

world. Forty lights are fed by it, and it requires 36 horse power. Several circuits are connected with this station, one exclusively for lighting parks and streets. Broadway, from 14th to 34th street, is lighted from there. Among buildings in this district are the Sixth Avenue Elevated Railroad, the Sturtevant House, the Gilsey House, the Standard Theater, Daly's Theater, the Bijou Theater, the Aquarium, Aberle's Theater, Koster & Bial's, the *Herald* office, and many others. The company runs wires from this station to any point within a radius of two miles, putting up the light in any desired place, and renting in the same manner as is done with gas.

The street lighting is done by means of double lamps on iron posts twenty feet in height, and in plain glass globes. It is proposed to extend this materially and to use the larger lights, elevated on poles, for open spaces, as is now done in the West. This company has had much success in lighting large buildings for balls, such as the Academy of Music, Madison Square Garden, etc., using opal and lemon colored globes, giving a hue to the light which is approved by the fair sex.

The establishment of lighting stations in cities and towns for the illumination of streets, parks, open spaces, depots, docks, stores, hotels, factories, etc., is enlisting very large amounts of capital, and promises to be a business as profitable and as eagerly sought after by capitalists as gas companies have been heretofore. Companies have already been formed, or are about to be formed, for the establishment of such lighting stations in the following cities and towns: New York, Philadelphia, Boston, Baltimore, Washington, Providence, Albany, Hartford, New Haven, Meriden, Rochester, Buffalo, Cleveland, Cincinnati, Dayton, Indianapolis, Columbus, Middletown, Detroit, Grand Rapids, Chicago, St. Louis, Denver, Salt Lake City, Ogden, Butte, San Francisco, etc.

It is only a question of a few months before similar companies will be formed, and similar lighting stations established in every city and town of any pretensions in the country. In all of the above places the Brush light is to be exclusively used.

The general plan of operations in all these lighting stations will be similar to the one in New York, which, briefly described, is as follows: A location is first selected as central as possible with reference to the territory to be lighted; sufficient space must be provided for engines, boilers, heater, pumps, shafting, belting, pulleys, etc.; space is also to be provided for the dynamo-electric machines with the necessary wires and connections. As the steadiness and quality of the light are dependent entirely upon the steadiness of the power, care is taken to provide for this by the use of engines of approved make, with automatic cut-offs and other modern appliances for producing steady motion. The central station having been thus equipped, copper conducting wires are run from it on poles, on house tops, or underground, to the various points or places where light is needed.

The light is furnished and charged for in proportion to the amount used, and this is readily ascertained by noting the consumption of carbons in the lamps, which is sufficiently uniform for this purpose. When the engines in the lighting station are started the electric light machines are put in motion, and the electricity passes over the wires, and produces a light in each lamp in circuit. An automatic governor or regulator is provided for each electric machine, and this is so constructed and so connected to the machine that, without changing the speed of the machine, any number of lights from one up to the number capable of being produced by the machine may be burned without any disturbance or interference, either in the machine or in the lamps. By means of this simple and admirable contrivance any of the lamps in circuit may be turned off or turned on without increasing or diminishing the light in any of the other lamps in the circuit. From this description it will be evident that a lighting station of this character affords practically all the facilities provided in the use of gas, for the electric lamp may be turned on and off at the lamp itself as readily as if it were a gas burner. The lighting of interior spaces is in this way fully provided for in a practical manner.

