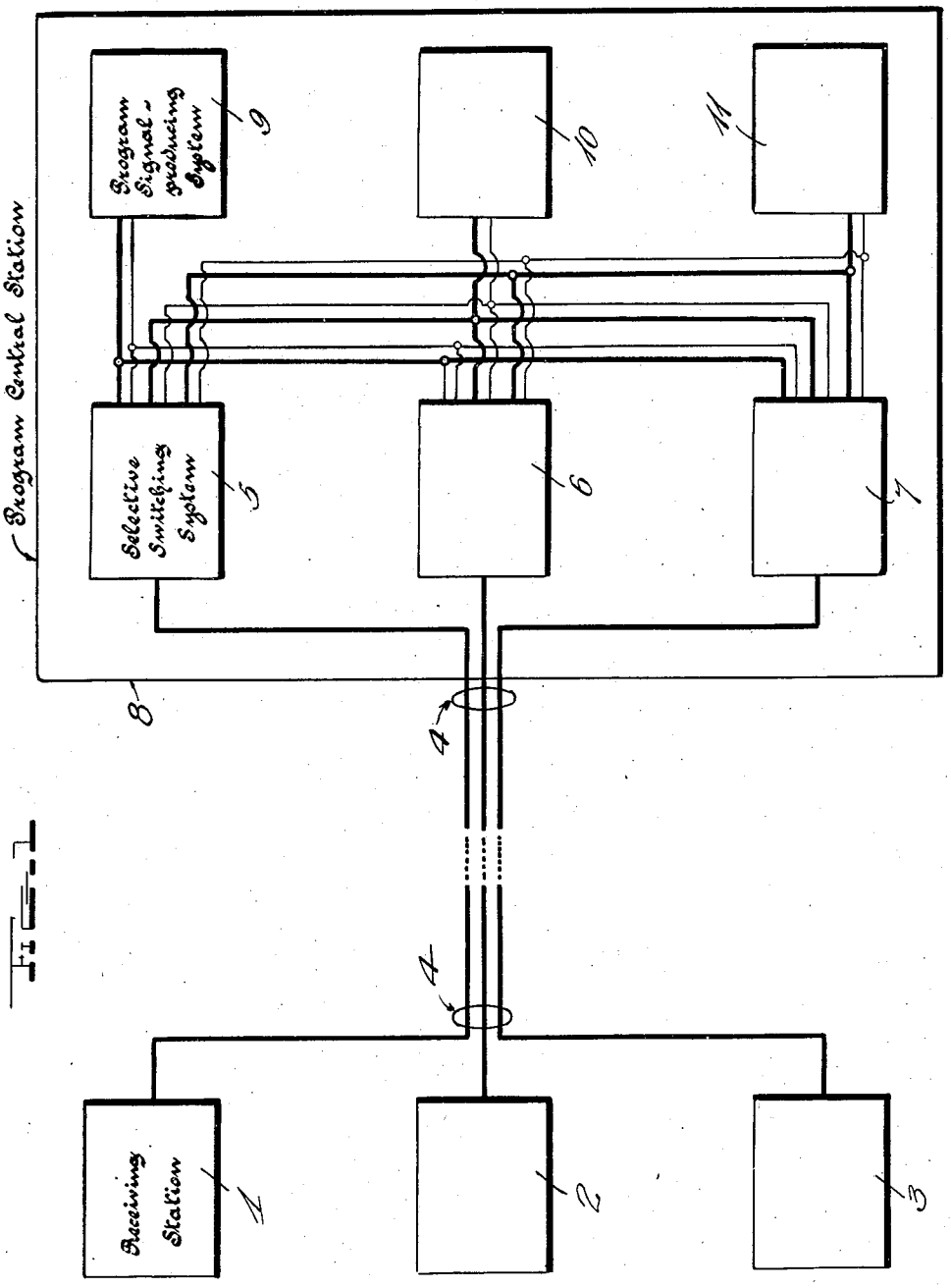


Fig. 1

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SELECTIVE PROGRAM SYSTEM

Original Filed March 12, 1931 6 Sheets-Sheet 2

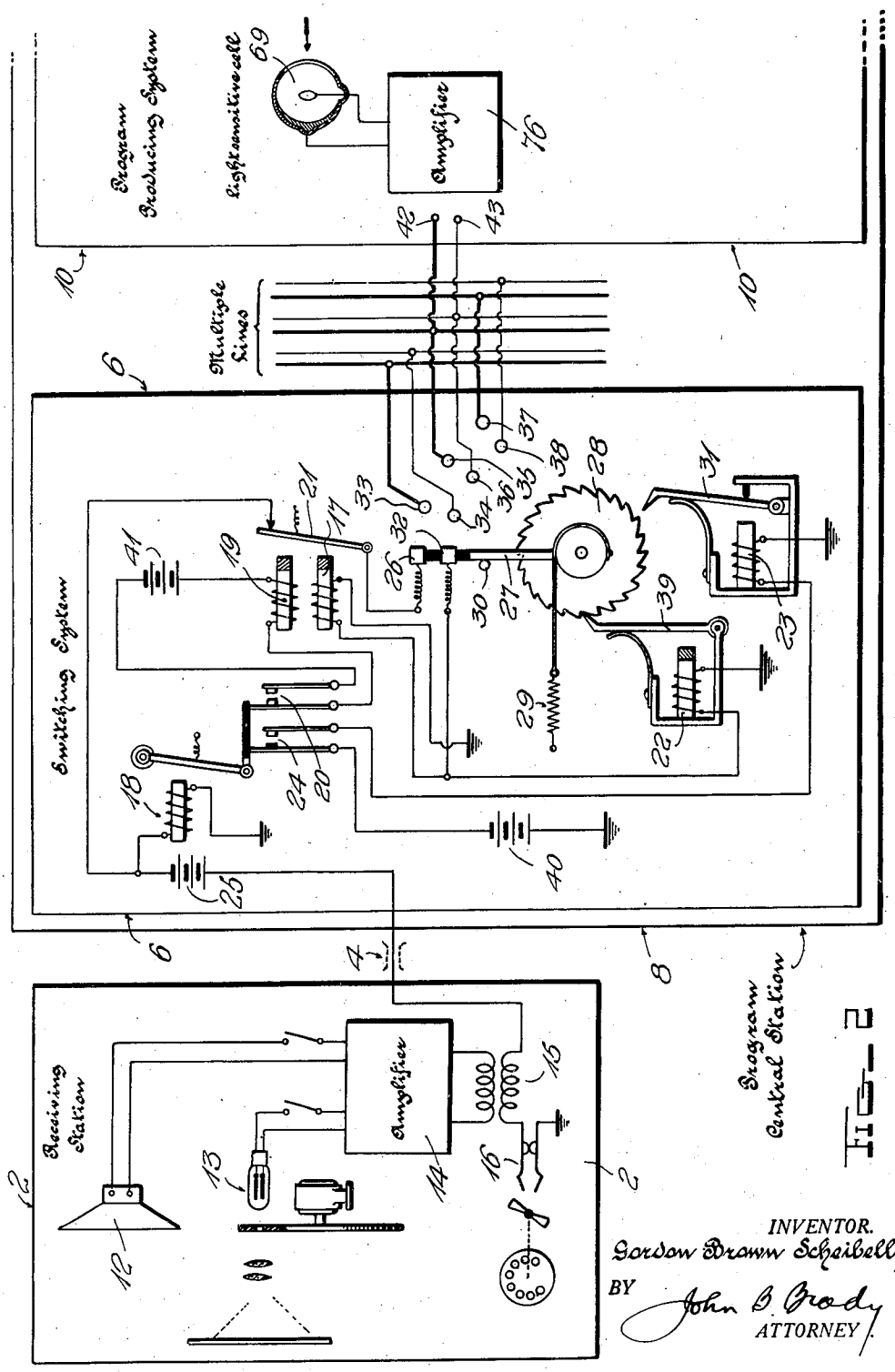


FIG. 2

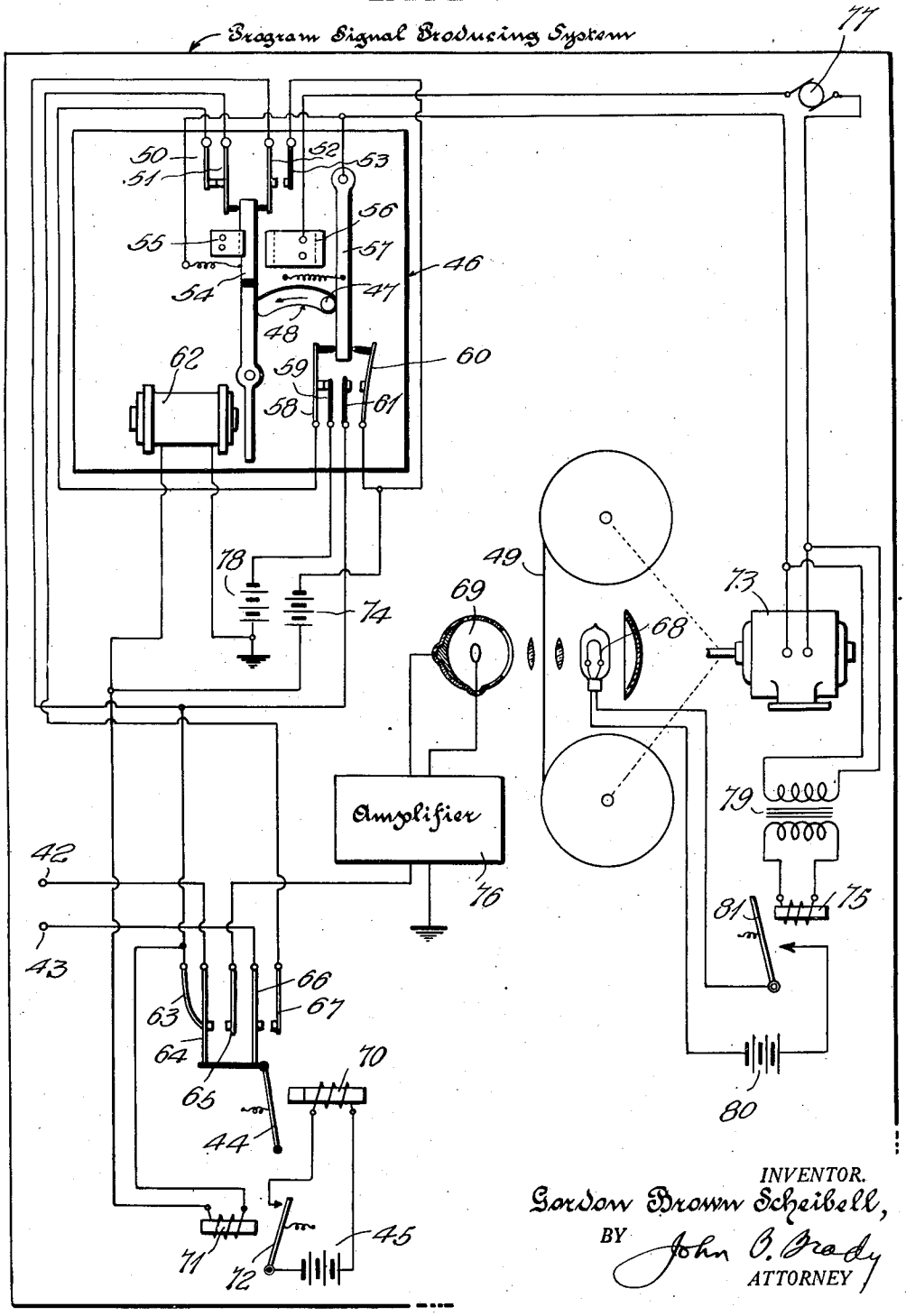
