

Cassier's Magazine

Engineering Illustrated

Volume XXXI

November, 1906—April, 1907

Pages 25 to 35 - prepared by David de la Hyde - Sept 2018



The Cassier Magazine Company
3 West 29th St., New York
33, Bedford Street, Strand, London

ELECTRICITY IN THE HOME

By H. W. Hillman

Mr. Hillman, who has under his care the electric heating department of the General Electric Company, at Schenectady, N. Y., lives, with interesting appropriateness, in a thoroughly equipped electric house, and it is this to which he refers in the following pages. It has latterly been made the subject of half a dozen magazine articles, but in none of them have all the advantages of domestic electric service been emphasized to the full; hence this additional contribution by Mr. Hillman himself, who naturally is best qualified to express himself on the subject.

To what Mr. Hillman says, it is of interest to add here that in planning the house Mr. Hillman had two sets of specifications prepared, one including the cellar excavation for coal and wood storage under the entire house, and a kitchen range with its inevitable chimney. The other specification was with only half the cellar excavated, the other half of the foundation going down only to the frost line, with no provision for a kitchen range and kitchen chimney, but including the installation of heating and cooking circuits and outlets in addition to the lighting circuits. When the estimates were examined it was found that the difference in cost between the first and second plans was so much in favour of the second, that the amount saved was more than sufficient to purchase the entire electric kitchen equipment and all the other small electric utensils used throughout the house. The extra cost of wiring was about \$125, or less than 1 per cent. of the total investment.

In connection with the present article also it may be interesting to refer to the one in the June number of this magazine, entitled "Extending the Uses of Electricity." This told in a more general way of what electricity was ready to do toward lightening the burdens of domestic service.—The Editor.



THE experience in my home during the past three years with electrical devices has led me to think over very seriously the reasons why the people in general consider the subject so favourably, and why the devices are so popular. A household device might be especially convenient,

and yet fail to attract the attention of the housewife, due to a high initial cost; or it might possess both essential features of convenience and low initial cost, and yet a high operating cost would make it unpopular for general household use with many people.

In my opinion, the prime reason for the great popularity of household electrical appliances is found in connection with their excellence of engineering design, which has been particularly marked during the past two years. An electrical engineer who is master of the art will con-

sider all phases of a subject before submitting a design of an article to be manufactured and commercially introduced. Such has been the case in regard to the electrical appliances used in my home. It was necessary to have the initial cost of the articles compare favourably with old-style utensils used with coal and gas ranges, and then, with a reasonable operating cost at the average rates of charge by electrical companies throughout the country, the problem was solved.

An illustration of these two points,—low operating cost and low initial cost,—may be interesting and instructive. It is a matter of common knowledge that in the operation of boiling eggs, either with a gas stove or a coal stove, a small quantity of water, say a pint, is placed in an ordinary cooking utensil, either on the lid of the stove or over a gas flame. Several minutes are required to bring the water to a boil, and then the eggs are placed in the dish for three, three and one-half, or four minutes, varying with the desire for a soft, a medium, or a hard-boiled egg.

In comparison, the electric egg



FIG. 1.—REPRODUCTION OF AN EVENING PHOTOGRAPH OF MR. HILLMAN'S HOUSE, TAKEN BY THE LIGHT OF A TUNGSTEN LAMP ON THE PIAZZA



FIG. 2.—ON THE PIAZZA OF MR. HILLMAN'S RESIDENCE. AN ELECTRIC RADIATOR, A CIGAR LIGHTER, AND A MESSAGE MOTOR HERE DO SERVICE

steamer requires forty-five seconds for a spoonful of water to arrive at a steaming point; the cover is then raised, the eggs are dropped in, and a three, three and one-half, or four-minute egg is steamed. The total time, therefore, is three minutes and forty-five seconds for a soft-boiled egg, or less than half the time which has been commonly required when boiling eggs in the old way.

I claim that this application of electricity, as suggested by a thoughtful engineer, represents a principle of economy that affects time and labour in a way to make the experience with electricity in my home a success. The same principle is utilized in cooking potatoes and cereals. The same principle also is used in connection with heating a baby's food, where time is a very important factor. Expense is also a factor when considering that such food may be required six or seven times a day, or about 2000

times a year. This point of economy in time and expense is mentioned simply as an illustration of many new applications of electricity, bringing the cost of operation down to such an insignificant sum that people are naturally very much attracted to the devices.

