

DECISIONS OF THE COURTS RELATING TO PATENTS.
United States Circuit Court.—District of
Massachusetts.

AMERICAN BELL TELEPHONE COMPANY *et al.* vs. ALBERT
SPENCER *et al.*

Opinion of the Court, June 27, 1881.

Lowell, J.:

The bill alleges an infringement of two patents granted to Alexander Graham Bell. The defendants admit that they have infringed some valid claims of the second patent, but the plaintiffs are not content with this admission; they rely besides upon the fifth claim of the first patent, which is much more comprehensive in its scope.

Patent No. 174,465, issued to Bell, dated March 7, 1876, is entitled "Improvement in Telegraphy," and is said in the specification to consist in "the employment of a vibratory or undulatory current of electricity in contradistinction to a merely intermittent or pulsatory current, and of a method of and apparatus for producing electrical undulations upon the line wire." The patentee mentions several advantages which may be derived by the use of this undulatory current, instead of the intermittent current, which continually makes and breaks contact, in its application to multiple telegraphy; that is, sending several messages, or strains of music, at once over the same wire; and the possibility of conveying sounds other than musical notes. This latter

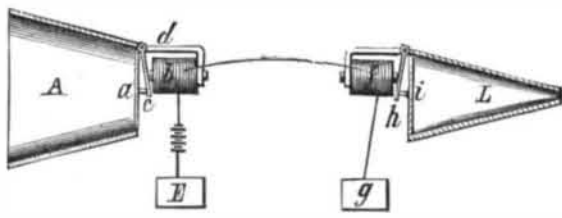


Fig. 7 Bell's Patent, March 7, 1876.

application is not the most prominent in the specification; though, as often happens, it has proved to be of surpassing value. This part of the invention is shown in Fig. 7 of the drawings, and is thus described in the text:

"The armature, *c*, Fig. 7, is fastened loosely by one extremity to the uncovered leg, *d*, of the electro-magnet, *b*, and its other extremity is attached to the center of a stretched membrane, *a*. A cone, *A*, is used to convey sound vibrations upon the membrane. When a sound is uttered in the cone, the membrane, *a*, is set in vibration, the armature, *c*, is forced to partake of the motion, and thus electrical undulations are created upon the circuit, *E*, *b*, *e*, *f*, *g*. These undulations are similar in form to the air vibrations caused by the sound; that is, they are represented graphically by similar curves. The undulatory current passing through the electro-magnet, *f*, influences its armature, *h*, to copy the motions of the armature, *c*. A similar sound to that uttered in *A*, is then heard to proceed from *L*."

With the Figure 7 before us, this description is readily understood. A cone of pasteboard, or other suitable material, has a membrane stretched over its smaller end; at a little distance is a piece of iron magnetized by a coil through which is passing a current of electricity. When sounds are made at the mouth of cone, *A*, the membrane vibrates like the drum of a human ear; and the armature, which is directly in front of the magnet, vibrates with the membrane, and its movements cause pulsations of electricity like those of the air which excited the membrane, to pass over the wire; and the wire stretches to another similar magnet and cone with its membrane and armature. The second armature and membrane take up the vibrations and make them audible by repeating them into the condensing cone, *L*, which translates them into vibrations of the air.

The defendants insist that the instrument represented in Fig. 7 will not transmit articulate speech; that this great result has been reached by Mr. Bell entirely through the improvements described in his second patent, such as the substitution of a metal plate for the stretched membrane, and some others.

The importance of the point is, that if Bell, who is admitted in this case to be the original and first inventor of any mode of transmitting speech, has not completed his method, and put it into a working form when he took his first patent, he may lose the benefit of his invention; because, in his second patent, he makes no broad claim to the method or process, but only to the improvements upon a process assumed to have been sufficiently described in his first patent.

