will be set on fire by the concussion and take on the form of falling stars.

It is, however, unnecessary to wait for the earth's passage through the November meteor-zone to witness the phenomenon of a falling star. Hundreds of other meteor-groups have been observed, which, excepting the August group, are not so well defined. They are all extremely diverse, and they cross the plane of the earth's orbit at widely different angles. Consequently on any clear night falling stars maybe seen to blaze forth suddenly in the sky, rush on their headlong course, and then disappear, leaving oftentimes a train of light to mark their course. Instances are on record where falling stars were of such brilliancy as to be visible in the daytime even, when the sky was overcast.

A surprising number of these tiny bodies fall through the atmosphere every day. The average number of those sufficiently bright to be seen at night with the naked eye is no less than seven millions every twenty-four hours. If we include the number visible through a telescope, the average must be increased to four hundred millions. Interplanetary space swarms with meteoric matter! The work accomplished by these systems made up of innumerable atoms of cosmical dust, their origin, the part they play in the economy of the universe, and their mysterious association with comets, are questions of the deepest interest to astronomers.

OSTRICH FARMING IN THIS COUNTRY.

The ostrich farm in California is reached over a sandy road leading from Anaheim, part of the way being over the old bed of the Santa Ana River. The land on which the farm is located comprises640 acres of alkali soil. The same kind of soil is found in Africa, and it was considered no obstacle. To rid it of its alkaline properties, it was plowed very deep and water turned on it, a well 300 feet deep yielding many thousands of gallons of water a day. The water was allowed to remain for a while, when it was drawn off, taking with it a portion of the alkali in solution. This operation was continued until the land had been washed sufficiently to be put under cultivation. According to the San Francisco *Bulletin*, this farm has yielded three crops of alfalfa, and a fourth is ready to be cut.

The twenty-one birds on the farm were brought, in a roundabout way, some 22,000 miles, part of the distance by car. When young they are kind and tractable, but after three years become vicious and deceitful. Blindfolding them —generally accomplished by pulling a stocking over their heads—takes away their pugnacity, and they will not kick, except they know what they are kicking at. The eggs are not fruitful because, the owner states, the birds are becoming acclimatized. Even if all attempts to hatch the eggs should prove unsuccessful, the value of the feathers will cover the expense of tending the birds for the year.

The attempt to raise ostriches in Florida has just been commenced, three pairs of birds having been taken there.

Ostrich eggs are about six inches long by five wide, and are equal in bulk to 24 hens' eggs. The chick is hatched in 42 days, and a few days after reaches the size of a common hen. A light brown down covers it, and at the back and wings are projecting needles, similar to those of a hedgehog. At the age of one month the size of a turkey is reached, and small feathers begin to appear. At one-half a year the feathers have attained a good size, but are not cast off until the bird becomes a yearling; young ostriches are kept in flocks of from twelve to fifteen, and separate from the old ones. Generally the feathers are cut off only once a year, but birds which receive special attention yield two or even three crops of feathers.

The best feathers now come from North Africa, but the crop is insignificant compared with that of Cape Colony, Natal, and the Transvaal. Since 1862, ostrich farming has greatly multiplied in those countries, and it is now estimated that there are 100,000 domestic ostriches which yield feathers worth $4,500,000.

TOBACCO IN FRANCE

The report of Consul B.F. Peixotto, of Lyons, France, gives a brief history of tobacco in France and the value of that industry to that government. In 1560, Jean Nicot, a French explorer who had been Ambassador to Portugal, and had traveled in the Antilles, conceived the idea of collecting in the island of Tabago, one of the isles of the Archipelago, a plant of which the natives dried the leaves and chewed. He carried some seeds to France and planted them in his garden. He propagated it as an exotic curiosity, no one dreaming of making the repugnant use of it as did the savages. A long time after, when intercourse with the New World had become more frequent, travelers learned the use of the weed and imported its taste into Europe. Tobacco was then devoted to smoking, and in a powdered state was taken as snuff. The practice obtained royal favor, and became popular with the nobles.

