Economy of Lenoir's Gas Engines.

Mr. John Pinchbeck writes as follows to the London *Engineer:*—

"Notwithstanding the unfavorable opinion expressed by your correspondent, Mr. Birckel, on the merits of the Lenoir gas engine, I am not without the hope (if you will allow me space in your columns) of removing, or, at least, of modifying, that opinion, and of proving that, after all, the gas engine may possess some merits, and that it is not so 'monstrous a production' as he at first imagined.

"If your correspondent will turn to the catalogues of the most eminent makers of portable steam engines he will see that the quantity of fuel required for working these engines is much greater than the 6 lbs. he has taken for his data. Take, for instance, an 8 horse-power engine; the quantity of coal is set down at 7 cwt. for 10 hours, exclusive of what is required to raise steam—about ½ cwt. The time necessary to get up steam is about 45 minutes, so that the engine requires 7½ cwt. for 9¼ actual working hours, or at the rate of 90 lbs. per hour. Compared with such an one a 1-horse power engine would labor under every disadvantage as regards economy of fuel, and I do not hesitate to say that the fuel required will not be less than 1 cwt. per day of 10 hours at the very lowest computation, instead of 60 lbs., as given by your correspondent. So small an engine would require constant attention on the part of the attendant; the slightest neglect, or an absence of ten minutes, would be enough seriously to lower the pressure of steam. No inconvenience of this kind is felt with the gas engine, as no attendant is required. The gas-tap is opened, the engine started, and continues to work till the gas is turned off. A little oiling once a day is all that is required; any comparison neglecting this point is unfair, because the major part of the expense of working a steam engine is ignored.

"In **Paris**, where upwards of 200 of the gas engines are at present at work, the average cost of the chemicals (sulphuric and nitric acids) if purchased at wholesale prices, is found to be 2½d. or 3d. per horse-power per day, which is not so serious an outlay as Mr. Birckel imagines. Taking his data, viz: 50 cubic feet of gas, at 4s. 3d. per 1,000, the cost of **1 horse-power per day of 10 working hours will be** as follows:—

	s.	d.
500 cubic feet of gas	2	1½
Sulphuric and nitric acids, say	0	3
Total cost of 1-horse power for 10 hours.	2	4½

The cost of working the 1 horse portable steam engine will be—

	s.	d.
1 cwt. of coal at 1s	1	0
1 day's wages to attendant, at 18s. per week (wages in large towns)	3	0
Cost of working a portable steam engine for 10 hours	4	0

"From the above it will be seen that, although the gas used may be four times the expense of coal, yet the cost of the same power by the gas engine is little more than half that of a steam engine.

"If the expense of working a gas engine be compared with horse-power, the advantage will be equally in its favor:—

	s.	d.
Take keep of 2 horses, each working 5 hours per day, at 10s. per week	3	4
Boy to drive, at 12s	2	0
Cost of horse labor per day of 10 hours.	5	4

"I think, there ore, it may be fairly admitted that the gas engine does possess the advantage of economy in working; and that where power of one or two horses is required, it may be employed to advantage and that it is not so monstrous a thing after all.

"Reading Ironworks, July 11, 1864."

Petroleum transported through Pipes.

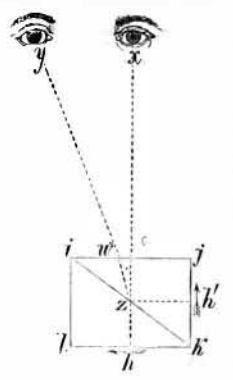
The *American Railroad Journal* says:—"For the more convenient transportation of the oil from the wells to the railroad, the Oil Creek Railroad Company and the Atlantic and Great Western Railroad Companies are laying between the termini of their roads iron pipes, through which the petroleum will be forced from the tanks at the wells to the railroad termini by powerful steam pumps. It is estimated that by this means, if necessary, 10,000 barrels a day can be delivered to the roads at a cost greatly less than by the present means, thus reducing the cost of the petroleum to the consumer, and preventing the fluctuations in the amount transported from the effect of the seasons on the wagon roads."

PHOTOGRAPHIC ITEMS.

A correspondent asks the address of the introducer of the wonderful "Crystal Miniature," of which we have before published some accounts. We believe Mr. Jos. W. Swan, of Newcastle, England, enjoys the credit of bringing this beautiful application of photography before the public in practical form.