There is some evidence that Bell's experiments with the instrument, described in Fig. 7, before he took out his patent, were not entirely successful; but this is now immaterial, for it is proved that the instrument will do the work, whether the inventor knew it or not, and in the mode pointed out by the specification.

The fifth claim of this patent is for

"The method and apparatus for transmitting vocal or other sounds, telegraphically, by causing electrical undulations, similar in form to the vibrations of the air accompanying the said vocal or other sounds, substantially as set forth."

The defendants use a method and apparatus for transmitting vocal sounds, which resemble those of the plaintiffs in producing electrical undulations copied from the vibra-

tions of a diaphragm, and sending them along a wire to a similar receiver at the other end. The specific method of producing the electrical undulations is different. It is made on the principle of the microphone, which has been very much improved since the date of the first Bell patent.

If the Bell patent were for a mere arrangement, or combination of old devices, to produce a somewhat better result in a known art, then, no doubt, a person who substituted a new element not known at the date of the patent, might escape the charge of infringement. But Bell discovered a new art—that of transmitting speech by electricity—and has a right to hold the broadest claim for it which can be permitted in any case; not to the abstract right of sending sounds by telegraph, without any regard to means, but to all means and processes which he has both invented and claimed.

The invention is nothing less than the transfer to a wire of electrical vibrations like those which a sound has produced in the air. The claim is not so broad as the invention. It was, undoubtedly, drawn somewhat carefully in view of the decision in *O'Reilly vs. Morse*, 15 How. 62, and covers the method and apparatus; that is, any process and any apparatus of substantially similar character to those described. The patent points out distinctly that the undulations may be produced in other modes besides the vibration of an armature in front of a magnet; and the defendants make use of a mode not wholly unknown at that time, though much improved, in creating their undulations.

It seems to me that the defendants use both the method and the apparatus of Bell. The essential elements of the method are the production of what the patent calls undulatory vibrations of electricity to correspond with those of the air, and transmitting them to a receiving instrument capable of echoing them. Granting that the defendants' instrument for converting the vibrations of the diaphragm into vibrations of electricity is an improvement upon that of the plaintiffs, still it does the same sort of work, and does it in a mode not wholly unknown at the date of the patent; though I do not consider that material.

An apparatus made by Reis, of Germany, in 1860, and described in several publications before 1876, is relied on to limit the scope of Bell's invention. Reis appears to have been a man of learning and ingenuity. He used a membrane and electrodes for transmitting sounds, and his apparatus was well known to curious inquirers. The regret of all its admirers was, that articulate speech could not be sent and received by it. The deficiency was inherent in the principle of the machine. It can transmit electrical waves along a wire, under very favorable circumstances, not in the mode intended by the inventor, but one suggested by Bell's discovery, but it cannot transmute them into articulate sounds at the other end, because it is constructed on a false theory, and the delicacy of use required to make it perform part of the operation is fatal to its possible performance of the other part. A Bell receiver must be used to gather up the sound before the instrument can even now be adapted to a limited practical use. It was like those deaf and dumb pupils of Professor Bell, who could be taught to speak, but not to hear. That was all, but it was enough. A century of Reis would never have produced a speaking telephone by mere improvement in construction.

I am of opinion that the fifth claim of patent No. 174,465 is valid, and has been infringed.

The statute declares that if a patentee has claimed too much in any part of his patent he shall not recover costs, and it has been argued that certain claims of these patents, not relied on by the plaintiffs, are too broad. In this stage of the case the question of costs does not arise; but I may as well say, that there is not sufficient evidence in the record to enable me to find whether these claims are valid or not; and that the statute does not mean that claims not in issue should be contested for the mere purpose of settling the costs. More expense might be incurred in such a mode of trial than depended upon the main issue.

Decree for the complainants.

United States Circuit Court.—Western District of
Pennsylvania.

GRADUATED GLASSWARE.—HOBBS *et al.* vs. KING *et al.*

1. Letters Patent No. 132,208, granted to J. H. Hobbs, October 15, 1872, for glassware graduated on its inner face, substantially in the manner set forth, examined, and sustained.