In the matter of lighting streets and open spaces electric light possesses many advantages not possessed by any other illuminating agent. The electric lamps can be placed on top of lamp posts of moderate height, as in the lighting of Broadway, New York, each electric light providing for the illumination of a space two hundred to three hundred feet in diameter; or the lamps may be placed upon towers at a considerable elevation above the ground and above adjoining buildings, as is done in Wabash, Indiana, and Akron, Ohio; each light, or group of lights, providing for a general illumination over an area a mile or more in diameter. Either of these plans is perfectly practical and successful, and both have been thoroughly tested. For the lighting of cities and towns of moderate size the latter plan is the most economical, and will, no doubt, be very largely adopted. The town of Wabash, Indiana, was the first in the world to light its streets wholly in this way, and they find that four Brush lights, of 3,000 candle power each, placed on an iron flag-staff on the dome of their court house, at a height of about 130 feet above the ground, are sufficient for the general illumination of an area from one half to three quarters of a mile in every direction. Some of the streets are, of course, much better lit than others, although they are not nearer to the lights, because the light is not intercepted by intervening buildings. It is stated, however, that even in the streets where no direct light falls, and where the shadows are great-

est, there is yet enough diffused light to permit of getting around without the use of other light. It is also stated that even at a distance of two miles from the lights there is a sort of general illumination produced which is of considerable value.

By placing a sufficient number of powerful electric lights upon towers high enough it is no doubt possible to produce an amount of light that would be practically as efficient as daylight for the lighting of all spaces within a reasonable distance of such towers. A sufficient amount of light could be thus provided to light the interior of buildings and dwellings sufficiently for ordinary purposes. This is the plan that has been proposed for the lighting of the Capitol and its surroundings at Washington.

It is proposed to place upon the dome of the Capitol, and upon six towers surrounding it, at a distance of 1,000 feet from it, no less than 450 electric lights, each of 6,000 candle power, or a total light of 2,700,000 candle power, equal to 200,000 four foot gas burners. The effect of such an enormous massing of light at such a distance above the ground and surrounding buildings would produce a surprising effect, and within a considerable area would, no doubt, be practically equal to daylight. If this plan is carried out the Brush light will be used. This subject will be brought to the attention of the next session of Congress.

The Brush Company have not yet taken up that branch of electric illumination known as incandescent lighting, because the voltaic arc system has so far proved vastly more economical than any possible incandescent system for the lighting of streets and large parks, buildings, manufactories, or halls. A single example will illustrate this fact. None of the advocates of incandescent lighting claim that their usual size of lights are any more powerful than an ordinary four or five foot gas burner; and wherever incandescent lights have been used at all practically, as at the Equitable Building in New York, each incandescent light has not certainly more than replaced one gas burner. The usual claim made by those who are interested in this system of lighting is that from five to seven lights of this size can be produced by the expenditure of one horse power. Others claim that four lights per horse power is as much as can be realized in practice. Assuming, however, that five can be produced from one horse power, it would appear that no less than 29 horse power would be required to supply 144 incandescent lights in the place of the 144 gas burners formerly used in the dining room of the Continental Hotel in Philadelphia. It is a fact, however, that this dining-room has for a long time been lit, much better than with gas, with two Brush arc lights, which, by actual dynamometer measurement, require *two horse power*—one for each light, or 15.48 horse power for the 16 lights used in the hotel. The Grand Pacific Hotel, in Chicago, replaces 571 gas burners with 16 Brush arc lights, requiring 16 horse power. If lit by the incandescent light no better than by gas, 114 horse power would be required, or, according to the figures of one prominent inventor in this line—7 lights per horse power—it would require about 82 horse power. This enormous difference in favor of the arc lights, where much light is required, will necessarily confine the small incandescent lights to small uses, where but few gas burners or lamps are now used. We are assured that when in the opinion of the Brush Company incandescent lights can be profitably and economically used they will take up that branch and be prepared to supply the market.

