Quartz-breaker—In this device the quartz is introduced within a hopper formed by the Union of two crushing jaws, one of which is stationary, the other movable. A special feature consists in imparting a downward motion to the movable jaw, as well as a lateral movement toward the stationary jaw. The quartz is thus crushed and ground in the most effective and speedy manner. J. W. Staunton, of Black Hawk Point, is the inventor.

Sorghum Evaporator.—Several novel features are represented in this improvement, one of which consists in proving the front edge of each of the evaporative compartments with a permanent skimmer, so arranged that, as the liquid flows down from one division into that next below, its floating scum will be completely arrested and removed by the skimmer. The labor of the attendant is thus very essentially reduced. L. Wright, Wapella, Ill., is the inventor.

MISCELLANEOUS SUMMARY.

THE RAVAGES OF INSECTS A CAUSE OF THEIR DESTRUCTION.—It is well known that after worms have for five or six years committed their ravages on the trees of a region, they suddenly disappear, and have no full return again for two or three or more years to come. It has been shown that the destruction is sometimes at least a result of their numbers. The larves or worms, when very numerous, consume the leaves of the tree on which they are before they attain full maturity, and, as a consequence, they never pass to the chrysalis state; they remain for a while as larves, often showing by their movements that they are half-starved, and then die.

MORID'S PROCESS FOR RECOVERING WRITING ON PAPER OR PARCHMENT WHICH HAS BECOME NEARLY EFFACED.—The paper or parchment written on is first left for some time in contact with distilled water. It is then placed for five seconds in a solution of oxalic acid (1 of acid to 100 of water); next, after washing it, it is put in a vessel containing a solution of gallic acid (10 grains of acid to 300 of distilled water); and finally washed again and dried. The process should be carried forward with care and promptness, that any accidental discoloration of the paper may be avoided.—*Cosmos.*

PATRIOTIC AND GENEROUS.—Borden & Co., owners of a factory for condensing milk and the manufacture of cheese, in Winsted, Conn., offered recently to condense and forward to the army all the blackberries the people of the surrounding country would furnish them. At last accounts over eighty bushels of berries had been deposited at their factory for that purpose. The company are making meat biscuit for the army, and have recently "condensed" an entire ox.

EFFECT OF ATMOSPHERIC PRESSURE IN GUNNERY.—The French artillerists in Mexico have recently found, to their surprise, that the angle of elevation used in France for their guns, for any given range, does not afford the calculated results; and have ascertained that this is owing to the diminished pressure of the atmosphere on the Mexican plateau. It follows that cannon may serve as a kind of barometer for measuring altitudes.—*Les Mondes*, July 7.

ACCLIMATION OF ENGLISH BIRDS IN AUSTRALIA.—The thrush, black bird, skylark, starling, chaffinch, various sparrows, and the wild duck, are already domesticated in Australia through the efforts of the Acclimatization Society of Victoria. Great success has also attended the Society's efforts to introduce good fresh-water fish into the rivers, and it is expected that the salmon will soon be naturalized in Tasmania.

PRIZE TO MR. RUHMKORFF.—The prize of 50,000 francs, offered by the Emperor Napoleon for the most useful application of electricity, has been awarded to Mr. Ruhmkorff for his induction coil. The king of Hanover, having heard of the award, forwarded to Mr. Ruhmkorff a large gold medal, "pour le merite," *Reader.*

A NATIONAL Boiler Insurance Company has been formed in London to afford the means of providing against the risks of loss, both of property and life, from the explosion of steam boilers.

[The best insurance for steam boilers is good engineers.—EDS

PLEASURE SEEKING AT SOME PROFIT.—A Saratoga letter writer records the following novel mode of paying hotel bills:

Among the anomolies of a depreciated paper currency the following is noteworthy: There are at present at the Springs quite a number of Cubans—never before so many. They all come laden with gold, on which at home they have paid no premium. On the liquidation of their board bills they are allowed the premium, of course. The practical result is, that when a Cuban has been here a month, and feasted well, he lays down one hundred dollars in gold, and receives in return a receipted bill, with one hundred and fifty-six dollars in change! The Cubans, hence, are living gratis, and making money by it besides! Of course, they are greatly enjoying themselves at our expense.

