

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 soaps must be avoided.—*Industrie Blätter.*

**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 CLOSURES, 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. Wethered, 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 tendinous 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 de-

signed 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.