proved that life can exist at 30,000 feet above the level of the sea, and that at 25,000 feet, and upwards, one may positively be comfortable if sufficiently warmly clad. That such is the case is sufficiently remarkable, for "travelers in the air" have to sustain incomparably more rapid variations of pressure and temperature than mountain climbers. Mr. Glaisher, on his memorable ascent on September 5, 1862, left the earth at 1 P.M., and in less than an hour shot up to a height of 30,000 feet. At starting the temperature of the air was 59°, and at its greatest altitude it was 61° lower! Mountaineers experience no such extreme variations as these. They rarely ascend more rapidly than 1,000 feet per hour, never so much as 15,000 feet in a day, and become to some extent acclimatized as they progress upwards. On the whole we are inclined to think that man will not rest until he has at least attempted to reach the loftiest summits on the earth, though we will venture to assert that it will be long before any one crushes down the snow on the summit of Mount Everest.—*Nature.*

Some Experiments with Diamonds.

It is not everyone who has an opportunity to conduct a series of experiments upon diamonds of various kinds, and we hope our readers will be interested in the results of Von Baumhauer.

Diamonds are not found exclusively in the form of more or less perfect, colorless or slightly colored, crystals. In washing diamondiferous sand there are frequently found rounded, and sometimes angular, masses, which are brilliant black on the surface, but when broken are dull and of a gray or violet color. These are known in the trade under the name of "carbonado," or "carbons." Under the magnifying glass they exhibit a great number of pores, and, if heated in water, give off a great many air bubbles. Although these carbons differ greatly from the real crystallized diamonds, yet E. H. Von Baumhauer found by examining a large number of carbons and diamonds, that there is an unbroken series of intermediate conditions between the carbon and diamond. It is remarkable that the carbon, which frequently accompanies the diamond in Brazil, has not been found in the diamond fields at the Cape.

Besides these two modifications of the diamond there is still a third, which is known to the dealers in stones as "bord." They consist of translucent, but not transparent, colorless or grayish spheroids, from which small octahedra can be split out, which are much harder than the well crystallized diamond, but are inferior to the "carbon" in this respect. Von Baumhauer determined the specific gravity of 17 different varieties, and his table of results shows that the highest specific gravity of 3·5225 to 3·5197 belongs to the purest diamond, that the "bord" comes next, being not much over 3·50, while the carbon has a considerably lower specific gravity, 3·3493 to 3·1552, probably because it is porous. The colorless diamond can be heated to a white heat in dry hydrogen gas, by excluding the air, without showing any change. Colored diamonds, on the contrary, change their color when ignited; a dirty green became pale yellow, a dark green turned to violet, the brown diamonds lost the greater part of their color, while the yellow remained unchanged. A colorless diamond acquired an intense rose color in consequence of being heated, and retained the color a long time in the dark, but soon lost it in the light.

If diamonds are heated by access of air, they become dull and opaque on the surface, they burn with loss of weight, but retain their transparency within. In oxygen the diamond comes to a lively glow, and burns with dazzling light long before the platinum crucible gets red hot. Small diamonds burn completely up after the lamp has been removed from under the crucible, while in larger ones the heat of combustion is not sufficient to support any farther combustion.

Although Von Baumhauer repeated these experiments several times, he never saw anything more than a quiet burning with dullness and cloudiness of the surface; a sight of blackening, conversion into coke, change of its state of aggregation, swelling up, fusion or softening, rounding of the corners or edges, was never vouchsafed to him.

By combustion of the diamond, it is perfectly established that the diamond is surrounded by a small flame whose exterior color is a bluish violet. When heated in superheated steam the diamond does not change at all, even for 10 minutes. The temperature employed was, however, only a moderate one. Heated to whiteness in an atmosphere of dry carbonic acid, the diamond became dull on the surface and lost in weight; hence it must have decomposed the carbonic acid and united with its oxygen.

[It is very rare that an element is able to drive out another atom of its own kind from a compound and take its place. The atomic condition of carbon in the diamond seems to differ from that in its compounds from its greater condensation, but it has not hitherto been considered to be in a very active state. Is the diamond perhaps when highly heated a kind of ozone carbon?—TRANSLATOR.]

Deep Mining.

Connection has been made between the Gould and Curry mine on the 1,900 level and the joint winze on the Savage line. This gives a fine circulation of air at that depth, the draft being southward through the Curry and up through the joint winze. It is a very important connection, as it opens up in the Curry mine for cross-cutting and prospecting 460 feet of new ground. Before this connection was made the drift was fearfully hot, the heat at the face being 126° Fah.

The benefit derived from such a connection is not instantaneous; on the contrary, when the opening is first made the miners get out of the place as soon as possible, as the heat and smell are such as to be unendurable, and frequently produce asphyxiation. It is the same air that the men breathe before an opening is made, but when it is set in rapid motion it appears to acquire some new and noxious quality. But for this the miners might drill ahead a great number of feet when drifts are being run to make such connections. A drill hole so run, however, would so sicken the men that they would be unable to work. When a connection is made it is desirable, therefore, to knock out as large a hole as possible with the last blast, then let the men employed retire for some hours until the foul air shall have passed out of the drift and level.—*Virginia City (Nev.) Enterprise, October 9.*

Fig. 1.—THE RAMIE PLANT.

