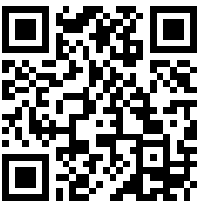
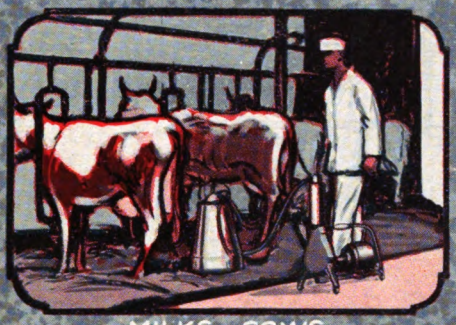


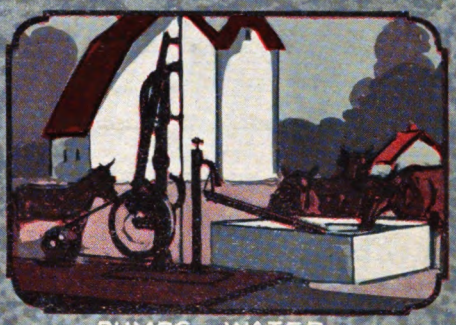
CIRCULAR NO. 134 JULY 1926

TURN the SWITCH

LET ELECTRICITY DO THE WORK

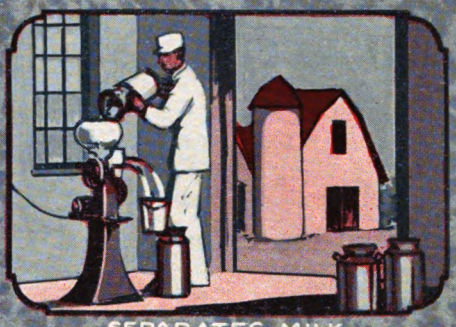


MILKS COWS



PUMPS WATER

WASHES CLOTHES



SEPARATES MILK

PURDUE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION
LAFAYETTE, INDIANA.

Agriculture is probably served in more ways by electricity than any other industry. Used as a source of light, electricity illuminates the farm home, barns, garage, poultry houses and other buildings. It lights the rural church, community hall and school, making possible community meetings with such attractions as stereopticon views, moving pictures, basketball games and community plays.

Electricity, as a source of heat, operates the electric range or cooker, warms the water for the poultry during the winter, heats the electric iron, toaster and percolator and warms the incubator and the electric heating pad.

Electricity, as a source of power, renders the greatest service on the farm in pumping water, running the washer, separating the milk, churning the butter, turning the grindstone and fanning mill, sawing the wood, grinding the feed, milking the cows, cooling the refrigerator, grading fruit, mixing concrete, etc.

Ten cents spent for electricity will perform any one of the following tasks:

Cook for two persons for one day.
Do the farm family washing for one week.
Run the vacuum cleaner for ten hours.
Operate the milking machine 1 hour and 20 minutes.
Separate 1,500 pounds of milk.
Heat a 150-egg incubator for two days.
Saw one and two-thirds cords of wood.
Pump 500 gallons of water.
Run a fanning mill three hours.
Cool the refrigerator for 12 hours.

Turn the Switch

Let Electricity do the Work

TRUMAN E. HIENTON
KATHRYN MCMAHON

The introduction of electricity into the activities of the farm is often followed by improved home conditions and increased profits. Better lighted buildings, reduction in the labor of performing household and farm duties and increase in the opportunities for enjoyment of home life result from harnessing electrical energy to perform the tasks of the farm.

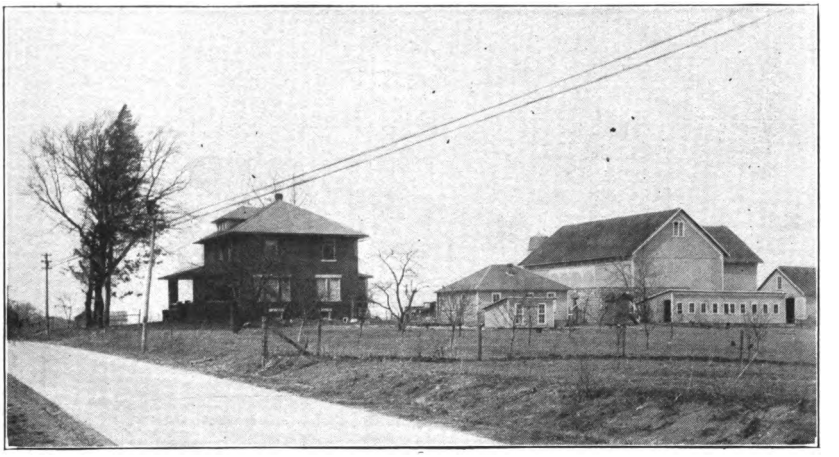


Figure 1. Electric service for this Indiana farm in Elkhart County is obtained from the 2,300 volt rural electric line shown in the foreground. The transformer on the pole in front of the house provides electricity at 110 and 220 volts for light, heat and power. Electrical energy is used for eleven different purposes, in addition to lighting the residence, barns, garage and poultry houses.

Electricity is now in use on more than 10,000 Indiana farms. Reports for 1922 and 1923 by the Bureau of Agricultural Statistics show an increase of 8 per cent in the number of farmers using electricity in one year in Indiana.

