An improved Locomotive has been patented by Mr. Jacob J. Anthony, of Sharon Springs, N. Y. It consists in a hollow frame which forms the water tank, and at the same time supports the cylinders and valve gear, and is itself supported by the axles of the drive wheels. The invention possesses many other novel features which cannot be properly described without an engraving.

Mr. Nathaniel F. Gilman, of Rochester, Minn., has patented an improved Railway Car Truck. The object of this invention is to provide a safe and economical railway system. It consists in a track formed of I-beams set on edge, joined at their ends, and supported by suitable cross ties or sleepers. The inventor provides a truck of peculiar construction adapted to the I-beams.

Mr. Abraham L. Akins, of Greensburg, Pa., has devised an improved Treadle Motion for sewing machines, circular saws, lathes, and other light machinery, in which the reciprocating motion of a treadle is changed in connection with a spiral spring and intermediate oscillating parts into continuous rotary motion.

Improvement in the Leclanche Battery.

At a recent meeting of the French Academy, M. DuMoncel exhibited, on the part of M. Léclanché, a new model of the well known battery of the latter, designed to furnish a more constant current (as well as being more durable) than the form at present in use. In this new model the carbon electrode of the positive pole, instead of being immersed in a mixture of peroxide of manganese and carbon (from which it often becomes isolated when the battery is operated much), is completely detached; and, for the mixture, there are substituted two prisms of these materials, held in place against the two faces of the electrode by means of rubber bands. The simple contact of a fragment of this mixture is sufficient to quickly and powerfully depolarize a carbon plate; and this effect results from the local current developed in the contact of these two substances, which current causes the hydrogen from the carbon to be immediately absorbed by the peroxide. In order that their local current be better established, the prisms are hollowed out on the side of contact, and the depression filled with a layer of carbon, thus increasing their conducting power. By this means the negative electrodes may serve for an indefinite period (which is an impossibility in the form of battery in use at present), and when the prisms are used up new ones have only to be substituted. Moreover, in this model, the mixture can be more strongly pressed, and the resistance of the element remains uniform. This system, also, may easily be rendered portable for the use of physicians.

ANCIENT STAND FOR YULE LOG.

The days when

> "A Christmas gambol oft would cheer
> A poor man's heart through half the year"

are gone; but a few mementos remain to remind us of that happy period when holidays were looked forward to through weeks of pleasurable anticipation, and the remembrance of such a day lingered in the mind until the approach of another.

Anciently, on Christmas, a glowing fire was made of great logs, the principal of which was termed the yule log, or Christmas block, which might be burned till Candlemas Eve, to resist the severity of the weather. As ancient customs and the articles which are the necessary accompaniment of such customs are coming into vogue after having completed a cycle, we present our readers with an engraving of a richly wrought stand for supporting the yule log, which was in use in Venice in 1577.

Vital Resistance.

In summing up the results of a long series of observations on the effect of sunlight on bacteria and other organisms commonly associated with putrefaction and decay, Arthur Downes and T. P. Blunt remark that there is a lingering belief in the minds of many that matter which is endowed with life can, by its "vital resistance," the more endure and survive the effect of injurious influences. This belief receives no support from their experiments. On the contrary, they have met with results which are best explained by the consideration that bioplasm is matter of the utmost complexity and instability of constitution, ever changing and most unstable when the life forces are at their full.

The Largest Ship Ever Made.

It is said that the steamship Great Eastern has been purchased by a company who intend to use her as a cattle boat to ply between Texas and London. She is now being fitted out at Milford Haven, and is to have new engines and boilers, manufactured by the Clyde Iron Works, at a cost of $500,000. Refrigerators will be built in her for the purpose of carrying fresh beef. It is estimated that she will carry 2,200 head of cattle and 3,600 head of sheep.

A CABINET.

Drawing room furniture, although it may be of a lighter and perhaps more ornamental description than the more

CABINET FROM "ART IN THE HOUSE."

solemn fittings of the dining room, must follow the same general rules: it should be well constructed, suitable to its purpose, and thoroughly good. American walnut is a good wood for the purpose. It should be oil finished, so that it may be rubbed down from time to time and made as good, if not better, than new. Among the larger pieces of furniture for the drawing room may be a cabinet such as is represented in the accompanying engraving. It is of walnut ornamented with lighter and darker woods. The recesses and shelves have mirror backgrounds, which reflect the ornaments and give a brilliant effect to the whole.