For the information of photographers generally we subjoin a description of the crystal picture with a diagram, which will enable any person of skill to produce them. We copy from our valued contemporary, the *British Journal of Photography.*

"A piece of solid clear glass is ground into the form of a prism, having one of its angles a right angle, and the two other angles of about 43° and 47° respectively. This is cut in halves transversely, and the larger sides of the two pieces are placed in contact, so that viewing them endwise they appear as in *i, j, k, l.* It is evident that if an eye be placed at *x* an object at *h* will be visible, because the surfaces *i j* and *l k* are parallel, as also the two surfaces at *i k*; but, if the surfaces at *i k* were inclined at an angle of 45° to *i j*, an object at *h'* would also be seen by an eye at *x* by reflection from the surface *i k*, its incidence thereon exceeding the critical angle; and it must not be forgotten that, although the two surfaces at *i k* are popularly supposed to be *in contact*, this is not actually true, there being a film of air, however thin, between them. The surface, *i k* is, however, inclined to the perpendicular, *h z*, about 42°, so that, instead of the reflection being from *z* to *x*, it is really from *z* to *w*, where it is slightly refracted outwards in the direction of the dotted line to *y;* consequently if an eye be located at *y* it will see an object at *h'*. It is, therefore, only necessary to adjust in proper positions a pair of stereographs at *h* and *h'* in order that each one shall be seen by its appropriate eye, and stereosity of effect will be produced. It is observable that, as the object at *h'* is viewed by reflection, it must be inverted before applying it to the surface of the prism, and as Mr. Swan applies the films by tranference to the prism, and as transparent positives are needed they can readily be printed of a convenient size in the camera. It is probable that the paper prepared for the practice of photodiaphanie, lately introduced by Messrs. Harvey, Reynolds and Fowler, of Leeds, may be found useful for this purpose.



"Mr. Swan mounts the prism elegantly in a kind of jewel case with opal glass at the bottom, so that when looked at, by being in the hand and the bottom turned towards the light, each eye can see only the image intended for it, the limits of the prism acting as diaphragms which obscure the image not intended for each eye respectively, and a portrait appears as a perfect miniature bust of surpassing delicacy and brilliancy inclosed in a mass of crystal. The crystal miniature is one of those productions that charms alike the unlearned by its beauty and the man of science by its cleverness of adaptation."

Re-union of Dissevered Nerves.

Professor Laugier, one of the surgeons of the Hotel Dieu, has recently made a most important communication to the Academy of Sciences. In an operation performed on the arm, and in which the median nerve had been severed, that skillful surgeon united by a suture the two ends of the nerve. Almost immediately after signs of sensibility were observed, and in a few days more the nerve had entirely recovered all its properties of sensation and motion. I need not insist on the importance of this case, which throws such a new light on physiological pathology of the nervous system. No longer than two weeks ago, in a discussion which took place at the Society of Surgery, it was affirmed by several members that the regeneration of the nervous tubes, which alone could cause the recovery of sensibility and motility, was the work of weeks and months, and could not immediately take place. Such also was the opinion of M. Brown-Sequard and of MM. Vulpian and Philippeaux. These two gentlemen published last year a memoir which received academical honors, and in which they gave the relation of different experiments they had made, the result of which is entirely opposed to that recently obtained by M. Laugier. The memoir of that eminent professor, read at the Acacemy of Sciences, has been the scientific event of the week.—*Paris Correspondent of the London Lancet.*

A Colorless Varnish.

There are few things in photography that give the professional and amateur followers of the art more trouble than varnish; and as lac—a resinous substance, the product of an insect found on several different trees in the East Indies—is one of the principal ingredients used, it has been a great desideratum among artists, to render shellac colorless, as, with the exception of its dark brown hue, it possesses all the properties essential to a good spirit varnish in a higher degree than any other known resin. A premium of a gold medal, or thirty guineas, was offered some years ago by the Society of Arts for "a varnish made from shell or seed lac, equally hard and fit for use in the arts." There were two candidates, Field and Luning. When on due examination and trial both processes were found to answer the purpose, the Society awarded the sum of twenty guineas to each of the candidates. We give the process known as—