ELECTRICITY FOR ILLUMINATION

Electricity is making farm life more attractive and enjoyable. An outstanding use of electricity in the home and about the farm

buildings is that for illumination. No other convenience is so appreciated on the farm as that which provides light at the push of a button.

Electric lights save a great amount of labor daily spent in cleaning and filling kerosene lamps. One Indiana woman reports that, during 36 years of her life, she has worked the equivalent of twelve hours a day for an entire year cleaning and filling lamps and lanterns for the ordinary uses of the farm and home.

Figure. 2. This combination electric hot plate and cooker is being used on a LaPorte County farm for a good many purposes. The cooker has proven very satisfactory for cooking cereals, roasts, vegetab'es, soups and dry legumes. The hot plate on the top is used for frying and boiling.

The use of this cooker, especially during the summer time, eliminates the heat of the coal or wood range and makes the kitchen considerably more comfortable. An entire meal can be cooked at one time in the insulated section with a small amount of heat.

Electricity for lighting barns and other out buildings reduces the danger of fire considerably below that of gasoline and kerosene lamps and lanterns. This is especially true around hay, straw and other combustible materials so common on the farm. An electric light in the yard saves time in doing the chores at night and in stabling horses and other animals that may be wandering about the farm.

Electricity, as a source of light, is used productively and economically to increase winter egg production. By lengthening the

working day for the pullets and hens during the winter months, more feed is consumed and more eggs produced at a time when the price is relatively high.

Electricity provides the light at the rural school, church or community hall to make possible community plays, moving pictures and stereopticon views. It illuminates the gymnasium for basketball games and other entertainments. Electricity, in this way, is a potent factor in the development of rural community life.

Figure 3. Rugs and carpets can be kept freer of dirt by the use of an electric vacuum cleaner than by other types of cleaning equipment. The electric cleaner not only cleans rugs, but overstuffed furniture, draperies and mattresses, and can also be used to renovate feathers. Records obtained on several farms show that cleaning can be done in less than half the time usually consumed in sweeping and dusting. The consumption of electricity is very low and the cost of operation is less than one cent per hour.

ELECTRICITY IN THE FARM HOME

Aside from illumination, there are many uses of electricity which tend to increase the comfort of the farm home and to lighten the labor of the farm woman. Motor driven and electrically heated equipment reduce the number of hours the farm woman must spend at her daily tasks. This allows her more time for taking part in community affairs and caring for the family. The benefit

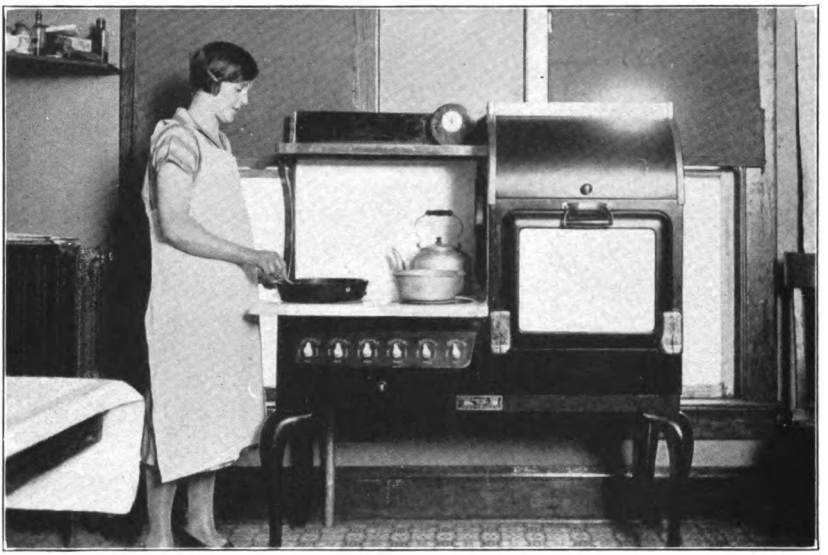


Figure 4. The farm woman of today can have an electric range to do her cooking as well as the city woman, when electric service is available. She finds cooking with electricity is much cleaner than with other fuels.

Flexibility of control, freedom from heat in summer and efficient baking are some of the features responsible for the installation of this range on a farm in Kosciusko County. The average cost for electric cooking, as revealed by several tests, is from $1.20 to $1.60 per person per month for 30 to 40 K. W. H.

Figure 5. An electric washer can reduce the time spent in washing to nearly one-half that required to do the same washing by hand. Not only is time saved by the use of the washer, but the heavier work is eliminated, and the whole task is made easier.

The cost of operating the wringer and washer for an average farm washing of 30 pounds of dry clothes is 9.1 cents for .7 K. W. H., as shown in tests on this LaPorte County and other Indiana farms.

