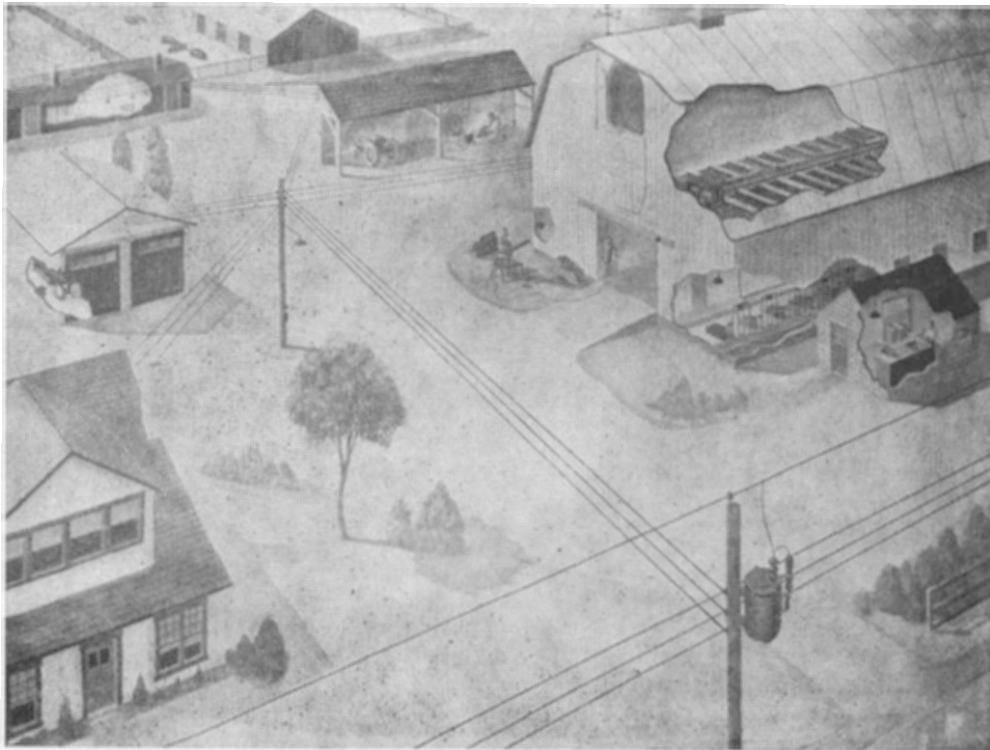


PLANNING FOR

# *Electricity*

ON THE FARM

CIR. 459



EXTENSION SERVICE, OKLAHOMA A & M COLLEGE  
SHAWNEE BROWN, DIRECTOR  
STILLWATER, OKLAHOMA

## FOREWORD

*The satisfaction with which electricity serves the farm depends a great deal on how well the wiring system is planned. Many farmers are sorry now that they failed to install adequate wiring when they first received electricity. Time and thought should be spent in planning the electric wiring system, just as plans are made for a new home. A wiring system installed now will serve for years to come, so plan not only for present equipment but make provisions for electrical devices to be added later.*

*Visits to neighbors who are using electricity will bring new ideas and help avoid mistakes. A good wiring system helps a person use electricity economically, conveniently and safely and to get full efficiency from lights and equipment operated. Plan your system with this in mind.*

# PLANNING FOR ELECTRICITY ON THE FARM

C. V. PHAGAN  
Extension Agricultural Engineer\*

## ELECTRICAL TERMS AND DEFINITIONS

**AMPERE:** A measure of the rate at which electricity flows; may be compared to gallons per minute of water flowing in a pipe. (Abbreviation is "amp.")

**VOLT:** A measure of electric pressure similar to pounds of pressure in a water system.

**WATT:** A unit of electric power (1 volt  $\times$  1 ampere = 1 watt).

**HORSEPOWER:** Equals 746 watts.

**KILOWATT-HOUR:** Equals 1,000 watts used for 1 hour. Example; a 100 watt lamp burning 10 hours will consume 1,000 watt hours or one kilowatt-hour. (Abbreviation is "kwh.")

**LIGHT OUTLET:** A point on the wiring system or circuit where a light is located.

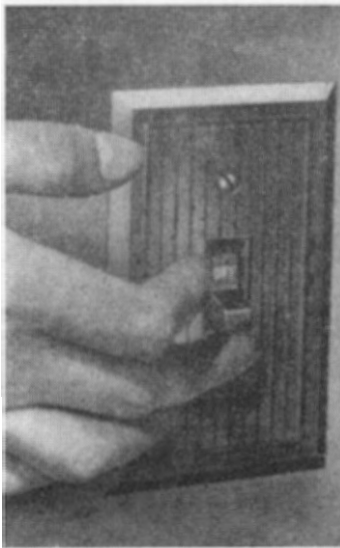


Fig. 1.—Wall switch.

\* Credit is given to Louis Strong, former rural electrification specialist, who helped prepare this bulletin for publication.

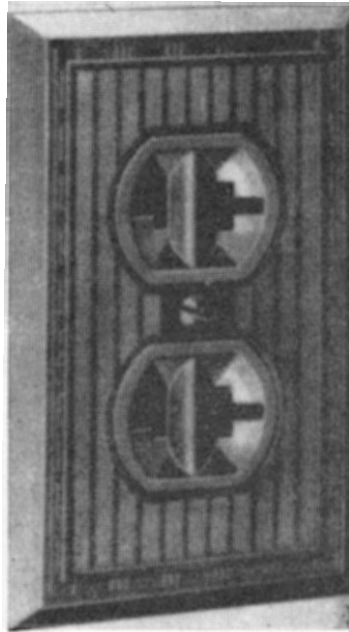
**SWITCH:** A device for turning electricity on and off, usually mounted on the walls for convenient control of lights.

