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Merchant
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system.

Jan. 27, 1953

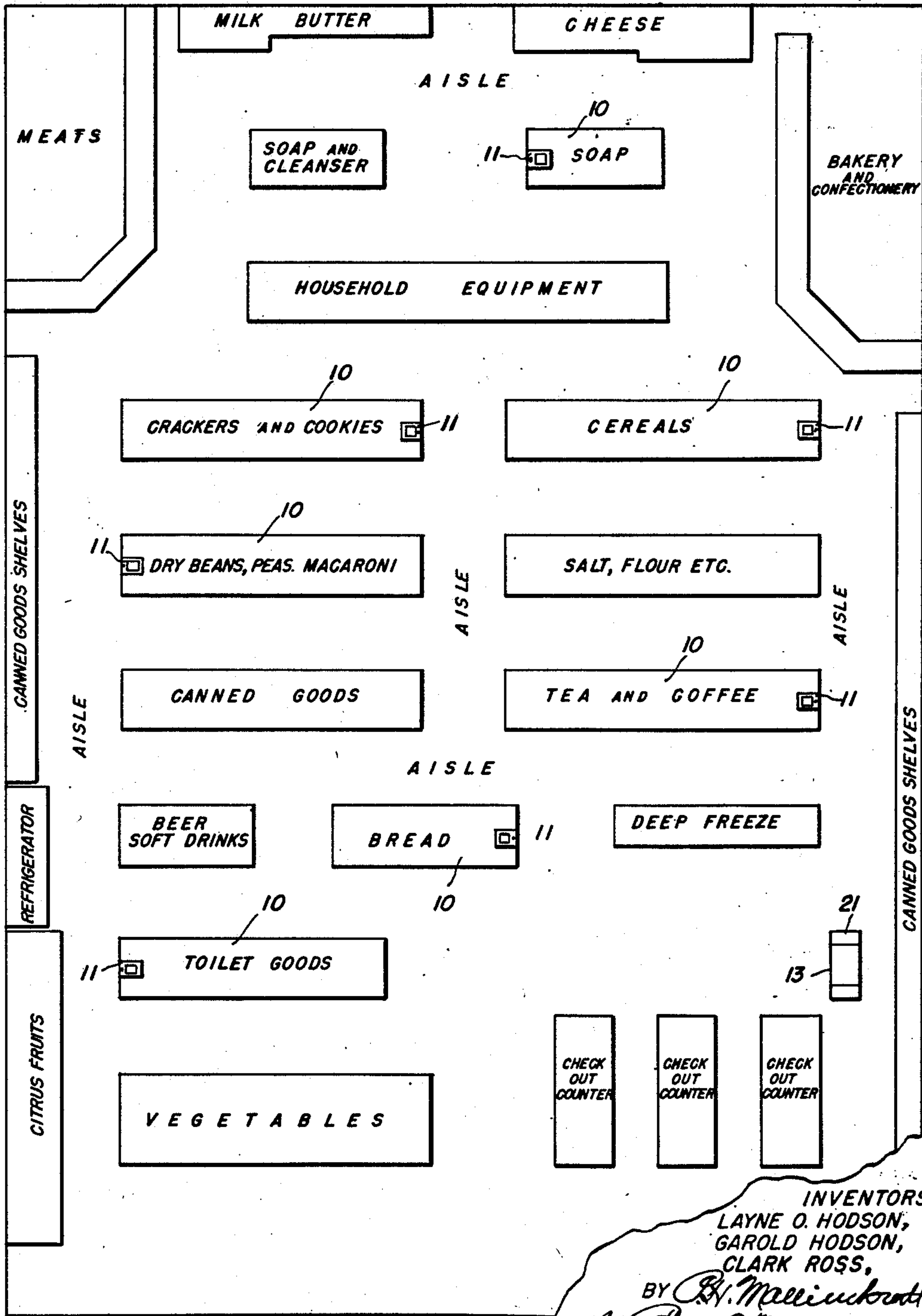
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BROADCASTING AND INTERCOMMUNICATION SYSTEM

