

THE SERPOLLET AUTOMOBILE TRAMWAY IN PARIS.

In Paris, as in most large cities, it is very difficult for any corporation to get permission to build tramway lines where the motive power is other than that furnished by horses. The Serpollet system, however, is not open to the usual disadvantages of ordinary steam and cable tramways, so that the Compagnie Generale des Ommibus was allowed to equip its Madeleine-Asnieres line and its Porte Clignancourt-Bastille line with cars propelled by motors of this system. The fuel used may be coal briquettes, anthracite coal or coke. In cities coke is usually preferred. The boiler is of rather curious construction and is placed on the front platform, the long vertical tubes admitting of the heat being utilized to its full extent. The boiler really consists of two parts, the lower part composed of horizontal tubes heated directly by the fire and the upper part made of vertical tubes which are heated by the burning gases. The motive power is derived from a two-cylinder engine which is located between the two axles. Motion is transmitted to the axles by means of chains and gears, one turn of the axles being equivalent to three turns of the engine. The machinery is arranged to permit of its being run in both directions. The lubrication is automatic, so that the engine driver is not troubled with oiling during the trip. A pump is provided to automatically supply the boiler with water.

All the machinery is carefully protected from dust and mud by sheet iron cases, which are also arranged to suppress the odor of the hot grease. In winter the tramway car is heated by the exhaust steam. The car is provided with two brake systems, which are entirely independent of each other and which can be applied from either platform. Both of the cars which we illustrate are the well-known double-deck pattern and accommodate about fifty persons. The travelers do not experience any inconvenience from the heat, and the disagreeable odor of the gas is reduced to the minimum by the long chimney, which produces a powerful draught. The gases are so diluted, before they pass from the chimney, by a large body of ascending air that nearly all the odor is lost. The motion of this tramway is very easy and curves are passed with ease. The reduction of dead weight in this motor is very great, and on slopes it is possible to carry the steam pressure to 225 or 300 pounds to the square inch, so that the speed may not be diminished. We illustrate a car of the Serpollet automobile system crossing the Place de la Concorde in Paris and a car on the Porte Clignancourt-Bastille line which is adapted to carry fifty passengers and is capable of carrying a trailer car for fifty persons. For our engravings we are indebted to La Revue Technique.

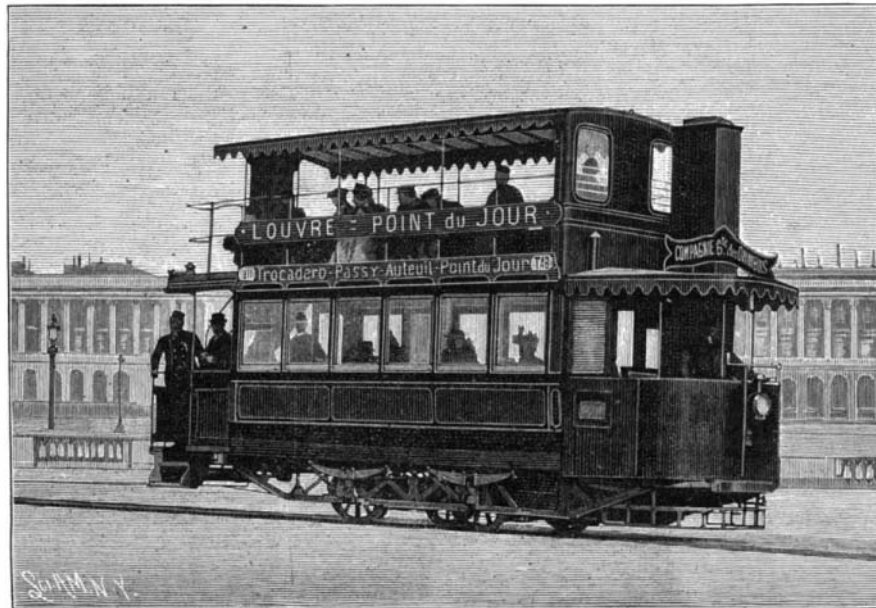
Wonderful Growth of the Electric Railway in the United States.

