

## COTTON MACHINERY INVENTIONS.

The last number of the London *Quarterly Review* contains some very interesting reminiscences of the early inventors of cotton machinery; and, in contrasting the past with the present, the conclusion is inevitable, that inventors of the present day live in a millennial age, in comparison with their predecessors of the past century. At one period, it was a common practice to persecute inventors of labor-saving machinery; now they are justly esteemed, and their inventions frequently entitle them to wealth and honorable distinction. The greatest single manufacturing interest in the world is that of cotton—all others stand far below it in comparison. It is America's chief surplus product, and England's greatest textile agent. Its history is like a romance; its recent rapid development seems like a miraculous achievement. In 1770, only seven bales of American cotton were imported into England; in 1859 no less than 2,085,000 were imported, and this amounted to more than four-fifths of England's total supply. This manufacture has been the means of creating large cities, and converting barren fields into busy hives of industry; and it has afforded immense revenues in times of war, and great profits in seasons of peace.

A recent number of the London *Times* states that the net profits of the Manchester cotton manufacturers exceed one million pounds sterling per month, after all expenses—ordinary and extraordinary—are paid. Lancashire, in England, is the cotton workshop of the world; and for this it is indebted to its people—its inventors—not its position, soil or climate. One century ago, this county of England was almost a wilderness; Manchester then contained but a few thousand inhabitants, who dwelt in miserable houses, and who were both poorly clad and fed. At present there is a population of 3,000,000 contained within a circle of a few miles around it; its wealth is enormous, and many of its buildings are of the most splendid character. Liverpool, which is also in this county is now the greatest seaport in the British empire; while, 100 years ago, it was little better than a miserable fishing village. All this has been done by inventors of cotton machinery; and we will give a brief review of some of their achievements.

