

## **AUXILIARY SIGNALS**

### **IDENTIFICATION**

#### **1.00 INTRODUCTION**

**1.01** This section describes auxiliary signals which may be associated with telephone stations to meet special requirements for loud or distinctive tone signals.

**1.02** The section is reissued to correct Table B.

#### **2.00 GENERAL**

**2.01** Auxiliary signals consist of power-operated:

- Vibrating bells
- Single-stroke bells
- Chimes
- Horns.

**2.02** These signals may be obtained with or without control relays for use in indoor and outdoor locations.

**2.03** Signals which do not contain a control relay require an externally mounted power relay set. One relay may operate several signals. See C Section entitled Power Relay Sets — Identification, Installation, and Maintenance.

**2.04** Certain signals are equipped with a 0.5- or 0.45-uf capacitor in series with a relay which operates on telephone ringing current. The relay and capacitor constitute a high-impedance ringing bridge which is subject to the provisions of the C Section covering ringing bridge limitations.

**3.00 KS-16301 SIGNALS**

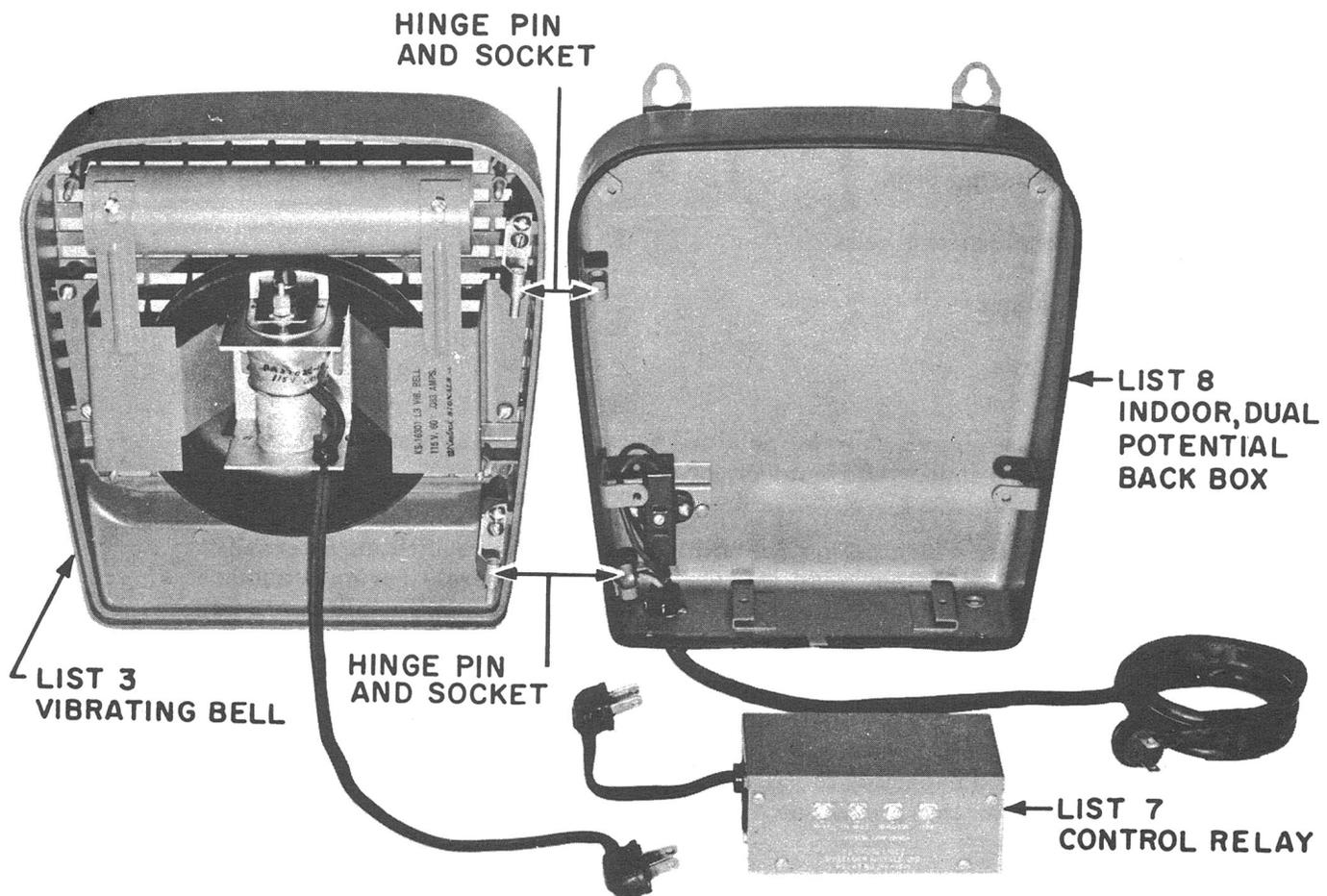
**3.01** The KS-16301 signals are all-purpose signals which replace many existing auxiliary signals.

