4A TIME ANNOUNCEMENT SYSTEM

GENERAL DESCRIPTIVE INFORMATION

CONTENTS

1. GENERAL

INTRODUCTION

1.01 This section provides general information covering an improved announcement system coded No. 4A time announcement system. The No. 4A time announcement system is designed to furnish customers with brief recorded time announcements through regular telephone facilities.

1.02 The new system replaces the Nos. 1 and 1B announcement systems which are being rated "A&M Only." The component parts of the new system are not interchangeable with those in the Nos. 1 and 1B systems.

1.03 In the No. 4A announcement system, the time announcements are made from either a dual-channel or a single-channel time announcing machine.

2. SWITCHING ARRANGEMENTS

2.01 In the No. 4A announcement system, calls for the time service will be connected to the network at the district or office frame in panel offices, at the office link frame in No. 1 crossbar offices, and at the trunk link frame in No. 5 crossbar offices. This arrangement requires the assignment of an office code for this purpose but has the advantage, as compared with an announcement reached on final terminals, of reducing the effects of heavy loads on the interoffice trunk plant and the terminating equipment. In step-by-step areas, calls for this service will ordinarily be trunked over the regular interoffice plant to the building in which the announcing machine and distributing network are located. Here they will be connected to the network through digit-absorbing trunk equipment. No arrangements have been provided for connecting to the service through final terminals in panel offices, line link frame terminals in crossbar offices, or connector terminals in step-by-step offices.

2.02 The No. 4A announcement system is arranged to employ either of two types of announcing machines as the source of recorded time announcements. The first type, designed for use in larger cities, utilizes two channels, each one announcing the time continuously. Either channel can be connected to the load. The other one acts as a spare; it is switched in automatically in the event of voice failure on the working channel. When voice failure occurs in both channels, manual announcements are made from a microphone or a switchboard position. The second type of machine uses only one channel and has been designed for smaller localities. In case of voice failure in this machine, announcements are made manually from a switchboard position. Manual announcements are also provided when the machine is taken out of service for maintenance reasons. Both types announce the time at 10-second intervals.

2.03 An optional feature of the No. 4A announcement system is the regulated frequency power supply which may be used to drive the dual-channel machine in areas where the frequency regulation of the commercial power is considered to be insufficiently accurate for time announcement purposes.

3. EQUIPMENT ELEMENTS

3.01 The essential parts of the No. 4A announcement system are the announcing machines, control units, distributing and alarm units, and trunks.

ANNOUNCING MACHINES

A. General

3.02 The machines which announce the time are of the optical type, and the announcements are assembled from separate hour, minute, and 10-second (if furnished) sound tracks. The tracks are mounted helically on drums which rotate continuously and are driven by a synchronous motor, the latter being the timekeeping element. The machines, amplifiers, and control equipment are assembled in a console-type cabinet suitable for floor mounting in any desired location. Working space should be provided on all four sides of this machine for maintenance purposes.

B. Dual-channel Machine

3.03 There are two types of dual-channel machines arranged to provide either of two types of announcements. In one arrangement, the hour, minute, and next 10-second interval are announced, followed by a tone signal at the exact time. Since the tone signal implies a degree of accuracy greater than that usually obtainable from the commercial power supply, this type machine will ordinarily be used in conjunction with the regulated frequency power supply.

3.04 The other type of machine provides announcements in terms of the hour and nearest minute. It is expected that this type will usually be operated from the commercial power supply in cities where the timekeeping qualities of this supply are considered satisfactory for announcements in which the time is given to the nearest minute.

3.05 The dual-channel machines are complete with two power amplifiers, voice alarm equipment, and control panels. Emergency manual announcing facilities are also furnished. The amplifier used with the emergency equipment also serves as a spare for the machine amplifiers, and is mounted with the others in the announcing equipment. All of the power amplifiers are alike and are plug-ended to facilitate substitution. A schematic of equipment arrangements for the dual-channel announcing machine is shown in Fig. 1 (attached).