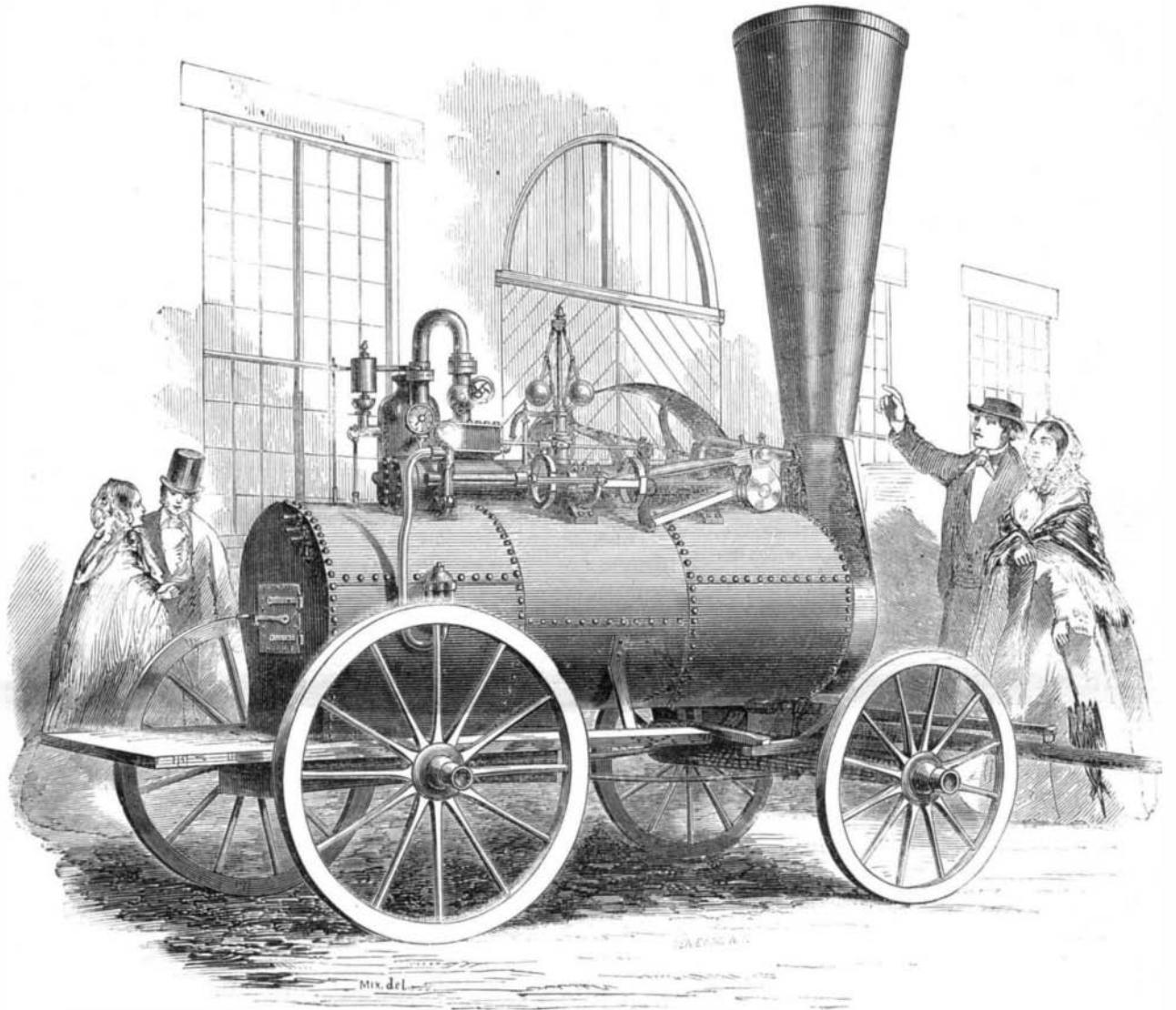
Six score years ago, exactly, all the operations of spinning and weaving were performed by the hand wheel and the old loom in the cottages of the peasantry, and the work which each operative could execute was very limited. The first great improvement for increasing the amount of work was effected by John Kay, of Bury, who secured a patent in 1733, for what is called the "fly shuttle." The old way of operating the shuttle was exactly like that now employed in weaving rag carpets. The shuttle is thrown with one hand through the cleft of the warp; then the lay is driven up to beat in the thread, when the shuttle is again thrown with the opposite hand through the warp; and so on continually. The improvement consisted in operating the shuttle without ever touching it by hand, through the means of a sliding head, connected by cords to a handle, which was operated back and forth with one hand while the other operated the lay. This improvement enabled the weaver to execute double the amount of work in the

same time, and with greater ease. How was John Kay rewarded for his most useful invention? The Yorkshire cloth manufacturers formed associations to resist payment for the use of the patent, and they at last ruined the inventor by expensive lawsuits. After this, John Kay invented an improved loom and a carding machine, for the spirit of invention would not allow him to rest; but so prejudiced were the brutal hand-workers against the innovations of labor-saving machinery that a mob broke into his house in 1753, and smashed all his machines, while he barely escaped with his life. His native land, to which he was one of its greatest benefactors, threw him off; and he fled to France, where he died, a few years afterwards, in great poverty. Such was poor Kay's experience at the hands of his then ignorant countrymen.

came dependent on public charity in that very city of Manchester which his genius had contributed to enrich.

The next improvement in cotton-spinning machinery was effected by Richard Arkwright, who was originally a poor barber. He placed two pairs of rollers on the spinning frame, and, by giving the front pair a higher velocity than the back set, the thread was drawn out much thinner to the flyer; and thus much finer yarn was spun. Richard was also compelled to fly from a mob on one occasion, and for a long time he struggled against opposition and ill luck; but he had a stout heart, and at last he triumphed over all difficulties, saw his invention generally introduced, and was ultimately "crowned with riches and honors nobly won."

The next improver of cotton-spinning machinery was



THE BLANDY PORTABLE STEAM ENGINE. [See page 274.]

