count, the error of position in either case being beyond detection with the unassisted eye.

The 12 inch telescope has been used by Mr. Barnard for the observation of comets and nebulæ. It has been found by him to be capable of giving photographic images of exquisite sharpness, and in this capacity forms an important addition to the outfit of the observatory. Twenty-five new nebulæ have been discovered by Mr. Barnard with this telescope, and a comet (comet *e* 1888) was discovered by the same observer with the 4 inch comet seeker on September 2. It is probable that the 12 inch telescope will be fitted with a new driving clock, in order to better fit it for photographic work.

No change has been made in the dome and hydraulic elevating floor of the large telescope. The convenience and, indeed, necessity of the elevating floor is every day more apparent. The rapid motion of the eye end of the telescope (a foot in eight minutes for an equatorial star) would alone make the use of an observing ladder proportioned to the size of the instrument extremely troublesome. The pier, when finally placed exactly in position, will probably be filled with brick and sand.

The driving clock of the large telescope was provided by the makers with an electric control, for keeping its rate in exact coincidence with that of a standard astronomical clock. The vertical shaft of the governor rotates in one second, and has near the bottom a small projecting pin. A stud on the end of the armature lever of an electromagnet is struck by the pin as the governor shaft rotates, when a current is passing through the magnet; but when the current is broken once a second by a standard clock, the stud is withdrawn at the proper instant to allow the pin to pass. There is also an ingenious and beautifully constructed attachment for breaking the circuit in case the standard clock should, either by accident or design, omit one or more seconds in a minute. The driving clock is adjusted to run a little fast, and is continually checked by the control, the governor being allowed to rotate by turning in a friction collar. It was found, however, that the impact of the pin on the governor shaft against the stud of the armature caused a shock which was transmitted to the telescope and produced a disturbance of the image fatal to photographic work. The control was therefore removed, and another, which I devised for the purpose of giving a perfectly smooth motion, was substituted for it. The new control answers its purpose so well, and is of such extreme simplicity, that I shall give a description of it here, as it can be applied to any clockwork having a shaft which rotates in an integral part of a second.

A soft iron sector subtending an angle of 36°, and having a radius of six inches, is clamped to the vertical axis of the governor, and rotates in a horizontal plane. The sector passes very close to the poles of an electromagnet (part of the old control) which is mounted on a slightly elastic standard of steel. At every second a strong current is sent through the coils of this magnet by means of a standard clock, the circuit being closed, as in the case of the old control, by the relay points of the chronograph attached to the driving clock. The driving clock is set so as to run a little too fast, and when the governor is started the sector gradually gains upon the click of the chronograph until it reaches the magnet of the control, when the friction produced by the attraction of the latter prevents any further acceleration, and the governor will rotate in exactly one second by the standard clock as long as the control is in operation.

The elasticity of the support on which the electromagnet is mounted plays an important part in the proper working of the control. When the sector passes at the exact instant of the passage of the current, the magnet springs in toward the sector and comes into actual contact with it, very greatly increasing the friction, while the passage of the sector at any other instant meets with no resistance, the magnet being slightly withdrawn by its support.