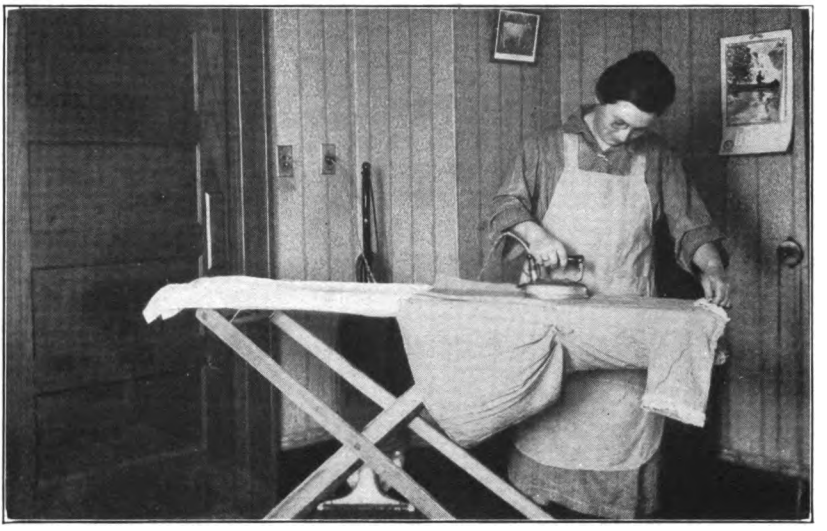


Figure 6. The electric iron is the most commonly used article of electrical equipment in the Indiana farm home. Ironing with an electric iron is done much more conveniently and comfortably than with irons using any other source of heat. Walking from range to ironing board is eliminated. Automatic operation assists in maintaining a steady, even temperature which permits of better and more efficient work.

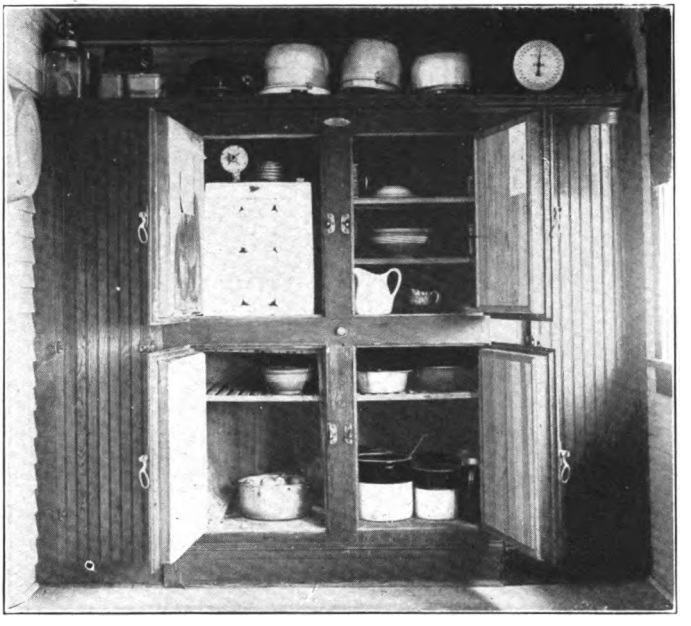


Figure 7. Electric refrigeration is needed more by the farmer than by the city man who can obtain ice regularly. Large quantities of food are needed on the farm which must be kept at a low temperature. Perishable produce for market must be preserved. The electric refrigeration unit can be installed in an old refrigerator. Two refrigerators which would hold ordinarily 150 pounds of ice have been run electrically for about $60 each per year, consuming 750 K. W. H. The cost is about 18c a day during the summer months and 15.3c a day during the winter months.

to farm women thru reducing the physical labor and giving more time for recreation and advancement can not be measured in mere dollars.

Cooking and Refrigeration

Cooking and baking by electricity on the farm are no longer considered impossible. Electric ranges are coming into rather common use in Indiana farm homes. The combination electric and coal or wood range is found to be the most suitable for farm use, where furnace heat is not available in the kitchen and where large

Figure 8. Electric incubators are easily controlled, provide a very uniform heat, and require little attention. Freedom from odors permits of their operation in the house. The incubator shown is located on a LaPorte County farm and hatched 66.9 per cent of the eggs the first time it was operated (April, 1926). Tests on this and other 150 egg machines show a consumption of 22 to 30 K. W. H. per hatching period, costing from .88 to $1.20.

amounts of hot water are needed. Electric hot plates and cookers are frequently used where a wood or coal range is installed. They are especially desirable for use during the summer to eliminate heat in the kitchen.

The need for electric refrigeration is greater on the farm than in the city home. Ice deliveries at the farm are usually not obtainable and when available, likely to be irregular. Larger quantities of fruits, eggs, butter, meat and milk must be kept cool on the farm than in the city home where deliveries of food can be had at short notice. Perishable produce such as berries, butter, eggs and

cream that is to be marketed at the farm or in a nearby town can be kept longer and in much better condition in the electric refrigerator. A small motor drives the electric refrigerator, insuring constant low temperatures, which are necessary for proper preservation of food.

Laundry Equipment

Farm women in Indiana are agreed that the electric washer does more to reduce labor than any other piece of electrical equip-