The first tax was the result of a royal decree dated November 17, 1629. At first it was a custom tax, but later it was a direct impost upon the apothecaries, who had an almost exclusive monopoly for its sale. But as the apothecaries sold largely and reported very little, the tax was insignificant in amount. The King then took possession of the manufacture and sale of all tobacco, the ordinance dating from September 29, 1674. Thus the druggists gave way to contractors who would pay no more than 500,000 francs per annum for the monopoly. The privilege increased in value until it became, in 1697, 1,500,000 francs, and in 1715 it reached 2,000,000 francs. In 1790, the consumption having become so great, the monopolists willingly paid 30,000,000 francs.

From 1791 to 1798 all tax was removed. Then the plan of permitting its culture but taxing the sales was tried without success, and on December 29, 1810, the government monopoly was resumed, and has been continued to the present time. By this law the administration is alone charged with the purchase of leaves and cigars from home and foreign cultivators and manufacturers, and with the manufacture and trade of tobacco in all its forms.

The revenue from tobacco in 1820 was 64,338,834 francs, and in 1882 it was 362,594,000 francs, or 1,000,000 francs per day. This enormous sum contributes toward the budget of public instruction.

DECISIONS RELATING TO PATENTS.

In the United States Circuit Court, Southern District of New York, Fetter *vs.* Newhall, Drive Screw, Patent 110,839; reissued March 12, 1878, No. 8,121. Judge Wheeler held the patent to be in part valid. Also that it is not necessary to take the whole of a patented invention to constitute an infringement. The patent gives exclusive enjoyment of the whole patented invention, and taking one feature is an infringment *pro tanto*.

Where a defendant has repudiated a license formerly held by him, and is acting in defiance of the patent and outside the license, such license is no protection against suit for infringement.

An interesting question came up on this trial relative to the rights of minors and women to receive, hold, and convey patents. The Judge held as follows:

The laws of Congress give the right to a patent to the inventor, whether *sui juris* or under disability, or to the assigns of the inventor. As inventor or assignee of a patented invention a married woman, an infant, or a person under guardianship obtains a vested right to the patent. Married women could always take by assignment under the common law.

Section 4898 Revised Statutes requires that the assignment of a patent be by an instrument in writing. The ability to make the instrument, however, or the aids to a disability must be found in the laws of the States, where all such rights are regulated.

The laws of New York free married women from disability to make an assignment by an instrument in writing, and make their property distinctively their own. Where a married woman by her sole deed assigns an interest in a patent the assignment is valid, and she may join with such assignee in an action involving their joint rights.

An interesting decision touching the right of towns and other State authorities to tax the sellers of patented goods, was given by Judge Cooley, of the Supreme Court of Michigan, in the case of the People *vs.* Russell.

An ordinance of the city of Coldwater provides, among other things, that "no person shall hawk or peddle any meat, goods, wares, or merchandise from door to door within the limits of the city of Coldwater, without a license from the mayor." For the license, when not for the sale of meat, fifteen dollars is required to be paid for one year, or three dollars for one day. The defendant was convicted under this ordinance, on evidence that, without license, he traveled from door to door in said city and sold a clothes wringer. The clothes wringers were manufactured by the defendant at Sturgis, in this State, under letters patent of the United States issued to him and one Shepardson as patentees. The defendant appealed.

The Judge in delivering the opinion of the court, said:

It is objected to the ordinance that if applied to the sale of patented articles it is an interference with the power of Congress to grant exclusive rights to patentees to make and sell their inventions, and an encroachment upon the rights which the patent assures to the patentees. We agree that if this is the case the ordinance can have no such application. The power of Congress to grant the exclusive right to make and sell the articles which from their originality and value have been found deserving, is exclusive, and any State legislation which undertakes to limit or restrict in any manner the privileges which the letters patent confer is an invasion of the sphere of national authority, and therefore void. This was shown in Cranson *vs.* Smith, 37 Mich., 309, and what is said there need not be repeated. But the ordinance in question does not assume to interfere with or in any way to abridge the exclusive rights which the patentee may lay claim to under his patent. The ordinance is a police regulation, made under the general police authority of the State, and taking no notice of this or any other patent, or of the way in which any salable commodity may have come into existence. It is one of the customary regulations for a business. It is well settled now, if it was ever doubted, that any ordinary exercise of congressional authority does not take from the State any portion of its general power of police. (Pervear *vs.* Commonwealth, 5 Wall., 475.) The acts of Congress assume the existence of State regulations, and in many respects would prove inoperative and confusing if it were otherwise. The patent laws are as forcible for illustration as any other; they give exclusive rights, but they do not determine personal capacity to contract or prescribe the requisites for sales of patented articles or impose the customary restrictions which are supposed to be important to the protection of public morals. All these matters are left to the State Law. A patentee must observe the Sunday law as much as any other vender; he must put his contracts in writing under the same circumstances which require writings of others, and he must obey all other regulations of police which are made for general observance. (Patterson *vs.* Kentucky, 97 U. S., 501.) Invidious regulations applicable to patentees exclusively might be void; but there is no question of that nature here. We have no doubt that it was competent for the State to confer upon the city the power to pass such an ordinance. That the regulating of hawkers and peddlers is important, if not absolutely essential, may be taken as established by the concurring practice of civilized States. They are a class of persons who travel from place to place among strangers, and the business may easily be made a pretence or a convenience to those whose real purpose is theft or fraud. The requirement of a license gives opportunity for inquiry into antecedents and character, and the payment of a fee affords some evidence that the business is not a mere pretence.

Judgment affirmed.

Electric Launches.

At the recent meeting of the British Association, Mr. A. Reckenzaun read a paper "On Electric Launches." He described the boat Electricity. It has one Siemens D_2 dynamo connected directly to the screw shaft, upon which is a propeller with two blades; diameter 17¾ inches, pitch 11½ inches, and area of blade surface 66 square inches. Yarrow and Company, in conjunction with the Electrical Power Storage Company, have fitted up a launch, which has been sent to the Vienna Exhibition. This is 40 feet long by 6 feet beam, and can carry forty passengers. The motor is a Siemens D_2 machine, which develops 7 horse power with 80 cells, and a current of 40 amperes. The screw is two-bladed of thin forged steel, with a diameter of 19 inches, and a pitch of 13 inches. The weight of the motor and batteries combined is 2¼ tons. During the trial the speed of the boat was over eight miles an hour, the current used at the time being 41·22 amperes, and the counter electromotive force 112·5 volts, with 60 cells in circuit.

Mr. J. Clark, of Glasgow, described a wooden boat, clinker built, 21 feet long over all by 4 feet 4 inches beam, and drawing 12 inches of water with three or four persons on board. She is fitted with an electric motor coupled direct to the propeller shaft, and her power is derived from two battery boxes 3 feet long by 8 inches wide, and 12 inches high, which can be utilized as seats. The batteries require recharging with chemicals about every four hours of continuous use, one battery driving the boat at three-quarters speed, while the other is being recharged. During several trials at Kilcreggan-on-Clyde, a speed of a little over five miles an hour was obtained, the motor running at 600 revolutions per minute. The weight of the boat complete, with batteries charged, is 4 cwt. Clark's electric launches are now being built by Messrs. Gilbert Bogle and Co., of Glasgow, of varying sizes, from 15 feet long and four miles per hour speed to 30 feet long and seven miles per hour speed. The author gave no clew as to the nature of his batteries or to the cost of working them.

Sir William Siemens said that there were many applications in which the secondary battery would be most useful, but it was a mistake to suppose it could be employed for every purpose. For instance, it was foolish to endeavor to adopt them for driving tricycles, but in launches, where the machinery was perforce very cramped, they promised excellent results. The great question was whether the secondary battery would last or whether it would perish. In order to test this point quietly he had put down batteries in his own house last autumn, and he had found them satisfactory so far. He charged them all day, and at night he used both them and a small dynamo to feed his lamps. In the case of a launch the machine could not be taken with the boat, and consequently the navigation would be confined to short stages.

Sir James Douglas pointed out that an electric launch was much more easily swung from the davits of a ship than a steam launch, and that it offered greater security at sea. There was no fire to be put out if two or three waves were shipped, and the machinery would work under water. There was also a saving in the number of attendants, one man only being required.

