

that the former must appoint an attorney or representative in Germany. Patents may be declared void if insufficiently worked in the German Empire. It is considered a proof of such insufficiency if the articles patented are imported into Germany after a qualified person has offered to work the patent within the Empire. All such patents are to be forfeited if the proprietors allow importation without interfering, provided the laws of the respective patentee's native country contain similar ordinances (France, etc.). In all other respects, there is no special proof of working necessary. Patents are to last fifteen years, and in certain cases extensions may be had. Progressive taxes are to be levied. Prior publication prevents the grant of a patent, the patent right is transferable by deed or will, divided or undivided. A special court is to be provided for patent suits. Patent objects are to be marked, as under the American law. Patents may be declared void if the invention is insufficiently specified, if the foreign patentee maintains no German representative, if taxes are not paid, or if the patent can be proved to have been void from the beginning. There are some other, minor provisions, but the above sufficiently indicate the scope and character of the law, which, so far as Americans are concerned, is but little improvement on the present system. Of course the complete text is necessary before a just opinion of the provisions as a whole can be reached, and we should prefer some experience in its working before hazarding judgment as to its fairness and efficacy as regards foreign inventors. The clauses which require inventors to "give licenses when demanded for the public benefit," those relating to working in the Empire, and the offer by "a qualified person" to do so in the event of the non-compliance of the inventor, seem to open the way to wide constructions adverse to foreigners, and virtually to a continuance of the present injustice. The letter of the law may, it is true, change; but when such constructions are possible, and not only this, but, as past experience shows, have been the rule in Germany, it is not unreasonable to believe that those who interpret the law will be guided therein by the light of precedents.

PROGRESS OF THE MISSISSIPPI RIVER JETTIES.

We have held so firm an opinion that a triumphant success awaited the carrying out of Captain Eads' plans, for opening the Mississippi river to the commerce of the world, that to read the engineer's reports of the splendid progress of the work is but to learn of the fulfilment of confident expectations. The latter report, dated August 18, is now before us, and the results noted must certainly be gratifying to the whole country. The channel between the jetties, we are told, is constantly increasing, and the jetties themselves are built up above mean low tide, and for a great length above average high tide. The last survey, made July 27, shows a channel extending down 1,800 feet from the upper end of the jetties, and within only 250 feet of the deep waters of the Gulf, having an average width of about 350 feet, in which all soundings are 20 feet or more in depth. The line of deepest soundings through the length of 2½ miles averaged over 26 feet, and many single soundings showed over 40 feet. Some idea of the progress of the erosion going on between the jetties may be inferred from the fact that the 20 feet channel, existing on June 17, had increased in average width nearly 100 feet throughout its entire length in the forty days between that date and the last survey.

Captain Eads reviews, in some detail, various objections which the opponents of his project have urged, and devotes himself more especially to the assertion that the earth washed out of the channel would merely form a new bar outside the jetties, and thus render access as difficult as ever. To settle this matter, he had soundings made in radial lines from the end of the jetties; and comparing the results thus obtained with those gained from a like series of soundings made in 1875, he finds that, instead of a bar being formed, there has been actually excavated, out of an area 1,100 feet square immediately in front of the jetties (which area must first be covered with deposit before a re-formation of a bar can occur) a mass of earth equal to 68,400 wagon loads. And this aggregate deepening has occurred while nearly 3,000,000 cubic yards of earth have been taken up, from the bar between the jetties, by the river current, in excess of the ordinary burden of sediment, and transported over this area out into the Gulf of Mexico. If the mass had been deposited over the area mentioned, it would have covered the space to the depth of about 18 feet. In fine, it is conclusively proved that a general deepening has occurred in 490,000 square yards of the area in front of the jetties, comprising the outer slope of the bar and the track of the river discharge, and thus the report of bar advance and shoaling in front of the jetties is shown to be without any real foundation. Captain Eads admits that this favorable phenomenon of deepening immediately in front of the jetties was unexpected to all the advocates of his system, and he ascribes it to the sea current which is induced by the prevailing winds, which blow almost constantly from between the northeast and southeast. The current resulting is driven westwardly beneath the river discharge, and excavates more room for itself as the volume from the jetties becomes gradually stronger. Captain Eads reports in conclusion

"In seventeen months after the passage of the act, and within fourteen months from the commencement of the work, the jetties have solved the problem presented at the mouth of the river. In their unfinished condition, they have withstood with but trifling injury two very severe storms, one surpassing in violence any known in the locality for many years; they have demonstrated the entire ability of the delta formation safely to sustain the works necessary to

control the river discharge; they have not been overturned by mud lumps, nor swallowed up in quicksands, nor undermined by the river current: and although largely over 3,000,000 cubic yards of earth have been swept out from between them into the Gulf, and the channel across the bar has been deepened from eight or nine to twenty-one feet, no evidences of a re-formation of the bar have yet to justify the belief that any extension of them will be necessary."