Control Equipment

3.06 The controls for the dual-channel system are centered at the announcing machine. Switches are provided for manually connecting either channel to the load; the unconnected channel acting as a spare. When the load is manually shifted from one channel to the other, the operation of the keys causes the first channel to complete its announcement before shifting the transmission path to the other channel. The second channel is then closed at the beginning of the next announcement thus preventing a partial announcement. When the load is transferred because of a voice failure on the working channel, an immediate transfer is effected but, in this case also, the transmission path to the incoming machine is cut through only at the beginning of the next announcement. Voice failure on the spare channel results in a minor alarm.

3.07 Control equipment is provided in the dual-channel machine for adjusting speech levels and for isolating either channel so that maintenance work can be accomplished without interference. While the key which takes a channel out of service is operated, a voice failure of the working channel produces a major alarm but the automatic transfer feature is inoperative.

3.08 Means are also provided in the dual-channel machine for connecting to emergency manual announcing equipment in case of the failure of both channels.

3.09 A battery-driven inverter is furnished as a part of the equipment. Upon a failure of the commercial power supply, this inverter is started automatically and keeps the announcing machine in operation for the duration of the power failure.

Distributing and Alarm Equipment

3.10 The function of the distributing and alarm circuit in the dual-channel arrangement is to provide apparatus for multiplying the synchronizing signals received from the machine for trunk circuit use, and for checking the fact that these signals are being produced. It also operates the central office alarm circuits and provides lamp indicators to show the character of the trouble. Speech failure on the working channel, or on the nonworking channel, results in a minor alarm indicating which of the two channels has failed. The simultaneous failure of both channels results in a major alarm.

3.11 Duplicate relay equipment, designated as the A and B sections, is provided. The A section is used when announcing channel No. 1 is on the line, and the B section when channel No. 2 is on the line. Keys are provided for removing either the A or B section for maintenance work, in which case the other section is used with both channels Nos. 1 and 2.

Emergency Announcement Facilities

3.12 Provision is made in the dual-channel machine for announcing manually in the event of simultaneous failure of both channels. This includes a switch mounted on the machine panel and a third amplifier, previously described; the latter also serving as a spare machine amplifier. When the switch is operated, this amplifier is connected to the load, the input being fed optionally from either a microphone furnished as a part of the announcing machine or from an operator's telephone set at DSA or toll board. The microphone mounting contains a key and a call waiting lamp. The operator pushes the key momentarily in one direction before making the time announcement and in the other direction when the announcement has been completed. When the optional DSA or toll board arrangement is used, announcements are made from the operator's telephone set. In this case, an auxiliary circuit is used to provide the necessary signals. In answer to the alarm indicating a need for manual operation, an operator plugs into the jack assigned to this service and announces during the period when the associated cord supervisory lamp is dark. The lamp is dark for 10 seconds and lighted for 2 seconds as long as there is a call waiting. If there is no call waiting, the lamps light continuously. Should the operator take down the connection, the alarm will again signal a call waiting condition unless, in the meantime, the machine has been restored to service. It is expected that emergency announcements will be timed to the nearest minute, using the regular position clock, or if a microphone is to be used, any convenient wall clock. Under this condition, there will be five announcements per minute instead of the usual six. Ordinarily, no clock is furnished with this equipment for emergency announcing.

C. Single-channel Machine

3.13 The single-channel machine announces the time in hours and minutes, repeating the same announcement in each of the six 10-second intervals. This type is driven directly from the commercial power supply, and its timekeeping qualities are determined by the accuracy of that supply. An ac powered amplifier is used in the machine announcements. The control and the emergency announcing facilities, including the power amplifier, are located separately in the terminal room. A floor-mounted cabinet houses the machine and its associated amplifier, and space is provided for a spare amplifier which is to be furnished, if desired. In this case also, working space should be provided on all sides for maintenance activities. A schematic of equipment and trunking arrangements for the single-channel announcement machine is shown in Fig. 3 (attached).