Oil for Wagon Wheels.

A practical man says: "I have a wagon of which, six years ago, the fellies shrank so that the tires became loose. I gave it a good coat of hot oil, and every year since it has had a coat of oil or paint, sometimes both. The tires are tight yet, and they have not been set for eight or nine years. Many farmers think that as soon as wagon fellies begin to shrink they must go at once to a blacksmith shop and get the tire set. Instead of doing that which is often a damage to the wheels, causing them to dish, if they will get some linseed oil and heat it boiling hot and give the fellies all the oil they can take, it will fill them up to their usual size and tighten to keep them from shrinking, and also to keep out the water. If you do not wish to go to the trouble of mixing paint, you can heat the oil and tie a rag to a stick and swab them over as long as they will take oil. A brush is more convenient to use, but a swab will answer if you do not wish to buy a brush. It is quite a saving of time and money to look after the woodwork of farm machinery. Alternate wetting and drying injures and causes the best wood soon to decay and lose its strength unless kept well painted. It pays to keep a little oil on hand to oil fork handles, rakes, neck yokes, whiffletrees, and any of the small tools on the farm that are more or less exposed."

Aluminum.

J. Morris, of Uddington, near Glasgow (German patent No. 22,150, August 30, 1882) claims to obtain *aluminum by treating an intimate mixture af alumina and charcoal with carbon dioxide.* For this purpose a solution of aluminum chloride is mixed with powdered wood, charcoal, and lamp black, then evaporated, until it forms a viscous mass, which is shaped into balls. During the evaporation hydrochloric acid is given off. The residue consists of alumina intimately mixed with charcoal. The balls are dried, then treated with steam in appropriate vessels for the purpose of driving off all the chlorine, care being taken to keep the temperature so high that the steam is not condensed. Now the temperature is raised, so that in the dark the tubes are seen to be at low red, and dry carbon dioxide then passed through. This is said to be reduced by the charcoal to carbon monoxide, which now, as affirmed by Morris, reduces the alumina to aluminium.

Although the quantity of the escaping carbon monoxide is in general a good indication of the progress of the reduction, it is nevertheless advisable not to continue the heating of the tubes or vessels until the evolution of this gas has ceased or even nearly ceased, as, in consequence of slight differences in the consistence of the balls, some of them give up all their carbon sooner than the others. The treatment of the balls with carbon dioxide for the purpose of the reduction lasts about 30 hours, when the substances are mixed in the proportions of 5 parts carbon to 4 parts alumina.

As Morris states, further, the metal appears as a porous, spongy mass. It is freed from the residual alumina and particles of charcoal by fusion and mechanical treatment, and then poured into moulds.—*Dingler's Polytechnisches Journal*, 249, 86; *Amer. Chem. Jour.*

New Test for Oxygen Eliminated by Plants and Animals.

Engelmann has devised the following ingenious test for oxygen, which is described in *Wiedemann's Annalen.* It depends on the fact that the bacteria of putrefaction do not move except where free oxygen is present, and, when the oxygen grows scarce, they collect in those places where there is still some free oxygen, as in air bubbles, etc.

The advantages of the bacterial method employed by Engelmann for investigating plant assimilation consist chiefly in this, that it enables him to detect the smallest trace of oxygen to the trillionth part of a milligramme, and at the same time to determine with microscopic accuracy the places where the oxygen is given off.

He found that only those cells which contain chlorophyl give out oxygen, and that only in the light. The action of light is strictly local; it begins the moment that light strikes it, and seems to cease instantly when darkness comes on.

BUTTER BOX.