STEAM ENGINE SLIDE VALVES.

Some of our correspondents seem to have a difficulty in deciding as to the comparative merits of engines with single slide valves, and engines with separate cut-off valves. Take the following letter as a specimen:

"Can you explain clearly and definitely the difference in action between an engine with a single slide valve and one having two slide valves, one being a cut-off valve, there being a throttle in the steam pipe? And what are the advantages of the more modern cut-off engines, in which the governor acts upon the cut-off valve directly? I cannot find the information in any book, and none of the men in our shop seem to have precise information upon it."

If, with a single slide valve, sufficient steam lap is given to the valve to enable it to cut off the steam earlier than when the piston has traveled about three quarters of its stroke, the exhaust becomes cramped at the cylinder exhaust port, as explained in volume XXXII, page 101. Hence, to economize fuel by using the steam expansively during a greater portion of the stroke, the cut-off valves were added; and at the same time, to avoid the loss of steam due to long steam passages, the latter were placed at the ends instead of in the middle of the steam chest. This necessitated the employment of two steam valves and two cut-off valves, it being considered that the power required to operate the valves was more than compensated for by the steam saved by reason of the short ports.

The placing of the throttle valve in the steam pipe had the following defects: In the first place, the action of a governor takes place after the error which it is intended to remedy has actually occurred: or, in other words, the speed of the engine must be greater than it is intended to be before the governor balls will rise and correct the evil. So that there is an element of time between the acceleration of the speed of the engine and the diminution of the steam supply by the action of the governor and throttle valve. Now in order that the initial pressure of the steam supplied to the cylinder shall be as near that of the boiler as possible, a supply of steam is provided close to the cylinder, that is to say, in the steam chest; and when the engine is running at her proper speed, the pressure of this steam approximates to that in the boiler; and if the engine speed increases and the governor closes to a corresponding degree the throttle valve, there is nevertheless a supply of steam at full pressure which has passed the throttle, and is already in the steam chest; and its action is, to a great extent, to offset the effort of the governor.

Secondly, the throttle valve, by reducing, at the necessary times, the pressure of the steam in the steam chest, correspondingly reduces its temperature, inducing in the steam chest a certain amount of condensation of the re-entering full pressure steam, admitted when the throttle valve reopens wide. When, however, the governor is attached to the cut-off valve direct, the pressure (and temperature) of the steam in the steam chest is not affected by the governor, and continues, therefore, to be nearly that of the boiler. The advantage due to this will perhaps be more readily perceived if we suppose that the throttle valve is the steam pipe, and that, the engine load having suddenly lightened, the throttle partly closes, thus reducing the pressure of the steam in the steam chest and cylinder. If, then, the engine load suddenly augments, and the throttle opens wide, the inflowing steam is required to restore the pressure in the chest before it can restore it in the cylinder. In other words, the space requiring its steam pressure to be increased is the contents of the steam chest as well as of that part of the cylinder in open communication with the steam chest.

The action of a governor attached directly to the cut-off valve is that, so soon as the engine load lightens, the supply of steam to the engine cylinder is lessened by cutting it off earlier in the stroke: and there is hence a direct relation existing, at all times, between the engine duty and the consumption of steam, the engine speed being reduced by the extra degree of expansion employed, instead of by wire-drawing the steam. In addition to these advantages, most of the modern cut-off devices are given a motion which opens and closes the steam ports very suddenly, inducing a greater initial pressure of steam in the cylinder and obtaining a more sharply defined point of cut-off.

MORE CENTENNIAL AWARDS.

Another lengthy list of Centennial awards has been published, and the New York Times has still better ground for its witty suggestion that people will before long begin to seek for exhibitors who did not receive honors, under the idea that the true mark of distinction lies in failing to obtain any judicial notice whatever. Meanwhile it is amusing to notice the efforts which many of the successful exhibitors, and most especially the sewing machine and piano men, are making to convince the public that each and every one of them obtained the first and best and highest premium. Four piano firms are lavishly advertising the fact, and reinforcing their assertions with extracts from the judges' reports, which quotations, when considered together, show that the judges avoided an obvious dilemma by characterizing all the pianos as excellent, as doubtless they were, and leaving the rival makers to wrangle over their grammars and dictionaries in determining the exact comparative signification of the high sounding adjectives employed. Of

course (and every one who has taken the trouble to comprehend intelligently the system of awards knows it) there are no "first premiums," and it is only uselessly to infer ignorance on the part of the public to blazon forth any claim to such. The regulations of the Centennial Commission on the subject are as follows: "Fourth: Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purpose intended, adaptation to public wants, economy, and cost. Fifth: Each report will be delivered to the Centennial Commission as soon as completed for final award and publication. Sixth: Awards will finally be decreed by the United States Centennial Commission, and will consist of a diploma with a uniform bronze medal and a special report of the judges on the subject of the award."