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SELECTIVE PROGRAM SYSTEM

Original Filed March 12, 1931 6 Sheets-Sheet 3

Fig. 3



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SELECTIVE PROGRAM SYSTEM

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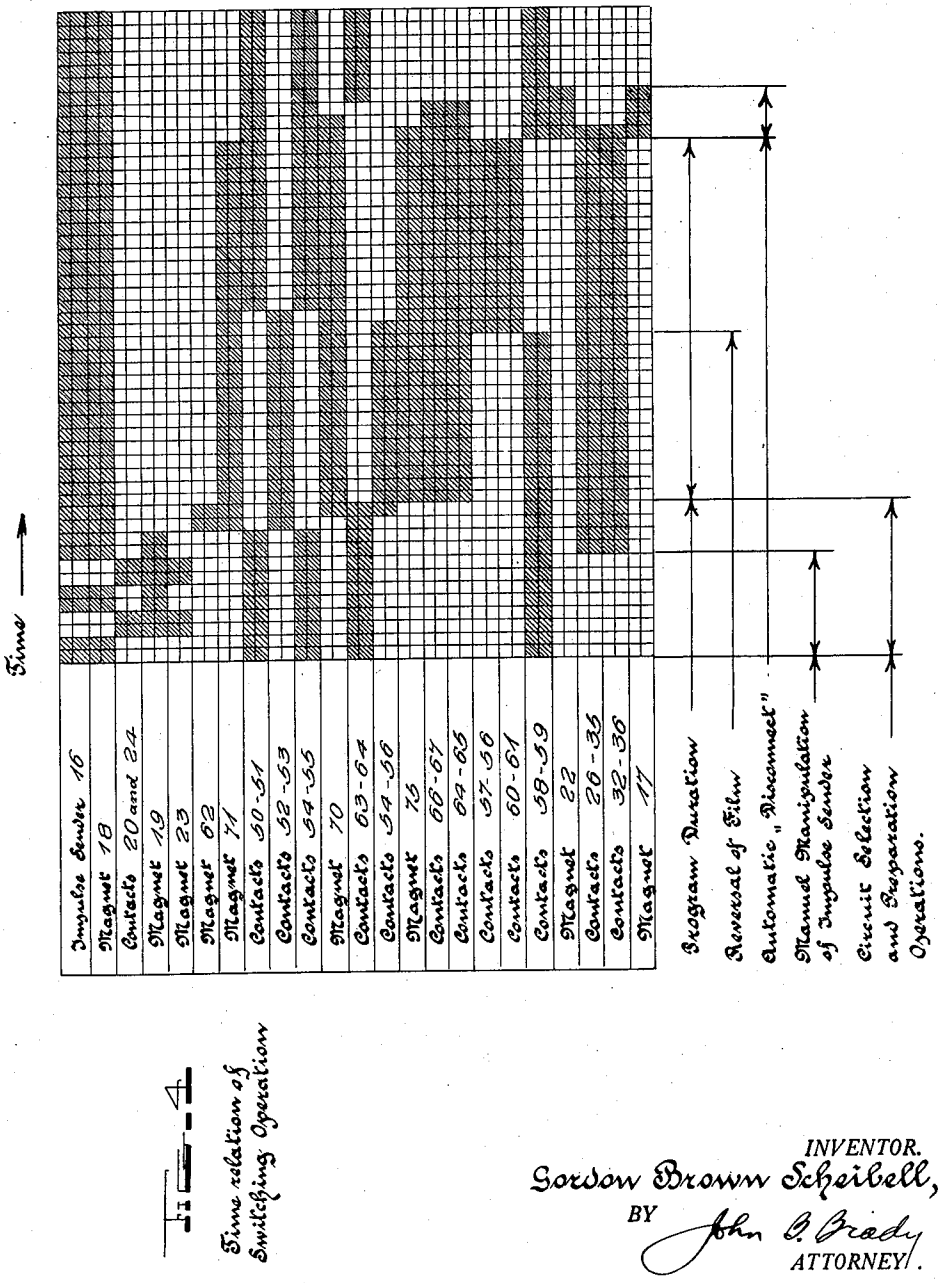


