

Communications.

Our Washington Correspondence.

To the Editor of the Scientific American:

The business of the Patent Office is taking its usual course notwithstanding the fire, as the following issues, being those for the past week, will show: patents, 217; reissues, 8; designs, 5; trademarks, 40; labels, 9. If any of your readers are delaying making application for fear they will have to wait, they need do so no longer on that account, but should forward their applications at once, as, owing to other inventors' postponement of their cases, those who apply now will have the best chance, and will not have to wait so long as if they delay until the reaction takes place.

Our Consul General at Berlin has communicated further particulars concerning the American department at the International Leather Exhibition in that city, from which it appears that the highest premium, a gold medal, was awarded to the American firm of Larabee & Co., for their collective exhibit of boot and shoe machinery. Several other American firms received diplomas and honorable mention for machinery and leather exhibits. It is believed that the American hemlock-tanned leather will meet with a large market in Germany; for although greater strength and durability are claimed for the home-made, salt-tanned article, the cheapness of the former will prove a decided advantage in selling. The consul also reports on our general trade with Germany, and states that the most urgent requirement to increase it is that the wants and peculiarities of the German markets should be studied, which he thinks can be most readily accomplished by resident agencies. The superiority of most articles of our manufacture exhibited there is fully acknowledged, but in many cases they are kept for show in the windows, and exorbitant prices asked, thus precluding their sale. With all drawbacks our trade with Germany is steadily on the increase, our exports thereto amounting to \$277,000,000 during the last five years, being nearly \$50,000,000 more than our imports during the same period. The exports of our manufacturers have increased in the ratio of four to one since 1872, and the Consul General says that by proper efforts a much greater ratio of increase may be accomplished hereafter.

In response to the request of a body composed of the leading merchants and manufacturers of Philadelphia and styled the Associated Industries of the United States, Postmaster General Key has issued a letter of credence to Mr. J. W. Fralick of Philadelphia, who is about to travel in the adjacent South American States with the object of increasing our postal facilities with those countries in order that our trade with them may be extended in a manner which the present limited and uncertain means now forbid. In an interview relating to the same matter which was had with the Secretary of State, it was shown that the Brazilian markets open up a large demand for a number of American manufactured articles, but that owing to the absence of proper facilities the trade is carried on through English houses who buy their goods here and ship them to Brazil, making from ten to fifty per cent on their own account, which advantage might be in the hands of American merchants if our postal and freighting facilities with those countries were as good as are those of the English. Secretary Evarts stated that he believed it to be the imperative duty of this government to do all it can to advance the commercial and manufacturing interests of the country by a more liberal policy regarding our foreign trade, and that this could only be accomplished by the establishment of ocean postal routes under the auspices and fostering care of the government. It has been ascertained that there are now building four iron steamships which are designed for a line between New York and Rio Janeiro, and by the establishment of this line all our manufacturing and commercial centers will be much benefited. For the more certain establishment of proper facilities for trade, the secretary thinks we should have a system of judiciously subsidized postal lines, particularly with those foreign ports which have a demand for American manufactures and products, and is disposed to exercise the influence of his department in their favor.

Postmaster General Key has received a communication from the English Post Office Department stating that it has been found necessary to take precautions against the admission of the potato bug into the United Kingdom through the mails, as several live specimens of this insect had been discovered in mails received from the United States, either surreptitiously inclosed in newspapers or forwarded as specimens. It is feared that, notwithstanding the utmost vigilance on the part of the British authorities, many newspapers and packages containing these insects pass without detection and therefore the friendly co-operation of our postal department is requested in putting a stop to the reprehensible practice of sending these insects in mail matter to Great Britain, whereby the potato crop of the kingdom may be endangered.

