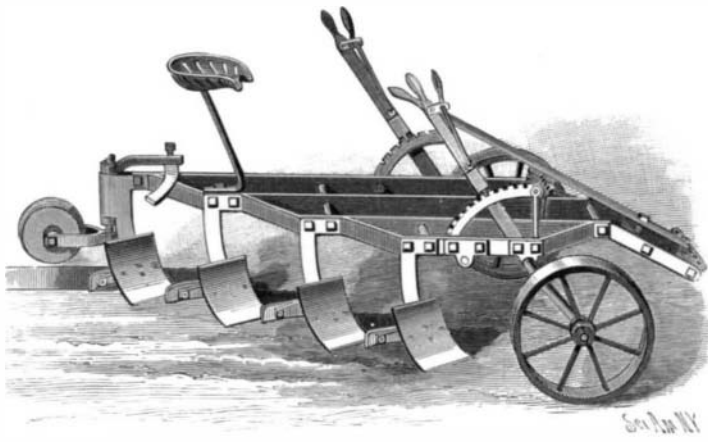


**A NEW GANG OR CULTIVATOR PLOW.**

Our illustration represents a novel cultivator plow which has been patented by John T. Lucas, of Wasco, Ore., and which is characterized by the use of a rear guide-wheel having but slight frictional engagement with the land, and by the use of mechanism for raising and lowering all the shares simultaneously and for leveling the plow.

The body of the plow is composed of two side beams and two projecting intermediate beams. The right-hand side beam is bent to form a series of steps, to which rectangular shares, concaved on their forward faces, convexed on their rear faces, are bolted. One or more shares are provided with landsides.

The landsides prevent the shares from slipping upon

**A NEW GANG OR CULTIVATOR PLOW.**

hilly ground; and their shape is such that much of the friction usually met with is avoided. The shares and landsides are especially adapted to three-wheeled plows, the draft being considerably reduced by reason of the small pressure between the land and the bottom of the shares and their landsides.

The rear share differs from the others, in having an integral sleeve which receives a vertical shaft carrying at its lower end a fork in which a beveled guide wheel is journaled. A forwardly extended arm is attached to the shaft, moves over a guide to the right, and is prevented from moving toward the land by a pin with which it engages. The guide-wheel, therefore, requires no attention and need not be operated by hand.

At the front end of the plow a clevis of angular construction is arranged. One member of the clevis is adapted to travel laterally; while the other member is provided with a series of apertures adapted to receive a draft device. The clevis is laterally shifted through the medium of a hand-lever to vary the draft to and from the land when the plow is in motion.

The plow-frame is provided with separate, parallel axles, formed with crank-arms by which the supporting wheels are carried. A lever is connected with each axle. By means of the lever at the left of the frame and attached to the rear axle, the shares can be raised and lowered; and by means of the left-hand lever the wheel which travels in the furrow can be raised independently of the landside wheel, so as to level the plow.

SEVERAL prominent railroad men have given a number of cars to be used for religious work, and they are described in a recent number of *The Railway Review*. The cars are 80 feet long and there is a 50-foot chapel capable of seating a hundred people. They are kept in repair and go through the shops for paint and varnish whenever needed. They are met with almost universal

favor by the officials of the railways and they are always given free transportation over any line. The car is really a parsonage, church, choir and chapel combined. A distribution of bibles, tracts and religious newspapers is made among the railroad men and people in destitute places. The cars are enabled to make calls at small towns which are long distances away from the nearest church. The chapel car is specially welcome at the car shops. The pulpit is at one end of the car and the audience is seated as in the ordinary day coach.

**A FOUR-SPINDLE HORIZONTAL CAR-BORING MACHINE.**

A machine has been constructed by the J. A. Fay Company, 10 to 30 John Street, Cincinnati, Ohio, which is designed to overcome the difficulties met with in operating the car-borers used in the construction and repairing of railway and street cars, agricultural implements, and heavy wagons. In this new machine the driving or belt power of the boring spindles has been so improved that the capacity in boring holes of large diameter has been considerably increased.