LUNING'S COLORLESS VARNISH.—Dissolve two ounces and a-half of shellac in a pint of rectified spirits of wine, boil for a few minutes with five ounces of well-burnt and recently-heated animal charcoal. A small portion of the solution should then be filtered, and if not colorless, more charcoal must be added. When all color is removed, press the liquor through a piece of silk, and afterwards filter through fine blotting-paper. This kind of varnish should be used in a room at least 60° Fah., perfectly free from dust. It dries in a few minutes, and is not liable afterwards to chill or bloom. It is particularly applicable to drawings and prints that have been sized, and may be advantageously used upon oil paintings which are thoroughly hard and dry, as it brings out the colors with the purest effect. This quality prevents it from obscuring gilding, and renders it a valuable varnish for all kinds of leather, as it does not yield to the warmth of the hand and resists damp, which subjects leather to mildew. Its useful applications are very numerous, indeed to all the purposes of the best hard-spirit varnish.

A common lac varnish may be made by digesting four ounces of clear-grained lac in a pint of spirits of wine in a wide-mouthed bottle, keeping it in a warm place for two or three days, and occasionally shaking it. When dissolved, strain through flannel into another bottle for use.—*British Journal.*

ARTIFICIAL LARYNX.—Dr. W. N. Cote in the Paris *Medical Gazette* says:—"M. Edmond Fournier, at a late sitting of the Academy of Sciences, produced an artificial larynx composed of india-rubber pipe and several keys and pedals, by means of which the action of the natural muscles is imitated and sounds similar to those of the human voice are produced. This apparatus is constructed according to the inventor's theory of the production of sound, founded on a long and patient investigation of the construction and action of the larynx."

A PEAT company is to be formed in Rochester, N. Y., to supply that city with fuel. It seems that the peat can be cut, dried, and conveyed to the city at a much less cost than coal. Long Island and New Jersey, it is said, are likely to produce large quantities, and the method of drying the peat and preparing for market has been patented.

FAST TIME.—The steamer *Daniel Drew*, Capt. Tillman commanding, on her down trip for New York, made the extraordinary fast time from West Point to New York—fifty-three miles—inside of two hours.—*Newburgh Telegraph.*

How the Mine before Petersburg was Constructed.

A correspondent of the Philadelphia *Press* gives the following interesting account of the manner in which the mine was run under the rebel fort at Petersburg:—

"The work was assigned to the 48th Pennsylvania, a regiment which is composed chiefly of miners from the coal mines of this State. Their experience in mines admirably fitted them for the task, which they carried to such a successful conclusion. The method they pursued under the direction of their colonel, himself a practiced miner, was strictly scientific. The process of triangulation was employed. Lines were laid off behind our works. From these lines as bases, and with the angles formed by lines extending to our exterior works, sprang a simple problem of geometry easily solved. Five triangulations were made, and an excavation commenced in the side of a hill upon which our exterior lines of works run. The tunnel or 'gallery' was about four and a half feet high, the same width at the bottom, and two feet at the top. The tools used were abbreviated army picks. Water was met with not far from the entrance, and for a time gave no little trouble. The floor, however, was planked, and the sides and ceiling shored up. A quicksand was met with and to obviate it the tunnel was curved upwards, so that the latter half was several feet higher than the entrance. The oozing of the water formed mud in several places, so that the regiment came from their daily labor bespattered and stained. The earth as fast as excavated, was conveyed in hand-barrows, made of cracker boxes or half barrels, to the mouth, where it was emptied into bags which were afterwards used on the top of the breastworks. In this manner no betraying accumulation of earth took place.

"The ventilation of the gallery was effected by a shaft sunk at the side of the tunnel just within our interior lines of works. Here a fire-place was built with a grating opening into the gallery. Tubes made of pine boards were inserted through the earth into the fire-place, through which the air when it became rarified and ascended, created a suction or draft in the tubes connecting with the gallery. As fast as the work advanced additional tubes were jointed on. The smoke of the fire, of course, could not be concealed, but suspicion was quieted by keeping other fires burning along the lines. The lighting of the tunnel was effected simply by placing candles in lanterns along the walls at a distance of about twenty feet apart.

"At length the end was reached, and the triangulation was abundantly verified in the noises overhead. The nailing of timbers and planks could be distinctly heard and left no doubt that the men were directly beneath the rebel fort. The enemy were evidently making a flooring for their artillery. As near as could be ascertained, the distance from the tunnel to the fort was twenty feet.