Fig. 4

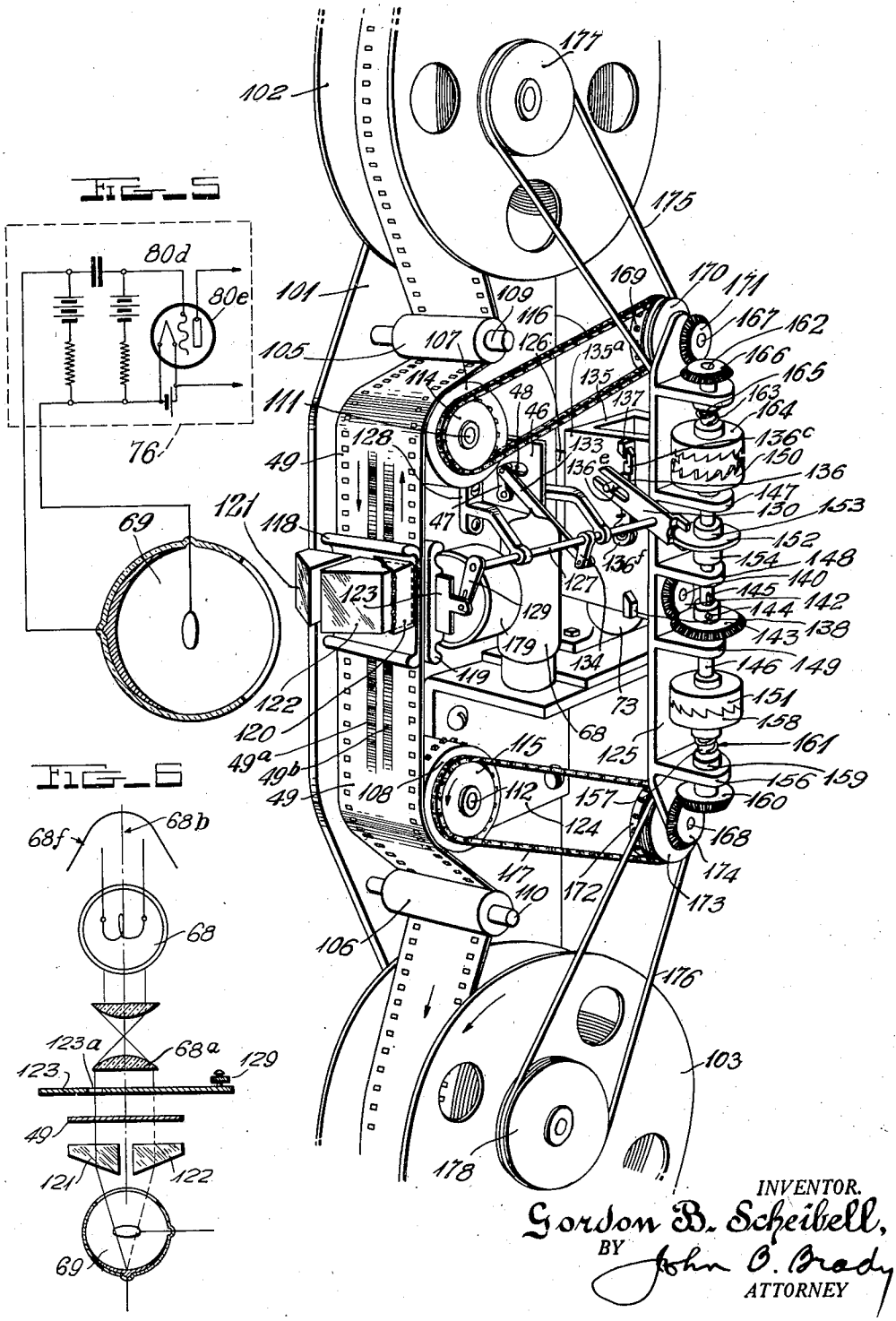
Time relation of Switching Operation

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SELECTIVE PROGRAM SYSTEM

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SELECTIVE PROGRAM SYSTEM

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FIG. 9

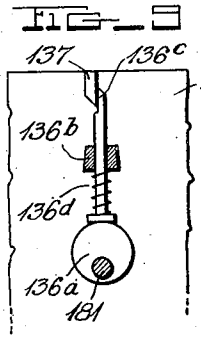


FIG. 7

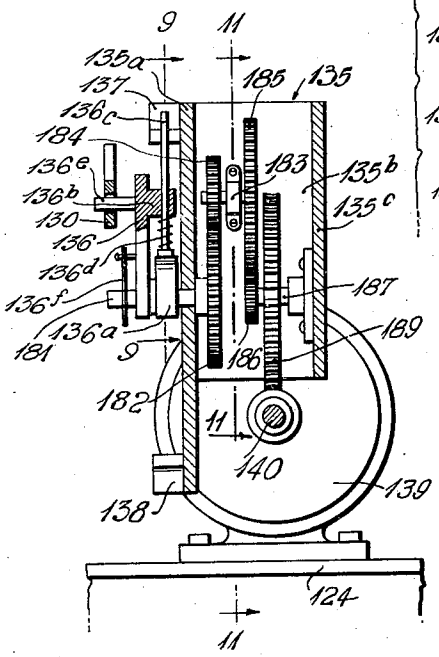


FIG. 8

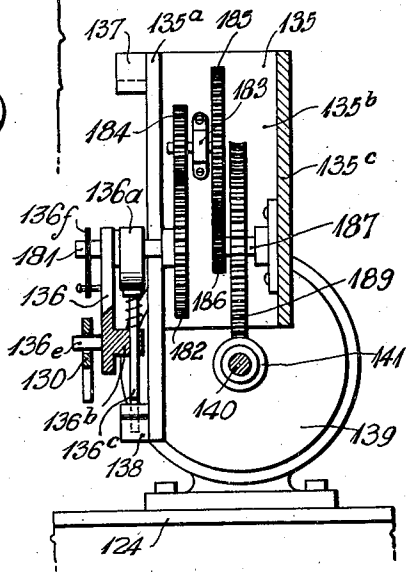


FIG. 10

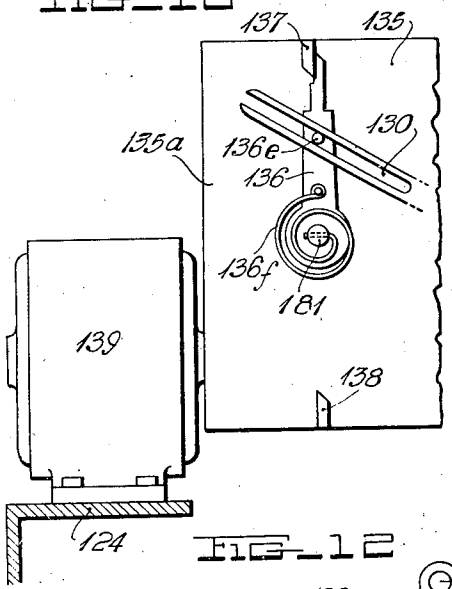


FIG. 11

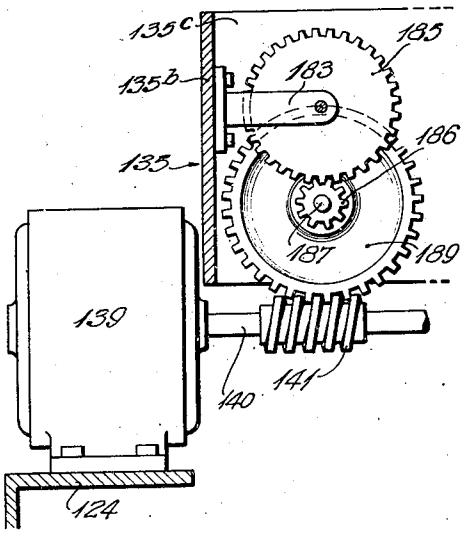
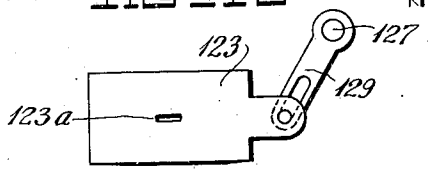


FIG. 12



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Patented Feb. 18, 1936 2,031,075

UNITED STATES PATENT OFFICE

2,031,075

SELECTIVE PROGRAM SYSTEM

Gordon Brown Scheibell, New York, N. Y.

Application March 12, 1931, Serial No. 522,090
Renewed June 7, 1933

43 Claims. (Cl. 179—2)

My invention pertains to a selective program system in which any one of a plurality of recorded programs can be automatically selected for reception by any one of a plurality of receiving stations.

I am aware of program systems in which programs are distributed at carrier frequencies over commercial light and power distribution networks to a plurality of receiving stations as well as other systems in which programs are distributed over telephone systems to a plurality of receiving stations. I am not aware, however, that any system has been heretofore disclosed in which means are provided expressly for the selective distribution of recorded programs to a plurality of subscribers by purely automatic methods.

One of the objects of my invention consists in providing a selective program system in which recorded programs can be selectively distributed to a plurality of program receiving stations by automatic apparatus under control of each of the receiving stations.

Another object of my invention consists in producing a selective program system in which a plurality of programs recorded on photographic film can be selectively distributed to a plurality of program receiving stations by automatic apparatus.

A further object of my invention comprises providing a selective program system employing a plurality of automatic program reproducing machines, a plurality of program receiving stations, and machine switching apparatus for selectively connecting the receiving stations to the program reproducing machines.

The word "program" herein used is defined as meaning television signals or sound signals inasmuch as my system can be equally well employed for distribution of either visual or sound programs, or both, as will be hereinafter pointed out.

My invention contemplates providing a central program station in which a multiplicity of automatic program reproducing machines are located. These program reproducing machines are preferably of the type adapted to employ program recordings made on photographic film and which are automatic in their operation as hereinafter disclosed. Each of these program machines, according to my present invention, is preferably provided with a different program recording so that each machine will reproduce a different program. A plurality of receiving stations are connected by wire lines to the central program station in which machine switching means are provided whereby each receiving station can be connected to any one of the automatic program reproducing machines. A step-by-step impulse sending-device is located at each receiving station for effecting the control of the machine switches. When a subscriber at any one of these receiving stations desires to select a program, he sends the required sequence of impulses to the central program station by means of the impulse-sending device located at his receiving station. Machine switching apparatus at the central program station then responds to the impulses to connect the receiving station to the proper automatic program reproducing machine. The desired program will then be automatically reproduced from a recording. At the expiration of the program recording the automatic program reproducing machine will be shut down while the machine switching apparatus will be restored to its initial position so that another program can be selected by the subscriber at the receiving station as desired. All of the operations of my system, aside from the manual manipulation of the impulse-sending mechanism at the receiving station, are entirely automatic.

In my copending application, Serial Number 522,091, filed March 12, 1931, there is described a related system making use of phonograph recordings for program selection purposes.

The arrangement and operation in detail of one embodiment of my invention will be apparent from the following, reference being had to the accompanying drawings, in which:

Figure 1 is a schematic representation of the general arrangement of one embodiment of my system; Fig. 2 is a diagrammatic representation of the electrical circuits of a typical receiving station and switching system together with an elementary representation of typical program producing system employed in the embodiment of Fig. 1; Fig. 3 is a diagrammatic representation of the electrical organization of a typical program producing system employed in my invention; Fig. 4 is a graphical representation of the time relationship of the switching operations of my system. This table is provided for purposes of clarity in description; Fig. 5 is a perspective representation of a form of one of the program signal producing systems employed in my system; Fig. 6 is a schematic representation of the optical system employed in the apparatus depicted in Fig. 5; Fig. 7 is a sectional view of timing mechanism employed in the apparatus of Fig. 5; Fig. 8 is a sectional view corresponding to Fig. 7 but with movable elements thereof in a different relative position;

Fig. 9 is a view of part of the mechanism also depicted in Figs. 7 and 8 and taken along the line 9—9 of Fig. 7; Fig. 10 is a front view of the mechanism of Figs. 7 and 8; Fig. 11 is a sectional view along the line 11—11 of Fig. 7; and Fig. 12 is a representation of the shutter mechanism employed in the apparatus of Fig. 5.