Such a piece of furniture as this takes up the principal place in the room, and the rest of the wall space may be utilized for hanging book and china shelves, and smaller cabinets.

Military Boots.

The French military authorities have condemned the shoe and gaiter and favor the adoption of a boot which is formed of two pieces of leather, reaches some way above the ankle, and opens on the outside of the leg from the top to below the ankle bone. This opening is covered by a piece of soft leather, and closed by three short leather strings fastened to the boot on one side and three buttons. The pressure upon the instep and the tightness of the upper part round the leg can be regulated at pleasure; during any temporary halt, a man can throw the boot open and allow the air to circulate around and cool his feet; it can be put on and fastened without trouble in the dark; it effectually keeps out wet and dust, and the bottoms of the trowsers can be worn either inside or outside the boot.

New Mechanical Inventions.

Mr. Simon S. Zahm, of Huntington, Ind., has patented an improved Churning Apparatus, which is simple, convenient, easily operated, and effective, bringing the butter in a very short time, and with a comparatively small amount of labor.

An improved Machine for Skiving Boot and Shoe Counters has been patented by Mr. Seth D. Tripp, of Lynn, Mass. The object of this invention is to furnish a machine which will feed the counters to one knife for skiving one edge, and then carry the counters forward to a second knife, which skives the other edge, delivering the counter in a finished condition; also, to provide for the rapid sharpening of the knives without removing them from the machine. It has a feeding device, which will feed the counters automatically, one by one, at the proper speed.

An improved Gas Light Extinguisher has been patented by Messrs. Philipp Brand and Edward J. King, of Jacksonville, Ill. This device is to be applied to gas burners and their supply pipes, and is so constructed that the light may be extinguished by varying the gas pressure at the gas works or at other points, as may be desired. It may be adjusted to burn gas under high or low pressure, as required.

Mr. Thoro F. Greenleaf, of Westborough, Mass., has devised an improved Flour Dressing Machine, which has a casing of suitable form divided by transverse partitions into as many compartments as there are different kinds of flour to be bolted. The casing contains wheels composed of wire brushes and perforated wings or floats arranged in alternation, one of these wheels being placed in each compartment in the casing, and they are all mounted on the same and operated by the same driving mechanism.

Mr. James Hutton, of Denver, Col., has patented an improved Felly Joint. This invention relates to means for expanding the fellies of a wheel, and it is applicable to either iron or wooden fellies, and to fellies that are either sawed or bent.

Mr. William L. Orran, of Morris Gap, Tenn., has patented an improved Endless Chain Water Wheel, which is so constructed that the water may exert the full power of its weight for the longest possible time.

