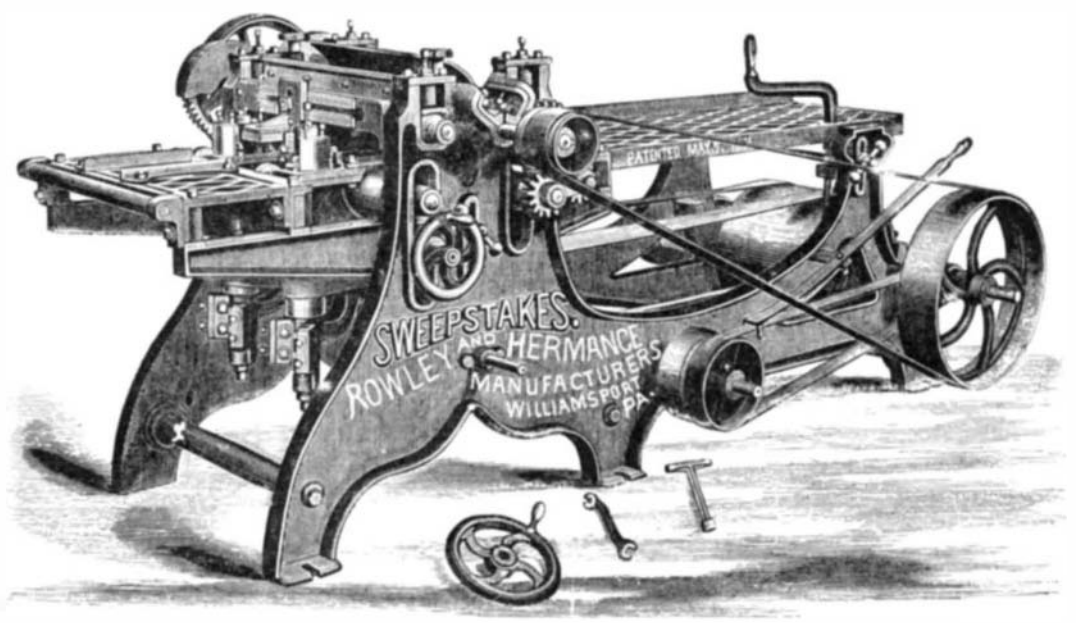
THE SWEEPSTAKES PLANER AND MATCHER.

Good judges of mechanical design will appreciate the well-balanced, light, yet strong construction of the efficient planer and matcher illustrated in the accompanying engraving. With a weight of from 2,100 to 2,500 lbs., according to capacity, it contains all that is essential to a first class machine. It offers also several novel features of great merit, among them its solid forged steel head and steel matcher spindles, running in the Ellis patent journal boxes shown in the lower right hand corner of the engraving. By means of this improvement the journal can be kept central and tight until the box is worn out, thus preventing any tremble and jar of the shaft, a very important gain where smooth work is required. The machine can be quickly and easily changed to a surfacer, simply by loosening two nuts and removing the matcher head, when the spindles will swing below the surface of the table. When required again the spindles can be swung into position without measuring or other delay. A shaft, crossing the machine behind the matcher heads, carries a head with cutters, to be used in making California rustic siding, beaded ceiling, small mouldings, and the like.

The machine has four 4½ inch feed rolls, connected with expansion gear, securing a powerful feed of 45 feet a minute. It has two pressure bars, one in front and one back of the head; and the rolls are held down by forged steel coil springs. The long table makes room for the long gauge indispensable in a good flooring machine. The countershaft is heavy, and is fitted with tight and loose pulleys 10 inches in diameter and 6 inches face. It should run 900 revolutions a minute.

Further information, if desired, may be had of Messrs. Rowley & Hermance, Williamsport, Pa., who also manufacture a large variety of other wood-working machinery.



THE SWEEPSTAKES PLANER AND MATCHER.

An Educated Seal.