THE RAMIE PLANT AND ITS UTILIZATION.

In our editorial columns will be found the particulars of the recent offer by the British Government of large rewards to the successful inventors of a machine capable of preparing the fiber of the ramie plant for textile uses. In the following article we propose to explain what the plant is, and to summarize what has hitherto been done towards its utilization.

Ramie is the Indian name for the plant producing the fiber called China grass. It belongs to the *urticaceæ*, or nettle family, and is nearly related to the true nettles. It is found either in a wild or cultivated state throughout the greater part of tropical and eastern Asia. In 1867 it was introduced into this country from Mexico, and its cultivation has since been carried on chiefly in Louisiana, with but partial success. The plant itself is perennial and somewhat shrubby, growing to a height of about four feet. Its character is well shown in the annexed engraving, Fig. 1. Numerous stems, each about as thick as a man's little finger, bear opposite pointed serrate leaves, each 6 inches long by 4 inches broad, on long hairy petioles. There are two principal types of the plant bearing the specific names *nivea* and *tenacissima*; both are utilizable, but the latter is much the better for industrial purposes. The first has leaves green on one side and silvery on the other, and yields a fiber which is greenish, stiff, and brittle. The other is the true ramie, or East Indian rhea, and it is for the utilization of this variety that the reward is offered. The useful portion is the fiber of the inner bark, which must be bleached and picked apart into threads. The Chinese have for centuries accomplished this by hand, skinning the stalk and cleaning off the outer bark with a knife. This is exceedingly slow, as one man can produce but from one to two pounds per day of marketable raw product, which should be in the form of clear ribbons of a light yellow color. This is ungummed and bleached, dressed, and combed smoothly, and becomes a strong and brilliant staple now used for the manufacture of "Japan silk," "Canton goods," "grass cloth," "Nankin linen," and similar goods.

The nature of this fiber has been microscopically and otherwise investigated by Dr. Ozanam with the following results. Under a magnifying power of 80 diameters he finds: (1.) The fiber of ramie is, so to speak, of any length, as it has been traced throughout a length of nearly 10 inches on the field of the microscope, without any break being found in it, whether it be constituted of a continuous cellula, or whether the different cellulas which succeed each other have lost their points of separation by reason of a more intimate fusion, one with the other. Hence the ramie fiber possesses great strength. (2.) Taking the ramie fiber as a unit in comparison with other fibers, the following relative results were obtained:

	Thickness.	Traction.	Elasticity.	Twist.
Ramie....	1	1	1	1
Flax......	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{2}{3}$	$\frac{4}{5}$
Hemp....	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{19}{20}$
Cotton....	$\frac{1}{3}$	$\frac{1}{3}$	1	1
Silk... ...	$\frac{1}{4}$	$\frac{1}{6}$	4	6

Thus the fiber of the ramie is longer and more uniform than all the others, except that of silk. It is stronger, offers greater resistance to traction and to torsion, and is more elastic than hemp or flax, and even than cotton, which is more flexible in twisting. Ramie in these respects only yields the palm to silk. To these advantages are to be added the sparkling whiteness and brilliant luster of the fiber, the easy cultivation of the plant, and its rapid reproduction and excessive multiplication. It yields three crops yearly and as many as 500 pounds of fiber to the acre. This last varies with the density of growth, a plantation with regular thick stands producing the above maximum. A mowing machine with thick short blades suffices to gather the plants, which are gathered in sheaves like wheat and are left in stacks. After a few days the leaves wither and fall under the handling and shaking they undergo while they are being carried to the machine. The plant should be cut from eight to fifteen days, according as the weather is dry or damp, before it is decorticated.

Persons familiar with the treatment of textiles know the impossibility of cleaning thoroughly any fiber, dried or green, by the continuous action of machinery. Either with drums or beaters the cleaning instruments cannot turn out the filaments without a certain amount of chaff and other refuse entangled in the fiber. All ex

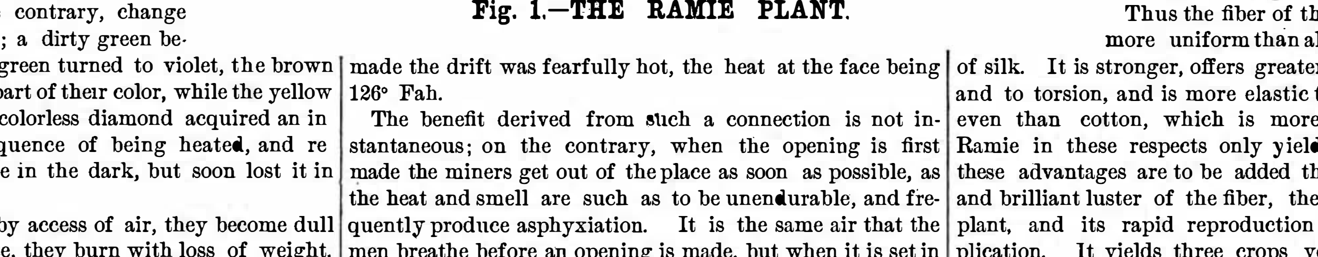

Fig. 2.—COLEMAN'S MACHINE FOR PREPARING RAMIE.

periments on this point have failed and proved the insuperable difficulty of expelling, by continuity of friction, all the particles of pith that have penetrated into the fiber. It is only through a scraping process, acting in a backward and forward direction, that a perfect cleaning can be obtained.