*Single pole switch*—used for controlling light at one point.

*3-way switch*—two 3-way switches used for controlling light at two points.

*4-way switch*—two 3-way switches and one 4-way switch used for controlling light at three places.

**CONVENIENCE OUTLET:** A device usually located on the walls for the quick and convenient connection of electrical appliances, lamps, etc.



**Fig. 2.—Convenience outlet.**

**CIRCUIT:** An electric supply line to a number of convenience outlets or lights. It usually consists of two wires, one carries the electricity from the entrance panel to the point where the electricity is to be used, and the other takes it back.

**CIRCUIT BREAKER:** An automatic device for protecting a circuit against overloads and short circuits. The breaker may be reset after the trouble is corrected.



**Fig. 3.—Circuit breaker.**

**FUSE:** A protective device consisting of a strip of soft wire for protecting a circuit against overloads or short circuits. The fuse will only carry so much electricity before it melts or “blows.”



**Fig. 4.—Plug type fuse.**

**SERVICE ENTRANCE PANEL:** Term applied to the box containing the protective devices through which the current flows to the various circuits. Protective devices may be either fuses or automatic circuit breakers.

**THE WIRING SYSTEM SHOULD INCLUDE**

**1. Farm Service Entrance**

The farm service entrance may be compared to the neck of a bottle since all the electricity used on the farm must come

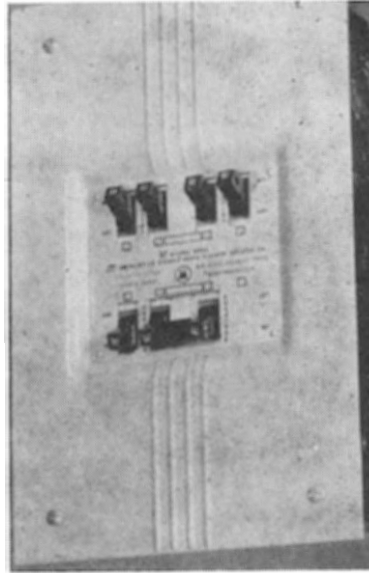


Fig. 5.—Service entrance panel.

through these wires and equipment. The entrance is usually installed on a pole located as near the center of the electrical load as possible.

#### 2. *Feeder Lines to Buildings from Service Entrance*

These lines should be large enough to carry all the loads of the building being served with enough reserve capacity for future expansion, also large enough to withstand mechanical strain. (See table I for recommended wire sizes for feeder lines.)

#### 3. *Building Service Entrance*

Service entrances to the house or other farm buildings should provide capacity for present and future loads, including reliable convenient protection against overloads. The building service entrance includes entrance cable, entrance panel, and ground connection.

#### 4. *Plenty of Circuits of the Correct Wire Size*

Circuits carry the electricity from the building entrance panel to light and convenience outlets throughout the building. The reliable and convenient use of electricity depends upon supplying enough circuits of correct wire size with enough outlets to make electricity readily available at the proper voltage wherever needed.

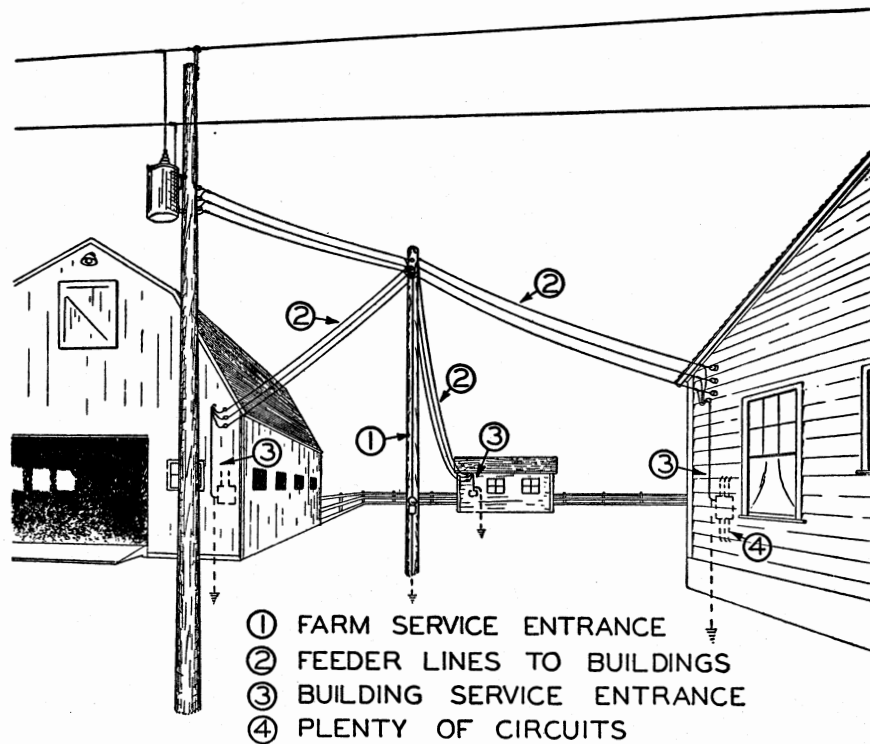


Fig. 6.—Essential parts of the wiring system from transformer to circuits.

### PLANNING THE HOUSE WIRING SYSTEM

*In planning the house wiring system, it is first necessary to know what appliances or equipment will be used in each room. The important thing is to have plenty of convenience outlets in order to make full use of equipment that may be used later, if not already available.*

*The list of equipment below, according to the various rooms of the house, may prove helpful in making plans for future uses:*

#### *Kitchen*

Refrigerator, range, fan, coffee maker, mixer, waffle iron, toaster, roaster, electric milk pasteurizer, radio, sandwich grill, food chopper, churn, clock, cream separator, dishwasher, flat iron, electric ironer.