FERMENTATION AND FERMENTS.—M. Lemaire denies that a special ferment for every kind of fermentation exists. He finds the same microscopic beings present whether sugar is being changed into alcohol, or alcohol into acetic acid. But in the case of natural animal and vegetable matters he has assured himself that microzoa begin the decomposition, which, when the matters become acrid, is carried on by microphytes. By means of a little acid, these latter may be made to appear at will, and the author consequently argues that mycoderms do not make the acid but appear in consequence of its presence. The acidity of the perspiration it is thought may cause the development of certain microphytes which are observed in some obstinate cutaneous affections.—*Dublin Med. Press.*

NEW CURE FOR CROUP.—Several cases have been reported in a French journal, in which croup was successfully treated with a mixture of perchloride of iron, in the proportion of fifteen drops in four ounces of water, given in tablespoonful doses every five or ten minutes. The effect is to detach the false membrane, which is expelled by coughing. The remedy can scarcely be called a specific, as there were several failures, but anything promising to afford relief should be known in so dangerous a disease.

EXTENSIVE FROST IN JUNE.—We have received the Bi-monthly Report of the Agricultural Department for June and July, an unbound pamphlet of 23 pages. Among the matter is a collection of reports in relation to the frost which occurred over all the northern portion of the country on the 9th and 10th of June. It extended from Maine to Minnesota, and as far south as New Brunswick, N. J.

VALUATION OF NEW YORK CITY.—The Commissioners of Taxes and assessments of New York value the real estate of the city at $410,774,435 for the year 1864, against $402,187,382 in 1863. The personal estate amounts to $223,920,505, an excess over 1863 of $31,953 34. The net increase is $40,640,397.

THE costliest Bible ever made in this country was gotten up by the people of Baltimore as a testimonial for the President in honor of his proclamation of emancipation. The cost of the book being nearly six hundred dollars—$580 75. It is a pulpit Bible, bound in violet silk velvet.

AN interesting communication from Mr. V. B. Le Van, of Philadelphia, on the "Power of a newly Patented Steam Engine," has been accidentally overlooked for a month or more. We are obliged to Mr. Le Van, and hope to hear from him on another occasion.

THE young lady pupils of the Buffalo schools are to receive prizes for the "best loaves of bread." There is a good deal of common sense in that, Good loaves of bread are quite as worthy of prizes as good essays in Latin.

FASTENINGS OF ARMOR PLATES.—In the experiments at Shoeburyness, it has been found that armor plates fastened to ships' sides by large wood screws hold much better than those secured by through bolts and nuts.

IT is stated that in the first two years of the present war 28,000 walnut trees were felled to supply a single European manufactory of gunstocks for the American market.

THE American Wood Paper Company at Providence, advertise for 10,000 cords of wood suitable for their purpose. Success to them.

A New Alloy for Bells.

Le Moniteur Illustre des Inventions says that M. M. M. H. Micolon has just patented a new alloy suitable for numerous articles, such as bells, hammers anvils and other non-cutting instruments. The alloy consists of iron, manganese and borax. The proportions given in the specification are—

20 parts of iron turnings or tin scraps.
80 parts of steel.
4 parts of manganese.
4 parts of borax.

But it states that these proportions may be varied. If it is desired to augment the tenacity of this alloy, two or three parts of wolfram (Franklinite) may be added. The iron and steel are placed first in a crucible, afterwards the manganese and borax, and the crucible is then filled with charcoal. It must be poured rapidly into the molds. Bells are thus obtained possessing the sonorousness of silver and costing less than bronze.

SPECIAL NOTICE.

EDWARD HAMILTON, assignor of NELSON GOODYEAR, of Chicago, Ill., has petitioned for the extension of a patent granted to him on May 27, 1851, for an improved mode of preventing the entrance of dust, etc., into railroad cars.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, May. 8, 1865.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing at least twenty days before the final hearing.