The officers of the Brush Electric Company (the home company) of Cleveland, Ohio, are as follows: General Mortimer D. Leggett, President (formerly Commissioner of Patents); George W. Stockly, Vice President, Treasurer, and Business Manager; F. K. Collins, Secretary; Nathan S. Possons, Superintendent; W. J. Possons, Assistant Superintendent. Agencies for the sale of apparatus and supplies have been established in all sections of the country. The most important of these are: the Brush Electric Light Company of New England, who control all territory east of 77° longitude, except Manhattan Island, of which company Mr. Lyman P. French, of Boston, is President, and Mr. Charles M. Rowley, of New York, Treasurer and General Manager. Mr. Rowley has been of the greatest assistance to the home company in the management of their Eastern business, of which he has certainly made a very great success. The Brush Electric Illuminating Company of New York controls the territory of Manhattan Island, and is pushing the introduction of the Brush light in this city vigorously. Their office is at 860 Broadway, which is also the main office of the N. E. Co., above mentioned. The N. E. Co. has branches at 5 Pemberton square, Boston; 430 Walnut street, Philadelphia; and in Baltimore and Washington. At Pittsburgh the business for that vicinity is managed by Ridall & Ingold, 224 Liberty street. Chas. E. Stockly, at Rochester, is the agent for Western New York and Northwestern Pennsylvania. Other agencies are the Brush Electric Light Company, of Cincinnati; W. W. Leggett, 88 Griswold street, Detroit; M. C. Bullock, 84 to 90 Market street, Chicago (for the Northwest); the Brush Electric Association, 421 Olive street, St. Louis (for the Southwest); Colorado Electric Company, of Denver, Colorado; Salt Lake Power Light and Heating Company, of Salt Lake City; California Electric Light Company, of San Francisco, and others.

We publish in SUPPLEMENT 274, April 2, a monograph by Mr. Brush, giving a full scientific description of his apparatus and its mode of operation, illustrated with cuts and diagrams; also profusely illustrated articles from foreign journals on the same subject.

AGRICULTURAL INVENTIONS.

Certain improvements in that class of sulky plows having the plow beam supported by adjustable hangers arranged on a suitable frame extending back of the seat, and provided with vertical adjustment for raising and lowering the plow, have been patented by Messrs. Samuel M. Robertson and Augustus A. Hamilton, of Lynnville, Iowa.

Mr. Owen Davis, of Sullivan, Ind., has patented a separator for grain, etc., so constructed as to drive off the chaff and straw, separate the larger and smaller kernels of wheat, separate the split kernels of wheat, and the cockle and cheat from the grain, separate red clover seed, timothy seed, and red top seed from the grain and from each other, and to separate the larger kernels of oats from the smaller kernels.

Mr. Fred Aldred, of Glencoe, Ontario, Canada, has patented a swinging churn, having supporting springs, made in S shape, and attached to the ends of the churn above the central line; by this means the churn body is supported and allowed to vibrate.

An improved method of raising tobacco plants has been patented by Mr. James M. Dunkum, of New Canton, Va. The object of this invention is to protect the plants from the ravages of the tobacco fly or bug. The invention consists in protecting tobacco plants from the tobacco fly by surrounding the bed with logs, covering the bed with brush, and applying to the logs a mixture of whisky or alcohol, gum camphor, oil of peppermint, and linseed oil.

Mr. Lorenzo P. Teed, of Erie, Pa., has patented an improved ladder, designed especially for use in picking fruit from trees, but which may be used to advantage for any of the purposes for which ladders are required.

Mr. Philip H. Long, of Newark, N. J., has patented a separable button so constructed that the head and foot can be readily connected and disconnected, that the buttons will not turn in the button holes, and in which the fastening mechanism is connected with the foot, so that any kind of heads can be used.

Treatment of Carbuncle by Carbolic Acid.

In the *Toledo Medical and Surgical Journal*, December, 1880, Dr. J. T. Woods writes:

It is now about two and a half years since a patient presented with two carbuncles, one on the back of the head, the other below it, on the neck. They were of moderate size only, the upper one open in three places, while in the lowest the skin was unbroken.

Having considered the various known properties of the carbolic acid, I determined to use it vigorously instead of inserting it in meager quantity. I loaded my hypodermic syringe, and passing the point through the openings and into the sloughing mass in every direction, I completely saturated it with the pure acid and awaited results. In a minute the smarting disappeared and with it all pain and all sense of soreness.