These five years have indeed done wonders in the domain of street railroading in this country, and have even set our transatlantic friends to work following our example, says Joseph Welter in Scribner's for May. To give some idea of the extent to which electricity has displaced the horse, and, on the other hand, been instrumental in creating new roads, we need only cite the fact that at the present time there are over 850 electric railways in the United States, operating over 9,000 miles of track and 23,000 cars, and representing a capital investment of over \$400,000,000. What stupendous figures, when we consider that in 1887 the number of such roads amounted to only 13, with scarcely 100 cars.

At the present time the Australian aborigines are the lowest known species of humanity. They have little or no reasoning faculties, and their only idea of a higher power is through fear. They are chocolate-colored, wear little clothing, and their weapons are of wood.

Rice for Feed.

Under average circumstances rice is grown at a net cost of \$1 per sack of 180 to 200 pounds. There is good demand for it at one cent a pound for feed. It is eaten greedily by all kinds of stock. There are objections to feeding rice whole, but when ground it gives excellent results. The sooner rice is adopted as the staple stock feed, the sooner will this country come into possession of the comforts of good butter, good eggs, best beef, finest pork and fat cattle, horses and mules. When these are once produced steadily there will be a market



STEAM CAR OF THE SERPOLLET AUTOMOBILE SYSTEM.

with reliable demand. It will, moreover, result in a good market for rice, as none but clean, pure rice will be offered on the market. To-day the New Orleans rice market is being crowded with rice much of which can be sold at home for feed at better prices than it will bring on the city market, from the fact that poor grades of rice are a drug on the market.

This season Southwest Louisiana will import 1,000 cars of corn and oats at over one cent a pound cash, and for no better feed than rice, which is shipped to get money to buy corn. Already, says the Jennings Times, many of our best farmers have stopped buying corn or oats, substituting rice at less cost. If all would adopt this practice, supplementing with what corn and oats can be grown on the farm, Southwest Louisiana would save at home annually \$100,000 more or less for feed stuffs. Already has the importation of hay been

workmen employed warrant any expenditure which promises to cheapen the production or improve the product. But all this was inevitable. Granted the cycle and its great use, the vast cycle factories with their magnificent equipments, marvels of ingenious tool making and wonderful methods of construction were certain to follow.

The miracle of the bicycle lies in its birth, death and resurrection; in its incredible load-bearing power in proportion to weight; in its displacement of the horse as a means of pleasure, and in the selection of its mechanical details of compressed air support, tubular framing and chain driving. All of these are details often before introduced in machines, but never before permanently retained. That these cast-offs are undeniable power savers is convincingly proved by their continued use under human muscle driving power.

Finally, the one great achievement of the bicycle is to increase the human powers of locomotion so that the slow-footed man is made one of the swiftest of all running creatures. —Robt. Perkins, Engineering Magazine.

Under the Shadow of Mount Everest.

Mr. Henry Ballantine, author of "Midnight Marches Through Persia," and a more recent book on Nepal, "On India's Frontier," gives a most interesting description of his reception at the Nepal court by the Maharajah. Khatmandu, the capital of Nepal, is on the southern slope of the Himalayas, about 400 miles north of Calcutta, and almost within the shadow of Mount Everest. The traveler found the Maharajah a prince of very decided character and large intelligence, interested in a great deal that was going on in the world outside of his remote kingdom. Mr. Ballantine had with him

"a copy or two" of the

SCIENTIFIC AMERICAN, one number of which happened to be of the issue of July 30, 1887, containing illustrations of some fine Holstein-Friesian cattle. These the prince much admired, and wished him to have arrangements made at once to get out a few for him. The prince spoke Hindostani, but the pictures of the SCIENTIFIC AMERICAN speak a universal language, and the prince seemed very much interested in looking at all the illustrations which appeared in the papers, but the cattle picture seemed to appeal to him the most of any of them.