2. A patent for glassware graduated on its inner face is not anticipated by a prior patent for a graduated cup, "the graduations being in the interior if the cup be of metal, or blown or cut on its exterior if the cup be of glass." Such prior patent does not show or in the remotest degree suggest internal graduations upon glassware or any method of producing the same.

3. In Hobbs' (complainants') improvement the desired graduations are in the first instance made upon the face of the plunger, and thereby corresponding graduations are made in the glassware, while in the Block (defendants') plunger the edges of the rings form the graduations; but the principle of the two plungers is identical, their methods of operation practically alike, and the result substantially the same. The extension of the graduations entirely around the glass may have its advantage; but if it were conceded that such extension is a patentable improvement upon Hobbs' invention, still this would not justify the defendants in using his invention.

The Barb Fence Question.

A very interesting statement of the present aspects of the barb fence question, with a summary of the general results of the patent system in furthering the manufacturing and farming interests of the Northwest, has been published by the Washburn & Moen Manufacturing Company, of Worcester, Mass., and I. L. Elwood & Co., of De Kalb, Ill.

After showing the intimate dependence of the farming interests of the West upon local manufactures, and the influence of the patent system in securing the development of the latter, the authors present a cogent summary of the chief arguments in favor of encouraging invention in the way contemplated by the patent laws. Then they proceed to give some specially instructive facts with regard to fence patents, particularly those which have resulted in the development and perfection of the barb fence.

That the barb wire fence was an invention, they say, is amply shown by the fact that it is only a few seasons since it was a strongly challenged and somewhat strenuously resisted novelty. "Now having fully established its character and value before the world, there are those who are seeking to impress upon the farmers of the Northwest that such a statement as the following comprises its complete history: *Some one twisted a short bit of wire sharpened at both ends about another continuous wire or strand, and it proved to be just what the public wanted; and those who claim any patented specialties or proprietorship in the thing are robbers and extortioners.* But the history of barb wire is exactly that of other inventions. It had numerous inventors, reaching various stages beyond the first thought of annexing the barb. It had a comparatively ineffective start in life. It was not readily accepted as practical. It had to wait for recognized effectiveness for independent inventors and inventions to realize the perfect combination of the barb and the wire; and labor-saving machinery that could bring out the finished product cheaply. It cost several years of experiment, much outlay, much disappointment, and like all other promising inventions, waited for perfected utility until capital should take it up, advance the work, combine by purchase the various patents then in existence having reference to the same subject, and without which the original patent was comparatively inert and powerless, giving as the combined result a fencing material which is all the farmer desires, and all that those who brought together this great family of patents ever claimed for it: the cheapest, easiest built, and everywhere the most available fence material ever given to mankind.

"Thus, instead of arriving by a single feat of discovery, barb wire fencing has reached its present perfection through the protection of over one hundred and eighty patents and patented improvements, representing the various interests and rights of very many owners, expressly guaranteed to them by our patent laws as an exclusive right for a limited period."

The patents relating to the manufacture of barbed wire fencing, however, are but a small part of all the patents upon fencing materials and modes of construction. From 1801 to 1879 there were issued 1,229 patents for fences and fence materials, distributed as follows: New England States, 40; Middle States, 372; Southern States, 108; Western States, 696; District of Columbia, 8; Canada, 5. More than two-thirds of the fence patents have been issued since 1865, and, as the preceding figures show, the great majority of fence improvements have been made in the West, where stone and timber were absent or costly and the need of improved and more economical fencing has been most pressing.