By this result emboldened, I again charged my instrument, and thrusting it through the skin over the other carbuncle, in a variety of places, I soaked the whole carbunculous mass beneath the skin, enough of necessity escaping to fully bathe the borders, modify inflammation, and destroy any septic elements then developed. I waited, not without concern, and was delighted to learn in a few moments that all the pain and soreness was gone in this also. The skin over the mass became quickly white, hard, and dead, and in a few days detached, in the form of a slough, the interior mass also becoming rapidly loosened, only requiring the cutting of a few shreds to remove it, when the cavity was found to present a satisfactory appearance and rapidly filled up, leaving an exceedingly small cicatrice. The remarkable feature in this case was that after the complete saturation of the carbunculous mass no pain occurred, my patient going about his ordinary labor without discomfort. It is now one year since I treated a very painful case, the same method bringing about similar results, the party suffering no pain or even soreness after the lapse of one minute following the injection.

In making this suggestion, which, so far as I know, is new, I am conscious of the insufficiency of my cases, but I am so sure of its efficacy that I shall at once resort to it when case and occasion offer, and advise others to do so, at least until the value of the measure is determined.

In conclusion, I would advise the use of the pure acid only, and to complete saturation. Dilution would increase, if not create, danger of absorption of the acid, converting a very simple procedure into a condition of great danger, and insufficient quantity defeat the purpose for which it is used.

The Tides of Electricity.

Mr. Alex. Adams, one of the officers of the British Post Office Telegraph Department, has discovered the existence of electric tides in telegraph circuits. By long continued and careful observations he has determined distinct variations of strength in those earth currents, which are invariably present on all telegraphic wires, following the different diurnal positions of the moon with respect to the earth.

The Geological Survey.

Mr. Clarence King has resigned the directorship of the Geological Survey. The reasons given for the step are two. The administration of the office left him no time to pursue his investigations, and he believed that he could be of greater service to geology if unencumbered by executive duties and responsibilities. Major J. W. Powell is named as the probable successor of Mr. King.

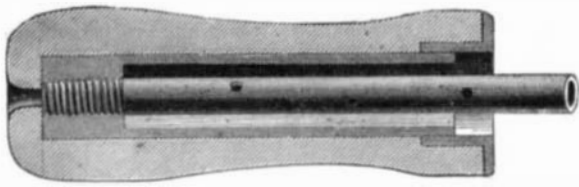
Collodion Films.

According to M. E. Gripon, if a layer of collodion, such as is used by photographers and surgeons, be poured upon a plate of very clean glass, it will be found, after the layer has dried, that an extremely thin and transparent film is formed, which, with a certain amount of care, can be separated from the glass, and may then be stretched upon a frame. This film, so placed, is seen to have some curious physical properties, which the author just named describes as follows: In the first place he finds that this delicate thin membrane reflects light exactly as glass does, and polarizes it both by reflection and by transmission of the rays of light through its substance.

M. Gripon has also found that films obtained in this manner may be procured as thin as 0.01 of a millimeter, and that when no thicker than this they transmit a very large proportion of radiant heat. Polarizing piles, he tells us, may be formed of these layers of collodion film, which are much more transparent than the piles of mica usually employed by physicists for this purpose, and necessary in studying the properties of heat; and although they are, of course, much more fragile, and require more careful handling than mica piles, they are also more easily replaced than the latter when destroyed.

NEW HANDLE FOR SOLDERING IRONS.

In ordinary soldering irons and like tools it is well known that the wood which surrounds the shank is liable to become loose on account of the shrinkage and expansion of the contiguous wood and metal, and to keep the handle tight in its place it has frequently to be driven on to the shank. This results in splitting the wood and the speedy destruction of the handle. Mr. A. A. Park, of Gill, Mass., has patented a handle which obviates this difficulty and renders the handle as durable as other parts of the tool. This handle is shown in longitudinal section in the annexed engraving. The shank of the iron is made of small gas pipe threaded at its

**PARK'S HANDLE FOR SOLDERING IRONS.**

free end and fitted to a perforated tube supported in the middle of the handle, which is hollow. This construction admits of a free circulation of air, which keeps the handle cool.