STEAM CAR OF THE PORTE CLIGNANCOURT-BASTILLE LINE.

stopped by substituting home-grown hay and rice straw. Now, let farmers and others stop importing grain feed, using rice instead. The demand for rice as feed is growing, and it is doubted by some whether there is enough rice left in this country to supply the demand. Some rice can be fed whole to at least some extent. During harvest rice is fed in the bundle with satisfactory results. Egyptian, or bull, or Japan rice can be sown on old land foul with red rice, and by cutting early all can be saved, making a large yield and excellent feed.—Westlake News.

Our Debt to Inventors—Shall we Discourage Them?

Dr. R. H. Thurston, director of Sibley College, Cornell University, contributes to the May Forum an able and interesting article under the above title, from which we make a few abstracts:

"In a single generation, it is agreed among statisticians, the inventors have promoted the efficiency of human labor, and have diverted to the use of man such enormous amounts of Nature's energies that production has been increased fifty to seventy-five per cent more rapidly than population, and wealth has been correspondingly augmented. A day's labor produces two-thirds more in agricultural implements, or in carriages, and a half more in machinery, and eighty per cent more in boots and shoes, than in 1860. One dollar has been made capable of buying fifty per cent more of cloth, a quarter more of every kind of staple food; five men do the work of eight, and both wages and the purchasing power of the dollar have increased together. Labor can to-day produce twice as much in a given time, and secure more than twice as large a share of the product, as in the days of the origin of our patent law. In the time of Watt and Fulton, six weeks were required to cross the Atlantic, and the inventor and the mechanic and the engineer now send the steamship across in six, and will soon make the voyage in five days. They transport a ton a mile at sea with the combustion of the amount of fuel represented by a single one of the millions of letters in the modern foreign mail bags. They have reduced the cost of transporting wheat from New York to Liverpool from twelve cents a bushel to four cents, and of meat from absolute commercial impracticability to one cent a pound. They have given the world nearly a half-million miles of railroads, and transport 150,000,000,000 tons a mile each year. Without protection of the inventor's rights to his own absolute creation and brain property, we should to-day not have the aid of the fifty or seventy-five millions of horse power of the steam engines of the world and their equivalent aid—that of three or four times the working power of the whole population of the globe. . . .

"The telegraph and the telephone, those great 'monopolies' so much inveighed against at the moment, have not only presented the world with the grandest illustrations of the helpfulness of modern science in promoting commerce and the industries of production; they promote also, directly and indirectly, and in a thousand ways, the intelligence and culture of the race. Morse and his colleagues among inventors gave the world, as a contribution to education and a

stimulus to moral growth, inestimable profit upon all its patrons have paid into the treasury of the telegraph companies—to be redistributed to the world. The telephone, however 'business-like' its management, is a gift from the inventor of vastly greater worth to the world than all the dividends ever declared by the telephone companies. Edison, and Thomson, and the General Electric and the Westinghouse companies, representing contributions to the world of invention and the mechanic arts, as a limited tribute, have given handsome profits to the world of users of their inventions and products. . . .

"The steam engines of James Watt, of Frederick Sickles, of George Corliss, which constitute the foundation of the whole system of modern industries, and furnish, practically, the whole sum of the mechanical power which has built up existing material civilization, were given to us by their inventors in response to the inducements held out to them by the patent law—itsself the most important invention of all. . . .

"It has been universally admitted that the United States has owed to the simple and inexpensive and effective action of the patent law system, as well as to the freedom of its political institutions—the two forming units of a whole—the mighty march of its development and civilization. The blessings of the patent law have been inconceivably great.

"But a spirit diametrically opposed to the spirit in which the patent system was conceived and enacted has within a few years sprung up, and its malevolent influence has been promptly seen and felt in the tone of legislation and in the decisions of the courts. The old feeling of indebtedness and of gratitude to the inventor and to the exploiter of inventions has become tempered by criticism and by a caviling spirit, which seeks to deprive these greatest of benefactors of the race of the intellectual property which they create and the material benefits which they, in comparatively slight degree, share with the world. In many ways both legislation and the decision of the courts are curtailing their rights and depriving them of the just share, which was formerly cheerfully granted to them, of the gains made by the world through their inventions. The inventive genius and his wholly beneficent work are now too often looked upon with suspicion, jealousy, and a mean opposition, which are in strange contrast with the grateful and generous spirit which characterized every legislative and judicial act early in the century, and which pervaded the whole people of the United States from the time of Watt to the time of Corliss, of Fulton, of Stephenson, of Howe, and of Morse. . . .