**3.02** To provide flexibility, the KS-16301 signals consist of:

- Six types of signals
- Three different control relays
- Four types of back boxes.

**3.03** These items are manufactured by two suppliers, and all major components are interchangeable.

- Each signal operates on 115 volts 60 cycles unless otherwise noted.
- Control voltages through a relay connect the power supply to the signal.
- The various components must be ordered separately (signal, back box, and control relay).



**Fig. 1 – KS-16301 Signal**

**3.04** Each signal is equipped with a 2-conductor cord and plug and is shipped mounted to the grilled cover. This cord connects to receptacle of control relay or to power receptacle in back box (see Fig. 1).

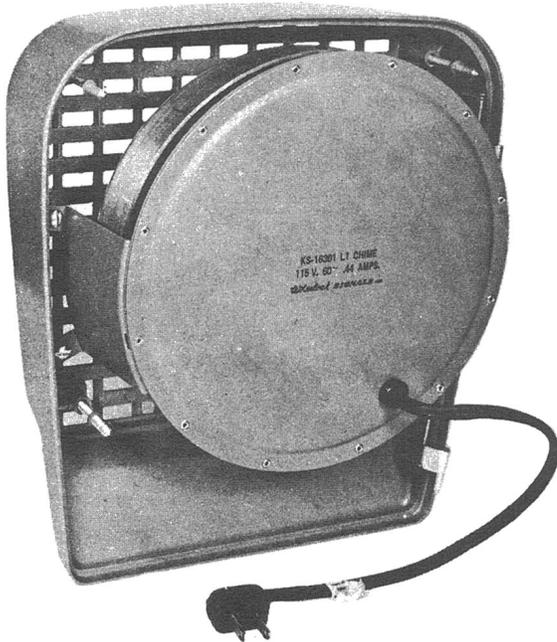
### SIGNALS

**3.05** The six KS-16301 signals are shown in Fig. 2 through 7. Operating requirements are listed in Table A.

**TABLE A**  
**KS-16301 SIGNALS**  
**OPERATING REQUIREMENTS**

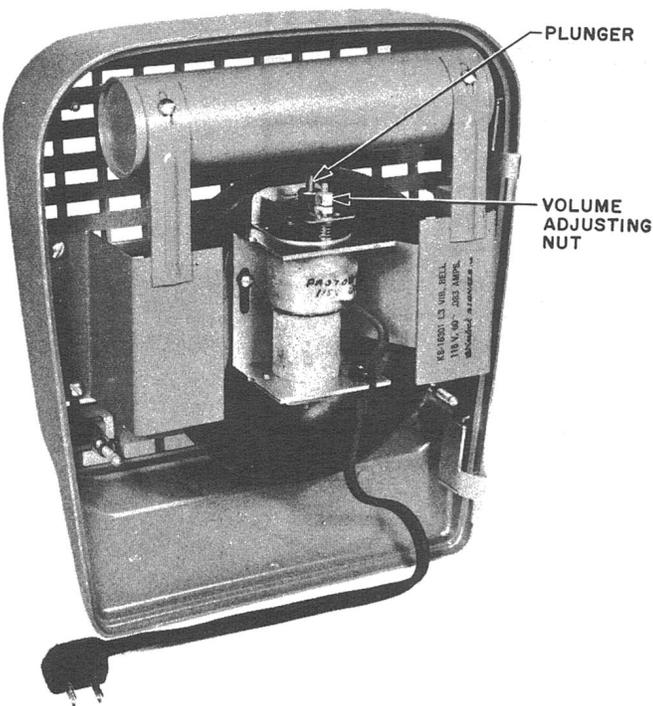
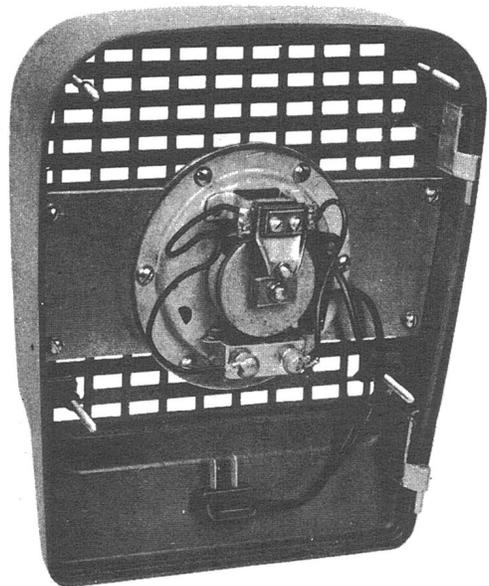
Signal	List Number	Type		Operating Voltage			Operating Current in Amperes	
		Single Stroke	Vibrating	115 Volts 60 Cycles ac	115 Volts dc	48 Volts 60 Cycles ac	Mfd by Sperti-Faraday Company	Mfd by Wheelock Signal Company
Chime	1	•		•			1.32	1.22
Horn	2		•		•		*	0.36
Bell	3		•	•			0.084	0.113
	4	•		•			0.89	1.22
Horn	5		•	•			0.68	0.65
	6		•			•	*	1.70

\* Not manufactured by Sperti-Faraday Company.



