

WEAVING.—No. XXV.

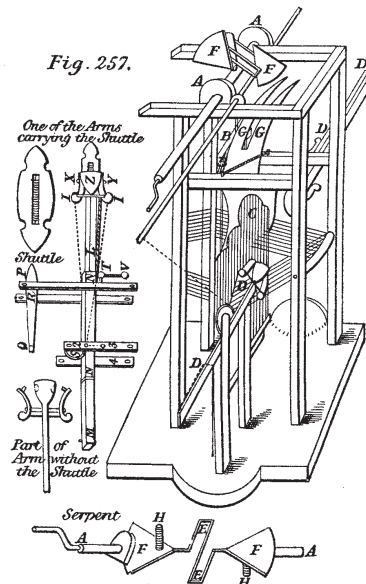
THE POWER LOOM.

In the last article it was shown that the ribbon loom had been made to work automatically about the middle of the last century, and was the first loom made to work by power. But the term "power loom" is usually understood to mean a loom to weave wide cloth such as calico, and in fact it was to weave calico by power that Dr. Cartwright set himself the task to accomplish, as related in a former article.

The power loom must be adapted to perform the various operations of the weaver, and these are as follow:

1. To open the shed.
2. To throw the shuttle.
3. To beat the weft together.
4. To wind up the cloth as it is woven.

Although these are the only operations required to weave, there are many circumstances that must be attended to in order to make the best use of the



loom. In plain weaving to open the shed and beat together the weft threads is a simple matter, but in case the weft thread should break, the loom would continue to move unless some contrivance was used to stop the loom without the assistance of the weaver, and in case the shuttle should fail in being thrown through the shed into the opposite box, it should stick in the shed, then serious damage would be done to the warp if there were no means to stop the loom suddenly. The winding up of the cloth in constant and regular intervals must also be effected, or as the cloth beam became filled the cloth would be wound up faster in proportion to the diameter of the cloth beam.

Now the above operations could be accomplished in the ribbon loom with much less difficulty than in broadcloth looms. The shuttles could be easily and safely thrown through the shed without danger, and the winding up of the ribbon as woven is very ingeniously carried out by a plan that could scarcely be adopted in a wide loom. Therefore, the problem to be solved to weave wide cloth was a very different one, and it now remains to be shown how it was accomplished.

The first mention or suggestion that is known relative to weaving by power is given in the French "Journal des Savants" for the year 1678, a copy of which was printed in the Transactions of the Royal Society of London. In these works a model is shown and described of a "New machine for making linen cloth without the aid of a workman." It was presented by M. de Geunes, an officer of the French navy, to the Royal Academy.

Fig. 257 is a copy of the drawing, which is inserted here on account of its being the first known attempt at power weaving, and not from any practical value it possesses. The crankshaft is called a "serpent," and the shuttle is inserted in a lever, and carried half way through the shed where it is received by a corresponding lever on the opposite side of the loom. Cams are shown to work the headles,

and in this instance, although of little practical use, they certainly are the first application of tappets to looms.

The next attempt appears to have been made by "Robert and Thomas Barber, of Billborough, Nottingham, gentlemen," who took out a patent in 1774, No. 1083, for "Machinery for preparing, spinning, and weaving fibrous substances, &c."

The specification is accompanied with a drawing

L, L, L, represents the layth or swing of a common loom, with the sley in it, which strikes the threads up, &c. 1, 1, a square shaft fixed upon the low rails of a loom, set short of being perpendicular under the layth. 2 a cog wheel, which gives motion to the whole when it is moved by a water wheel, or a wheel turned by horses, air, or fire. 3, 3, two wheels, with each a piece cut out to make them catch upon the arms 5, 5, and hold them forward

catch to lay hold upon, fixed to the layth bottom. 14, a wheel fix'd in the carriage. 15, 15, two lavers fixed upon opposite squares of main shaft, which, moving circular, roll the carriage up until the catch lays hold of layth. 16, 16, 16, 16, four traddles, with ends coming forward almost under the main shaft. 17, the bed of the layth, or bottom on which the shuttle passes. 18, 18, two triggers, which slip on wires to strike the shuttle. 19, 19,