The breadth and strength of the barb fencing industry is attested by a list of forty companies and individuals, representing large capital, and a capacity of 50,000 tons product annually, who are manufacturing under licenses. The manufacture of this fencing calls for a substantial plant of machinery and the best processes, and the opinion is expressed that not one of the firms named would undertake the business without some guarantee that their interests would be protected. The only royalty charged by the present owners of the patents is three-fourths of one cent a pound, the greater portion of which is turned over by them to the original patentees. The companies referred to (Washburn & Moen Manufacturing Company and I. L. Elwood & Co.) repeat in this pamphlet the announcement made some months ago, that no suit will be brought by them or either of them, nor will any demand be made, against any farmer who has purchased infringing barbed wire made by any unlicensed manufacturer previous to the court decisions of December last. They add:

"Not a single pound of barb fence can be sold, unless it is put upon the market at a price that makes it the cheapest fence material the farmer can use. That it rewards the inventors and is still the cheapest of fence materials constitutes the merit of the invention and the stimulation to other inventions. It is not a practical question, honestly to be considered by any fair-minded citizen, whether any man or organizations of men, who have no royalties to pay and no right to manufacture barb fence at all, can produce it cheaper."

The Question of Patents.

We understand that the Medical Society of the State of New York has appointed a committee to inquire into the matter of what changes, if any, are advisable in the code of ethics. From the make-up of the committee we do not doubt that its report will be founded upon sterling work, undertaken with the sole purpose of advancing the real interests of the profession, which, indeed, should be the only object

of a code of ethics, if we must have one. Should this anticipation prove true, the society may fairly be looked to to indorse the committee's recommendations, and, broached under such auspices, they may stand a chance of sober consideration by the American Medical Association. The committee is not likely to recommend radical changes unless it is made plain to them that such changes are approved of by a considerable portion of the profession. We trust, therefore, that those who have given thought to these matters may bring their views and conclusions to the committee's knowledge, either by publishing them or by direct correspondence with the committee.

For our part, we would urge upon the committee that it would be an act of propriety, as well as a matter of simple justice, to secure the abrogation of that portion of the code that proclaims it "derogatory to professional character . . . for a physician to hold a patent for any surgical instrument or medicine."

We do not propose to argue at length as to the propriety or impropriety of a physician's holding such a patent, for we think that the statement which we have quoted from the code would not have commended itself to physicians in general, nor have been suffered to remain so long a part of the code, had it not been bolstered up by being incorporated into the same sentence that declares it also derogatory "to dispense a secret nostrum." Whether this grouping of the two acts for common denunciation was an ingenious device on the part of those who abhorred the idea of a physician's holding a patent and who chose this way to spread their abhorrence, we are unable to say; but it is certain that the idea of dispensing secret nostrums is revolting to high-minded men, and, when they find this practice classed in the same category with the possession of a patent, it is no wonder that, without giving the matter much thought, they gradually come to look upon the latter as a heinous offense.

Very little reflection is needed, however, to show how diverse the two are, and how monstrous it is to class them together. The code has no denunciation for the holder of a copyright; and yet there is no essential difference between a copyright and a patent. A copyright covers a publication, and every one recognizes that about this there can be no secrecy; hence to couple the holding of a copyright with the dispensing of a secret nostrum would carry its own refutation. But a patent also is a publication—nothing of secret composition or of secret mechanism can be patented. Analogy shows us, then, that there is nothing in the nature of things to justify the assertion that it is derogatory to professional character for a physician to hold a patent. As a matter of fact, we find that some physicians do hold patents, and that they are not looked upon by their professional brethren as having debased themselves by so doing. We understand that Paquelin's cautery is patented. Whether the patent is held by the inventor or by the maker matters little, for, if now held by any other person than M. Paquelin, it must have been held by him originally. Who has whispered that M. Paquelin has degraded himself? Is an act right in France, but wrong in America? What, then, shall be said of Dr. Dawson, who patented cautery battery of his invention? We have not heard that he has lost caste, and, for our part, we admire the independence he showed in acquiring and holding the patent right as much as we admire the ingenuity displayed in the construction of the battery.