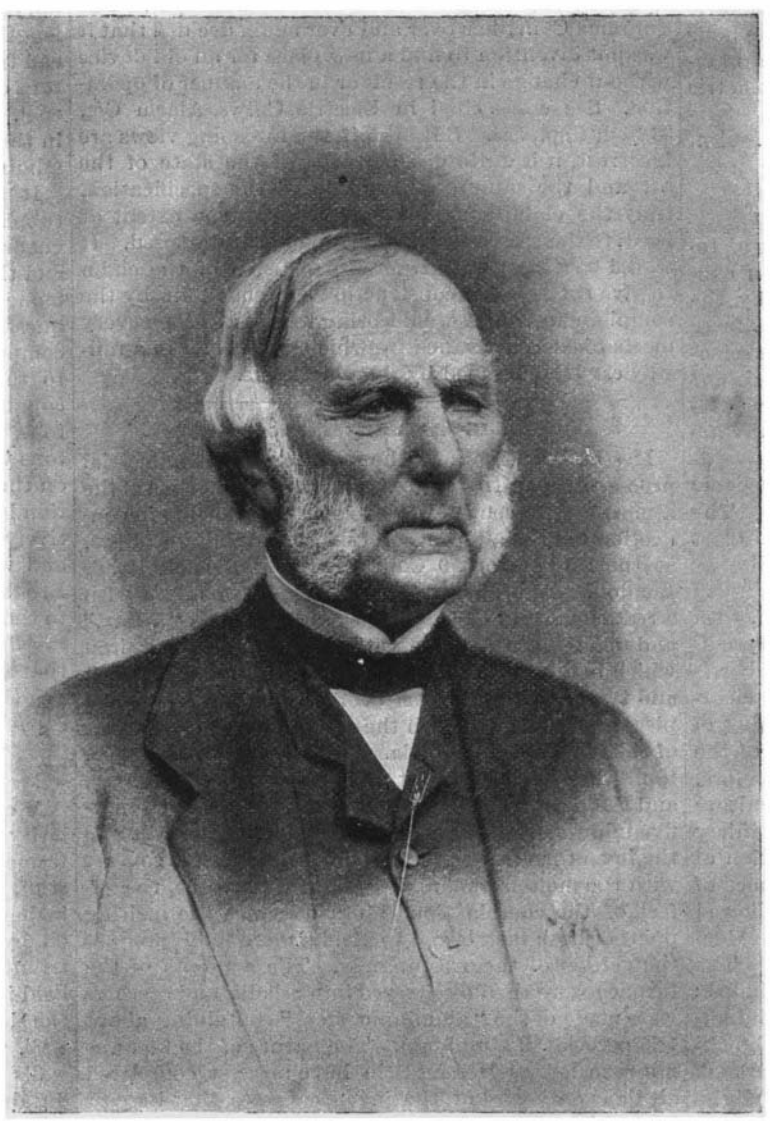
The current used with the control is obtained from the battery of twenty gravity cells, employed during the daytime in transmitting time signals to San Jose. As the signals are not sent at night, the battery is then connected with the control by turning a switch. With this control no shock is communicated to the telescope, and the image of a star is steady.

Since, however, changes of refraction and slight irregularities in the clockwork produce small displacements of the image in a telescope, it has always been necessary in photographing with long exposures to keep the telescope pointed by hand, correcting any displacement which may occur by the slow motions of the instrument. It was found impracticable to move the immense mass of the Lick telescope with the quickness and delicacy required in this operation, and after various experiments Mr. Schaeberle suggested that the photographic plate should be mounted upon double slides, one moving in right ascension and the other in declination, and should be kept upon a star by means of a diagonal microscope attached to the plate. A rough experimental model was constructed on this plan by the observatory machinist, and performed so satisfactorily that a plate holder of more accurate workmanship will be made on the same principle.

The public receptions on Saturday evenings interfere greatly with these experiments, as all apparatus must then be removed to fit the telescope for visual observation. Probably few visitors are aware of the hindrance to astronomical work caused by their entertainment, although, as a duty to the public, the sacrifice is always cheerfully made. Many fine nights are to be expected during the months of October and November, but after that fog and rain will almost put an end to observation until the succeeding spring.

Fig. 1.—JEAN CAUSEUR AT THE AGE OF 130.

Fig. 2.—NOEL DES QUERSONNIERES AT THE AGE OF 117.



THE LATE COL. GEORGE H. PERKINS, OF NORWICH CONN.

CENTENARIANS.

Mr. Emile Levasseur has recently presented to the Academy of Sciences a very interesting communication *apropos* of the "Centenarians in France, according to the Census of 1886." The number of such persons is much less than is generally supposed. Young women have the affectation to remain young, while the old men that are cited for their great age have the vanity to grow old in order to be admired.

In Bavaria, according to the census of 1871, there were 37 centenarians; but, when the fact came to be verified, only one authentic case was found.

In Canada, 421 were cited. Out of this number, the social state of 82 was ascertained by the aid of *bona fide* documents, and there remained after the examination but 9 genuine centenarians—5 men and 4 women.

In France, the same delusion exists in regard to centenarians, as is proved by the reports emanating from the bureau of statistics.

After the reception of documents relative to 184 centenarians, it was found by reference to authentic records, such as registrations of baptism, half-pay lists, etc., that the number dwindled down considerably, say to about sixty. Among these there was a person named Joseph Ribas, who was born at San Estevan de Litera, in Spain, on August 20, 1770, and who lived at Tarbes.

