which they live. The *sarracenia*, the large plant on the left of the page, the *nepenthes*, in the center, and the *cephalotus*, which is immediately below it, have lids which shut down upon their victims. The *darlingtonia*, shown on the right, curls it leaf around them; the *pinguicula*, in the right hand bottom corner, shuts itself up and curls its leaves; the *dionœa* on the left, below the *sarracenia*, also shuts itself upon its prey, and the *drosera*, in the left hand bottom corner, has an arrangement of fine lines ending with little knobs, which it throws over its prey, and thus secures it.

"To Mr. Ellis," says Dr. Hooker, "belongs the credit of divining the purpose of the capture of insects by the *dionœa*. But Rev. Dr. Curtis made out the details of the mechanism, by ascertaining the seat of the sensitiveness in the leaves; and he also pointed out that the secretion was not a lure exuded before the capture, but a true digestive fluid, poured out, like our own gastric juice, after the ingestion of food.

"For another generation the history of this wonderful plant stood still; but 1868 an American botanist, Mr. Canby, who is happily still engaged in botanical researches, while staying in the *dionœa* districts, studied the habits of the plant pretty carefully, especially the points which Dr. Curtis had made out. His first idea was that 'the leaf had the power of dissolving animal matter, which was then allowed to flow along the somewhat trough-like petiole to the root, thus furnishing the plant with highly nitrogenous food.' By feeding the leaves with small pieces of beef, he found, however, that these were completely dissolved and absorbed; the leaf opening again with a dry surface, and ready for another meal, though with an appetite somewhat jaded. He found that cheese disagreed horribly with the leaves, turning them black and finally killing them. Finally, he details the useless struggles of a curculio to escape, as thoroughly establishing the fact that the fluid already mentioned is actually secreted, and is not the result of the decomposition of the substance which the leaf has seized. This curculio, being of a resolute nature, attempted to eat his way out. 'When discovered he was still alive, and had made a small hole through the side of the leaf, but was evidently becoming very weak. On opening the leaf, the fluid was found in considerable quantity around him, and was without doubt gradually overcoming him. The leaf being again allowed to close upon him, he soon died.'"

The foregoing description and illustration appeared in a special edition of the SCIENTIFIC AMERICAN, issued in December, 1874, and will be read with interest by all students of natural history and lovers of the marvelous in Science.

Sir John Lubbock has recently turned his attention to botany with special reference to the same thing, and has recently published "British Wild Flowers Considered in Relation to Insects," which will undoubtedly throw a great deal of light upon it. Meanwhile in this country no pains have been spared by those competent to investigate; and within the last year or two one lady in particular, Mrs. Mary Treat, of Vineland, N. J., herself both a practical botanist and a charming writer, encouraged in her pursuits by Professor Gray, of Cambridge, Massachusetts, has made diligent search for plants possessing these characteristics, and has patiently watched them through months of experimenting, keeping a diary and giving the information thus gained to the public. Mrs. Treat's latest experience is with bladderwort, which she carefully observed, and found ample proof that the little sacks are traps for water insects which are unsuspectingly drawn in and then consumed. She found that not only small insects were caught, but "innumerable moths, and butterflies two inches across, are held captive until they die—the bright flowers and brilliant, glistening dew luring them on to sure death." Some of these plants she took to the house, "away from atmospheric agitation," and began her experiments, pinning living flies "within a quarter of an inch of the most vigorous leaves; in less than an hour the flies' legs are entangled in the glands. I now take the long-leaved sun dew, which is more common and a more wonderful flytrap than either of the other species, place a struggling fly on a vigorous, healthy leaf; in less than three hours the leaf is folded completely around its victim. I take a bit of raw beef, placing it as nearly as possible on the center of the leaf; in twelve hours it is so enfolded in the leaf as to be completely hidden from view." Mineral substances, bits of chalk, etc., were not at all affected. Next she tried the round-leaved sun dew, whose leaves clasped a piece of raw beef in less time.

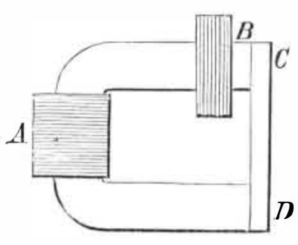
Killing Gophers.