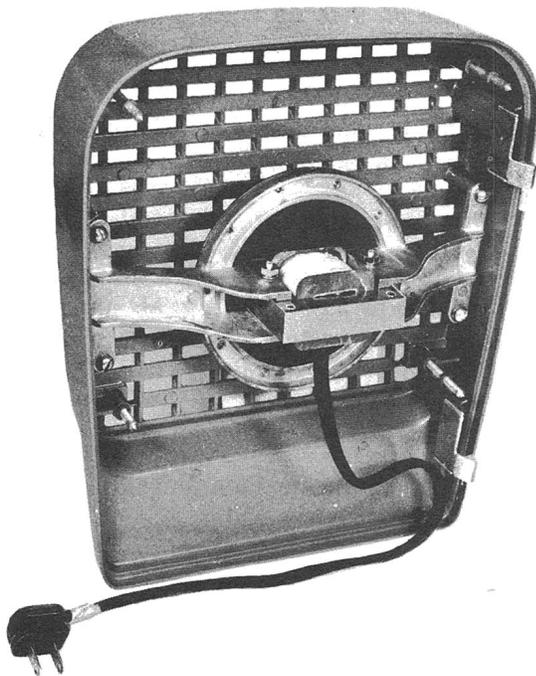
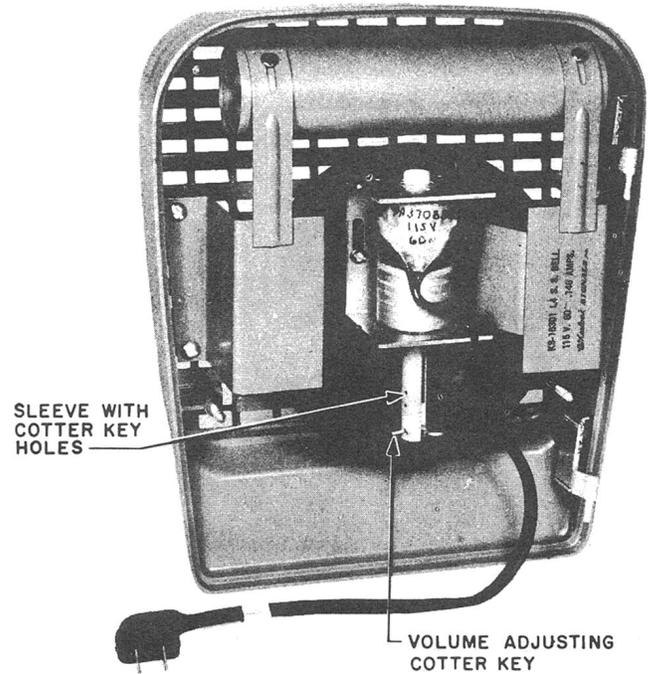
◀ **List 1 Chime (Fig. 2)** — An ac-operated chime signal which utilizes a 250-cycle, resonated, 8-inch brass gong.

**List 2 Horn (Fig. 3)** — A dc-operated horn signal having an energy peak between 1500 and 3000 cycles per second. Maximum volume output is 105 db. ▶



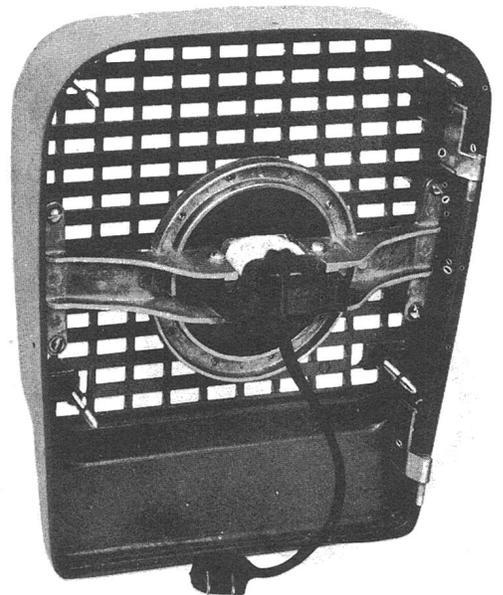
◀ **List 3 Bell, Vibrating (Fig. 4)** — An ac-operated vibrating bell signal which employs a 580-cycle, resonated, 6-inch steel gong. A volume adjustment control is provided which has a range of about 10 db. Maximum volume output is 100 db.