Filed March 2, 1948

3 Sheets-Sheet 1

FIG. 1



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2,626,995

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FIG. 3

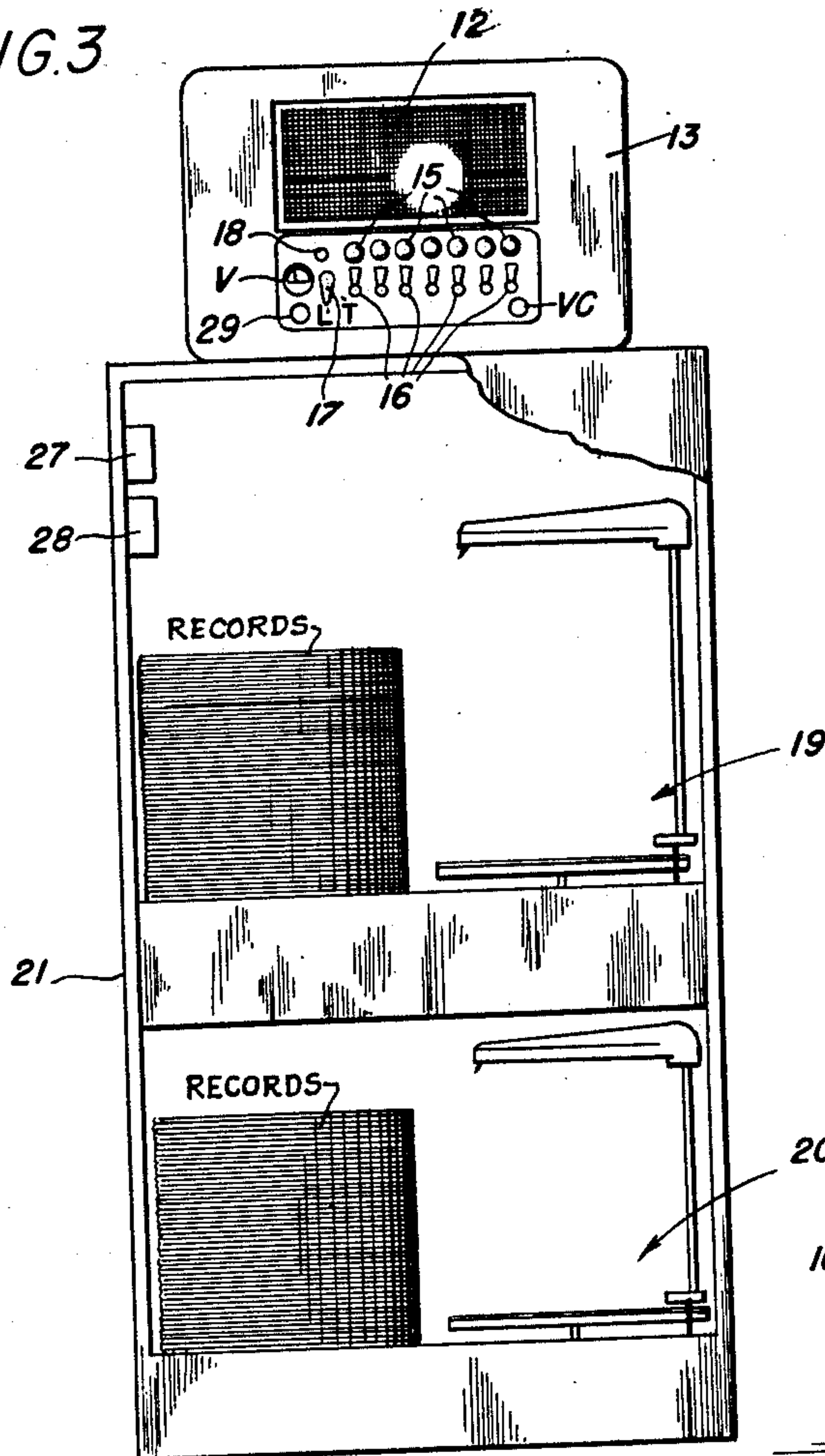


FIG. 2

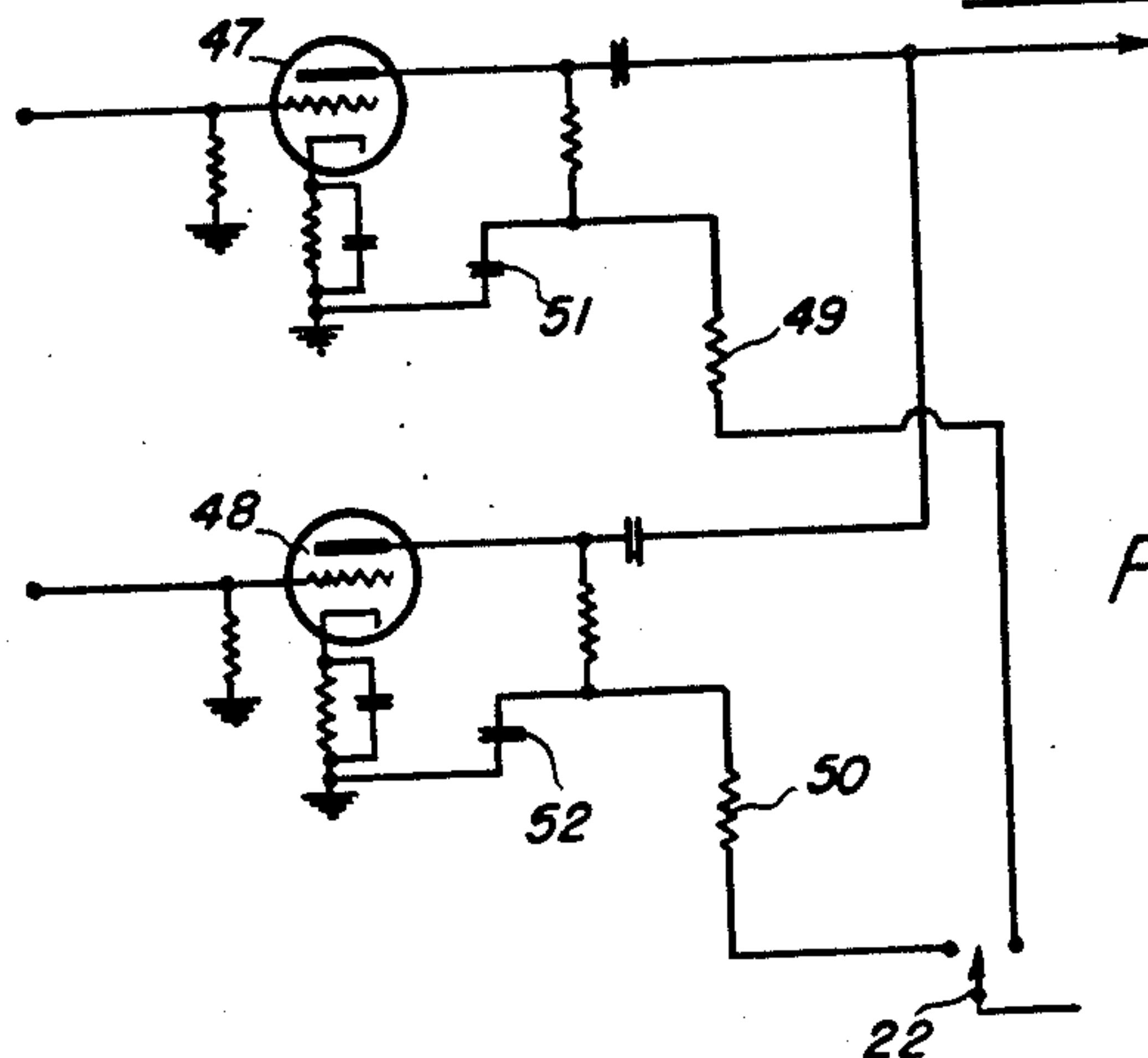
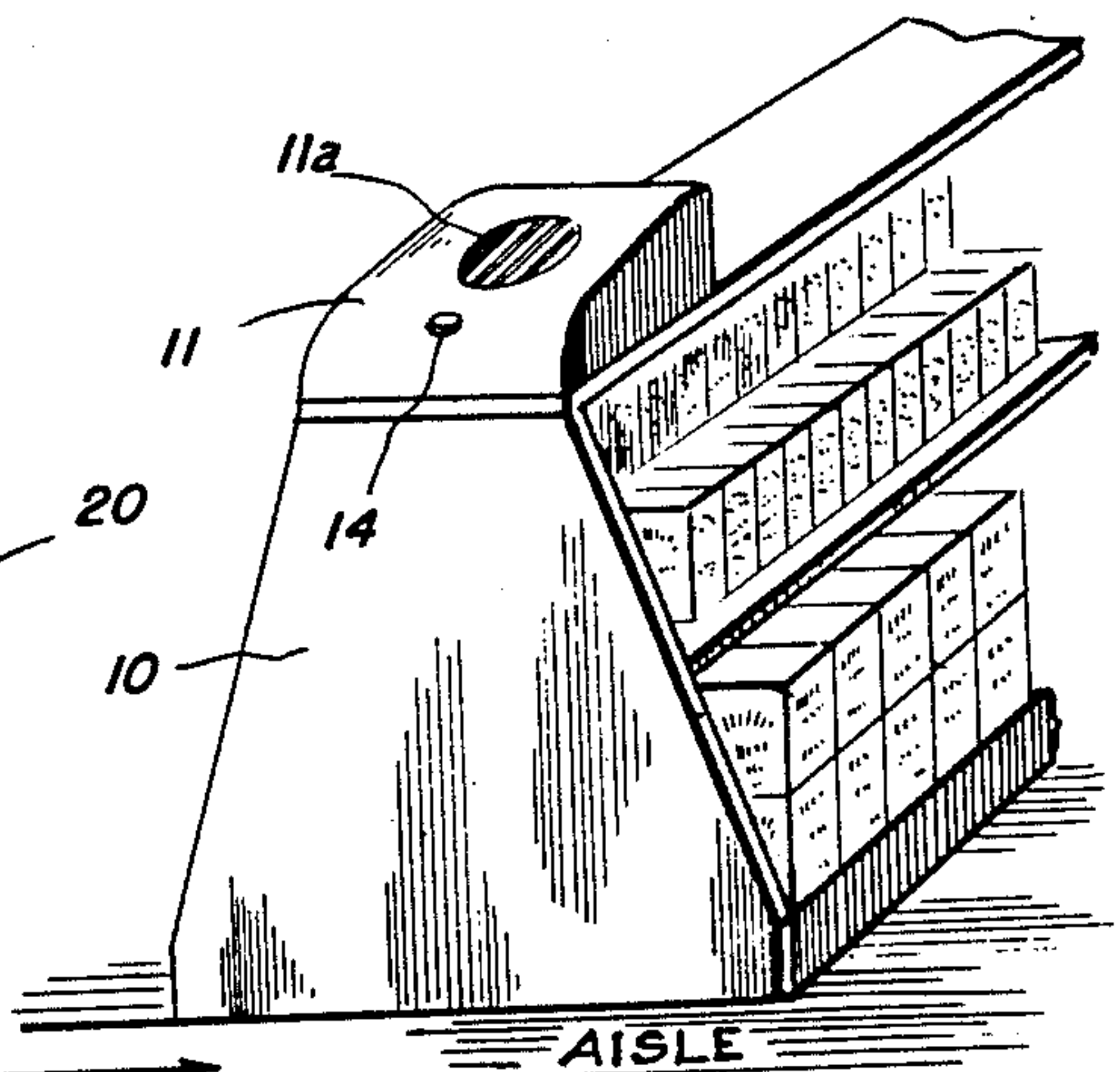


