

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN.

A. E. BEACH.

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NEW YORK, SATURDAY, JANUARY 22, 1887.

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JOHN ROACH.

This distinguished shipbuilder died at his home in Fifth Avenue, New York, January 12. He was born in County Cork, Ireland, in 1815, and came to this country when fourteen years of age, having less than three shillings in his pocket when he landed. This is substantially the story of many thousands of Irishmen who have come to America, but in none of them have the qualities of pluck, energy, and business capacity found more splendid exemplification than in the career of John Roach.

His first positions were in the Howell and Allaire iron works, New York, at 25 cents a day, and during this period he was obliged to work overtime nights and mornings to obtain a bare subsistence. His apprenticeship finished, he became a journeyman machinist at \$9 a week, and by close work and rigid economy had, at the age of 25, accumulated \$1,200, but the most of it was lost by the failure of his employer, and he was obliged to work as a mechanic for several years more; he worked hard, however, and was ambitious, and found himself, when 36 years of age, the owner of a prosperous iron foundry which had been started by himself and three of his fellow laborers.

From this period, notwithstanding frequent discouragements, Mr. Roach's business progress was steady. The war gave an immense impetus to all branches of manufacture, and in 1868 Mr. Roach purchased the Morgan Iron Works, of New York city, subsequently adding thereto the Neptune Iron Works, the Franklin Forge, and the Allaire Works, and four years later buying an extensive shipbuilding plant at Chester, Pa. All of these establishments, machine shops, boiler shops, iron foundries, rolling mill, blast furnace, and shipyard, were large and well equipped, it being Mr. Roach's idea to take the ore and the coal from the mines, and the wood from the forest, to his own workshops, and turn out therefrom the completely built and furnished ocean steamship. Shipbuilding on a more extensive scale than was ever before attempted in this country was thus inaugurated by Mr. Roach.

In New York and at Chester 3,000 men were employed, and 114 iron vessels have been sent out from his workshops. It has been estimated that 90 per cent of all the iron vessels flying the American flag have been turned out from Mr. Roach's yards. His work for the Government has not been as large as generally supposed. He built two sloops of war in 1873, six monitors, the engines of the Trenton, the sectional dock for the Pensacola Navy Yard, three steel cruisers, and the Dolphin. Among his other work may be mentioned the engines of the Dunderberg, the Bristol and Providence, and the hull as well as the engines of the Puritan, these famous steamers having the largest engines ever built in this country. He also built the Pacific Mail steamships Tokio and Pekin, the City of Para and Rio Janeiro for the Brazil line, with many others for the Mexican, West Indies, and coastwise trade, besides some fine specimens of steam yachts.

But Mr. Roach has filled a larger place in the public eye than would ordinarily come of the accomplishment of this great amount of work, important as it has been. During the last quarter of a century, the country has been gradually falling behind the rest of the world in shipbuilding. With the advent of iron ships, so far from taking the lead we unquestionably held in building wooden vessels, it seemed as though we were to have no ships of this class to carry the American flag. Mr. Roach has stood forth almost alone in making the most vigorous effort to encourage and develop this business. He has not only written and spoken much on the subject, in such way as so direct a business man could, but he has put his money, energy, and mechanical skill as well into the work, and in this way has succeeded, notwithstanding great obstacles, in demonstrating the possibility of easy success for American builders in this field, under slightly more favorable circumstances, as well as given to our flag some specimens of marine architecture that will compare favorably with vessels of a similar class made anywhere else.

In view of these facts, it is painful to have to record that probably his life was shortened, as his last year was certainly made extremely unhappy, by the consequences of the differences between his firm and the government as to the acceptance of the dispatch boat Dolphin. It is not necessary to go into details in regard to the matter, further than that they are largely charged to the exigencies of the time among political wire pullers and the blundering of the Secretary of the Navy, but their effect was to compel an assignment by him in July, 1885. It has since been decided that the fault found with the Dolphin was of a very minor and unimportant character, so far as the builder's work was concerned, but an irreparable injury had been done to the great shipbuilder. His assets were largely in excess of his liabilities, and a comfortable fortune will remain from them for his heirs, but a fatal blow had been struck to the extensive business which he had founded and developed, and which was the pride of his declining years.