Among the documents recently received by the State Department is the first annual report of the Sappora Agricultural College, situated in the city of that name in the province of Nekkaido, Japan. This college was only opened in August, 1876, and now we have the first report, a pamphlet of 148 pages, printed on beautifully tinted paper, with clear type, and giving in terse English information that bears the most incontestible proofs of the success of the undertaking, and of the practical spirit in which Japan proposes to educate the rising generation of agriculturists, combining all that is good in the old world with all that is best in the

new. From it we learn that the college farm contains 250 acres, from which fine crops of a large variety of farm produce were raised; and that the college building contains a library (having a large collection of books in the English language), lecture rooms, chemical laboratory, dormitories, etc. Professor Clark, an American, was appointed director of the college for one year, and much of the credit of the success of the institution is acknowledged by the Japanese to be due to him. All of the farm utensils, machines, most of the seeds, etc., were purchased in the United States, and the surveys, draining, and planting were carried out under the direction of Professor Wheeler.

Since the burning of the model halls of the Patent Office a commission was appointed to examine the various public and other buildings where the Government papers and records are kept. The report of the commission has just been published, from which it appears that the new State Department, the Shepherd and Coast Survey buildings are as nearly fireproof as a building filled with records can well be. Two old wings of the Capitol adjoining the Congressional library are very defective, and have much woodwork under the roof. The War Department records are stored in many buildings which are, in most cases, complete tinderboxes, ready to blaze up from the smallest spark. The Treasury records are in a large degree exposed. Part of the Post Office Department roof is supported on wooden rafters. The National Medical Museum, supposed to contain the finest surgical collection and most extensive medical library in the world, is under a wooden roof and cornice. The Agricultural Department, with its museum, is also unsafe. In fact nearly all the archives of the Government are in constant danger of fire, and an unlucky spark may sometime destroy a collection of records that will expose the government to the probability of having to pay many millions of dollars of fraudulent claims that would never have been brought forward had such records not been destroyed.

The United States steamer Guard is about to sail under the command of Lieutenant Commander F. M. Green, on an expedition to Lisbon, Cape De Verde Islands, and across the Atlantic to the coast of Brazil, for the purpose of establishing the longitude of the various places by means of the telegraph. The several cable companies along the route have offered to the Navy Department the gratuitous use of their cables for this undertaking in the interest of commerce and navigation. The Guard will be absent about a year and a half, and the work of the scientific corps on board is looked for with the greatest interest, as the correction of a vast number of charts depends upon the results of the expedition.

Washington, D. C. OCCASIONAL.

The American Middlings Purifier Company.

To the Editor of the Scientific American:

We are accustomed to being traduced by millers' journals catering to suit the taste of their customers, and regarding nothing but their subscription lists; but when we read in your journal the same charges, we are moved to ask your permission to reply to some of them. The original patents of Wm. F. Cochrane were issued, one for an improved process, and four for mechanical improvements. Some of them required to be reissued, generally because subsequent investigation showed that the originals were too broad in their claims. The process patent, however, required reconstruction; and when I tell you that the application was examined by the late lamented Nolan, than whom no abler or purer man has ever ornamented the examining corps of the Patent Office, you will be prepared to believe that these reissues probably rest on a safe foundation, and will at least require some proof of fraud; but except in the columns of newspapers and milling journals, nothing has been presented on this head.

Having obtained the reissues, we sued one of the largest milling firms in the United States. The case went through the courts the more rapidly because we had selected parties owning patents claimed to cover the same subject matter, who had made a good deal of money out of their patents, and were as anxious to get through with the case as we were, and all the more that they supposed they were going to beat us easily, as in fact they did in the lower court. Judge Miller said, in his decision in St. Paul, that the case was considered with unusual care in the Supreme Court, and the patents were fully sustained. Now they talk of collusion and threaten to have an examination, but though the Supreme Court is in session they don't move in the matter. We are ready and anxious to meet them, and would bring on the question ourselves, if we could; for the charge is without foundation; but they prefer to raise a clamor, and so encourage their members to stand by their association. Twice they have made the charge in the Circuit Court, and in both instances entirely failed to prove it. Have we not a right to ask you not to take the truth of this charge for granted?

Then they say the invention is old. That is fair ground for defense; but why yell fraud, and hurl all sorts of names at us, because, in the absence of any proof whatever to the contrary, we insist that our patent shall be accepted as valid. It is for them to overthrow it, and they have utterly failed; the patent stands, and up to date has never been shaken; why then do you talk of the patent ring trying to impose a fraud on these innocents?