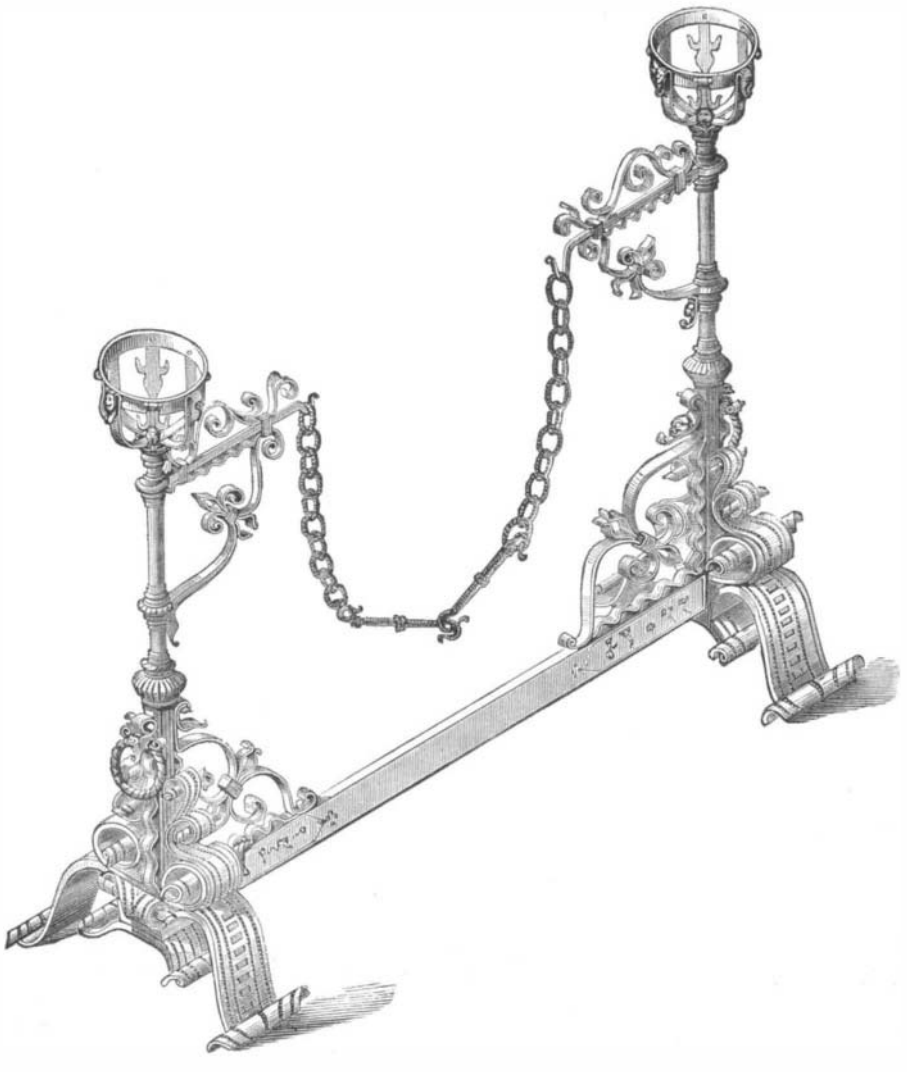
Mr. John Brant, of Providence, R. I., has patented an Apparatus for the Manufacture of Seamless Balls, which will enable seamless balls of any desired size to be made rapidly and accurately.

Messrs. Philip Van Tassel and Martin Paup, of Port Madison, Washington Ter., have patented an improved Steam Pump, which is so constructed that the valve may be operated, without any gear or other attachment, by the movement of the main piston, to change the position of the valve and reverse the motion of the main piston.

Mr. John H. Blain, of Round Rock, Texas, has patented an improved Horse Power. The object of this invention is to combine the principles of the lever and endless-tread horse powers in one machine, and utilize the weight of the horse or other animal; also, to construct a cheap and compact power which will be available for any purpose on a farm or other place where power is needed.

An improvement in Carving Machines has been patented by Mathew Rice, of Augusta, Ga. This device may be used in connection with lathes and other machines for carving, dovetailing, moulding, blind-slat mortising, and other descriptions of wood working.

An improved Wire Stretcher has been patented by Mr. Isaac G. Ericson, of Colorado Springs, Col. This invention consists of two levers pivoted a short distance apart to a bar or carrier near the center of the levers. The lev-



STAND FOR YULE LOG.

ers are provided at one end with gripers to grasp the wire, and the other ends of the levers are operated by a screw rod to stretch the wires and draw the ends together.

Messrs. Joseph B Eaton and Charles Latham, of Shamokin, Pa., have patented an improved Machine for Cutting and Threading Pipe, which consists in a divided and hinged sleeve, having at its ends projecting rims for receiving the ends of a forked lever, which carry pawls for engaging ratchets carried by the rims. A thread cutting die is fitted to the sleeve, and the sleeve carries a leader for starting the thread.

Mr. James Keefe, of Port Eads, La., has patented an improved Fastening for Dredges, for connecting the backing chain with the dipper handle, to enable the dipper to be lowered to the bottom at the desired angle without its being necessary to throw the drum out of gear.