John Roach's life was a brave and inspiring one. He started from about as lowly a position as one well could be placed in; such time as could be spared

from absolutely necessary work he devoted to self-improvement in study, for which he otherwise had no opportunities; and in all his complicated business in after life, he was not only the master mechanic, but his was the designing mind; in all his business character his methods were simple and direct, so that he never had a lawsuit; to all of his little army of employes he was a personal friend and an example of the possibilities open to every one who wished to follow in his footsteps; and in his relations to the general public he was a patriotic and eminently useful citizen.

THE INVENTOR'S WORK IN AGRICULTURE.

The conditions of the welfare of countries have undergone very great changes during the last fifty years. Up to a comparatively recent period, it was almost an axiom of political economy that the farmers were the producers of the true wealth of a region. They worked a mine that was inexhaustible if proper treatment was awarded it. If the soil became spent, it was interpreted as a sign of faulty agriculture. Properly treated, the same land could be used, year in and year out, and would yield a constant return for labor expended and capital invested. The coal miner works out a deposit of coal and abandons the region, after cumbering many acres with heaps of culm. The metallurgist builds his furnaces near the source of supplies, to be abandoned when these fail. But the farmer, by his permanence of location, and by his improving, instead of exhausting, the land, seemed the founder of a country's prosperity. It is true that, in some instances, particularly where subjected to a heavy drain upon its mineral constituents by successive crops of cereals or tobacco, land became exhausted. Modern science, with improved systems of fertilizing and prescription of rotation of crops, endeavored, with much success, to overcome this trouble.

The agriculturist was thus advanced in his efforts by the chemist, and took a step forward toward a more scientific treatment of his materials. Coincident with, or a little in advance of, this epoch, the mechanical inventor appeared on the scene, and invented machinery which enabled horses to do the work of men. From the reaping hook to the cradle was an important step. It multiplied greatly the labor of a man. From the cradle to the reaper, from the pitchfork to the unloading machinery, from hand labor to the self-binder, from the flail to the thrashing machine, were still greater ones, as they did away with directly applied human labor. These inventions mark a revolution in farming.

The farmer or his laborers to-day do not one hundredth of the actual work. Steam or horse driven machinery are the agents. The farm is converted into a factory. Grain is sowed and fertilizers are distributed by machines. Improved cultivators are used in treating growing crops. After harvesting by power, thrashing machines are substituted for the old time flails. The farming of fifty years ago is becoming a lost art.

To a great extent, the farmer is deposed from his position as the principal producer of a region's wealth. This honor must be shared by others. The chemist has had his part in the change, but the inventor stands above all in this. To him the new condition is principally due. As the result of his work, the United States maintain numerous factories devoted entirely to the production of agricultural machinery. Every city and village have stores devoted to their sale. The farmer directs the operations of the machinery when completed, just as the engineer of a steamer superintends the running of the engine. It would be as truthful or logical to call the marine engineer the developer of commerce as to claim for the farmer the title of sole producer. In his work he has partners. Without the great agricultural implement works, he could do nothing. They, as well as he, are agents in production. The inventor who directs and plans the factories' work is also a partner, and is an actual producer. He may not make two blades of grass grow where formerly there was only one, but he has changed another ratio for the better. He has made the actual labor of a man far more efficient than before. The soil may produce no more, but the labor of those tilling it is many times more productive.

The future political economist should pay regard to the new order of things. The influence of the inventor has been particularly great in the field of agriculture. It has done away with the customs of many centuries; it has converted the farmer into a superintendent or engineer, and raised him from the despondency due to unending toil.

The immense grain farms of the West are the outcome of such factors. Steam and horses are the motive power, and improved machinery is the direct performer of the work. The system by which they are run could no more exist without the inventor's aid than the merchant navy could be profitably worked without compound engines and all the latest devices and inventions in steam machinery. The same applies to the smaller farms of the East. On them the work is done by machinery, and the farmer is being educated and developed into an engineer, capable of running and repairing complicated machines.