Let us suppose that the old way of accomplishing such results could be changed, and that all kinds of dishes could and would be redesigned so as to utilize the same principle of cooking by steam instead of boiling water. Even then the argument will not be a forcible one, because there are so many operations by electricity for household use where the cost is already so small that a little further economy of gas or coal would not overbalance the convenience which the electrical devices possess, compared with coal and gas appliances. In other words, the engineer who discovered this point of applying electricity in such an economical way has brought the



FIG. 3.—A FIVE-COMBINATION ELECTRIC COOKING DEVICE

cost of operating down to a point well within the means of many classes of people, and changed the condition of things as compared with what they were a few years ago.

At this point the question will be asked, if only a spoonful of water is used, what will happen should the water evaporate, and the device be left operating dry by mistake? The same engineer who conceived the idea of cooking by steam electrically, also conceived the design of manufacturing electrical devices so as to be indestructible. If they are left operating dry by mistake, the dish is not injured, nor is the surface on which it rests, nor the heating element. On the other hand, the ordinary cooking utensil, placed over a gas flame, or on a coal stove, operating dry by mistake, would be injured, so as to require replacement. In other words, while the electrical engineer has given great thought and attention to this subject in connection with the new electrical appliances for cooking, evidently the same careful attention has not been paid to all other utensils used with gas and coal stoves. Therefore, to be competitive with electrical articles, new developmental work must be started, and time will be required before the same results can be accomplished with all the old-style cooking utensils.

As a user of electric household utensils exclusively, I am convinced

that the above-mentioned principles represent important, far-reaching features, and as these new ideas become generally known among households, it is plainly to be seen why the subject is so interesting to the public.

The above explanation will also show why my monthly electricity bills, covering a period of two years, have been so low. The average monthly bill for the past twenty-four months was \$6.69, at a price of 5 cents per kilowatt-hour, with a family of five. During the past year, a great many homes have been fitted up with similar appliances, and under the same conditions, with the same price of current, the bills have been about the same.

In regard to initial cost of devices, great ingenuity has been exhibited in their design. The egg steamer, for example, is known as a five-combination dish. It is the equivalent of five dishes, or performs five different operations. When considering the average household work at different hours of the day, it will be seen that the same dish can be used practically for the various operations. It is not a matter of theory, but represents a practical feature of the article as a water heater, an egg steamer, a cereal cooker, a potato steamer, and a baby food warmer. This device performs the five operations, and yet the initial cost is only slightly higher than it would be as a water heater, or one device.

This is simply one illustration of many of such combination devices which economize in first cost. Space will not permit of mentioning the various articles which are so designed. Too much stress cannot be laid upon the two points mentioned,—economy in operation, and economy by having combinations of many devices. They have been the means of popularizing electric household devices with rates of charge commonly made for current by most of the electric central stations.

late in September and early in October the average temperature is not such as to require starting the central heating system in the house. Still it is frequently done; then the weather changes, and the fire is allowed to go out again. The cost of operation must necessarily be high when operating a furnace, or boiler, for a day or two at a time instead of continuously. With the electric auxiliary system, quick heat in the bathroom for fifteen minutes in the morning or at night is sufficient, and not