"After it was sufficiently evident that a point directly under the fort was reached, the construction of the mine was commenced. The angle of the fort projects towards our lines, and under this angle the tunnel diverged into two galleries, each running as near as could be ascertained, under each side. It was the intention to make the mine consist of eight magazines, placed at intervals along these branch galleries, so that the entire length of the fort might be blown up, in place of one spot. Preliminary experiments were made by the Colonel (Pleasants) with cartridges of powder, which he inserted in the earth and ignited by a fuse. He ascertained that the work of making a breach would be more effectually secured by distributing the powder instead of putting it in a bulk. In the latter case the explosion resulted in a deep and broad crater; in the former in a wide chasm. Where the cartridges—his magazines—were not disconnected by packing, the tendency of the explosion was to find vent at the first hole. Hence he resorted to packing between the magazines, or, as it is technically known, "tamping."

"The magazines were eight in number, four in each gallery, so arranged that their explosion resulted in four craters, intersecting each other. The explosion was effected through tubes of pine wood six inches square, half filled with powder. These ran along the bottom of the tunnel, and entered the magazine through openings made for them. Between the pairs of the magazines and over the tubing was a layer of bags and logs.

"The fuses were those used for blasting in the coal mines of this State. When they were fired they became extinguished twice, but the third time the powder in the chamber, *six tuns* in all, was ignited with results that have already been described."

Gathering and Keeping Fruit.

It is becoming a well understood principle that pears are improved by being gathered before fully ripe. Some should approach nearer maturity than others. But early apples should be fully ripe, as a general rule, before gathering. Late fall and early winter apples should not be eatable when picked, and all the late winter varieties should be gathered when too hard to yield to the pressure of the thumb, and always before heavy fall frosts. A dry time should be selected, if possible. There will be a few specimens not yet mature, but you can afford to throw them out to save the best and the main crop. When a good keeping variety begins to drop freely from the tree, as is sometimes the case, secure the balance of the crop that remains on the tree as soon as possible; but they should not be mixed with those on the ground—not one should be saved with those picked. Windfalls will not keep, for in addition to the injury sustained from the fall, they become heated by lying upon the ground exposed to the sun and hot air, and the ripening process already commenced is hastening it to a rapid decay.

No matter how hot the weather is, an apple is always cool while upon the tree, and in that condition should be taken care of, if we would have it keep in its most perfect condition for the full development of all the delicious juices with which it is so abundantly supplied. How to obtain it in that condition will be my purpose now to show. We have seen that it must be carefully gathered before it is too ripe, as it is commonly termed; but I say before it is ripe, for when it it ripe it is fit to eat, and that should not be the case with winter apples when gathered.

We have also seen that heat hastens the ripening process, and that cold retards it. Apples should therefore be kept cool, barely so as not to freeze. A minimum temperature of thirty-four degrees is probably about right, with as little fluctuation as possible. It is not for the purpose of assuming to know more than the most of you about the best method of keeping apples, that I give the subject so large a space in this address, but it is to give it more prominence in our deliberations than it has heretofore had. I regard it as one of the points very much overlooked in all meetings of this kind.

Whether we regard the ripening process as a vital or a chemical action, it is quite sure that it should go on gradual and unchecked until all the good qualities are fully developed, and when the highest point of excellence is attained, then the fruit should be used. It is never so good as when just fully ripe; but is frequently eatable for a long time. Some varieties become dry and mealy, others tough and leathery. Others, by being kept very cool, will frequently remain in a very good condition for a very long time, or by the use of artificial means may be kept for an almost indefinite period.

I hold that the ripening process once commenced, goes on, no matter how cold, if frost is not present, slowly, perhaps, but uninterruptedly, until full maturity. Hence the importance of a cool cellar, which should always be dry and dark. It should be frequently aired, when the outside temperature will allow of it. Some varieties are much more sensitive to their treatment than others. The Winesap, for instance, which has a thick skin, may be abused a great deal in handling and but indifferently cared for in the cellar, and yet it will keep pretty well; that is it will rot but little; but, if kept close and warm, it is subject to a fungus that renders it scarcely tolerable to eat. But if it is kept cool and dry, all its best qualities are retained. It is also one of the varieties that do best to keep on open shelves. The Belmont, on the other hand, which I regard as one of the best and most profitable apples, is very impatient of bad treatment. Its skin is smooth and thin, and flesh of a delicate texture. If roughly handled and kept in a warm room it soon decays. If carefully handled and kept in a cool place, it keeps, with very little waste, till April or May. Indeed, it is, with me, one of the very best of keepers.—*Trans. Indiana Hort. Society.*

On the Forging of Steel.

