

missionary work in Asiatic Turkey would do well to put themselves in communication with the missionaries in charge of them. Robert College at Constantinople, and the Syrian Protestant College at Beyrout, are too well known to the British public to require special notice at my hands. It gives me pleasure, however, to report in regard to both of those deservedly popular institutions that their prospects were never so full of hope as at the present time.

Still another Chemical Photometer.

There are several metals like uranium which are more or less sensitive to light when mixed with organic matter. The high degree to which silver possesses this character is well known. Dr. Eder, in Vienna, has studied the action of light on corrosive sublimate (mercuric chloride), and finds that it is easily reduced to calomel (mercurous chloride) in the sunlight. As the former substance is soluble in water and the latter is not, a white precipitate shows the change. It was found that the following proportions were the most sensitive: Dissolve 40 grammes of oxalate of ammonia in 1 liter of water (4 per cent) and 50 grammes corrosive sublimate (5 per cent) in 1 liter of water. Mix together 2 volumes of the former and 1 of the latter. In the red, yellow, and yellowish-green portions of the spectrum the solution remains clear, but is rapidly precipitated in the blue, violet, and ultra violet. The weight of the precipitate per minute is proportional to the photometric strength of the light.

The Largest of Land Animals.

In the *American Journal of Science and Arts*, Prof. Marsh describes the largest land animal yet known to have existed on the globe. Its name is *Atlantosaurus immanis*. The thigh bone of this creature is over 8 feet long, with a thickness at the larger end of 25 inches, though the bone has no true head. A comparison of this bone with the femur of a crocodile would indicate that the fossil saurian, if of similar proportions, had a total length of 115 feet. That the reptile was 100 feet long when alive is at least probable. The other bones of this animal that have been found are proportionately gigantic; caudal vertebra has a transverse diameter of more than 16 inches. All the bones of this reptile yet discovered are in the Yale College Museum. They are from the Upper Jurassic of Colorado.

A Fish Story.

A Boston correspondent of the *Forest and Stream* tells the following remarkable story. The scene is laid in Long Island, where, on the shore of a pond, the correspondent was watching the play of swallows as they skimmed just over the surface of the water shortly before sunset. "About a hundred yards out was a bed of lily pads; and as the swallows skipped it, occasionally a good sized ripple could be seen, and sometimes a break from the edges indicating a fish there. This fastened my attention to the particular place. I had often seen cats play with swallows, swooping at them, but the idea of fish doing the same was something new to me. Presently I saw a clean breach, and a fine large pickerel showed his whole size and got a swallow, too, as he disappeared beneath the water. This I saw repeated several times, and I called the attention of my companion to this novel sight. While we were watching we saw two large fish break at the same swallow, the fish coming from opposite directions, and each head on to each. Both missed the swallow, but, singular to relate, only one fish was seen to fall into the water, and neither was seen to pass the other. My companion and myself looked with wonder. There was a great commotion in the water with a continuous spattering, and a boat being handy we jumped in and rowed to the spot, and picked up the largest pond pickerel I ever saw. When we had him in the boat the mystery was solved; the smaller of the fish had, in his eagerness for the swallow, jumped clear down the larger one's throat, and only the tail, to the extent of about an inch, showed. The large fish was completely rent asunder and killed by the catastrophe. Both together weighed 22 pounds."

Two telephone companies have been chartered in Paris by the government, and are now connecting their central offices with the residences and offices of the subscribers. The company using the Edison telephone charge six hundred francs a year. The Société Générale de Telephones uses the Gower telephone, and charges one thousand francs per year. The government reserves the privilege of buying out both companies.

ELECTRICAL RAILWAY.

The electric railway illustrated in the accompanying engravings, which we take from *La Nature*, was exhibited at

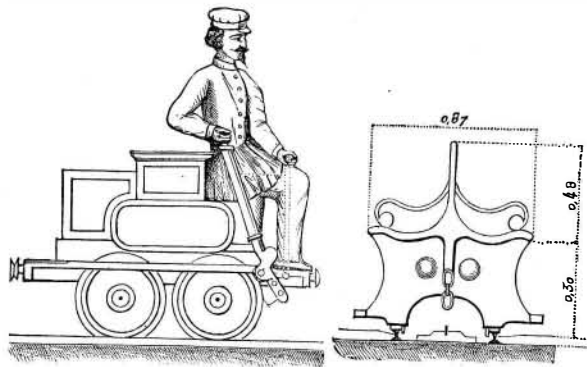


Fig. 1.—MOTOR.