Referring to the drawings in detail, and particularly to Fig. 1, three program receiving stations 1, 2 and 3 are electrically connected through electrical conductors forming a cable 4 to three selective switching systems 5, 6 and 7, respectively, provided in the program central station 8. As contemplated by my invention, the program central station 8 is indicative of a central organization comprising a multiplicity of program sources and associated switching apparatus serving a large number of program "consumers" indicated by the receiving stations 1, 2 and 3. For purposes of description, the program central station might be compared to a telephone system central office, or "exchange" and the receiving stations to the telephone "subscribers". It is to be understood that in practice the number of receiving stations and associated circuits would be considerable, the number being here limited for simplicity. Still referring to Fig. 1, each of the selective switching systems is connected in multiple to three program producing systems 9, 10 and 11. In this specification, for simplicity, circuits are shown as having ground returns, although in practice, metallic or wire returns may be used.

Fig. 2, now, shows in more detail the arrangement of the electrical organization of a typical receiving station, such as receiving station 2, and a typical switching system, such as switching system 6, as employed in the selective program system of my invention. The arrangement of each of the receiving stations and switching systems is similar.

A loud speaker 12 and television set including neon lamp 13 are connected through switches to an amplifier 14. The amplifier 14 can be of any conventional type adapted to amplify television and sound signals. The input to this amplifier 14 is coupled to an inductance 15 in series with an impulse sending-device 16. The impulse-sending device 16 is of a conventional type such as used in automatic telephony and comprises a dial, cam, and switch adapted to interrupt a circuit to produce a sequence of electrical impulses corresponding to a "dialed" number. The program line from the inductance 15 in the receiving station is directed through the cable 4 to a battery 25 of the switching system 6 within the program central station 8. This program line is extended from the battery 25 to relay armature 21 and thence through a flexible lead to a wiping contact 26 mounted on the rotating arm 27 which forms part of a step-by-step selector, well known in automatic telephony. The arm 27 is mounted on a rotatable ratchet wheel 28. A tension spring 29 is provided to hold the arm 27 normally against the stop-pin 30. An arm 31 is provided adjacent an electromagnet 23 and is adapted to rotate the ratchet wheel 28, one ratchet tooth each time the magnet 23 is energized. The arm 27 is provided with another wiping contact 32. The contacts 26 and 32 are adapted to make contact with an arcuate group of contacts 33, 34, 35, 36, 37 and 38 positioned about the center of the ratchet wheel 28. When the arm 27 is at rest against the stop-pin 30, the contacts 26 and 32 are not in engagement with any of these contacts. Each separate energization of the magnet 23 advances the arm 27 to the next consecutive radial pair of contacts of the group 33, 34, 35, 36, 37 and 38. A spring holds the arm 31 away from the ratchet wheel 28 when the magnet 23 is deenergized. A pawl 39 is normally held in engagement with the teeth of the ratchet wheel 28 and prevents the spring 29 from returning the arm 27 to the stop-pin 30 as the ratchet wheel 28 is being actuated. A slow-to-release magnet 22 is provided adjacent the pawl 39 for releasing the same at the proper time so that the arm 27 can be returned to its initial position against stop-pin 30. It is to be understood that the foregoing arrangement comprising a step-by-step selector is here shown in elementary form only, the construction of the same being well known in automatic telephony.

A magnet 18 is connected to the battery 25 and is under control of the impulse-sending device 16. An armature, under control of the magnet 18, actuates the contacts 24 and 20 which are closed when the magnet 18 is deenergized. That is, the contacts 24 and 20 are closed when the line to battery 25 is interrupted by the impulse-sending device 16. The contacts 24 control the current from battery 40 to the magnet 23. The contacts 20 control the current from battery 41 to magnet 19. The magnet 19 is of the slow-to-release type provided with a copper collar on its core which serves to maintain the flux in the core for some time after the current has been interrupted. Such slow-to-release magnets are well known in automatic telephony. An armature 21 positioned adjacent the magnet 19 controls the line from the battery 25 to the contact 26 on the arm 27. Another slow-to-release magnet 17 is positioned to act upon the armature 21 independently of magnet 19. The magnet 17 is connected through ground in parallel with magnet 22. The contacts 33, 35 and 37 are connected to program lines in multiple with the program producing systems 9, 10 and 11, respectively, while the contacts 34, 36 and 38 are connected to auxiliary "disconnect" lines associated with the program producing systems 9, 10 and 11, respectively. For simplicity of description a typical example of operation of my system will be set forth in which the step-by-step selector of the switching system 6 makes connection with the program producing system 10. The circuits from contacts 35 and 36 are therefore shown in full, extending to terminals 42 and 43 of the program producing system 10, while the circuits extending from contacts 33, 34, 37 and 38 are not shown extended.

The program producing system 10 consists of means for automatically reproducing a program from photographic film. In the present embodiment of my selective program system, I employ together with a novel arrangement of associated circuits, a type of sound reproduction projector, which is, by itself, disclosed and claimed in my copending application Ser. No. 443,398, filed April 11, 1930. It is, of course, known in the art to record either sound or television signals upon a photographic film. My present system contemplates employing either sound or television signals so recorded.

In Fig. 2, the block entitled "Program producing system", comprises a system which employs the sound reproduction projector before referred to and hereinafter described in greater detail. The exact manner in which this sound reproduction projector is employed, as well as the associated circuits, will be better understood by

referring to Fig. 3, which is a diagrammatic representation of the electrical organization of a typical one of the program producing systems of the selective program system of my invention including amplifier 76 controlled by photo cell 69.

Referring to Fig. 3, the terminal 42 is connected to contact spring 64, while terminal 43 is connected to contact spring 66. An armature 44 is mechanically connected to the contact springs 64 and 66 through an insulating bar. A slow-to-release magnet 70 is positioned adjacent the armature 44. Energization of magnet 70 causes contact spring 64 to disengage from contact spring 63 and to engage with contact spring 65, while contact spring 66 engages with contact spring 67. However, contact spring 63 is of the follower type and continues in engagement with contact spring 64 until contact spring 64 engages contact spring 65. A connection is provided from contact spring 63 to a magnet 71 and a magnet 62 connected in series. Another connection is provided from contact 63 to contact springs 61 and 52 connected in parallel. The magnet 71 operates to influence an armature 72 which controls the circuit from a battery 45 to the slow-to-release magnet 70. The contact springs 61 and 52 are positioned upon a panel 46 which is a modified form of switch panel to be found in application Ser. No. 443,398, to which reference has already been made. Panel 46 corresponds to "switch panel 31" in this copending application. A pair of contact blades 57 and 54 are pivotally mounted on the panel 46 upon opposite sides of a movable member 47 which extends through an arcuate slot 48 in the panel 46. The member 47 is actuated to traverse the slot 48 once for every change in direction of the movement of the photographic film 49 of the sound reproduction projector.

The film 49 is mounted between reels and is adapted to be moved alternately in two longitudinal directions between lamp 68 and photoelectric cell 69 by means of an electric motor 73. The member 47 is adapted to be moved every time the direction of longitudinal movement of the film 49 is changed. The mechanical arrangement of the panel 46 with reference to the film 49 and motor 73 will be understood by reference to the description hereinafter following in connection with Figs. 5–12. The contact blade 54 is adapted to engage with either contact 55 or 56, while the contact blade 57 is adapted to engage with contact 56. The contact blade 54 has an extending portion which serves as an armature under control of the magnet 62. The contact 52 is positioned on the panel 46 upon one side of the contact blade 54 to engage with contact spring 53 also positioned on the panel 46. Contact springs 50 and 51 are positioned on panel 46, as shown, on the other side of the contact blade 54. The contact spring 61 and a contact spring 59 are positioned on the panel 46 to engage with contact springs 58 and 60, respectively, which are positioned upon opposite sides of the contact blade 57, as shown. A spring is provided to exert a force on the contact blade 57 in the direction of the contact 56. The member 47 is adapted to engage contact blades 57 and 54 in the path of its movement.

The contact springs 53 and 60 are connected in parallel to a battery 74 and thence to the magnet 71. The contact springs 58 and 50 are connected in series. The contact spring 51 is connected to the contact spring 67 and the contact spring 59 is connected through a battery 78 to ground. One end of the winding of magnet 62 is also connected to ground. A connection is provided between terminal 43 and contact spring 66. The contact spring 65 is connected to an amplifier 76. The amplifier 76 amplifies the output of the photoelectric cell 69, and can be of any conventional type such as a multistage resistance coupled amplifier well known in the art. The circuit from amplifier 76 to the receiving station is completed through ground.