By declining to throw obloquy upon these gentlemen the profession has shown that it does not regard the possession of a patent as derogatory. That declaration in the code that so set it down is, therefore, a dead letter and ought to be expunged.—*N. Y. Medical Journal.*

Imitation Jewels.

The following are some of the very latest recipes for making imitation stones. Rue Turbigo, Paris, exhibits some paste jewels which even connoisseurs cannot readily distinguish from the real article, and must make use of scales or file to be satisfied whether they are handling a product of nature or of art.

The imitation of precious stones is to-day an interesting pursuit of chemistry, although in ages of antiquity Egypt and Greece had already attained in it a high perfection. All the precious stones, except opal, may be successfully imitated. The easiest of counterfeiting is the chrysolite.

The coloring substances are the following oxides: Gold, for purple (*Purpura Cassia*); silver, for yellowish green; copper, for bright green; iron, for pale red; cobalt, for blue; tin, for white; manganese, in small quantity to make the glass devoid of color; in a larger, to give it an amethyst color; in great quantity, to make it black and opaque; antimony, for reddish hyacinth color.

To prepare the mass for the body proceed as follows: Pure flint or rock crystal is heated white, cooled in water, pulverized, and sifted with a silk sieve; thereupon exposed to the action of muriatic acid for several hours, washed, dried, and again sifted. Of this substance five different bases are prepared:

For the first base— $1\frac{1}{2}$ parts of the flint or rock crystal powder; $2\frac{1}{2}$ white lead in scales; $\frac{1}{2}$ saltpeter; $\frac{1}{2}$ borax; $\frac{1}{2}$ white arsenic.

For the second base—1 part prepared flint; $2\frac{1}{2}$ white lead; $\frac{1}{2}$ cream of tartar; $\frac{1}{4}$ calcined borax.

For the third—1 part prepared rock crystal; 2 red lead; $\frac{1}{2}$ saltpeter; $\frac{1}{2}$ cream of tartar; pulverize the mixture, melt it three times, and after every melting pour into cold water. This for the three preceding bases.

For the fourth—1 part prepared rock crystal; 3 calcined

borax; 1 part cream of tartar; melt, pour the mass into lukewarm water, add an even amount of red lead (*minimum*), and repeat the melting and cooling twice.

For the fifth base—Take 1 part prepared rock crystal and 3 cream of tartar, melt in a crucible, dissolve the mass in warm water, and add nitric acid as long as a boiling takes place; it is then carefully washed, dried, and $1\frac{1}{2}$ parts white lead are added. To $1\frac{1}{2}$ parts of this mixture add $\frac{1}{2}$ calcined borax, next melt and pour into cold water. This makes, when $\frac{1}{2}$ part saltpeter is added, a handsome crystal glass, which, without further addition, makes the artificial diamond, called Strass, from its inventor.

The following are recipes for imitations of precious stones:

For Yellow Diamond—16 ounces of fourth base; 24 grains horn silver; 10 grains antimony.

Sapphire—25 ounces of fifth base; 2 drachms 46 grains cobalt.

Oriental Ruby—1 ounce of fifth base, and a mixture of 2 drachms 48 grains purple of gold, and the same quantity of sulphuret of antimony and fusible manganese, and 2 ounces of rock crystal; or, 20 ounces of the flint base, $\frac{1}{2}$ ounce fusible manganese, and 2 ounces rock crystal.

Baloy Ruby—16 ounces of fifth base, and the preceding coloring substance, lessened by one-fourth; or, 20 ounces flint base, same coloring mass, but less manganese by one-fourth.

Oriental Topaz—24 ounces of first or third base; 5 drachms black antimony.

Brazilian Topaz—24 ounces of second or third base; 1 ounce 24 grains black antimony; 8 grains purpura cassia (purple of gold).

Saxonian Topaz—24 ounces of first or third base; 6 drachms black antimony.