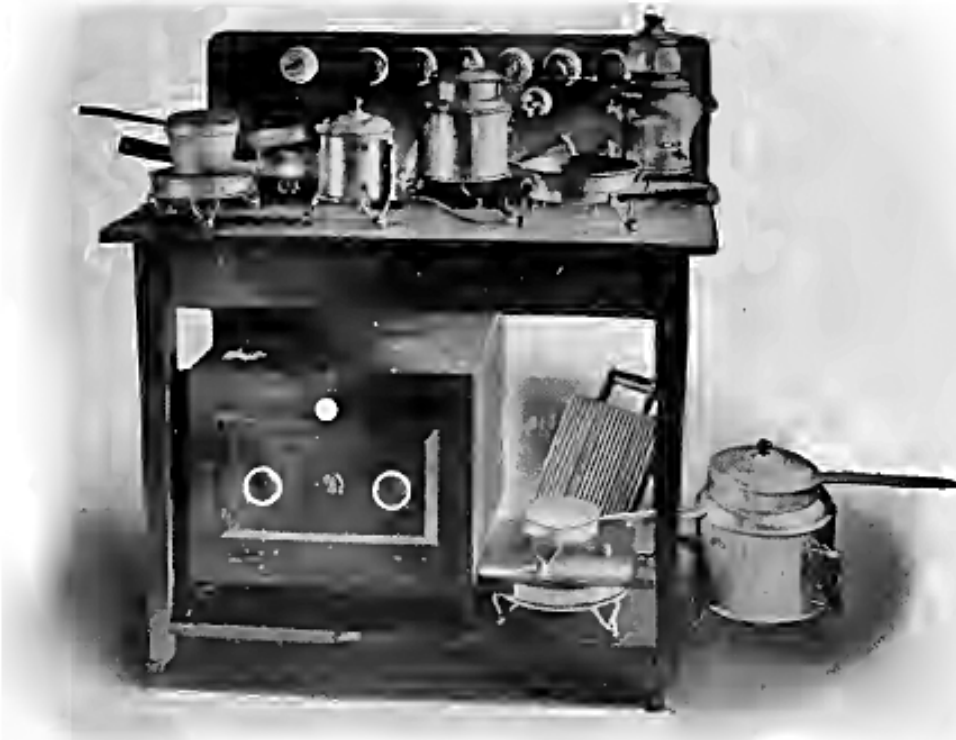


FIG. 4.—ELECTRIC KITCHEN CABINET AS USED IN MR. HILLMAN'S RESIDENCE

The "ready-to-serve" feature has impressed us greatly in our residence. If a quick meal becomes necessary, there is no question whether the coal range is ready, or the fire is low, but the electric frying pan is immediately available; the meat broiler and the griddle-cake cooker are quick devices, and emphasize the "ready-to-serve" principle. I have used to advantage four luminous radiators as an electric system of heating during spring and fall seasons for auxiliary or supplementary heat. It is well known that

expensive. A little heat for a half hour in the morning in the breakfast room is very desirable, yet not expensive. After three years' experience with these electric heaters, I should dislike very much indeed to get along without them and depend upon the central-heating system in the house for heat during the early spring and fall seasons.

To my knowledge, there is no steam or gas motor which is convenient and easy to use for a massage operation, while the electric massage motor is beautifully de-



FIG. 5.—AN ELECTRIC LUMINOUS RADIATOR

signed for such work. It can be placed upon the socket in the bathroom, bedroom, or anywhere in the house. It weighs but 4 lbs., can be handled conveniently, is designed with various massage tools, and the expense of operation is negligible.

I do not remember ever having seen a household lighter for cigars, cigarettes, or pipes, and do not believe that such a device has been designed for convenient use with gas. However, I have in my house several electric cigar lighters, which are exceedingly convenient, and attract

much attention from visitors who enjoy the inspection of our electrical devices.

I do not remember ever having seen an attractive ladies' gas or stove iron for use in the sewing room in connection with light work such as ironing handkerchiefs, linen, etc., or for quickly pressing trousers, or for use in connection with a silk hat. Hence the small, 3-lb. electric flatiron is a household necessity. So much evidence has been offered during the past two years to prove this point that I will not dwell upon the popularity of this device as a domestic convenience.

From a careful consideration of the above, one gets an impression that the electrical engineer has been devoting much thought and study to the use of electrical devices in the home, and the results have been most excellent. It would seem, on the other hand, that gas and steam engineers have not attached much importance to the subject, or else household devices for general use with gas and steam heat have been difficult to design, and perhaps the expense has not been warranted. At any rate, the fact remains that the engineers of the electrical industry have taken the lead, and are deserving of much credit for the attractive designs presented to the public. Evidently their work has only just commenced, because I frequently hear of new articles being developed which leads me to believe that electric applica-