An improved Pump has been patented by Mr. Friederich A. Helmecke, of Round Top, Texas. The object of this invention is to furnish, for the purpose of sprinkling liquid poison on cotton plants, as well as for sprinkling and watering purposes, and for extinguishing fires, an improved pump of simple and effective construction, that may be operated with great facility, and used in connection with any suitable receptacle.

Correspondence.

Curious Suggestion for the Measurement of Stellar Distances.

To the Editor of the Scientific American:

I read with much interest your speculative editorial, a week or so past, on the possibilities of Professor Edison's new heat measuring instrument, the tasimeter.

Granting that it can be so sensitively made and adjusted as to detect a star by invisible radiations, then I would propose, for your criticism, an adaptation which I have not seen advanced heretofore, namely, for the measurement of distances of heavenly bodies from the earth.

If it is not already known, it would be a matter of comparatively easy experiment to establish a ratio of increase or decrease of indication on the scale of the instrument for a given temperature measured at regularly approaching or receding distances. For instance, the heat of the flame of a candle, being, say, 10° at 12 feet distance, will indicate on the scale, say, 9° of arc; removed to 15 feet, the indication will be, say, 8½°; and so on regularly for the increase or decrease of distance. So that if at the least distance from the instrument measurement is made of a heated object (which, if at a greater temperature than that previously ascertained, might be reduced to the necessary quantity), and measurement is then made at an increased known distance from the instrument, by the quantity indicated on the scale, with the law previously established, we might ascertain by mathematical formulæ the distance of the body from the point of observation. To illustrate, we will take the sun for example. Let one observer observe at exactly the mid-day meridian passage, and another, at the same instant of time, so far west of the first that the distance the observed ray has to travel is, say, one, two, or three thousand miles further, as the case may be, to the western observer than to the eastern; it being understood that observation is made at the same point on the sun by both observers; hence it will be seen that if the distance between the instruments is known, and the instrument sufficiently sensitive to detect the loss of heat by the passage through the larger space, we can then at once determine the distance of the sun from the earth, and bid farewell to slow coming transits.

To give an idea of the sensitiveness of the instrument required for such an observation, it is only necessary to state that, assuming the distance between the two stations of observation to be 3,000 miles, and the already known distance of the sun as about 95,000,000 miles, such an instrument, to detect a difference in the loss of heat, coming from a source so far distant, while traversing 3,000 miles, or 3-95,000 of the whole, must be able to detect the loss of heat for every inch of removal of a body distant half a mile from the instrument! Can it be done?

"It's a big thought to think;" and yet, if it is possible for the spectrum to pick up and photograph upon the eye the millionth part of a grain of matter, why is not this and more quite as possible?

Ascribing all honor to the inventor of this most wondrous instrument, putting new possibilities and grand thoughts into the minds of men, I am, JOHN THOMSON.

New York, August 24, 1878.

A Note from Mr. Edison on the Above.

To the Editor of the Scientific American:

Referring to the communication from Mr. John Thomson which you kindly sent me, I have every reason to believe that the tasimeter will do all that he proposes. It certainly is infinitely delicate, and its only limit seems to be in dexterity of manipulation. Last evening, while using the Thomson galvanometer, the spot of light went off of the scale when my hand was placed in line with the tasimeter standing at a distance of fifty feet away from the instruments.

Menlo Park, N. J., Sept. 4, 1878. T. A. EDISON.

The First Gold Payments.

To the Editor of the Scientific American:

We notice in No. 9, current volume, of your paper, a statement that the Yale Lock Manufacturing Company paid off in gold August 15. Being subscribers to the SCIENTIFIC AMERICAN, we would call your attention to the fact that we paid our May pay roll in gold. So far as we know, we made the first gold payment on pay roll of any manufacturers in the country. WILCOX, CRITTENDEN & CO.

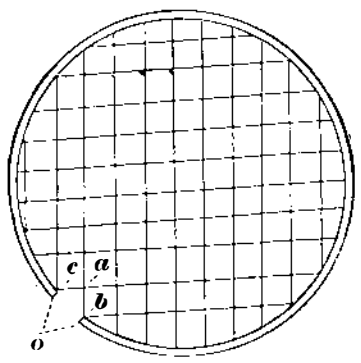
Middletown, Conn.

