AMERICAN INVENTIONS OF THE NINETEENTH CENTURY

THE dead nineteenth century has been a marvellous one, as far as inventions are concerned, and, what is more remarkable still, the United States, the youngest of nations, heads the list both as to number of inventions and their scope and ingenuity. No other country can compare with the United States in this respect; in fact, France, England and Canada united just about equal the number of patents obtained in America during the nineteenth century.

In one hundred years, 650,123 patents were granted in the United States. France comes next, with 308,558; England next, with 278,129; Belgium, with 154,155; Germany, 126,114; Austria-Hungary, 82,933; Canada, 65,510; Italy, 49,990; and Spain, 22,314. From the birth of the Patent Office in 1790 until 1836, 9,957 patents were granted. In the latter year, 109 patents were issued. In 1890, when high-water mark was reached, 26,292 patents were issued. As far as States are concerned, Connecticut is the most prolific, while Thomas A. Edison heads the list of individual patentees, with 727 patents issued and more pending. Besides, there are about forty other inventors each of whom has more than one hundred patents to his credit.

"MANY INVENTIONS"

But leaving the number of patents aside, the quality of the inventions is as remarkable as their quantity. The steamboat owes its origin to American ingenuity. It was Robert Fulton, its inventor, who went to the great Napoleon, offering to put it within his power to conquer England with a fleet of steam-propelled vessels. The Corsican laughed at the ridiculous idea and—Britain eventually conquered the scoffer of Fulton.

Morse annihilated space with his American-invented telegraph. Field united two continents by cable. Edison reproduced sound. He enabled telegraph operators to send four different messages on the same telegraph-wire at the same time. Bell enabled human beings miles apart to converse with each other. The first steamer to cross the Atlantic was the American *Savannah*. McCormick invented the reaper, making it possible for harvesting to be done with great speed, where formerly it was carried on in the most primitive manner. Americans first made watches by machinery. Smith and Wesson invented the magazine firearm. Sleeping cars were first constructed in this country, being the invention of Woodruff. Iron floor beams were first used in frame construction, in the building of Cooper Institute, New York City. Howe invented the sewing machine. Otis constructed the first passenger elevator. The first barbed wire fence was erected in the United States. Ericsson invented the iron-clad battleship. And so on, in endless numbers almost.

STEAM POWER

Perhaps the most important of all inventions has been the application of steam to moving machinery. Steam is the primary power which moves our engines, runs our presses, does our work—is our servant. While the invention of the modern steam engine itself dates back to 1784, when James Watt obtained his patent, yet the steam engine of to-day is of much more recent origin. The cut-off valve, which saves two-thirds of the steam, the various gauges, the numerous rotary engines—in fact, most of the principal improvements to the engine of James Watt—are of American origin.

The steam fire-engine, such as every city in America possesses, is American, having been invented in 1841 by a Mr. Hodges. The great locomotives which draw our trains up to 112 miles an hour are all built on American lines. The total steam horse-power of the world is estimated at about 65,000,000, of which the United States can lay just claim to almost one-third.

ELECTRICAL PROGRESS

Next to steam, electricity has made the most wonderful progress. At the end of the eighteenth century practically nothing was known of this subtile fluid. A hundred years later, marvellous doings can be recorded. What steam fails to do for us electricity does. It rings our bells, propels our cars, raises our elevators, transmits our messages, reproduces our voices, plays our pianos, lights our streets and homes, cauterizes our wounds and performs a thousand other functions. All these marvels owe their origin to the discovery of the electro-magnet, an indispensable adjunct to all electric contrivances, by Professor Joseph Henry of Princeton, N. J. Samuel F. B. Morse, utilizing Henry's invention, discovered the telegraph and the system of signalling which bears his name. Joseph B. Stearns of Boston discovered the duplex system of telegraphing and Edison the quadruplex. Royal C. House, another American, invented the printing telegraph, now used in every broker's office in the shape of the famous "ticker." Still another invention of American origin is the fire-alarm system, discovered by Channing and Farmer of Boston. Burglar alarms, district messenger calls, railroad signals and hotel annunciators are also American by birth.

ELECTRICAL PROPULSION, LIGHTING, AND THE TELEPHONE

As far as dynamos are concerned, the first patent in this line was granted by the United States to Saxton, a citizen. Since then, Edison, Tesla, Westinghouse and others have proven to the world that American inventors are unrivalled in the construction of new electrical contrivances.

The greatest step forward in electricity has, however, been in the propulsion of cars. Here, again, the American blazed the way, for Professor Henry, the inventor of the electro-magnet, also constructed the first practical motor. Dr. Page, another American, built the first electric locomotive, which, in 1851, drew a train from Washington to Badensburg at the rate of 19 miles an hour. To-day, there are in the United States about 20,000 miles of electrical railways.

In electric lighting, too, America stands first. The greatest searchlight in the world is near Pasadena, Cal. It is of 3,000,000 candle-power and can be seen for a distance of 150 miles. The first incandescent lamp we can also claim, being the invention of a Mr. Starr. Moses G. Farmer lighted his home at Salem, Mass., with electricity in 1859, being the first in the world to put electricity to such a use. Since then, electric lighting has been so developed and has become so popular, that to-day there are about 500,000 arc lights and 25,000,000 incandescent lights in active use in the United States.

The telephone dates to 1874, when both Professor Bell and Elisha Gray applied to the Patent Office for protection. After much legal wrangling, the prize went to Bell. To-day there are 772,989 miles of telephone wire in use, connecting 465,180 stations and giving direct employment to 19,668 persons. In 1899, the Bell Telephone Company answered 1,231,000,000 calls.