The contact blades 57 and 54 are connected in parallel through a power source 77 to the motor 73. This circuit is completed through the contact 56. The magnet 75 is connected through a step-down transformer 79 to the circuit to the motor 73, as shown. The magnet 75 controls the energy from battery 80 to lamp 68 by means of armature 81.

The operation of the foregoing will be understood from the following:

Fig. 4 is a graphical representation of the time relation of the switching operations of my selective program system. The representation of Fig. 4 is intended only to show the time sequence relation of the switching operations and not the absolute time value or duration. The hatched portions of the table indicate, for magnets, the time interval the magnet is energized, and for contact pairs, the time interval the contact pairs are in engagement.

In an initial position the switching elements of the switching system 8 of Fig. 2 and the program producing system 10 of Fig. 3 are as shown in those figures.

When the subscriber at one of the receiving stations desires to have a certain program reproduced at his receiving station, he obtains the proper calling number which corresponds to the desired program. These numbers may be arranged in an index in which the calling numbers are opposite the program titles alphabetically listed, similar to an automatic telephone directory. The subscriber then "dials" his number on the impulse-sending device 16 so that a sequence of interruptions occurs in the subscriber's circuit which, in number, corresponds to the desired program number. For the purpose of the present description, the desired program number will be arbitrarily considered as number "2". In other words, it requires two interruptions by the impulse sender 16 to obtain the selection of and connection to a program producing system having a particular program listed in the index and designated "2". It is to be understood that in practice there will be a great many program producing systems and that therefore the calling number might comprise several digits. In my present description, the program producing system 10 has been arbitrarily chosen as providing the program signals comprising program number "2".

The two interruptions in the program line cause two interruptions through ground of the current supply from battery 25 to magnet 18. The magnet 18 upon deenergization causes the contact pairs 20 and 24 to be closed twice in succession. The contact pair 24 thereby closes the circuit through battery 40 to magnet 23 twice which accordingly moves the arm 27 around two steps into a position such that contact 26 engages contact 35 and contact 32 engages contact 36. However, at the same time, contact pair 20 has twice completed the circuit from battery 41 to the slow-to-release magnet 19. The two resultant excitations of magnet 19 act to keep the program circuit continuously broken at 21, inasmuch as the flux is maintained in the core of magnet 19 for some time

after the current supply has stopped. The magnet 19 thereby keeps the program line open at 21 until the interruptions in the program line produced by the impulse-sending device 16 have ceased. That is, the flux in the core of magnet 19 is maintained after the cessation of current supply for an interval longer than the interval between the constantly timed interruptions produced by sender 16. (See Fig. 4.)

After the arm 27 has arrived at the desired position (which is to say, after the desired number of interruptions has been made by sender 16), the program circuit will be closed at 21 which completes a circuit from battery 25 through terminal 42 and contact springs 63 and 64 to the magnets 71 and 62 connected in series to ground. Magnet 62 acts upon the armature extension of contact blade 54 to cause the blade 54 to move out of engagement with contact 55 and into engagement with contact 56. At the same time, the contact springs 59 and 51 disengage by virtue of resilient formation and contact springs 52 and 53 are brought into engagement. The contacts 52 and 53 complete a sustaining circuit from battery 74 to magnet 71. The energization of magnet 71 causes the circuit from battery 45 to slow-to-release magnet 70 to be completed at 72. The magnet 70 attracts armature 44 which causes contact spring 64 to disengage from contact spring 63 and to engage with contact spring 65, while contact spring 66 engages with contact spring 67. Contact spring 63 follows contact spring 64 up to a point just preceding the engagement of contact spring 64 with contact spring 65. When contact 63 disengages from contact 64, the circuit from battery 25 to magnets 62 and 71 is broken. However, contacts 52 and 53 are now in engagement to complete a circuit from battery 74 to magnet 71 which sustains the energization of magnet 71. The magnet 62 is deenergized. Contacts 66 and 67 prepare a circuit from terminal 43 to contact 51 which is now out of engagement with contact 50.

When contact blade 54 engages with contact 56, the motor 73 is started and the magnet 75 is energized completing a circuit to the lamp 68. The lamp 68 directs a beam of light through the recording on the longitudinally moving film 49 to control the photoelectric cell 69 to produce program signals. A circuit from the photoelectric cell 69 and amplifier 76 is now complete through contact springs 65—64, terminal 42, contacts 35—26, and contacts 21 to the amplifier 14. The program signal output of amplifier 14 is directed to either the television lamp 13, or the loud speaker 12, depending upon the type of program signals recorded on the film 49.

When the film 49 has reached the limit of movement in one direction, an automatic mechanism, described later in more detail, reverses the direction of longitudinal movement of the film 49 and shifts a shutter which exposes a different signal record to the photoelectric cell 69. A continuous program reproduction is thereby obtained without interruption. At the same time that the direction of movement of the film 49 is reversed, the automatic mechanism before referred to also causes the member 47 to move along the arcuate slot 48 so as to cause the contact blade 57 to engage with contact 56, and the contact blade 54 to disengage from contact 56 and to engage with contact 55. As the associated tension spring causes contact blade 57 to engage with contact 56 when the member 47 is moved, the contacts 60—61 engage and the contacts 58—59 disengage. The member 47, moving in the direction of the arrow and engaging with contact blade 54, causes contacts 52—53 to disengage and contacts 50—51 to engage. The contacts 60—61 therefore engage before the contacts 52—53 disengage which sustains the circuit from battery 74 to magnet 71. At the same time, contacts 58—59 disengage before contacts 50—51 engage, which serves to maintain an open circuit from battery 78 to contact spring 67.

The program now continues without interruption until the limit of movement is again reached by the film 49. At this instant, the automatic mechanical apparatus associated with the sound reproduction projector unit moves the member 47 in a direction opposite to that indicated by the arrow to the initial position shown in Fig. 3. The contact blade 54 will remain in its previous position, but the contact blade 57 will be moved out of engagement with contact 56. The circuit to motor 73 will be immediately broken and the magnet 75 will be deenergized and the circuit to lamp 68 broken.

At the same time, the contacts 60—61 will be disengaged which breaks the circuit to magnet 71 since the contacts 52—53 are now also disengaged. The circuit from battery 45 to magnet 70 will then be broken at 72 inasmuch as the magnet 71 is deenergized. However, the magnet 70 is of the slow-to-release type and retains the armature 44 for a considerable interval.

Simultaneously with the foregoing operation, the contact springs 58—59 are brought into engagement which completes a circuit from battery 78 through contacts 50—51, which are now in engagement to contact spring 67. The contact spring 67 is still in engagement with contact spring 66 and completes the circuit through terminal 43, contacts 36—32 to the slow-to-release magnet 22. At the same time a circuit is also completed to the slow-to-release magnet 17. As soon as the magnet 22 is sufficiently energized from battery 78, the pawl 39 is withdrawn from engagement with the ratchet wheel 28. The tension spring 29 immediately returns the arm 27 to its initial position adjacent stop-pin 30. The contacts 26 and 32 are, of course, consequently out of engagement with any of the contacts of the group 33, 34, 35, 36, 37 and 38. Before the pawl 39 is withdrawn from the ratchet wheel 28, the magnet 17 breaks the program circuit at 21. Both magnet 17 and magnet 22 do not release until after the arm 27 is at rest against stop-pin 30. When the magnets 17 and 22 are deenergized, the system will be in an initial starting position so that another program may be "dialed" by the "subscriber" by means of the impulse-sender 16. In the next instance, the "subscriber" may dial a different number to connect to a different program producing system, such as program producing system 9 or 11.

The magnets 19 and 17, in the foregoing, serve to prevent the energization of the magnets 71 and 62 in any of the program producing systems other than the one desired, inasmuch as the program circuit from battery 25 is always open at 21 while the arm 27 is moving.

In Fig. 5 reference numeral 101 designates a frame. Adjacent the opposite extremities of the frame the reels 102 and 103, upon which the film 49 is wound, are journaled. Idler pulleys 105 and 106 are provided adjacent the reels 102 and 103. Reference characters 107 and 108 represent sprocket wheels which positively drive the film by engaging with the perforations provided in the

