

Type-Setting Machines—Important Patent Decision.

In the United States Circuit Court, New York, on March 11, Judge E. Henry Lacombe granted a preliminary injunction against the New York Typograph Company and others, representing the Rogers patented type-setting machines, and in favor of the National Typographic Company and others, representing the Mergenthaler system. Strictly speaking, neither of the machines sets type, but type matrices are arranged, by the fingering of a keyboard in proper order and position for the casting of a line of type, and the latter operation is automatically performed, so that bars or slugs, representing a line of type each, are the product of the machine. It can be readily run by an expert operator at a speed of four to five thousand ems per hour, equal to more than a column of the *SCIENTIFIC AMERICAN*. The Mergenthaler machine was fully described and illustrated in the *SCIENTIFIC AMERICAN* of March 9, 1889, and August 9, 1890. Almost the entire work of the New York *Tribune* has been done on this machine for more than six years past, and other daily papers in different cities are using it, to the exclusion of type-setting in the ordinary way.

In the Rogers machine the solid printing bar is cast, but the mechanism by which it is accomplished differs in many respects from Mergenthaler's. Judge Lacombe in his decision holds:

That the machines manufactured and sold by the defendants may be lighter, smaller, cheaper, more easily operated, and more efficient; that they may be a decided improvement on the Mergenthaler machine, and may as such commend themselves more readily to the public; that they are themselves patented, and that, if put in open competition with the earlier machines, they would prove more attractive to purchasers and users—each of which points is pressed with great force by the defendants—is wholly immaterial if the complainants' main contention is a sound one, viz., that the Mergenthaler "linotype" is covered by a foundation patent; that it embodies a combination wholly new in the printing art, which marks the first great step in advance taken for over 400 years, and which, though susceptible, as all new foundation patents are, of subsequent improvement, has yet demonstrated its ability, practically and efficiently, to perform the work which it was designed to do. If, upon the case now presented, it appears that Mergenthaler is a pioneer inventor, he is to be secured the fruits of what he invented and covered by his patent, even as against a subsequent inventor, who, though he may have greatly improved it, still uses the original invention which lies at the foundation of the art. (See cases cited in notes to Section 894, Robinson on Patents.)

The product of the combination of machinery described in the patent and thus claimed is a line of type, cast in a solid bar, presenting on its printing edge any combination of letters and printer's marks which the operator may desire—produced automatically. By its use a great change is introduced in the printer's art, whereby the type-setting of single types is dispensed with, and the matter is set up from "slugs," or "bars," each containing, not a single letter, nor a single word, but any conceivable combination of words and figures. That such a change in the art is almost revolutionary seems to be practically conceded, the defendants insisting, however, that the merit of the invention which effected it must be shared so largely with others, earlier in the field, that Mergenthaler can at most claim but an extremely small part of it for himself. Upon the papers, however, it appears that Mergenthaler was the first man who united in a single machine the instrumentalities which, by means of the operation of finger keys, assembled, from magazines or holders, independent disconnected matrices, each bearing a single character, carried each individual character independently one by one to a common composing point, where they were placed in line, and were thereupon brought in contact with and closed the face of a mould, of the exact length of a predetermined line, into which mould, by the subsequent operation of the same machine, molten metal was injected and a cast taken, which cast consists of a line bar of type metal, having on its printing edge any desired combination of characters, and which is ready as it leaves the machine for imposition on the form. Some such combination was required to solve a problem with which inventors in the field of the printer's art had struggled for years, and there is not found in any of the earlier patents and methods which have been put in evidence by the defendants anything which fairly anticipates it.

The patent which covers it may, therefore, be fairly considered a foundation patent, and its claim should be broadly construed. When thus construed, infringement seems plain. Though there are differences in the form and structure of the intermediate mechanism, tending to simplicity and perhaps improvement, and in the form of the casting mechanism, still each of these mechanisms as it is embodied in the defendants' machine performs the same function as the corresponding mechanism in the Mergenthaler machine, in substantially the same way, and they are combined to produce the same result. The combination which is covered by the claim is the same in both. There is

sufficient here to fortify the presumption of the patent, especially as there seems so little real question about either its validity or the infringement of the claim above quoted by defendants' machine.

EXPERIMENT IN SPECIFIC GRAVITY OF FLUIDS.

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The illustration shows a very interesting experiment on the law of the specific gravity of liquids, which, simple as it is, presents a very good exposition of the phenomena brought out by the operation of this law. A strong solution of potassium bichromate in hot water is made in a test tube. By boiling the water and adding the salt as long as it dissolves, an exceedingly strong solution can be produced. It is then cooled. This cooling is best effected by placing the test tube in a beaker of cold water with its mouth upward in the regular position. As it cools, the bichromate of potash rapidly crystallizes from the supersaturated solution, and the building up of these crystals is in itself an exceedingly interesting process to watch. When it has cooled, the experiment proper can be carried out.

A beaker is filled with cold water. The test tube is next filled to the brim. It is closed with the thumb, and the mouth of the test tube is immersed in the water of the beaker and then released. The object is to prevent the admission of any air whatever. As soon as this is done, the bichromate of potash in what is now the upper end of the test tube begins to dissolve. As it dissolves, it forms a solution heavier than the water, and pours in a stream down the lower side of the test tube, through the water, to the bottom of the beaker. It inevitably mixes more or less with the water surrounding the streams, but at the same time the course can be distinctly traced by holding the

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beaker against the light. At the same time a stream of clear water can be observed, rising along the upper walls of the test tube to supply the place of the heavy fluid escaping therefrom. It is easy to see that carried out with the proper tank and a small test tube, this experiment would form an admirable illustration for projection by the magic lantern.