FIG. 5

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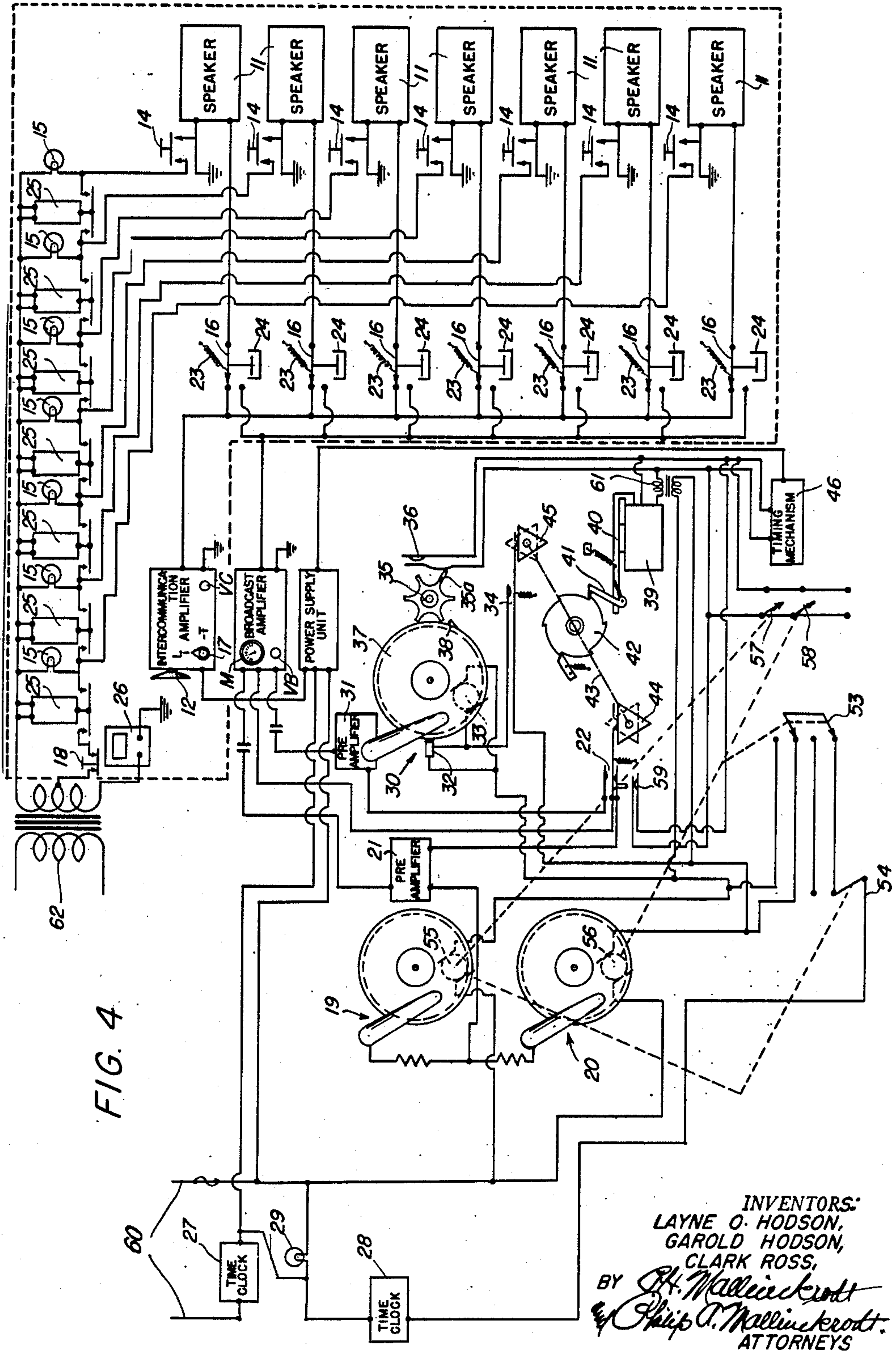


FIG. 4

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2,626,995

BROADCASTING AND INTERCOMMUNICATION SYSTEM

Layne O. Hodson, Layton, and Garold Hodson and Clark Ross, Ogden, Utah, assignors, by direct and mesne assignments, of one-third to said Layne O. Hodson and said Garold Hodson and one-third to Blaine W. Wilson and one-third to Philip A. Mallinekrodt, both of Salt Lake City, Utah.

