

ELECTRICAL WATER STILL

Device Invented for Distilling Wate That Has Capacity of One Gallon Per Hour.

One of the latest applications of electric current in the laboratory is the water still. This device has a capacity of one gallon of distilled water per hour and operates on 110 or 220 volt direct or alternating current.

The device consists of a resistance element, superimposed on which is a very shallow retort properly insulated. so as to use up all the heat energy ob tainable. The dome and the inside of the retort throughout are block tin lined. Surrounding the retort is a condensing trough into which cold water is allowed to run. The condensing tube leading from the retort is im-mersed in this trough, and has suff-cient fall to deliver the distilled water rapidly. The water supply is allowed to come in at the bottom of the trough. and absorbs the heat from the condensing tube; the upper layer of water, therefore, being warm, is utilized for filling the retort, the excess being al-



Water Distilled by Electricity.

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lowed to go to waste. In this manner the water is pre-heated, and 98 per cent. of energy of the still is utilized.

Increased Use of Electricity.

The rapidly-increasing use of elec-tric power is remarkably illustrated by the report of the United States bureau of census upon street and othe electric railroads, recently issued for 1907. It shows 4,714 establishments as compared with 3,620 at the end of 1902, an increase of 30 per cent., of which 1,252 are municipal, the latter having increased by 53.6 per cent. The total mileage of main line is 25,547 compared with 16,651 in 1902, an in crease of 53.4 per cent.; and the passen gers carried total 9,533,080,766, an in crease of 63.3 per cent. The fact that the total output of stations, four and three-quarter billion kilowatt hours has increased by the much larger per centage of 110.3, would indicate an in creasing sale of power for commercia and domestic purposes other than trac-tion, while the total income of all plants having been more than doubled for an increase in plant cost of less than 100 per cent., is a tribute to the efficiency of both plant and manage ment, as well as to the flourishing state of the industry.

High-Voltage Underground Wires. It is only in comparatively recent years that engineers have deemed it safe to carry electric currents of high potential or voltage in underground cables buried under the streets of cities. But nowadays systems of 9,000, 11,000, 13,200 or even 20,000 volts are employed with entire relia-bility and safety. It is said that when local and commercial conditions justiify, pressure as high as 25,000 volts can be used satisfactorily under-ground, even for systems aggregating 100 miles of cable. But no single line of such a system should be longer than about 20 miles. On short lengths underground or under water, as a part of a long overhead transmission line, cables operating at 40,000 volts may be used.



Detonator in Air.

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Plan for Wireless.

be employed. The parts of the system

are as follows: (D)) is the detector, (B) the battery, (TR) the telephone re-

Connect a wire from one binding

ELECTRIC MEAT SAW.

tricity.

by cords and weights from two

A meat saw which is operated by a

ceiver, (C) the condenser.

REASONS FOR SOURING MILK. Lactic Acid Bacteria Cause Milk to

Sour; Introduced Into Fluid in Various Ways.

Many of the lower plants find sugar a suitable food. In making use of this food, the sugar is chemically changed and in its place we find many new chemical compounds differing widely from the sugar from which they originated. Some bacteria in this process form various kinds of acids and gases. Among these is a large group of closely re-lated bacteria which cause the souring of milk by breaking up the milk sugar into lactic acid. On account of this peculiarity they are commonly called the lactic acid bacteria. Typical lactic acid bacteria do not form gas. They do not have spores and therefore are destroyed at a comparatively low tem perature. They are extremely widely distributed, and it is only under excep-tional conditions that milk is obtained entirely free from them. They seldom or never occur in the udder it self, but probably are introduced into



Typical Lactic Acid Bacteria

the milk with the hair, bits of feces, and dust that fall into the milk in the barn.

motor and which is easily adjusted to Milk is an excellent medium for the the work in hand is shown in the cut. growth of lactic acid bacteria, and un-The saw, which is partially inclosed der favorable temperature conditions they multiply with astonishing rapidin a protective housing, is suspended ity. which run on an overhead track. An-

The acidity of the milk is so close ly connected with the life processes of this group of bacteria that it may be taken as a rough measure of their development. The acid, as fast as it is The acid, as fast as it is formed, unites chemically with the casein, which exists as very fine particles suspended in the milk serum. When the acid reaches a certain per that is slightly sour is added to hot coffee, or is otherwise heated, it curdles.

Milk which has undergone a strictly lactic acid fermentation has a firm curd, free from gas bubbles and with a small amount of whey on the sur-face. When shaken the curd breaks up into small particles which settle slowly, leaving a clear whey. The milk should have a pleasant acid taste. far as is known, none of the products of the bacteria of this group is of a

poisonous nature. Some of the bacteria commonly classed with lactic acid bacteria form acids other than lactic, together with large quantities of gas. Milk curdled by bacteria of this class shows gas bubbles and has a disagreeable taste. The lactic acid bacteria not only are able to grow in an acid medium, but to a certain point the acid is a favorable influence. Many bacteria, however, find the acid detrimental to their development and are not able to grow long in milk in competition with lactic acid bacteria. When the milk be gins to taste sour the growth of nearly all nonacid-forming bacteria is checked. The activity of the lacticcid bacteria thems

KEEPING PROFITABLE COWS.