A READY way of imitating ground glass is to dissolve Epsom salts in beer, and apply with a brush. As it dries it crystallizes.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Aug. 31, 1864, to Wednesday, Sept. 6, 1864:—

T. T. & B., of N. Y., $10; C. E. W., of N. Y., $45; G. H., of N. J., $40; L. A., of N. Y., $40; A. E. K., of Pa., $50; W. J. W., of Ohio, $20; W. F. S., of N. Y., $20; J. S., of Ohio, $20; E. C. C., of Mass., $20; A. W. H., of N. Y., $15; D. N. D., of N. J., $45; R. R. S., of N. Y., $45; J. W. N., of Conn., $45; W. H. G., of N. Y., $20; F. T., of N. Y., $15; C. & T., of Conn., $15; E. R., of N. J., $32; A. T., of Conn., $25; B. & G., of Conn., $25; H. W., of Wis., $16; M. S., of Ill., $20; J. A. McP., of N. Y., $15; E. C., of Conn., $35; F. C. W., of Conn., $16; J. J. S., of Conn., $25; H. G. D., of Ky., $30; N. N., of R. I., $25; W. F. Q., of Del., $16; J. M. H., of N. Y., $25; N. H. B., of N. J., $25; J. H., of N. Y., $20; C. J. VanW., of N. Y., $40; V. G., of N. Y., $15; P. L. M., of Ohio, $10; J. H., of N. Y., $20; H. R., of Austria, $15; J. L., of N. Y., $20; P. L., of N. Y., $20; J. F., of Ohio, $30; C. P., of Ohio, $20; T. G. M., of N. Y., $20; E. M. C., of R. I., $20; C. S., of N. Y., $20; W. E. D., of N. Y., $35; H. C., of N. Y., $20; J. E. S., of N. Y., $15; H. B. M., of Mich., $30; J. G., of Pa., $25; T. H. W., of Pa., $16; W. B. M., of Mich., $15; A. W. C., of Vt., $30; H. F. W., of Mass., $15; C. H. N., of N. H., $20; H. G. W., of Iowa, $30; C. M. J., of Ill., $36; J. S., of N. Y., $30; T. C. W., of Mich., $41; G. H. S. D., of N. Y., $60; C. E. W., of N. Y., $45; S. G., of N. Y., $45; L. & L., of Ohio, $20; E. S. A., of N. Y., $45; J. N., of Ill., $20; A. H., of Ky., $45; A. S. H., of N. Y., $15; W. H., of Iowa, $20; G. I., of Pa., $20; C. A., of N. Y., $10; J. F., of N. Y., $15; J. B., of R. I., $20; W. B., of N. Y., $15; E. L. P., of N. Y., $40; H. W. B., of N. Y., $25; E. R., of Mich., $15; P. J. G., of N. Y., $15; J. K., of N. Y. $30; J. H., of Ill., $25; E. W. M., of Ill., $25; W. H. W., of N. Y., $15; L. M. D., of N. Y., $25; C. C. B., of Iowa, $36; D. H. S., of Conn., $16; L. T. D., of R. I., $35; F. S., of Pa., $25; C. A., of N. Y., $12; E. H. T., of Conn., $50; W. & S., of N. Y., $40; S. B. H., of Mass., $60; C. H. R., of Maine, $16; G. E. H., of Maine, $15; J. D., of N. Y., $450; H. R., of N. Y., $25; C. C. & V., of N. Y., $20; W. B., of N. Y., $28; J. L., of Iowa, $25; R. & K., of N. Y., $25; A. B., of Ohio, $20; G. & C., of Conn., $19; J. G., of Ohio, $20; P. D. S., of Nevada Territory, $25; A. K., of Ill., $25; J. W. B., of Mass., $10; J. R. E., of U. S. A., $25; A. & H., of Conn., $605; S. S., of N. H., $20; J. A. D., of Ill., $20; A. S. of N. Y., $20; R. T., of N. Y., $15.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Aug. 31, 1864, to Wednesday, Sept. 6, 1864:—