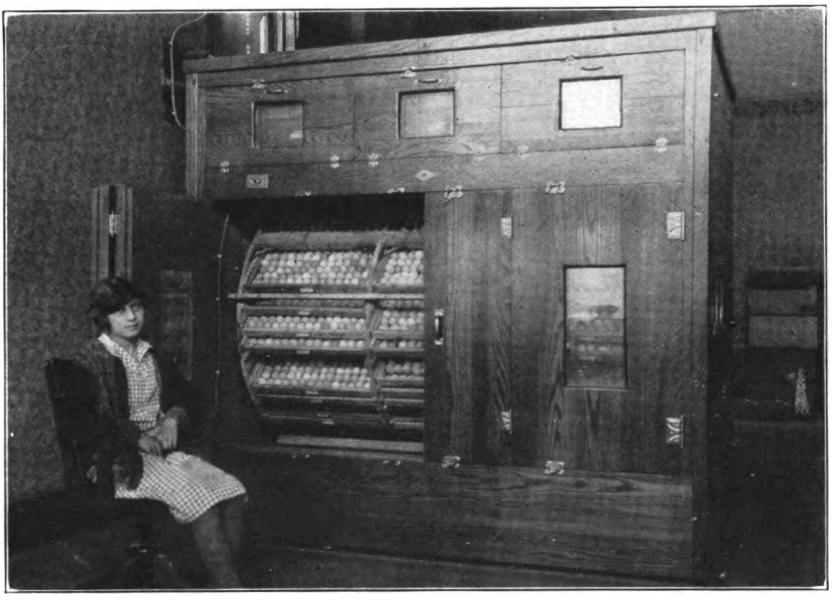


Figure 9. Electricity has reduced to a considerable extent the amount of labor required to operate large incubators. This factor, together with good hatching results, the elimination of fire hazard and close temperature regulation has popularized this 15,000 egg electric incubator. During the 1925 hatching season 68 per cent of all the eggs set in this machine produced salable chicks. Five of them are now in use in Shelby County, where this one is located. Fifteen are in use in the state. Records show that 15 to 20 K. W. H., costing from 60 to 80 cents, are used per day for heat and power to operate the fans.

ment. Hand washers are frequently converted into electrically driven machines by the use of a portable or small stationary motor.

Hand electric irons eliminate many steps from the ironing board to the range required by the ordinary sad iron. Their low first cost has resulted in almost universal use where electricity is available. Electricity also drives and heats the ironing machine and reduces the labor of ironing to a greater degree than the hand electric iron.

Large amounts of water are used in the laundry work on the farm. Water must be pumped and carried into the house and then out again in many cases. A small automatically operated pump

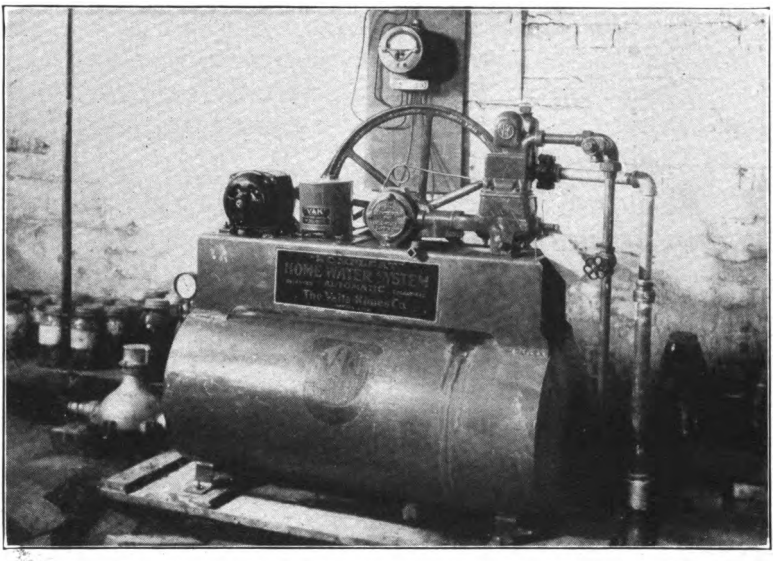


Figure 10. The carrying of water in and out of the farm home is one of the heaviest tasks the farm woman has to perform. Water under pressure makes possible hot and cold running water and the installation of a bath room. Automatic operation can be easily obtained by the use of an electric motor, a feature which is considerably more difficult with other types of power. Tests have been made on several automatic shallow well water systems, similar to this one located on a farm in LaPorte County, where the pressure is maintained between 20 and 40 pounds. The results show an average energy requirement of 1.5 K. W. H., costing 19.5 cents, for pumping 1,000 gallons of water.

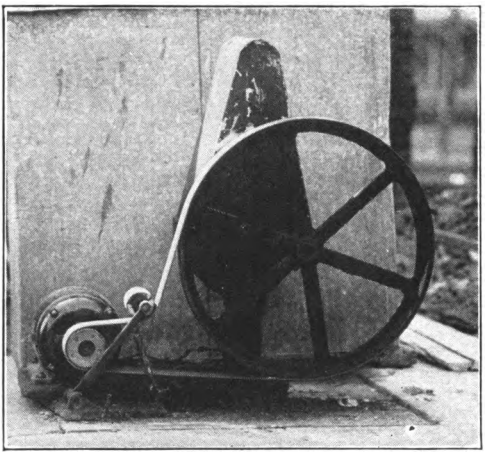


Figure 11. Deep well pumps must be used in wells where the water is more than 22 feet below the level of the pump. This automatic deep well pump provides running water under pressure for an Elkhart County farm home, and for various uses at the barn. The pressure tank is located in the basement of the house, where the power to the one-half H. P. motor is automatically shut off when the pressure reaches 40 pounds and turned on again when it has dropped to 20. The sheet metal cover shown in the picture is placed over the pump and the motor to protect it from the weather.