#### *Living Room:*

Vacuum cleaner, radio, floor lamps, table lamps, fan, clock.

**Porch:**

Washing machine, lawn mower, churn, cream separator, fan, doorbell or chimes, flat iron.

**Utility Room:**

Washing machine, water heater, flat iron, cream separator, egg candler, hot plate, electric ironer, sausage grinder, radio, fan.

**Basement:**

Washing machine, water system, water heater, home freezer, clothes dryer, oil burner, furnace stoker, air conditioning.

**Bathroom:**

Razor, vibrator, sun lamp, hair dryer, room heater, water heater.

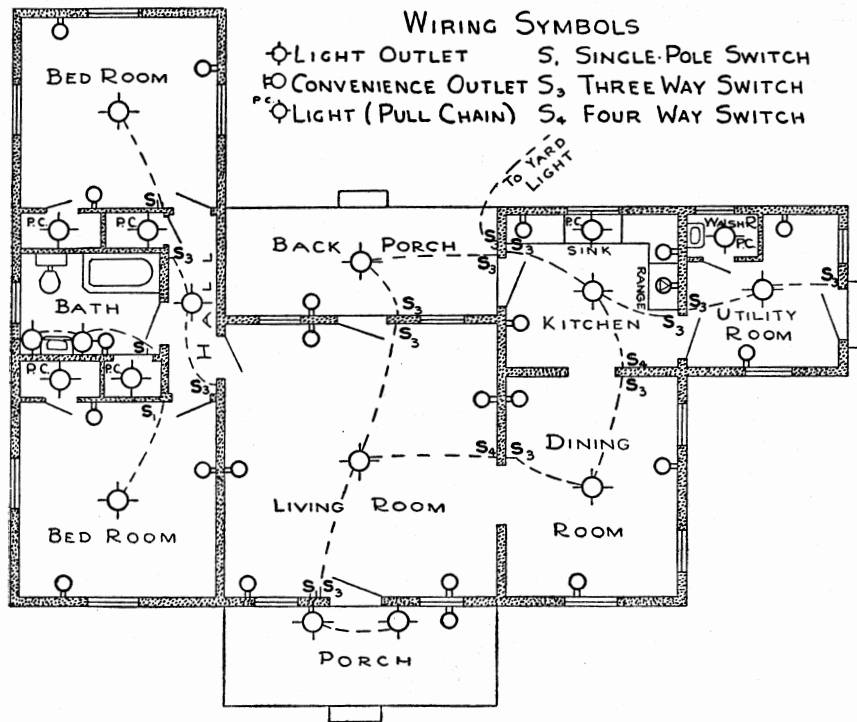


Fig. 7.—Floor plan of farm house showing location of various kinds of outlets.



**Bedrooms:**

Fan, heating pad or blanket, vacuum cleaner, sun lamp, bed lamps, pin-up lamps (mirror), sewing machine, radio, heat lamp, hair dryer, clock, air conditioning.

**Dining Room:**

Waffle iron, toaster, sandwich grill, radio, mantle lamps, clock, vacuum cleaner, flat iron, coffee maker, electric ironer, fan.

**Hallways:**

Vacuum cleaner, attic fan.

**SUGGESTIONS FOR LOCATING OUTLETS**

*One of the best methods* of locating outlets for lights, switches and appliances, is to draw a floor plan of the house and indicate with proper symbols where the various outlets will be. This information will help the electrician in making estimates of the cost of the wiring job.

**LOCATING CONVENIENCE OUTLETS**

You will want enough outlets so that no point along a usable wall space in the living room, bedroom and dining room is more than 6 feet from a convenience outlet. With outlets located in this manner, table lamps, floor lamps and radios may be used with different arrangements of furniture.

*Locate outlets* from 1 to 3 feet above the floor except in the kitchen. Here outlets are usually located about 42 inches above the floor, convenient to places where equipment will be used.

*A combination light and outlet* is handy at the bathroom mirror for an electric razor.

*Do not use light outlets* for connecting appliances, portable lamps, etc. They are unsightly and are not built to withstand the resulting electrical and mechanical strain.

**LOCATING LIGHTS**

Carefully consider lighting needs of each room according to suggestions as given below:

**Kitchen:**

1. Ceiling light.
2. Additional light over the sink or work table is strongly advised for here the housewife does much of her work.
3. Fluorescent lights under the cabinets may be included.

*Living Room:*

1. Ceiling light for general illumination.
2. Floor lamps and table lamps to be operated from convenience outlets for reading and local light.

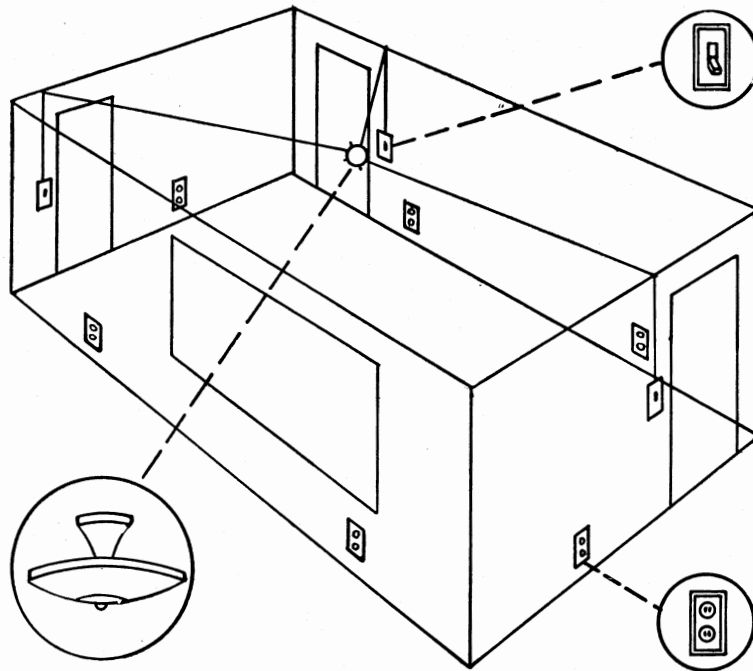


Fig. 8.—Perspective view of living room showing convenient arrangement of switches and convenience outlets.