The gopher is one of the most troublesome pests that the Western farmer has to contend with, and as difficult of extermination as any. Several inquiries have been made of us says *The Inter-Ocean*, as to the most effective means of disposing of them; and with a view of finding the most approved, we have consulted several farmers who have had extensive and painful experience with them. The plans for removal have been as various as the persons consulted, and have included poisoning, drowning, shooting, trapping, and other methods. But to our minds by far the best plan is that adopted and highly recommended by Dr. W. A. Pratt, of Elgin, Ill., and seems the most simple, least expensive, and most effective of any. He takes a light steel jaw trap, such as is used for catching rats, and crooks the catch (that passes over one of the jaws to the pan) a little, so as to allow the jaws to come nearer together then they do when set for ordinary purposes. He then sets the trap so that it will go off easily, and plants it bottom upwards over the gopher's hole, bringing the dirt a little around the edges so that the only apparent passage is through the jaws of the trap. The gopher, who generally comes out with some haste, rushes up, hits his head or paws against the pan of the trap, which unfastens it, and he is caught securely in the jaws. Dr. Pratt says that a few days of persistent trapping in this way will completely clean out every vestige of the gophers from a large farm

A NEW MAGNETO-ELECTRIC ENGINE.

In order to investigate the induced currents produced by the application of armatures to horseshoe magnets, Professor W. R. Morse recently constructed the simple apparatus represented in Fig. 1. This consisted of cylindrical horse shoe electromagnets, the wires of which were wound about iron cores at the bend of the iron, so as to form practically straight electromagnets with cores horseshoe in form. A is the coil of the electromagnet, and B the induction coil. Upon exciting the electromagnet, induction currents arose in the coil of fine wire, B, both at making and breaking the circuit. These currents were measured by a reflecting galvanometer placed in the circuit of the coil, B, and were compared with those obtained from the same electromagnet by placing a straight armature, C D, upon its poles, and then exciting the electromagnet.

Fig. 1.

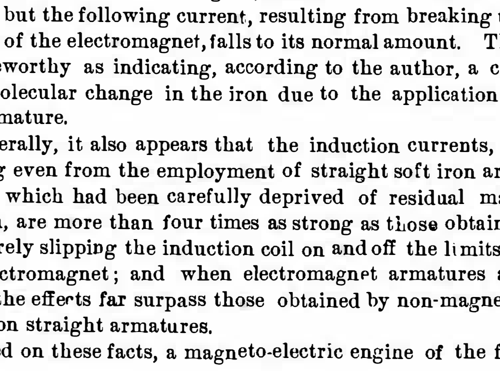


The results of experimenting show that a marked increase, amounting to nearly 25 per cent in the strength of the induction currents, is due to the application of the armature to the poles of the electromagnet. The first induced current after the removal of the armature, which results from again making the current in the electromagnet, shows the same increased effect, but the following current, resulting from breaking the circuit of the electromagnet, falls to its normal amount. This is noteworthy as indicating, according to the author, a certain molecular change in the iron due to the application of the armature.

Generally, it also appears that the induction currents, resulting even from the employment of straight soft iron armatures which had been carefully deprived of residual magnetism, are more than four times as strong as those obtained by merely slipping the induction coil on and off the limits of the electromagnet; and when electromagnet armatures are used, the effects far surpass those obtained by non-magnetic soft iron straight armatures.

Based on these facts, a magneto-electric engine of the following construction is suggested by Professor Trowbridge:

Fig. 2



The horseshoe armature is made to revolve around the line, X X, Fig. 2, as an axis. It has been found by experiment that, when a north and south pole are opposed, the induction currents through B and A' are in the same direction, and those through B' and A are also in one direction. By a suitable commutator, the currents circulating through the coils on the stationary magnet can be sent through those on the armature, and *vice versâ*. The residual magnetism in soft iron is sufficient to start the induced currents. Experiments, says the *American Journal of Science and Art*, are now being made upon the engine.

A Word to Young Mechanics.