tions

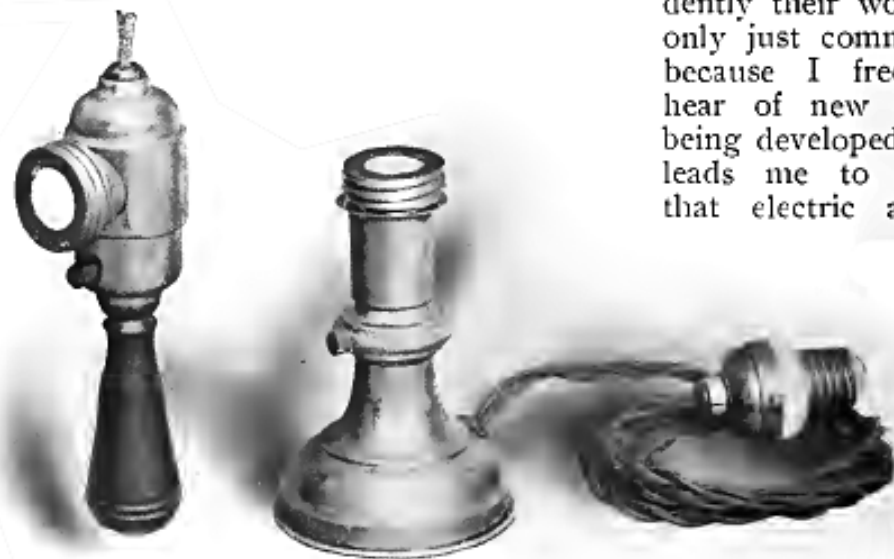


FIG. 6.—ELECTRIC CIGAR LIGHTERS



FIG. 7.—A PART OF THE BATH ROOM, WITH ELECTRIC RADIATOR, MASSAGE VIBRATOR AND WATER-HEATER FOR SHAVING



FIG. 8.—AN ELECTRIC COOKING AND BAKING TABLE, DESIGNED FOR A LARGER FAMILY THAN THE ONE IN FIG. 4

tions in the home will be even more fully realized than we have dared to believe heretofore.

The wiring plans of my house are rather interesting. In many ways they may be helpful to others desiring to take advantage of the conveniences mentioned. In connection with a new house being erected, an easy opportunity is afforded for wiring with two sets of circuits, one circuit for lighting devices and an-

other for heating devices. Architects and wiring contractors are becoming so well posted on the subject of electricity in the home that will be an easy matter for the owner of a new house to secure good advice on the subject, and have plans made up by the architect accordingly. If a \$10,000 or \$15,000 house is under consideration, the extra cost of wiring for a separate heating circuit should not be more than \$15

that is, in addition to the cost of the lighting circuit, and as this represents such a small percentage of the total expenditure, many owners will desire to have both circuits.

In connection with a \$3000 or \$4000 house, it is a very common matter to wire for electric lights; but by giving the subject a little further attention with your electrical contractor, and the architect, it is possible to arrange outlets for lighting socket heating devices at very little extra expense. Such receptacles would be taken off from the lighting wires in a very simple manner. The cost of operating later, at lighting rates, would not be large, for the reason that the electrical devices which will be used on such a circuit consume only a small amount of electricity, and are generally used for only short intervals. They would comprise, for example, the chafing-dish, the coffee percolator, heating pad, cigar lighter, shaving mug, curling iron, baby milk warmer, small frying pan, and many others.

Electricity in the home has an important bearing upon the kitchen of the house; especially is this true where the kitchen is small. Many articles have been written about desirable kitchens, and almost always the recommendation is made that any up-to-date housekeeper should have a gas stove, in addition to the coal range,—also, a goodly sized kitchen table for the convenience of the cook. It is easy to imagine how a small-sized kitchen would be very much crowded if such recommendations were followed. On the contrary, in recommending an electrical outfit for an up-to-date kitchen, the greatest economy in space is secured, as well as maximum convenience. In connection with the several classes of tables shown in this article, particular attention is called to the kitchen cabinet. In building a small house for two persons only, it frequently occurs that a small-sized kitchen and a small-sized pantry are

preferred. In such a case, the kitchen cabinet takes the place of coal range and gas stove; a stock of all the cooking material is kept in the cabinet, and it also answers the use of a table, so that it is practically the only piece of furniture in the kitchen except chairs. Fig. 4 shows a plain type, small table for a small-sized family; Fig. 8 shows a large table for use with a large family.

An incandescent light is placed at the front of the table so as to indicate that the current is on. Some of the first experiences in our house without this indicator light were annoying, and it is considered to be a very convenient improvement.

The fuse block will be noticed also on the back-board. If a fuse blows for any reason, it is exceedingly convenient to replace the plug, and this makes a very simple arrangement.

Below is given a list of desirable articles for small and large-sized families:—

SMALL-SIZED FAMILY

Seven-inch frying pan.
Two-quart cereal cooker.
Oven.
Two-quart teakettle.
Double quick broiler.
Grid.
Coffee percolator.

LARGE-SIZED FAMILY

Ten-inch frying pan.
Four-quart cereal cooker.
Kettle.
Oven.
Double quick broiler.
Grid.
Coffee percolator.
Four-quart vegetable boiler.

Such outfits can be purchased complete for about \$60 and \$30, respectively, thus comparing favourably with combination coal and gas stoves or large-sized ranges.