Amethyst—24 ounces of fifth base; 4 drachms manganese; 4 grains purple of gold.

Emerald—15 ounces of any one base; 1 drachm blue carbonate of copper; 6 grains antimony; or, 1 ounce of second base; 20 black antimony; 4 grains cobalt.

Beryl—24 ounces of third base; 96 grains black antimony; 4 grains cobalt.

Common Opal—1 ounce of third base; 2 grains loadstone; 26 grains of some absorbing earth.

For the imitation of pearls, thin balls of glass are used, which by an addition of a small quantity of potash and oxide of lead, receive a bluish glittering sheen, and the inner sides of which are covered with the scales of a small river fish (*Cyprinus alburnus*). To make these scales pliable and adhesive, they are steeped for some time in spirits of ammonia in which a small amount of isinglass has been dissolved. Messrs. Savary & Mosbach exhibit some which, being solid, are in all respects equal to the Roman.

MISCELLANEOUS INVENTIONS.

THE DIVISION OF THE CIRCLE.—The problem, long ago practically abandoned by mathematicians as impossible, of dividing exactly, theoretically and mechanically, any angle into any number of parts, has at last been solved. A patent protecting the mechanical means used for this purpose was issued to O. P. Dexter, who has written a pamphlet ("The Division of Angles") fully explaining the mathematical theory of the subject, which, we understand, will be published at an early date by the American News Company of New York.

In the business of taking oysters from the bottom of the river or bay the dredge is hauled along the bottom by a rope or lever attached to the vessel, whose movement through the water supplies the power to drag the dredge. Now, this business places the operators in great danger of life and limb, due to a violent backward motion of the crank in case the dredge should strike a "hang" or a large stone or other obstruction on the bed of the river or bay. Mr. John S. Stuart, of Crisfield, Md., has patented a simple and efficient form of dredge winder which obviates this danger. It consists in recessing the end of the spool and providing it with a circular series of inwardly-projecting ratchet teeth, then fixing rigidly on the shaft at the end of the spool a disk, and outside of this a loose ratchet wheel and pawl with right-angular dogs acting through the stationary disk from the loose ratchet wheel upon the spool, so that the spool may be wound up or automatically released when an extraordinary strain is put upon the rope.

An improved apparatus for transmitting motion has been patented by Mr. Stephen Dennis and Antonio Samper, of Paris, France. This invention relates to improvements on the invention the subject of former Letters Patent dated 16th July, 1879, for mechanism for the transmission of motion by means of bands, ropes, or chains wound spirally on drums or surfaces receiving rotary motion.

An improved pen holder has been patented by Mr. Daniel Hepp, of Chicago, Ill. The object of this invention is to enable several parallel lines to be drawn at one stroke of the pen. It consists in connecting two pen holders to one staff, and securing them together by set-screws, so that they can be easily and quickly adjusted to enable the pens to draw several parallel lines.

Mr. William Von Bergen, of Andover, Mass., has patented an apparatus that can be used at will either as a photographic camera or as a magic lantern, thereby saving the expense of two instruments.

An improvement in fences has been patented by Mr. James A. Manning, of Danville, Ind. The object of this

invention is to facilitate the construction of fences and increase their strength and durability.

Mr. Joseph T. Hammick, of Rhinebeck, N. Y., has patented an improved car coupling and detaching device, by means of which cars may be coupled and uncoupled without going between them by using the ordinary link, either straight or crooked.

An improved fire escape has been patented by Messrs. Alfred J. Harrison, Alexander H. Birkmire, and Frederick Lowe, of Parkville, Conn. This invention relates to that class of devices that are designed to be operated from the street for affording means of escape to inmates of burning houses, and it consists of the combination with screw-actuated lazy-tongs of hinged sliding supporting blocks, whereby the tongs may be inclined toward a building, and of devices for holding them in that position; and it consists, further, in combination with the adjustable tongs and supporting blocks, of a rope ladder and a flexible tubular conductor for affording direct means of ascent and descent.