*Dining Room:*

1. Ceiling light over the table.
2. Where the dining room is used for other purposes, provide convenience outlets for table and floor lamps.

*Bedrooms:*

1. A ceiling light. Supplemented by bed lamps and pin-up lamps operated from convenience outlets.
2. Locate outlets for pin-up lamps or fluroscnt lights on each side of the bedroom dressing mirror.

*Bathroom:*

1. Ceiling light.

2. Mirror light—preferably on each side of the mirror. These are often fluorescent.
3. The ceiling light is sometimes eliminated and mirror lights alone are used.

*Closets:*

1. Ceiling light or wall light over the door.

*Stairway:*

1. Ceiling light that lights entire stairway.

*Cellar or Basement:*

1. Ceiling outlet located so the stairway will be lighted.

*Porches:*

1. Ceiling light, or lights on each side of the front door.
2. Ceiling light on back porch.

LOCATING SWITCHES

*The satisfaction and convenience* of lighting depends largely on how easily it can be turned on and off. All lights with the exception of mirror, sink and closet lights should be controlled by wall switches. Lights over the sink, at mirrors in the bathroom, and in closets may be controlled with pull chains.

*Light switches should be near the door* located on the latch side. If they are about 42 to 48 inches above the floor they will be convenient for both children and adults. If a room has more than one door, a switch at each for convenient control at either entrance is practical. In some cases you may want three points from which a light can be controlled.

*When lights are controlled at only one point*, single pole switches are used. At two points two 3-way switches are used and when lights are controlled at three points use two 3-way switches and one 4-way.

*In locating switches place them* so the main passageways through the house and stairways can be lighted ahead and turned off after you have passed. It is awkward and inconvenient to cross a dark room to turn on a light or cross it after the light is off.

*Porch lights should be controlled* by switches inside the house. Yard lights may be controlled inside the house or porch.

TOTAL NUMBER OF OUTLETS

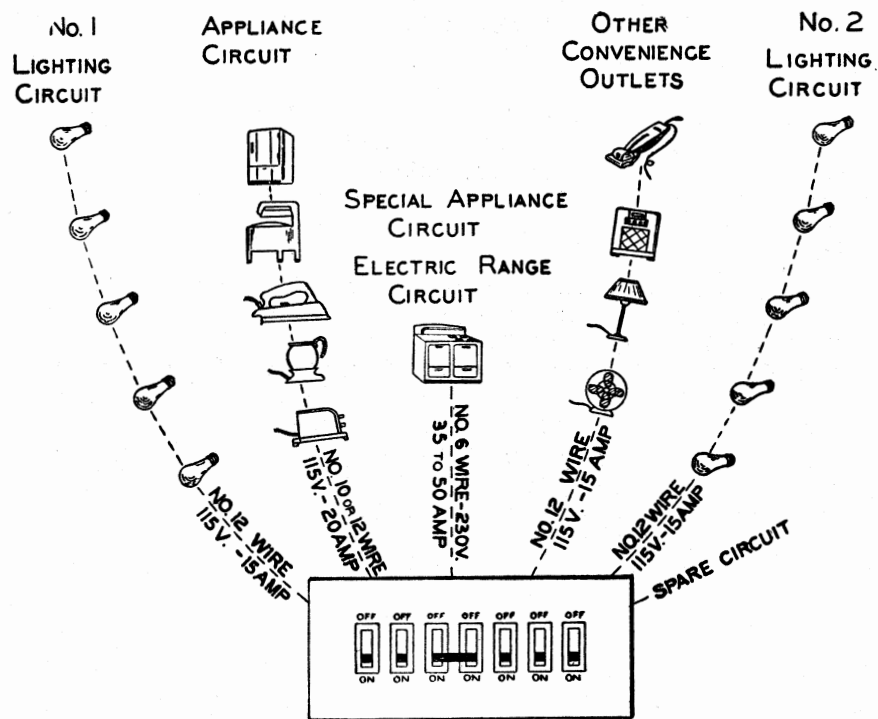
Consider needs of the entire family before final decisions are made on outlet locations. After the number to be used in each room has been decided, enter them on the "Wiring Esti-

mate Sheet" shown on page 25. Take each room and carefully total convenience, light, and switch outlets, indicating whether a single pole, 3-way or 4-way switch is needed, and record on the estimate sheet.

**KIND AND NUMBER OF CIRCUITS**

The circuit layout is generally left up to the electrician doing the wiring. There are some things about circuits however, that you will want to know. First, the three types of circuits:

- A. Appliance circuits (20 amperes)
- B. General purpose circuits (15 amperes)
- C. Special appliance circuits (20 to 50 amperes)



TYPICAL ENTRANCE PANEL AND CIRCUITS IT MAY SERVE. EACH LINE REPRESENTS ONE CIRCUIT.

Fig. 9.—Entrance panel illustrating different types of circuits.

The number of these circuits required to serve convenience outlets, lights and appliances in the home should meet the following minimum requirements.