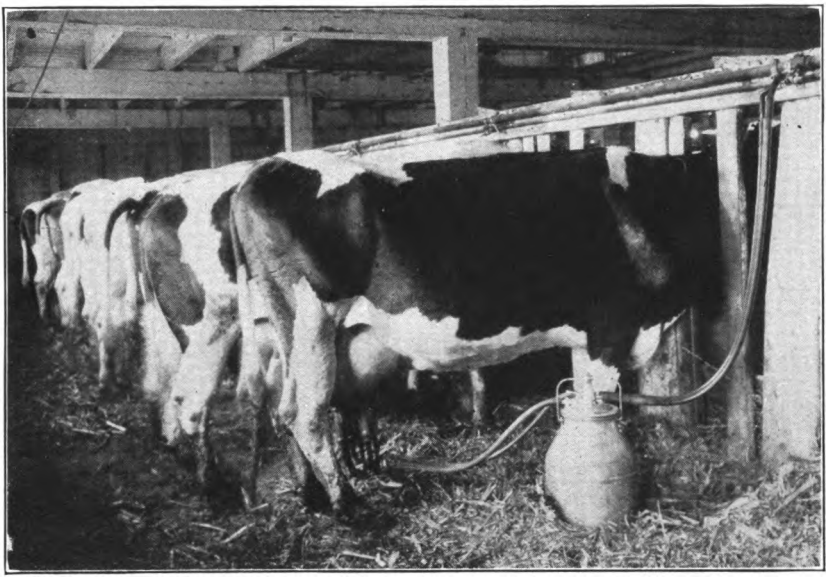


Figure 12. Milking requires more labor than any other task on the dairy farm. Electric milking machines reduce the necessary amount of labor to less than one-half that of hand milking. This milker is located on a dairy farm near Hobart, Indiana. The motor and vacuum pump of this type of milker are stationary and the milking units are attached to the pipes along the stanchions. Tests made on machines of this type, operating two milker units, show an average energy consumption of .74 K. W. H., costing 6 cents, per hour of operation.

Figure 13. This portable electric milker requires no installation except the provision of convenient electrical connections. A quarter H. P. motor together with the vacuum pump is located on the top of the bucket. This machine milks two cows at once and two of them are in use on a farm in Porter County. The power cost is especially low, since tests show that 1 K. W. H. of energy will operate the machine for three hours at a cost of thirteen cents.

driven by a motor will furnish water under pressure considerably cheaper than can be done by hand power. Running water under pressure also makes possible a hot and cold water system and a bathroom, which adds to the general health of the family.

Small Electric Appliances

Labor in sweeping and dusting is minimized by the use of the electric vacuum cleaner. An electric fan cools the air on a hot summer day. Many other electric appliances such as curling irons, sewing machine motors, radiant heaters, toasters, percolators and

Figure 14. The radio has done more to eliminate distance between the farm and town than any other invention with the possible exceptions of the telephone and automobile. It not only furnishes entertainment, but provides market news and educational talks, and tends to keep the farm in close touch with current events. Electricity is used to charge the batteries or operate the set directly and must be provided in some manner. A radio program is being enjoyed by this LaPorte County farmer and his wife.

heating pads may be used to add to the comfort and convenience of the farm household.

Radio

Education, recreation and valuable information concerning weather and markets are provided in the farm home through one of the newer uses of electricity on the farm. About 4.5 per cent or 8,665 Indiana farmers had radio sets in their homes on January 1, 1925. Electricity is used to operate a battery charger or a receiving set directly from a lamp socket, or to provide energy for a motor to drive a small generator for charging the batteries.

ELECTRICITY ON THE FARM

The largest use of electricity for heat on the farm outside of the home is for heating incubators. Electric incubators vary in size from 50 to 15,000 egg capacity. Electricity is easily regulated and provides a very uniform temperature, an essential factor in incubation. Another use of electricity for heat on the farm is that of warming water for poultry. A small immersion heater is placed in the water or a carbon lamp placed beneath the drinking fountain to prevent the water from freezing in cold weather.

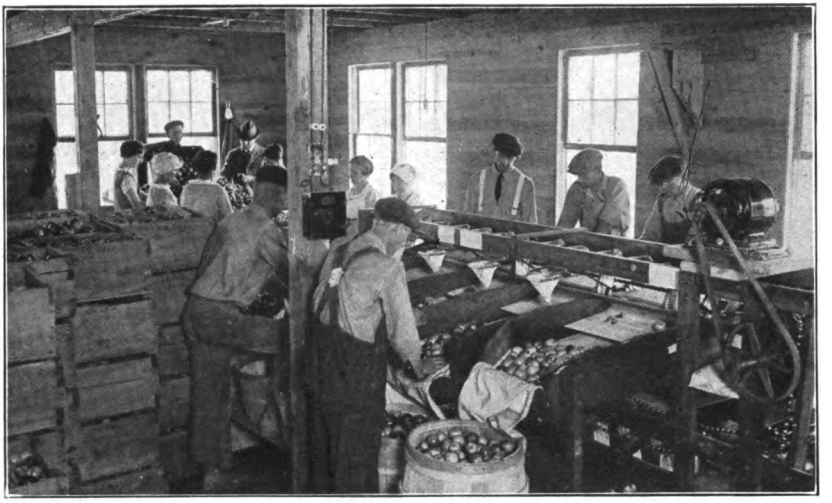


Figure 15. Proper grading of fruit is required to secure the maximum possible price for the product. Electrically driven mechanical graders are used rather extensively in the fruit growing sections of Indiana. This one is located on a Lawrence County fruit farm. Tests show an energy consumption of 1 K. W. H., costing 8 cents, for each 150 bushels graded.

Stationary Motors

Water pumping for poultry, horses, cattle, hogs and sheep is as much a chore for the farmer as pumping water for the house is for his wife. Large amounts of water are used, especially where many animals are kept or where large orchards are sprayed. One of the most economical uses of an electric motor on the farm is to do this pumping. Cream separating is likewise an economical use of electric energy to assist the farmer with his chores.

Milking is frequently the longest chore on the farm where many cows are kept. Milking machines reduce this time considerably and enable the farmer to substitute electric power for hand power at a profit to himself.