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5 Claims. (Cl. 179-1)

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This invention relates to sound-transmitting and reproducing systems, and particularly to such systems as adapted for marketing and policing purposes in stores.

A feature of the present system resides in the strategic placement, throughout a merchandising area of a store—for instance the common grocery super-market—of display stands, racks, tables, shelving or the like having combined therewith respective speakers, each preferably directed toward main aisles and maintained at such low sound intensity as to comprehend only a localized zone adjacent the speaker. Such localized zones may be separated by minor areas of relative inaudibility, may be substantially contiguous, or may overlap. In any event they add up to a low-intensity sound network throughout the merchandising or sales area of the store, the pattern of which is determined by the layout of the particular store concerned.

The use of a plurality of low sound intensity speakers distributed throughout the marketing area of the store and directed toward the main aisles is very advantageous, in that satisfactory coverage is obtained without any unpleasant loudness or booming. Furthermore, as so spotted, the speakers may be dissociated from, yet remain generally correlated with, the merchandise to which much of the broadcast sound will directly refer.

The above feature of the invention is applicable to any type of sound system where advertising or comment on the goods displayed for sale is broadcast. However, it is especially advantageous in combination with another feature of the invention, namely, the coupling of a broadcast system for sound with a customer-clerk intercommunication system, whereby a customer who hears the advertisement of a given product can immediately call back and ask just where that product is located within the store.

The preferred arrangement is the use of a single speaker at each location to serve both broadcast and intercommunicating systems, with the customer being given the opportunity of pushing a button or the like at the particular speaker to suitably indicate to a central operator that intercommunication is desired.

A very advantageous broadcasting system for use in this connection is one which is individual to the particular store, the broadcast sound

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emanating from recordings suitably reproduced at an instrument serving all the speakers, in common. Controls for both broadcasting and intercommunication are desirably located at a master control panel conveniently accessible to an employee of the store, who responds to any questions put by a customer through the intercommunication system and who may also use such system to hail would-be shoplifters at various points throughout the goods-display area. By the controls provided, the store employee switches the particular speaker concerned from broadcast to intercommunication without interrupting or disturbing broadcast from the other speakers.

Principal objects of the invention are, therefore:

To provide effective point-of-sale advertising and entertainment throughout a merchandising area.

To provide such advertising and entertainment at a low-intensity sound level without sacrificing effective coverage of the area.

To provide for customer participation in the operation of the system to the extent of affording direct customer inquiry and personal store reply by way of the system.

To provide for broadcast over the system from a recorded-sound reproducer whose operation is entirely automatic.

To provide for spot announcements automatically over the system at predetermined time intervals.

To provide a combination broadcast and intercommunication system having a plurality of speaker outlets wherein any one or more speakers may be removed from broadcast and diverted to intercommunication without interfering with broadcast from the remaining speakers.

To provide a recorded-sound reproducing system wherein one sound-reproducer breaks into the delivery from another at predetermined time intervals, the delivery from the said other sound-reproducer being suppressed during delivery from the said one.

To provide an effective policing system for a store, operable from a central point of observation.

To provide an effective tool for marketing research.

Other objects and features of the invention

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will appear from the following detailed description of a preferred form of the system, which is illustrated in the accompanying drawings.

In the drawings:

Fig. 1 represents the floor plan of a typical installation of the system, the layout of the several speakers with respect to the aisles and display equipment being indicated schematically;

Fig. 2, a perspective view, from the front, of one of the merchandise-display and speaker combinations;

Fig. 3, a front elevation of the record-player unit and associated master control unit bearing the master control panel, dual record players with record supply being illustrated schematically, the front wall of the cabinet being removed for the purpose;

Fig. 4, a schematic showing of the broadcasting and intercommunicating equipment of the system, as wired for use; and

Fig. 5, a detail of the pre-amplifier circuits.

Referring now to the drawings: the floor plan illustrated in Fig. 1 is of a grocery super-market, to which type of store the broadcast system of the invention is particularly suited. The floor plan and layout of display equipment and merchandise will of course vary from store to store, but that illustrated may be regarded as typical.

As shown, the various merchandise display stands 10, with which the several speaker units 11 of the system are associated, are surrounded by access aisles. Each of the speaker units 11 preferably faces a main aisle marked "aisle," and is adapted to comprehend in sound coverage a localized zone mushrooming out from the speaker unit into adjacent aisle areas. It has been found that localized zones of approximately 12 feet radius each, are ordinarily very satisfactory for the establishment of a network of sound of such low intensity level as to make for enjoyable listening as well as effective coverage. In any installation, size of the individual zones and the actual volume to which the broadcast sound is amplified is determined in accordance with the acoustical factors peculiar to that store, and may be varied from time to time to accommodate the sound to changing conditions, such as extra noisy crowds, unusual outside noise, etc. In all instances, however, the sound intensity will be at a considerably lower level than is customary for public address systems designed to cover a similar area, and the sound will tend to be directed in predetermined channels by the placement of the speaker units relative to the aisles. Thus, the merchandising or sales area of the store will be substantially covered by a network of low intensity sound of pleasing effect.