1. *One separate appliance circuit* (20 amperes) to serve convenience outlets in the kitchen, utility and dining room. No lighting should be connected to this circuit.
2. *One general purpose (15 ampere) circuit* for every 500 feet of floor space in the home.
3. *Provide special circuits* for each of the following equipment used. (1) Electric range, (2) Electric water heater, (3) Electric ironer, (4) Electric water pump.

*Too few circuits:* If all the lights in the home were on one circuit the entire house would be in darkness if something went wrong at any point causing the protective device to operate and cut off the current. Because of this and to keep from overloading any one circuit, the number of outlets are divided into groups or separate circuits with a protective device in each

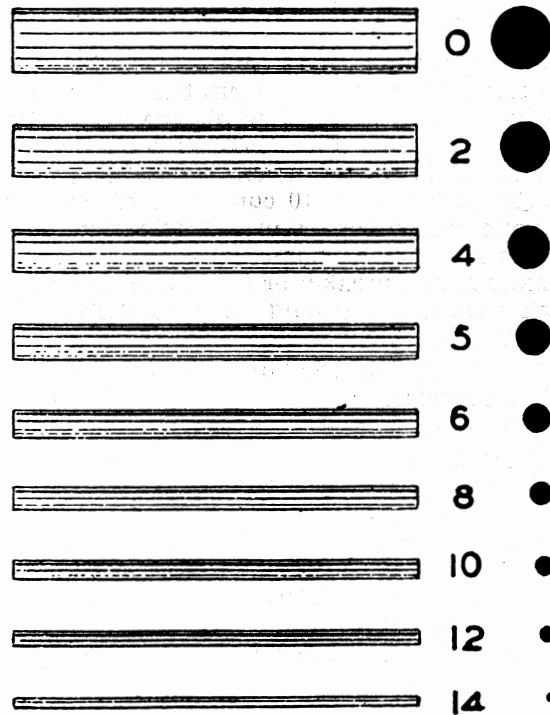


Fig. 10.—Approximate size of electric wires with insulation removed.

circuit. When too many lights or appliances are on one circuit, equipment doesn't operate efficiently and lights do not burn as bright as they should.

*The average five room farm dwelling* should have one 20 amp. circuit for convenience outlets in the kitchen, utility and dining room; three 15 amp circuits for lighting and other convenience outlets. Install a spare circuit in the service entrance panel for an electric range and at least one spare 20 amp circuit for equipment to be added later.

#### RECOMMENDED WIRE SIZE FOR HOUSE

*Number 12 should be the smallest size* wire used in wiring the house. Although No. 14 may be safely used on the 15 amp circuits, experience has shown that the slightly higher cost involved in using No. 12 wire is paid back many times over through brighter lights, better operation of equipment, less loss of electricity in the line and capacity for future electrical load on the lines.

#### HOUSE SERVICE ENTRANCE

*The service entrance includes* the wires and entrance panel necessary to bring the electricity from the meter to the house. These wires and panel must carry all the electricity used in the home. It should, therefore, have ample capacity to carry present as well as future electrical loads. A typical service entrance as shown in Figure 10 consist of (A) entrance cable (B) service panel which serves as a distribution center where various circuits serving the home originate. It also contains either automatic circuit breaker or fuse protection against overloads on each circuit, (C) ground for protection against lightning or other excess voltage.

It is recommended that the house be supplied with both 115 volt and 230 volt service.

*What Type Service Panel:* There are two types of service panels available; the automatic circuit breaker, and fuse type. Both serve the same purpose but are fundamentally different in construction. Circuit breakers are reliable, give long service and will stand temporary overloads before they operate. A flip of the handle restores the service when trouble occurs. Fuses will usually protect the circuit just as well but have the following disadvantages.

1. When a fuse blows, it must be replaced, sometimes in the dark.
2. Caution must be used to always replace a blown fuse with another of the proper rating.

3. There is always danger that you may receive an electric shock when replacing a fuse.
4. They always require a main disconnecting switch ahead of the fuse box.

*What Size Entrance Panel:* The 70 ampere, 6 circuit, 3 wire, 115 volt, 230 volt entrance panel should be the minimum size for most farm homes. It will provide capacity to operate the following:

1. Lights for the house.
2. Appliances—refrigerator, washing machine, ironer, toaster, etc.
3. Outside lights.
4. An electric range or 5 horse power motor.

*Entrance panels* can be purchased with varying numbers and ratings of circuits at relatively little more than the smaller panels. A good combination for many farm homes would be three 15 ampere 115 volt circuits; one 20 ampere 115 volt circuit; one 20 ampere 230 volt circuit and one 35 ampere 230 volt circuit.

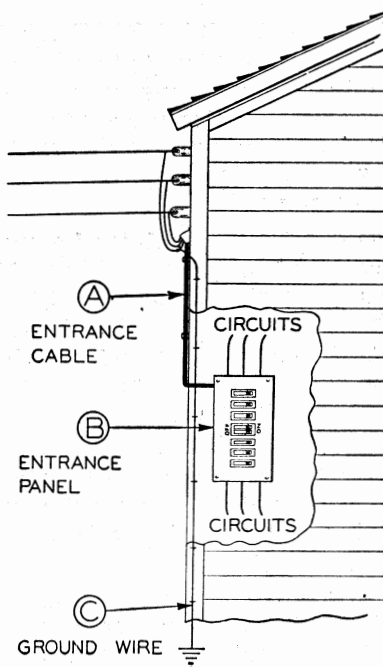


Fig. 11.—Typical service entrance showing essential parts.

A 30 ampere two wire entrance box will provide only 115 volt service for a limited number of lights and appliances. The 30 ampere size panel is often used on other farm buildings where only limited use of electricity will be made.