This handle may be fitted to an iron having an ordinary solid shank.

Comparative Health Statistics.

The cities of the United States which made weekly sanitary reports to the National Board of Health last year numbered sixty-eight. The Bulletin of the Board for February 19, contains in tabular form the aggregate results of reports so received, from which table it appears that Vallejo, California, was the healthiest place reported in 1880, and Norfolk, Va., the unhealthiest. The average life in Vallejo was 83.5 years, and only one person in 1,000 of population died of consumption, while in Norfolk the average life was only 27.9 years, and one person in 241 of population died of consumption. The aggregate population of the sixty-eight cities is 7,359,937, the average duration of life in them was 44.5 years, and there was one death from consumption for every 326 of population, and one death from acute disease of the lungs for every 429 of population. In other words, of every 100 deaths 24.4 were from lung diseases, and of these 14 were from consumption and 10.4 from acute diseases of the lungs. Four of the best cities for health were Yonkers, N. Y., average life, 70 years; Omaha, Neb., average 68 years; Utica, N. Y., 67.5 years; Keokuk, Iowa, 67.1 years; and four of the worst cities were Jacksonville, Fla., 35 years; Vicksburg, Miss., 34.8 years; Charleston, S. C., 31.3 years; and Savannah, Ga., 30.6 years. In Boston the average life was 42.5 years, deaths by consumption one in 246, by acute lung disease one in 336 of population; in New York average life 37 years, death by consumption one in 254, and in acute lung disease one in 260; in Philadelphia, life 47.8 years, consumption one in 314, acute disease one in 844; in Cincinnati, life 47.8, consumption 346, acute disease 494; Louisville, life 47.6, consumption 300, acute disease 410; Indianapolis, life 47.8, consumption 447, acute disease 381; Chicago, life 48, consumption 593, acute disease 453; St. Paul, life 58.5, consumption 561, acute disease 715; San Francisco, life 51.8, consumption 295, acute disease 459; New Orleans, life 41.3, consumption 256, acute disease 584; St. Louis, life 52, consumption 447, acute disease 580. The difference between New York and Philadelphia in the general death rate and in that from consumption is great; in that from acute lung disease it is striking. Next to lung diseases diarrheal disorders cause the greater number of deaths. In every 100 deaths from all causes in the sixty-eight cities, 10 are from diarrheal disturbances, and there is one death from this source in every 436 inhabitants.

RECENT DECISIONS RELATING TO PATENTS.**United States Circuit Court.—District of Massachusetts.**

SMITH *et al.* vs. MERRIAM *et al.*—PATENT PRESSER FOOT FOR SHOE SEWING MACHINES.

Lowell, J.:

1. Where the thing shown and described in the original patent and in the reissue is the same, but in the original has been claimed with all its features in combination, the patentee can in the reissue modify or divide his claim so as to embrace severally the distinct features of the thing invented.

2. The case of *The Giant Powder Company vs. The California Vigor Powder Company et al.* (18 O. G., 1,339) considered and commented upon.

3. The most natural construction of the law relating to reissues (Rev. Stats., sec. 4,916) would perhaps be that, if a patent should be inoperative by reason of a defective specification or invalid for claiming too much, the defect might be supplied or the excessive claim be reduced by reissue.

4. But the courts have given a very different interpretation, much wider in most respects and narrower in only one. They do not permit a defective specification to be supplied excepting from the drawings or model; but they do permit the claim to be varied, provided the same invention is described in both patents.

5. The law is extremely liberal, perhaps too much so, and has been much abused; but if we change it suddenly we shall make a destruction of titles which it is impossible to contemplate without dismay.