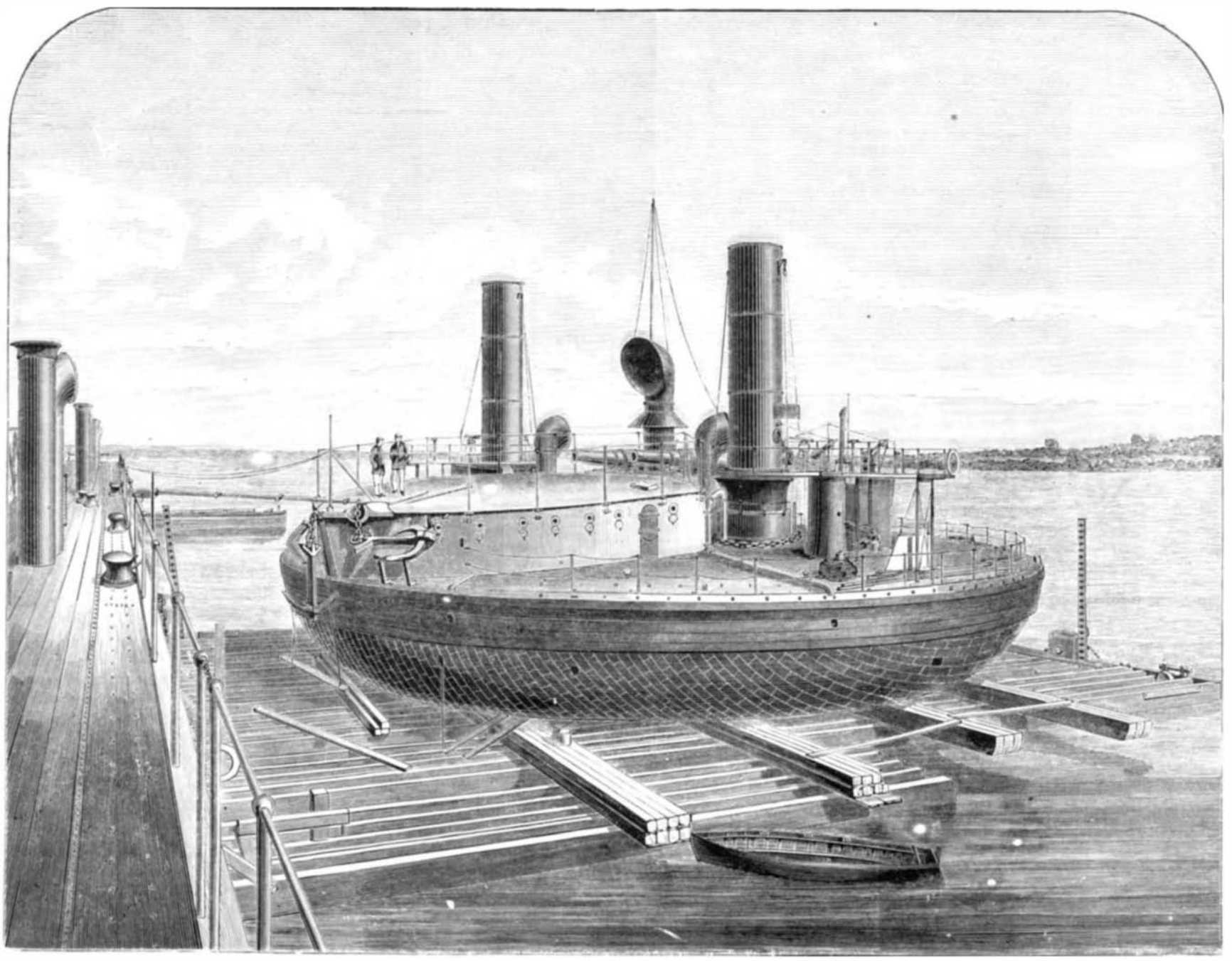
The naturalist of the Westminster Aquarium has been experimenting on a young seal, training it to perform many curious tricks. A London exchange says the seal now goes through a performance which includes plucking the strings of a guitar, beating a tambourine, climbing a flight of steps, taking a "header," smoking, or pretending to smoke, a pipe, firing a revolver, and drawing a boat to which it is harnessed.