END OF CAR.

the Berlin Exhibition of 1879. It presents a good example of the conversion of motive force into electricity and the conversion of the electric current back into motive force.

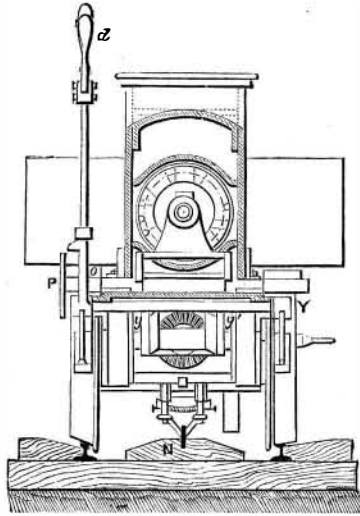


Fig. 2.—END VIEW OF MOTOR.

Two magnets or dynamo-electric machines, A and B, connected by metallic conductors, form a complete system for the transmission of power. If motion is imparted to the

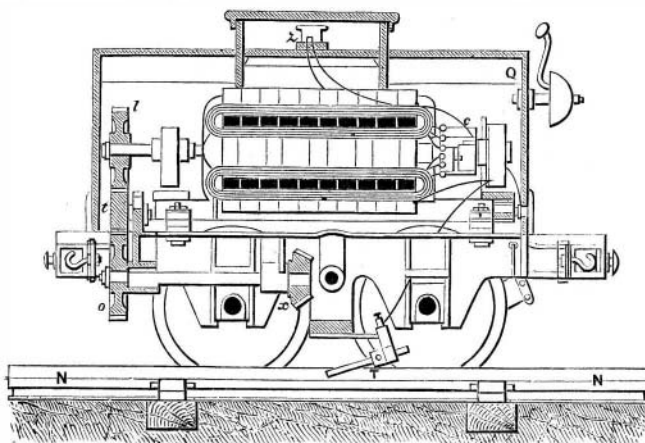


Fig. 3.—LONGITUDINAL SECTION OF MOTOR.

machine, A, an electric current will be produced which is converted into motive power by the machine, B. Of course the machine, B, delivers only a part of the power applied to

the machine, A, and this amount of power transmitted varies with the nature of the machines, their speed, and the length of the conductors connecting them. Some machines are capable of delivering 60 per cent of the original power under favorable circumstances. A dynamo-electric machine operated by a steam engine, and connected by conductors with a second dynamo-electric machine mounted on a vehicle, the wheels of which are acted on by the second machine, constitutes an electric carriage or wagon. If the vehicle be placed upon rails, and the rails are used as conductors, the current being taken from an insulated rail by a metallic brush and returned to the electric generator by the ordinary uninsulated rails, we have an electric locomotive; connect a few cars with this locomotive and we have the electric railway as constructed by Dr. Werner Siemens, the well known German electrician, and exhibited at Berlin.

In the annexed cuts Fig. 1 represents a side view of the locomotive and a cross section of the cars, both drawn to a scale of $\frac{1}{10}$. Figs. 2 and 3 show detailed views of the locomotive on a scale of $\frac{1}{2}$. Fig. 4 shows the locomotive drawing three cars, each containing six passengers. The machines used are of the continuous current system of Siemens. The armature is rotated by means of the current received through the conductors from the stationary machine, and transmits its motion to the driving wheels through a number of gear wheels, *l, t, v, x, y*, which are necessary to reduce the speed.

The machine producing the current has one of its poles connected with the track rails, and the other pole is connected with the insulated central rail, N (Figs. 2 and 3), which is simply a conductor. A pair of brushes made of very fine copper wire, like the collectors of the Gramme machine, are kept in contact with the rail, N, completing the electrical communication between the rail and the machine. The current comes through the insulated rail, passes through the brushes, traverses the wires of the electric motor, and returns through the wheels and track rails.

The cars and the locomotive have an electrical connection through a copper wire. The sixteen wheels of the train form a perfect metallic communication between the locomotive and the rails for the return current.

The locomotive is started and stopped by a lever controlled by the driver sitting on the locomotive. The brake is operated in a similar way. The performance of the locomotive varies from 2 H. P. and a velocity of 6 feet per second, to $3\frac{1}{2}$ H. P. and $12\frac{1}{2}$ feet per second ($7\frac{1}{4}$ miles per hour), the train carrying eighteen passengers.

MECHANICAL INVENTIONS.