6. As to the mere question of the necessity for a reissue, supposing the new patent itself to be unobjectionable, the decision of the Commissioner has always been held to be final, and this for an unanswerable reason that no patentee, however honest or careful, can be safe in obtaining a reissue if he is to be informed when he gets into court that the judge is unable to see why he should have surrendered his first patent. The slighter and more obviously unobjectionable the change the stronger will be the argument that there was no occasion to make it, so that honest and careful patentees will be the most likely to suffer.

7. A mistake by the Commissioner as to the necessity of issuing a new patent is not an excess of jurisdiction, but a mistake in a matter clearly within his jurisdiction, and the real question is whether it is one which the courts will correct by destroying a new patent after the old one has been surrendered.

8. Urgent reasons of justice require that, upon the mere question whether the paper called a reissue shall be given, the finding of the Commissioner should be, as it has hitherto always been held to be, conclusive.

9. If it be found that the claims the original patent were valid, and that the reissue for the same invention states the claim or claims in a different way, the law is well settled that the change does not of itself vitiate the new patent, but that, on the contrary, the original claims are conclusively presumed to have been made as they were through inadvertence, accident, or mistake.

10. It has been brought out a little more decidedly by the later cases that the invention must be the same; but it has never been held in the Supreme Court or any circuit court that the Commissioner's decision is not final as to the propriety of a reissue as distinguished from its validity upon what may be called its merits, or that the claims may not be varied to express the real invention.

11. The claim is part of the specification, and if defective may be amended.

12. The Reissue No. 7,558, to Daniel A. Sutherland, March 13, 1877, for "improvement in presser-feet for sewing machines," was granted in order to enable the patentee to claim the actual operations of his tool in detail, which is a perfectly legitimate reason for a reissue until the law is changed by Congress or the Supreme Court.

Patent sustained.

MECHANICAL INVENTIONS.

Messrs. Francis W. Ashton, of Hyde, county of Chester, and William Mather, of Salford, county of Lancaster, England, have patented machinery for washing fabrics, which consists in certain combinations of machinery, whereby the fabrics in a distended state are continuously lifted out of and immersed in the water, soap liquor, or other liquid, while passing through the machine, so as to obtain a dashing action, which will effectually cleanse the piece while extended to its full width and without undue tension, thus obviating the necessity of washing pieces that are printed with color in the form of a rope, as at present.

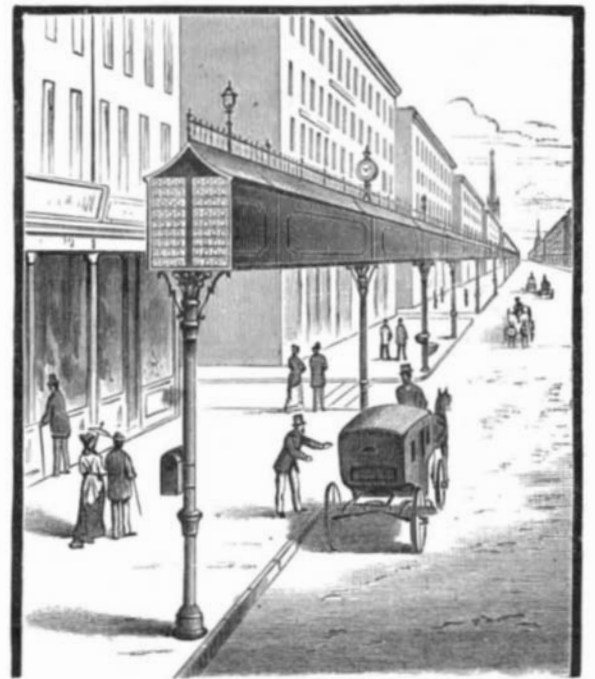
An improved glove-sewing machine has been patented by Mr. Claude M. Boland, of New York city. This invention relates to that class of machines for sewing gloves and furs in which are employed two parallel feed disks, a reciprocating needle, and an oscillating looper; and it consists in an arrangement of parts which cannot be clearly described without engravings.