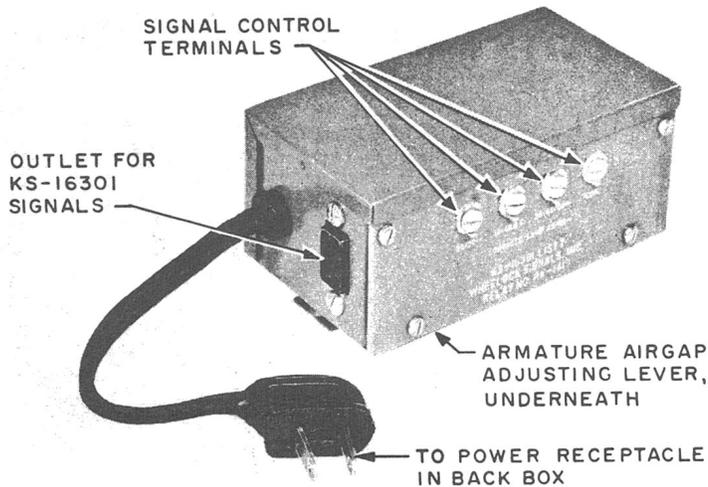
**List 4 Bell, Single Stroke** (Fig. 5)—An ac-operated single-stroke bell signal which employs a 580-cycle, resonated, 6-inch steel gong. Maximum volume output is 98 db.



◀ **List 5 Horn** (Fig. 6) — An ac-operated horn signal having an energy peak between 1500 and 3000 cycles per second. Maximum volume output is 105 db.

**List 6 Horn** (Fig. 7)—A low-voltage ac-operated horn signal having an energy peak between 1500 and 3000 cycles per second. Maximum volume output is 105 db.





**Fig. 8 — KS-16301, List 7 Relay,  
Manufactured by  
Wheelock Signal Company**

**Control Relays**

**3.06** Control relays are always used in conjunction with list 8 and list 10 back boxes and permit dual-potential service when mounted in these housings.

**3.07** These relays control the commercial power supply to the signal and are designed to operate over a wide range of control voltages.

**3.08 List 7 Relay** is designed to operate on following voltages:

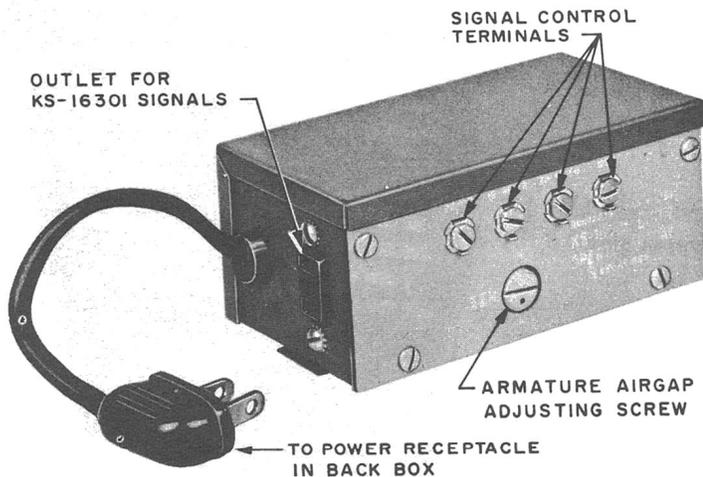
- 18 to 48 volts dc
- 30 to 48 volts 60 cycles ac.
- 39 to 90 volts 20 cycles ac (ringing voltage).

**3.09 List 12 Relay**, shown in Fig. 10, is designed to operate on 9 to 48 volts 60 cycles ac.

**3.10 List 13, Relay**, shown in Fig. 11, is designed to operate on 12 to 78 volts dc.

**3.11** The list 12 and 13 relays serve to make new installations of KS-16301 signals more compatible with existing systems of KS-8200 signals when they are added to them.

**3.12** Operating requirements and relay characteristics are listed in Table B.



**Fig. 9 — KS-16301, List 7 Relay,  
Manufactured by  
Sperti-Faraday Company**

**3.13** A common terminal and a terminal for each operating voltage are provided for termination of telephone wiring.

**3.14** An external 2-position armature airgap adjustment is provided on the relay to permit a close armature airgap setting when used on man-

ual ringing telephone lines and a wide airgap setting when used on dial-operated telephone lines.

**Note:** There is a slight difference in list 7 relay airgap adjustment due to manufacture by different suppliers (see Fig. 8 and 9).