Mr. Alfred H. Crockford, of Newark, N. J., has patented an improved brace for bits and drills of all kinds, whereby the bits and drills may be centered and firmly secured in the brace. The bits can also be readily applied to work in places or positions where the brace stock cannot have full swing.

An improved paper machine has been patented by Mr. William E. Phelps, of Lewisville, Pa. The object of this invention is to strengthen the paper by laying the fibers in all directions, instead of in the direction of the length of the paper only, as is now done.

Mr. Elijah Ware, of Omaha, Neb., has patented an improved spring power for watches and clocks. The object of this invention is to construct a spring power mechanical movement for use in watches and clocks, or for other purposes, where a small power is required, and to dispense with the train of gearing usually required. The inventor makes use of a spring attached to and coiled around a shaft that carries a loose and fast gear wheel, the spring being attached also to the loose gear, and the two wheels geared to a secondary shaft.

Mr. James A. Moore, of Kewanna, Ind., has invented a spring-propelled carriage, whose motive power is contained in a combination of coiled springs, levers, eccentrics, etc. These are so arranged upon a carriage as to be capable of exerting sufficient force after the springs are wound up to effect a long continued and economical propulsion of the carriage.

Improvements in pressing machines for printers, bookbinders, etc., have been patented by Mr. Joshua W. Jones, of Harrisburg, Pa. The object of this invention is to improve the construction of the machines for which letters patent Nos. 204,741 and 212,947 were granted to the same inventor June 11, 1878, and March 4, 1879, respectively, and which were illustrated in these columns some time since.

Mr. Ebenezer R. Gay, of Dubuque, Iowa, has patented a

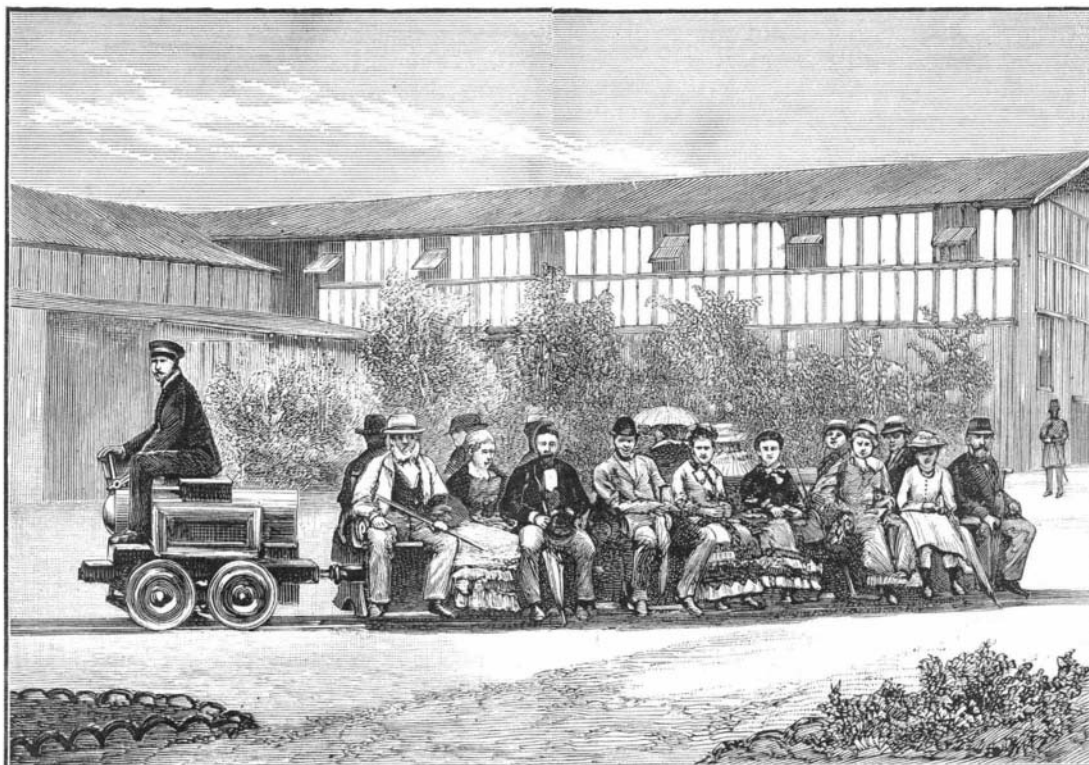


Fig. 4.—SIEMENS' ELECTRICAL RAILWAY.

relishing or tenon finishing machine for use on rails for doors, blinds, panels, or other woodwork having rails with tenons and a groove or rabbet for panels. In such work, when the groove is not as wide as the tenon is thick, or does not have the same face as the tenon, a rib or projection is left, which has to be removed, and the improved machine is adapted for such operation.