We add to these details two little known documents on examples of extraordinary human longevity. The first of these consists of an engraving, which we reproduce in Fig. 1. It was made by Chas. Levesque, in 1772, and is very well executed. It is accompanied with the following legend: "Jean Causeur, butcher by trade, aged 130 years, born in the village of Ploumoguer, in Lower Brittany. Painted in August, 1771, by Chas. Caffieri, sculptor, by commission, to the king, for the navy, at Brest."

The second document is relative to Mr. Noel des Quersonnieres, whose portrait is published in Fig. 2, from a lithograph made in 1845. At this epoch, Mr. Des Quersonnieres was 117 years of age. He was still living the following year, as is proved by a biographical sketch published on his account. Francois Marie Joseph Noel des Quersonnieres was born on February 28, 1728, at Valenciennes, where his father was king's counselor. He became commissary-general of military supplies in 1789, and was in disgrace under the empire. He went to live at London, where he married. At the age of 117 he was still vigorous. His face is pleasant, says his biography, his hearing and sight have preserved an astonishing delicacy of perception, and his head is not entirely devoid of hair.—*La Nature.*

A CONNECTICUT CENTENARIAN.

It is not often that one sees a hale and hearty hundred-years-old man or woman, in the full possession of the normal faculties, and filling responsible positions in life, but such an opportunity was afforded in the case of the late Col. Perkins, who died at Norwich, Conn., September 5, and whose portrait we give herewith. Col. Perkins celebrated his 100th birthday on August 5, just one month preceding the date of his death, and at that time the New York *Tribune* and other papers, in noticing his long life, bore particular testimony to the remarkable preservation of his faculties.

Col. Perkins was a native of Norwich, but as a lad was rather weakly, although he was able, in his nineteenth year, to walk to Poughkeepsie to embark on the Clermont, the pioneer Hudson River steamer, when she made her first trip to New York. During the war of 1812–14 he was paymaster for Connecticut, Rhode Island, and Massachusetts. He was present at the battle of Stonington, and was aboard Commodore Decatur's fleet when it was blockaded at New London. He was one of the incorporators of the Norwich and Worcester Railroad, the second or third road of the kind built in the United States, and from 1838 until his death was its treasurer, continuing active in the performance of his duties until three or four weeks before his death, when he left town for a vacation. He had not

missed an election in his town for seventy-six years Instead of being robbed of half his faculties in his old age, and so helpless from physical infirmity as to be a burden to his friends—as is often the case with those who are spared for so long a life—he engaged actively in business up to the last, a conspicuous figure in the streets, a regular attendant at church, and as well preserved and alert as many a man of sixty. It was his habit until recently to walk from his home to the company's office, over half a mile, four times daily, and he carried himself with an erect bearing, wrote a beautifully legible hand, and attended to his duties with an assiduity which many young men might copy with profit. His sight and hearing were excellent, and his only hobby is said to have been the art of preserving the health, a subject which he had carefully studied, with a benefit of which his great age affords the best attestation.

Thunder Storms.

Thunder storms at Brussels were much more common last June than for many years past. There is some evidence that since the erection of Melsen's complex and effective lightning conductor on the tower of the Hotel de Ville, they have not had nearly so many thunder storms in the city. But this tower commands the southwestern part of the city, and while thunder storms usually come from that direction, these come from the east.

The lightning flashes in some of these storms were extremely vivid. Several persons remarked in one of them that the rain drops were shining, and one observer saw the strokes followed by shining traces in the air, something like those which follow shooting stars. An interesting fact is that, in one case, at the instant of the stroke of wind which announced the advent of the storm, the flags which had been hanging loosely suddenly erected themselves toward the sky, thus showing in that case the presence of an ascending current in front of the storm.

M. Lancaster thinks that the following principles are true for Belgium thunder storms and, *mutatis mutandis*, for these storms generally:

1. The storms appear in connection with areas of low pressure, more generally when this area is from west to northwest of the locality occupied by the thunder storm. For Belgium, the electric phenomena attain their maximum when the focus of the general storm is over or near Ireland.

2. Thunder storms are most likely to occur when the barometer (reduced to sea level) stands at from 29·5 to 29 7 inches. In high pressures they are rare, local, and of little intensity. In Belgium they occur only in the mountainous part of the country.

3. The storms travel generally from southwest to northeast at a speed of 25 to 30 miles per hour. The rainfall accompanying them decreases toward the east.