G. H., of N. J.; N. H. B., of N. J.; J. M. H., of N. Y.; H. G. W., of Iowa; H. W. B., of N. Y.; D. D., of Ill.; E. R., of N. J.; E. W. M., of Ill.; J. J. S., of Conn.; H. N., of R. I.; T. C. W., of Mich.; C. E. W., of N. Y.; B. & G., of Conn.; H. G. D., of Ky. (2 cases); H. B. M., of Mich.; G. D., of Mass.; J. G., of Pa.; E. C., of Conn.; C. C. B., of Iowa; T. T. & B., of N. Y.; J. S., of N. Y.; E. L., of England; J. H., of Ill.; W. T., of Conn.; A. W. C., of Conn.; J. K., of N. Y.; L. M. D., of N. Y.; H. B. S., of Wis.; W. H. G., of N. Y.; E. L. P., of N. Y.; D. J., of England; R. & K., of N. Y.; C. A., of N. Y.; E. H. T., of Conn. (2 cases); J. G., of Ohio; S. B. H., of Mass. (2 cases); H. F. B., of Mo.; P. D. S., of Nevada N.; W. & S., of N. Y.; A. K., of Ill.

Some Facts about Diamonds.

From Dr. Feuchtwanger's treatise on gems we take the following statements in reference to the diamond:—

"A letter was lately published from Sir David Brewster, on a curious optical phenomenon that had occurred in the construction of a diagonal lens. The diamond, previous to working, had all the appearance of internal brilliancy; but, after being polished, it presented a series of stratified shades, which rendered it useless for the required purpose. It afterwards appeared that lapidaries were acquainted with this appearance, which rendered them extremely unwilling to take the risk on themselves, of cutting up diamonds for optical purposes. On a minute examination of this phenomenon, it appeared that these different shades occurred in regular strata, each section being about the one-hundredth part of an inch, and each stratum having a different focus, and being of a different degree of hardness and specific gravity. The inferences drawn from the above facts were—that the diamond was a vegetable substance, and that its parts must have been held in solution and subjected to different degrees of pressure at different stages of existence. If, on the contrary, as it has been generally believed, it is subject to the laws of crystallization, its crystals must necessarily be homogeneous.

"The diamond being the hardest of all substances, yields to no file; scratches all other minerals, and is not touched by any. This character has become the most important of the diamond since the late discovery of the amorphous or compact diamond. It is very frequently tinged light-green, but more rarely with orange, red, blue, or black; but in setting, these shades disappear, particularly in the smaller diamonds; but there are also known diamonds of rose and pistachio-nut green colors. The blue color is very rare. The blue diamond of Mr. Hope of London, is one of extreme beauty and rarity, and is of immense value; the yellow diamond in the Museum of Natural History, in Paris, is likewise very remarkable for its color and size. The black diamond, which is perfectly black, although plainly crystallized, occurs most frequently in small bristled balls, but crystalline points: the crystals are very small grouped together in an irregular manner, and extremely refractory to the cut; it is considered the hardest of all diamonds. The green diamond is also very rare, but I have seen some beautiful specimens in the Jardin des Plantes and in Freiberg, the first in the cabinet of Abbe Hauy, and the latter in the cabinet of Werner.

"In Russia, the first diamond was discovered in July, 1829, by Humboldt and Rose, when on their journey to Siberia, on the west side of the Uralian mountains, in the gold-washing establishments of Krestowosdwisheaski, belonging to Count Schuwalow. The locality, in connection with the other circumstances of the place where the diamond was found, bears a striking resemblance to the diamond district of Brazil. The predominating rock of the spot on the Uralian mountains is a quartzose chlorite, talcose schist (itacolumite), with an admixture of iron pyrites and mica, wherein we find beds of red oxide of iron, talcose schist, limestone, and dolomite.