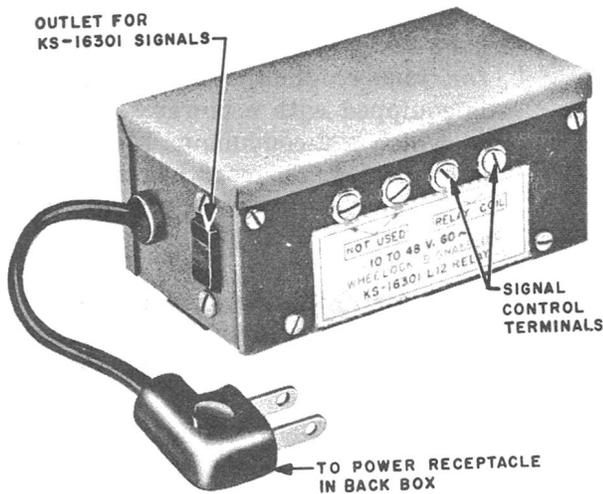


Fig. 10 - KS-16301, List 12 Relay

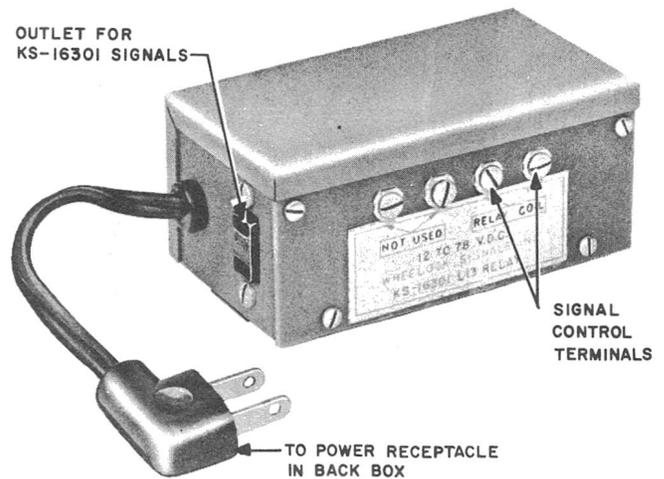


Fig. 11 - KS-16301, List 13 Relay

TABLE B

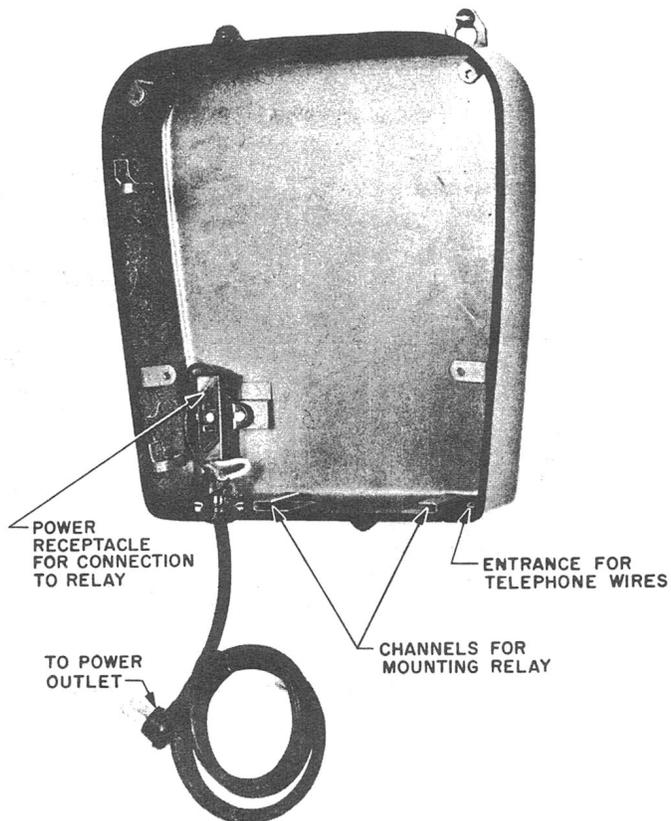
KS-16301 RELAYS

Relay	Operating Voltage	Operating Current at Max Voltage	DC Resistance of Relay Coil	Impedance of Relay Coil	Relay Contact-carrying Capacity
List No.		amperes	ohms	ohms	amperes
7	18 to 48 volts dc	0.011	4500	—	5
	30 to 48 volts 60 cycles ac	0.025	1000	1920	
	39 to 90 volts 20 cycles ac	0.012	4500	7550*	
12	9 to 48 volts 60 cycles ac	0.404	26.3	118	
13	12 to 78 volts dc	0.069	1130	—	

\* Includes 0.045 mf series capacitor.

Back Boxes

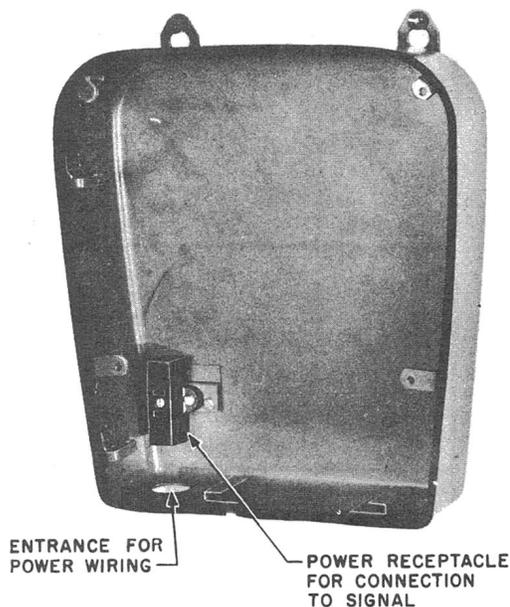
3.15 The four KS-16301 back boxes are shown in Fig. 12 through 15.