In a movement for watches and clocks patented by Mr. Elijah Ware, of Omaha, Neb., the object is to dispense with the train of gearing generally employed in clocks and watches, and thereby simplify the construction and reduce friction. This movement cannot be clearly explained without engravings.

Mr. William Forshaw, of Chicago, Ill., has patented an improved platform for vehicles. The invention consists of a forked standard, whose lower end embraces the axle at its center, while its head supports the bolster plate; and secured between the forks of the standard and projecting laterally therefrom in both directions is a plate spring parallel with and above the axle, and connected at its ends with the axle by transverse elliptical springs that are secured to the axle near its shoulders; and it further consists of a device for supporting and a device for adjusting the elevation of the carriage pole.

A lawn-edge mower, patented by Mr. Timothy Hanley, of Boston Highlands, Mass., is an improvement on the lawn-edge mowers for which letters patent No. 220,829 were granted to the same inventor, October 21, 1879. With the improvements they may be used for mowing both high and low edges, as may be required.

An improved machine for making eyebolts has recently been patented by Messrs. Richard H. Briggs and James H. Dougherty, of Whistler, Ala. The object of this invention is to provide an improved machine that may be operated by hand or other power for the manufacture of eyebolts of any required dimensions.

Mr. Josephus T. Willis, of Mount Sterling, Ala., has patented a device for instantly detaching horses from vehicles. It consists of levers, sleeves, pivoted trace hooks, and a helical spring arranged upon a whiffletree and operated by pulling upon the governing strap.

George Wharton Simpson.

Mr. George Wharton Simpson, the proprietor and editor of the London *Photographic News*, died suddenly at his residence, Rose Lawn, Catford Bridge, Kent, on the 15th January last. His life, for many years past, had been devoted to the study of photography and its literature, and the history of the *Photographic News*, as that journal very justly observes, is practically that of the deceased gentleman.

Mr. Wharton Simpson was the author of many well known works connected with photography. The "Year Book of Photography" is probably the most important of all, of which an edition has annually appeared since 1859. "On the Production of Photographs in Pigments" is the title of a historical and practical treatise of carbon printing published in 1867, which is of value to this day; nor must we omit to mention an important contribution to the history of the photographic art published in the *British Quarterly Review*.

As a successful experimentalist, he has left his mark. He early predicted a great future for collodion, and worked for many years to improve this material as a vehicle for silver salts. About 1857 he undertook an exhaustive research upon collodions sensitized with bromine salts, and strongly advocated the use of these in conjunction with iron development, as against iodized collodion with pyrogallic development. In later years he brought forward the well known collodio-chloride process, or Simpson type, as it has been called in America. The collodio-chloride process may be termed the most permanent silver printing process we have, since the collodion film permits of more thorough washing than the albumen film. Strange to say, although the Photographic Society awarded its silver medal to Mr. Simpson for the work, it was in Germany, France, and America where the process found most favor, and where collodio-chloride paper was generally manufactured.

Finally, Mr. Simpson, we believe, enjoyed the reputation of being the only Englishman who has produced color by photographic printing. In experimenting with his collodio-chloride, he found one day that a portion of the material covered with ruby glass had become red under the action of the sun, the explanation, no doubt, being that the chloride in suspension had been changed by light to the violet subchloride, which had reproduced the tint of the glass above. The colors produced in photography by Niepce de St. Victor were secured, it is well known, by a similar use of what has been termed, for want of a better name, the violet subchloride of silver.

Mr. Wharton Simpson has served as vice-president of the Photographic Society, and of the South London Photographic Society since its commencement, and his ability, both in the world of literature and photography, placed him in a prominent public position for many years past.

Captain Minié.

The death is announced, at Paris, of Claude Etienne Minié, the inventor of many important improvements in fire-arms. Born in Paris about 1805, as soon as he was old enough M. Minié enlisted in the French army as a private, and served through several campaigns in Algeria. Promoted to a captaincy of chasseurs, he devoted himself to inventing improvements which would perfect the infantry service. Favored with the special protection of the Duke of

Montpensier, he was able to secure the adoption of various improvements, which affected the shape and make of balls, cartridges, and gun barrels. He was decorated in 1849, and in 1852 made chief of a battalion of horse. M. Minié refused to go to Russia and apply his inventions there, although offered still further promotion. He was long in charge of the shooting gallery at the Normal School at Vincennes, and contributed largely to the perfection of portable arms. In 1858 he was invited by the Pasha of Egypt to go to Cairo and direct the manufacture of arms and a school of shooting there.