The Loss of Expansive Force of Steam at High Temperatures.

To the Editor of the Scientific American:

"Water and steam cannot be forced through narrow openings in the red-hot generator of a steam engine." Perham, in *Quarterly Journal of Science*, July–December, 1827, p. 471, also *Annal. de Chim. et de Phys.*, xxxvi., p. 435 (see *Silliman's Journal*, pp. 36–245), refers to the above principle as a well known fact, and in explanation it has been assumed that "steam, at a very high temperature, loses its expansive force." This does not seem a feasible supposition, namely, that heat, in certain degree, applied to water, renders it expansive, but in a greater degree it ceases thus to affect it.

Cannot this phenomenon be more satisfactorily explained? Referring to the accompanying engraving, representing a section of steam generator, having a narrow opening, *o*, I have drawn lines through this diagram equidistant and intersecting each other, as at *a*, *b*, *c*.



Let *a*, *b*, and *c* represent the molecules of water no longer divisible by heat, while the lines represent the repellent force of heat operating as inflexible rods. Now suppose the molecules of water to be separated, as at *c*, *b*, until two of them cannot pass through the orifice, *o*, abreast, then the repellent force of the heat will prevent the escape of the steam until the orifice is enlarged or the heat diminished.

If this be the correct explanation it follows that it would be no difficult task to ascertain the number of molecules of water, at a certain temperature, in a given space.

W. A. G.

The Spanish Language.

The Spanish language is derived from the Latin. It has preserved none of the various indigenous forms of language; of all the Latin tongues it is the purest, for it has taken nothing from the barbarian conquerors who overran Spain; and in spite of several centuries of foreign occupation, only a few foreign words have retained a place in the language; it is homogeneous. Much more Latin than Italian is, it does not disfigure its words either by elisions more or less arbitrary, or by illogical constructions, and its syntax is strictly laid down; it does not easily lend itself to the caprices of fashion or the whims of authors; it still remains what the sixteenth century authors made it.

Even in the Middle Ages the language of poetry was already formed, and required only the necessary lapse of time to polish it. Spanish literature flourished from that period, and Cervantes found ready to his hand the marvelous instrument which was to create the first masterpiece of really European literature.

The most singular feature of the Spanish language is its capability of being a perfect instrument at once for prose and poetry. In this respect it surpasses all others; Greek alone can be compared to it. As if this marvelous language were destined to be perfect in every way, it is as well adapted to the portrayal of the most vigorous passions as to that of the tenderest sentiments.

In prose, as in verse, the language shapes the idea, and, as it were, carves and moulds it. The great poet Villegas, had already, in 1500, adapted it to every variety of Greek rhythm and meter. Ercilla, one of the conquistadores, about the same time, wrote his epic poem "Araucana," in language as delicate and flexible as his own sword. Quiros, and Cervantes himself, drew poetical arabesques which throw the modern romantic school into the shade.

But let us leave these highly educated authors, distinguished Latinists, Hebraists, and Hellenists, and let us seek the fountain head, the unknown, popular, simple, uneducated authors, the romanceros (ballad singers).

In those times—more glorious, perhaps, than we think—whether war were carried on against Goth or Vandal, Saracen or King, the romanceros sang of everything—a romance of religion or love, a rustic song, a heroic deed, a ballad, civil or political history, celebrated paladins, noble ladies, provincial rights, liberty, famous palfreys, the Cid Ruy Diaz de Bivar and Ximena, Ogier and Durandarte. A fine and copious stream of poetry, drawn from the very fountainhead—the heart, the head, and the arm. What sap! what vigor!

History may break off, monks may impose silence, but history will live on in ballads—true, national history, the progress of civilization, exalted faith, *fueros* (charters), gallantry, chronology, sieges, dynasties, marches, and provinces, bishops and clergy, civil rights and canon laws, political life—all these the ballad treats of, and the language allows of it. Without a settled language it would have been impossible. We may judge of the glorious artists Spain possessed in those days when she outshone all Europe by the works they have bequeathed to us.