◀ **List 8 Back Box** (Fig. 12)—Is intended for indoor, dual-potential use and is equipped with a power receptacle to which a 2-conductor, 4-foot cord is connected. The cord has a 2-blade plug to connect to the commercial power outlet.

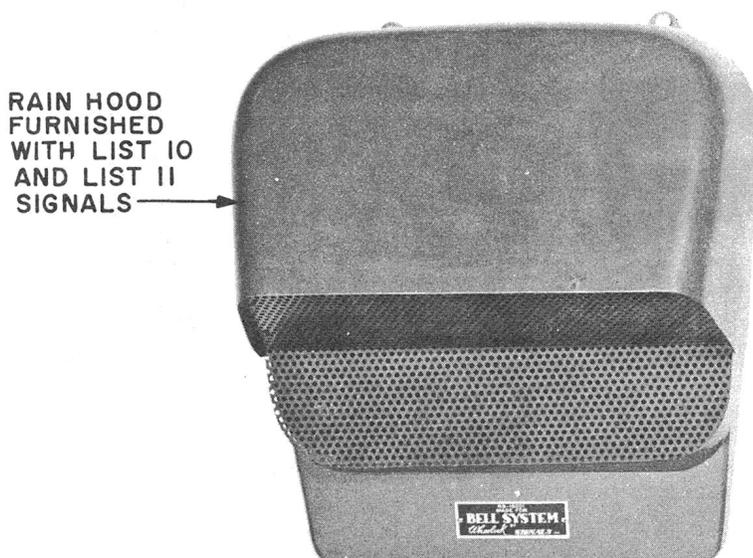
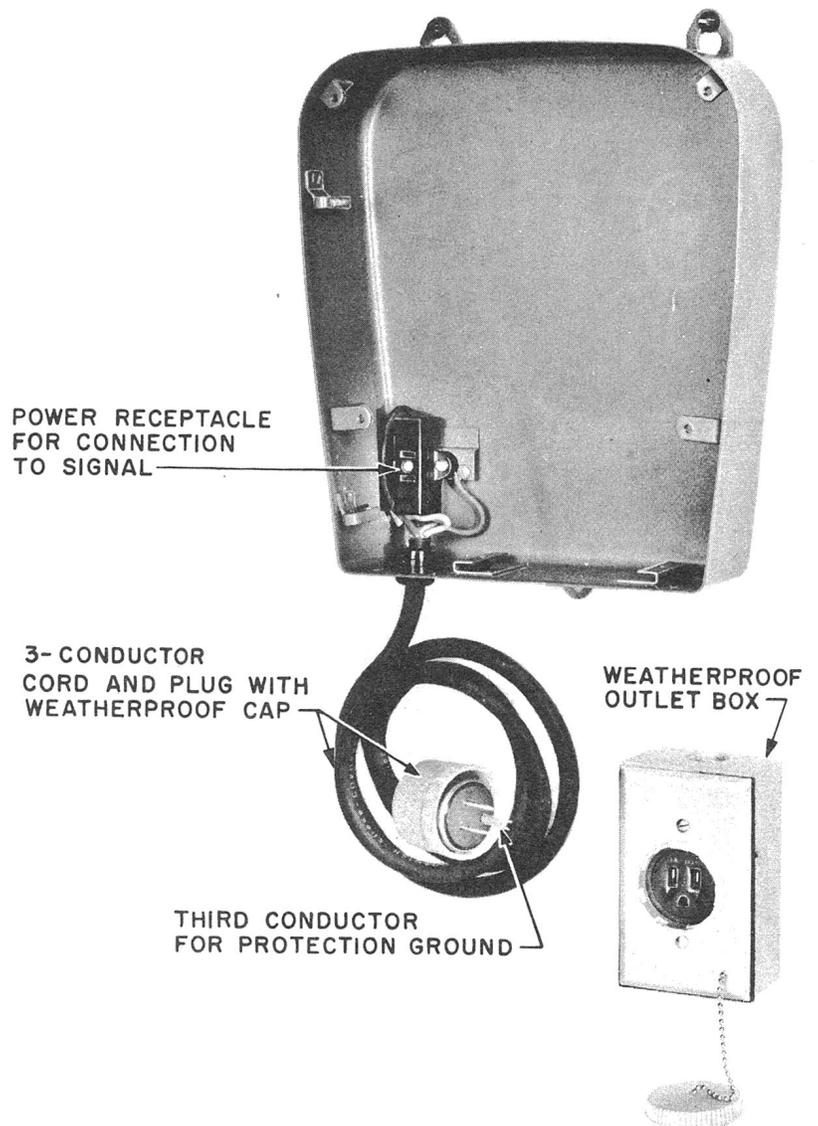
- Brackets are provided on the bottom of the interior surface of the box to mount control relay.