Excellent results are achieved when the speaker units are placed on top of and at the end of a long display stand, such as the display stands 10 of Fig. 1, and when the speaker outlets, see 11a, Fig. 2, face the aisles at upwardly directed angle, preferably an approximate median slope between horizontal and vertical, as illustrated. A greater slope toward the horizontal than toward the vertical has been found desirable for a merchandising area such as a super-market where there is an open expanse above the display equipment throughout the area.

As illustrated, the speaker units 11 serve both a broadcast circuit and an intercommunication circuit, the latter having a master speaker outlet 12, Fig. 3, associated with a master control panel 13. Each speaker unit 11 embodies a push-button 14 or the like which enables a customer to

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close a signaling circuit effective to operate a corresponding signal on the panel 13, here one of a series of electric lights 15. A correlated series of individual switches 16 enables a store clerk to cut a particular speaker 11 out of the broadcast circuit and to introduce it into the intercommunication circuit, and vice-versa, and a talk-listen switch 17 enables the clerk to either listen or talk over the intercommunication circuit through master speaker outlet 12 and the particular speaker 11. Another switch 18 enables the clerk to clear the panel of signal light after any session of intercommunication with a customer.

The broadcast source in the illustrated embodiment of the invention comprises recorded-sound reproducing means, specifically a pair of disc type record-players 19 and 20, Fig. 4, advantageously housed in a cabinet 21, Fig. 3, which carries a control unit embodying the master speaker outlet 12 and the master control panel 13.

As illustrated in the schematic wiring diagram of Fig. 4, the dual record players 19 and 20 are operatively linked together in conventional manner so that one takes over when the other has completed the playing of a record and, vice-versa, both being of automatic record-changing type having provision for holding in readiness a supply of records to be played, either musical, or recordings of advertising, or a combination of both.

These dual record players feed into a broadcast amplifier (labeled such) by way of a pre-amplifier 21 and, as here illustrated, a double throw switch 22 of timed switch means, described fully hereinafter. The broadcast amplifier feeds into the several speakers 11 by way of the respective manually-operable switches 16, which are normally maintained in broadcast circuit closing position by means of suitable springs 23. Individual timing mechanism, for instance the dash-pots 24, illustrated schematically, are advantageously associated with the respective switches 16 to automatically return them to broadcast circuit-closing position following a predetermined time interval (desirably 40 seconds) after any selective throwing thereof to intercommunication circuit-closing position. It will be noted that the throwing of any one or more of the switches 16 to intercommunication circuit-closing position doesn't affect the others, and that, consequently, those speaker circuits not affected will continue to carry the broadcast to their respective speakers 11 during intercommunication through the others.

The respective speakers 11 are adapted to be connected in circuit with an intercommunication amplifier (labeled such) when the corresponding switches 16 are thrown to intercommunication circuit-closing position. Master speaker outlet 12 is also connected in circuit with said intercommunication amplifier, so that, when the switches 16 are properly thrown, a customer may speak with a clerk at the master control panel and the clerk may speak with the customer. Control of this intercommunication between customer and clerk is in the hands of the clerk who manipulates the talk-listen switch 17 at the master control panel, such switch being suitably interposed in the intercommunication circuit in well known manner.

The attention of the clerk is secured by means of a signaling arrangement operable by the customer through the push-button 14 at each speaker unit 11. As illustrated, the several push-

buttons 14 control respective signaling circuits, each of which embodies a relay 25 and one of the signal lights 15. The signal light for a particular speaker is correlated in position on the master control panel 13 with the position of the switch 16 which controls that speaker. The push-button switch 18 is a normally closed, break switch connected in common with the several signal circuits, as shown, so that, when pushed by the clerk at the master control panel following his conversing with a customer, any energized relay 25 is de-energized and any signal light 15 extinguished.

If desired, additional audible signaling means may be provided. For instance, an electric buzzer 26 may be connected in the signaling circuit, as illustrated.

The recorded-sound reproducing arrangement is preferably automatic in operation, a time clock switch 27 being interposed in the broadcasting circuit, as illustrated, to effect starting and stopping of the broadcast source at such times as may be desired, and a second time clock switch 28 being interposed in the system, as shown, to control the power source and amplifiers so that the intercommunication circuit may be maintained operative independently of the broadcast circuit usually throughout the entire working day. The time clocks 27 and 28 are advantageously the 35 ampere, single pole instruments manufactured by the General Electric Company. A pilot light 29 indicates whether the system is turned on or off.