The performance to meet public taste is made more sensational than anything M. Leconte did, who had some trained seals at the Zoological Gardens; but the way in which the seal enters eagerly into the fun, with a keen eye on the fish given to it now and then in its performance, is a good illustration of how these animals can be educated.

NICOLAIEFF DEPOSITING FLOATING DOCK.

The accompanying perspective view, which we take from *Engineering*, represents the Nicolaieff floating dock, a structure which, from the novelty and boldness of its design, possesses more than ordinary interest. The engraving shows the dock carrying one of the Russian circular ironclads, the Novgorod. This ironclad is 101 feet in diameter, and weighs 2,450 tons. The dock has also been successfully used for raising the other ironclad, the Vice-Admiral Popoff, which is 121 feet in diameter, and weighs 3,850 tons.

This dock consists of a series of pontoons, each 72 feet long, 18 feet deep, and 15 feet broad, placed 5 feet apart, and connected with a pontoon, 280 feet long, 44 feet 6 inches high, and 12 feet broad. The structure resembles a comb, the larger pontoon forming the back; the smaller ones the teeth. An outrigger connected with the larger pontoon opposes and counteracts the oscillations of the smaller ones. The smaller pontoons are submerged by allowing the water to enter, the vessel is floated over them, when the water is pumped out by machinery carried by the longer pontoon. The keel takes its bearing on the blocks, and the bilge blocks are hauled into place by chains in the usual manner. This dock appears to have met very successfully the difficulty of dealing with exceptionally broad vessels. It can deal with vessels of 150 feet beam, and the system upon which it is constructed is such that it can be very readily extended to take any greater widths or lengths required. It is capable of depositing the vessels lifted by it on fixed stages erected along the shore. In these days when there are decided indications of growth in the beam of our ironclads, this system of dock promises to be of much value, as when a dock of this kind is available, the restrictions in width which ordinary graving docks impose are at once removed. The facility with which this system of dock can be extended, and the manner in which the sections of which it is composed admit of variation of arrangement to suit different conditions, are also many points in its favor, and altogether the dock at Nicolaieff deserves to be the forerunner of many others.



THE NICOLAIEFF FLOATING DOCK.

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Railway Notes.

A LOCOMOTIVE electric light has been constructed in England for railway use. It consists of a light six horse power four-wheel locomotive, with a dynamo-electric machine attached. Any electric light can be used. When the engine is moving along the line, the electric machine rotates at its proper speed, and when it is necessary to stop in order that the light may be directed on some particular spot, the driving wheels are thrown out of gear by means of the disengaging handle attached to the pinion on the crank shaft, and the machine ceases to be locomotive, while the engine continues to move the dynamo machine at its proper velocity. The engine is furnished with sensitive governors, so that the speed of the dynamo machine may be accurately regulated, which is very important in order to insure a bright and continuous light. If required, this engine is sufficiently powerful to drive two electric machines. The arrangement is compact, and the engine may be used during the day for pumping, sawing, drilling, or any other purpose for which this type of engine is usually employed.

THE engineers of Europe are watching with considerable interest the behavior of the American locomotive exhibited at Paris by the Reading Railway Company, and since then a working exhibition on the Northern Railway of France. The *Continental Gazette* states that recently Messrs. Delbec and Bandasalli, of the Northern Railway, accompanied by a party of gentlemen, among whom were Messrs. C. Geshardt and A. Mensier, of the Eastern Railway; Henry Mathieu, of the Midi Railway; David Woeflin, of the Orleans Railway; B. Meissonnier, Inspector-General of Mines; and a number of other eminent engineers, made a journey with it to Persan-Beaumont, passing over the heaviest grades and shortest curvatures of the line, and were enthusiastic in their praise of the powerful effort of the engine, and the very great smoothness and steadiness with which it passed around the shortest curves. Mr. Wootten, the General Manager of the Reading Railway Company, who was also of the party, has since taken the locomotive to Switzerland and Italy, for the purpose of demonstrating the desirability of anthracite coal for fuel for locomotives in those countries.