George Ede, an English mechanic, has given a great deal of valuable practical information in his little pamphlet on the management of steel, published by D. Appleton & Co. From the work we make another extract:—

"Steel being one of the most valuable metals and requiring great care in the forging, hardening, tempering, annealing, and management of it in general, I think, after having had nearly twenty years' good practice, experience, and study combined, I am now able to give a little information to those who have not had so much to do with it as I have. All that I here state is from my own practical experience; and by following the plans I shall here give, the artist will meet with every success. There are many people who, for the want of a little useful knowledge on steel, refrain from making many a good tool, because they say it is sure to crack in hardening; but if the steel is good, and has not been spoilt in forging the article, then, by following my plans they never need be afraid that it will be a 'waster.' There are tuns of the very best steel condemned as bad steel—when, at the same time, it is the forging of it that has made it bad, through men not having a proper knowledge in the management of it; and those masters who study their own interest will employ those men for the forging of steel on whom they can most depend. For I have seen plenty of the very best steel destroyed, and have even heard men remark to each other, 'Make it well hot—it will work the easier;' and I felt what a sad thing it was to see men that knew better; yet they would destroy their employer's roperty Therefore I say, as justice to the manufacturer and supplier of steel, it behoves masters to put those men only at the forging of steel on whom they can most depend.

"In forging of cast-steel the fire must be regulated by the size of the work; and in heating the steel, when the flames begin to break out, beat the coals round the outside of the fire close together with the slice to prevent the heat from escaping. To save fuel, damp the coal, and throw water on the fire if it extend beyond its proper limits. To ascertain the heat of the steel, draw it out of the fire, and that often, for it requires to be well watched to heat the steel properly; and if not hot enough, thrust it quickly in again. Soft coke is even better than coal for the fire. The heat the steel receives is judged of by the eye; and care should be taken not to use a higher degree of heat than is absolutely necessary to effect the desired purpose, and to use as few heats as possible; too frequent and overheating steel abstracts the carbon, gradually reducing it to the state of forged iron again. It is an idea of many men, that so long as the steel does not fly to pieces when they strike it with the hammer, it is not too hot; but it is an erroneous idea, and easily proved when it comes to be hardened and when it comes to be used; still it is an idea that many men will maintain, but only for the want of knowing better, and I hope that this will have the effect of altering their opinion. I can safely say that no man will ever injure the steel by being too careful how he takes his heats. Cast-steel may be welded by boiling sixteen parts of borax and one of sal-ammoniac together over a slow fire for an hour, and when cold grinding it into a powder. The steel must then be made as hot as it will conveniently bear, and the borax used as sand."

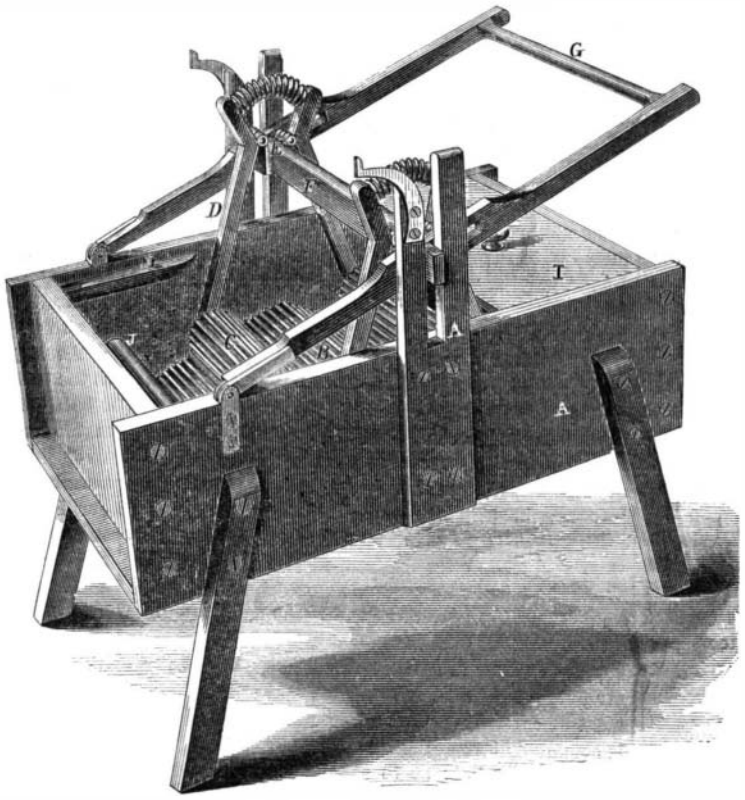
PRESERVATION OF FRUIT.—At the Russian Court fruit is preserved by being packed in creosotized lime. The lime is slacked in water in which a little creosote has been dissolved, and is allowed to fall to powder. The bottom of a plain deal box is covered with it one inch high, and over it is a sheet of paper. Upon this the fruit, well selected and cleansed, is arranged; over this another sheet of paper, and on top of this another such stratum of prepared lime; in the corners a little finely-powdered charcoal is put. The whole box is then filled in the same manner, and the well-fitting lid nailed down. Fruit kept in this manner will remain intact at least one year.