It would seem almost unnecessary to say anything about electricity for light. At the same time, great convenience and small lighting bills can be secured by paying particular attention to plans for wiring when the house is being built. On the lower floor of my house there are no chandeliers, but arrangements for attractive ceiling lighting, using the reflector type of lamps. The ceilings are covered so that the lamp

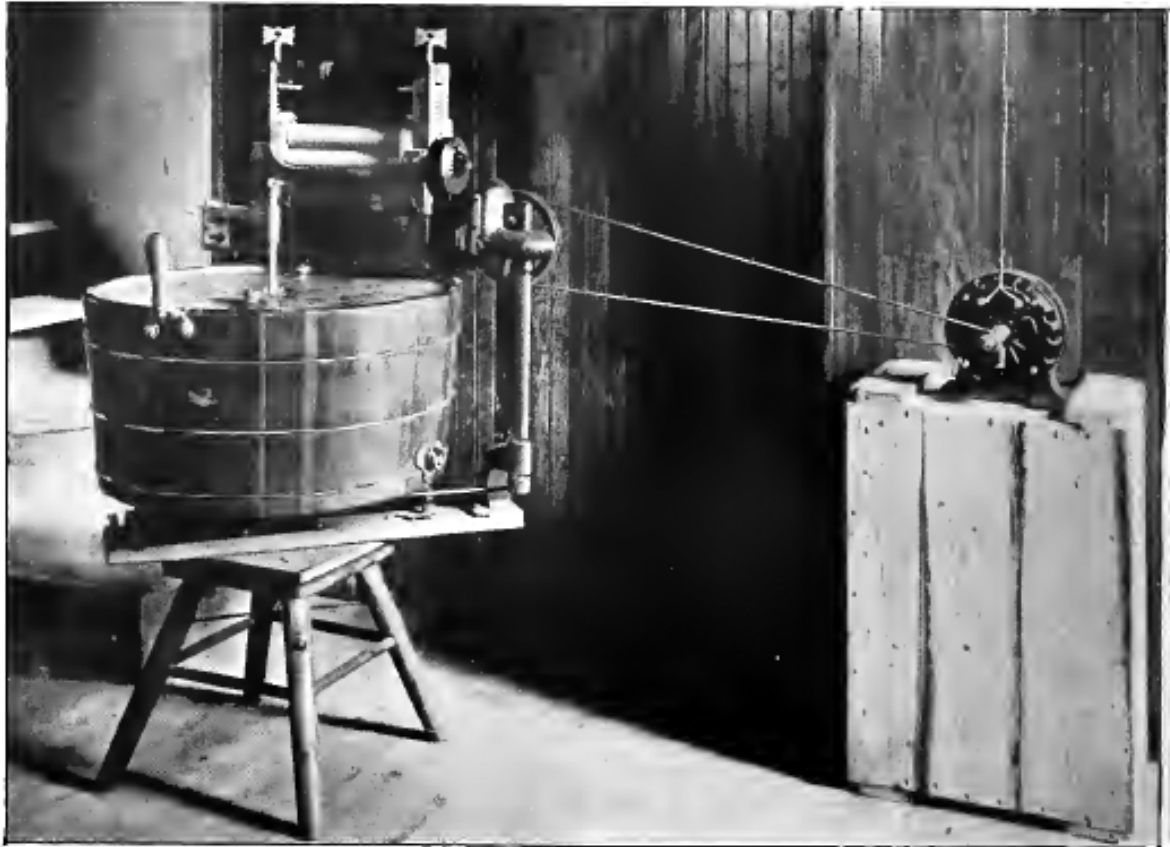


FIG. 9.—MOTOR DRIVING A WASHING MACHINE AND WRINGER IN MR. HILLMAN'S HOME

reflects its light at an angle of 45 degrees, giving the best illumination on the dining room table. Eight lamps in all are installed in this room, and the switches are arranged so that one lamp can be switched on for general lighting; two or four lamps for good illumination, and the entire eight for a brilliant display.

In the living room ten lamps are installed, and these are of the high-efficiency, $2\frac{1}{2}$ -watt type which have recently been commercialized. By paying particular attention to improvements in lighting in this manner, I have secured even greater illumination in some rooms, or lower costs for the same illumination.