In a pamphlet entitled "The Culture and Manufacture of Ramie and Jute," Mr. Emile Lefranc, who has extensively studied into this subject, states that the true principle to be adhered to in a ramie-cleaning machine is as follows: "Revolving cleaners, provided with a peculiar sort of knives, receive gradually, by means of a circular carrier, bunches of stems, which are doubled down and hooked in the middle. The carrier withdraws them from the rotary action of the cleaners and delivers them in the form of clear yellow ribbons." The yield of the machine will be in proportion to its size and power. The cleaning is incessant if the machine

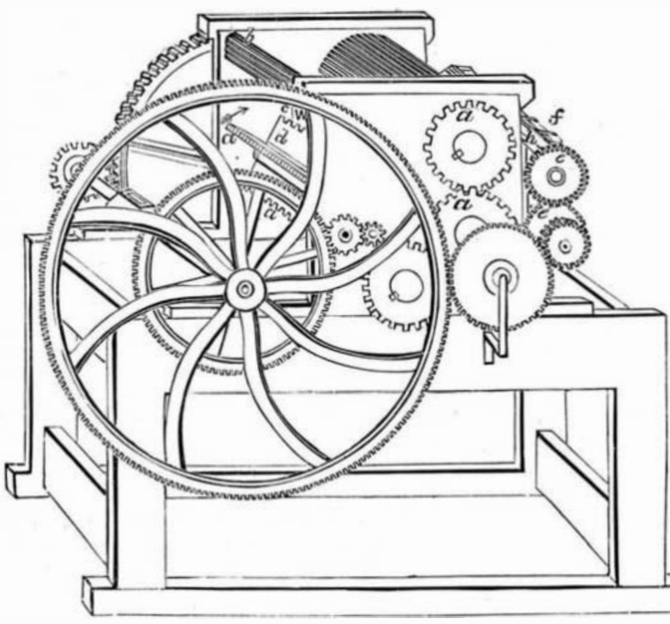

Fig. 3.—LEFRANC AND NAGOUA'S MACHINE.

is fed constantly by a quick handling. This principle, the same authority goes on to explain, offers the facility of such an expansion that the apparatus can be made large enough to clean one ton of fiber per day with a twenty horse motive power. It is not only to ramie, but also to jute, flax, hemp, and all strong textiles, in green plants, that this new machine can be successfully applied. It is demonstrated by theory and practice that the textiles extracted in a green state retain all the natural qualities of strength and color, which lose always 50 per cent by the ordinary process of rotting in stalks. The avoiding of that loss is one of the great advantages of the machine, besides the economy in labor. Now comes the disintegration of the decorticated fiber.

The yellowish ribbons produced from the plant engaged in the machine are the crude fibers. Albumen keeps them undivided, but being dried in the shade they acquire in that state a marketable value, which will double and triple by subjecting the filament to the bleaching treatment. The best method is that of Berthollet, which has been the most extensively used. It consists in first steeping the fibers or vegetable tissues in boiling water, and then in rinsing them in a copious supply of water in order to disengage them from soluble matter. When the water has entirely dropped off they are plunged into a bath of alkaline lye, which is raised to the boiling point; they are then immersed in a solution of hypochlorite of lime or an alkaline hypochlorite. The tissues are washed in a copious supply of water, and then immersed in water acidulated by sulphuric acid; washed with soap and water; then rinsed in water and dried. Now, much labor is spared by bringing the chlorite into immediate contact with the fibers washed in hot water and still damp, or by plunging them into a bath saturated with chlorate.

Some machines for preparing ramie have already been patented in this country. Fig. 2 represents the invention of Mr. C. C. Coleman, of Honolulu, Sandwich Islands, which the inventor claims will clean the fiber at a cost of $20 to $30 per ton.

The plant, freshly cut at its full ripe stage, is passed through a series of rollers, being carried along by moving wire screens. It dips into tanks filled with steam, hot water, and bleaching chemicals.

The rollers crush the plant and squeeze out the glutinous matter, which is absorbed by the water and steam. The mass is passed through the machine as often as may be necessary to dissolve and remove all the extraneous gum and other elements and to bleach the fiber itself. After each submersion it is passed through rollers, which squeeze out the water with the matter it has absorbed from the plant. It is not even necessary to remove the leaves, as they are separated by the machinery. The fiber is said to be not broken or even weakened by the process. This is an immense reduction of labor from the manual process of India and China, where a workman does well if he secures a pound and a half of clean fiber per day, making it cost about $150 per ton.

In Figs. 3 and 4 we illustrate an improved machine for treating ramie and other textile plants, devised by Messrs. Emile Lefranc and Joseph Nagoua, of New Orleans, La., and patented August 23, 1870, which embodies the construction advocated, as already stated by Mr. Lefranc.