same. The idler pulleys 105 and 106 and the sprocket wheels 107 and 108 are secured to the frame 101 by axial mountings 109 and 110 and 111 and 112, respectively, and are free to rotate thereon. Affixed to the sides of the principal sprocket wheels 107 and 108 are additional sprocket wheels 114 and 115 for engagement with driving chains 116 and 117. For the purpose of properly guiding the film I provide members 118 and 119 located between the sprocket wheels 107 and 108 and secured to the frame 101 between which the film 49 passes. The central portion of the member 118 is open to fit a lens box 120 into which are mounted two prisms 121 and 122. The member 119 has a longitudinal slot into which an aperture plate 123 slidably fits. At the back of the projector and secured to the frame 101 is a mounting bracket 124. A frame 125 is mounted parallel to the frame 101 on the bracket 124. A strengthening member 126 extends from the frame 101 to the frame 125 and is secured at opposite ends to both. A shift rod 127 extends from a bearing in the frame 125 through a bearing support which is secured to the frame 1. At one end of the shift rod 127 is a coupling link 129 which couples the shift rod 127 to the aperture plate 123. At the other end of the shift rod 127 is a shift yoke 130. The switch panel 46 is mounted on the frame 101 and at right angles thereto. The arm 47 is part of a switching arrangement mounted on the switch panel 46 which is more fully described elsewhere and is connected by a coupling link 133 to an arm 134 which is secured to the shift rod 127. A box 135 which contains a timing element, more fully described later, is mounted on the back of the frame 125. On the side of the box 135 adjacent to the shift rod 127 is an arm 136, more fully described hereinafter, which revolves in a plane parallel to the surface of the box 135 upon which it is mounted. Two stops 137 and 138 are secured to the box 135 and located so that they intercept the path of the arm 136 every 180 degrees. The driving motor 73 is mounted upon the bracket 124. The shaft 140 of the motor extends through the frame 125. Centrally located thereon is a worm 141 which engages a gear of the timing element of the box 135 described hereinafter. At the end of the shaft 140 is a bevel gear 142 which engages another bevel gear 143. The gear 143 has a pin 144 extending through its hub into a slot 145 in the drive shaft 146. The drive shaft 146 is supported by bearing members 147, 148 and 149 which are secured to the frame 125. At one end of the shaft 146 and above the bearing member 147 is secured the driving member 150 of a clutch, while at the other end of the shaft 146 below the bearing member 149 is secured the driving member 151 of another clutch. A shift disc 152 is located between two thrust collars 153 and 154 which are secured to the shaft 146. The disc 152 engages with one end of the shift yoke 130. A shaft 157 is mounted in bearing member 156. Secured to this shaft are the driven members 158 of a clutch, a thrust collar 159 and a miter gear 160. The member 158 is prevented from moving up or down on the shaft 157 by an annular shoulder but is free to rotate. A spring 161 coiled around the shaft 157 has one end secured to the thrust collar 159 and the other end secured to the driven member 158 of the clutch. Hence, shock from sudden engagement of the member 158 will be absorbed by this spring. A similar construction will be seen in shaft 162, driven member 164 of a clutch, spring 163, thrust collar 165 and miter gear 166. Shafts 167 and 168 are provided at either end of the frame 125 upon which are mounted, as shown, sprocket wheels 169 and 172, pulley wheels 170 and 173, and miter gears 171 and 174, respectively. The sprocket wheels 169 and 172 engage the driving chains 116 and 117 and positively drive the sprocket wheels 114 and 115. The pulley wheels 170 and 173 engage belts 175 and 176 which in turn engage other pulley wheels 177 and 178 which are secured to the reels 102 and 103. The belts 175 and 176 are preferably of a metallic weave or wound wire which will slip on the pulleys 177 and 178. The pulleys 170 and 173 are of a size such that they will cause the belts 175 and 176 to always drive the pulleys 177 and 178 at the maximum speed required to reel up the film fed by the sprockets 107 and 108.

The sprockets 107 and 108 maintain a continuous and even rate of speed for the film 49, but as the film is reeled and unreeled on the reels 102 and 103, the diameters upon which the film 49 is wound will vary and increase or decrease according to the amount of film on the reels. The belts 175 and 176 which slip upon the pulleys 177 and 178 act as a slip-clutch and compensate for this change in diameter.

Mounted directly behind the member 119 and secured to the frame 101 is a lens box 179. This lens box is part of the optical system which will be fully described later. In line with the lens box 179 and mounted on the bracket 124 is an exciting lamp 68 suitable for use in conjunction with the photoelectric cell.

In Fig. 5 a photoelectric cell 69 is shown in its relative position with reference to the structure of the reel mechanism. A portion of the photoelectric cell circuit is schematically illustrated at 80*d* including an amplifier tube 80*e* leading to the sound reproducing program circuit.

As shown in Fig. 5, the film 49 has a multiplicity of parallel channels of sound recordings 49*a* and 49*b*, the arrows indicating direction of recording. It will be seen that one channel is reproduced in one direction and that the other channel is reproduced in the opposite direction.

Fig. 7 is a detail view of the interior of the box 135 containing the timing element. The shaft 181 is journaled in one side 135*a* of the box 135. Mounted on this shaft 181 is the arm 136 as shown in Figs. 7 and 8. Mounted upon the same shaft but upon the other side 135*a* of box 135 is a spur gear 182. A bearing 183 which is secured to the side 135*b* of the box 135 carries a shaft upon which is secured a large spur gear 185, and also a small spur gear 184 which meshes with the large spur gear 182. This large spur gear 185 meshes with another spur gear 186, which is in turn secured to a shaft 187 mounted in the wall 135*c* of the box 135. Secured to this shaft 187 is a large worm wheel 189 which meshes with the worm 141 described elsewhere. This worm 141 is mounted upon the shaft 140 which is driven by the motor 139. It will be seen that this gear train appreciably reduces the number of revolutions per minute transmitted from the driving shaft 140 and delivered to the shaft 181. This train of reduction gears is to be so timed that there will be a 180 degree revolution of the shaft 181 every time a complete length of film has passed by the aperture plate 123 in one direction. This timing element determines the length of a sound channel recorded upon the film 49, and all such recordings have a specific length.

The shaft 181 extends through one end of the

arm 136. A cam 136a is eccentrically mounted on the shaft 181 and is rotated in a plane parallel with the arm 136 as shown in Fig. 9. A sliding bearing 136b is mounted upon the outer end of the arm 136. Slidably positioned in this bearing 136b is a pawl 136c. One end of this pawl 136c is notched in the manner shown to engage with the stops 137 and 138. The other end of this pawl is shouldered to form a bearing which rides upon the cam 136a. Mounted upon the pawl 136c and between the shoulder thereon and the bearing 136b is a spring 136d. This spring exerts pressure against the shoulder of the pawl and forces it continuously in contact with the periphery of the cam 136a. It will be seen that a revolution of the shaft 181 will cause the pawl 136c to move up and down with reference to the center of the shaft 181. Mounted upon the reverse side of the arm 136 is a pin 136e which engages in a slot in the shift yoke 130. The spiral spring 136f is coiled about the end of the shaft 181 which projects through the arm 136. This spring is secured at one end to the arm 136 and at the other end to the shaft 181. The spring is so shaped and positioned that there is a continual pressure transmitted from the shaft to the arm 136 in the direction of rotation. Rotation of the shaft 181 tends to increase this spring pressure. The purpose of the mechanical elements of this arm 136 is to provide a very quick motion of the arm 136 at a predetermined point of rotation of the reduction gear train.

Fig. 12 shows the aperture plate 123 containing aperture 123a coupled by means of the coupling link 129 to the shift rod 127. The aperture 123a in the plate 123 is of a nature best suited for admitting a proper light beam to the film. Further, it is of such a size and position that it will admit a light beam to but one channel of the sound record on the film.

Fig. 6 is a schematic representation of the lens system used in this projector. The exciting lamp 68, the condensing lenses 68a, the aperture plate 123, the film 49, the prisms 121 and 122, and the photoelectric cell 69, are symmetrically located about an axis 68b shown in Fig. 6. Parallel light rays from the exciting lamp 68 are intercepted by the aperture plate 123 and passed through the aperture 123a. A parabolic reflector 68f is located behind the lamp 68 for directing the light rays toward the film 49. The aperture 123a admits a suitable beam of light to the film 49 and subsequently to one of the prisms 122 or 121, which in turn bends the beam to focus upon the sensitive portion of the photoelectric cell 69. It will be seen that the aperture plate 123 will admit a beam of light from the exciting lamp 68, first to one sound channel 49a on the film and then, when shifted, to the other sound channel 49b, and the light beam upon coming from either side of the film will be focused upon the photoelectric cell 69. An advantage of such an arrangement is that the exciting lamp is symmetrically located with reference to the photoelectric cell 69, and will give uniform intensity for both channels of sound recording 49a and 49b with subsequent uniformity of reproduction.

Before the projector is started, the reel 102 will contain all of the film 49 except that portion which is used for threading through the projector up to reel 103 between plates 118 and 119. There is no sound record upon this threading up portion. The rest of the mechanical elements will be in a position as indicated in Fig. 5.

Referring back to Fig. 7, as the film is run through the projector, the train of reduction gears in the timing element in box 135, revolves the shaft 181. At the exact moment when the end of the sound channel on the film is proximate to the path of the light beam from the exciting lamp, the shaft 181 will have revolved 180 degrees by means of the train of reduction gears and caused the cam 136a to release the pawl 136c from engagement with the stop 137. The arm 136 will then very quickly revolve 180 degrees in the direction of rotation of the shaft 181 by means of pressure of the spring 136f. The projection 136e on arm 136 which engages with shift yoke 130 will cause the same to partially rotate the shift rod 127 and shift the shift disk 152, which in turn disengages clutch 151—158 and engages clutch 150—164, thereby abruptly reversing the direction of travel of the film 49. Simultaneously, the movement of the shift rod 127 will move the aperture plate 123 so that the aperture 123a admits a light beam from the exciting lamp to the other sound channel 49b. Further, at the same time, the coupling link 133 will cause the member 47 mounted on the panel 46, as shown in Figs. 3 and 5, to disengage the contact 54 from contact 56 and allow the contacting blade 57 to engage with the contact 56, thereby continuing the electrical circuit from source 77 to the motor 73. The film will then be driven from reel 103 and wound on reel 102 by means of the sprocket 107 and reel 102, which are now being driven from the shaft 167. When the end of the channel 49b, which was the beginning of the first channel 49a is proximate to the path of the light beam the arm 136 will again quickly revolve 180 degrees.