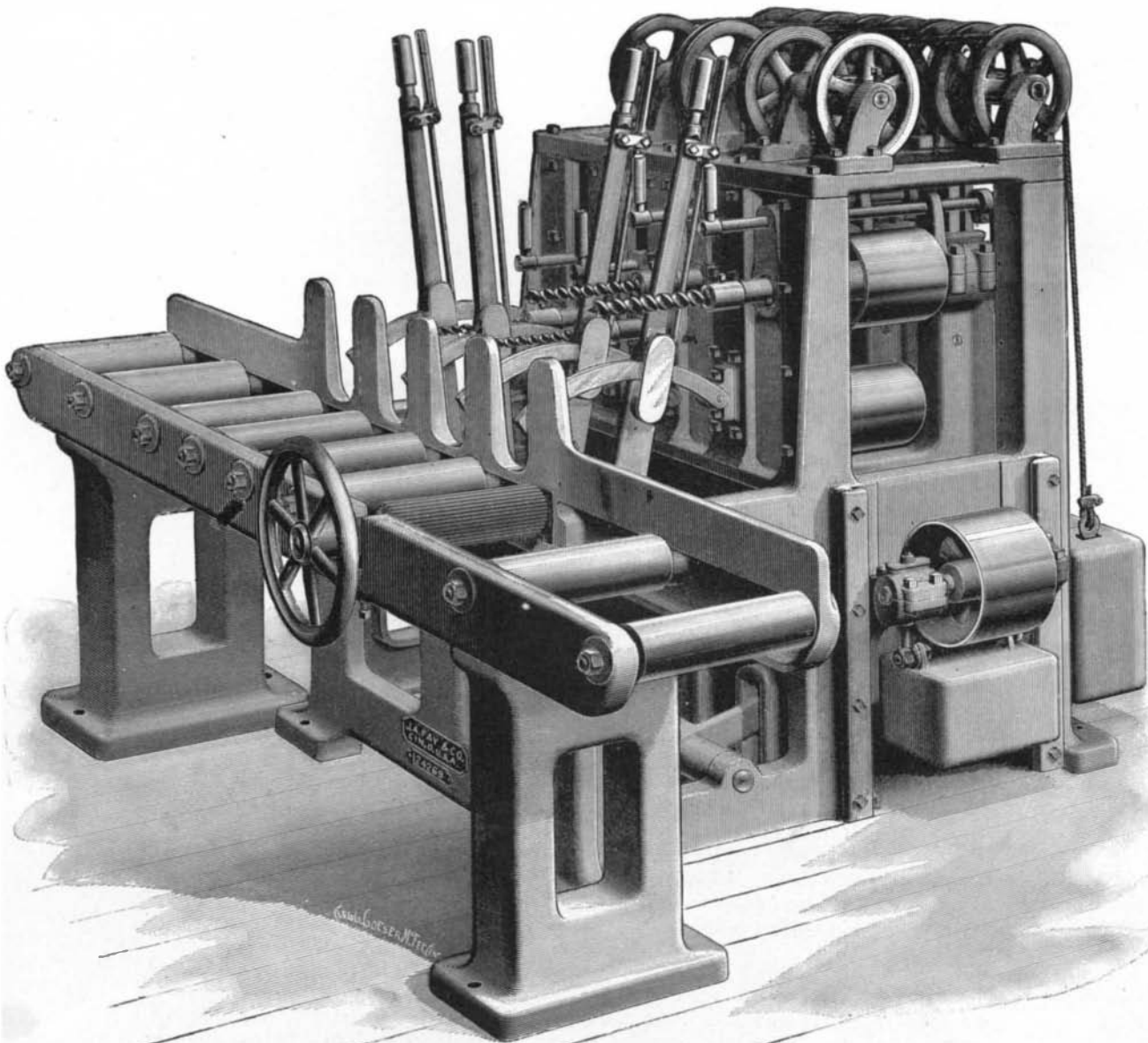
The working parts of the machine are all supported by a heavy cored column.

The boring spindles are  $1\frac{1}{8}$  inches in diameter and are double key-seated. They have a vertical movement of 13 inches controlled by adjusting levers, and a transverse movement of 16 inches. Abundant belt power is provided for boring holes 3 inches in diameter. The spindle pulleys are 7 inches in diameter by  $7\frac{1}{2}$  inches space. The

spindles run in heavy self-oiling bearings of gun metal.