Fig. 3 is a perspective longitudinal, and Fig. 4 an end, view of the machine. *a a'* and *b b'* are crushing and feeding rollers, having their peripheries grooved correspondingly, as shown. *c* is a toothed support for the plant while moving into the rollers, *a a'*, and *d*, revolving beaters. *e e'* are cylinders, furnished with a series of knives, *f*, which said knives may be either spiral, curved, or elliptical in form, cushioned by a rubber or other elastic surface, *h*, adapted, as shown, to the periphery of the cylinders, *e e'*. The motive power is applied to the axis, *g*.

The operation is as follows: The ramie, or other plant, is first fed between the rollers, *b b'*, from whence it passes between the rollers, *a a'*, and thence between the knives, *f*, of the cylinders, *e e'*. The speed of the surface of the rollers, *a a'*, is a little slower than that of the rollers, *b b'*, better to avoid the tension of the plant, which might break the fibers; but the speed of the cylinders, *e e'*, is much higher than that of the rollers, *a a'*, in order that, when the plant is crushed, the knives, *f*, should strip off the bark and the pith of the stalk, leaving only the fibers in a ribbon-like state; while rollers, *a a'*, revolving comparatively slow, hold firmly the same, and deliver between the knives, *f*, as gradually as the necessity may show.

It is obvious that there would be left uncleaned one end of the plant, equal in length to the distance between the centers of the rollers, *a a'*, and cylinders, *e e'*, because, as soon as the rear end of the plant is past the crushers, *a a'*, the cylinders, *e e'*, instead of stripping the plant, would simply roll it out. To avoid this, revolving toothed beaters, *d*, and a toothed support, *c*, are employed.

The plant is crushed first, by the rollers, *b b'*, and, secondly, by the rollers, *a a'*, and while the forward part of the plant reaches the latter, the rear end of the plant, when past the former, falls on and between the arms of the beaters, *d*, which, revolving at a high velocity in the direction of the arrow shown in the drawing, bend and divide the plant over the toothed support, *c*, and, jointly with it, strips the bark and the pith off the end of the plant before it reaches the crushers, *a a'*, so that the plant, after passing through the machine, is cleaned from end to end, the fiber alone being left.

Fig. 5 represents a machine for the same purpose patented May 2, 1871, by M. Adolph Bouchard, of New Orleans, La. The plant is placed upon the table, F, and introduced by the lower end of the stalk through the rollers,

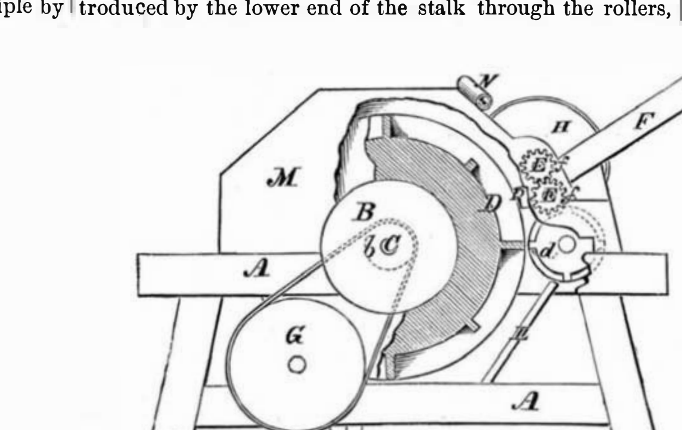

Fig. 5.—BOUCHARD'S MACHINE.

E E, and then the machine is set in motion, the supply being maintained. The small drum, *d d*, does the decortication, the pipe, N, supplies the water, which will partially macerate the plant, and then the mass is projected by the lever, P, toward the drum, D, which, in its revolutions, will totally disintegrate it and pass it through the rollers placed below, fibrated, filamented, and deprived of all its gummy and glutinous substance.

Prize Method of Preparing Plaster Casts that can be Washed.

The prize offered by the Prussian Minister of Commerce and Industry for a method of preparing plaster casts that permit of being washed was conferred upon Dr. W. Reissig of Darmstadt. From Dr. Reissig's essay on the subject we abstract the following points:

In preparing these casts it was not only desirable to obtain a surface which should not wash away, but also to include a simple process for preventing dust entering the pores and render them more easily cleansed. Laborious experiments convinced this gentleman that the only practical method of accomplishing this and retaining the sharpness of outline was to convert the sulphate of lime into

1. Sulphate of baryta and caustic or carbonate of lime, or

2. Into silicate of lime by means of silicate of potash.

Objects treated in this way are not affected by hot water or hot soap solutions, but, from the method of preparation, they remain porous, catch dust, etc., and when first put into water eagerly absorb all the impurities. To avoid this evil, he subsequently coats the articles, now rendered water proof, with an alcoholic soap solution, which penetrates more easily, deeper, and more freely into the pores than an aqueous solution. After the alcohol evaporates a layer of soap remains which fills the pores, and when washed it is