Control, Distributing, and Alarm Equipment

3.14 In the single-channel system, the control is exercised from the distributing and alarm circuit in the terminal room, rather than from the announcing machine. This circuit controls the equipment for transferring to an emergency manual announcing switchboard position in case of machine failure. A key is provided for transferring to the manual position, if it is desired to do maintenance work on the machine, together with a key to transfer from one set of signal multiplying relays to the other. Lamp signals indicate the operation of the keys or the causes of alarms.

3.15 The emergency amplifier used in the single-channel system does not have a voice alarm. The ac power is connected to it automatically upon voice failure of the announcing machine or the operation of the key which takes the machine out of service. An emergency power plant is furnished to insure continuity of power to this amplifier during periods of power failure. No provision is made in the single-channel installation to keep the announcing machine in operation during power failure.

Emergency Announcement Facilities

3.16 The emergency announcement facilities in the single-channel arrangement are similar to those described above for the switchboard application of the dual-channel machine. Since they are used whenever the time announcing machine is taken out of service for maintenance or other reasons, they must always be furnished.

TRUNKING ARRANGEMENTS

A. General

3.17 In both dual- and single-channel systems, calls for the service will be trunked from the originating office to the building in which the time announcing equipment is located, or as may prove economical, to a subcenter supplied either from the time announcing equipment or from another subcenter. In panel, crossbar, and manual areas, these interoffice trunks will handle only time business in order to reduce the effects on other services of heavy traffic to the time equipment. In step-by-step areas, time calls can use the interoffice trunk plant in common with the regular telephone business, if desired. The usual arrangement will be to route the calls over the regular trunk plant to incoming selectors in the building in which the time announcing equipment is located, using one of the thousands or hundreds levels for time service. Except in the case of the No. 5 crossbar, no relay equipment is required at the originating end of the interoffice trunk. In No. 5 crossbar, an outgoing trunk circuit is needed to provide supervisory and charging functions.

3.18 In No. 1 and No. 5 crossbar, panel, step-by-step, and manual systems, incoming trunk circuits have been made available for connection to the announcement system.

3.19 Incoming trunks to the announcing equipment are equipped with peg count registers which are operated by a momentary connection made during the set up of the call. One register is provided for each 20 trunks in the system.

3.20 Wherever it is economically advantageous to do so, one or more subcenter can be established. Calls are trunked to a subcenter in the same manner as to the time announcing equipment. Subcenters can be supplied either from the time announcing equipment or from other subcenters. In order to provide maximum safety, and to permit the use of simple alarm equipment at the subcenter, both speech and cut-through signals are transmitted over two cable pairs from the time equipment to the subcenter. The two pairs should be run in different cables, preferably over different routes.

REGULATED FREQUENCY POWER SUPPLY

3.21 A regulated frequency power supply has been made available for use in larger cities where the timekeeping qualities of the commercial power are not considered accurate enough for telephone time service. The time drift of this apparatus will ordinarily be less than one second a week. The additional equipment used when the dual-channel machines are driven by a regulated frequency power supply is shown in Fig. 2 (attached).

3.22 This power supply has been designed to operate the dual-channel machine, and will usually be used with the machine which announces in terms of 10 seconds with a tone to denote the exact time. The regulated frequency power supply has two separate channels driving the two channels in the announcing machine. The primary source of frequency in each channel is a temperature controlled fork.

3.23 The equipment does not have sufficient power to start the driving motors, thus, control facilities are provided to bring them up to speed on commercial power, to synchronize with the fork supply, and to transfer to the latter at the proper moment. Facilities are also provided for comparing the machine time with radio station WWV and for introducing a small correction, if desired.

3.24 Emergency equipment, used to keep the regulated supply in operation in case of power failure, is not provided. On power failure, the regulated supply will cease to function and the time announcing machine will fall back onto the battery-driven inverter which has been provided.