A volume control V C is disposed on the master control panel 13, Fig. 3, the same being arranged to control the volume output from the intercommunication amplifier in well known manner. A volume meter M provides visual indication of the broadcast volume level. The volume control V B, Fig. 4, is however preferably disposed within the cabinet 21 so that it is available only to specially authorized persons. Supplying the speakers with power of approximately one watt will ordinarily produce the desired low-intensity sound level, though as stated hereinbefore, the sound level is determined by the circumstances of the particular installations.

The above provides a completely operable system, exclusive of power supply connections, and may be used as such. It is preferred, however, to incorporate therewith an additional recorded-sound reproducer for cutting into the broadcast program at predetermined times with so-called "spot" announcements, each ordinarily of only seconds' duration.

To this end a third record-player 30 is here provided. It is arranged to feed into the broadcast amplifier through its own pre-amplifier 31 and switch 22 of the timed switch means. It embodies timed stop means including a solenoid brake 32 arranged to be released when the turntable motor 33 is energized. Both brake and motor are connected in circuit with a control switch 34, which is arranged to be operated by component parts of said timed switch means. The timed stop means includes, also, a timer in the form of a revolution counter 35 and associated switch 36 which here is arranged to close a circuit controlling the operation of the timed switch means, every five revolutions of the turntable 37.

A pin 38 actuates the revolution counter in well known manner.

The timed switch means preferably employed is in major part commercially available as Relay

Type 904A manufactured by Advance Electric and Relay Co., Los Angeles, California, and includes, besides switch 22, a relay 39 whose movable member is an arm 40 carrying a panel 41 operative upon a ratchet wheel 42. The ratchet wheel 42 is rigidly affixed to a shaft 43 carrying two triangular cams 44 and 45. The cam 44 is operative upon switch 22, while the cam 45 is operative upon control switch 34. The several elements are so arranged that, when switch 36 is closed by the long arm 35a of revolution counter 35 at the end of every five revolutions of turn-table 37, the coil of relay 39 is energized to actuate the ratchet mechanism and cam 45 to open control switch 34 and thus de-energize the turn-table motor 33 and the solenoid brake 32, thereby effectively and promptly stopping turn-table 37. Further, the arrangement is such that the corresponding action of cam 44 causes switch 22 to throw the dual record-players 19 and 20 back into the broadcast circuit and to remove record-player 30 therefrom.

It should be understood, of course, that the switch 22 of the timed switch means normally connects the dual record-players 19 and 20, or any other main broadcast source wherever located, into the broadcast circuit. The timed switch means embodies timing mechanism 46 of suitable type, for example another conventional time clock arranged to close the circuit and start the spot announcement record-player 30 at regular intervals, depending upon the setting, for instance every 45 seconds or every few minutes, as desired, so that the spot announcement record-player 30 will automatically replace the main broadcast source at such intervals.

With the pre-amplifiers 21 and 31 constructed as illustrated in Fig. 5, broadcast from the main broadcast source will gradually fade as the spot announcement record-player 30 is introduced and will gradually build up in volume as the latter is cut out. Switch 22 is disposed in the plate-supply circuit of the amplification tubes 47 and 48 of the respective pre-amplifiers rather than in the signal circuit. Supply is through the respective high resistances 49 and 50 connected to the respective high capacity condensers 51 and 52. The former may have a value of 1 megohm each, for example, and the latter a capacity of 16 microfarads each. The storage of electricity by the condenser produces a delaying action resulting in fading output and a gradual building up to full volume when the power is respectively diverted from and directed to the pre-amplifier circuits concerned.

While the spot announcement record-player 30 may be introduced into the broadcast circuit and its operation started by action of the timing mechanism 46, the same is achieved during the switch-over from one of the dual record-players 19 or 20 to the other. Such switch-over is controlled by the mechanically interconnected switches 53 and 54, which are associated, respectively, with the turn-table motors 55 and 56 of respective record-players 19 and 20 in conventional fashion, as illustrated. Pursuant to the invention, switches 57 and 58 of the spot announcement circuit are mechanically interconnected with the respective switches 53 and 54 to cut-in the record player 30 when switch-over commences between main record-players 19 and 20. Another switch 59, arranged to be actuated with switch 22 by means of the cam 44, is disposed in parallel circuit with the switches 57 and 58 so as to render the actions of the latter inef-

fective if the spot announcement record-player 30 is playing when switch-over occurs between the main record-players 19 and 20.

The pre-amplifier 21 may comprise an integrated part of the broadcast amplifier if the spot announcement record-player 30 is not provided in the system, in which case switch 22 and the other component parts of the timed switch means will be eliminated. Also, the provision for delayed action as shown in Fig. 5 will be eliminated, and the amplifying arrangement will be conventional.

Connection with an outside source of power is provided for at 60, the power being 117 volt A. C. for the system illustrated. A conventional power supply unit is interposed in the system for feeding the amplifiers, as shown, and a transformer 61 feeds relay 39. Power for the signalling circuit is fed through transformer 62.