4. Their production depends on the state of two important meteorological factors—pressure and temperature. A high temperature at the time of a barometric depression is the most favorable condition. The hour when they are most common is that which falls nearest to the thermometric maximum and barometric minimum.

5. A feeble gradient favors their production.—*Am. Met. Jour.*

Tobacco and Bacteria.

The popular belief in the germicidal virtues of tobacco smoke (which we note has been revived in connection with the alleged immunity enjoyed by the cigar makers of Florida during the recent yellow fever epidemic) has received some confirmation in the scientific researches of Dr. Vincenzo Tassinari, first assistant of the Hygienic Institute of Pisa University. In a preliminary note on his experiments (*Centralbl. f. Bakteriologie*, Bd. iv., No. 15) he describes the simple apparatus he designed to test the effect on pathogenic organisms of exposure to the fumes of tobacco. The apparatus consists in a chamber formed by two glass funnels placed horizontally, and connected together at their mouths by paraffin. In this chamber is suspended from a loop of platinum a small piece of linen, with the threads of its lower extremity immersed in a culture fluid containing the microbes. The chamber is connected at one end by a tube with a cigar or cigarette, and at the other by a tube containing a plug of cotton wool (to serve as a filter) with the mouth of the experimenter. The smoke as it is exhaled, therefore, thoroughly surrounds the linen soaked in the culture fluid, and after the experiment, which lasts from thirty to thirty-five minutes, involving the consumption of from three and a half to four and a half grammes of tobacco, the chamber is opened and the linen allowed to fall into a test tube containing fluid gelatine. Control experiments were also, of course, made. The micro-organisms subjected to this treatment included: 1. Spirillum choleræ asiaticæ. 2. Spirillum Finkler-Prior. 3. Bacillus anthracis. 4. Bacillus typho-abdominalis. 5. Bacillus pneumoniæ (Friedlander). 6. Staphylococcus pyogenes aureus. 7. Bacillus prodigiosus. The result varied with the variety of tobacco and the kind of microbe, but in every instance there was marked (sometimes very great) delay in the development of colonies in the gelatine as compared with that of organisms dealt with similarly, but without exposure to tobacco smoke. Indeed, the development of some was entirely prevented. For example, in the third series of experiments cited, where large Virginia cigars were used, the development of Bacillus prodigiosus was delayed for seventy-two hours, that of Staphylococcus pyrogenes aureus for seventy-three hours, of Bacillus anthracis for ninety-seven hours; while of the others, mentioned above, no development of colonies took place after from a hundred and twenty-eight to a hundred and sixty-eight hours. Dr. Tassinari attributes these results to the chemical action of the ingredients of tobacco smoke. He proposes to extend his researches more fully, both as regards the effect of different kinds of tobacco upon these and other micro organisms, especially the tubercle bacillus, and to determine the time of exposure as well as the amount of tobacco necessary to produce the full effect. He hopes also to ascertain what substance or substances are responsible for the germicidal action.—*Lancet.*

Patent Car Bell.

U. S. Cir. Ct., S. D. N. Y., March 7, 1888. Mann's Boudoir Car Co. vs. Monarch Parlor Sleeping Car Co. Opinion by Coxe, J.

A patent for an improvement in compartment rail way cars, describing an arrangement of wire signal bells, or apparatus, to extend from each compartment to the porter's room, in view of the fact that such signals were in common use in hotels, on steamboats, and elsewhere prior to the grant of the letters patent, is void for want of novelty, and is not patentable. The patentee appears to have been the first to employ a wire signal bell to summon a servant in a railway car; but can it be that it required an exercise of the inventive faculties to do this, in view of the fact that the identical apparatus had previously been used for the identical purpose in dwelling houses, hotels, and steamboats? The additional fact should also be remembered that similar signal appliances had been used in horse cars and in railway cars. The only novel feature that can by the most liberal construction be discovered is the location of the apparatus in railway cars. The operation is the same. If it be invention to place a jingle bell in a passenger car, then each successive applicant who finds a new situation for such a bell is entitled to the rewards of an inventor. If this claim is held to be valid, with what consistency could a patent be refused to a person who, for the first time, should connect in a similar manner a row of bath houses at the seaside, or the boxes in a theater, or the tables in a restaurant? To remove a bell from the stateroom of a passenger steamer and place it in the stateroom of a passenger car requires no more of the inventive faculty than to take a steam whistle from a tug boat and place it on a woolen mill—no more than to place a doctor's speaking tube at the front door of a lawyer. The Supreme Court has over and over again decided that it was not invention to find a new place for an old device without change in the result or in the manner of operation. See cases cited in Electric Co. vs. Alarm Co., 33 Fed. Rep., 254. But even if the foregoing views are incorrect, it is quite clear, in view of the state of the art and the minute description of the specification, that the claim must be confined, to some extent at least, to the mechanism and arrangement disclosed. It would be a most unwarranted expansion of the claim to give it the broad construction contended for by the complainant, which would bring within its scope every mechanical contrivance by which the porter in a railway car is summoned by the passengers.