No less than twenty freight engines on the Western railroads have recently been altered so as to burn coal, it having been found that this is a cheaper fuel than wood. Ten more are in the work-shops to be altered in the same way.

Improved Washing Machine.

The terrors of washing day have well nigh disappeared before the perseverance and ingenuity of inventors. Machines for doing the hardest part of cleansing linen are now as indispensable as those for sewing. The machine shown herewith is easily operated and would appear to be efficient in action. Its construction is as follows:—

The box, A, is water-tight and has a large fluted inclined plane, B, extending from one end to the other. Upon this inclined plane two rollers, C, work, which are attached to the arms, D. These arms are hinged at E to the cross-piece, F, which permits them to open and shut as they rise with the action of the lever, G, one end of which is jointed to the case, A. The ends of the cross-piece are confined between slides, H, which insures certainty and efficiency of action. The covers, I (one of which is removed), keep the water from splashing about, and may be instantly removed when necessary. At the extreme ends of the case, A, there are wooden battens, J, which prevent the clothes from being pushed out by the action of the rollers. The operation of this machine is very similar to that of the old-fashioned wash-board, and the rollers rub the garments the same as the knuckles do. The clothes are rubbed in one place, but are thoroughly worked over by the rollers. This washing machine was patented, on June 28, 1864, through the Scientific American Patent Agency by Jos. Adams, of Janesville, Wis., and for further information address him at that place.



ADAMS'S WASHING MACHINE.

Balanced Slide Valve.

It has always struck us as singular that so few balanced slide valves are used on steam engines. They are most unquestionably of very great benefit when properly applied and not complicated in construction, and we hope that the inventors of such machines will take pains to introduce them to those using steam power. Even if the valve is not wholly balanced a large proportion of the friction may be taken off the seat with good results.

The engraving published herewith shows a balanced slide valve of an improved construction. The steam chest is not shown, but the bonnet which carries the working parts remains in place. Two systems are shown in this engraving—one in the valve, A, and the other in the plate, B. This plate, it will be seen, has a raised portion, C, at each end, which is slotted and carries a bar, D, and a rubber cushion, E, in the said slots. The valve, A, has a sliding cap, G, which works over a standard, H, screwed into the flange, and the springs, I, press this sliding cap up to the adjustable plate, B. This kind of valve and the india-rubber cushions are not used together for they are not necessary, but a solid adjustable plate, as at J, is employed, and the springs, I, fulfill all the purposes of a cushion. When the cushions are used, a solid valve without springs is employed. The plate, B, is adjusted as it wears by the set screws, K, and any steam that leaks through the back passes out through the opening, L, under the hemisphere, M. The valve may also be lubricated on the back through the port. A stuffing box and gland, N, is fitted to the bonnet so that live steam cannot leak through. This is a very neat arrangement, and the solid valve arrangement was patented on the 27th of October, 1863, through the Scientific American Patent Agency by M. H. Barnes, of Peoria, Ill.