The cardinal object of the system is to avoid gradation. The judges simply write reports on exhibits which they deem commendable, and the Centennial Commission thereupon decides which out of the exhibits so reported upon are entitled to the medal and diploma. From the length of the lists, it is safe to believe that few if any of the objects commended by the judges were denied the distinction: and inquiry among several exhibitors in this vicinity reveals the further fact that, in most cases, those who did not receive judicial notice and a report owe it to their own neglect and misapprehension in not entering for competition, or in failing to send in the required description to the judges, or in some other wise not complying with the regulations of the Exposition.

We do not think that any one will regard the medals and diplomas as of any especial importance. Some system of the kind had to be devised, else exhibitors would be dissatisfied at being denied their usual stimulus. The defects of the old anonymous jury system, with its multifarious gold and silver medals, are well known, and the present plan was adopted as a better substitute. It gives everybody a premium, and that is excellent, and likely to cause universal gratification. The real distinction, however, lies in the reports; and when an exhibitor receives a document signed by such experts as Dr. John Anderson, or Professor Reuleaux, or Dr. Nordenskjold, or Captain Eads, all of whom are judges besides many other eminent gentlemen, pointing out the merits of his device, showing wherein it excels, and thus lending the weight of their high authority in his support, then he has something worth any number of meaningless medals; and if he fails to publish that report, and to advertise the fact that he has received it, and the object he received it for, over the whole land, he simply neglects his best interests and throws away the greatest benefit which the Centennial Exposition can secure to him. And this we strongly advise our readers to do: Do not claim "first premiums," for that is nonsense; but procure a copy of the report (and every exhibitor is legally entitled to that), and publish it along with such a description of the invention that the public may see what has been accomplished, and what the accomplishment has earned.

We give below some further names of manufacturers and inventors well known to our readers, who have received favorable reports and awards: H. W. Johns, for asbestos and its adaptations to roofing, paint making, engine packing, boiler covering, cement, etc.; Dixon Crucible Company for graphitic crucibles; Morris, Tasker & Co., gas works machinery; Charles Pratt & Co., petroleum products; General M. C. Meigs, for hydrodioptric light; Odorless Excavating Company, for cesspool cleaning machine; W. D. Andrews & Brother, for centrifugal pumps; Lathrop Anti-Friction Company, for lubricant; Jerome Wheelock for automatic cut-off engine; George B. Brayton, for hydrocarbon engine; and Professor R. H. Thurston, for metal-testing machine.

A Remarkable Fish Dinner.

The fish culturists who have recently been in session at the Centennial Exposition treated themselves, during their stay in Philadelphia, to a fish dinner, which is certainly extraordinary and unique in its way. The bill of fare embraced fifty-eight different kinds of fish, and in its entirety is much too long for publication here. Some of the delicacies, however, are remarkable. Under the head of *hors d'œuvres froids*, (the *menu*, by the way, is organized with the utmost elaboration) we find Norwegian pluck fish, Portuguese conger eel, and Spanish conger eel with tomatoes, Turkish botargoes or mullet roes, Japanese shake or dried salmon, crayfish from the Cape of Good Hope, French tunny fish, Chinese white and black shark fins, Alaskan oolachans, Portuguese sword fish and squid, Russian caviar, Chinese dried fish maws, and, most astonishing of all, "desiccated octopus eggs." Noted scientists are honored by having their names applied to the various sauces. Thus we have *filet* of English soles à la Buckland, sheepheads, Agassiz sauce, aspice of eels à la Huxley, and *bisque* of lobster, Seth Green style. It was a memorable feast, and taxed the culinary skill of the cooks at the Centennial to the utmost. One particular dish seems to have puzzled even the most ingenious chefs, and that was kanten (Japanese seaweed) à la Sekizawa Akeio. The aid of the Japanese cook in the employ of the Japanese Commission was at last invoked, and he proved equal to its toothsome preparation.

AN agricultural society in Massachusetts, desiring to encourage tree planting and the re-forestation of poor lands in that State, have offered prizes for the best plantations of larch, pine, ash, and other trees suited to different localities and soils. The prizes range in amount from \$400 to \$1000, and special instructions are published to guide competitors.