"When Tubal Cain began to invent utensils and started to make a din in his forge, I suppose the first idea that struck him—for he must have been very observing in his youth—was that some materials are soft and easily manipulated, while others are of a more obdurate and ungovernable nature, and consequently require different treatment at the hand of him who would attempt to work them into new forms, so as to mold the shapeless mass to his uses, or engraft order and design upon chaos. With the lesson to be learned from the example of this pioneer of our order in view, I desire to say a word to young mechanics that would have been valuable to me while in the maze of study in the days in which I was learning a trade.

Every one that ever learned a trade knows that many a time he has been without any clear idea of what he was doing, having merely acted as the machine of a master who was credited with being a No. 1 mechanic and all which that should imply, but who just lacked one thing, and that a very important one—he did not understand how to tell another how to do what he could do exceedingly well himself, and, as a general rule, got into a passion because his 'cub' didn't do it just to his mind. Now I could drop a word of advice here to journeymen; but you know, boys, as well as I do, that it is not our place to tell a 'jour.' anything, for fear his dignity might suffer, and ours too in consequence. But my advice to you is simply this: In starting out to learn a trade, make up your mind to learn and study both at the same time. This combination of occupations, it unfortunately happens, is rarely agreeable at fifteen or seventeen years of age, when one has just left school, and all study is looked at as something belonging to bygone days. I have been told by many a young man that work was his portion now, and that he didn't have time to study, and besides he was so tired at night that it was out of the question. My reply to those who speak in this way is:

'But you misunderstand me, my young friend. The lessons you need to study now are not taught in schools, colleges, or seminaries. You never see the books you need to apply your mind to now in libraries.'

I lay a piece of wood before the carpenter and say, 'my boy, that is one of your books.' I present a piece of iron to the blacksmith in the same manner, and on through all the branches of mechanism. The carpenter answers:

'Why, this is only a piece of pine, or of oak, and nothing more.' The smith will say: 'A bit of iron, and that's all.

But here comes the question, 'what do you know of the nature of the wood, or of the iron, and why should you know its nature? True, you may be able to work them after a fashion, and your powers of imitation may enable you to be as good a mechanic as the man who taught you; but you will never thus, in the nature of things, excel, and excellence is what every young man should have in view in any pursuit, for without it you will be termed just what you so often hear of—only a mechanic.'

Every mechanic should have as thorough a knowledge of the material he works as has the best chemist in the land; and this cannot be arrived at without close study and attention to its every natural feature—strength, power of resistance, and tension; in short, everything connected with its working or transformation from one condition to another. This knowledge is what is meant when you hear a man spoken of as an experienced mechanic."—*Paper Trade Journal.*

Correspondence.

The Fireless Locomotive.

To the Editor of the Scientific American:

The fireless method of using steam is one of those simple affairs which need but little experiment to develop its best results.

Locomotives of this kind with large tanks will probably prove more economical than those with small tanks. If a tank, 3 feet diameter and 10 feet long, is capable, with one charge, of propelling a car with from 25 to 40 passengers a distance of 8 or 10 miles, a tank of twice this capacity would probably do considerably more than twice the amount of work, owing to the greater body of concentrated power and heat in proportion to the weight and surface of tank. The weight of these tanks may be reduced to a minimum by making them with hemispherical ends.

A tank of this form, 4 feet in diameter and 15 feet long, capable of sustaining a pressure of 360 lbs. per square inch safely, would weigh only about one third as much as an ordinary locomotive boiler. A tank of this size once charged with cold air only, to a pressure of 350 lbs. would propel an ordinary horse car load of passengers about five miles, if I figure correctly; if charged with water and steam at the same pressure, it would probably propel the same load some twenty miles. Notwithstanding this difference in expansive power of the two mediums, condensed air might prove the more economical and satisfactory of the two, especially in localities where ample water power could be obtained for condensing the air into reservoirs for charging the locomotive tanks.

A foreign periodical recently contained an illustrated description of a car propelled by a series of coiled steel springs arranged upon a single shaft beneath the car; but nothing very satisfactory seemed to be developed by this device. At present there seems to be nothing so likely to supersede horses on street railroads as the fireless locomotive or a system of condensed air engines. When the possibilities of both of these systems are fully developed, city transit will be conducted much more cheaply and satisfactorily than it now is.