THE *Railroad Gazette* discusses the possible displacement of wooden cars by cars of iron. The question of economy, based on relative cost and endurance as determined by actual experience, is figured out as follows, assuming the mileage of freight cars to be 15,000 miles a year, which is about the average on most American roads. From data in hand the cost of maintaining a wooden car at 0·5709 cent per mile is found to be $85.63 per year. If it costs 0·0922 cent less to maintain an iron car, the cost per year would be only $71.80, or $13.83 less than the cost of maintaining a wooden car. The latter sum is 7 per cent interest on $197.57. Let us assume now that a wooden car costs $450, and an iron one $197.57 more, or $647.57, and let us then calculate the cost of service on this basis, and if we leave out of the account the interest on the money expended, at the end of 10 years the wooden car would have cost $1,306.30, and the iron car $1,365.57. Supposing, though, that the life of the wooden car is 10 years, and that of the iron car 15, then the whole cost of the service per year of the former would be $130.63, whereas that of the latter would be $114.97. It should be said that these figures are not given as representing anything except the possibility that the economy they indicate may be realized by the use of iron cars.

GERMANY has 20 locomotive shops, with an aggregate capacity of 1,922 a year. The largest of these, Borsig's, at Berlin, had turned out 3,750 locomotives at the close of 1878; the second in capacity had made in all 2,600; the third and fourth, 1,700 each; the fifth, 1,250; and four others from 90 to 980 each. Speaking of the first named, a German contemporary says: "One of the proudest monuments of the iron trade of Germany, the Borsig locomotive and machinery works, are, it is reported, about to be closed for an indefinite period. For some time past they have had to be kept going out of savings, and this the trustee of the Borsig estate declines to continue to do any longer. The works have been conducted at a loss for so many years in succession that they threaten to swallow up the entire estate. The late Borsig kept the works open for the purpose of finding bread for his numerous workmen, the thought of whose dispersion and distress was painful to him." There are 5 locomotive works in Austria-Hungary, and 3 in Switzerland, though one of the latter has turned out no locomotives since 1867. One of the Austrian works belongs to a railroad company; it has built 1,560 engines, and can turn out from 80 to 100 yearly.

THE received opinion, as to the relation between the hardness of steel rails and their wearing capacity, has been that, barring the tendency of a hard steel to be brittle, the harder the rail the better it would wear. Dr. Dudley, Chemist of the Pennsylvania Railroad, finds the experience of that road to be different, and is rather of the opinion that under the conditions of wear to which a steel rail is subjected, namely, rolling friction, unlubricated surfaces, and great weight with small bearing surface, the quality of the metal necessary to most successfully withstand the disintegrating forces is best expressed by the word toughness, and not by hardness. He says: "Some two years ago the Pennsylvania Railroad Company, in view of the unsatisfactory wear it was obtaining from its steel rails, asked to have more carbon put into its rails, with a view of making them harder, to resist wear. Before the increase the limits of carbon for rails to be used on Pennsylvania Railroad was from 0·30 to 0·50 per cent. After the increase the limits were from 0·40 to 0·50 per cent, thus securing on the average, perhaps, about a tenth of a per cent more carbon in the steel. Now Mr. W. H. Brown, Chief Engineer Maintenance of Way, Pennsylvania Railroad, informs me that these rails of higher carbon are giving poorer wear than before the lower limit of carbon was raised. This opinion of Mr. Brown is based on his observation of the wear of these higher carbon rails, and on the number of renewals of these rails rendered necessary by the condition of the track." This experience appears to be in harmony with that of the General Manager of the Barrow Hæmatite Steel Works, England, Mr. J. T. Smith, who, as early as 1875, expressed the conviction that, contrary to what might have been anticipated, greater hardness has not conduced to the longevity of the rails, and the softer ones show the minimum of wear.