Inventions Made by Employes do not Belong to the Employer.

An interesting decision has lately been made by the Supreme Court of the United States, in which the rights of the employe inventors were considered and adjudicated. Judge Blatchford delivered the opinion of the court.

This is a suit in equity brought in the Circuit Court of the United States for the District of Indiana, by Charles H. Hapgood, James H. Hesse, and John Packer, trustees of Hapgood & Company, a dissolved Missouri corporation, and the Hapgood Plow Company, an Illinois corporation, against Horace L. Hewitt. The main object of the suit is to obtain from Hewitt the transfer of letters patent granted to him for an invention. The defendant interposed a general demurrer to the bill for want of equity. The circuit court sustained the demurrer and dismissed the bill (11 Biss., 184), and the trustees have appealed to this court.

The Missouri corporation was in existence from before August 1, 1873, to January 1, 1880, when it was dissolved. At the latter date the three trustees constituted its board of directors, and Hapgood was president. By virtue of the laws of Missouri, Hapgood and the two others became trustees of the corporation, with power to settle its affairs and recover the debts and property belonging to it. Hapgood was the president of the corporation during its existence, and had the control and management of its business. All the officers and employes were under his direction. He had power to hire and discharge all agents and employes of every grade, to determine the classes and kinds of goods that should be manufactured, and the general way in which the business should be conducted.

The corporation employed Hewitt to devote his time and services to getting up, improving, and perfecting plows and other goods, and to introducing the same. It was agreed between Hewitt and the corporation that Hewitt should fill the position of superintendent of the manufacturing department, and as such exercise a general supervision over that department, subject to the president. He agreed in such position to use his best efforts and devote his knowledge and skill in devising and making improvements in the plows manufactured by the corporation and in getting up and perfecting plows and other agricultural implements adapted to its trade.

Hewitt was, early in the summer of 1876, directed by the president to proceed at once to devise and build an iron sulky plow according to suggestions made—that is, he should retain in the new plow all the valuable features of the wooden sulky which the corporation had been manufacturing, should construct the plow of wrought and malleable iron, should adopt the other features suggested by the president, and the arch suggested by Black, and should add such additional features as might seem advantageous to him (Hewitt). He was directed to proceed with the work without delay, so that the corporation might be ready to manufacture the new plow for the season of 1877. In accordance with these directions, Hewitt devised and constructed a sulky plow of wrought and malleable iron, and after some delays, about the 1st of April, 1877, produced a plow satisfactory to the president.

During all the time that he was engaged in devising and constructing the new plow he was in the employ of the corporation, and drawing a salary of \$3,000 a year. The time during which he was so engaged was the regular working hours of the factory. The men who did the manual labor on the new plow were all employes of and paid by the corporation, and all the materials used in its construction were bought and paid for by the corporation. The work as it progressed was under the general superintendence of Hewitt; but the work in the respective departments was also under the special superintendence of the respective foremen of those departments, who were also paid by the corporation. During the whole time of the construction of the plow it was understood by all the parties engaged therein, and by those at whose instance its construction was commenced, that it was being devised and constructed for the use and benefit of the corporation and as a model for the future construction of sulky plows by it.

After the plow was completed and had been accepted by the president as satisfactory, the latter directed Hewitt to go to Chicago and have the necessary malleable castings made for the construction of plows after the model. Hewitt did so, obtaining at Chicago castings, moulds, and other things necessary for the future building of plows after the model. During the time so spent he was drawing his regular salary, and all his expenses, as well as the price for the models, castings, and other things obtained by him, were paid by the corporation. During the time Hewitt remained in its employ he never made any claim of property in any of the devices and improvements made or suggested by him in the new plow, and never stated or claimed that he was entitled to a patent on any of said improvements, or that he had any rights adverse to the corporation in any of said improvements or devices, and never during the term of his employment asserted any right to a patent in his own name for such improvements or devices, or any of them. After his connection