#### GROUNDING FOR SAFETY

*Purpose:* A ground is a protection for farm buildings, electrical equipment, livestock and human life. Good ground connections reduce danger from lightning or other excessive voltages. Ground frames of motors and other appliances when used outside or on earth or concrete floors.

*Method of Grounding:* The neutral or white wire at every building service entrance should be effectively grounded by connecting a No. 6 size bare copper wire to a copper clad ground rod or galvanized pipe  $\frac{3}{4}$ " in diameter driven 8 or more feet in permanently moist earth. Lateral trenches may be dug where it is impossible to drive a rod down eight feet. Where a continuous underground water piping system is available, the ground conductor may be connected to it. Motor and appliance frames are grounded in a similar manner by connecting the frame to a ground rod with copper wire.

#### POINTS TO CONSIDER IN GOOD LIGHTING

*Select easy to clean, one bulb fixtures* that have some means for diffusing and shading the light. Impaired physical conditions resulting from eye strain are effecting such a large percentage of both children and adults that more thought should be given to good lighting.

##### 1. *Provide enough light.*

*The size bulb required* varies with the height of ceiling, type of fixtures, and color of walls or ceiling. The amount of light rapidly decreases as the distance to the light increases. Dark walls will absorb a great deal of light.

*A 100 watt bulb gives more light* and costs less than four 25 watt bulbs. Follow the bulb recommendations given for the ceiling fixtures and lamps you buy.

##### 2. *Light where it is needed.*




Provide local lighting with floor and table lamps for sewing, reading, etc. Additional lights over the sink and working surfaces in the kitchen is highly desirable.

##### 3. *Freedom from glare.*



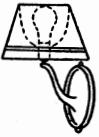

To avoid glare provide a proper shade and bowl for every lamp bulb. Glare is obtained both from the bulb itself and when too bright a light is reflected from a book or shiny surface.



### DINING ROOM

 <p>Suspension Fixture 1-150 Watt Bulb</p>	 <p>Semi-Ceiling 1-150 Watt Bulb</p>	 <p>Indirect Silvered Bowl Lamp Bulb -150 Watt</p>
---	---	--

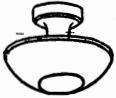


### BED ROOMS

 <p>Ceiling Fixture 100 Watt Bulb</p>  <p>Small 7 Watt Night Light -Plugs In Convenience Outlet</p>	 <p>Pin-It-Up Lamp 75 Watt Bulb</p>	 <p>Fluorescent Mirror Lights 20 Watt Tubes</p>
---	---	---

### PORCH







 <p>Wall Lantern 60 Watt Bulb</p>	 <p>Ceiling Globe 60 Watt Bulb</p>	 <p>Ceiling Lantern 60 Watt Bulb</p>
--	---	---

### HALL AND CLOSETS


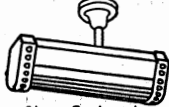




 <p>Ceiling Light For Hallway 60 Watt Bulb</p>	 <p>Hall or Closet</p>	 <p>Closet Pull Chain</p>
---	---	--

A SELECTION OF LIGHTING FIXTURES AND LAMPS FOR GOOD LIGHTING





**KITCHEN**

GENERAL LIGHTING		
 <p>Crystal Top-Diffusing Globe 100 Watt Bulb</p>	 <p>Louvered Bottom Diffusing Globe 100 Watt Bulb</p>	 <p>Fluorescent - Glass Enclosed 3-20 Watt Tubes</p>
WORK AREA LIGHTING		
 <p>Shaded Bracket 60 Watt Bulb</p>	 <p>Fluorescent 15 Watt Tube</p>	 <p>Fluorescent Shaded Type 15 Watt Tube</p>

**LIVING ROOM**

 <p>Semi-Ceiling 1-200 Watt Bulb</p>	 <p>Glass Enclosed Fluorescent 4-20 Watt Tubes</p>	 <p>Silvered Bowl Lamp Bulb 150 Watt</p>
 <p>Circline Floor Lamp Combination 100-200-300Watt 30 Watt Fluorescent Tube</p>	 <p>I.E.S. Floor Lamp 3-Light 100-200-300 Watt Bulb</p>	 <p>I.E.S. Table Lamp 3-Light 50-100-150 Watt Bulb</p>

**BATH ROOM**

 <p>Ceiling 75 Watt Bulb</p>	 <p>Mirror Side Lights 60 Watt Bulbs</p>	 <p>Shaded Bracket Over Mirror 60 Watt Bulb</p>
	 <p>Mirror Side Lights Fluorescent 15 Watt Tubes</p>	

4. *Even distribution of light.*

*Avoid dark spots*, even though you are using lamps leave the ceiling light on so the contrast will not be too great. It takes time and is tiring for your eyes to continually adjust themselves first to the bright light and then to darkness.

WIRING FOR SERVICE BUILDINGS

FEEDER LINES TO VARIOUS BUILDINGS

When planning feeder lines, the height and spacing of poles, and size of wire should be planned according to suggestions as given below:

1. *Height of Poles:* The poles should be of sufficient height so that wires over the driveway will not be less than 18 or 20 feet above the ground and at any other point less than 12 to 15 feet above the ground. In order to get proper clearance, a 25 or 30 foot pole will be required.

2. *Spacing of Poles:* Normally do not space poles more than 125 feet. When longer spacing is used, wires usually lengthen and sag.