"The killing of the goose that lays the golden egg is contemplated even by 'statesmen' and by the courts with complacency. They would nullify the patent system and put a summary end to this era of progress. They would terminate the period of supremacy of their country in all the industrial arts. . . .

"When the United States loses its regard for the rights and privileges that were justly and fairly accorded to inventors in our earlier life as a nation, and, instead of gratitude and generous reward, gives them grudgingly less than a fair and liberal share of the profits which they so lavishly secure for the world, a long step will have been taken toward that decadence which, historians are accustomed to assure us, inevitably, sooner or later, comes to every people. The immediate and complete repeal of every obstructive law and the inauguration of a new period of good-will and generous encouragement of that highest of industries is the right way and the only way to insure permanence of that growth in material prosperity which has for a hundred years, and until the present moment almost, been the most marked characteristic of our history.

"The promotion of the arts and manufactures by suitably rewarding inventors and providing that they shall be permitted to collect profits, as in all other departments of business, as large as the business will yield, and in due proportion to the value to the country of the invention or discovery, is one of the most important features of an enlightened public policy; and it is the duty of every intelligent and patriotic citizen, and especially of every one in any manner connected with any department of engineering, of manufactures, or of the mechanic arts, to exert every power and to apply all his influence to promote the perfecting of the patent system, to increase the facilities of the Patent Office, and, especially, to insure to the inventor of new and valuable devices a liberal period of possession of the products of his genius."

Canadian Natural Gas Lines.

The Detroit Gas Company has made arrangements with the Ontario Gas Company for a new pipe line between the natural gas fields of Kingsville and Walkerville and a third pipe line across the river to Detroit. Although that city was supplied by only one line last winter, it was considered safer to have three lines than two in case of a break. The expense of constructing the line from Kingsville to Detroit will be \$200,000, and it is expected that the work will be finished by next October.

RECENTLY PATENTED INVENTIONS.**Engineering.****STEAM CONDENSER AND OIL SEPARATOR.**

—Edward Rowe, Indiana, Pa. This is a simple construction more especially designed for condensing exhaust steam from engines, returning the water of condensation to the feed pump, at the same time purifying the water to prevent incrustation of the boiler. The invention consists principally of a series of connected vessels, of which the first receives the steam, and each vessel has air tubes for the circulation of air to condense the steam circulating in the vessel, no water jackets or other circulating devices being necessary. The impurities of the water of condensation are skimmed off in a separate tank to which the water of condensation flows before passing to the feed pump.

Railway Appliances.

CAR FENDER.—Charles E. Montell, White Plains, N. Y. According to this improvement a frame is attached to the car platform, and to this frame is pivoted an auxiliary or receiving frame, there being a bed of yielding material attached to the upper portion of the fixed frame and the outer front portion of the receiving frame. There is a sprocket wheel and chain connection between the two frames, whereby the forward frame may be lowered by the motorman pressing upon a lever. This frame has wheels adapted to travel on the rails or on the surface. When the receiving portion of the fender strikes an object in the path of the car, the object is thrown back into a cushioned section, and the forward portion of the fender rises, forming a pocket which will safely hold a person thus taken up from falling out.

CENTER BEARING FOR RAILROAD CARS.—Samuel Walters, Warren, Pa. This bearing comprises a bottom plate to be fastened to the truck bolster and a top plate to be fastened to the car body, a center pin in the bottom plate engaging the top plate, while a slide or lock bar locks the center pin in position to hold the top and bottom plates in a united position. With this improvement the car body may be conveniently lifted off the truck without lifting the body very high, and accidental displacement of the car truck and body is prevented. The center pin does not pass through the truck bolster, weakening the latter, as is so frequently found in the usual practice.