This last movement of the arm 136 will disengage the clutch 150—164, engage the clutch 151—158, shift the aperture plate 123 so that the aperture 123a admits a beam of light to the first sound channel 49a, and move the coupling link 133 so that the member 47 returns to the position shown in Figs. 3 and 5 and disengage the contacting knife 57 from contact 56, related circuit switching operations being performed as before pointed out.

It will now be obvious that I have provided a novel selective program system in which any one of a plurality of subscribers can select any one of a plurality of recorded programs. Such a system possesses many advantages. For example, a subscriber may choose any type of program he may desire for reproduction at any time he may desire. By the use of my system it is possible to provide an extensive central program station in which a very great number of different programs are available to any subscriber. These programs may not only be for entertainment purposes, but may also be directed to educational purposes in which plays and instructive lectures on different subjects are made available to the subscriber. The use of my system thereby makes conveniently available to a subscriber a large field of entertainment and instruction in which a subscriber can have practically any subject of intelligent thought re-enacted and reproduced before his eyes and ears at any time he may so desire. The subscriber to such a system is enabled to dispense with entertainment devices now commonly used, such as radio receivers, gramophones, and home cinematographic apparatus, and obtain the equivalent in a more economical manner, inasmuch as the service is shared by a considerable number of subscribers.

While I have described my invention in a cer-

tain preferred embodiment, I desire that it be understood that modifications may be made and that no limitations upon my invention are intended other than are imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A selective program system comprising means adapted to produce program signals and including a program record, a plurality of program receiving stations, and switching means adapted to selectively distribute said program signals to said receiving stations, said switching means being controlled in accordance with predetermined movement of said program record.

2. A selective program system comprising a plurality of program receiving stations, each of which includes an impulse sending device, means adapted to produce a plurality of programs of predetermined duration, a selector under control of each of said impulse sending devices, said selectors being adapted to connect to said program producing means, and means adapted to automatically operate said selectors to disconnect from said program producing means at a predetermined time.

3. A selective program system comprising a plurality of program signal receiving stations, a program central station having a plurality of program producing systems each of which is adapted to produce program signals from a program signal recording of predetermined duration, a selective switching system under control of each of said receiving stations and adapted to connect to any one of said program signal producing systems, and means under control of each of said program producing systems and adapted to operate a selective switching system connected thereto to disconnect any one of said program producing systems from any previously connected receiving station at the expiration of a program.

4. A selective program system comprising a plurality of program signal receiving stations, and a central program station including a plurality of program signal producing systems, and a plurality of switching systems each of which is under control of one of said receiving stations, said switching systems being adapted to connect to any one of said program signal producing systems, and means controlled from said program signal producing systems for controlling said switching systems.

5. In a program system, a plurality of receiving stations each having an impulse device, a plurality of program systems each including a program recording and operating means therefor, impulse controlled switching means for selectively connecting said receiving stations with said program systems, and means operative at the expiration of a program recording in a selected one of said program systems for normalizing the switching means connected to said program system in a selection operation.

6. In a program system, a program central station having a plurality of program signal producing systems, a plurality of selectors each having different groups of contacts each group of which is severally connected with said program systems, and a plurality of receiving stations remotely situated from said central station and each having an impulse device for controlling one of said selectors for establishing a circuit through at least one contact of each group of contacts thereof to a selected program signal producing system whereby signals can be transmitted from said selected program producing system to said controlling receiving station for the reproduction of a program thereat, and means controlled from said program signal producing system through a contact of the other group of contacts of said selector to cause the normalization of said selector at the expiration of a program.

7. In a program system, receiving stations, program signal producing systems, selectors each having dual sets of contacts each group of which is severally connected with said program producing systems, means for enabling one group of said contacts of each selector to establish program signal transmission circuits to said receiving stations and means for enabling the other group of contacts of each selector to establish selector controlling circuits from said signal producing systems.

8. In a program system, a program central station having a plurality of program signal producing systems each including a motor driven program recording and a translation device for producing electrical signals from said recording, a plurality of receiving stations remotely situated from said central station, each of said receiving stations including an impulse device, a plurality of step-by-step selectors each under control of one of said impulse devices, a plurality of groups of contacts in each of said selectors, said groups of contacts being severally connected with said program producing systems, means in each of said program producing systems responsive to energization through a contact of one of said groups in any of said selectors for causing the energization of said motor, means for subsequently disconnecting said last mentioned means and connecting said translation means of said program producing system through said contact of said last mentioned group in a selecting selector to the receiving station connected with said selector for the reproduction of a program at said receiving station, and means in said program producing system and operable upon the expiration of the program thereof for establishing an energizing circuit through a contact in another group of said selecting selector, and means connected with said selecting selector and responsive to said last mentioned energization for causing the normalization of said selecting selector whereby said selector is disconnected from said program producing system.

9. In a program system, a plurality of program signal producing systems, a plurality of receiving stations remotely situated from said program producing systems, a plurality of switching systems for selectively interconnecting said receiving stations with said program producing systems, each of said switching systems including a step-by-step selector controlled by an impulse device, said selector in any one of said switching systems including groups of contacts, contacts of each group being severally connected with said program producing systems, a program recording in each of said program signal producing systems, a motor for driving each of said program recordings, a translation device in each of said program producing systems for producing electrical signals in accordance with the program recording thereof, motor controlling means in each of said program producing systems and responsive to energization through the contacts of one group of contacts in any of said selectors for initiating the operation of said motor, means

in each of said switching systems for causing such energization only after the selector thereof has established connection with a desired contact, means in each of said program producing systems for disconnecting said selected contact from said motor controlling means and connecting said contact with the translation means thereof, means for maintaining the operation of said motor controlling means during such disconnection until the expiration of the program, means operable at the expiration of a program for disconnecting said circuit established with said translation device, other means subsequently operable for establishing an energizing circuit through a selected contact of another group of contacts of a selecting selector, and means in each of said switching systems and responsive to such an energizing circuit for causing the return of the selector thereof to an initial position for the further selection of programs.

10. An automatic program system comprising, an electrical translating device at a receiving station, a plurality of reproducing devices remotely situated from said receiving station for producing program signals from recordings, an impulse device, a step-by-step selector under control of said impulse device for connecting said translating device to a selected one of said reproducing devices, and a switch operated by an electromagnet for disconnecting said translating device from said selected reproducing device, said selector being adapted to prepare a circuit between said electromagnet and said selected reproducing device whereby said electromagnet can be energized from said selected reproducing device for causing the disconnection of said translating device from said reproducing device.

11. An automatic program system comprising, an electrical translating device, a reproducing device for producing program signals from a recorded program of predetermined length, relay operated means for establishing a plurality of separate circuits to said reproducing device, one of said circuits extending between said translating device and said reproducing device and another of said circuits extending between said relay operated means and said reproducing device, and means operated by said reproducing device at the expiration of said program for disconnecting said circuits.

12. An automatic program system comprising, a translating device, an impulse device, a plurality of different sources of programs, a selector including a movable contactor for selective engagement with a plurality of contacts, connections between said sources of programs and said contacts, a circuit coupled with said translating device and controlled by said impulse device, a relay connected with said circuit for controlling said selector, another relay for controlling a circuit from said translating device to said movable contactor, and means for causing the operation of said last mentioned relay to interrupt the circuit to said movable contactor when said movable contactor is moved with respect to said contacts.

13. An automatic program system in accordauce with claim 12 in which said last mentioned means includes a circuit controlled by said first mentioned relay.

14. An automatic program system in accordance with claim 12 in which each of said sources of programs comprises automatic means for recurrently reproducing a recorded program.

15. In a system of program distribution, a plurality of different sources of program signals, a plurality of receiving stations, selection means for selectively establishing program signal distribution circuits between said program sources and said receiving stations, and switching means for establishing controlling circuits between said selection means and said program sources independent of said program circuits whereby said selection means can be controlled from said program sources.

16. A program distribution system comprising, automatic means for recurrently producing program signals from program record means and including control circuits for causing said automatic means to effectively produce selected signals, a plurality of receiving stations remotely situated from said automatic means and each including a translating device and an impulse device, a plurality of impulse operated switching systems respectively controlled from said receiving stations, said switching systems being connectible in parallel with said automatic means for distributing said program signals to one or more of said receiving stations for translation, said control circuits being operable from said switching system to cause said automatic means to produce desired signals.

17. In a system for receiving program signals from one of a plurality of remotely situated program sources, a signal receiving station for reproducing programs, selection means controlled at said receiving station for selecting one of a plurality of programs for reproduction at said receiving station, and means operable from at least one of said remotely situated program sources for controlling said selection means.