Many Kept in Iowa That Do Not Pay for Their Feed and Care.

A dairy authority in Iowa asserts that there are hundreds and hundreds of cows kept for dairy purposes in Iowa which do not yield sufficient to pay for the feed which they consume, for they consume as much feed as do the profitable ones and require as much time and care in milking.

There was a time when the dairy cow was not expected to milk for more than six months in the year, but with the present high prices for labor and feed this condition of affairs can no longer profitably exist.

The lactation period should be at least nine months in length. The amount of milk a cow should produce to be profitable is variously stated at from 5,000 to 6,000 pounds annually, or sufficient to yield from 200 to 240 pounds of butter fat. This should vary, of course, with the locality, price of labor, feed, etc. However, it is safe to say that a cow with reasonably good care, that does not produce the lesser of these amounts is not a profitable animal. Yet how large a percent age of so-called dairy cows will stand this test?

In order to determine accurately ow's usefulness as a dairy animal it is well to weigh one day's milk every week or ten days during the lactation period. At the same time a sample should be taken for testing. The time of freshening should also be noted in order to determine the length of the lactation period.

The same authority asserts that it is good plan to keep a book account with each cow, charging her with cost of feed consumed and labor expended, and credit her with value of milk and calf. In this way it will not be difficult to pick out the non-paying individuals.

DAIRY NOTES.

Hollow concrete blocks make an ideal silo that will not crack or the contents easily freeze. Machines for making silo concrete blocks may be purchased for about \$20.

With the exception of where the very best cedar is used, all wooden silos should often be painted inside and out in order to preserve the wood and to prevent leaking. For paint for this purpose, coal tar is about as good as any kind. It serves well for filling cracks and is also a good

The question of the one purpose and the dual purpose dairy cow has almost ceased to be discussed by rational dairymen. "The difference between the dual purpose dairy cow and the dairy cow," says W. D. Hoard of Wisconsin, "is just the difference between a machine that is made for its pur What would you think of a man who would go out to cut grass with a sewing ma chine?"

his own farm and comes to under stand the most economical use of skimmed milk and manure, dairying will become a profitable industry. The skimmed milk and manure combined may be made to represent as much as the butter fat of the dairy. It is better to build two or thre silos of narrow diameter than one of wide diameter. When silage is used for summer feeding it will keep bet-

feed.

Partial Cow Ration. No one should attempt to run a steam engine that was driving a modern threshing outfit with but 30 pounds of steam. Yet many dairymen at-tempt to get profitable results from their cows by feeding them a partial ration. They attempt to run them with

WESTERN CANADA'S HAPPY PROSPECTS.

In no year since the development of Western Canada began has spring brought a brighter outlook than it brings this year. In no preceding brings this year. In no preceding spring has there been greater assurance of advancing development and prosperity. The movement of immigration has already assumed large proportions, and is as desirable in character as it is satisfactory in volume; from across the Atlantic sturdy, industrious and thrifty newcomers are ar-riving in large numbers, homeseekers from Ontario and the other older Provinces are coming in a steady stream, and from across the international boundary a movement is already in full flow, which, it is confi-dently predicted, will beat the records of all previous years; special settlers' trains are crossing the line, loaded with effects, actual material wealth being thus brought into the country at the rate of millions of dollars' worth monthly.

The movement is so unprecedented ly large that extra Dominion Immigration officials have had to be provided at both North Portal and at Emerson, and it is estimated that the total num-ber of new settlers from the United States this year will be 70,000, at least, and may run well up toward 100,000. Last year's total of new set-tlers from the South was 53,723; thus the area that will be placed in wheat and other grains this year will greatly exceed that of last year. Settlers are making extraordinary efforts to get on their lands and begin seeding opera-tions. The price of wheat now, away above the dollar mark, is incentive enough, and when one has in view the splendid results that the past few years have shown, it is not to be wondered at that the present will be the banner year for Immigration to Canada. Ask your nearest Canadian Gov-ernment Agent for rates of transportation, and he will also send you illustrated pamphlets.

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possible to secure a homestead of 160 acree free, and additional 160 acres at \$3 per acre.

"The development of the country has made marvelous strides. It is a revelation, a rec-ord of conquest by settlement that is remark-able."-Effici. from correspondence of a National Editor, who visited Canada in August last.

The grain crop of 1908 will net many farmers \$20.00 to \$25.00 per acre. Graine raising, mixed farming and dairying are the principal industries. Climate is excel-lent; social conditions the best; railway ad-vantages unequalled; schools, churches and markets close at hand. Land may also be purchased from railway and land comparise purchased from railway and land companies.