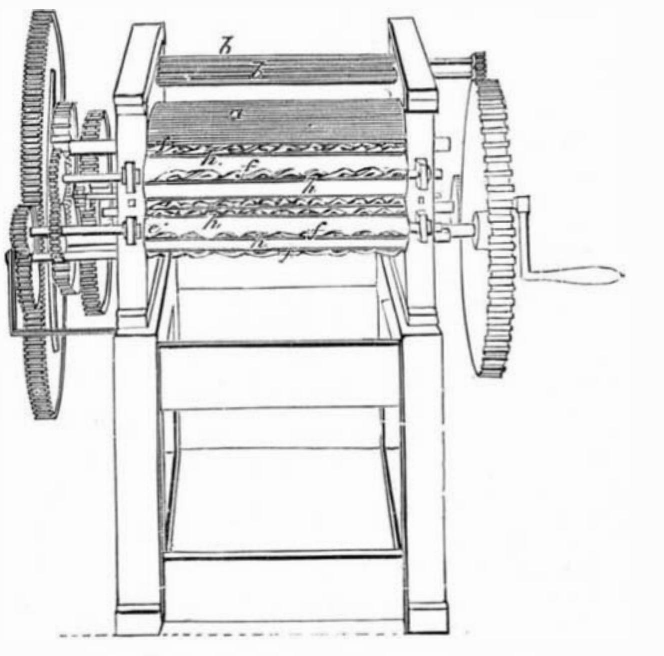

Fig. 4.—LEFRANC AND NAGOUA'S MACHINE.

converted into a suds which easily removes the dust without allowing it to penetrate.

1. Process with baryta water. This is the simplest, easiest, and cheapest method. It depends upon the fact that gypsum, or sulphate of lime, is converted by baryta water into sulphate of baryta (which is totally insoluble), and caustic lime which is converted by contact with the air into carbonate of lime. The practical method of carrying this out is as follows: A large zinc vessel is required with a tight-fitting cover. In each vessel is a grating made of strips of zinc, resting on feet 1¼ inch high. This vessel is two thirds filled with soft water at 54° to 77° Fah., and to every 25 gallons of water is added 8 lbs. of fused or 14 lbs. of crystallized, pure hydrated oxide of barium, also 0·6 lbs. of lime previously slaked in water. The solution stands about 4° Beck. As soon as the baryta water gets clear it is ready to receive the casts. They are wrapped in suitable places with cords, and after removing the scum from the baryta bath are dipped in as rapidly as possible, face first, and then allowed to rest upon the grating.

Hollow casts are first saturated by rapid motions, then filled with the solution and suspended in the bath with the open part upwards. After the cords are all secured above the surface of the liquid, the zinc vessel is covered. The casts are left in it from 1 to 10 or more days according to the thickness of the waterproof strata required. After taking off the cover and removing the scum, the plaster casts are drawn up by the strings, rinsed off with lime water, allowed to drain, carefully wiped with white cotton or linen rags, and left to dry, without being touched by the hands, in a warm place free from dust. The same solution which has been used once can be used again by adding a little more barta and lime.

Of course this process can only be applied to casts free from dust, smoke, dirt, colored particles of water, rosin and varnish, soap, animal glue from the moulds, or sweat from the hands. To prevent the casts getting dust upon them, they should be wrapped in paper when taken from the mould and dried by artificial heat below 212° Fah. If in spite of every precaution the casts when finished show single yellow spots, they can be removed in this manner: The perfectly dry, barytated casts saturated with carbonic acid are painted over with water and oil of turpentine, then put in a glass case and exposed to the direct rays of the sun. All spots of an organic nature will then disappear; but, of course, rust, smoke and mineral spots cannot be removed in this way.

In the place of cold baryta water the casts may be placed for half an hour in a concentrated solution of baryta heated to 104° to 122° Fah. This has the advantage that casts may be put in before drying. As the casts treated in this way are not hardened very deeply and are still porous, it is well to place them subsequently in a cold bath for a longer time.

The casts are now ready, as soon as perfectly dry, for the soap solution. For cheapness he selects a pure, good, hard soap, shaves it up, dries it and dissolves it in 50 or 60 per cent alcohol; 10 or 12 parts of alcohol to one of soap. Such a solution of Marseilles soap, known as "spiritus saponatus," can be had at any drug store. The finest appearance, as well as a high degree of durability, is obtained by the use of a solution of stearate of soda in strong alcohol. Both the solution and cast should be warm so that it may penetrate as perfectly and deeply as possible. It is no harm to repeat the operation several times, as long as the liquid is absorbed by the cast. When dry the cast is finished.

2. Process with silicate of potash solution. This process depends upon the conversion of the sulphate of lime into silicate of lime, an extremely hard, durable, insoluble compound, and is accomplished by the use of a dilute solution of silicate of potash containing free potash. To prepare this solution he first makes a 10 per cent solution of caustic potash in water, heats to boiling in a suitable vessel, and then adds pure silicic acid (free from iron) as long as it continues to dissolve. On standing, the cold solution usually throws down some highly silicated potash and alumina. It is left in well stoppered glass vessels to settle. Just before using it is well to throw in a few bits of pure potash or to add 1 or 2 per cent of the potash solution. If the plaster articles are very bulky, this solution can be diluted to one half with pure water.

The casts are silicated by dipping them (cold) for a few minutes into the solution, or applying the solution by means of a well cleaned sponge, or throwing it upon them as a fine spray. When the chemical reaction, which takes place almost instantly, is finished, the excess of the solution is best removed with some warm soap water or a warm solution of stearin soap, and this finally removed with still warmer, pure water.

