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  FRENCH INTERNATIONAL EXPOSITION OF 1878.—Jurors Representing the United States.—The Algerian Pavilion. 1 engraving.—The Swiss Buildings. 1 engraving.—Labor in France.—Steam and Check Valves. 3 figures.—New Furnace Feeder. 3 figures.—Brotherhood's Compound Engine. 2 figures.

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- mo-Electric Machines. 1 figure.

  NATURAL HISTORY, GEOLOGY, ETC.—Recent Progress of Entomology in North America. North American butterflies A Strange Insect. The Basket Carrier, or House Builder Caterpillar. By William H. Girson, New York. A species of moth of which the female has never been discovered. How are the eggs fertilized?

  The Enemies of Books. Their natural history, their ravages, and the means of prevention. 12 figures.

  The Earthquakes of 1877. The eruption of Cotopaxi. The Eruption at Hawaii. An eruption in the Bay of Kalukeakua. Eruption of the Jaranese Island Volcano Ooshima. Eruption in Southern California. Earthquakes in Spain, Switzerland, and elsewhere. Statistics of Earthquakes; comparative frequency in summer and winter.

  A Variation in the Moon's Motion caused by the Earth's Spheroidal Figure. By D. P. BLACKSTONS, with figure.—An Estimate of Geological Time.

#### EDISON AND THE UNSEEN UNIVERSE.

Hitherto man's knowledge of the extent of the universe has been bounded by the limits of vision. During the day, brightness, we see but a minute fraction even of the little world we inhabit. At night a wider reach of vision is possible, and some thousands of stellar and planetary bodies are added to the domain of positive knowledge, thus enlarging enormously man's idea of the magnitude of the of the universe opened up by the telescope; and every addi- seems to be the only bar to its general adoption. larger universe within our ken.

That the most powerful of telescopes enables us to reach the limit of the universe no one imagines. See as much as we may, more—perhaps infinitely more—lies beyond. So, at nies displayed at Philadelphia was a surprise to many. For least, all experience leads us to infer; but our positive a century or more the curse of bad government had weighed knowledge ends with the limit of vision.

that are unseen and unseeable! Mr. Edison's plan is to ad which has just gone into operation. just the tasimeter to its utmost degree of sensitiveness, then body can be fixed and mapped the same as if it were visible. Seeing that the tasimeter is affected by a wider range of Philippines, and Fernando Po. etheric undulations than the eye can take cognizance of, and bring within human ken a vast multitude of nearer bodiesburnt out suns or feebly reflecting planets-now unknown because not luminous.

# IMPROVEMENTS NEEDED IN SALT MAKING.

salt manufacturers of Syracuse, who have so long enjoyed a monopoly, are beginning to recognize the fact that the methods which have so long prevailed for the manufacture of this commodity require considerable modification in order and expensive for these times of sharp competition in the us the command of their markets. business, and is at last not indisposed to admit that some change might be advantageous.

50 to 75 square feet of grate surface, and at the other an upright smoke stack, while arranged all along on the top of have so long suffered, in pocket as well as in credit. this flue are open circular iron pans for the evaporation of the salt water.

sufficient burning gas to fill the flue throughout its length; and manufacturers. but of course the pans at the grate end evaporate the water four or five times more rapidly than those at the other end. The water in the pans is constantly replenished until several inches of salt are deposited, which is then removed with shovels, and the evaporation renewed.

perature in the flue are the most immediately apparent ob-tablishment of manufactures in that city. Among the jections to this method, but one of no less importance lies in means proposed for securing that end is the proffer of sites the fact that the deposit in the pans of several inches of salt for manufacturing establishments at low rates, the exempconstitutes such a non-conductor of heat that a large portion from municipal taxation of the buildings and mation of the thermal value of the fuel used is lost.

than is now done.

than is now done.

MEDICINE AND HYGIENE.—Medical Uses of Carbolic Acid. A clinical lecture delivered at the Norfolk and Norwich Hospital, England By Peter EADS, M.B.—Carbolic Acid in Carbunds.—The Alband By Peter EADS, M.B.—Carbolic Acid in Carbunds.—The Alband By Peter EADS, M.B.—Carbolic Acid in Carbunds.—The Alband of firing was in successful practice and brought to our notice eighteen years ago at certain experigentant of Morphia.—Diseases of the Ear from Bathing.—Strumous Disease, treated by Volcanic Vapors.—The New Dental Beparture. By L.P. Merchith. M.D. Past history and present state of dentistry, with plain hints useful for all. Gold, tinfoil, gutta percha, and white filling. brought to our notice eighteen years ago at certain experithirty years through the numerous manufactures that have mental works in Philadelphia, but since then we had heard been established within her limits.

Another method of very economical firing for salt works would, in our opinion, be found in the use of pulverized bituminous coal, by which a great saving in cost and amount when the range of sight is narrowed by the sun's excessive of fuel, and a long, hot flame throughout the flue, could be secured; and this plan, we understand, is about to be tried by parties in Pomeroy, Ohio.