One of the most recent, and greatest, improvements in electric lighting is shown in connection with one lamp which I have in operation on the front piazza. It is known as the "Tungsten" type, and is remarkable for its very high efficiency. The illumination from this one lamp is

such that it has been possible to do very fine embroidery work for several hours in the evening under its rays. Fig. 5 has been reproduced from an evening photograph, and gives a fair idea of the illumination obtained.

As people generally have, for a long time, been well posted on the subject of electricity in the home, for light, and are generally taking a keen interest in educating themselves in regard to electricity for heating operations, it is also well at the same time to know about the use of electricity for power in the home. The sewing-room electric motor is probably the most convenient of all. It is becoming universally used; every up-to-date electrical company advertises it in their monthly bulletins, sent to prospective users, and it was in this way that we were led to the use of the motor in our home. It can be operated for an hour for about a cent, and its first cost will vary from \$10 to \$12, depending upon condi-

tions, the type of sewing machine, etc. The electrical company will install it and in many cases offer the motor on the installment plan, to be paid for monthly,—a small portion in addition to the regular monthly electric bill.

A small motor in the laundry or work shop is exceedingly convenient, and at the same time represents a simple installation. It can be used for operating the washing machine, the wringer, the buffer for cleaning

tached to it, as it is a permanent installation thereafter, and no repairs or renewals are required. The amount of electricity required to operate it is so infinitely small as to be negligible.

Before closing, it would be interesting to call attention to the use of electricity in the home by referring to the increasing numbers of electric automobiles which are being used. This increase is due in no small degree to the successful intro-

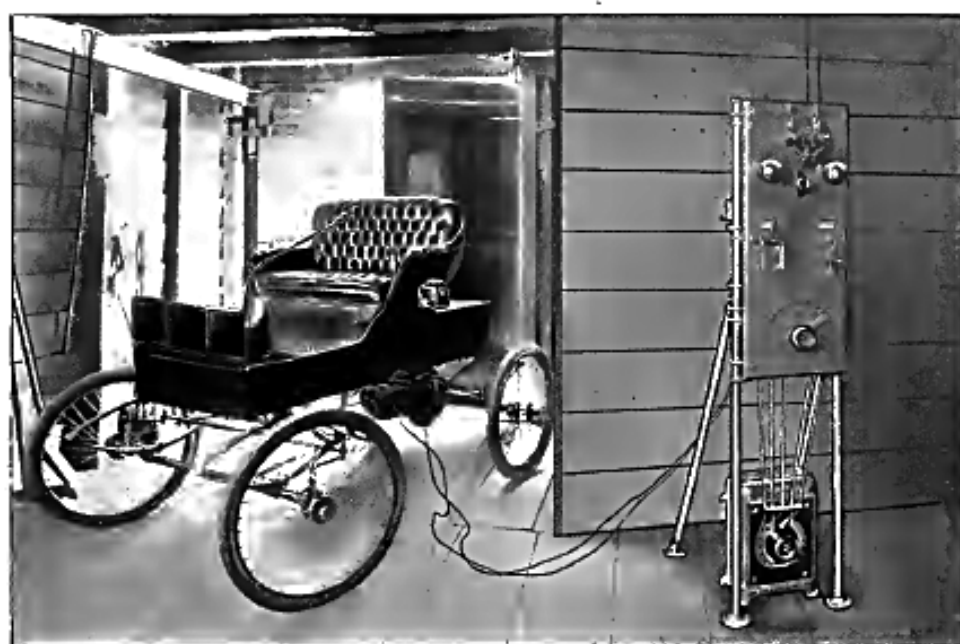


FIG. 10.—WITH THE ELECTRIC VAPOUR CURRENT RECTIFIER, ELECTRIC AUTOMOBILE BATTERIES CAN EASILY BE CHARGED AT HOME

silverware, the grinder for sharpening knives, etc.

Many have probably never heard of the new electric door bell, which in many respects is similar to the ordinary electric door bell as commonly used for years; but this new one eliminates the use of batteries, which from time to time need renewing, and unless the owner or occupant of the house is mechanically inclined the renewal of the batteries generally means something more than trifling expense. The first cost of the new door bell installation represents the only expense at-

duction of the electric rectifier for charging the batteries. Until this rectifier was a commercial success, the batteries of the electric carriage could not be charged at the owner's home, because the supply of current on his circuit was not of the right character. With the introduction of the rectifier, however, the electric automobile can be charged in any home regardless of the character of electricity used. Therefore, when a new home is under consideration, the stable, as well as the house, is wired complete for electric devices.