Call a thing an evil name and all evil is at once accredited to it. How are we a ring? The company is a unit; it has a moderate capital of only fifty thousand dollars, and, all told, nine stockholders. Are you really afraid that we are

going to override an association of millers representing five thousand mills and at least fifty millions of capital? The danger is to us, not them. Nothing but a cause most just can sustain us against such a combination; and why should we be abused because we have manfully stood up for what we believe to be the right against such enormous odds? What has become of the American sense of fair play? Our cause is in many points that of the whole body of inventors. These associations are formed, in the language of the Minnesota Association, to oppose, by their joint capital and influence, claims made against any miller by any person on any patent. Right or wrong, just or unjust, they claim the privilege of taking any person's patent, and the unfortunate patentee must prepare to fight the combined capital of all the millers. How many, with a cause however righteous, can sustain themselves against such a force? They can break down almost any one by the simple multiplication of expenses, which they can sustain because the amount divided among so many will be small for each; but the plaintiff must bear all the burden unassisted. There is a community of interest among patentees, which entitle us to some sympathy from them at least. We have tried to conduct ourselves squarely in this matter. We have not sued poor men, have struck at the strongest, have made our case, met theirs, and have tried to bear success without exaltation, or defeat without depression. We have beaten them upon every question of law which has ever yet been raised, and on every issue of fact, except in the last trial in St. Louis, when, by reason of our difficulty of obtaining witnesses, they were enabled to outswear us; and even then the court allowed us an order to inspect the mills, which we did, to find that they had succeeded by denying what we found to be the truth; but it was too late to get advantage of it, for one judge had gone and the other was going in a few days, and could not turn aside from the law cases then being tried with a jury in attendance to resume the chancery docket.

Now, having failed at every turn in the courts, they are circulating petitions that Congress shall interfere; and at this point your readers have a very genuine interest in the matter, for they can only hurt us by modifying the rules of recovery applicable to any other patent. It means that we are to have an attempt, backed by most formidable interests and untold money, to obtain legalization of the right of any man to confiscate other people's patents; and if at the end of long and expensive litigation they are held to account, it shall never be more than an ordinary license fee, say a few cents or a few dollars. This is what this appeal to Congress means; they can only strike us by striking at the system.

If we were so minded, we could tell things of the management of these cases for the association which would disgrace those implicated; but we do not care to try our case to the public. We are willing to stand or fall in the courts, and only ask of the public that it will await the development of the trials. If we should perchance fail, it is no new fate, and we will try to be patient; but if we should succeed, as we expect to, we ask the public not to believe that this one little company, with hardly capital enough to run an ordinary grist mill, has trodden under foot, crushed and cruelly oppressed these five thousand innocents, who have simply been trying, and heretofore successfully, to enrich themselves by the use of our property. Are your readers, of all the people on earth, the ones to turn against us in such a contest?

Yours respectfully,

The American Middlings Purifier Company.
Washington, D. C., Oct. 13, 1877.

A Rich Silver Mine.

We have recently examined some remarkable specimens of silver ore from the mine of Todos Santos, near Batopilas, Chihuahua, Mexico, which is now being worked by Messrs. Mitchell, Ford & Co. This mine forms one of probably fifty which exist within a radius of five miles around the vicinity. It has been known some twenty years, but was abandoned and re-opened in 1875, since which time it has yielded some \$75,000 worth of ore. At present, however, the ore extracted is of astonishing richness, yielding 12 ounces of silver to the pound, and in some cases a hard dollar to every ounce. The specimens exhibited to us were nearly solid silver, nodules and filaments of the metal being interspersed so thickly with the pure white quartz. The mine is situated nearly opposite that of the Batopilas Silver Mining Company, across the Batopilas river, and in the Sierra Madre Mountains at some 1,600 feet elevation, or 2,500 feet above the level of the Gulf of California, from which it is distant about 250 miles. Owing to the almost total absence of machinery—absent because of the inaccessibility of the locality—ore yielding as high as \$200 to the ton is thrown aside as non-paying. The rich ore after treatment in the rude adobe furnaces of the country gives silver 993 fine. It is run into bars worth about \$1,000 and \$1,200 a piece. The cost of transportation of ore to New York is 12½ per cent, inclusive of the 5 per cent Government duty.