The casts which can be immersed or easily moved around may be treated as above when warm; a very short time is required, but some experience is necessary. In every case it is easy to tell when the change is effected from the smooth dense appearance and by its feeling when scratched with the finger nail. It is not advisable to leave them too long in the potash solution, as it may injure them. A little practice renders it easy to hit the right point. The fresher and purer the gypsum and the more porous the cast, the more necessary it is to work fast. Castings made with old and poor plaster of Paris are useless for silicating. These silicated casts are treated with soap as above.

In washing plaster casts prepared by either method, the author recommends the use of a clean soft sponge, carefully freed from all adherent sand and limestone, wet with lukewarm water and well soaped. They are afterwards washed with clean water. They cannot, of course, be washed until thoroughly dry and saturated with carbonic acid. The addition of some oil of turpentine to the soap is useful, as it bleaches the casts on standing. The use of hot or boiling soapsuds must be avoided.—*Industrie Blatter.*

ASTRONOMICAL NOTES.

OBSERVATORY OF VASSAR COLLEGE.

Position of Planets for November, 1877.

Mercury.

Mercury may possibly be seen early in November, as it rises on the 1st at 5h. 57m. A.M., at a point several degrees north of that at which the sun rises. It cannot be seen after the first few days. On November 30 it rises at 8h. 6m. A.M., and sets at 4h. 52m. P.M.

Venus.

On November 1 Venus rises at 10h. 27m. A.M., and sets at 7h. 3m. P.M. On the 30th, Venus rises at 10h. 46m. A.M., and sets at 7h. 42m. P.M. It keeps nearly the same diurnal path through the month, increasing some in brilliancy.

Mars.

Although Mars is farther and farther from us, it will be very brilliant through the November evenings, as it has higher declination and comes to the meridian between 7 and 8 P.M.

On November 1 Mars rises at 2h. 47m. P.M., and sets at 1h. 44m. the next day. On the 30th, Mars rises at 1h. 13m. P.M., and sets at 12h. 54m. the next morning. Mars is moving rapidly toward the east, among the stars, and Saturn's apparent motion is toward the west; they are therefore approaching rapidly. According to the *Nautical Almanac* they will be in conjunction November 3 at midnight, Mars being the higher in altitude.

Jupiter.

Jupiter can be seen in the southwest. It rises on November 1 at 10h. 51m., and sets at 7h. 49m. P.M. On November 30, Jupiter rises at 9h. 22m. A.M., and sets at 6h. 21m. P.M.

Saturn.

On November 1 Saturn rises at 2h. 48m. P.M., and sets at 1h. 48m. of the next morning. On November 30, Saturn rises at 0h. 54m. P.M., and sets at 11h. 54m. P.M.

Saturn and Mars will be very nearly together on November 3, at midnight; they will diverge rapidly, as Mars rises higher in the sky and passes to the east of Saturn. Saturn is the most interesting planet at the present time; the ring which surrounds it seems exceedingly narrow, as the sunlight strikes almost in its plane. Through a good telescope the ring seems almost like a belt, running across the ball of Saturn and extending beyond the sphere on each side.

Saturn has eight satellites. A large telescope will show many of them lying around the planet, some at the distance of several times its diameter, and some skirting along the edge of the ring. On October 13 one of these moons was seen to pass across another, so that the two were seen as one for a few minutes. Saturn is so far off that few of these satellites can be seen with an ordinary glass; but Titan, the largest, can be found with a telescope whose object glass is two or three inches.

Uranus.

On November 1 Uranus rises at 0h. 36m. A.M., and sets at 2h. 8m. P.M. On November 30, Uranus rises at 10h. 41m. P.M., and sets at 11m. after noon of the next day. It has passed to the east of Regulus and a little below it in altitude.

Solubility of Sulphur in Acetic Acid.

Liebermann ("Wien. Anz.") finds that sulphur is soluble to no inconsiderable degree in warm concentrated acetic acid, and that a trace is taken up even by the dilute acid. If the concentrated solution be diluted with water, much of the sulphur separates as milk of sulphur; if it be evaporated with the Sprengel pump, fine long prisms of sulphur separate; when cooled, moreover, the liquid deposits sulphur in a crystalline form. All modifications of the element appear to be taken up by acetic acid. The author refers to analytical methods where these changes occur, and are apt to mislead the operator.

Inventions Patented in England by Americans.

From September 18 to October 5, inclusive.

COMPRESSED AIR.—T. F. Rowland, Brooklyn, N. Y.
ERASERS.—A. S. Mills, Brooklyn, N. Y.
FIRE ARMS.—E. Remington & Sons, Ilion, N. Y.
LOCKS.—M. A. Dalton, Cincinnati, O.
LOOM.—B. J. Stowe, New York city.
MATCHES.—E. B. Beecher, Westville, Conn.
PAPER CUTTING, ETC.—G. L. Jaeger, New York city.
PAPER FASTENERS.—P. H. Sweet, Washington, D. C.
PESSARIES.—W. H. W. Campbell, Norwich, Conn.
POSTAGE STAMPS, ETC.—J. Sangster *et al.*, Buffalo, N. Y.
PRINTING PRESSES.—T. S. Bowman, St. Louis, Mo.
PULP MACHINE.—A. H. Elliott, New York city.
RAILWAY CROSSINGS, ETC.—J. S. Williams (of Riverton, N. J.), London, England.
TREATING BLOOD.—W. L. Palmer, New York city.
WATER CLOSETS, ETC.—J. E. Folk, Brooklyn, N. Y.
WINDOW SHUTTERS, ETC.—A. Bijar, New York city.
WOOD SCREWS.—A. L. R. Monson, New York city.