The objection to the use of pans for evaporation has been removed by substituting for them revolving cylinders, whose continual movement prevents the local deposit of the salt universe. But the increase of knowledge which darkness and thereby greatly economizes or makes of use the volume reveals is almost infinitesimal compared with the wider view of heat now lost. The expense of the plant for this system

#### THE NEW PATENT LAW OF SPAIN.

The splendid exhibit which Spain and the Spanish coloso heavily upon the industries of that once powerful coun-Must this always be so? Hitherto science has given no try that the recovery of its former standing among nations hint of the possibility of exploring the vast and mysterious was regarded by most people as practically hopeless. The beyond, from which no visible ray of light has ever been de-inumerous prizes won by Spain at the Vienna Exhibition, tected, or is ever likely to be detected, by the most far- however, had clearly indicated that the period of Spanish reaching and sensitive of optic aids. But now there comes a decadence had come to an end, and that the spirit of the promise of an extension of positive knowledge to fields of nineteenth century had at last, though tardily, gained a space so remote that light is tired out and lost before it can lodgment there. The energy and industrial earnestness traverse the intervening distance. A new agent or organ manifested in connection with the Centennial Exhibition of scientific sense for space exploration has been given to proved that Spain was becoming once more a power in the the world in the tasimeter, by which it is possible not only world-industrially if not politically. A further and if to measure the heat of the remotest of visible stars, out, Mr. anything more striking evidence that the country is in ear-Edison believes, to detect by their invisible radiations stars nest in regard to industrial progress is seen in the patent law

Hitherto patents have been granted in Spain only under attach it to a large telescope, and so explore those parts of such onerous conditions as to practically exclude the majorthe heavens which appear blank when examined by tele- ity of inventors, foreign inventors especially, from any scopes of the highest penetrative power. If at any point in share in the very limited benefits offered. The new law is such blank space the tasimeter indicates an accession of tem-comparatively liberal, placing foreigners on the same footperature, and does this invariably, the legitimate inference ing as natives, and the interests of the inventor are well prowill be that the instrument is in range with a stellar body, tected. The duration of patent rights has been largely exeither non-luminous or so distant as to be beyond the reach tended, the fees have been greatly reduced, and a single patof vision assisted by the telescope; and the position of such ent now covers not only Spain, but all the Spanish colonies —the Balearic Islands, the Canaries Cuba, Porto Rico, the

Heretofore separate patents had to be taken out for each is withal far more acutely sensitive, the probabilities are of these possessions, each costing several times more than is that it will open up hitherto inaccessible regions of space, now charged for all. Certificates of additions, covering any and possibly extend the range of our real knowledge as far improvement or modification of patents, are granted any time beyond the limit attained by the telescope as that is beyond within the first year; and subsequently the inventor is givthe narrow reach of unaided vision. Possibly too it may en the preference for new patents on improvements. Patents may be inherited, sold, or donated, the same as other property. The time allowed for the official working of patents is extended from one year to two. Infringements are punishable by fines, confiscation of machinery and products for the benefit of the patentee, and, if repeated, by im-Judging from articles in some of our recent exchanges the prisonment. The life of a patent has been extended to twenty years.

Inventors and manufacturers will readily appreciate the value and importance of the field laid open to them by this law-certainly that part of it embraced in the Spanish West to encourage continued or further investment of capital; Indies. The commercial relations of our country with Cuba that the conservatism which has for so many years held fast and Porto Rico are steadily increasing in scope and value, to the old system, is beginning to find that it is too crude and the nearness of those islands to us must ultimately give

The protection which patented inventions now enjoy there cannot but prove of signal advantage to our manufacturers The salt block of to-day consists of a horizontal brick flue in many ways, not the least of which may be the shutting 90 to 110 feet long, or thereabouts, having at one end from out from Spanish-American markets of British and German counterfeits of American products, by which Americans

As our readers are doubtless all aware, the publishers of this paper are also solicitors of American and foreign patents. When in operation a large amount of soft coal (two or Their advertisement, with special reference to Spanish patthree tons) is kept burning on the grate in order to produce ents, in another column, will be of interest to inventors

# LOCAL ENCOURAGEMENT OF MANUFACTURES.

A member of the Baltimore City Council proposes to that body the appointment of a permanent commission of prom-The excessive consumption of fuel and the unequal tem- inent citizens, whose special duty shall be to promote the eschinery used, and the granting of special water rates. The two first objections may be overcome by improved Speaking of this proposition the Baltimore Sun pertinently methods of firing; one of which would be to build a cylin-remarks that except in rare instances and under peculiar drical fireplace (which should be fed from the top), lined with circumstances it is always by a combination of manufaca coil of pipe for superheating steam, then to make within tures and commerce that cities grow populous and wealthy. it a fire of anthracite culm, and force up through the burn- Everynew manufacturing establishmentbrings an accession ing coals a jet of the hot steam, which, first passing through of citizens—who require additional houses, and whose wants the coil, should carry with it into the mass of fuel sufficient must be supplied by additional artisans and shopkeepers. air to maintain active combustion. The steam, taking air | The wealthiest States are the manufacturing States, and they with it, becomes decomposed by passing through the hot are the ones which sustain a numerous population. Rhode coals, and creates a very high temperature and a long and Island, for example, depending almost entirely upon manufull hydrogen gas flame, which, extending throughout the factures, has a larger population for its area than any other length of a "block," would secure a far more equable heat in the Union. So with cities. Philadelphia, which until recently has had no foreign commerce worth speaking of, This method of firing was in successful practice and has grown populous and wealthy within a little more than

The gathering of eight or ten thousand inhabitants about the mills and manufactories in the suburb of Baltimore known