After the resplendent talents and literary genius of the fifteenth and sixteenth centuries came, alas! the wretched, passionless classicists; conventional poetry, more varied, more regular, assimilated the literature of Spain to her kings, swathed in etiquette, stiffened in ceremonial. It no longer attracts by its national vigor; poetical originality fades away; authors seek rather to imitate, to draw from Greek and Latin sources; impotent rules of poetic art can only supply lifeless forms, as is always the case where inspiration is wanting; art vainly seeks to support talent. All the works of these authors of the decadence have been preserved, and are still admired. Why? The language has saved them; it has given a body to the feeble idea, like those preparations which give substance and firmness to vaporous gauze.

Essentially poetic in character, being essentially dreamy and contemplative, the Spaniard still preserves his ancient gravity, and his language is the most solemn as well as the most poetical in Europe. It sings in a serious manner the subject which inspires it, and this seriousness adds to its grace. Strength, grace, and dignity are the principal characteristics which render it a language worthy to be spoken by the gods. E. OGIER.

[To the foregoing eloquent tribute to the literary merit and importance of the Spanish language, we may add the more prosaic, yet to American students and business men the more suggestive remark that the Spanish tongue competes with the English for the mastery of the New World. With the single exception of Brazil, the language of the South American States is Spanish. It is also the dominant language of the West Indies, Central America, and Mexico. These are our neighbors, and they furnish the nearest market for our surplus goods, as well as the sources of many of our importations. Every year draws the commercial ties between us more and more close, and every year makes a knowledge of Spanish speech more and more valuable to our manufacturers and merchants. During the coming winter evenings our young people will do well not to neglect the pleasures and profits of Spanish in choosing their studies.—ED.]

Optical Effects of Intense Heat and Light.

The following facts have lately come under my observation at the rolling mills at this place:

While looking at the eclipse of the sun July 29th, I handed the glass to one of the mill "heaters." He at once told me he could see as well with the naked eye as with the smoked glass. I then tried another "heater," and he at once repeated the same statement. I then went to the rolling mill and tested every "heater" at his furnace. They all told the same story. I hunted up every "heater" in the town except two (who were not found), over twenty in all, and every one declared he could see the phenomenon, and all its phases, as well or better with the eye unshaded. I took the precaution to test each one by himself, told him nothing of what I expected, or of the testimony of others. I made no suggestions to any of them, but let each tell his own story. All told the same tale; one peculiarity all agreed to—the image in the glass was upside down from what they saw with the naked eye. They would describe many peculiarities of color which could not be seen by others with the aid of the glass. It should be remembered that the "heater" has to see his iron in the furnace while it is enveloped in a flame whose intense glare prevents unskilled eyes from seeing anything, an education of the eye peculiar to this class of workers, as no other class of workmen is exposed to the same degree of heat or light.

I noticed as soon as the eclipse had progressed some time that I became nervous. I observed the same fact in many others about me. My wife at home did not think of the phenomenon at first, but became so nervous that she had to rush out of doors; she then saw the eclipse for the first time. I found this nervousness more in women than among men, chiefly in persons of debilitated frame, such as convalescents. Is this magnetic?

In accordance with your request, I repeated the experiment of Ericsson, and submitted a spherical piece of iron, eight inches in diameter, to a heat of over 3,000° Fah. It was carried to an almost melting point, withdrawn from the flame and placed on a stand. It had the appearance of a disk at all distances tried, up to over 100 feet. As seen by Mr. Hughes, the chief engineer of the mill (one of the most scientific men in his line in the West), myself and others, it was perfectly flat. The convexity did not appear; it was, while in this state, to all appearance no longer a sphere, but a disk. As the iron cooled off it resumed its original appearance of a sphere. Our mill men were much surprised by this phenomenon which they had been seeing all their lives, but till now had never observed.—*Joshua Thorne, M.D., in the Kansas City Review.*

TO FACILITATE the loading of heavy guns it has been found of advantage to enlarge the bore at the muzzles by half an inch or more, by turning out the metal to the depth of about two inches. The process is termed "bell mouthing," and is to be applied to all the guns in the English service of ten inches and upward.