The butter box herewith illustrated is of the knock down class, adapted for the economical transportation of food products and other merchandise. The ends of the box are of the same length as the bottom, and the sides have a length equal to that of the bottom and the thickness of the two ends. The parts are hinged so that the ends and sides fold up against the edges of the bottom into vertical positions. The ends and sides are made narrower than the full outside height of the body of the box, so that the staples and screw eyes which hinge the parts together may have a secure fastening

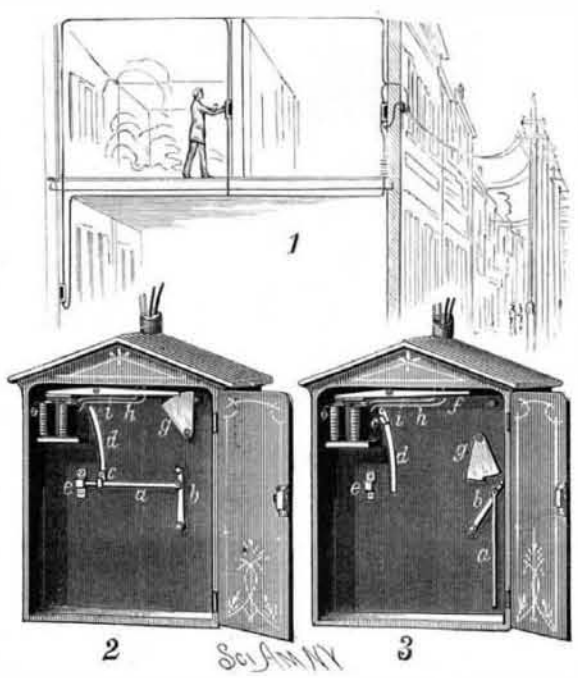
SWEATT'S BUTTER BOX.

in the edges. By this arrangement the boxes may be packed closely upon and against each other. The cover is large enough to fully overlap the upper edges of the sides, a thin strip of metal overlapping the sides and ends, as shown in Fig. 2, thus holding the parts of the box firmly against the butter. In using the box it is set in a suitable square frame whose upper edges are provided with turn buttons, which press against the sides and ends of the box and resist the outward thrust of packing. Before removing from the frame the cover is placed on.

This invention has been patented by Mr. Atherton Sweatt, of Webster, N. H.

ELECTRIC FIRE ALARM.

The method of sending an alarm of fire by means of the ordinary fire alarm telegraph consists in unlocking the door of the alarm box and pulling down the hook against the pressure of an opposing spring, so that when the hook is released it is carried upward and the mechanism connected with it sends the box number to the stations. The alarm box represented in the engravings is of the usual well known construction, and is provided with the hook, *c*, projecting through the slot, *d*, in the front plate, which conceals the mechanism and supports the several parts. Fig. 2 represents the apparatus before the alarm is given, and Fig. 3 the position of the parts after. The hook, *c*, is held down by the bolt, *a*, in readiness to rise at any time when released by the



FINCH'S ELECTRIC FIRE ALARM.

withdrawal of the bolt. One end of the bolt is joined to an arm, *b*, pivoted to the plate, and having its upper end within the path of the pivoted drop weight, *g*. The free end of the bolt passes above the hook, *c*, into a socket secured to the plate. The free end of the drop weight, *g*, is notched to engage a detent lever, *f*, pivoted to the plate, and carrying at one end an armature which is within the influence of an electro magnet placed in the circuit, *i h*, which also includes a battery and push buttons located at convenient points in the building. By preference the push buttons are in locked boxes, the keys being accessible to persons authorized to use them. The passage of an electric current draws the armature of the lever down, relieving the weight, *g*, which swings down, striking the bar, *b*, pulling out the bolt, *a*, thus allowing the hook, *c*, to rise. The alarm may be sent by withdrawing the bolt, *a*, by hand.

This invention has been patented by Mr. R. S. Finch, of 572 W. Seventh Street, Cincinnati, Ohio, and at the Eleventh Industrial Exposition in the above city was awarded first premium medal and a certificate for conspicuous merit.

Wasteful Use of Water.

Mr. Thomas J. Bell, Assistant Superintendent of the Cincinnati (Ohio) Water Works, in the course of a paper written by him upon "The Wastage of Water," gives the following table as representing the daily per capita consumption in five American cities, and claims, with perfect truth, that the great increase of rate is to be charged directly to waste instead of necessity:

Boston, per capita rate in 1850, 30 gallons; in 1881, 92 gallons.

Brooklyn, per capita rate in 1866, 17 gallons; in 1880, 54 gallons.

Chicago, per capita rate in 1867, 43 gallons; in 1880, 114 gallons.