IN their report for 1878, the Executive Committee of the Western Railroad Associations deprecate any movement to repeal or to seriously impair the integrity of the patent system, and say:

We believe that the gradual and continuous reduction in the rates of fare and freight which has taken place would have been impossible without the economy of the labor-saving and operative devices which invention has furnished. It is evident that while "railroading" is being gradually more and more reduced to an exact though unwritten science, and while its masters are members of a profession that is growing in wisdom and importance, still, that further reduction in fares and freights, which the logic of events will make necessary in the future, is dependent largely upon further improvements which the inventive genius shall furnish. It is seriously doubted by some whether invention has not been stimulated too much in some of the arts—as that of agricultural implements. It is, however, difficult to see how the inventor can in any way do too much in the matter of reducing the cost or increasing the facilities of transportation. If, then, it is in any sense good policy for the government, by arbitrary means and the offering of special inducements, to stimulate invention, so much more is it wisdom for transportation companies to use every proper means toward the same result.

Again, the right of the inventor to his invention, though a statutory right, is also a property right, and entitled to respect as such. The spirit which would knowingly deprive an honest, original inventor, or his assignee, of his right, or of the reward due for its use by another, simply because it is a patent right, is the same as the spirit which plunders a railroad corporation simply because it is a railroad corporation.

Labor in New York City.

The *Herald* is responsible for the following table giving the number of unemployed mechanics and laborers in the city in 1873, the first year of "hard times," and the corresponding figures for the present time; also the average wages received by each class of workmen then and now.

The *Herald* remarks that, when it is remembered that the present number of idle men is not far in excess of the average in ordinary prosperous years, it will be understood how encouraging is the prospect for the coming spring season.

	1873		1879	
	Average wages per day.	No. unemployed.	Average wages per day.	No. unemployed.
Laborers (all kinds)	$2.00	10,000	$1.10	3,000
Carpenters	2.50	2,000	1.75	1.000
Masons & stone-cutters	3.50	1,500	3.00	1,000
Bricklayers	3.50	2,000	2.25	800
Plasterers	3.50	1,500	2.00	600
Painters	3.50	1,000	2.00	800
Roofers	3.00	300	2.00	100
Moulders	2.50	250	2.25	150
Sawyers	2 50	50	1.90	25
Harness makers	3.00	50	2.50	40
Blacksmiths	3.00	300	2.00	100
Longshoremen (ship work)	4.50	1,000	2.50	100
Cabinetmakers	2.55	500	1.75	200
Boxmakers	2.75	200	1.80	150
Printers	3.50	800	2.00	600
Wagonmakers	3.00	200	2.50	100
Brass finishers	3.50	200	2.50	50
Engineers	3.00	500	2.00	400
Ironworkers	2.50	1,500	2.00	1,000
Tailors (custom)	4.50	200	2.50	50
Jewelers	3.25	50	2.25	30
Shoemakers	3.50	500	2.00	200
Capmakers	2.50	200	1.70	50
Cigarmakers	3.00	500	1.75	300
Weavers	3.00	100	2.00	50
Total		25,400		11,395

The Welding of Metals at Low Temperatures.

Some time ago, in order to estimate the amount of hydrocyanic acid in a solution, Mr. Charles A. Fawsett, of Glasgow, Scotland, precipitated it with silver nitrate. After having filtered and washed the precipitate, he reduced it to the metallic state by heating to the required temperature. Just as he was about to allow it to cool he noticed a small piece of dirt among the reduced silver. In order to separate them he took a thin platinum wire and pushed the silver to one side, but on attempting to take the wire away the silver remained in contact with it. As he thought this curious, he tried the following experiment: He took a piece of silver foil, about one centimeter square, placed it in an inverted porcelain crucible lid, and heated it to about 500° C.; then he brought into contact with it the extremity of a thin platinum wire, and to his astonishment the wire raised the silver from the lid, and it remained in contact when cold.

The silver being so much below its melting point its behavior puzzled him, so he wrote to Sir W. Thomson for an explanation. On witnessing the experiment Sir William pronounced it a remarkable case of "cohesion," the two metals, in fact, "welding," although the temperature was far below the melting point of silver. Mr. Fawsett says that the experiment can be performed successfully at lower temperatures than 500° C. if smaller pieces of foil are taken; and that other metals, for instance copper and aluminum, cohere to silver in the same manner as platinum, but less strikingly.