Hand grading of fruit is a slow, tedious task. A mechanical grader driven by an electric motor speeds up this work consider-

Figure 16. The use of a quarter H. P. motor frequently saves the labor of an extra man on the farm. An Elkhart County farmer has mounted a motor of this size on a short piece of plank to assist in transporting and operating it. The motor has replaced a windmill for pumping water and is also used for odd jobs such as is shown in the picture. A motor of this size will operate from 3 to 4 hours with a consumption of 1 K. W. H. of electrical energy costing 13 cents.

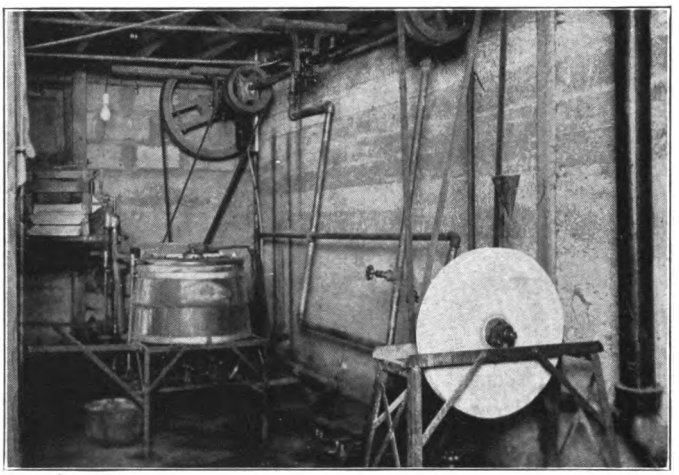


Figure 17. It is often possible to operate several pieces of equipment with one motor by means of a line shaft. A 1 H. P. motor operates this line shaft on a farm in Porter County. The double tub washer, grindstone and water pump are all driven from it. The water pump, equipped with two suction lines, two discharge lines and four gate valves, furnishes either well or cistern water. Water is pumped for the residence, 30 dairy cows and 5 horses, and the washer and grindstone operated with a monthly cost of less than $1.50, with electricity costing 8c per K. W. H.

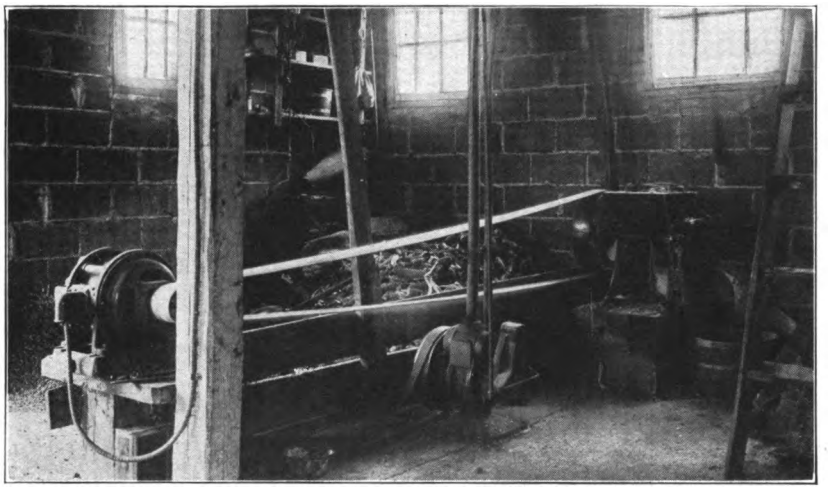


Figure 18. Experimental evidence has been obtained to show that the grinding of grain for dairy cattle is economical. This is also true for some of the feeds for poultry, and for certain grains when fed to other classes of livestock. The grinding of feed on the farm frequently eliminates long trips to the mill or elevator. A Tippecanoe County farmer uses a 3 H. P. motor for grinding feed and also for operating the vacuum pump on his milking machine.

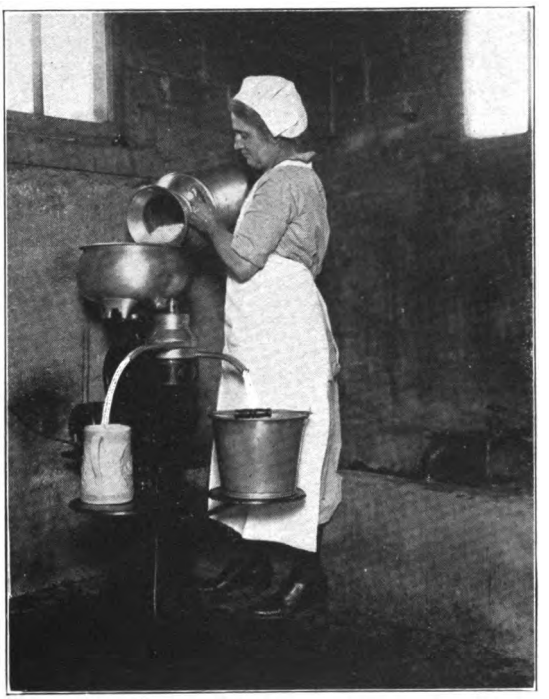


Figure 19. The cream separator, to obtain its most successful operation, must be driven at a uniform rate of speed. The electric motor, with its constant speed, replaces other types of power for driving the separator when electricity is available. One of the commonest uses of an electric motor on the farm is to drive the cream separator, as it is doing on this Tippecanoe County farm. Two thousand pounds of milk are separated by 1 K. W. H. of electrical energy costing 13c, as shown by the average of a number of tests.

ably and reduces the total amount of labor to considerably less than that required for hand grading.