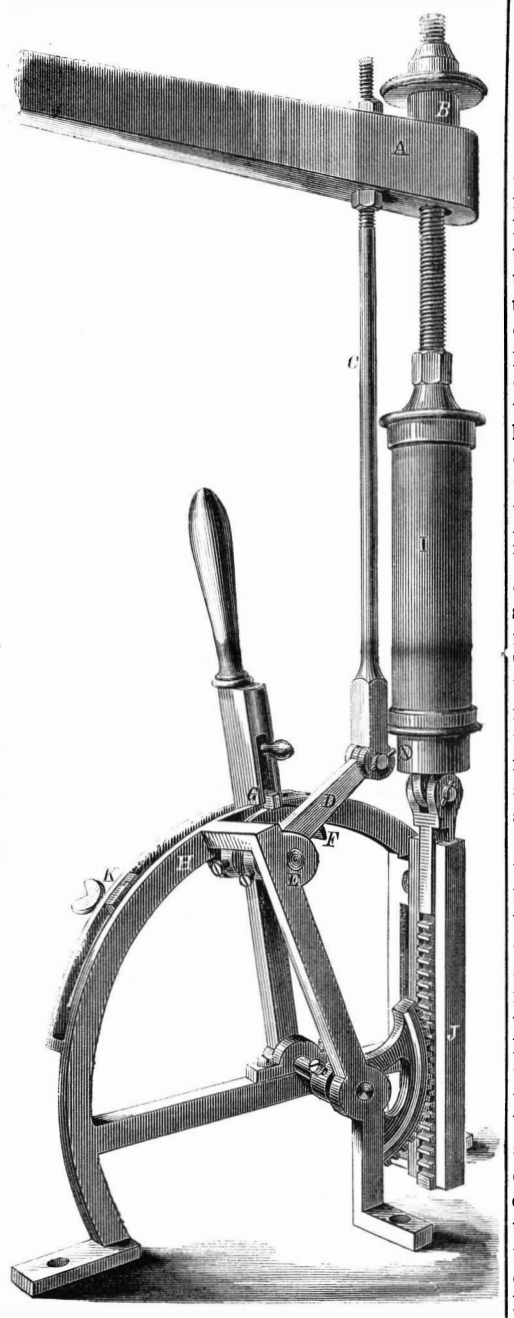
"At a most extensive sale of diamonds, which took place in the summer of 1837, at the auction of Rundell & Bridges, London, there were twenty-four lots put up, which produced the sum of forty-five thousand eight hundred and eighteen pounds, nearly two hundred and twenty-nine thousand dollars! Some of the prices were as follows:—The celebrated Nassak diamond, which weighs three hundred and fifty-seven and a half grains, and is of the purest water, was purchased for thirty-six thousand dollars. It is considered to have been sold at a price considerably under its value. A magnificent pair of brilliant ear-rings, weighing two hundred twenty-three and a half grains, formerly the property of Queen Charlotte, were bought for fifty-five thousand dollars, a price infinitely below their usually estimated value. A sapphire, seventy-five and a half carets, set with brilliants for a brooch, two thousand four hundred and sixty-five dollars.

"According to Spix and Martius, there have been produced in Brazil, from 1772 to 1818, 1,298,037 carats of diamonds—that is, in the time of the Royal Administration; but that during the Lease, only 1,700,000 carats were produced, which together make 2,998,037 carats, or 1301¼ pounds, thus averaging from fourteen to fifteen pounds per year; those brought into market by contraband being excepted.

"The largest diamond is in the possession of the Grand Mogul, and according to Tavernier, resembles in form and size, half a hen's egg. Its weight is two hundred and ninety-seven and three-sixteenths carats. It was found in 1552, in the mine of Colore, a short distance to the east of Golconda, and is valued at 11,723,000 francs. It is cut as a rose-diamond, and is perfectly limpid, with the exception of a small flaw at the end of the girdle."

HUNTINGTON'S SELF-ACTING SAFETY-VALVE.