Worcester, Mass. F. G. WOODWARD.

Fire Escapes Wanted.

To the Editor of the Scientific American:

The French church in which the Holyoke horror occurred was a large wooden building constructed of inflammable pine, with insufficient modes of exit in case of accident. Under such conditions, the best fire department in the world is helpless, and the only possible remedy is to rigidly require such buildings to be properly constructed. The only door by which escape could be made opened inwardly; and as was the case in the accident at a New York church several weeks ago, the frenzied crowd of men, women, and children pressed against it, barring their only way of escape, and became a prey to the raging flames.

There must be a remedy for all this. There must be responsibility somewhere for an arrangement that will crowd seven hundred strong men, timid women, and helpless children into a small church with no sufficient means of egress in case of an alarm. The church at South Holyoke is not the first that has been thus destroyed, and with it the lives of many human beings; yet that church, and many another like it, seems to have been constructed with a special view to occasioning a loss of life in the event of a stampede. This large and densely packed congregation were quietly seated in their church at a certain moment; and in twenty minutes thereafter, seventy-five of their number lay dead and dying, trampled under foot, crushed by fatal leaps, or blackened by the flames that rushed upon them. There was not a person in that church who could not, with an uninterrupted passage, have placed himself in security from danger in the space of one minute. If the means of egress had been sufficient to empty the church in five minutes, all would have been saved.

The estimates for the strength of gallery and floor are based upon the largest crowds they can hold, and may be calculated with accuracy. Why should not similar estimates and calculations be made in determining the facility for emptying a place for public gathering? Why should not the architect picture to his mind's eye a great audience struggling for egress, as well as standing or sitting, wedged in together, on the floor and gallery? There is need for the law to control these matters. Provision can be made, and it should be compelled to be. We forbid the building of frame structures in our cities; we maintain, at enormous cost to the public treasury, and by an onerous tax on private property, efficient and skillful fire departments; we cover the roofs of our cities with a network of telegraph wires that summon, at an instant's warning, the distant engine to the scene of a conflagration; we take every public precaution against the destruction of property by fire; yet we take none against the destruction of human life through the same instrumentality. To save some slight expense, an extra flight of stairs, or an extra door and a few convenient windows, the law permits hundreds of persons to be gathered into a pen from which there is no escape in case of confusion and alarm, to be seated, as it were, over a magazine that may be exploded in an instant.

There is just as much danger of fire in every church and public place as there was in the church at South Holyoke. Drapery and lights in close proximity may be noted anywhere. It chanced there, as it may in any such place, that the light touched the drapery; that a small stream of flame shot terror into some one's heart; that there was a cry, and, as the contagion of fright increased, a rush for the door. All this may occur in any place where a crowd is gathered; but it is not from every place that, when the rush begins, the crowd can escape. The crowd could not readily pour itself out of the South Holyoke church, nor can a startled crowd so pour itself out of anyone of two thirds of the churches and halls in this country.

Indianapolis, Ind. L. K. Y.

The Motive Power of Light.

To the Editor of the Scientific American:

I read in your paper an account of Professor Crookes' instrument for proving the motive power of sunlight. In Dick's "Practical Astronomer," chapter 1, you will find a description of a device made for the same purpose thirty years ago. R. L. TAYLOR.

914 Chestnut street, Philadelphia, Pa.

The following is the description to which our correspondent refers:

[From "The Practical Astronomer," by Thomas L. Dick, LL.D. Published in 1848.]