**List 9 Back Box** (Fig. 13) — Is intended for indoor, single-potential use and is equipped with a power receptacle to which commercial power wiring is directly terminated. This back box is intended for conduit installation and is not provided with a cord. ▶



**List 10 Back Box** (Fig. 14) — Is intended for outdoor, dual-potential use and is equipped with a power receptacle to which a 3-conductor, 4-foot cord is connected. The cord has a 3-blade plug and a weatherproof cap for connection to a weatherproof commercial power outlet. Insertion of plug grounds the signal housing.

- The weatherproof receptacle is furnished loose with back box and should be supplied to customer for advance installation.
- Brackets are provided on the bottom of the interior surface of box to mount control relay.
- A rain hood is also furnished loose with back box and should be mounted on front cover by telephone installer (see Fig. 15).



◀ **List 11 Back Box**, Equipped with Rain Hood (Fig. 15)—Is intended for outdoor, single-potential use and is identical to list 9 back box except that it is provided with a rain hood.

4.00 KS-8000 SERIES SIGNALS

4.01 KS-8000 series signals consisting of bells, horns, and chimes (shown in Fig. 16, 17, and 18) may be obtained with or without relays for indoor or outdoor use. Most of these signals have been replaced by KS-16301 signals (see Tables C and D).

4.02 Relay-equipped indoor signals are furnished with a backboard, a 4-foot cord and plug for power connection, and a 9-inch spade-tipped cord for connection to the telephone circuit. The KS-8227, 6- and 10-inch single-stroke bells are equipped with a reversible plunger. This may be reversed in the field to change the volume.

4.03 Relay-equipped outdoor signals are furnished with a 2-1/2 foot weatherproof cord and plug. A weatherproof receptacle for commercial power connections is shipped with the signal. This receptacle is supplied by telephone company for advance installation by customer.

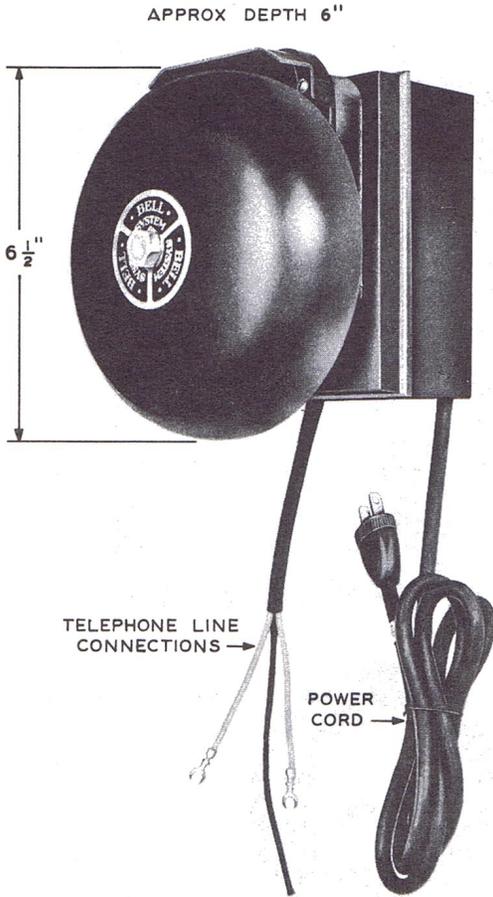


Fig. 16 — KS-8227 Signal Bell (6 Inch, Indoor)