General Arthur J. Morin.

A Paris report of February 7 announces the death of Gen. Arthur Jules Morin. General Morin was born October 17, 1795, and entered the Foot Artillery of the French Army some time after attaining his majority. He became a General of Division in 1855, and was afterward made Director of the Conservatory of Arts and Trades. He was well known to the scientific world, having published many works connected with experimental mechanics, and aided largely in the advancement of that science in France. He was admitted to the Academy of Sciences in 1843, and in 1858 was made a grand officer in the Legion of Honor. General Morin was President of the Imperial Commission for the Exhibition of 1855, and in 1862 was made President of the Society of Civil Engineers of France.

Death from an Electric Shock.

An accident of an extraordinary nature occurred on Tuesday night, January 17, 1879, at the Holte Theater, Aston, a suburb of Birmingham. The stage is lighted by two electric lights, and when the candles are not burning, the connections used for the purpose of crossing the current are hung up over the orchestra. After the performance of the pantomime, Mr. Bruno, the euphonium player, was leaving with the other members of the band, when, presumably out of curiosity, he caught hold of the two brass connections referred to; the man in charge called out to him with the object of warning him of the danger he was incurring. The warning, however, came too late; Mr. Bruno received the full shock of the electric current, generated by a powerful battery which supplies the whole of the lamps in the building and grounds. It is said that the candles not being then burning Mr. Bruno was unable to disengage himself, and pulled the wire down. The shock rendered him insensible. A medical man was at once sent for, and restoratives were applied, but Mr. Bruno died in about forty minutes afterwards.—*The Electrician*.

MISCELLANEOUS INVENTIONS.

Mr. James Alfred Roberts, of Sydney, New South Wales, Australia, has invented an improvement in carriage lamps, which relates to the candle tubes of the lamps. The object of the invention is to facilitate the insertion of the candle into and its removal from the candle tube.

Mr. William H. Hawes, of New York city, has devised a pigeon trap, so constructed as to prevent the birds from remaining in the trap after the trap is sprung. The invention consists in combining a semi-cylindrical box, a middle pivoted cover, and a cord, arranged so that as the cover is tipped it will force the birds from the semi-cylindrical box.

Mr. John W. Smith, of Jersey City Heights, N. J., has patented a bunker for holding ice in markets, hotel provision rooms, vessels, and other places where a room is to be kept cool. It is so constructed as to effect a great saving of ice, while keeping the room cooler than the ordinary bunkers.

Mr. Francois Raymond, of Woodhaven, N. Y., has patented a new and improved folding bed, which is simple in construction, durable, and convenient.

Mr. Charles H. Cushing, of Tidioite, Pa., has invented an improved device for adjusting or locking and unlocking the plug of a stop cock. The plug may be firmly held in any desired position against any pressure of the liquid contained in the pipe to which the cock may be attached, and all wear on the plug or on its seat in the body may be compensated for by slightly turning down a nut.

Mr. Abram V. S. Hicks, of Rockville Center, N. Y., has patented an improved combined hammock and supporting frame. This invention is an improvement in the class of beds formed of a folding frame and a hammock attached thereto. It consists in the peculiar construction and arrangement of the parts of the frame.

An improved book holder, patented by Mr. John L. Highbarger, of Sharpsburg, Md., is designed for holding books open for convenience of reading. The device is applied to the upper end of a book cover; and it consists mainly of three parts—a bar or roller, two hooks or clasps, and two bent pivoted fingers. The hooks and fingers are attached to the ends of the bar or roller, and receive and tightly clamp the upper edges of the lids of the book, and are so attached to the bar that it is free to rotate. The pivoted fingers revolve with the roller, so that they may be turned into suitable position to enable them to hold the leaves of the book.

Mr. William Driscoll, of Brockville, Ontario, Canada, has patented a trap, which is an improvement upon the form of animal trap in which the weight of the animal is made to release a tilting platform and allow the animal to be precipitated into a tank of water, a barrel, or other receptacle placed beneath the trap. In this form of trap it has been a desideratum to secure a latch mechanism for locking the platform which is sufficiently sensitive to be tripped by

small animals, like mice, as well as by rats or larger animals. This improvement aims at this result.