"*Light*, though extremely minute, *is supposed to have a certain degree of force momentum.* In order to prove this, the late ingenious Mr. Mitchell contrived the following experiment: He constructed a small vane in the form of a common weathercock, of a *very thin* plate of copper, about an inch square, and attached to one of the finest harpsicord wires about ten inches long, and nicely balanced at the other end of the wire by a grain of very small shot. The instrument had also fixed to it in the middle, at right angles to the length of the wire, and in a horizontal direction, a small bit of a very slender sewing needle, about half an inch long, which was made magnetical. In this state the whole instrument might weigh about ten grains. The vane was supported in the manner of the needle in the mariner's compass, so that it could turn with the greatest ease; and to prevent its being affected by the vibrations of the air, it was enclosed in a glass case or box. The rays of the sun were then thrown upon the broad part of the vane, or copper plate, from a concave mirror of about two feet diameter, which, passing through the front glass of the box, were collected into the focus of the mirror upon the copper plate. In consequence of this, the plate began to move with a slow motion of about an inch in a second of time, till it had moved through a space of about two inches and a half, when it struck against the back of the box. The mirror being moved, the instrument returned to its former situation; and the rays of the sun being again thrown upon it, it again began to move, and struck against the back of the box as before. This was repeated three or four times with the same success.

On the above experiment the following calculation has been founded: If we impute the motion produced in this experiment to the impulse of the rays of light, and suppose that the instrument weighed ten grains, and acquired a velocity of one inch in a second, we shall find that the quantity of matter contained in the rays falling upon the instrument in that time amounted to no more than one twelve-hundredth-millionth part of a grain, the velocity of light exceeding the velocity of one inch in a second in the proportion of about 12,000,000,000 to 1. The light in this experiment was collected from a surface of about three square feet, which reflected only about half what falls upon it; the quantity of matter contained in the rays of the sun, incident upon a foot and a half of surface in one second of time, ought to be no more than the twelve-hundred-millionth part of a grain. But the density of the rays of light at the surface of the sun is greater than that at the earth in the proportion of 45,000 to 1; there ought, therefore, to issue from one square foot of the sun's surface, in one second of time, in order to supply the waste by light, $\frac{1}{46000}$th part of a grain of matter, that is, a little more than two grains a day, or about 4,752,000 grains, or 670 pounds avoirdupois, nearly, in 6,000 years; a quantity which would have shortened the sun's diameter no more than about ten feet, if it were formed of the density of water only.

If the above experiment be considered as having been accurately performed, and if the calculation founded upon it be correct, it appears that there can be no grounds for apprehension that the sun can ever be sensibly diminished by the immense and incessant radiations proceeding from his body on the supposition that light is a material emanation. For the diameter of the sun is no less than 880,000 miles; and before this diameter could be shortened, by the emission of light, one English mile, it would require three millions one hundred and sixty-eight thousand years, at the rate now stated; and before it could be shortened ten miles, it would require a period of about thirty-one millions of years. And although the sun were thus actually diminished, it would produce no sensible effect or derangement throughout the planetary system. We have no reason to believe that the system, *in its present state and arrangements*, was intended to endure for ever; and before the luminary could be so far reduced, during the revolutions of eternity, as to produce any irregularities in the system, new arrangements and modifications might be introduced by the hand of the All Wise and Omnipotent Creator. Besides, it is not improbable that a system of means is established by which the sun and all the luminaries in the Universe receive back again a portion of the light which they are continually emitting, either from the planets from whose surface it is reflected, or from the millions of stars whose rays are continually traversing the immense space of creation, or from some other source to us unknown."

Our Patent System.

"A Defence of our Patent System," and "Our Country's Debt to Patents," are the titles of two essays, written respectively by Mr. John S. Perry, of Albany, N. Y., and Mr. H. Howson, of Philadelphia, and published under the auspices of the United States Patent Association, in a handy volume, by J. R. Osgood & Co., of Boston, Mass. Mr. Perry's paper is a reply to the speech of Hon. H. B. Sayler, in the House of Representatives, last winter, in support of a bill permitting the free use of any article made under a single patent, on the payment of a royalty of 10 per cent and the filing of a bond by the user. The object of the measure was the prevention of such monopolies as those controlled by the sewing machine ring and the hat body people; but the provisions advocated, as we remarked in commenting upon them at the time, were objectionable and contrary to public policy for a variety of reasons, which need not here be recapitulated as the bill was not passed.

