

that year 975 ships, representing 200,839 tons, were built and registered in the United Kingdom;—of these 91,095 tons were constructed of iron, the average of the iron vessels being a burthen of 430 tons each.

And this, it should be remembered, is exclusive of iron ships built in private yards for the Royal Navy, and of the ships constructed for foreigners!

The iron screw steam-ships, in consequence of their great and regular speed, due to engineering skill, have practically become an extension of the railway system over all parts of the world, and have enabled us more freely to exchange the products of our industry for those of other nations, thereby conducing to the employment, the intellectual and social enjoyment, and the convenience of the people, and providing for the further increase of population and universal wealth.

On these considerations I am justified in stating, that the increase of the income of England since the year 1815, has not arisen from the land; but that it is mainly due to the discoveries of our great engineers. There remains still to be considered the question of the distribution of this wealth, which has been the means of providing profitable employment for millions of a rapidly increasing population, who, but for such industrial undertakings, must have remained a burthen on the land, and a cause of poverty and discontent; unless reduced in number by famine, or by extensive emigration.

We may also congratulate ourselves that this wealth has not been employed in reproductive undertakings alone, but that the great cause of education has felt the stimulus of it, and that every year the importance of developing and directing the intelligence of the people is more distinctly recognized."

THE INVENTION OF THE CARD-MAKING MACHINE.

WHITTEMORE—1797.

We do not rank the card-setting machine among "the most important American discoveries and inventions," and yet we cannot omit it from our account, for it is generally regarded as coming nearest in its movements to the acts of intelligence of any piece of mechanism that has ever been devised. Two delicate needles dart forward and punch the leather; the wire is drawn in from the reel and cut off at the proper length; a fork sweeps forward and bends the wire into the form of the letter U; a pair of pincers seize the bent wire and thrust it deftly into the holes prepared for it; and finally a press rises on the opposite side of the leather and bends the wire at the proper angle to make a perfect card. All of these varied movements go on automatically and continuously, and if a crooked or imperfect tooth is made, the machine instantly stops of its own accord. This last, the stop-motion, is the only material improvement made in the machine from the form in which it was originally devised by its first inventor.

A few years since a manufacturer of these machines, a Mr. Earle, of Leicester, Mass., had a very fine machine on exhibition at the Mechanics' Fair in Boston, when the Rev. Mr. Pierpont came along with a friend and stopped to look at it.

"Here," Mr. Pierpont remarked, "is the machine that more than any other impresses me with the feeling that it must be endowed with thought."

At that time the stop-motion had not been invented, and great efforts were being made to devise it. With this in his mind, Mr. Earle replied:—

"Yes, all it needs to be a perfect sentient being is a conscience."

In the course of that season the stop-motion was perfected, and when Mr. Pierpont passed through the next Fair, he reminded Mr. Earle of the previous conversation. Mr. Earle replied:—

"The defect is now remedied. The machine has got a conscience, and it does just what a conscience ought to do—it stops at the first wrong step."

We have heard a gentleman speak repeatedly of visiting a large card manufactory in New Jersey. While he was talking with the proprietor a man came out of the mill and went off to his house. Some 15 minutes afterward our friend went into the factory, and found a very large room full of machines in active operation, with not a single person in the building to attend to them!

The card-setting machine was invented by Amos Whittemore, who was born at Cambridge, Mass., April 19th, 1759. His father was a farmer, but Amos early showed a fondness for mechanical pursuits, and, on arriving at the proper age, he became an apprentice to a gunsmith. Long before the expiration of his apprenticeship his master confessed that he could teach him no more, and advised him to set up business for himself. Some years later he became interested, with his brother William and five others, in the manufacture of cotton and wool cards, conducting their business in Boston, under the firm of Giles, Richards & Co., and supplying nearly all the cards then used in the country. Amos attended to the mechanical department.

It soon occurred to him that if a machine could be devised to perform the operations, it would supersede a vast amount of hand-labor, and would be of great value. After long and patient meditation the plan had so far taken shape in his own mind that he was ready to communicate his idea to his brother William. This brother encouraged and assisted him to the utmost, and a chamber was set apart for the construction of a model. Here the enthusiastic inventor devoted himself to the perfecting and embodying of his plans with such zeal as frequently to neglect his food and sleep. In the course of three months the machine was so far advanced as to punch the leather, and to cut, bend, and insert the wire; but the bending of the teeth at the proper angle completely baffled his genius, and he began to despair of success. While his mind was on the stretch to overcome the obstacle, one night during his sleep the idea was presented to him in a dream. Rising early in the morning he hastened to his workshop, and, before he broke his fast, he was able to announce to his brother that the machine was perfected.

Steps were immediately taken to secure a patent, and this was obtained on the 2d of June, 1797. The brothers determined also that a patent should be taken out in England, and that the inventor should visit that country for the purpose. At that time but two vessels traded between Boston and