4. METHOD OF OPERATION

4.01 When the customer dials the assigned number to obtain the time announcing service, the call is routed either to the central point where the time equipment is located or to a subcenter. The call is connected to an announcement trunk of the No. 4A announcement system and is held until the equipment is ready to begin its time announcement. In this waiting period, which may last a maximum of 10 seconds, audible ringing signals are sent back. When the time machine is ready to start an announcement, the customer is cut through to the equipment and receives the time announcement.

4.02 Should the customer not hang up at the end of the first announcement, the connection is held and several succeeding announcements will be heard, the number depending on the type of central office equipment. When the customer is disconnected from the announcing bus, he receives a dial tone.

5. APPLICATION OF TIME ANNOUNCING MACHINES TO EXISTING NOS. 1 AND 1B SYSTEMS

GENERAL

5.01 Arrangements have been made available for associating the dual-channel announcing machine with the announcement networks of existing Nos. 1 and 1B systems. In general, the desk, clock, and oscillator equipment is removed and a distributing and alarm circuit added. Part of the outgoing supply circuit is re-used. Either of the two types of dual-channel announcing machine described under "Equipment Elements" may be used with these systems.

DISTRIBUTING AND ALARM EQUIPMENT

5.02 A new distributing and alarm circuit is used to multiply the cut-in signals and provide alarm features. It is similar to that described under "Equipment Elements."

REGULATED FREQUENCY POWER SUPPLY

5.03 The regulated frequency power supply designed for installations where accurate timekeeping qualities are desired may be used to drive the dual-channel machine in No. 1 or 1B system arranged for machine operation.

EMERGENCY ANNOUNCEMENT FACILITIES

5.04 Emergency announcements may be made either from a microphone or from a switchboard position, depending upon which arrangement is ordered. This equipment is the same as that described under "Equipment Elements."

6. MAINTENANCE FEATURES

GENERAL

6.01 A low-volume alarm circuit continuously monitors the output of the power amplifiers associated with the time

announcing machines. In the dual-channel machine, low volume on the working channel results in the automatic transfer of the load to the spare channel. In the single-channel machine, voice failure causes automatic transfer to an emergency announcement trunk over which announcements are made by an operator from a switchboard position.

6.02 A transfer key is provided in the dual-channel installation for isolating either channel so that maintenance work can be accomplished without interference. With this key operated, speech failure on the working channel results in a major alarm and the manual operation of the emergency transfer key connects the load to the emergency announcement equipment from which manual time announcements may be made.

6.03 Speech and other alarms operate the central office alarms in the usual manner, and lamp indicators have been provided to indicate the cause of the alarm.

6.04 Monitoring jacks are located on the control panels of the time announcing machines to provide means for connecting across the output of the power amplifier associated with each automatic announcement channel.

6.05 A volume meter, indicating the approximate volume level on the announcement bus, is located on the control panel of both the dual-channel and single-channel announcing machines.

6.06 The relays in the time announcing machines, and the power amplifiers associated with the machines, are plug-ended to facilitiate substitution.

6.07 Maintenance data for amplifiers are covered in a Western Electric Company instruction manual. Maintenance of other apparatus, such as the trunks associated with the dual-channel and single-channel machines and the emergency power supply in the single-channel installation, will be covered in appropriate BSP sections.