The same experiment has its useful application. The principle is used in the laboratory for dissolving the melted mass from sodium carbonate fusions, as in the analysis of iron ores, etc. For cleaning out battery jars, in which very hard crystals of chrome alum often form, or for dissolving the same crystals in bottles in which battery solutions which are partially exhausted have been kept, the same method is applicable. By a little manipulation the battery jar or bottle can be inverted in a bucket of water, itself being full. It is well to support it on a couple of bricks, or by other means, as far above the bottom of the bucket as possible, in order to admit of the free escape of the strong solution thus formed. An inclined position, as favoring the regular ascent and descent of the two columns of liquid, is also to be recommended where the process is practically applied. Crystals quite irremovable by ordinary means can thus be dissolved, and the bottle or jar saved. Sometimes several hours are required, and it is also well to renew the water in the bucket or other receptacle. Care must be taken to admit no air.

Canal Enterprises.

Up to December last over \$45,000,000 had been expended on the Manchester ship canal, to provide an adequate waterway to the ocean from this great manufacturing center of the north of England. It is now found that about \$20,000,000 more will be required to complete the work, which is a good deal larger sum than the canal company can command, and the city of Manchester has been asked to extend its credit to the enterprise to the amount of \$15,000,000, the outside public having failed to subscribe for debentures to form a first charge on the property. The work has been somewhat interfered with during the winter, but is

now being energetically pushed forward at many points. A committee of the Manchester corporation has advised the giving of the required assistance to the enterprise.

The constructors of the ship canal across the Isthmus of Corinth appear to have met with unexpected difficulties. This company was reorganized in 1889, and great preparations were then made for pushing the work, workshops being erected along the line and an adequate plant provided. It is now stated, however, that sufficient slope was not given to the argillaceous banks, and that it has been necessary to protect large sections with solid masonry. The section to be cut being frequently as much as 250 feet vertically, it is now apparent that the amount of earth to be removed will be enormously in excess of what had been contemplated, or the canal will have to be protected throughout its whole length with solid masonry—in either case greatly increasing the cost.

Although it would seem that the Panama Canal is now quite dead, there yet appear to be people in France who entertain hope of a revival of the project in some form. One scheme to this end is that of M. Amedée Lebillot, who proposes to connect the two unfinished portions of the canal by means of a ship railway, the work to be completed in three years at a cost of \$50,000,000. The locomotive it is proposed to use on this railway is in the form of a ship's cradle having propelling mechanism in the interior, the cradle to be sunk under the vessel, draw it out of water, make the journey overland in two hours, and as promptly float the ship in the other section of the canal.

In spite of the disaster that has overtaken the work at Panama, there is every reason to feel encouraged by the progress that has been made at Nicaragua. The latter route was equally open to the French engineers, and it is safe to say that, with half of the money which has been irretrievably sunk at Panama, they might by this time have had in successful operation a practical ship canal for the largest vessels through Lake Nicaragua to the Pacific Ocean. Ex Senator Warner Miller, President of the Nicaragua Canal Construction Co., with several engineers and other assistants, sailed from New York for Nicaragua on March 14. Only about four million dollars have now been expended upon the work, but very substantial results are apparent in the opening of a safe harbor at Greytown, the clearing away of the route and the construction of a railway on the line to the principal "divide," with the erection of workshops and the providing of all necessary facilities for an energetic attack upon the main difficulties of the undertaking.

The engineers estimate the cost of the whole work at \$65,000,000, but Mr. Miller places it at about \$100,000,000, with interest accruing during construction. The projectors hope, as do the Foreign Affairs Committee of the United States Senate, that the government will become interested to the extent of guaranteeing the bonds of the company at a low rate of interest, thus keeping the control of the canal in American hands, but they have no distrust of their own ability to provide all the funds necessary, and are not delaying the construction to wait for government assistance. Mr. Miller has a high reputation as a capable and successful business man, and he has entered upon this enterprise as a practical project, to be worked out by dollars and cents, in the full confidence that the investment will be a good paying one to all who put money in it, as well as of high importance in the development of American commerce.

Among other important canal projects, one which of late attracted considerable local attention is the plan for a water connection of Pittsburg with Lake Erie. The route has been several times surveyed, but the exact course which would be most practical has not yet been fully determined. The matter was recently reported upon by a Pennsylvania State commission, and the cost of such a canal was put at \$27,000,000. Pittsburg is now using such large quantities of Lake Superior ores that the railroad freights have become a large item in her iron and steel manufactures, and the competition of Southern iron producers has become so sharp that every possible economy must be studied or Pittsburg will be in danger of losing her established prestige in this branch of industry. It is figured that the construction of this canal would reduce the cost of transporting ore to Pittsburg from Lake Superior by about two dollars a ton.

HIGH PLACES.—The highest place in the world regularly inhabited is stated to be the Buddhist monastery Haine, in Thibet, which is about 16,000 feet above sea level. The next highest is Galera, a railway station in Peru, which is located at a height of 15,635 feet. Near it, at the same level, a railway tunnel 3,847 feet in length is being driven through the mountains. The elevation of the city of Potosi, in Bolivia, is 13,330 feet; Cuzco, Peru, 11,380 feet; La Paz, Bolivia, 10,883 feet; and Leadville, Colo., 10,200 feet.