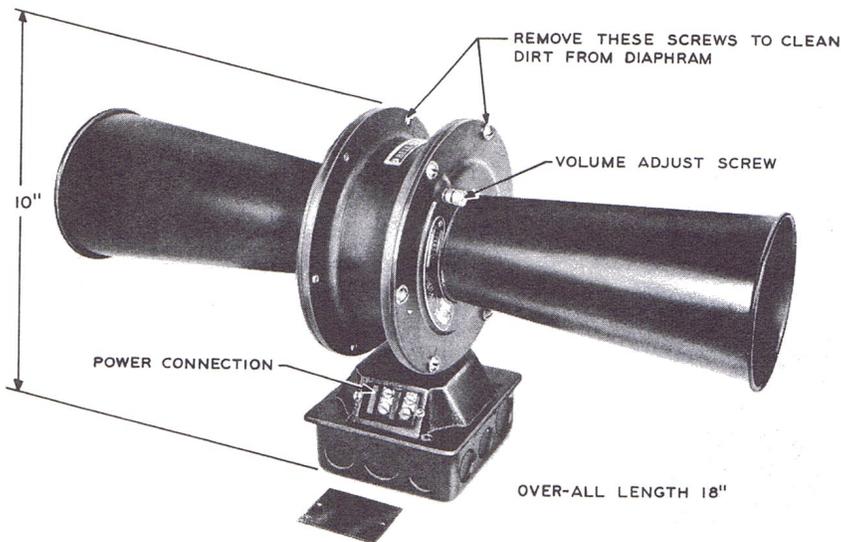


Fig. 17 — KS-8228, List 1 Signal Horn

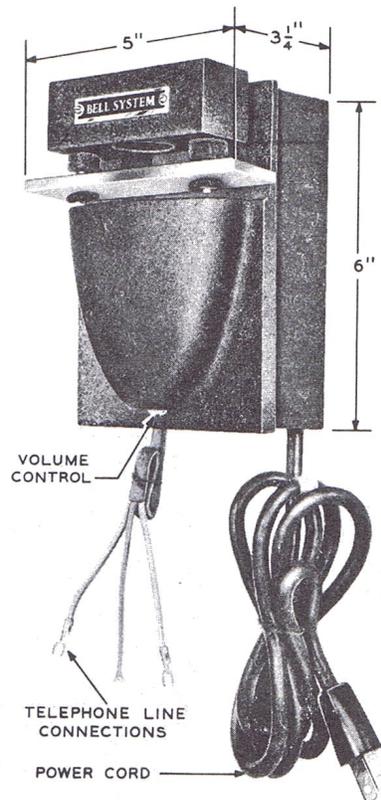


Fig. 18 — KS-8229 Signal Chime

## 5.00 OTHER AUXILIARY SIGNALS

Low-voltage signals such as bells, buzzers, or lamp indicators may be used as auxiliary signals. These signals may be controlled by the relay in a 531C or 687B subscriber set. See C Section entitled Auxiliary Signals—Connections. The low-voltage current required to operate these signals may be provided by a 101G power plant, or equivalent.

TABLE C

**KS-8000 SERIES SIGNALS WITHOUT RELAYS  
(115-volt AC Operated)**

Signal	List Number	Type						Signal Operating Current amperes	Replaced by KS-16301 Signal List No.
		Gong Diameter in Inches	Cycles per Second	Indoor	Outdoor	Single Stroke	Vibrating		
KS-8226 Bell	3	6		•		•		0.60	4, 9
	5	10		•		•		1.80	4, 9
	7	10			•	•		1.80	4, 11
	17	6		•			•	0.16	3, 9
	18	10		•			•	0.16	3, 9
	19	10				•	•	0.16	3, 11
KS-8227 Bell	49*	10			•	•		0.92	
KS-8228 Horn	1			•			•	0.38	5, 9
	2				•		•	0.38	5, 11
	18*				•		•	1.08	6, 11
KS-8229 Chime	19		245	•		•		1.80	1, 9
	23		980	•		•		0.13	
KS-8547 Bell for Hazardous Locations	1	10		•			•	0.15	
	2	10			•		•	0.15	
	3	10		•		•		0.45	
	4	10			•	•		0.45	

\* Manufacture discontinued; operated on 48 volts 60 cycles ac.

**TABLE D**  
**RELAY EQUIPPED KS-8000 SERIES SIGNALS**  
**(115-volt AC Operated)**

Signal	List Number	Type						Signal Operating Current amperes	Relay Operation *			Replaced by KS-16301 Signal List No.
		Gong Diameter in Inches	Cycles per Second	Indoor	Outdoor	Single Stroke	Vibrating		Ringing Current	48 Volts 60 Cycle ac	48 Volts dc	
KS-8227 Bell	7	6		•		•		0.60		•		4, 8, 12
	8	6		•		•		0.60	•			4, 7, 8
	9	6		•		•		0.60			•	4, 8, 13
	13	10		•		•		1.80		•		4, 8, 12
	14	10		•		•		1.80	•			4, 7, 8
	15	10		•		•		1.80			•	4, 8, 13
	19	10				•	•	1.80		•		4, 10, 12
	20	10				•	•	1.80	•			4, 7, 10
	21	10				•	•	1.80			•	4, 10, 13
	50	6		•			•	0.16		•		3, 8, 12
	51	6		•			•	0.16	•			3, 7, 8
	52	6		•			•	0.16			•	3, 7, 13
	53	10		•			•	0.16		•		3, 8, 12
	54	10		•			•	0.16	•			3, 7, 8
	55	10		•			•	0.16			•	3, 8, 13
	56	10				•	•	0.16		•		3, 10, 12
	57	10				•	•	0.16	•			3, 7, 10
58	10				•	•	0.16			•	3, 10, 13	
KS-8228 Horn	3			•				0.38		•		5, 8, 12
	4					•		0.38		•		5, 10, 12
	5			•				0.38	•			5, 7, 8
	6					•		0.38	•			5, 7, 10
	7			•				0.38			•	5, 8, 13
	8					•		0.38			•	5, 10, 13
	17†					•		0.28				2, 7, 10
KS-8229 Chime	1		245	•		•		1.80			•	1, 8, 13
	2		245	•		•		1.80		•		1, 8, 12
	3		245	•		•		1.80	•			1, 7, 8,
	13		980	•		•		0.13			•	
	14		980	•		•		0.13		•		
	15		980	•		•		0.13	•			

\* 48-volt ac relays will operate on 9 volts minimum; 48-volt dc relays will operate on 17 volts minimum; telephone ringing relays will operate on 53 volts minimum with wide armature airgap and on 34 volts with close airgap.

† KS-8228, List 17 horn signal operates on 115 volts dc; the relay operates on 24 volts dc.