Attached:
Figs. 1, 2, and 3

ANNOUNCEMENT SYSTEM NO.4A(TIME OF DAY)
COMMON SYSTEMS

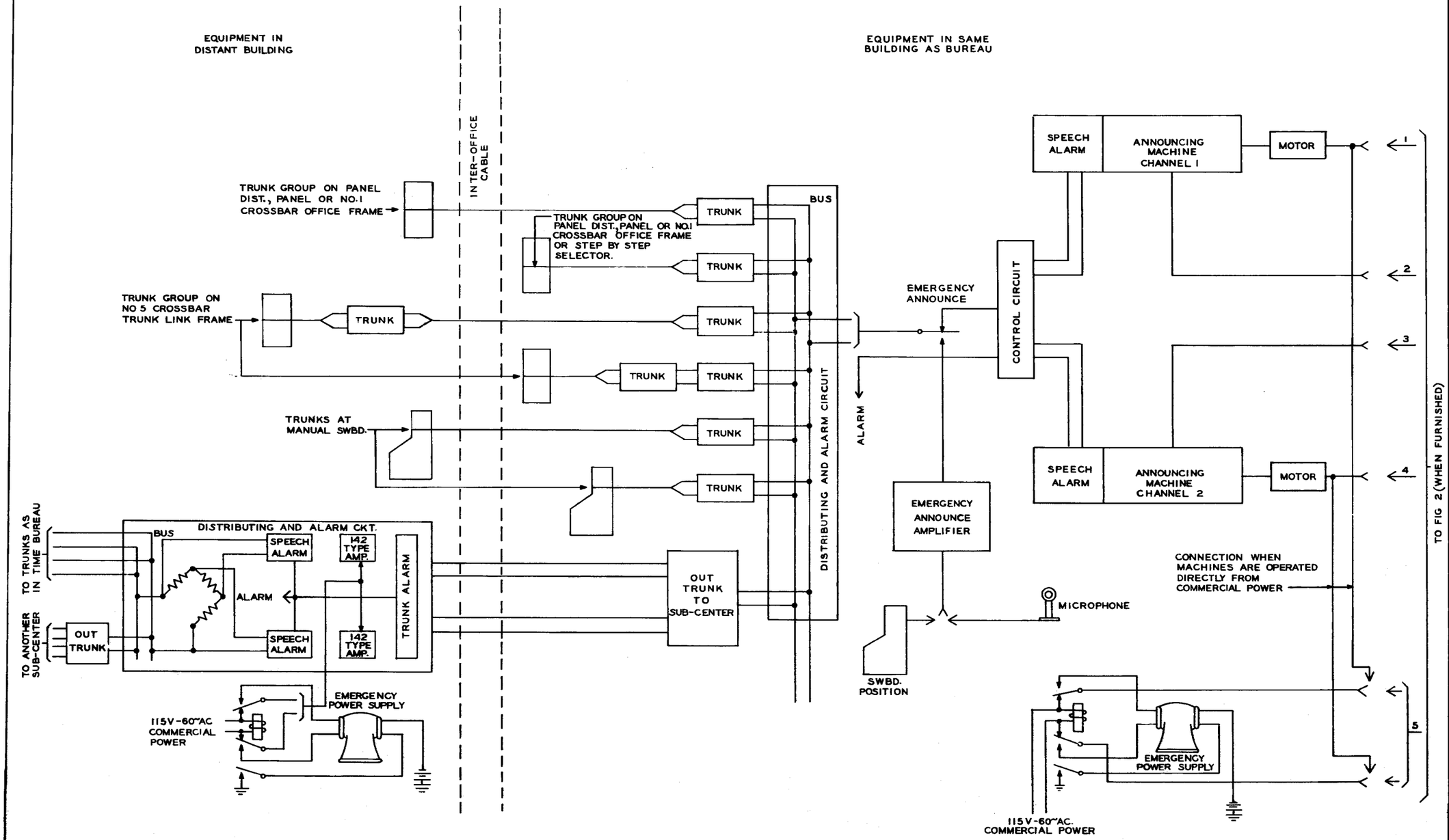

FIG 1- SCHEMATIC OF EQUIPMENT AND TRUNKING ARRANGEMENTS FOR THE DUAL-CHANNEL ANNOUNCING MACHINES