A Universal International Exhibition of One.

Signor Louis Josue Raynusso, of Santa Clara Mill, Lima, Peru, proposes a grand universal contest, to take place in Rome, Italy, during the month of October, 1879. His experience and study have inspired him with the profound conviction that water power is not so widely nor so wisely employed as it might be; also that he has unequaled plans for obtaining the following results, to wit:

To canalize any waterfall; to elevate the water of any river so as to employ it in the irrigation of high grounds; to perfect the system now in use for grinding corn and other grain; to modify advantageously the current mode of making bread, biscuits, and vermicelli.

To test the question, he proposes the competition above named, with prizes to be furnished by himself. The first prize of 100,000 francs is offered for the best three plans of works, edifices, and machinery, as follows:

I. Of a large establishment to contain four manufactories, as follows:

1st. A model mill to grind wheat and other kinds of grain, with its proper machinery moved by hydraulic power, and stores to keep the grain, flour, and bran.

2d. A factory for the manufacture of bread, with all the necessary facilities and advantages for this industry.

3d. A factory for the manufacture of crackers, with the above conditions.

4th. A factory for the manufacture of vermicelli with the same conditions.

II. To employ the water of a river, by means of a new system of canalization, in irrigation, and for the factories worked by hydraulic power.

III. A new system to control any fall of water, regulate it, and employ the same as motive hydraulic power in factories.

If only two plans among all those exhibited shall equal his, he will pay 50,000 francs; if only one, 25,000 francs. A further reward of 2,000 francs is offered for each piece of machinery, either cast, in wood, or drawn, of a new pattern and useful to the mill industry, provided it be superior to those exhibited by him.

Also a reward of 1,000 francs for each improved piece of machinery, either cast, in wood, or drawn, of those actually employed in the mill industry, provided it be superior to those employed by him.

The jury is to be formed from judges selected by the candidates. The contest is open to all the world.

The plans of the several candidates will be accepted at Rome by a commission appointed *ad hoc*, until the 1st day of September, and none afterward.

Reporting Machine.

Among apparatus which may be called literary aids—writing, calculating, and other machines—seen at the Paris Exhibition, was one which attracted much attention, and which has not yet been introduced into this country. It is known as *La Machine Sténographique Michela*, the name of its inventor. The claims made respecting it are very broad. In the first place, it is declared that after a fortnight's practice, any person of ordinary ability can take down in shorthand characters any speech, however rapidly delivered. It is a small instrument, piano like in form, with twenty-two keys, white and black, and the stenographic characters are small and impressed on slips of paper. Signor Michela claims to have classified all the sounds which the human organs of speech are capable of producing, and to have so constructed his machine that it shall report with unerring fidelity whatever is said, German, French, Italian, and Spanish, and it may be taken for granted that English is also included, as the exhibitors announce their intention of introducing the machine into this country. The inventor even believes that his machine will do much towards the realization of that philosophic dream, an universal language. To what extent the hopes of the inventor may be realized, of course remains to be seen, but the machine is certainly highly ingenious, and seems to work satisfactorily.

A New Method of Planting Telegraph Poles.

A new method of planting telegraph poles has been introduced in Pennsylvania. The ground is staked off at distances of 200 feet apart; a man starts off with cartridges of "electric powder," and with a crowbar in his hand. The bar is driven four or five feet into the ground, a cartridge with a lighted fuse is dropped into the hole, and the man proceeds to the next stake, but before he reaches it the cartridge has exploded, making a cavity as big as a flour barrel in the ground, and a gang of men who follow plant a telegraph pole in the spot. In this way four men will set up 100 to 150 poles per day, and at a cost two thirds less than by the old way.

Simple Mode of Silvering Metals.

Small articles may easily be coated with silver by dipping them first into a solution of common salt, and rubbing with a mixture of one part of precipitated chloride of silver, two parts of potassa alum, eight parts of common salt, and the same quantity of cream of tartar. The article is then washed and dried with a soft rag.

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