EXPERIMENTAL RESEARCHES ON MAGNETIC COERCITIVE FORCE.—(D. Kulp.)—The author magnetizes iron and steel rods in spirals, which he opens before taking out the rods. On percussion, the permanent magnetism of the rods is partly increased, partly diminished, and partly inverted. As a series of induced currents arise in the rods on opening the spiral they have been exposed to magnetizing forces in alternating directions, whereby their behavior is explained. —*Wiedemann's Beiblätter.*

IMPROVEMENT IN TELEPHONE AND TELEGRAPH LINES.

We give an engraving of an elevated support for telephone and telegraph wires invented by Mr. T. G. Ellsworth, manager of the John St. office of the Metropolitan Telephone and Telegraph Company, New York city. Many useful and improved appliances are combined in this invention, making the whole structure an ornament rather than a blemish to the streets. In the larger cities telegraph wires are becoming objectionable to the public on account of the space they occupy, on account of the unsightliness of the poles and fixtures; and the great expense and trouble of constructing and maintaining the lines on house tops and in streets, is becoming a burden on the different companies.

The number of wires in many localities has become very large since the telephone has been so universally adopted. In many instances the breaking of a single wire has interrupted communication on twenty or thirty other wires, suggesting the necessity of some better means to carry the wires from point to point. The great value of telegraphic and telephonic communication lies in uninterrupted service, and any means that will insure this will undoubtedly prove valuable. The particular tube shown in the engraving has been selected from many desirable forms to illustrate this invention. Inside the tube, are arranged a number of shelves for supporting the cables, which are marked at suitable distances along the route in the covering. At each

**ELLSWORTH'S TELEPHONE AND TELEGRAPH LINE SUPPORT.**

street crossing is located an electric light, its support being a part of the structure. At proper distances are located letter boxes arranged for the attachment of a pneumatic tube for collecting the letters, or they may be collected in the usual way by carriers. Electric clocks are located at desired points. Police time detectors form a part of this system, each policeman to signal to station while on his beat. By this arrangement it may be known where the men are at stated times. Fire-alarm boxes are placed at suitable distances, and ambulance boxes are provided for calling ambulances. Drinking fountains are distributed at different points. These attachments constitute some of the uses which can be made of the structure. The columns being hollow admit of cables passing unseen underground to offices wherever desired, or special tubes can be arranged for conveyance above ground.

Birch for Cabinet Work.

The small value of birch wood for fuel, and its lack of toughness and strength, except in the smaller twigs, have led to its general neglect in the arts. Our more enterprising builders of railway cars, however, have discovered that its light weight, close grain, and rich finish make it admirably suited for certain applications where fine finish and bright effects are desired. The contrasts presented when white birch and light colored ash are relieved by the red of the cherry birch, are said to be peculiar but very pleasing.

Simple Mode of Toughening Glass.

A Leipzig journal gives a method which it asserts will prevent lamp chimneys from cracking. The treatment will not only render lamp chimneys, tumblers, and like articles more durable, but may be applied with advantage to crockery, stoneware, porcelain, etc. The chimneys, tumblers, etc., are put into a pot filled with cold water, to which some common table salt has been added. The water is well boiled over a fire, and then allowed to cool slowly. When the articles are taken out and washed, they will be found to resist afterward any sudden changes of temperature.

THE DISAPPEARANCE OF A RIVER.—The labors of a number of miners have been successful in filling up the large chasm caused by the river Bradford breaking through the roof of a disused mine at Alport, in Derbyshire. The stream, however, still flows through the mass of rock and timber thrown into the opening, and finds its way to the Derwent underground. It is impossible to divert the stream by reason of the conformation of the ground. A large number of persons have visited the spot.