A New Aluminum Process.

Messrs. Brin Brothers, the inventors of the industrial process of separating the oxygen from the nitrogen of the atmosphere, recently showed some experiments in connection with a new process of making aluminum alloys, at their laboratory, 9 College Street, Belvedere Road, London. An ordinary, but rich, clay was mixed with a reducing agent called by the experimenters "a flux," and made into a paste with water. Some pig iron which had been run into bars three-eighths inch thick and two inches broad was broken into pieces. These pieces were charged with the paste and alternate layers of coke into a small cupola. A further quantity of coke to fill the furnace was put upon the top of the charge, and the blast from a fan turned on. In about twenty-five minutes the pig iron had melted. According to the inventors, nascent aluminum is produced in contact with the molten iron, and penetrates the same, the effect of the combination being to reduce the melting point of both metals and to yield a more fluid product than either of them separately. The contents of the furnace were then discharged into a ladle, and castings were made of the "aluminum steel" containing about 1·75 per cent of aluminum. The nature of the flux was not revealed, as Messrs. Brin have not yet completed all their patents, but the inventors state that its cost is not higher than that of the clay used. The castings were exceedingly sonorous, for when suspended by a string and struck with a piece of metal, the vibrations lasted from thirty to forty-five seconds. The castings were of white fracture, and free from blow holes. The silicon and some other impurities of cast iron are thrown out in the form of slag. The aluminum has thus a twofold function in this process. It forms definite alloys with the iron, and aids in clearing out its impurities.

In another experiment the ready manner in which aluminum can be reduced by the process was illustrated. A piece of thin, soft scrap iron was coated with the clay and flux, and inserted in a blowpipe flame. At a bright yellow heat the clay was reduced, and metallic aluminum became occluded in the whole thickness of the iron, giving the latter a white surface. The resulting metal, instead of being soft and pliable, became tough and springy, and it was claimed had acquired all the properties of first class steel. Some of the alloy thus made was put into strong, pure nitric acid, and was not acted upon thereby; while a piece of the original scrap iron was rapidly attacked under the same circumstances. The proportion of aluminum in the steel produced depends, within certain limits, upon the proportions employed of the original ingredients for charging the furnace. Alloys of copper and of some other metals can be formed in the same way. Some copper aluminum bronze was exhibited; also such a bronze alloyed with from 17 to 20 per cent of steel. This alloy can be made hard and with a fracture like fine cast steel; or by careful annealing and repeated rolling a fibrous texture can be produced. Mr. Frederick Varley, who has made experiments with Messrs. Brin's aluminum steel, states that it has all the properties of the best iron for conducting magnetism, while chilled castings will make excellent permanent magnets. He suggests the use of the bronze containing 20 per cent of aluminum as telephone and telegraph conductors, believing that the bimetallic character of the alloy will be found to be a corrective of self-induction. The principle of producing alloys by applying aluminous vapor in its nascent state is found to work with a long range of metals besides iron, and makes an exceedingly fine aluminum silver alloy, possessing valuable properties.—*Industries.*

American Freight Cars in England.

With the object of inaugurating a new industry at Barrow in the building of what are known as American freight cars, two of Goodfellow & Cushman's freight cars have been brought over from the United States in sections, and, after being built up at London, were taken to Barrow recently, where they were loaded and severely tested. These wagons are each 30 ft. long and will carry 30 tons. The frame is built of steel tubes, bound with steel struts. The car is supported at each end by a bogie, something similar to those seen under the carriages of the Midland Railway Company. The wheels, which are of cast steel, and of which there are four to each bogie, are cast in a block and without the usual tire. The carrying capacity of an ordinary English railway wagon is 10 tons, though the length of the wagon is just half that of the American freight car. One of the cars was loaded with 30 tons of steel rails and the other with about 27 tons of coal. Several trips were made to the steel works and in the goods yard, and the cars were found to answer admirably.