An improved handle socket for shovels, spades, and scoops has been patented by Mr. Patrick W. Groom, of St. Louis, Mo. The invention consists in a socket provided with a flange having recesses in its under surface around the rivet holes, so that the lower heads of the rivets and that part of the sheet iron of the shovel or scoop covered by these rivet heads will be driven into these recesses, whereby the heads of the rivets will become flush with the under surface of the shovel, and consequently will not wear off as rapidly as they do in the shovels of ordinary construction.

The New Cunard Liner Servia.

While this splendid new vessel, to ply between New York and Liverpool, built by Messrs. Thomson, of Clydebank, was proceeding down the Clyde a few days ago, with the object of having her experimental trials made, it was observed that a crack was opening out in the main crank shaft. Although it might have been possible to work the vessel for some time with the imperfect shaft, yet it has been deemed advisable to have it taken out and either thoroughly repaired or a new one substituted. The work will, it is expected, occupy about two months. The shaft was made at the Lancefield Forge, Glasgow, and is probably the largest hitherto placed in any Clyde-built steamer. Along with the above fact a very remarkable circumstance transpired, namely, the existence of a flaw in the corresponding portion of the spare shaft, which was made at the Mersey Iron and Steel Forge, Birkenhead. A new shaft has since been ordered, and no fewer than four furnaces will be at work on as many separate forgings for making a "built" shaft, the crank pin of which is to be of steel. The Servia is a vessel of 8,500 tons, 530 feet in length, and the largest merchant vessel yet built, with the exception of the City of Rome, recently launched at Barrow-in-Furness, excluding the Great Eastern.

An English Opinion of American Locomotives.

R. M. Brereton, an English engineer, says concerning American locomotives: "I argue that the greater duty done by the American motor is due to the better design and better system of working the locomotives. The American builder excels in the system of framing and counterbalancing, and in designs of crank axles, etc., so that the engine may run remarkably easy and without jar round sharp curves, and work not only on the light roads, but also diminish the wear and tear on the solid roads, and at the same time increase the effective tractive force. The English engine is a very heavy affair, and in running it not only wears and tears itself very rapidly, but also the roadway, and by its unsteadiness and jar it greatly fatigues the drivers and firemen. I have ridden hundreds of miles on engines in India, in France, and in the United States, and have always found the American engine most easy and comfortable; but I never did the English or the Continental engines. It is almost impossible to give these engines their full hauling power, simply because the greater portion of the weight cannot be thrown on the driving wheels."

Trial of the Largest Dredger in the World.

The new iron hopper dredger recently constructed by Messrs. W. Simons & Co., Renfrew, for Otago, was lately tried on the Clyde, and dredged at the rate of 400 tons per hour, which was plunged into its own hold or hopper cavity, capable of containing 1,300 tons of spoil. At the same time it loaded with several hundred tons the new government steamer Perseverance, which came alongside. Afterwards, by steam appliances, its bucket girder was elevated, and its twin screw propellers put in motion, and the vessel steamed away down the Clyde to the measured mile, where the loaded speed was tested at $7\frac{1}{2}$ knots per hour; the vessel then steamed down the Firth of Clyde, where its large cargo was instantly deposited through its bottom in 60 fathoms water.

This vessel dredges from 5 feet to 35 feet depth, has twin screws, and is propelled and worked by two independent sets of compound engines of 700 horse power, and besides loading its own cargo, it can fill if required a fleet of barges on the old system. It is the property of the Otago Harbor Board, and will steam to New Zealand.

The trial of dredging, steaming, maneuvering, and depositing was considered very satisfactory; this being the tenth and largest hopper dredger constructed by Messrs. Simons & Co., who are the inventors and originators of the system. It is also worthy of note that, owing to the enterprise of the above small colony, they will have a dredger the equal of which is neither in Europe nor America.