Motor driven fans are used in a number of ways on Indiana farms. Dairy barns are cooled by the use of large fans. Fruit and vegetable storage cellars frequently are ventilated mechanically by electric fans. The air in large incubators is circulated by motor driven fans to maintain an even temperature.

Portable Motors

A great many farm tools such as emery wheels, grindstones, churns, fanning mills, clipping and shearing machines, are used a relatively short time during the year. A small portable motor equipped with a speed reduction device and several belt pulleys of different sizes can be used to operate any one of these tools. Such a motor can be operated from an ordinary light socket and will frequently save the labor of an extra man at a cost of a few cents per hour.

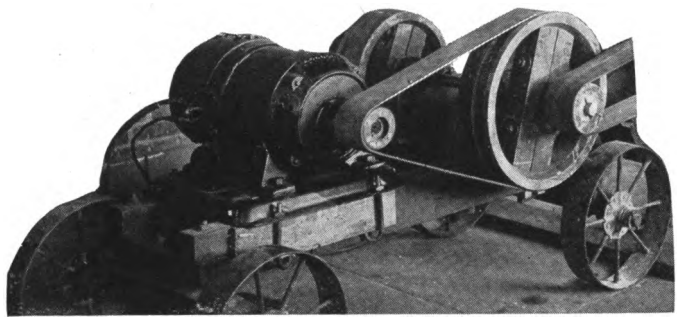


Figure 20. This portable motor was equipped to drive several farm machines in a somewhat similar way to the motor shown in Figure 21. A 5 H. P. motor was mounted on the front end of an old gas engine truck. It was belted directly to an 18 inch pulley mounted on a countershaft at the rear of the truck. Three pulleys 4 inches, 9 inches and 14 inches in diameter, are also mounted on the countershaft for driving farm machinery. The belt on the motor is tightened by sliding the motor forward on its base. This motor is used on a Lawrence County farm to run a corn sheller, cider press and feed grinder.

General purpose motors of 3 to 5 H. P. capacity are mounted on light trucks so that they can be moved from one farm machine to another. A countershaft driven by the motor is provided with a number of belt pulleys so that the machine may be driven at the proper speed. Such motors are replacing other types of power for sawing wood, grinding feed, elevating grain, hoisting hay, shelling corn and running the cider press.

A number of illustrations showing some of these various uses of electricity on Indiana farms is included in this circular. The rates shown per K. W. H. were those in effect where the pictures were secured and may not be exactly the same for other locations in the state.

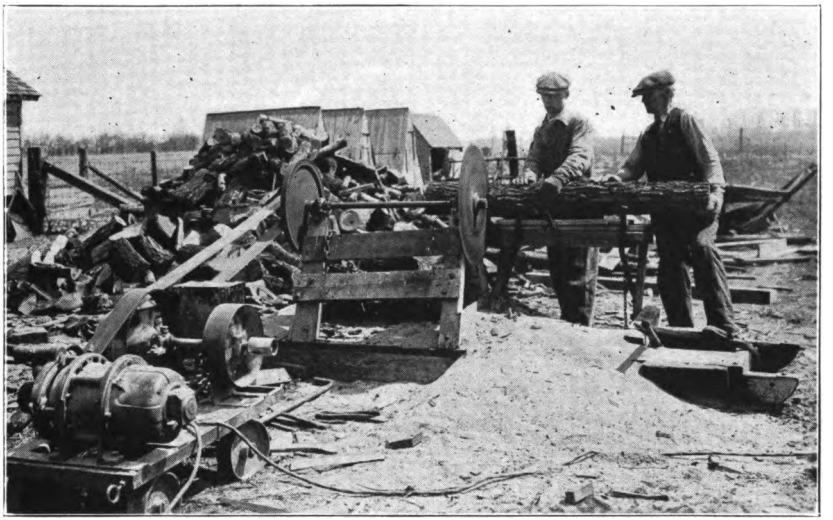


Figure 21. It is seldom possible to drive a farm machine at the proper speed with an electric motor using the standard pulley furnished with the machine. This motor has been developed to provide a range of driving speeds wide enough to properly drive several farm machines with their regular equipment. It is mounted on a truck to facilitate transportation from one machine to another, with power supplied to it through a cable. It uses .75 K. W. H. of electrical energy, at a cost of 6 cents, to saw a cord of mixed hickory, oak and elm wood on a farm in LaPorte County.