with the corporation had ceased, and after he had made an arrangement with the president whereby the latter bought back all his (Hewitt's) stock in the corporation, and after the corporation had been for many months, with the knowledge of Hewitt, engaged in the manufacture of such plows, Hewitt, on January 14, 1878, applied for a patent on the improvements in the plow, and on the 26th of March, 1878, a patent was granted to him covering certain parts of the plow, being devices which had been theretofore used by the corporation with his knowledge and consent. After this patent was issued he for the first time claimed, as he has since claimed, that he had and has an exclusive right to manufacture such parts of the plow as are covered by the patent, and has threatened to enforce his rights under the patent as against the corporation, its representatives, successors, and assigns, and to hold them liable in damages for any infringement of the same.

The bill also alleges that in devising and constructing the plow Hewitt was only performing his duty as an employe of the corporation and carrying out his contract with it; that he was doing only what he was hired and paid to do; that the result of his labors belonged to the corporation; that it became in equity and good conscience the true and rightful owner of the right to manufacture the plow; that if there is any part thereof which is patentable, the patent belonged to the corporation as equitable assignee of Hewitt, and that he was and is bound in equity and good conscience to make an assignment of the patent to the corporation or to its trustees.

The bill also alleges that upon the dissolution of the corporation of Hapgood & Company the stockholders thereof organized another corporation under the laws of Illinois, under the name of the Hapgood Plow Company, one of the plaintiffs; that the Hapgood Plow Company succeeded to the business of the prior corporation, and became by assignment from it the owner of all the latter's assets, whether legal or equitable, including the rights in the patent issued to Hewitt which such prior corporation had or was entitled to, whether legal or equitable, and its right to manufacture a sulky plow in accordance with the model plow made by Hewitt, including all the devices covered or claimed to be covered by the patent, and that all the rights in the premises which the prior corporation had have been fully transferred to and vested in the new corporation. The bill then alleges a refusal by Hewitt to assign the patent to the plaintiffs, and that he claims to hold it adversely to them.

The prayer of the bill is for a decree directing the defendant to make an assignment of the patent, or of such interest as he may have therein, and all of his rights thereunder to the Hapgood Plow Company, assignee of Hapgood & Company, or to the trustees of Hapgood & Company, in trust for the Hapgood Plow Company, vesting the title to the patent, or to the defendant's rights thereunder, in the Hapgood Plow Company, or in said trustees in trust for that corporation, and that he be enjoined and restrained from maintaining any action at law or in equity for any infringement of the patent by Hapgood & Company, or for the use by that corporation of any of the devices or improvements covered by the patent.

The decision of the circuit court (11 Biss., 184) was placed on the ground (1) that Hewitt was not expressly required by his contract to exercise his inventive faculties for the benefit of his employer, and there was nothing in the bill from which it could be fairly inferred that he was required or expected to do so; (2) that whatever right the employer had to the invention by the terms of Hewitt's contract of employment was a naked license to make and sell the patented improvement as a part of its business, which right, if it existed, was a mere personal one, and not transferable, and was extinguished with the dissolution of the corporation.

We are of opinion that the views taken of the case by the circuit court were correct. There is nothing set forth in the bill as to any agreement between the corporation and Hewitt that the former was to have the title to his inventions or to any patent that he might obtain for them. The utmost that can be made out of the allegations is that the corporation was to have a license or right to use the inventions in making plows. It is not averred that anything passed between the parties as to a patent. We are not referred to any case which sustains the view that on such facts as are alleged in the bill the title to the invention or to a patent for it passed.

In *McClurg v. Kingsland* (1 How., 202), the facts were in some respects like those in the present case; but the decision only went to the point that the facts justified the presumption of a license to the employer to use the invention as a defense by him to a suit for the infringement of the patent taken out by the employe.

The circuit court cases referred to do not support the plaintiff's suit. In *Continental Windmill Co. v. Empire Windmill Co.* (8 Blatchf. C. C. R., 295), there was an agreement that the employe should receive \$500 for any patentable improvement he might make. In *Whiting v. Graves* (1 Holmes, 222), it was held that an employment to invent machinery for use in a particular

factory would operate as a license to the employer to use the machinery invented, but would not confer on the employer any legal title to the invention or to a patent for it. In *Wilkins v. Spafford* (1 Holmes, 274), the contract was that the employer should have the exclusive benefit of the inventive faculties of the employe and of such inventions as he should make during the term of service.