CONTINUOUS DRAWBAR.—James Seath, Terre Haute, Indiana. This is an attachment for railway equipment which is simple and durable, and capable of application readily to any form of drawbar. Combined with a yielding drawbar having straps attached to its opposite sides is a thimble secured to the straps, a draught rod passed around the thimble being adapted for connection with the draught rod of another coupler, and the thimble having a sliding movement between the members of the draught rod. The device can be used with single or with multiple buffing springs, or it may be used in connection with otherspring devices.

CAR AIR PIPE AND STEAM PIPE COUPLING.

—Robert L. Munson, Silver City, New Mexico. This inventor has devised an improvement in automatic couplings of the hook and catch type, in which automatic interlocking connection is made and the engaged couplings may be detached from either side or the roof of the car. The improvement provides for the simultaneous coupling of air brake pipes and steam heat pipes, the couplings being engaged or detached as the train is made up or broken up, and dispenses with the usual handling of couplings for the air and steam pipes, thus effecting a saving of time and labor.

Mechanical.

WRENCH.—Frederick J. Bourn and William R. Hale, Gualala, Cal. This is a wrench especially adapted for use on vehicle wheels. It will simultaneously clamp the hub of the wheel and the lock nut of the axle, so that when the wheel is removed the lock nut and its washer will be held in their proper relation to the hub, and will not fall to the ground or be lost, and on being again returned to position the nut will engage with the thread of the axle spindle, thus preventing the soiling of the hands and permitting the quick and convenient oiling or lubricating of the axle.

Mining, Etc.

AMALGAMATOR.—George W. Downs, Port Townsend, Wash. This invention relates to gold-saving apparatus having amalgamating plates, and provides a simple form of portable amalgamator, conveniently operated by hand power, to readily save the float gold in river or beach sand. It comprises a casing with removable sides in which are journaled wheels geared together, each wheel having amalgamating wings so arranged that the sand rolls down from one wing on the next following wing, while a hopper at the top of the casing has a screened bottom discharging on to the upper faces of the wings of the first wheel.

Agricultural.

HAY RAKE.—Isaac G. Lunday, Hubbard, Texas. This invention covers an improvement in revolving hay rakes, and the inventor has devised a rake which is free to move backward without danger of injuring any of the parts, the rake head and teeth turning freely, and whereby, with a simple arrangement of lever mechanism, the ground pressure of the teeth can be instantly regulated. The machine is of simple and inexpensive construction, and the several lever devices are disposed near the driver's seat, facilitating the easy operation of the machine.

Miscellaneous.

BICYCLE ATTACHMENT.—Charles A. Coey, Fairfield, Wash. This is a simple and inexpensive device, applicable to any safety bicycle, enabling the wheel to be run with speed and safety by an inexperienced rider on the rails of an ordinary railway track. It

consists of a third wheel, with concave rim, connected with the frame of the bicycle by removable and adjustable braces, constituting a rigid framework for spanning the track, while being very light. The attachment may be quickly applied to or removed from an ordinary bicycle, and when removed may be folded into very small compass.

ROLLER SKATE.—Richard H. Lahey, Canadice, N. Y. A skate which may be readily and firmly attached to the foot, and which affords an elastic and easy support, has been devised by this inventor. It is provided with a ratchet device to prevent the wheels from turning backward, and a brake which is actuated automatically or by a hand line or cord. The foot rest consists of a front portion and a heel portion, the two portions being slidable in relation to each other to enable the rest to be easily fastened to the foot.

TAP AND FAUCET.—Jacob Siebert, Jr., Yonkers, N. Y. This is an improvement in faucet taps designed to be permanently secured in the head of a barrel, and provided with a valve opened by the aid of the faucet introduced into the tap and through which the liquid is to be drawn. The invention simplifies the construction, and provides a tap in which the faucet may be readily inserted, and when the faucet is manipulated to secure it in the tap, the valve of the tap will be simultaneously and automatically opened, the valve being also automatically closed when the faucet is withdrawn. The improvement is also designed to prevent any possible leakage between the valve chamber and the receiving chamber for the faucet.