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FIG. 1

ANNOUNCEMENT SYSTEM NO. 4A (TIME OF DAY)
COMMON SYSTEMS

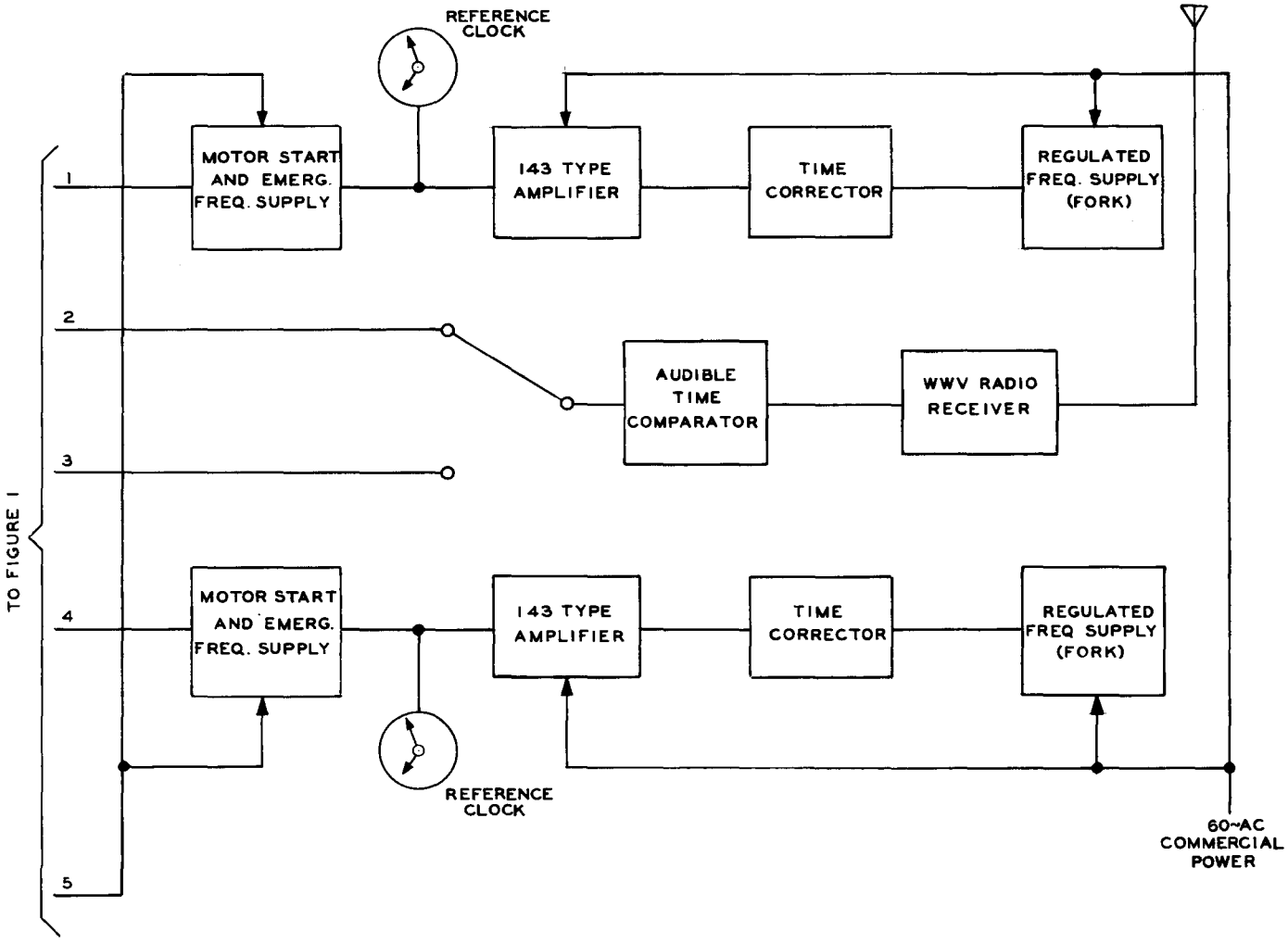

FIG. 2 - ADDITIONAL EQUIPMENT USED WHEN DUAL-CHANNEL ANNOUNCING MACHINES ARE DRIVEN BY A REGULATED FREQUENCY POWER SUPPLY.