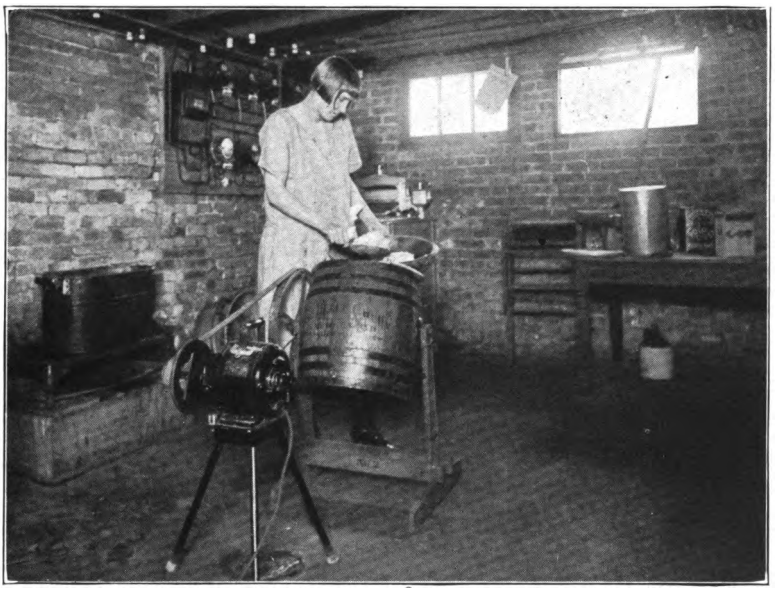


Figure 22. It is not always practical to provide an individual motor for each piece of equipment to be operated on the farm. A quarter H. P. motor equipped with a back gear and pulleys of various sizes will operate the churn, grindstone, fanning mill and other equipment at a reasonable cost. Thirty pounds of butter are churned on a LaPorte County farm by such a motor for 13 cents, using 1 K. W. H. of energy.

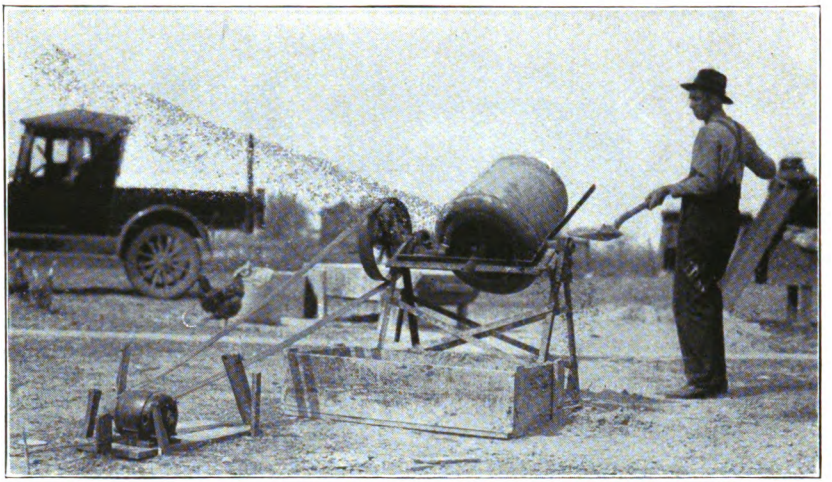


Figure 23. The use of concrete on the farm has grown rapidly for such purposes as floors, foundations, walks and well curbs. Hand mixing is used for small jobs but mixers are frequently used where any amount of concrete is to be handled. A one-half H. P. motor, generally used to operate a water pump and emery wheel, is being used to operate a small mixer on this Elkhart County farm.

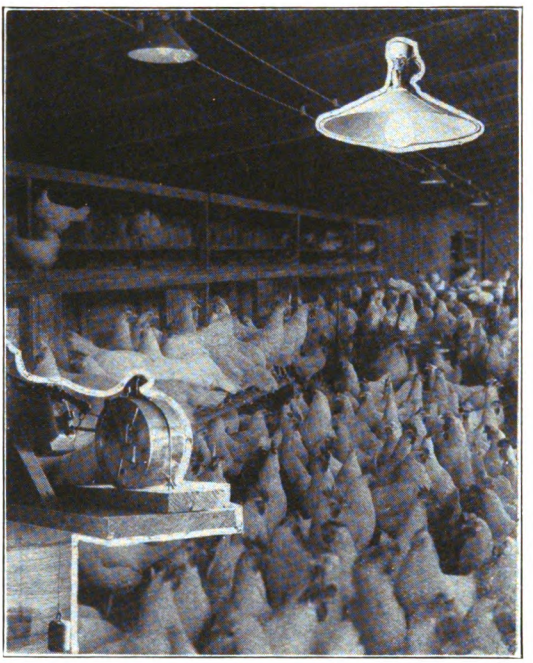


Figure 24. Poultrymen are agreed on the economy of using electric lights to increase winter egg production, as seen on this Tippecanoe county poultry farm. The reflector shown in the insert is one which has been developed by experimental work to properly distribute the light on the floor. It is 4 inches in height, 16 inches in diameter, constructed of sheet metal, and has two coats of aluminum paint on the under side. A home made switch for turning on the lights is shown in the other insert. An ordinary alarm clock is connected to a switch by a short piece of wire. A small weight closes the switch when the alarm key revolves and releases the wire.

An investigational program looking toward the solution of problems affecting rural electric service for Indiana farms has been under way during the past year. The Purdue University Agricultural and Engineering Experiment Stations have been aided and advised in the progress of this work by representatives of the Indiana Electric Light Association and the Indiana Farm Bureau Federation.

A rural electric line has been erected by the Calumet Gas & Electric Company to facilitate the experimental work. A large number of the tests referred to were made and the major portion of the data shown in this publication were secured on the farms located on this experimental line. The Interstate Public Service Company also has cooperated by making special installations at an experimental farm free of charge.

Financial assistance for the work has been furnished by the following utility companies:

Interstate Public Service Company,
Central Indiana Power Company,
Northern Indiana Gas & Electric Company,
Southern Indiana Gas & Electric Company,
Indiana Service Corporation,
Indianapolis Light & Heat Company,
Indiana General Service Company,
Calumet Gas & Electric Company,
Indiana & Michigan Electric Company,
Terre Haute, Indianapolis & Eastern Traction Company.

ELECTRICITY

FURNISHES

LIGHT, HEAT & POWER

FOR THE

FARM *and* HOME