For each of the spindle frames there are four gibs whereby the wear is readily taken up. These frames are rigidly supported at top and bottom, are counterweighted, giving them an easy vertical movement, and are adjusted by levers having an automatic locking device consisting of a double-eccentric working against a guide that grips with increasing force when the strain is applied. The spindles are driven by one belt properly adjusted in tension by an automatic sliding tightener. The table is 8 feet long by 15 inches wide, and is supported on two heavy cored stands; its sides are strongly ribbed and carry nine friction rollers, one of which is fluted, and provided with a hand wheel and with a vertical adjustment. The fence on the back of the table has a high support on each side of the boring bits.

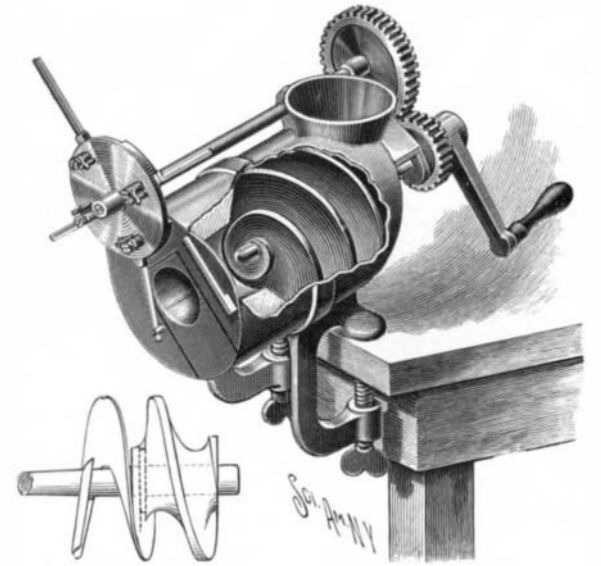
On the top of the frame are two sets of sheave pulleys giving a direct vertical pull on the spindle frame

**A FOUR-SPINDLE HORIZONTAL CAR-BORING MACHINE.**

and avoiding any binding. Counterweights on the back have rollers which reduce the friction on the sides of the frame.

**A MECHANICAL BUTTER MOULDER AND CUTTER.**

In restaurants and hotels it is customary to form butter into small pats or disks of such size as to answer for one person. A machine, by means of which such pats can be quickly produced, has been invented by

**A MECHANICAL BUTTER MOULDER AND CUTTER.**

Leopold Linkiewicz, of 176 Graham Avenue, Brooklyn, New York city. The machine comprises an inclined barrel or chamber formed in two parts fastened together by a pin and bayonet-slot connection. One end of the barrel has a hopper for the reception of the butter, and the other end has a discharge opening. Within the barrel a crank-operated spiral is mounted, which is connected by gearing with a shaft journaled above the spiral. The spiral is composed of two parts, one of which is made of wood, and the other of which is composed of a flat plate of spring metal secured by one end to the wooden part, being otherwise unsupported, so that it can be compressed during its rotation by engagement with the sloping end surface of the barrel. The butter is, therefore, compressed and forced toward the wooden screw portion and issues from the discharge opening in a bar of cross-section corresponding with the shape of the opening. The form of this cross-section can be changed by the employment of

slides with variously shaped openings. The shaft above the spiral carries at the discharge end of the barrel a disk on which spring-held knives are pivoted, sweeping past the discharge opening. A pin on the barrel engages the outer ends of the knives to retard them just before passing the discharge opening, so that the butter is cut by a quick, sharp blow. On the side of the discharge opening opposite the pin, a knife-clearer is secured which serves to clean the knives as they sweep around. Butter pats having variously formed surfaces can be produced by the use of special knives.

The government of New Zealand now sends communications by carrier pigeons between Auckland and Great Barrier Island, a distance across the water of 30 miles. The service is controlled by the Post Office Department, and the fee for a single message is one shilling and a stamp for this amount has to be bought at the Post Office.