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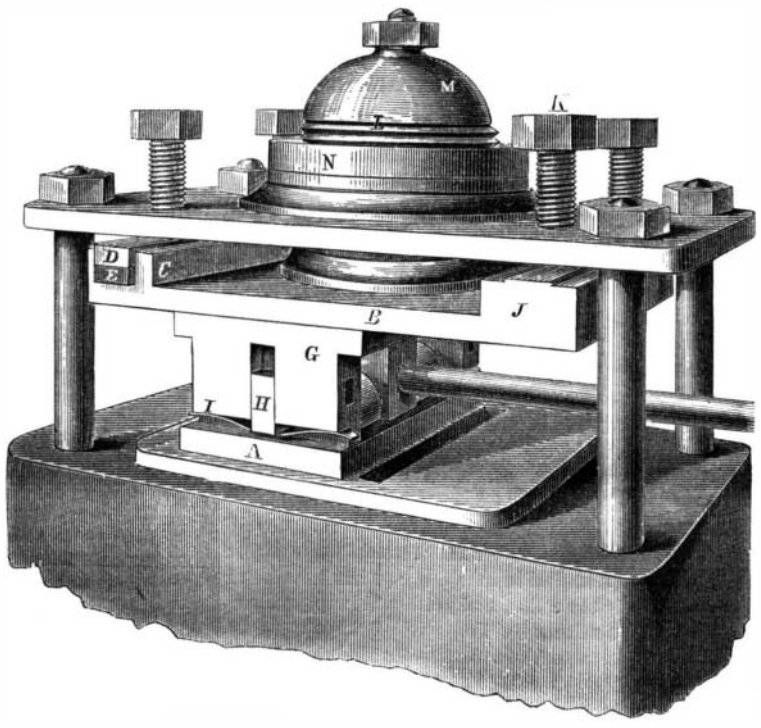

BARNES'S BALANCED SLIDE VALVE.

THE METAL MAGNESIUM.

There is no better authority in questions of photography, especially the science of the subject, than the editor of the *American Journal of Photography*. He makes the following remarks in relation to magnesium:—

"The metal magnesium has now been known for upwards of half a century. Its discoverer observed that it burns with a bright light, a fact which in the absence of any trial might easily have been predicted from the nature of its products of combustion. The magnesium light so much talked about is therefore no novelty; some one has, however, recently observed that wire is the most convenient form in which to have the metal for burning, and this clever observation has brought the light into great notoriety. The burning of magnesium wire is a very pretty and instructive chemical experiment; it is very interesting to see a silver, white metal ignite and burn vividly in a lamp flame. In our opinion, magnesium has not been found to possess any other practicable virtue.

"If magnesium were as cheap as lead, it might, under some circumstances, rival gas, or rock oil, as an illuminating material, and were it as cheap as silver, and at the same time could produce the brilliant magnesium light which some enthusiastic persons have seen, it might be useful for some photographic purposes, as a rival to the lime light. But the plain fact is that the intensity and brilliancy of this light have been enormously exaggerated. The light from a magnesium wire, burnt in a spirit lamp flame, is not greater and perhaps not more intense than a good coal-oil lamp will give, and it is not at all comparable with the lime light. But our enthusiastic English friends tell us that photographs have been made by it, and that it has extraordinary actinic properties. In the winter of 1840-41, a daguerreotype was made at night before a large audience, by means of the lime light, and since that time similar experiments have been, at least in America, a common lecture-room illustration. We have made an ambrotype by the light of coal-oil lamps, and it is a common thing to produce transparencies by gaslight. To believe the English journals, one Moule has been for years making photographs at night with a kind of gunpowder, etc., etc. This magnesium light is surely a case of 'great cry and little wool.'"

Important Law-suit settled.

The Biddeford, Maine, *Journal*, in announcing that the great sewing-machine suit in the United States Court, between Shaw & Clark, of Biddeford, on one side, and Wheeler & Wilson, Grover & Baker, Singer & Co., and Howe on the other, has been fully and finally settled, says:—

"The suit was brought by the large companies who combined to prevent the defendants from making and selling sewing machines, which they alleged infringed their patents. The best patent lawyers to be obtained were employed by both parties. After several years of tenacious and expensive fighting, the complainant succeeded in establishing their patent, and got out an injunction; but Shaw & Clark, in the meantime had obtained an interest in an older patent than theirs, and got the Government to extend it for seven years, with claims covering not only machines made by the complainants, but all the sewing machines of any kind now made in the country. This of course placed the 'boot on the other leg' at once, the result being that the whole matter has now been settled by Shaw & Clark receiving an interest valued at one million five hundred thousand dollars in the whole sewing-machine business. The old patent spoken of is now considered the most valuable of any in existence, except the rubber patent, as it will control the whole sewing machine interest of the country."

GAS from pine wood is to be made for lighting several of the continental cities of Europe. Such gas has been used in this country for many years.