It is claimed for the Goodfellow & Cushman steel tube light-weight freight cars that a larger amount of goods could be carried than with the present wagons, and that there would be a saving of time, labor, and money, and it is urged by many who have studied the question that the English railways will before long be compelled to adopt some such wagon. One objection to these cars is that, although 30 ft. in length and capable of carrying 30 tons, their weight is only 10 tons, whereas an English wagon carrying a load of 10 tons weighs on an average about 6 tons. It is urged, on the other hand, that the car by its mode of construction is really a stronger wagon, though it is comparatively much lighter. Mr. H. Roberts, of the carriage and wagon department of the Midland Railway, at Bristol, is an advocate for the adoption of cars similar to those under notice. He says he does not advocate the destruction of existing stock if good, but thinks that all renewals of worn-out stock should be on the principle of greater length and greater carrying capacity.—*Colliery Guardian.*

Veneering Frame Houses.

A construction detail that is gaining much popularity in some Western cities is the bricking in of frame houses. The building is sided up with matched stuff, as if complete; then a brick face wall, four inches thick, is laid in contact with the exterior, tied on by spikes about every sixth course. A boy distributes them all around on top of the wall. They are held in the mortar bed ready, and driven through into the siding till the heads are flush with the face of the wall, when the next courses are laid, and so on. The walls present the appearance of solid masonry, are durable, and, as they add to the warmth of the buildings, seem to present substantial recommendations, especially in severe climates.—*American Builder.*

Dosing Trees with Medicine.

Referring to the popular idea that sulphur placed in holes bored in the trunks of trees will be dissolved and carried by the sap to the foliage in such quantities as to render it offensive to insects, a recent *Bulletin* of the Massachusetts Agricultural College Experiment Station says that it has been found upon cutting down trees which have been plugged with sulphur that the material remains unchanged for many years. It is added, says *Garden and Forest*, that while we are spending so much effort to prevent injury to our trees from borers we certainly ought not to make holes in them many times larger than those made by any known species of insect. In order to ascertain whether sulphur in soluble form can be introduced into a tree so as to affect the fungus growths causing rusts, blights, and mildews, some large rose bushes, badly mildewed, were treated with saturated solutions of potassium sulphide, hydrogen sulphide, and ammonium sulphide. The liquid was forced into holes bored into the main stem with a small gimlet, and the orifice was plugged with grafting wax. At first a slight improvement in the amount of mildew upon the leaves was noticed, but in September all the bushes but one were dead, presumably from the effect of the holes. Until further trials are made, this experiment indicates that while there may be some promise that antiseptics introduced into the sap circulation may prevent the growth of fungi, some safer means of introducing the solutions must be found. From the nature of the case it is hardly possible that any substance can be introduced into the circulation in sufficient quantities to affect insect life. Professor Maynard, who prepared the *Bulletin*, suggests that an inspection be made next season of the elms in Boston which were bored and filled with chemicals last spring to make the leaves distasteful to beetles. Careful weighing would determine how much of the powder had escaped from the hole, and analysis could detect the presence of any excess of sulphur in the leaves.

Ancient Roman Plank Roads.

The Prussian Minister of Education, Von Gossler, having learned that Professor F. Knoke had lately found traces of old Roman plank roads on the moor between Mehrholz and Bragel, not far from Diepholz, in Lower Hanover, invited that gentleman to fully investigate the matter. He has just completed the task. He was able to trace the lines of two parallel plank roads right across the moor, presenting all those distinctive features which are found in Roman works of this kind. One of them shows evident signs of having been demolished by force, the boards, which were originally fastened with pegs to the bearers, having been violently torn away and buried in the bog to the right and left of the track. The other road seems to have fallen into decay, but there are signs of repairs executed even during the Roman period; for in places boards have been found fastened over the original planks, the fashion of both being the same. Those repairs seem to have been carried out hastily, for in one place a mallet, employed probably to drive home the pegs, was found on the track, forgotten, no doubt, by the workmen. The local archæologists feel assured that they have here the *pontes longi* which were used A. D. 15 by the Roman commander A. Cæcina in his retreat from Germany to the Ems.

AN IMPROVED ATTACHMENT FOR BICYCLES.