When a safety-valve rises to let off steam it does so gradually and gently, and as the pressure increases it continues rising until it can go no further. In many cases the distance to which the valve lifts is not



equal to the area of the pipe, so that the passage is much obstructed, and the boiler unnecessarily strained in consequence. The machine shown herewith is designed to obviate this evil, and to permit the steam to blow off as fast as it is formed. It is self-acting, and requires no attention; when it is once set the engineer may leave the cab and go to his dinner in perfect confidence that the valve will unhook itself at the proper time if the pressure becomes too great. No slacking off of the spring balances is required with this arrangement, as a single motion of the lever throws the balances up so that they are relieved from strain.

In the engraving the front of the spring balance is toward the engineer, as usual, and the safety-valve lever, A, is shown running from it to the dome. The rod of the spring balance passes through this lever and has a nut, B, on top to regulate the pressure.

There is an additional rod, C, which passes through the lever and connects to an arm, D, on the shaft, E. This rod trips the valve-lever, A, through the medium of the toe, F.

It will be seen that as the valve lifts, the small rod is drawn up, so that by degrees the toe, F, rises against the stop, G, which sets in a slot in the quadrant, H. When it has raised far enough to trip the toe or throw the stop, G, out of its seat, the lever, A, flies up immediately and quickly enlarges the area of the safety-valve passage. The spring balance is only held down by the rack and sector, J, and these in turn are held by the shallow recess in the quadrant, H, so that when the stop is pushed out by the toe, F, the lever goes up instantly, as before described. The check piece, K, limits the distance to which the valve lever rises, and it may be set at any point desired.

This invention was patented through the Scientific American Patent Agency, February 9th, 1864. For further information address Wm. S. Huntington, Andrusville, N. Y.

THE CALORIMETER OF BOILERS.

It is always well that terms should be exactly understood. The word "calorimeter" is so strictly technical that many of our readers might possibly be at a loss to comprehend its meaning without some definition. The calorimeter of a boiler, then, is simply the area of the orifice or orifices of its flue tube or tubes, and the proportion which this bears to the area of the interstices of the fire grate exerts a very important influence on the economical and positive efficiency of every steam generator. It is a pity that this fact has hitherto been very much over looked. It is too much the custom to construct boilers with the largest possible amount of tube surface, under the idea that thereby heat which would otherwise be wasted is saved up and converted to a useful purpose. The fact is, that the generation of caloric by combustion is one thing, and its subsequent use quite another; and, as we have before endeavored to show, the value of heating surface depends on a great many conditions, independently of its mere extension. Thus, boilers with crowded tubes cannot steam well because the contact of the water with the metal surfaces is prevented by films of that steam which cannot disentangle itself from the water with sufficient rapidity for want of room. There is in such boilers a want of circulation, and the result is that the tubes are burned out.

It is well understood now that very small and long tubes are inefficient. Stephenson's long boiler locomotive could not make steam without such a contracted blast-pipe that all the saving due to the reduction of temperature in the smoke-box was re-absorbed by back pressure in the cylinders. The locality of the waste was changed; its amount remained unaltered. The larger a flue tube is within certain limits the better; but if it is attempted to keep up the superficial area of heating surface by increasing their number, it is certain that the calorimeter must be injuriously increased in a nearly equal proportion; and it follows that a boiler with a few tubes of moderate diameter will be actually more efficient and more economical than one with either a greater number of tubes of equal diameter, or another with a larger number of tubes of small diameter, although the calorimeter is thereby in some degree kept within proper limits; and this is especially true of coal-burning engines. This statement may appear paradoxical; it is not the less true. In the first place, large tubes, from reasons which we pointed out in a recent article, permit a certain amount of combustion to go on within them. This cannot take place in very small tubes. The value of any heating surface increases in a very rapid ratio with the intensity of the heat to which it is exposed, and it follows that, as very small tubes cannot be traversed by flame, or even by very highly heated air—most of the caloric being given up in the first foot of length—they must be inferior inch for inch to those of fair dimensions, say three inches in diameter. If to this we add the loss due to contracted water-way, and the absence of circulation, it is easy to see that a limit is quickly reached beyond which no advantage whatever can be derived from the extension of tube surface. The worst defect