18. A program signal distribution system comprising, a plurality of receiving stations, a plurality of different program means remote from said receiving stations for producing and transmitting different program signals for reproduction at one or more of said receiving stations, control signal producing means also remotely situated from said receiving stations for producing control signals electrically different from said program signals but having a time relationship with the production of program signals at at least one of said program means, a plurality of selection means each individual to one of said receiving stations for rendering program signals from a selected one of said program means effective for reproduction at said receiving station, each of said selection means being manually controlled at its respective receiving station and also subject to control by signals other than program signals from said control signal producing means for controlling said selection means at a time having a definite relationship with the production of program signals from said program means.

19. A program signal distribution system comprising, a plurality of remote receiving stations each including a program amplifier and loud speaker as well as a manual control element, a plurality of systems each adapted to produce and transmit signals comprising a program to said receiving stations and each including a pick-up device and amplifier connected therewith as well as means for producing apparatus controlling signals, a plurality of selection means each individual to each one of said receiving stations for rendering program signals from a selected program system individually effective for reproduction at said receiving station, said selection means for each respective receiving station being primarily controlled by the manual control element at said

receiving station but including apparatus for effecting the operation of said selection means subject to control by signals from said apparatus controlling signal means.

20. A program distribution system comprising, a plurality of program signal sources, a plurality of receiving stations remotely situated from said program signal sources and each including amplification and loud speaker means as well as manual control means, a plurality of control means individual to said receiving stations for rendering desired program signals effective for amplification and reproduction at each respective receiving station, each of said controlling means being primarily subject to control by said manual control means but including electrically operated means subject to control by auxiliary signals other than program signals, and energizing means for producing and transmitting auxiliary signals other than program signals from at least one of said program sources to said electrically operated means for controlling the same in association with the transmission of program signals from said source for remote program reproduction.

21. The program distribution system in accordance with claim 20 in which said program signal source includes an electrical pick-up device and circuit therefore and in which said control signal energizing means includes another electrical circuit distinct and separate from said pick-up circuit.

22. The program distribution system in accordance with claim 20 in which said auxiliary signal producing means includes a timing element for effecting the production of said controlling signals at a predetermined time.

23. The program distribution system in accordance with claim 20 in which said auxiliary signal producing means includes an energizable circuit, a motor driven timing element, and means subject to manual control for initiating the effective operation of said motor driven timing element in a timing course for automatically effecting the energization of said circuit for transmitting auxiliary signals at a subsequent time.

24. The program distribution system in accordance with claim 20 in which said electrically operated means includes electromagnetic switching means subject to control by said auxiliary signals.

25. A signal distribution system comprising, program central station equipment having means storing signals corresponding to a plurality of different and predetermined programs and having circuits for operating said equipment to effectively produce selected signals, a plurality of signal receiving stations remotely situated from said central station equipment, and means controllable from said receiving stations for producing the effective transfer of program signals between said storing means and said receiving stations for program reproduction purposes at said receiving stations, said last mentioned means including means for operating said control circuits to cause said equipment to effectively reproduce selected signals and being subject to control from any one of said receiving stations to effect a reproduction of a program at said receiving station from said stored signals, the selection of program and time of reproduction of said program being determined from said receiving station.

26. The signal distribution system in accordance with claim 25 in which said transfer means includes a plurality of selection means individual to said stations and individually operable therefrom.

27. The signal distribution system in accordance with claim 25 in which said receiving stations each include an impulse sending device and in which said transfer means includes a plurality of impulse controlled step-by-step selectors individually controlled from said stations.

28. The signal distribution system in accordance with claim 25 in which said storing means comprises a plurality of motor driven automatic devices under control of said transfer means for automatically producing signals corresponding to programs.

29. The signal distribution system in accordance with claim 25 in which said storing means comprises a plurality of automatic devices each including a motor driven program record, a pick-up device for cooperation therewith, and in which the control of said transfer means by a particular one of said receiving stations effects the relative movement of a particular one of said pick-up devices and its respective program record for reproducing signals thereby for reproduction at said controlling station.

30. The signal distribution system in accordance with claim 25 in which said storing and transfer means include a plurality of automatic devices each for recurrently reproducing a particular program, a plurality of multiple circuits each connected with one of said automatic devices and switching means individual to said receiving stations for connecting each receiving station selectively with any one of said multiple circuits.

31. A signal distribution system comprising a plurality of remotely situated receiving stations each including amplification and loud speaking means as well as program selection controlling means, and a program central station having a plurality of different program signal sources including a plurality of different program circuits individual to said sources, a plurality of switching means individual to said receiving stations each for connecting a particular one of said receiving stations with anyone of said program circuits, means controlled by said program selection controlling means for effecting the production of a program selection signal at said switching means, and means for transmitting switching signals from said program sources to said switching means in definite relationship with the transmission of programs over said circuits.

32. The signal distribution system in accordance with claim 31 in which said switching means, in connecting a particular receiving station with a particular program signal source, also establishes a separate switching signal circuit to said switching means.

33. A signal distribution system comprising a plurality of remotely situated receiving stations each including amplification and loud speaking means, and a program central station having a plurality of different program signal sources including a plurality of different program circuits individual to said sources, switching means for selectively connecting said receiving stations with said program circuits, manual control means for effecting the operation of said switches, automatic means for also operating said switches, and circuits other than said program circuits from said program sources for controlling said automatic electromagnetic means in association with the transmission of program signals from said sources.

34. The signal distribution system in accordance with claim 33 including means for controlling said last mentioned circuits at a predetermined time after manual control of said switching means.

35. In a signal distribution system for transmitting signals from a plurality of program sources to a plurality of remotely situated receiving stations, auxiliary control-signal producing means and switching means having circuits extending from said receiving stations and adapted to establish a plurality of circuits, one extending to one of said program sources and another extending to said auxiliary signal producing means for effecting the reception of both program signals at said switching means, said auxiliary signals operating to control said switching means in the distribution of signals to said stations.

36. A signal distribution system comprising, a remote station having program amplification and translation means and an impulse sender, program means having a continuous program recorded in a plurality of individual record parts and pick-up means for producing program signals from said program record parts, impulse controlled means for initiating the controlling operation of said last mentioned means for producing signals for said translation means from one of said record components, and means for automatically effecting a change over at the expiration of one of said program parts to cause said translation and amplification means to be energized to receive signals from the other of said program parts for effecting a continuous transmission of signals to said program amplification and translation means from said program record parts for reproduction at said remote station.

37. In a control system, a plurality of electro-mechanical systems to be controlled, remotely situated electrical means subject to connection with said systems, step-by-step selection means for selectively establishing plural controlling circuits with said systems, and means operative for transmitting controlling signals over said plural circuits between said remote means, said selected electro-mechanical systems, and said step-by-step selection means for effecting interdependent operation in a selection process.

38. A signal distribution system comprising, a plurality of program reproducing stations, central station equipment including signal producing apparatus and selection means subject to reception of a code signal from one of said stations for initiating the operation of said apparatus to reproduce signals from a recording, and means for permitting another of said stations to connect with said apparatus, after said initiation of operation, to receive said recorded signals independent of any subsequent code signals transmitted by said first mentioned station.

39. A signal distribution system comprising, a plurality of remote stations, central office equipment including a plurality of program signal sources, means including selective circuit-connection apparatus for establishing an operative transmission channel from a selected one of a particular source to said station, means for transmitting signals from said station to said selection apparatus to determine a desired program source, and means operative from said selection apparatus to transmit a controlling signal to said selected source to cause the effective transmission of an ordered sequence of signals over said channel to said station, and means controllable from another of said stations for connecting said other station with said channel to receive said signals independently of subsequent control of said selection apparatus by said first mentioned remote station during said transmission of signals.

40. A program system comprising, a plurality of machines for producing various signals from a plurality of different program recordings each of said machines having a control circuit for controlling the operation thereof, a plurality of stations for reproducing said signals, and means subject to control from a particular one of said stations for establishing a program connection therefrom to a selected one of said machines, and subject to control from one or more of the other stations for selectively establishing program connections to the same machine during the establishment of said first metioned program connection, said last mentioned means including means for operating the control circuit of said selected machine to cause the same to produce selected program signals.

41. A program distribution system comprising, central station equipment including motor driven means for automatically playing a multiplicity of different signal records, control circuits within said central station for operating said equipment and energizing said motor driven means to play selected records, a plurality of receiving stations having connections with said central station, selection means subject to control from said receiving stations for selectively operating said control circuits to play selected records, and circuit means within said central station for rendering the signals from said played records available to a plurality of said stations.

42. A signal distribution system comprising, a plurality of different systems of recorded signals, each system including a plurality of separate record components, a translating station, an impulse controlled selector for establishing a connection between said station and a selected one of said systems, and means operated by the establishment of said connection for automatically reproducing signals from said separate record components and transmitting the same in an ordered sequence to said station.

43. A program distribution system comprising, a remote station, a plurality of automatic program machines for producing signals from recordings and each including a control circuit responsive to a control signal for initiating the operation of mechanism to automatically transmit signals from a recording, selection apparatus having a selecting contactor effectively connected with said station and having selectable contacts respectively connected with said program machines, means automatically operative, after the connection of said contactor with a selected one of said contacts, for originating and transmitting a control signal from said selective means through said connections to the program machine connected with said selected contact for initiating the operation of said mechanism to automatically transmit said signals, and means for transmitting a disconnection signal from said connected program machine to said selection apparatus at the conclusion of the transmission of said recorded signals from said machine.

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