Mr. Perry does not confine himself to showing up the disadvantages of Mr. Sayler's proposition, but goes further and denies, *in toto*, the latter gentleman's statements as to the profits made by the various industries involving the manufacture of patented articles; and he fortifies his denials by the testimony of a number of manufacturers and inventors, and by the assertion that the census returns, from which Mr. Sayler gathered his statistics, are entirely unreliable. There are several points in Mr. Perry's statements as to the profits of the sewing machine people, and those of various other manufacturers, which are open to criticism; but, in the main, his views on the general subject of our patent system are sound and able. He says, very truly, that "a patent law compels the inventor, if he would avail himself of its benefits, to make the inventions known by spreading out a minute description of the same upon the public records of the Office, and, if he would reap pecuniary advantage, to publish them to the world, thereby giving an opportunity for their general adoption. . . In no sense can a patent be considered an injustice to the public, because it takes nothing from them which they had ever before possessed; on the contrary, it gives them something new, some increased facility, some more advantageous method, a cheaper substitute for a rare and costly article. . . In proportion as the patent system has stimulated and developed inventions among our people, have our mechanical arts risen in importance, until our power in this direction has become recognized throughout the world."

Mr. Howson's essay will, without doubt, interest every one who is himself interested in patents. He deals with the subject in a practical and lucid manner, and his remarks are well worth careful perusal. We give an extract below, and shall present other selections in future issues.

"We constantly hear the word 'patents' from the mouths of the manufacturer and mechanic, the wholesale merchant and retail dealer, and the farmer, and always in connection with something that is novel, or of superior quality, or some thing that can be obtained at a cheaper rate than usual.

Now and then we hear the word uttered in contemptuous tones by disappointed speculators, jealous manufacturers, men who would invent without being inventors, or by those who would attempt to cure the minor evils always accompanying even the most salutary and beneficent systems of public policy, not by attacking these evils in detail, but by the disorganization of the whole system.

Common as the word is, there are few who are aware how intimately related patents are to our present well-being and comfort, how much we owe to patents in the past, how much we have to hope from them in the future, and how intimately they are interwoven with our whole social system."

WHAT PATENTS HAVE DONE FOR US.

"I propose to show how grateful we ought to be for our patent system, not by any elaborate investigation of different branches of industry, not by any lengthy historical and statistical researches, but by confining my remarks to familiar objects within my reach in the room which I now occnpy—a library furnished with the ordinary accessories which a professional man requires.

There is a tapestry carpet on the floor, a carpet with a tasty pattern woven in brilliant colors. Twenty-five years ago, a skilled workman could weave by hand two yards per day of a carpet like this, but not equal in quality; and now a single power loom will weave twenty yards per day. 'The carpets, moreover,' to quote the words of a well known authority, 'are more exact in their figures, so that they are perfectly matched, and their surface is smooth and regular. They surpass, indeed, in their quality, the best carpets of their kind manufactured in any other part of the world.'

To-day these superior carpets can be purchased at half the cost per yard charged for the inferior hand-made carpets of thirty years ago; that is, if we take into account the difference in value of money then and now.

To what shall we attribute this rapid progress in the manufacture of carpets? To Erastus B. Bigelow, you will say. I shall not be detracting from the merits of this great American inventor in saying, as I believe he himself would say, that the rapid progress of this manufacture is due quite as much to our patent system as to Bigelow's ingenuity.

This accomplished patentee spent years of studious application in the production of his loom. Where was the incentive to this laborious mental task? The reward which our patent system held out to him. Where was the incentive for capitalists to invest money in the manufacture of these carpets on a large scale? The security which patents afforded for the investment. Mr. Bigelow, although the most prominent inventor in this branch of industry, was not the sole contributor to its progress. Crompton and hosts of other patentees, have aided in bringing this manufacture to its present perfection, or rather to its present state of excellence; for we cannot foresee the end which perfection implies. We must look for further improvements, based on future patented inventions, providing progress is not obstructed by legislation tending to destroy the motive to invent. It is safe to say that better carpets may be seen to-day in the cottages of hardworking artisans than were found forty years ago in the houses of the wealthiest citizens; and this is due to the ingenuity called out by the incentives which patents have presented, and continue to present. It is not the wealthy alone who are gainers by our patent system; it is the masses who derive the greatest comforts from that source.