THE Cunard Company are constructing a new steamer to run between New York and Liverpool—the Gallia—of 5,000 tons, which will be built on a plan they intend to use on all new transatlantic liners—namely, the carrying of several watertight bulkheads to a deck 5 feet or 6 feet above water line. The Gallia will have seven of these bulk-heads, and will consequently be divided into eight watertight sections. It is to be hoped that the bulk-heads will be found really watertight if the emergency should arise.

Test for the Presence of Gold in Solutions.

Protosulphate of iron gives a brown precipitate, which acquires a metallic luster when rubbed. Proto-chloride of tin gives a purple or blackish precipitate, insoluble in muriatic acid. Sulphuretted hydrogen and hydrosulphuret of ammonia give a black precipitate, insoluble in simple acids. Ammonia gives a reddish-yellow precipitate (fulminating gold) with tolerably concentrated solutions, either at once, or on boiling the liquid. Liquor of potassa gives, with neutral solutions of gold, a similar precipitate to that formed by ammonia, insoluble in excess.

AN ANCIENT HAND WARMER.

Our illustration represents a curious old article of comfort, which is almost forgotten now-a-days, but which once formed one of the many objects carried by ladies at their chatelaines. It is a hand-warmer, and consists of a small



spirit lamp hung in gimbals in several circles of metal, so that it stands always horizontal. It is enclosed in two hemispheres of copper, which are hinged together. The contrivance was clasped between the palms of the hands, and thus kept the latter warm.

IMPROVED SELF-FEEDING DRILL.

The annexed engraving represents a new self-feeding drill for boring iron, steel, etc. The feed is adapted for all classes of work and all sizes of drills, and therefore needs no adjustment. A is the drill shaft, having at its upper end the flywheel, B. This shaft is rotated by the bevel gearing shown, which is revolved by hand by means of the crank. On the bevel pinion is a feather which enters a keyway on the shaft, A, so that although said shaft is turned by the pinion it can be moved vertically within the latter. To the upper part of the shaft are attached collars, and between them is a sleeve which is secured for vertical movement upon the shaft by means of the collars, and prevented from revolving with it by the set screws which attach it to the beam, C. It will be observed that the shaft, A, is free to move vertically within certain limits, and that its vertical position is regulated by the beam, C, which is attached to the shaft by the sleeve above referred to. The short end of the beam is connected by a link to the frame. The long arm is notched so that the weight may be adjusted upon it to cause more or less downward pressure on the shaft. This beam is operated by means of a lever, D, the short arm of which is cogged and engages with the cogs of the bell crank shown, which latter is connected to the beam by means of clevises. By raising the lever, the long arm of the beam is depressed, and consequently also the drill shaft. In order to limit the motion of the beam and through it of the shaft, an adjustable stop, E, is provided which may be secured in any desired position. The table is likewise adjustable, and is placed as desired by means of the dog, F, which engages with a rack upon the standard.

The machine is strongly constructed and is in all particulars a very excellent and useful tool, especially adapted to the needs of the general machinist. For further particulars address the manufacturers, Messrs. Combs & Bawden, Freehold, N. J.

The Atmosphere of Mars.

Mr. R. S. Newall, F.R.S., at the observatory, Gateshead, England, states that on August 23, during the total eclipse of the moon, he observed that Mars is surrounded by a whitish envelope, the diameter being about twenty times that of the planet. He saw it again on September 7 and 19 distinctly. It has a well-defined edge, and is densest nearest to Mars. Small stars were seen through it.

A New Dyestuff.