THE PRINTING PRESS

Next to steam and electricity must rank printing and all its kindred industries, from the production of books to the development of the newspaper and magazine. Printing presses, or rather improvements which have made possible the modern paper, are all due to American ingenuity. The Washington hand-press, still in use in most printing offices, was invented by George Rust in 1829. R. H. Hoe was the greatest worker in this line of endeavor, however, for he it was who invented the web press, which feeds endless strips of paper into the press. From a few hundred an hour, these machines have advanced until they can now turn out 96,000 eight-page papers in an hour, completely cut and properly folded.

TYPESETTING MACHINES

With increased rapidity in printing came a demand for an increase in the quickness of setting type. Here America once more distinguished itself, for it was Mergenthaler of Baltimore who invented the wonderful machine for setting type which bears his name. Hand in hand with the linotype, as this machine is called, came the discovery that wood, ground into pulp, could be converted cheaply into paper. As a result, paper has increased in quality and quantity and has materially decreased in cost.

United with the art of printing is the use of the typewriter. The first practicable typewriter—there had been half a dozen impracticable ones—was that of A. E. Beach, an American, who obtained his patent in 1847. Since then, thousands of other patents have so improved the typewriting machine that Mr. Beach would not recognize his invention, were he alive to see it.

THE SEWING MACHINE

Sewing machines have also played a prominent part in the inventive life of this country. In 1826 one Lye obtained a patent for such a contrivance, but it proved too cumbersome and was abandoned. The first practicable machine was that of Elias Howe, patented in 1846. From this has grown the complicated machine of to-day, which has decimated the cost of clothing, of shoes—of everything that was formerly sewn by hand and is now stitched by machinery. It is estimated that Howe's primitive machine has grown into an industry which produces about 850,000 machines a year and gives employment to more than 100,000 persons in this country alone.

ARTIFICIAL LEGS AND THE PHONOGRAPH

Artificial legs are truly American in their origin, for the first patent in this line was that granted to B. F. Palmer in 1846. The modern ones are so perfect that any one fortunate to possess one can even ride a bicycle. And that brings to memory the "wheel"—first patented in this country in 1819 by W. K. Clarkson. Even the pneumatic tire is of American origin, having been patented in 1847 by R. W. Thompson.

Edison, of course, invented the phonograph, the original voice and sound reproducer. Before his discovery in 1877, attempts had been made to reproduce the human voice, but without success. It was not until the American wizard evolved his machine that a triumph was achieved. He, too, is responsible for the numerous moving-picture machines now in existence, for his vitascope was the original, having been patented in 1893.

"TALKING MACHINES"

The phonograph, itself the mother of a big family of little or auxiliary inventions, is far in advance to-day of the halting but in itself wonderful machine of the Wizard of 1877. So far the public has toyed with the phonograph and the moving picture. They have been largely, indeed entirely, as far as the bulk of those enjoying them are concerned, the toys of our later days, but time, doubtless, will prove their scientific and more useful value. Films for use in making moving pictures are now preserved in many libraries, and a complete set of kinetoscopic views of the Queen's Longest Reign procession are preserved in London for the benefit and enlightenment of future generations. In the same way voices from many bodies that are now but scattered atoms on the earth's crust are still preserved for years yet to come.

The practical uses to which the phonograph may be put are increasing daily. The latest is to employ it as a teacher of languages. Schools and families unable to afford the services of a teacher from whom the correct accent can be acquired find an excellent substitute in the phonograph into which a highly paid professor of languages has dictated the lessons in his most academic accent. The machine is also used as a substitute for the stenographer in the dictation of letters, and even actual correspondence is carried on by its means.

SOME OTHER INVENTIONS

Gas, too, belongs, to a degree, to American inventiveness, for in 1805 David Melville of Newport, R. I., lighted his house with gas made in his home-made apparatus. Even the method of making what is known now as Bessemer steel owes its discovery to an American, William Kelly, who obtained a patent on the process in 1857. Nearly all the principal improvements in the spinning industry are due to the brain power of the American inventor—from Whitney's cottongin to the more complicated spinning machines.

Not least among modern inventions is the stem-winding watch, first patented by A. L. Dennison of Boston in 1848. The first practical reaper was also American, having been patented by Hussey in 1833 and a year later by McCormick. Since then all sorts of agricultural machines have been devised, each one more remarkable than its predecessors and nearly all American in origin.

This list could be lengthened out indefinitely, for American ingenuity is seemingly endless. There remains but to state that America's share in the inventions of the world during the nineteenth century is fully commensurate with her position among nations—first. And, as some one reported to Queen Victoria, when *America* won the America's Cup—"There is no second."

EDGAR MELS.

A PRIVILEGE

—Thrown Away Entirely.

It is curious to observe how hard it is for some people to give up coffee drinking after they have become, at least half satisfied, that it is the cause of their ill health, but it becomes an easy task to give it up when one takes Postum Food Coffee in its place, providing, of course, that Postum is made according to directions, for then it has the rich, beautiful color, and a satisfying taste, while the rapid improvement in health clinches the argument.

A young lady at Cambridgeport, Mass., says: "When it was shown to me plainly that my ill health and excessive nervousness was largely due to the coffee habit, I realized that I must give it up, but it was next to impossible to do so. However, I made the trial and took Postum Food Coffee, with the mental reservation of the 'privilege,' as I termed it, of drinking coffee once a week.

"Little did I dream what a true friend Postum was destined to become to me. The old stomach trouble left, the nervousness vanished, and good, natural, healthy sleep came to my relief. In less than six months I felt like another person, I was so well and happy.

"The 'reserve privilege' in regard to using regular coffee was thrown to the winds. I have not the slightest desire for it; in fact, I very much prefer my Postum to any coffee."