FLUE STOPPER.—Louis J. Haberkorn and Edward O. Beckman, Chatsworth, Ill. This device comprises a head with a segmental slot, a collar on the inside of the head having one end fixed and at its other end an arm projecting through the slot of the head, with means for locking the arm in the slot. It may be conveniently applied and locked in place in any sized thimble or flue body, effectually preventing smoke from entering a room. It also has a scoop section which will receive the soot which may accumulate in the thimble, and when the stopper is removed the soot will not be spilled upon the floor.

MACHINE FOR RAISING LIQUIDS.—Richard Wegner, Neu-Britz, Germany. This is a siphon apparatus working on the principle that the variations in the volume of air confined in a vessel, in the presence of combustion, are utilized for raising the liquids without the assistance of a plunger or pump. A burner making a constant flame in a closed vessel causes a partial vacuum, and the suction pipe for raising the liquid enters this chamber, while a float-controlled mechanism establishes communication between the interior of the vessel and the outside air when the vessel is filled with liquid to a predetermined level. Another float-controlled mechanism closes the communication when the vessel is essentially empty, and there is an outlet for the discharge of the liquid.

APPARATUS FOR SEPARATING HEAVY FROM LIGHT MATERIALS.—Frank Pardee, Hazleton, Pa.

For the separation of coal from slate, and ores and other materials from impurities, this inventor provides a tank with inclined bottom, in which is a dirt receptacle and chute, a frame parallel to the bottom being supported to be swung by means of a belt and pulleys, whereby the heavier material is carried up and delivered into the chute, and the lighter material travels downward. The material is carried through water, and simultaneously subjected in the water to a shaking motion, a traveling motion, and a floating action, to effect the separation.

WIRE FENCE STAY.—Solon M. Thompson, Whitesville, and William H. Bulla, Empire Prairie, Mo. For the staying of the strands in wire fences at points between the main posts, these inventors have devised a novel and simple form of bent wire braces, adapted to be removably connected with a series of fence wires, to hold them spaced apart and stiffened, and also afford ground conductors for electricity. The brace or stay comprises two nearly parallel members connected together at or near their ends and having an eye at each end, each member having lateral loops to receive fence wires, and a locking rod passing through the eyes.

PENCIL SHARPENER.—Oliver J. Lane, Chicago, Ill. The body of this device has a transverse throat or aperture, the upper side or back of the body having side flanges, and a slotted curved bit being pivoted between the side flanges and extending through the throat. A screw extends through the bit slot into the upper side of the back, the head of the screw bearing on the upper convex side of the blade. A pencil of any size may be quickly and properly sharpened with this device.

LAMP WICK TRIMMER.—William Chandler, North Bend, Canada. In lamp wick trimming shears this inventor has devised improvements whereby the shears will retain the charred wick or snuff that has been trimmed off, while the upper blade has a spring action rendering the device more efficient in use, making altogether a superior device which will be cheap to construct. The blades are preferably formed of sheet steel or by drop forging, or they may be cast, and both blades are curved and flanged, the guard flanges extending around the curved outer terminal of both blades.

COMBINATION KITCHEN CABINET.—John Tischer, St. Joseph, Mo. This inventor has combined in one article of furniture a table, safe, flour bin, sifter, kneading board, knife and fork trough, together with a sink, soap box, and various compartments for the storage of pots, pans, etc., to facilitate kitchen work. With this cabinet, all the things required by one working in a kitchen will be at hand, and dishes may be washed and placed in the cabinet without crossing the room or moving away from the tray.

COMBINED COUCH AND STORAGE CHEST.—Robert A. Caruthers and Charles P. Savage, Waco, Texas. According to this improvement the main couch section forms a hinged cover for a hollow body, and this section has wheels to run on suitable tracks connected with the body, and adapted when in closed position to be moved longitudinally in either direction, and projected beyond the end of the hollow body, afford-