Mr. Henry L. Russell, of Bloomington, Ill., has invented an improved device for attachment to the leaders that conduct the rain water from the eavestroughs to the cisterns. It is so constructed as to adjust itself automatically to conduct the first water from the roof into the waste pipe and the succeeding water into the cistern, to prevent the coal dust and other dust that may settle upon the roof from being washed into the cistern.

Mr. Joseph W. Price, of Bryan, Ohio, has patented an improved bed bottom, which is so constructed that the cord or wire can be easily and conveniently tightened, and easily put in and taken out.

A bucket for taking bees from the hives to arrange the comb, for carrying them from one place to another, and for capturing bees in case of swarming on trees, has been patented by Gideon C. Finley and Sarah E. Finley, of Petersburg, Tenn. The invention consists in a bucket for transporting and capturing bees, having openings for the entrance and exit of the bees, an apron before the entrance slide, and openings for ventilation. The bucket is so arranged that it can be pulled to the top of a long pole if desired.

A carriage body, which is so formed that it may be extended to form a two-seated carriage, or contracted or folded to form a single-seated carriage, as may be required, has been patented by Mr. Horace C. Seely, of Philadelphia, Pa.

Messrs. Charles Holzner and Fred. Vohringer, of Louisville, Ky., have patented an improved coal hod. The invention relates to the manner of securing the base ring, bottom, helmet, and funnel or nose of a hod to the body thereof. This is done by crimping and wiring the parts together.

A simple, convenient, and inexpensive refrigerator crate for transporting butter, fruits, meats, game, etc., has been patented by Mr. George W. Freeman, of Amboy, Ill.

Mr. James M. Davis, of Knobel, Ark., has patented improvements in irons for connecting the traces with the hames, the object being to permit the pressure on the horse's shoulder to be shifted when necessary to avoid irritation, and also to lock the traces in the hooks attached to the hames.

Messrs. James Stroud and Oliver C. Titus, of New York city, have patented an improvement in wickets used on doors, especially in prisons or asylums, which have heretofore consisted simply of a barred opening. The object of this invention is to construct such wickets with doors or flaps, whereby they can be closed tightly and fit the wicket flaps in such a manner that they can be opened only from one side.

Mr. Ira D. Bush, of Detroit, Mich., has patented a door bolt, which is so arranged that it can operate like an ordinary door bolt, and will also hold the door when it is opened a distance equal to the length of the bolt.

A key-board attachment for musical instruments, patented by Mr. Christopher C. Reynolds, of Kelseyville, Cal., is to be used in connection with prepared music sheets to play the instrument by turning a crank, or by attachment to any suitable motor.

Mr. James M. Thayer, of Randolph, Mass., has patented a cheap, simple, convenient, and effective buckle for ties for bags. The invention consists of a rectangular frame of metal, perforated on one side for attachment to a strap, the frame having pivoted within it a tongue with a beveled serrated tip, and curved or rounded end bars for the strap to hold or engage against.

Messrs. Robinson Buckingham and Charles W. Poindeexter, of Alto Pass, Ill., have patented an improved packer, designed to facilitate the pressing into boxes or packages of fruits and vegetables—as, for instance, peaches, early apples, pears, plums, or other fruit that will stand pressure when packed, or green peas, string beans, sweet and Irish potatoes, tomatoes, and other vegetables. The machine used for that purpose presses the fruit or vegetables by the lid into the box or package, and admits the convenient and quick nailing of the lid while being held on the box.

The First Stocking-Knitting Machine.

To the Editor of the *Scientific American*:

In an article in your paper (No. 9, vol. xlii.) it is stated that the first machine for knitting stockings by power was made by a man in Albany, N. Y., who, in 1831, succeeded in converting a common hand frame into one of that kind. This, if you will consult the records of the Patent Office, you will find to be a mistake, as a patent was granted to John Bazin, Jr., of Canton, Mass., dated October 28, 1814, for a machine for knitting by power. This was the first stocking machine ever made in this country, and was truly an original invention, the inventor not having seen any kind of machine for that purpose until long after he had completed his. One of these machines, which was in operation during the years 1815 and 1816, is still in existence, and, though somewhat damaged by want of proper care on the part of those who have had it in charge, could very easily be put in working order by a competent mechanic.

There were never more than four of these machines built, as some capitalists, who had bought the right to use them in a distant country, by trying to obtain control of the whole patent, not only lost all they had spent in the business, but succeeded in preventing the patentee from deriving any benefit from his invention.

J. A. B.

Canton, Mass., February 10, 1880.