Not long since a new dyestuff made its appearance in the German market, which consisted of a slightly crystalline powder of a light red color, similar to mercuric iodide. According to Professor A. W. Hofmann's experiments it is the soda salt of an organic acid, mixed with a not inconsiderable quantity of alumina. It dissolves quite abundantly in hot water, less so in hot alcohol, with a deep brownish-red color; the solutions, which dye a beautiful orange inclined to red, crystallize on cooling. The salt is insoluble in ether. The salt will endure quite a high temperature without decomposition. At a high heat it swells up almost like Pharaoh's serpents, and leaves behind almost exclusively a mass of carbon, which burns only with very great difficulty.

In order to obtain the acid the commercial product was dissolved in boiling alcohol and the solution treated with concentrated hydrochloric acid. From the deep violet-colored liquid there separated on cooling fine hair-like red needles, to which some of the mineral substance adhered most tenaciously. By frequently repeated crystallization from alcohol and acid the last trace of incombustible matter was at length removed.

The pure dye consists of beautiful reddish-brown needles, which are quite soluble in water, still more so in alcohol, but insoluble in ether. Free alkalies as well as ammonia dissolve it with a brown color. From the last named solution the dye is precipitated in a crystalline form upon the addition of an acid. In this case the liquid acquires a deep violet color. The composition of the dyestuff dried at 100° C. corresponds to the formula $C_{10}H_{12}N_2SO_4$, and that of the silver salt to $C_{10}H_{11}AgN_2SO_4$.

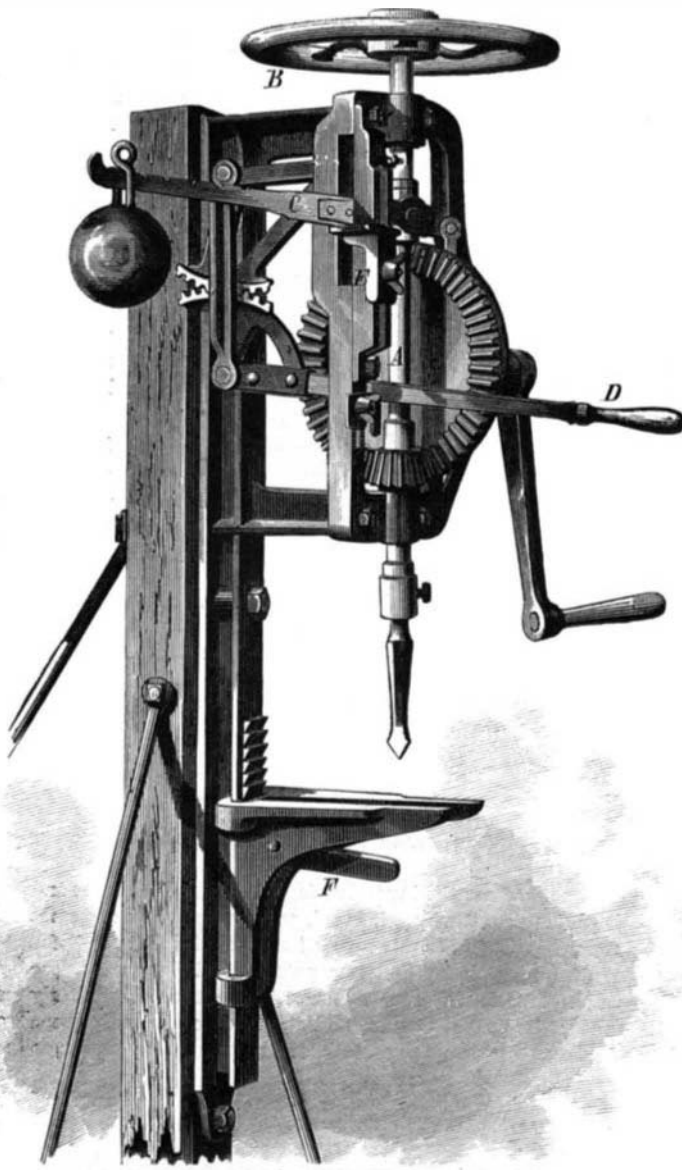
Such a substance could be obtained by the union of 1 molecule of naphtholsulfo acid with 1 molecule of diazobenzol:



In fact the new orange was obtained by the action of diazobenzol upon alphanaphtholsulfo acid. The last named acid was prepared by digesting naphthol with sulphuric acid upon the water bath. The lead salt was first prepared and the lead then removed with sulphydric acid, and the solution of the free acid concentrated and saturated with sodic carbonate. When the solution of this salt was mixed with a solution of aniline nitrate and potassium nitrite, a deep red precipitate was at once formed, of remarkable coloring power, but still impure. It was dissolved in ammonia, when a resinous mass remained undissolved. A purer substance was precipitated by acids; and after re-crystallizing several times from a boiling mixture of hydrochloric acid and alcohol, it was obtained in the same fine hair-like needles which were obtained from the commercial product.

Underground Telegraph Wires in England.

A considerable mileage of overground telegraph in the United Kingdom has been replaced by underground wires during the past year. At the time of the transfer of the telegraphs to the Post Office the total length of underground

**SELF-FEEDING DRILL.**

wire in existence was a trifle under 2,000 miles. On the 31st of March last it had been increased to a trifle over 8,000 miles, being more than four times as much in 1877 as in 1870. A considerable proportion of the increase in the mileage of buried telegraphs during the year has been in London alone. The aerial system was fraught with danger to life and property in the neighborhood of the wires. Under the new arrangement the telegraphic system generally will be less liable to interruption when the frosts and snows of winter set in.

A NEW FLOATING OIL BURNER.

The annexed engraving represents a new floating oil burner for night or other lights in which a long wick may be used. It consists of a cup-shaped float, having a convex top. A tube passes through the float, extending both above and below it. The lower end of the said tube is loaded to



maintain it in a vertical position. A slot is cut in the side of the wick tube, near its upper end, to receive the edge of a serrated wheel, by which the wick is raised or lowered. A curved handle is attached to the top of the float, for convenience in handling the burner. A ball is placed in the float which may be shifted so as to counterbalance the heavier side and cause the float to set evenly in the oil in which it is placed. The float is airtight and formed of thin sheet metal, and hence does not become oil-soaked.

This invention was patented through the Scientific American Patent Agency, September 18, 1877, by Mr. Oscar Tamagno, of New York city.

Mountain and Balloon Ascents.

In our number for August 9, we briefly noticed the ascent made by Mons. Wiener, of the mountain Illimani, one of the highest—if not the highest—of the Bolivian Andes, which forms a noble object from the city of La Paz, and was formerly reputed (by Mr. Pentland) to have an altitude of no less than 24,200 feet. Mr. Wiener, however, makes its height only 20,112 feet, while Mr. Minchin, as we have already observed, places its altitude at 21,224 feet. If the latter estimate be correct, Mons. Wiener has, we believe, not only made the highest ascent which has been made in the Andes, but has attained a greater altitude than has been reached on the earth out of Asia, and in Asia has only been beaten by Mr. Johnson, who some years ago got to a height of 22,300 feet in Cashmere. As the recorded ascents to the height of 21,000 feet are extremely few, we shall be glad to hear further particulars respecting Mons. Wiener's exploit, and more especially whether he experienced much exhaustion through the rarefaction of the air. Practised mountaineers who have climbed to a height of 17,000 to 18,000 feet have been of opinion that even at such altitudes there is a very important and perceptible diminution of the bodily powers, and think it probable that the height of 25,000 or 26,000 feet will be found to be about the limit which will ever be reached on foot. As a set-off to this opinion we may mention the facts that hunters in the Himalayas frequently pursue their game at heights exceeding 20,000 feet without experiencing any notable inconvenience from the low barometric pressure; and that natives living on the base of Demavend, near Teheran, often ascend to its summit to gather sulphur from its crater without any great difficulty. The height of this mountain, there is reason to believe, also exceeds 20,000 feet, although it has never been accurately determined. If, therefore, severe work can be done with impunity at such elevations, it seems not unreasonable to suppose that much greater heights might be attained by men who had previously accustomed themselves to life at high altitudes. Aeronauts, anyhow, have