For "Last Best West" pamphlets, maps and information as to how to secure lowest railinformation as to how to secure lowest rail-way rates, apply to Superintendent of Immi-gration, Ottawa, Canada, or the authorized Canadian Government Agent:





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pose and one that is not.

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ter with small top surface exposed. The power of production in a cow s inherited. If the cow is a good is inherited. dairy animal by inheritance and is given good care and feed she will become more productive as she increases in age. The quantity rather than the quality of her milk is influenced by

Cotter Pin Wire Terminals.

Good connections on the end of wires for batteries can be made from cotter pins, Fig. 1, about one and onehalf inch long Each end of the wire is put through the eye of a cotter pin, twisted around itself and soldered. The connection and eye are then covered



Arrangement of the Pins.

with tape as shown in Fig. 2. When connecting to batteries, spread the pin is commonly known as bar solder. and push the parts under the nut with one part on each side of the bindingpost. When the nuts are tightened the connection will be better than with the bare wire.

Electrical Rat Trap.

This unique device for killing rats consists of four metal plates insulated from each other. To the first and third plates is connected a wire from one side of the ordinary lighting circuit. To the second and fourth plates runs a wire from the other side of the cir-Thus adjoining plates are of opcuit. posite polarity and a rat stepping

other parallel track carries an electric motor from which depends a flexible shaft to turn the saw. The weights just about balance the saw and its housing so that the latter may readily raised up out of the way when not in use.

Aluminum Solder.

One of the things inventors have een working on for a long time is to obtain an effective solder for joining aluminum. Lack of such a solder has been one of the drawbacks in the more extensive use of aluminum in electrical work.

A new compound for this purpose has been patented. It consists of 68 parts of tin, 29 parts of zinc, two parts of antimony and one part of phosphorus, by weight. These different com-ponent parts are first thoroughly heated, separately to a liquid form, then thoroughly mixed and allowed to cool off and then used in the form of what

Removing Tools from a Barrel.

While reaming out a hole in a bar rel the reamer slipped through on the inside. Several methods were applied to extract the reamer from the barrel, with failure. At last a simple de-vice, and one easily prepared, was used with success. The device con-sisted of a 34-inch gaspipe of the proper length and a piece of steel wire. The wire was bent in the middle and inserted through the gaspipe The ends of the wire were bent in the shape shown, and by moving the wire across from the to another is electro-cuted. up and down through the pipe the jaws of the wire will open and close

and finally ceases entirely when the acid reaches a certain concentration, which varies with different varieties. Consequently sour milk usually contains a nearly pure culture of one or at most two or three closely related varieties of bacteria. While the lactic acid bacteria are

considered very beneficial in butter and cheese making, they are undesir-able bacteria from the standpoint of the milk dealer or consumer. It is almost out of the question absolute ly to prevent their presence in milk. but the initial number may be much reduced by observing a few simple rules of cleanliness in handling the milk. Every precaution which reduces the amount of dirt in milk reduces the number of bacteria correspondingly. The important factors here are freedom from dust at time of milking, brushing the cows, wiping the ud ders, and small-mouthed milk pails. It is also of great importance to cool the milk as soon as possible after milking to below the temperature at which lactic acid bacteria grow rapid-This temperature is controlled by practical conditions, such as the temperature of the water available for cooling, but it should not be higher than 50 degrees Fahrenheit

Breeding geese must not be fat. They should have corn in limited quantities only during cold weather, and then at night. Oats steeped in warm water makes a better feed. should be fed in V-shaped troughs Plenty of vegetable food, such as cab-bage, boiled potatoes and clover. bage, boiled potatoes and clover, should be supplied until the grass begins to grow and the birds go to pasture.

but "30 pounds of steam." Chemists tell us that two-thirds of what a cow consumes goes to maintain her body. The remainder goes toward milk production.

It is cvident to all that the profit must come from the feed over above that which the cow requires for maintenance, and that the more she eats the greater will be the profit. There are many good cows in the country that are not recognized as such, and cannot be made profitable unless they receive more feed. There is no profit in feeding partial rations to milch cows. We cannot get profitable sults running cows on "30 pounds of steam." If there is a food shortage, one might better feed full rations to half the number rather than feed the many on half rations. In the latter case there will be much work and little profit. In the former, the cows are sure to give profitable returns and the labor of caring for the herd would be much lessened. - Milk Re porter.

Milk from Either Side.

Cows are always milked from the off or right side because they have been taught that way. A cow can be milked from either side if she is brought up right, but the lessons must begin at the earliest handling of the heifer. Milk first from one side and then the other, and in a short time the heifer It often comes handy will not mind. to milk from the left side and the cows should be trained to stand for it. The man who will make a pet of his cow will have no trouble and will get greater benefit at milking time than the one who treats her as a stranger if not an enemy.



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