Before I leave the carpet, let me say that its greater durability is insured by a cheap patented lining, for different styles of which a dozen or two of patents have been granted, and that the carpet is secured by patent fastenings, on the production of which much ingenuity has been expended; for patents for these little devices can be counted by the score."

To be continued.

The Inventor's Paradise.

"A thousand patents," says a London writer, "are granted every month in the United States for new inventions. This number exceeds the aggregate issue of all the European States, yet the supply does not equal the demand, and the average value of patents is greater in America than in Europe by reason of the vast number of new industrial enterprises and the higher price of manual labor. A hundred thousand dollars is no unusual consideration for a patent-right, and some are valued by millions. The annual income from licenses granted on the Blake sole sewing machine is over three hundred thousand dollars, and other patented inventions are equally profitable. Inventors are encouraged by the moderate government fee of thirty-five dollars, which secures an invention for seventeen years without further payment; the rights of patentees are generally respected by the public; and no national legislator, with a single exception, has ventured to propose the abolition of a system which at once secures substantial justice to inventors and proves of incalculable advantage to the nation."

GUTTA PERCHA and india rubber are brought hither chiefly from Brazil and Columbia.

DECISIONS OF THE COURTS.

Supreme Court of the United States.

PATENT PAPER COLLAR.—THE UNION PAPER COLLAR COMPANY, APPELLANTS, *vs* ISAAC VAN DEUSEN, JOHN VAN DEUSEN, AND HENRY BOEHMER, PARTNERS, AS VAN DEUSEN, BOEHMER & CO.

[Appeal from the Circuit Court of the United States for the Southern District of New York.—Decided at the October term, 1874.]

The purpose of a reissue is to render effectual the actual invention for which the original patent should have been granted—not to introduce new features.

Therefore in an application for reissue, parol testimony is not admissible to enlarge the scope of the invention beyond what was described, suggested, or substantially indicated in the original specification, drawings, or Patent Office model.

Whether a reissued patent is for the same invention as the original depends upon whether the specification and drawings of the reissued patent are substantially the same as those of the original; and if not, whether the omissions or additions are or are not greater than the law allows to cure the defect of the original.

Where the original patent for improvement in paper shirt collars, granted to Andrew A. Evans, May 26, 1863, stated the invention to consist, first, in making the collars of parchment paper, or paper prepared with animal sizing; and second, in coating one or both sides of the collar with a thin varnish of bleached shellac to give smoothness, strength, and stiffness, and to repel moisture, the claim being for "a shirt collar made of parchment paper, and coated with varnish of bleached shellac, substantially as described, and for the objects specified:" *Held*, that a reissue thereof which describes a paper other than parchment paper, or one prepared with animal sizing, and which does not require either side of the collars to be coated with a varnish of bleached shellac for any purpose, the claim being for "a collar made of long fiber paper, substantially such as is above described," is for a different invention from that embodied in the original patent.

Articles of manufacture may be new in the commercial sense when they are not new in the sense of the patent law.

New articles of commerce are not patentable as new manufactures unless it appears in the given case that the production of the new article involved the exercise of invention or discovery beyond what was necessary to construct the apparatus for its manufacture.

It appearing that the collars made by Evans, apart from the paper composing them, were identical in form, structure, and arrangement with collars previously made of linen, paper of different quality, and of other fabrics, and that Evans did not invent the paper used by him, nor the process by which it was obtained: *Held*, that he was entitled to a patent for the collars as a new manufacture.

The relation of employer and employé, in regard to the origin of inventions, stated.

The object in turning down a collar on a curved line instead of a straight line is precisely the same, whether the collar be all paper, paper and linen, or all linen. Hence, where it appeared that linen collars had been turned over on a curved line to prevent wrinkling, and to afford space for the cravat: *Held*, that it was not patentable to apply the same mode of turning down to collars of paper or paper and linen.

Reissued patent of Andrew A. Evans for "Improvement in Paper Shirt Collars," July 10, 1866 (original May 26, 1863), and of Solomon S. Gray, March 29, 186[illegible] (original June 2[illegible], 1868), pronounced invalid.

Mr. Justice Clifford delivered the opinion of the court.

[*C. A. Seward*, for appellant.

J. J. Coombs & E. Wetmore, for appellees.