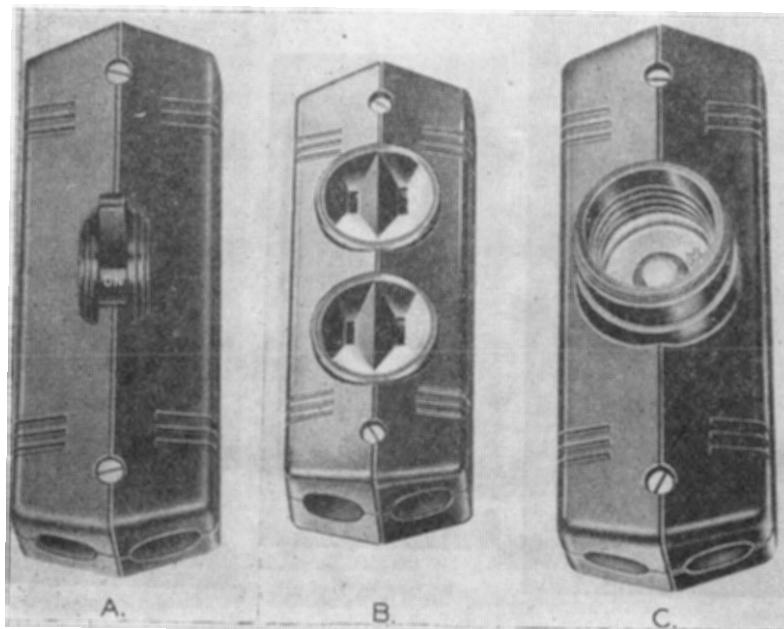


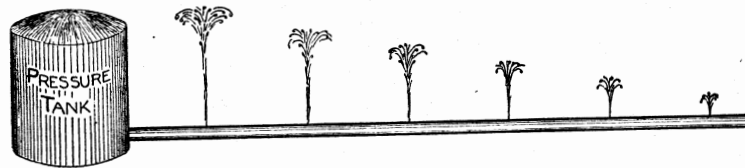
Fig. 12.—Approved types of outlet connections for service buildings.

3. *Size of Wire:* Use a wire big enough to carry the load at the building being served without too much voltage drop and strong enough to bear any mechanical strains. (See Table I.)

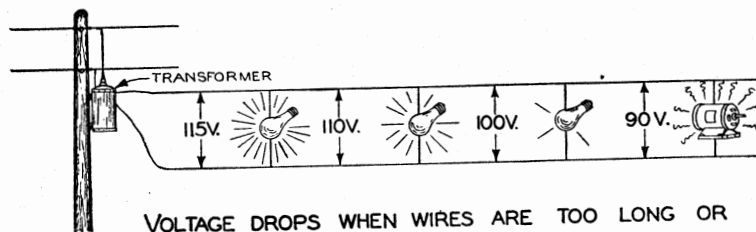
For mechanical strength, feeder wires should not be smaller than No. 10 size. On spans over 50 feet, No. 8 wire is used or No. 6, especially on the longer spans. These wires are required to not only carry their own weight but are often subjected to severe strains from wind and ice.

#### MATERIALS FOR WIRING SERVICE BUILDINGS

In barns, poultry houses and all outside wiring on the farm, wires and boxes are subject to more mechanical injury than in the house. There is the additional problem of moisture and fumes from the animals. For these reasons and for safety of both people and livestock, all outlets and switch boxes used in farm buildings should be of porcelain or bakelite construction. Switches are frequently operated while standing on the ground, where a short in a metal box could easily give a bad shock. Moisture, acid, and ammonia fumes around farm buildings often rusts metal boxes. Figure 12 shows types of outlet fixtures recommended for service buildings.



WATER PRESSURE DROPS WHEN PIPE IS TOO LONG OR TOO SMALL.



VOLTAGE DROPS WHEN WIRES ARE TOO LONG OR TOO SMALL. LIGHTS BURN DIM - MOTORS START SLOWLY - APPLIANCES OPERATE POORLY.

Fig. 13.—Voltage drop compares to the drop in pressure in a water system when pipes are too long or too small.

**Table I.—Size of Feeder Wires Recommended from Power Pole to Buildings for Different Loads and Distances (Based on Voltage Drop of 2%).**

2 Wire Feeders - 115 or 120 Volts

Load in Watts	3,500	8	6	4	4	4	4	2	2	2	1	1	1	0	0	00	00
	3,000	10	8	6	6	4	4	4	2	2	2	1	1	1	1	0	0
	2,500	10	10	8	6	6	6	4	4	2	2	2	2	1	1	1	0
	2,000	10	10	8	8	6	6	6	4	4	4	2	2	2	2	2	1
	1,500	10	10	8	8	8	6	6	6	6	6	4	4	4	2	2	2
	1,000	10	10	8	8	8	8	8	8	6	6	6	6	6	6	4	4
	500	10	10	8	8	8	8	8	8	8	8	8	8	8	8	8	8
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400

Distance in Feet

The heavy black line through the 2-wire feeder table indicates the point where 2-wire feeders become uneconomical and should, if possible, not be used.

3 Wire Feeder - 115/230 Volts

Load in Watts	10,000	10	8	8	6	6	4	4	4	2	2	2	2	2	1	1	1
	9,000	10	10	8	8	6	6	4	4	4	4	2	2	2	2	1	1
	8,000	10	10	8	8	6	6	6	4	4	4	2	2	2	2	2	2
	7,000	10	10	8	8	8	6	6	6	4	4	4	4	2	2	2	2
	6,000	10	10	8	8	8	8	6	6	6	4	4	4	4	4	2	2
	5,000	10	10	8	8	8	8	8	6	6	6	4	4	4	4	4	4
	4,000	10	10	8	8	8	8	8	8	8	6	6	6	6	4	4	4
	3,000	10	10	8	8	8	8	8	8	8	8	8	6	6	6	6	6
	2,000	10	10	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	1,000	10	10	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	

Distance in Feet

**SERVICE ENTRANCE FOR EACH BUILDING**

Each building on the farm where both lights and convenience outlets are used will usually have a separate entrance switch. These may be either the automatic circuit breaker type or a combination fuse and switch. It may sometimes be convenient to bring service from one building to serve a small load in another building or in some cases a spare circuit in the house may be used.