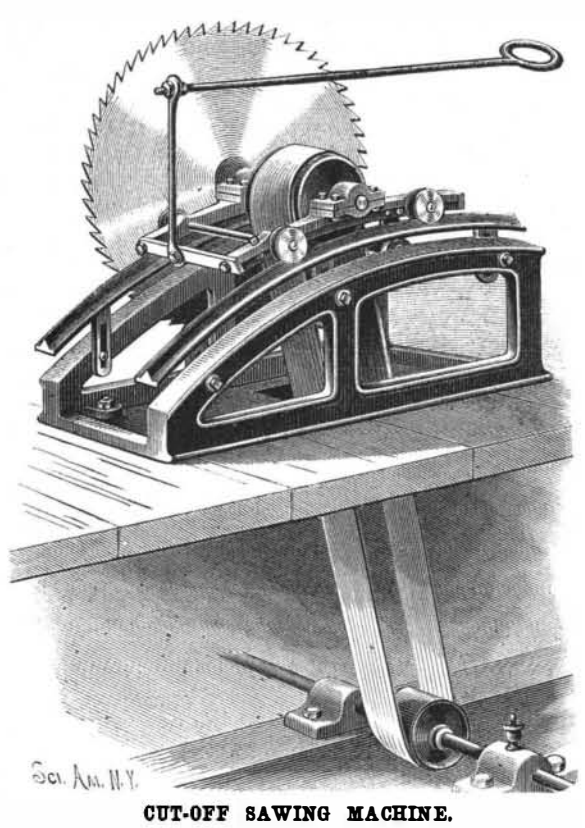
A simple and cheap attachment for bicycles or tricycles, whereby they may be run upon ice or snowy ground, is illustrated herewith, and has been patented by Mr. Herman H. Holtkamp, of New Knoxville, Ohio. A runner or shoe is arranged for connection with the small wheel of the vehicle, the shoe being attached by means of a clip on an adjustable bracket, whereby the runner may be used in connection with wheels of different diameters. To the large wheel are secured as many attachments as may be necessary, each of which consists of a cylindrical metallic plate, lined with leather or other slightly yielding material, and having flanges which extend outward from the side of the cylindrical section. This section is arranged so that it may be passed over the rubber tire and the felly of the large wheel, and on its inside are two projections extending toward the hub of the wheel, adapted to receive a clamping bolt, by which the attachment is clamped to the wheel. The two outward bottom flanges of this cylindrical section are placed at either side of the center of the tire, in order to allow for the regular operation of the ordinary form of bicycle brake, the small wheel being lashed to the backbone of the bicycle. With this attachment the vehicle may be freely used on ice, or heavily packed or frozen snow, while the attachment may be connected to or removed from the bicycle in a very short time. The whole combination, made of steel, may be sharpened for special feats on very smooth ice.

HOLTKAMP'S ATTACHMENT FOR BICYCLES.

A CHINESE teapot is of white porcelain embedded in a wadding lined bamboo basket, for retaining the heat.

CUT-OFF SAWING MACHINE.

We illustrate in the cut accompanying this article an ingenious mounting for a circular saw. It has been a usual practice when such saws are used for cutting off ends of timber or of boards, and for similar work, to mount them on an arbor at the lower end of a frame, swinging pendulum fashion from the beams of the ceiling of the shop. By the present invention all upper framework is dipensed with. The saw works on an



CUT-OFF SAWING MACHINE.

arbor, journaled on a carriage, that moves on a stationary frame or bed plate resting on the bench, working back and forth through the arc of the circle, being controlled in its reciprocations by the operator. The belt is driven from a pulley underneath the bench, the axis of whose countershaft coincides with the center of the arc or of the main frame. The rails on which the saw carriage moves are adjustable by bolts and slotted lugs. Their curve is also an arc of a circle, but in practice they are set slightly out of center with the driving pulley. As the saw is drawn forward it makes its cut. The rails, therefore, are so set that the belt is tightened as the saw comes forward and is slightly loosened as it recedes. Such loosening of the belt avoids wear of belt and journals. This receding motion is performed principally by gravity, so that the operator has little more to do than to pull the saw forward by its handle; the rest is practically automatic. Holding-down wheels are provided to prevent the carriage from lifting or rising from the rails. This machine is the invention of Messrs. J. W. Surprenant and J. E. Ferguson, of Astoria, Oregon.

The Qualities of a Good Rope.