While the specific system illustrated represents a preferred embodiment of the invention, it must be realized that various other arrangements within the skill of the art may be resorted to without departing from the inventive concepts. For example, in certain instances the dual record players 19 and 20 may be replaced by other broadcast sources, such as by an outlet from a telephone network for music and other features, or by an ordinary radio tuned to an appropriate station. Also, the spot-announcement record player 30 may very advantageously be replaced by a wire or tape recorder or the like, appropriate changes within the skill of the art being made in the timed stop means and timed switch means to accommodate the substitution. Furthermore, the intercommunication circuit and outlets may be independent of the broadcast circuit and speaker outlets, all without departing from the more generic aspects of the inventive combination. Again, other merchandising establishments, such, for example, as department stores and the larger drug stores, may utilize the system within portions of or throughout their entire sales area.

Another aspect of the present system which is one of no little importance is its use in connection with market research. Because of the combination of the advertising broadcast arrangement with the arrangement for intercommunication between customer and clerk in a merchandising establishment such as a supermarket, department store or the like, it is possible to record the number of inquiries received over the intercommunication circuit following any advertising broadcast or announcement, and from this, tabulate a reasonably exact estimate of customer reaction.

This may be accomplished manually by a clerk who makes a suitable record of the inquiries, or by a recording device of conventional construction arranged to respond to the pushing of a button 14 by the customer at the speaker unit and to mark or punch a record tape having time markings thereon or for which suitable provision is made for the marking thereon of the times of the various recordations.

Accordingly, although the invention is here illustrated and described with respect to a particular preferred embodiment thereof it should be understood that various changes may be made therein and various other embodiments may be constructed on the basis of the teachings hereof by those skilled in the art without departing from the inventive concepts defined in the following claims.

We claim:

1. A sound transmitting and reproducer system, comprising a plurality of speaker units; a single broadcast source; a broadcast circuit including an amplifier, said broadcast circuit connecting said single broadcast source in common with the speaker units; a master speaker unit, an intercommunication circuit including an amplifier, said intercommunication circuit connecting said master speaker unit in common with said plurality of speaker units; individual switches located in proximity to the respective speaker units and connected in common with both the broadcast circuit and the intercommunication circuit for selectivity establishing connection of said speaker units with either the broadcast circuit or the intercommunication circuit; means normally maintaining the respective switches in contact position establishing electrical connection of the respective speaker units with the broadcast circuit; a master control panel; intercommunication control means for the master speaker unit, said means including a group of individual switches connected in said intercommunication circuit to control connection of said master speaker unit with the respective speaker units, said intercommunication control means being located at said master control panel; individual signalling means connected in circuit with the respective speaker controls of the intercommunication circuit and disposed at the master control panel in correlated relationship with the individual switches of said group of switches; and time means operably associated with the respective switches of said group of switches for predetermining the time periods of connection of the respective speaker units with the intercommunication circuit.

2. The combination recited in claim 1, wherein a recorded-sound reproducer and timed switching means are connected in the broadcast circuit, said timed switching means controlling the broadcast source and said recorded-sound reproducer; means for stopping operation of said recorded-sound reproducer; and timer means for said operation-stopping means controlled by said recorded-sound reproducer, said timer means controlling said timed switching means.

3. A sound transmitting and reproducing system, comprising a broadcast circuit including a broadcast source; a recorded-sound reproducer having timed start means and timed stop means; timed switch means, including a switch connected in the broadcast circuit and operable between two contacts, one of said contacts being connected with the broadcast source and the other with the recorded-sound reproducer; a solenoid-operated switch-throwing device; an electrical timer for closing and opening the control circuit of the solenoid on said switch-throwing device; and a switch controlling said solenoid, the said timed start means including a connection with said electrical timer, and said timed stop means including a distance counter operable by the running of the sound record of said recorded-sound reproducer and controlling said switch which controls said solenoid.

4. The combination recited in claim 1, wherein the broadcast source comprises recorded-sound reproducing means, and wherein time clock means are connected in the broadcast circuit and in the intercommunication circuit for automatically starting and stopping operation of the system.

5. The combination recited in claim 4, wherein the time clock means comprise two independent time clocks connected respectively in circuit with the broadcast source and in the intercommunication circuit, whereby said broadcast source is controlled independently of said intercommunication circuit.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,733,609	Kuhn -----	Oct. 29, 1929
1,842,895	Chadwick -----	Jan. 26, 1932
1,873,813	Bergmann -----	Aug. 23, 1932
2,054,933	Frazier -----	Sept. 22, 1932
2,110,358	Dreisbach -----	Mar. 8, 1938
2,208,068	Blaski -----	July 16, 1940
2,241,663	Hayslett et al. -----	May 13, 1941
2,242,197	West et al. -----	May 13, 1941
2,269,144	Campbell -----	Jan. 6, 1942
2,291,115	Stark et al. -----	July 28, 1942
2,352,188	Farrell -----	June 27, 1944
2,396,756	Snodgrass -----	Mar. 19, 1946