**An Emerald Craze in Colombia.**

United States Minister C. B. Hart writes: "Until very recently emeralds were a drug on the market of Bogota. One who desired to buy them had only to wait and have them brought to him. The famous Muzo Mine, which has produced emeralds of great value and in large quantities, lies near Bogota, and the people of this city had long been familiar with its products. This mine is operated by a French company, which insists that for the past year or so it has found almost no emeralds. However, from this source, or from some other, crude emeralds have continued to come into Bogota. Of the cut stones, set and unset, there has been an abundance in the market. Hard times have compelled many persons to offer for the sale their highly prized heirlooms, and these have been obtainable, as a rule, at very low prices. In July an emerald craze seized upon Bogota. The jewelry stores and all other establishments where emeralds are dealt in were besieged by persons who wished to buy, and by others who wished to sell; and for the same reason, men and women crowded the streets, standing in the roadway as well as on the sidewalk, some displaying their emeralds and others their money. A jewelry establishment located on the most prominent corner in Bogota was compelled to ask the police to drive the crowd away.

"As the news spread outside of Bogota, emerald owners began to rush in. This swelled the throng and sent the fever up several degrees. Sales were made right and left, at prices hitherto unheard of in this market. Persons who had not thought of selling, tempted by the wild rush to buy, brought out their emeralds and began trading. Nobody could explain the real cause of the excitement, and many are now beginning to realize that it was without real cause. In a few days the fever reached its height and began to decline. While it lasted emeralds sold, on a gold basis, at about three times their value in this market just before the excitement began. It is estimated that up to this time about 4,000,000 pesos have changed hands as the result of the furor.

"The crowd soon disappeared from the streets, and many buyers who went in on the flood tide find themselves with emeralds that will not bring the price they paid for them. Others, also inexperienced, have more or less excellent imitations as souvenirs of this extraordinary movement. It does not appear that the expert dealers have bought so extravagantly as the general public, and yet it is believed that some of these have far overreached themselves.

"The only approach to an explanation for this craze is that a Bogota dealer who went to Paris recently, on his return to this city began to buy emeralds at higher prices than had been ruling in the market. This seems to have started it. Some of the experts say that this dealer drew out of the market long before prices reached their height, and that he did so because emeralds were selling in Bogota for more than they would bring in Europe."

**A RACING AUTOMOBILE.**

In Paris it has become quite the fashion to have automobile races covering long distances, and manufacturers build special machines for this purpose. The prevalence of good roads in France favors this sort of sport. But in this country, the road conditions as a rule, are against automobile racing, though the era of the bicycle has done much to effect road improvement.

Our illustration of a special racing gasoline propelled Winton machine showing, Mr. Winton's hand on the driving lever, has been built extra heavy to withstand the strains liable to be put upon it by reason of rough roads, and also to enable it to travel at a speed of twenty-eight miles an hour, where possible. It will be noticed that acetylene dash lamps are on the front, and also the signal horn midway between them. It is equipped with a seven horse power Winton engine and is expected to do the work intended for it very easily. The vehicle is to be used in making a time record between Chicago and New York sometime this fall.

**A Pneumatic Letter Copying Book.**

A novelty is a pneumatic letter-copying book. The device is intended particularly for the use of travelers who cannot have access to a press. The book is similar to an ordinary copy book in general appearance and is provided with clasps to hold the covers firmly and furnish resistance to internal air pressure. The leaves are moistened in the usual way with a brush or

sponge, or damp cloth, and the book is closed and clasped and the air bag is pumped up by means of a bulb. The pressure is even and good copies can be obtained by its use.

**A PORTABLE ACETYLENE GAS LAMP.**

A new acetylene gas lamp has been invented by Peter Josserand, of Josserand, Tex., which is particularly adapted for use as a table-lamp, and which is arranged to insure a uniform, perfect, and brilliant light.