Recent American and Foreign Patents.

Notice to Patentees.

Inventors who are desirous of disposing of their patents would find it greatly to their advantage to have them illustrated in the SCIENTIFIC AMERICAN. We are prepared to get up first-class WOOD ENGRAVINGS of inventions of merit, and publish them in the SCIENTIFIC AMERICAN on very reasonable terms.

We shall be pleased to make estimates as to cost of engravings on receipt of photographs, sketches, or copies of patents. After publication, the cuts become the property of the person ordering them, and will be found of value for circulars and for publication in other papers.

NEW MISCELLANEOUS INVENTIONS.

IMPROVED COMPOSITION FOR PAVING BLOCKS.

James S. Wetnered, New York city.—This invention relates to a compound for paving blocks and other purposes, and it consists in a composition formed by mixing pulverized slag with asphaltum and heavy petroleum or other non-drying oils. The inventor says: In carrying out my invention I take 17 parts of asphaltum (Trinidad preferred) and subject it to a slow heat until it becomes liquid. I then add 3 parts of heavy petroleum or other fixed oil, and thoroughly mix them together, and while this mixture is still hot I add 80 parts of broken, granulated, or pulverized iron or other slag, or its equivalent, which has been previously heated. I then, by aid of suitable machinery, thoroughly incorporate the ingredients while in the heated state, and form the composition into blocks, which I subject to heavy pressure in molds. I do not confine myself to the exact proportions herein stated, as the proportion of oil may be varied to suit the quality of the asphaltum, the oil being one of the most essential ingredients, as it renders the block elastic and durable.

IMPROVED SAP SPOUT.

Francis E. Lord, Readsborough, Vt.—This invention relates to a sap spout for maple and other trees, by which the sap is taken up in superior manner, and the bucket suspended therefrom without the use of nails or other iron material, which is injurious to the tree. The invention consists of a centrally perforated spout, whose end that is driven into the tree is made longer and provided with a rim, and annularly recessed and perforated or mortised to take up the sap. The outside of the spout is provided with side recesses for attaching a hanger or hook, from which the pail or other vessel is suspended. The connection of the spout and hanger or hook dispenses with the iron spouts and nails, which are so injurious to the trees.

IMPROVED METHOD OF PURIFYING RAW ANIMAL FAT.

Isaac Mayer, New York city.—The object of this invention is to furnish a superior machine tallow, by a quick, cheap, and convenient process, from raw animal fat without the use of special machinery; and it consists of treating the raw fat with diluted nitric acid, then boiling the fat, and finally separating the tallow from the heavier fibers by cooling. The raw animal fat is first cut up in small slices or blocks of about one inch in size, and then treated in a wooden vessel with diluted nitric acid of about 2° Baumé. The acid has to cover entirely the fat, and is allowed to remain in the vessel for from thirty to forty-eight hours or more, the liquid being then poured off, and the so-prepared fat exposed to boiling in an iron vessel for from fifteen to thirty minutes, the fat being stirred up from time to time to prevent the burning of the fibrous and tendonous parts. The fat is then removed and allowed to cool under addition of water, the fibrous parts settling on the bottom of the cooling vessel, while the tallow is obtained at the top, and readily drawn off or removed. The fibrous sediments form a valuable food for pigs, while the tallow is of clear and superior nature, and obtained in a cheap and convenient manner, without the use of expensive presses, etc., and without producing any obnoxious odors.

IMPROVED MEAT BLOCK.

Newton Wells, Painsville, O.—This invention consists of a meat block having a roughened plate detachably applied thereto, so that it can be used for tendering meat, and by removing said plate the block is left with a plain or flat surface, upon which meat may be cut or dressed. The block is provided with a cover to protect it from flies and dirt. The block is designed for use in families for chopping, pounding, or tendering meat. It is also provided with an attachment consisting of a plate of iron of suitable thickness, the upper surface of which is roughened or provided with pyramidal projections, and upon the lower side of which lugs are formed that project over the edge of the block for retaining the plate in position. Meat may be tendered upon this plate by means of an ordinary plain mallet. The block is so small that it is easily moved from place to place, and may be washed without difficulty.

IMPROVED TRANSFERABLE BARREL COVER.

Sylvester W. Sheldon and Daniel Dunscomb, New York city.—This invention consists in the combination of an adjustable fastening device with a barrel cover that is made in two parts and hinged together. The cover is attached to a barrel by placing it upon a barrel with brackets or fasteners outside and the block inside of the rim of the barrel, and forcing the block outward by turning the thumb screw until the edge of the barrel is firmly clamped between the brackets and the block.

IMPROVED COFFEE ROASTER.