The next great improvement in cotton machinery was in the spinning operation. After the hand loom had become so much improved by Kay, the weavers had frequently to wait for supplies of yarn from the spinners, who still whirled away with only one spindle each, while they drew out the cotton into thin slivers with their fingers and thumbs. Lewis Paul, of London, first invented a machine to spin several threads at one operation; but his *frames* never operated successfully. Thomas Highy and James Hargreaves appeared to have invented what is called the "spinning jenny," about the same time, and unknown to one another. It consisted in feeding in the cotton fillets between a pair of rolls, from which they passed in slivers to twisting flyers, and thence on to spindles. About 20 spindles were used on the first machine that was tried; and by simply turning a crank, 20 threads were spun at once. This was a grand improvement, but neither of these inventors were benefited by it. Hargreaves also had his house broken into by a mob, and he was compelled to fly from their vengeance. The manufacturers treated him no better than the operatives; they formed associations to resist his patent rights, and they succeeded in their base designs. He died in poverty; and his descendants afterwards be-

came dependent on public charity in that very city of Manchester which his genius had contributed to enrich. Samuel Crompton, an English weaver. He invented what is called the "mule frame," and produced much finer yarn than had ever been done before. This invention was also pirated by English manufacturers; and several wealthy parties who agreed to pay him certain sums annually for the use of his machine, afterwards repudiated their engagements, and the descendants of these men are now the great cotton lords of Lancashire. Poor Crompton also died in poverty. In disposition he was sensitive; and, although possessed of great mechanical genius, he was not well calculated to battle with wicked men in this world. His machine has surpassed all those of his predecessors for fine spinning, as there are 13 mule spindles used for every one on "throstle frames."

In 1779, a furious infatuation broke out against machinery in England, which displayed itself in violent mobs. Hundreds of factories were destroyed in that year, and the machinery in them broken to pieces. These outrages were winked at by the higher landlord classes, who dreaded the approaching industrial revolution of machinery, and the apparent rise in wealth and power of the manufacturing classes. These days of mobbing inventors have passed forever; all classes are

now sufficiently enlightened to recognize labor-saving machines as one of the greatest boons conferred on the human race.

As cotton machinery is very extensive in its range and character, we have only been able to devote space to the efforts of the early inventors; but these were the very men that established this great manufacture.

The mule spinning frame used to have its carriage moved by hand; but what is called the "iron man," or self-acting mule, was invented several years ago by Richard Roberts, of Manchester, to supersede the hand carriage. This it has done in many instances; but we understand that these mules do not yet make such good yarns as the old frames. Quite a number of useful improvements have been invented in America on cotton machinery. The "cop-spinner" of Danforth and the "ring-traveler" spindle of James Bogardus (patented in 1830), have come into very general use on throstle frames. McCulley's "Niagara throstle," in which the spindles are driven by friction instead of belts, and the mule of Mr. Mason, of Taunton, Mass., are esteemed in American cotton factories to be far superior, in their arrangements for the comfort of the operatives, to those of any other country; but, although we have made so many improvements in machinery, we do not make any of the finest kinds of cotton cloth. Without fine yarn, we cannot do it, and none of the higher numbers are spun in our factories. So far as we have examined personally, it appears to us that the sheetings manufactured at the New York Mills, Oneida county, N. Y., are the finest cotton goods made in America. The yarn is all spun on mule frames, and the fabrics are very beautiful. We must admit, however, that while the finest American yarns do not extend beyond what called are Nos. 60 and 80, large quantities of No. 240 are spun in England; and some have been made as high as No. 700. A pound weight of the latter will extend 334 miles in a single thread—wonderful perfection in machinery is required to produce such a result. When shall we reach this figure in our American factories? We believe there is a great and hopeful field before our cotton manufacturers, especially in the manufacture of fine yarns. A pound of cotton valued at 25 cents, first made into thread (in England), then into lace, is increased in value to \$2,000. There was a time when the fine muslins of Hindoostan, which were spun and woven by skillful hand labor, were supposed to be unapproachable; but the genius of man has at last invented iron fingers that produce gossamer threads far outrivaling in beauty and delicacy, the most skillful productions of oriental climes.