New York, per capita rate in 1867, 62 gallons; in 1876, 100 gallons.

Philadelphia, per capita rate in 1867, 56 gallons; in 1880, 67 gallons.

Cincinnati, per capita rate in 1845, 21 gallons; in 1881, 87 gallons.

New Process Steel.

The *Bulletin du Comité des Forges de France* gives the following statistics of the production of steel by the Thomas-Gilchrist process, during the first six months of the present year:

	Number of furnaces.	Product, tons.
England	1	57,900
France	2	5,960
Belgium	1	12,786
Germany	9	152,479
Austria	3	37,476
Russia	1	12,786
Total	17	279,387

In 1882, 6,500,000 tons of ingots were produced in the whole manufacturing world. As will be seen from the above figures, this process has met with the greatest favor in Austria and Germany; in the former country it prevails in 28 per cent of the steel works, and in the latter in 25 per cent, while it is only adopted in 5 per cent in England.

Another Electric Railway.

On the electric railway lately opened by Lord Spencer, with a large number of eminent scientists, between Portrush and Bushmills, England, the electricity, generated at a waterfall on the river Bush, and conveyed to the end of the line by an underground cable, is carried along through a conducting rail, which is supported on insulators at some distance above the ground. An arm with a brush or pad at the end of it stretches out from the train and keeps contact with this conductor. But on the day when the Lord-Lieutenant came to "inaugurate" the line it was suddenly found that there was a serious hitch. The engine declined to draw the car. The machinery was in perfect order; the connection with the conductor was all right, and yet there was no motion. Horror filled the souls of the public spirited promoters of the first electric line in the United Kingdom. It was discovered, happily before much time had been lost, that somebody had rendered progress impossible by the simple expedient of driving a piece of iron from the electric rail into the bank at the side, so that the current was being absorbed into the earth as fast as it was transmitted from the Bush. The iron being removed, the invited party made a successful trip.

Uninflammable Paper and Wood.

Dr. Winkelmann, of Augsburg, impregnates wood and articles made of paper with a solution of 33 parts of chloride of manganese, 20 parts of orthophosphoric acid, 12 parts of magnesium carbonate, 10 parts of boracic acid, and 25 parts of chloride of ammonium in 1,000 parts of water.

Wood must be exposed to the solution for six or eight hours at the temperature of boiling water, or have the solution forced into it under pneumatic pressure. A solution of the above composition is easily distributed through the mass of the wood, and incrusts the cells with pyrophosphate of manganese and magnesium, and borate of magnesium, which are insoluble double salts. The chloride of ammonium serves as vehicle to keep the phosphates in solution.

Articles made of paper, like paper hangings, are coated with or soaked in the solution after it has been boiled.

Wood and paper saturated with these salts are uninflammable even when exposed to an intense heat.—*Chem. Zeit.*

CHURN.

The churn which the accompanying engraving illustrates has been patented by Mr. Henry Hays, of Bridgeport, California. The cream box is cylindrical, and has its inner surface serrated or grooved longitudinally as shown in the sectional drawing, and at one end is provided with a projecting pintle fitting in an aperture in a standard secured to a base. The other end of the cylinder is furnished with an aperture that can be closed by a flanged cover. The pintle at this end is threaded, and passing through the cover is secured to a cross piece resting against the inner surface of the head from which two clips project in opposite directions, and under the clips the cross piece passes as shown in the small engraving. The cover is pressed against the outer surface by the winged nut of the pintle, a packing strip having been inserted between the head and cover. The threaded end of the pintle is adapted to be screwed into the end of a shaft which is journaled in a standard, and is provided with a pulley when

HAYS' IMPROVED CHURN.

power is to be applied, and with a crank for hand work. A supporting frame, having its upper edges recessed so that the cream box fits against them, rests upon the base. After the pintle has been screwed into position, a latch arm on the standard drops into an annular groove on the shaft, thus preventing further longitudinal movement. When the cream box has been filled, the supporting frame is moved one side, when it is lowered and freed from the box, as it is provided on its bottom with beveled tenons sliding in longitudinal grooves in the top of the base.

A washing machine can be constructed according to the same principle.