John H. Bankston, Pulaski, Tenn., assignor to himself and T. J. Wells, of same place.—This invention relates to an improved device for roasting coffee, baking bread, meat, cakes, and other articles in perfect manner by the radiated heat of an open fireplace, so as to utilize the heat in convenient and economical manner; and the invention consists of a conical reflector with fixed cap or apex, being supported in suitable manner, with the open base or mouth toward the fire, and provided with flanges and supports for the baking pans, roasting cylinder, etc. The device is used by placing either the roasting cylinder or baking pan in position in the reflector, and then placing the reflector before the fire. The roasting cylinder is then slowly turned by the crank or handle of the cylinder shaft, the roasting being accomplished by the heat of the radiated and reflected rays of the open fire. The bread, cakes, meat, etc., are baked in the same manner by placing the mouth of the reflector at proper distance from the fire, the same being readily moved by a top handle.

IMPROVED METHOD OF SETTING ARTIFICIAL GEMS.

Henry Pic and Maurice Nelson, Paris, France, assignors to Veit & Nelson, New York city.—The object of this invention is to substitute for the soldering and gluing or cementing on of glass, enamel, or other imitation stones on their metallic mountings, an improved method of setting the stones in articles of jewelry for mourning or fancy purposes, by which the breaking off of the stones from the metallic parts is prevented, and a more durable and neater style of such articles obtained. The invention is intended to overcome the objections to the methods heretofore employed, and consists of glass and enamel melted on stems, which are riveted, screwed, soldered, or otherwise affixed to the perforated metallic mountings. The stones are thereby firmly connected to the metal parts without any danger of breaking off and marring the appearance and effect of such articles. A substantial and durable class of ornamental jewelry is thus furnished, which gives thereby greater satisfaction, and may be used for a large number of different applications.

IMPROVED MAINSPRING ATTACHMENT FOR WATCH BARRELS.

Edwin H. Flint, Cincinnati, O.—The winding of the watch is effected by turning the arbor, which carries the outer end of the spring around, and coils the inner end of the spring around the boss of the barrel wheel. The advantages claimed for this improved watch are that it is perfectly dust proof, it does away with the usual retaining mechanism, and obviates injury to the watch in case the spring breaks.

IMPROVED LAMP BRACKET.

Thomas J. Jury, Spencer, Ind.—This invention has for its object the combination, with a sectional jointed bracket and clamp, of a rotary spool stand and a lamp holder. The bracket is composed of sections jointed together, so that they will articulate freely, and can be extended or contracted at will. A clamp is applied for the purpose of fastening the bracket to the edge of a table. The spool stand is free to rotate on a post that is secured to the section, and into the upper side of which stands are fixed a number of pins, intended to receive spools of thread and allow the spools to rotate freely while the thread is being unwound from them. The lamp is held in its place on a shelf by means of fixed lugs and a movable lug, which latter is confined by means of a clamp screw, and allows the lamp to be removed from the shelf.

IMPROVED FAUCET.

William S. Lempert, Fort Davis, Tex.—The object of this invention is to furnish an improved faucet, which shall be so constructed that it will not be liable to be injured by being screwed into and out of the cask, which will not be liable to leak, which will have the button of the valve stem protected from accidental injury, and shall be simple in construction and easily operated. The invention consists in the combination of the inner part provided with the square or octagonal flange, the outer part provided with the valve seat, the spring chamber, the channel, and the nozzle, the cup or flange, the valve, valve stem, and button, and the spiral spring. This faucet can never be left open by carelessness, accident, or manipulations of children, as the moment the pressure is taken from the button it closes itself securely.

IMPROVED SMOKE-EXCLUDING MASK.

George Neally, New York city, assignor to himself and Charles W. Bloomingdale, of same place.—A great many persons perish by being suffocated by the smoke and gases in attempting to escape from burning buildings, while also a large quantity of valuable property is destroyed by the inability of the firemen to determine the location of a fire on account of the smoke, so that it gains such headway that it is impossible to check it before a great deal of damage has been occasioned by throwing the water in localities where the fire does not really exist. The invention consists of a novel combined mask and cap, of suitable elastic material, that fits tightly to the head, and whose mouth and nose are connected, by a mouthpiece and one or more tubes with suitable filters containing moistening sponges, which filters are again connected, by one or more tubes, with an elastic water receptacle strapped around the neck or body, so as to resupply from time to time the filters with the required degree of moisture by a slight pressure on the receptacle.

IMPROVED WRENCH.

Jacob Eiseman, Galena, Ill.—This invention relates to an improvement on monkey wrenches, and the nature of the invention consists in the combination of a detachable serrated jaw with the fixed jaw of a monkey wrench, whereby the common nut wrench can be made to serve as a pipe wrench. The movable jaw is confined in its place on the wrench by a hook that passes over the nose of the jaw and the pin that passes through the ends of the jaw back of the shank. This affords a very strong attachment, and enables a common monkey wrench to be converted into a pipe wrench.

IMPROVED ADDING MACHINE.

William L. Hofer, Deposit, N. Y.—This invention has reference to an adding and subtracting machine, by which these arithmetical operations may be accomplished in quick and accurate manner by mechanical means; and the invention consists of a revolving wheel or disk, provided with the figures from 1 to 99, and with a corresponding number of holes or notches, that are engaged by a centrally pivoted spring arm and pin for working the disk. A raised circular rib, at the under side of the revolving disk, engages, by the end points of the rib, which are a small distance apart, a sliding and toothed bar, so that the slide moves at every revolution of the disk, and indicates the hundreds and thousands on the face plate of the machine, while the tens and units are read off in a side recess of the face plate.