#### PATENT EXTENSIONS BEFORE CONGRESS.

*Locomotive Wheels.*—It appears from the published proceedings of the Senate, for the 12th inst. (an official report of which is now before us), that Thatcher Perkins and William McMahon have asked for an extension of their patent, granted April 10, 1843, for an improvement in the wheels of locomotive engines. The claim of this patent is "the fitting of a chilled cast iron rim on to an inner rim, cast with the spoke, by making the inner surface of the former and the outer surface of the latter slightly conical, and binding them together with screw bolts." This patent expired April 10, 1857, and is now the property of the public. The Committee on Patents have reported a bill for the extension of this patent, which has passed to a second reading.

*Steam Boilers.*—It appears, also, that Jane B. Evans, executrix of Cadwalader Evans, deceased, has applied for the extension of a patent granted to her late husband. What this particular application is we are unable to say, as the title of the invention is not given; but we presume, from the nature of the other inventions patented by the late Mr. Evans, that it relates to steam boilers, as he took out several patents for improvements in this class.

#### REMARKS.

We would call the attention of the committee to the fact that, after a patent has expired, it becomes the property of the public, and there is no law in existence by which the public can be deprived of the right to hold that which has reverted to its use by due process of law. When a patent has expired, the legal ownership in the invention passes to the public; and in case Congress should extend the patent by a process known as a "relief bill," it would be acting on the principle of "robbing Peter to pay Paul." The patent laws enacted

by Congress provide for the extension of patents under the authority of the Commissioner of Patents; and whenever this power ceases, it seems to us that there is no other relief, unless Congress interposes its authority before the patent expires. We believe that Congress may legitimately interpose its authority to extend and keep alive a patent before it expires; but when it ceases to live, Congress would be inflicting great injustice by undertaking to raise it from the dead and restore it to its former possessors.

Upon this subject—the extension of patents—our position is perfectly plain. We will, however, re-state it in a few words. Our general laws allow the Commissioner of Patents to grant a patent for the term of 14 years, with the power to prolong it for another period of 7 years, under certain conditions. If the invention is valuable, it usually requires about one-half the first term of the patent to get it before the public; and when this is accomplished, it often takes about the whole of the remaining seven years to establish its validity against infringers. There are, in reality, but few valuable inventions which ought not to be extended, and it is one of the brightest spots in the history of the Patent Office that it has seldom failed to recognize the right of an inventor to the extension of his patent, by process of law, for any useful improvement in the arts. If the applicant has a good invention and an equitable case, he will scarcely fail to obtain an extension of his patent, if it is carefully prepared and judiciously managed. The public, also, who feel interested in opposing the extension are duly notified in the public prints, and can appear before the Office with testimony and argument, and contest its right to the extension. Not so, however, with cases before Congress; the public have no means of knowing what is going on in that body, respecting the extension of patents—they will look in vain in the reports of the daily papers for such information; therefore, those who might desire to remonstrate are ignorant of the application. We sincerely hope that Congress will not establish the dangerous precedent of reviving dead patents.

#### DEATH OF HON. CHAS. STEARNS.

On reading the obituary of Mr. Stearns, in a recent number of the *Springfield (Mass.) Republican*, our memory went back to the period when we first made the acquaintance of the deceased, eighteen years ago. Mr. Stearns was not a young man at that time, and the writer of this was not then out of his teens; but time has not effaced from his memory the many acts of kindness received at his hands. The city of Springfield has lost in the deceased one to whom she is more indebted for her prosperity and growth than to any other single individual who has ever been identified with the place; and we trust that its good citizens will exhibit their public spirit by taking upon themselves the responsibility of erecting a monument to his memory in their beautiful cemetery which, we believe, he was active in forming. The following we extract from the obituary notice in the paper referred to:—"The death of Mr. Stearns, at the ripe age of 71, closes a career at once eventful, active and extended. He was born in Lancaster, Mass., and learned the trade of mason in Boston. He came to Springfield in 1812, and began and perfected here the business of his life. For a considerable number of years, he was the master-mason of the place, while Simon Sanborn was the master-carpenter, and excellent workmen were they both. At an early period in his business career, he became an operator in real estate, and probably no man has lived in the town who has built and owned so many houses as he. At one time, he had a large number of tenants, and it was his stereotyped reply to applicants for tenements, when all were occupied, that he "had none, but could build one immediately." Mr. Stearns was always a ready and willing worker in every public enterprise. He was very active in procuring the experimental surveys for the Western Railroad, and in getting subscriptions to the stock. In fact, there was hardly a man upon the line to whose energy and enterprise that great work was more indebted for its inception and completion than to his. The Springfield Aqueduct Company was also a child of his begetting. The starting of the Indian Orchard enterprise is also traceable to him, we believe. It would be impossible for us to recall all the matters into which he has entered as an active power. There was a time when Charles Stearns was in everything. Nor were his business talent, sound sense and untiring industry unap-