**LOCATING CONVENIENCE OUTLETS**

*Outlets in the barn* and other outbuildings should be at least 4 feet above the floor. In locating convenience outlets for these buildings, consideration should be given to the various kinds of equipment that might be installed. Following is a suggestive list of equipment for certain buildings.

***Barn:***

Milking machine, extension trouble light, elevator, feed grinder, fly electrocutor, spray, hay hoist, feed mixer, ensilage cutter, fan, cream separator.

***Dairy Barn:***

Milking machine, milk cooler, refrigeration, tank warmer, water heater, bottle washer, bottling and capping equipment sterilizer, fans—ventilating, fan electrocutor, grain elevator, hay hoist, feed mixer, feed grinder, ensilage cutter, cream separator.

***Poultry and Brooder House:***

Brooder, water warmer, spray, time switch for lights.

***Shop or Garage:***

Emery wheel, grindstone, electric welder, soldering iron, lathe, jig saw, drill press, circular saw, battery charger, fan forge blower, trouble light, air compressor.

**LIGHTS AND SWITCHES FOR FARM BUILDINGS**

Be sure, in planning location of lights in barns and farm outbuildings, to place lights over passageways and work areas. Light travels in a straight line and the dark walls of the barn are poor reflectors. Carefully consider positions of partitions, stalls, and feed bins when locating lights and deciding on the number to be used. Time and steps can be saved by having well located switches for controlling lights. Seventy-five and 100 watt bulbs are recommended.

*Barns:* Locate a switch at the most used entrance. Three-way switches so the lights can be controlled at more than one point may be needed. Most farmers light walkways, feed alleys, silos, hay mows, and feed bins.

*Poultry House:* Lights in the poultry house are helpful for convenience and increased egg production during winter months. Use a 40-watt bulb with a 16-inch reflector 4 inches deep for each 200 feet of floor space. Time switches or some type of automatic device for turning the lights on at a definite time are needed when lights are used for egg production.



**Fig. 14.—Barn yard light.**

**Farm Shop, Machine Shed and Garage:** Each of these buildings should have a light with a reflector. Use a good light over work bench. A 75 to 100 watt shaded light is usually satisfactory.

**Yard Lighting:** Farm yard lights are a great aid in doing morning and evening chores. Most farmers who have farm yard lighting consider it one of the most highly prized parts of their system.

The following points should be considered in planning yard lighting.

1. Locate lights in gables or corners of buildings when possible. Poles are often used for mounting lights but aren't too desirable because of the difficulty encountered in changing bulbs. Also lights mounted on poles are more subject to wind damage.
2. Install lights at least 15 feet high so shadows will be short.
3. Bulbs should be from 100 to 300 watts. Cost of electricity for the higher wattage will be very slight because of the short operation period.
4. Provide switches for controlling the lights at both the barn and house.
5. Provide large reflectors, at least 12" in diameter, to throw the light toward the places where needed.
6. Light the house entrance and all paths between the house and other buildings. Special stock and feeding areas may require individual lighting.

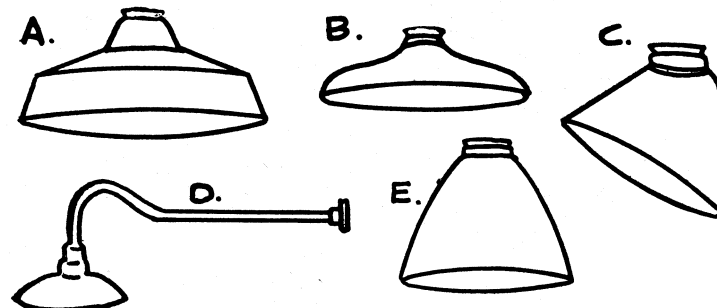


Fig. 15.—Types of reflectors recommended for yard and service buildings.

- |  |  |
|--|--|
| A. RLM dome reflector                                      | D. Bracket light with shallow dome reflector |
| B. Shallow dome reflector                                  |  |
| C. Angle reflector   |  |
| E. Bowl reflector for shops where intense light is needed. |  |



**ESTIMATING COST OF WIRING SYSTEM**

After planning the wiring system, obtain one or more estimates on the cost of installation. When obtaining more than one bid, be sure estimates are based on like materials, and specifications. Perhaps the best method of doing this is to prepare an Estimate Sheet similar to the one shown on pages 25-26-27.

House	Duplex convenience outlets	Light outlets	Single pole switches	3-way and 4-way switches	Price
Kitchen					
Utility Room					
Dining Room					
Living Room					
Bathroom					
Front Porch					
Back Porch					
Stairway					
Bedroom					
Halls					
Closets					
Basement					
Other					
House Total					



**COST ESTIMATE FOR WIRING INSTALLATION**

Name ----- Address -----

Please furnish an estimate on installing the following wiring on my farm.

Size Service Entrance Panel 30 amp \_\_\_ 60 amp \_\_\_ 100 amp \_\_\_

Automatic circuit breaker ----- fuse box -----

Number and size of entrance panels for outbuildings.

30 amp \_\_\_ 60 amp \_\_\_ Type -----

**REMARKS:**

Total costs \$ -----

The above Estimate Sheet includes all wiring between buildings. Branch circuits within buildings shall be No. 12 wire or larger. The installation and materials shall meet the NATIONAL ELECTRIC CODE requirements.

**SIGNED:** -----

*Local Contractor*

**Cooperative Extension Work in Agriculture and Home Economics,  
Extension Service, Oklahoma A. and M. College, and U. S.  
Department of Agriculture Cooperating. Acts of  
Congress of May 8 and June 30, 1914.**

301147