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ANNOUNCEMENT SYSTEM NO. 4A (TIME OF DAY)
COMMON SYSTEMS

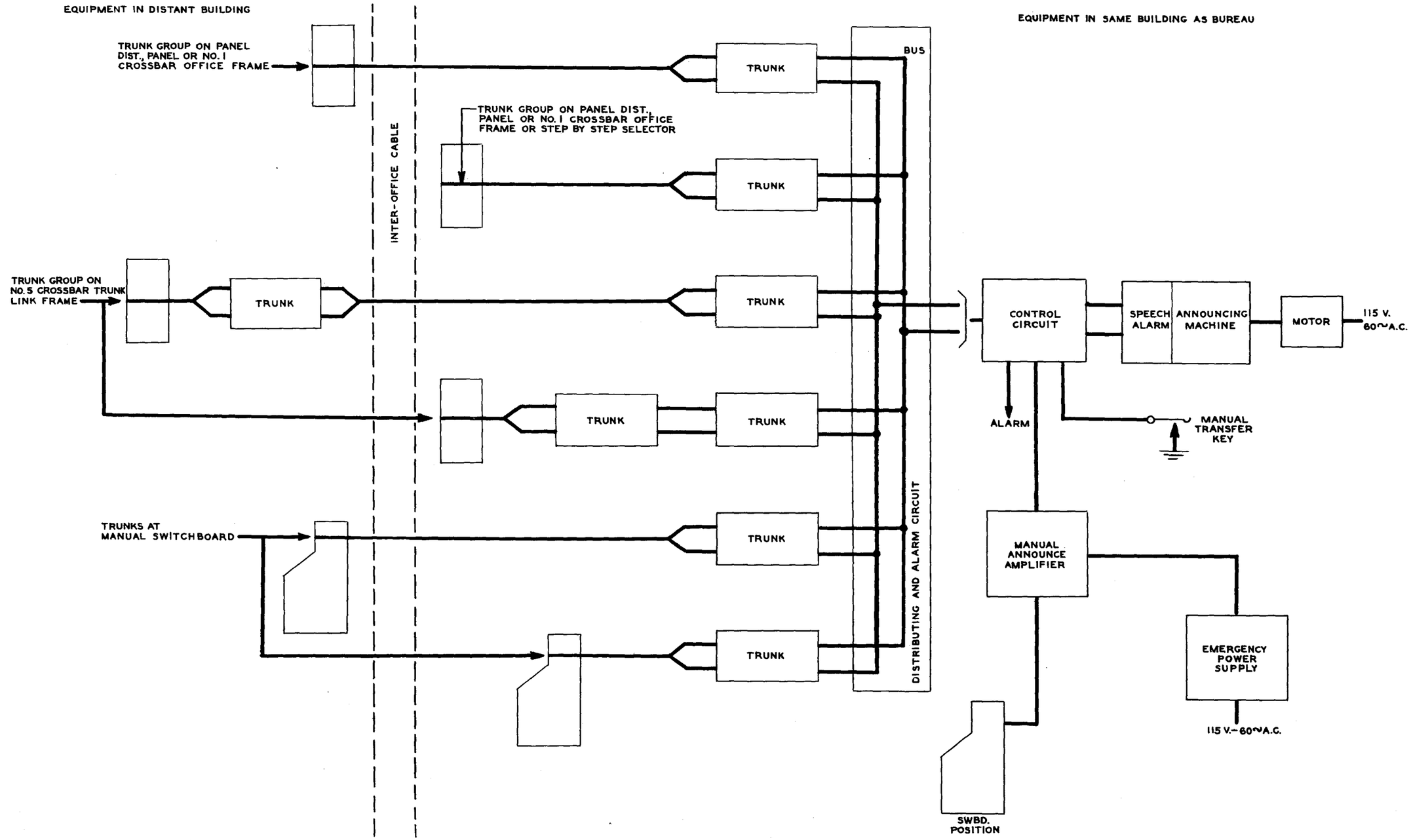

FIG. 3 – SCHEMATIC OF EQUIPMENT AND TRUNKING ARRANGEMENTS FOR THE SINGLE-CHANNEL ANNOUNCING MACHINES

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