preciated by his fellow-citizens. He was elected a member of the State Senate in 1845, and has represented the town, we believe, more than once in the lower branch of the Legislature. In the closing months of his life, he was engaged upon a history of Springfield, which, we believe, is nearly ready for publication. It occupied much of his thought during his closing days."

#### THE CATTLE DISEASE IN MASSACHUSETTS.

This terrible epidemic, by its continuous spreading, threatens to become one of the greatest scourges that has ever visited the country. The imagination is appalled at the contemplation of the thousands of herds from Maine to Texas being visited by this wasting and fatal malady. The suffering and anxiety from the loss of property and from the dread of its loss among the agricultural community, and the fear of diseased meat in all our cities, may be partly conceived but cannot be fully realized. It seems that the Legislature of the State has been aroused to the importance of the matter. A law has been passed for the appointment of three commissioners to investigate the subject, and authority has been given them to have slaughtered, at the expense of the State, all the cattle that are sick or that have been exposed to the contagion, to have their bodies buried and the barns in which they have been kept purified—even burning the hay if the commissioners think it necessary.

The commissioners are Richard S. Fay, of Lynn, Mass.; Paoli Lathrop, of South Hadley, Mass.; and Amasa Walker, of North Brookfield, Mass. They have caused fourteen animals to be killed, that they might trace the progress and character of the disease in all its stages. It is purely a disease of the lungs, affecting the animal in no other organ, and seems to be certainly contagious. A cow that died the night before the commissioners arrived was examined, and both her lungs were a mass of frothy, cheesy corruption. One cow that was taken sick so long ago as the 1st of January, and seemed to be recovering, appearing bright and healthy, was slaughtered; the left lobe of the lungs was sound, but from the right was taken a mass of pus, looking like rotten cheese, of more than a pint in measurement. She might possibly have thrown off the disease and lived, had she not been killed. Another cow in the same herd, and showing stronger signs of the disease, had a similar but greater mass of pus in the lungs, and with it a large amount of watery fluid. An ox that looked bright and well, and ate and chewed his cud as if in a healthy condition, was among the slain, and one of his lungs was a mass of corruption. Another singular case was that of a cow that calved some ten days ago; one lung was healthy, but in the other the disease was developing itself in scattered balls or masses of pus, looking like liver on the outside, but, on cutting, like rotten cheese; and her calf was found to have the disease in precisely a similar stage. The presence of the disease is detected by the breathing of the animal which makes a croupy noise or like breathing through a quill.

It is to be hoped that these energetic measures are not too late, and it is especially to be desired that the commissioners will allow no childish weakness to prevent the thorough and efficient discharge of their momentous duties. Contagion is so subtle in its nature, and is scattered abroad by such widely pervading agencies, that we shall be agreeably disappointed if any human power is able to arrest the spread of this deadly pestilence.

#### THE LIGHTNING CALCULATOR.

One of the most amusing and astonishing exhibitions of mental power that we have ever seen is the addition of a row of figures by Professor Wm. S. Hutchings, the mathematical phenomenon. During his absence from the room, several rows of figures are entered upon a board, and on his return, he picks up the chalk, and, giving it a whirl in the air, with a sort of convulsion, he announces the sum of the first column, setting down the digit. Another whirl of the hand and down goes the next figure, and thus the several columns are added, almost instantly; the operation exciting the wonder of the spectators. He also performs multiplication and the squaring of large numbers with marvelous quickness, setting down the result in a single row of figures. We have examined his processes, and are satisfied that almost any of our intelligent accountants, who are pretty quick at figures, might learn to calculate with nearly the same rapidity.