In an article on rope making credited to a German periodical, but quoted in *Iron*, it is remarked that the appearance of a hemp rope affords to an experienced eye very fair indications of its quality. A good hemp rope is hard but pliant, yellowish or greenish gray in color, with a well defined silvery or pearly luster. A dark or blackish tint indicates that the hemp has suffered from fermentation while curing; and brown spots show that the rope was spun while the fibers were too damp, and is consequently weak and soft in the stained places. Sometimes a rope may be made up of inferior hemp on the inside, while upon this, as a core, good yarns are overlaid. This fraud may, however, be detected by unlaying a portion of the rope; and it generally betrays itself in use, if not otherwise discovered. Another variety of inferior rope is that made of short fibers, or the strands may be of unequal length or unevenly spun. In the first case the rope has a woolly or rough appearance, on account of the number of projecting ends of fibers; and in the latter case the irregularity in laying is easily perceived upon inspection by any one who knows what a good rope should look like. The combustion test for ascertaining the purity of manila rope has been published, but may be usefully repeated here. It consists in unraveling some of the fiber of the rope to be tested, and forming it into a loose ball, which is to be completely burnt upon a clean surface, such as an iron plate. Pure manila hemp burns to a dull grayish black ash; sisal leaves a whitish gray ash; combinations of manila and sisal show themselves by gradations of the grays.

Fortunes in Patents.

The Commissioner of Patents estimates that "from six to seven eighths of the entire manufacturing capital of the United States, or six hundred millions of dollars, is directly or indirectly based upon patents." A calculation of the same kind in England, according to our English contemporary, the London *Inventor*, reveals a still more surprising result, the capital invested being enormous. It has been computed that Siemens' inventions have produced more than five millions sterling.

"There is," says an eminent authority, "scarcely an article of human convenience or necessity in the market to-day that has not been the subject of a patent in whole or in part. The sale of every such article yields its inventor a profit. If we purchase a box of paper collars, a portion of the price goes to the inventor; if we buy a sewing machine, the chances are that we pay a royalty to as many as a dozen or fifteen inventors at once."

Lord Brougham often said that he would gladly have exchanged his honors and emoluments for the profits and renown of the inventor of the perambulator or sewing machine.

The writer here states the profits annually divided by our several sewing machine manufacturers, which are phenomenal in amount, adding that "more money has been, and always can be, made out of patented inventions than by any other investment or occupation." The telephone, the planing machine, and the rubber patents realized many millions, while the simple idea of heating the blast in iron smelting increased the wealth of the country by hundreds of millions. The patent for making the lower end of candles taper instead of parallel, so as to more easily fit the socket, made the present enormous business of a well known firm of London chandlers. The drive well was an idea of Colonel Green, whose troops, during the war, were in want of water. He conceived the notion of driving a two inch tube into the ground until water was reached, and then attaching a pump. This simple contrivance was patented, and the tens of thousands of farmers who have adopted it paid him a royalty until the recent decision of the Supreme Court, which was adverse to sustaining the patent. A large fortune was realized by the inventor who patented the idea of making umbrellas out of alpaca instead of gingham, and the patentee of the improved "paragon frame" (Samuel Fox) lately left by will £170,000 out of the profits of his invention. The weaving, dyeing, lace and ribbon making trades originated and depend for their existence upon ingenious machinery, the result of an infinity of inventive efforts. Carpet beating, from being an untold nuisance, has become a lucrative trade through the same inventive genius and mechanical contrivance. Even natural curiosity has been turned to account in the number of automatic boxes for the sale of goods of all kinds, and fabulous dividends have been paid by the public companies owning the patents. In fact, any one can be a successful inventor. In proof of this, the most profitable inventions are the improvements in simple devices, things of every day use that everybody wants, and which are in the power of everybody to invent. A lady derived a large income for inventing a moving belt for drying eggs, albumen, etc.

The Power of the Imagination.

We learn from the New Orleans *Picayune* that Dr. Durand, wishing to test the practical effect of mind disease, gave a hundred patients a dose of sweetened water. Fifteen minutes after, entering apparently in great excitement, he announced that he had by mistake given a powerful emetic, and preparations must be made accordingly. Eighty out of the hundred patients became thoroughly ill, and exhibited the usual result of an emetic. Twenty were unaffected. The curious part of it is that, with very few exceptions, the eighty "emeticized" subjects were men, while the strong-minded few who were not to be caught with chaff were women.