The lamp comprises a base supporting a bowl forming a generator in which the calcium carbide is contained and in which gas is generated. A cap screws on the generator and terminates in a pipe by which a wa-



THE JOSSERAND ACETYLENE-LAMP.

ter-reservoir is supported. A tube provided at its upper end with a burner, extends through the reservoir and serves to conduct the gas. Water is supplied from the reservoir to the generator below by means of a pipe provided with an automatic valve. As shown in our enlarged detail view this valve has a downwardly extending stem fitting loosely in the end of the water pipe, and an upwardly-extending stem receiving the end of a rod screwed in a cap closing the valve-chamber. The screw-rod is provided with a collar engaged at its lower end by a spring coiled around the stem. A tube opening into the valve-chamber above the valve, conducts the water to the generator.

When the screw-rod is screwed down, the valve is seated to cut off the water supply, but when the rod is screwed out until the collar abuts against the under side of the cap so as to allow the spring to hold the valve loosely to its seat, then the water rises in the valve chamber and flows drop by drop to the generator. When the gas pressure overbalances the water pressure, the valve is seated, thus preventing the fur-

ther generation of gas. When the gas pressure has diminished, the valve is opened by the water and generation is resumed.

The supply of carbide can be replenished by unscrewing the generator cap and placing the required quantity of the material within the bowl. The water reservoir can be filled by means of a filling cap.

**British Consular Reports.**

Feildon's Magazine laments the inadequacy of the British Consul Reports which are issued without notice at uncertain intervals, and which are mostly prepared by men who have not had the advantage of any commercial experience. The reports are sold and with few exceptions are quite useless either in consequence of the incompetency of the authors or from the great delay in their publication, rendering the information out of date. Of late, instead of giving information which might possibly be of value they consist, for the most part of reproving homilies addressed to British manufacturers on the subject of their failings. A properly organized commercial section is now a necessity to the government of a manufacturing country. This is shown by both Germany and the United States whose consular service in trade respects is very superior. The American Consular Reports are issued daily and are sent to all newspapers who will use them. The Consular page in the SCIENTIFIC AMERICAN SUPPLEMENT, which is published weekly, gives an excellent idea of the value of these reports.

**On the Blue Color of Water.**

In an article that appeared in No. 1, Vol. XVIII, of the *Receuil des Travaux Chimiques des Pays-bas et de la Belgique*, W. Spring again discusses the questions as to the cause of the blue color of water. Many physicists have regarded the blue color of the sea and of lakes as not belonging to the water itself, but as being produced by the reflection of the sunlight from invisible particles which the water always contains in suspension. This idea was suggested by the theory then held regarding the cause of the blue color of the sky. Earlier experiments of Spring led him to the conclusion that water itself is blue, and that the fine particles which it holds in suspension, while contributing very much to its illumination, exert no appreciable influence on the intensity of the blue color. Soret had previously, in 1869, expressed this same opinion. As neither the work of Soret nor that of Spring appears to have convinced everyone, Spring has again taken up the subject with the object of determining experimentally the optical properties of the particles in clear waters, parallel rays from a powerful electric light were passed through (1) distilled water, (2) the drinking water of Liege, and (3) rain water that had been allowed to stand. In all cases the presence of particles became apparent, the clearest being the drinking water. There was no evidence of a blue water. Now four experiments were performed.

1. A cell containing a solution of magenta was interposed between the source of light and the tube containing the water, so that only red light passed through the latter. Under these conditions the light appeared red and its intensity was not diminished.

2. The light was passed through a solution of picric acid before it was passed through the water. The yellow light was not in the least modified by being passed through the water.

3. The water was illuminated by blue light produced by interposing a cell containing an ammoniacal solution of cupric hydrate or a piece of cobalt glass. The result was the same as in the first two experiments. The color was not changed by passing the light through the water.

4. Green light produced by passing it through a solution of nickel chloride gave the same results, that is to say, the color was not changed.

These experiments show that the particles, to which clear water, distilled of natural, owes its illumination, have the power to reflect the red, the yellow and the green waves, and that they cannot, therefore, be the cause of the blue color of water. Reflecting with equal facility waves of all lengths, they return the sunlight to us without chromatic change. The author concludes that water is blue of itself, and that the particles which it holds in suspension are the principle cause of its illumination. According to their nature, they determine also the modification of the color of the water, and produce greenish tones when they do not destroy all the natural color.—Am. Chem. Jour.



THE WINTON RACING VEHICLE.