Whatever license resulted to the Missouri corporation from the facts of the case to use the invention was one confined to that corporation and not assignable by it. (*Troy Iron and Nail Factory v. Corning*, 14 How., 193, 216; *Oliver v. Rumford Chemical Works*, 109 U. S., 75, 82.) The Missouri corporation was dissolved. Its stockholders organized a new corporation under the laws of Illinois, which may naturally have succeeded to the business of the prior corporation; but the express averment of the bill is that it took by assignment the rights it claims in this suit. Those rights, so far as any title to the invention or patent is concerned, never existed in the assignor. As to any implied license to the assignor, it could not pass to the assignee.

As to so much of the prayer of the bill as asks that Hewitt be enjoined from maintaining any action at law or in equity for any alleged infringement of the patent by the prior corporation, or for its use of any of the devices or improvements covered by the patent, which is all there is left of the prayer of the bill, any suit to be brought would not be a suit against the corporation, for it is dissolved, and could not be a suit in equity against its trustees, for they are not alleged to be using the invention. It could only be a suit at law against the trustees or the stockholders of the old corporation for infringement by it while it existed. The theory of the bill is that there is a perfect defense to such a suit. In such a case a court of equity, certainly a circuit court of the United States, will not interfere to enjoin even a pending suit at law, much less the bringing of one in the future. (*Grand Chute v. Winegar*, 15 Wall., 373; 1 High on Injunctions, secs. 80-93, and cases there cited.)

Decree affirmed.

Impure Ice as a Cause of Disease.

The State Board of Health, having been asked by the Board of Health of Syracuse to examine into the purity of ice taken from Onondaga Lake, from the Erie Canal at Syracuse, and from Cazenovia Lake, has not only made a careful investigation into the quality of ice from those sources, but has also prepared a report on the general question of the pathogenetic powers of contaminated ice. The Board comes to these conclusions: Ice formed in impure water has caused sickness; it may contain from eight to ten per cent of the organic matter dissolved in the water, and in addition a very large amount of the organic matter that had been merely suspended or floating in it; it may contain living animals and plants, ranging in size from visible worms down to the minutest spores, and the vitality of these organisms may be unaffected by freezing.

Hilborne L. Roosevelt.

On December 29, 1886, this eminent organ builder, electrician, and inventor died at his residence in this city. He was born in New York in 1850, and was a son of S. Weir Roosevelt. In early youth he began to study organ building in Hall & Labagh's factory, and afterward prosecuted his studies in Europe. Grace Church and Trinity Church in this city and the Cathedral of the Incarnation in Garden City (the A. T. Stewart memorial) contain his instruments. In the centennial main building, also, one of his organs was erected, and was listened to by the many who in 1876 visited Philadelphia. He had factories here, and in Philadelphia and Baltimore. He was much interested in electrical inventions. He applied electricity to organ movements, with considerable success. He was largely interested at one time in the New York Bell Telephone Company, but sold out just before the stock took its upward leap. He received up to the time of his death a royalty on a detail of the telephone apparatus. Outside of his main business of organ building he was well known among electricians, and was an intimate friend of Edison. The Garden City organ, one of the largest in the world, and provided with Wacker's electrical movement, has been described in these columns.* It is, probably, entitled to be considered his greatest work. His record covering the electrical and musical fields is a very remarkable one for one who still was comparatively young. He leaves a widow and one daughter.

George Crompton.

George Crompton, distinguished as the inventor of many improved looms, died at his home in Worcester, Mass., December 29 last, in the 56th year of his age. He was born at Ramsbottom, England, March 3, 1829. He was a man of much executive as well as inventive ability. His productions in the line of looms have long been famous for superior excellence.

* See SCIENTIFIC AMERICAN, August 7, 1886.