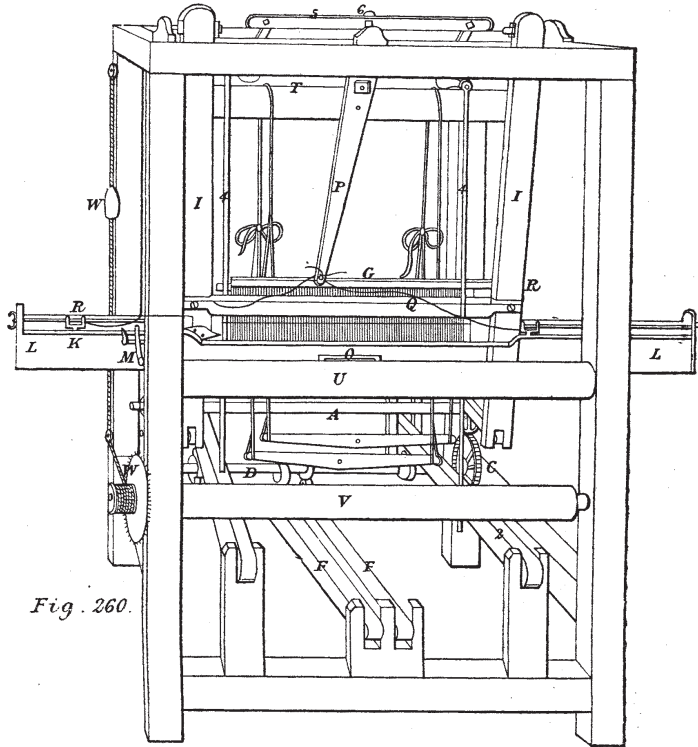


Fig. 260.

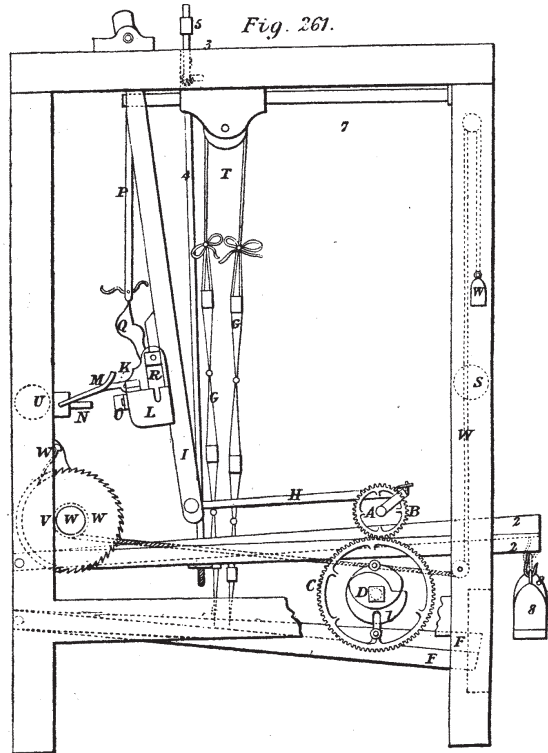


Fig. 261.

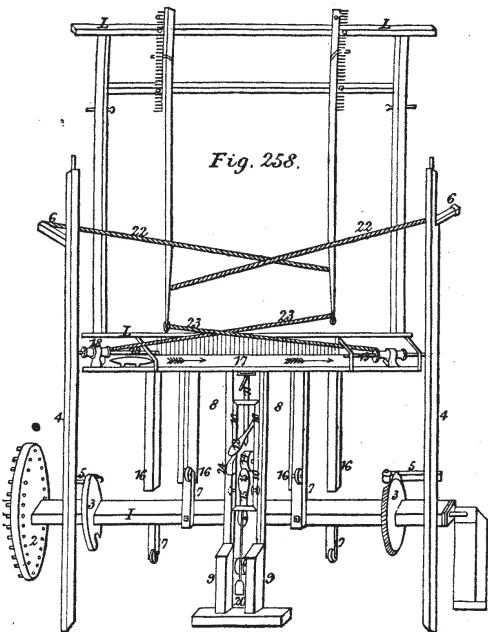


Fig. 258.

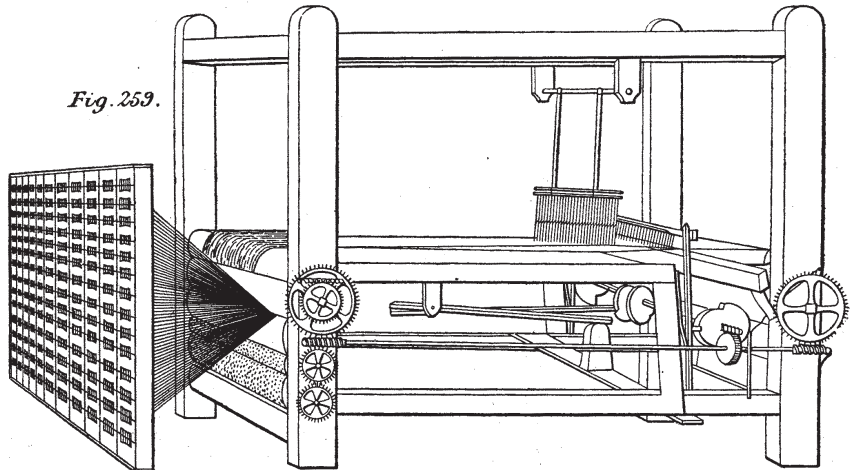


Fig. 259.

of the loom, and it is particularly interesting from the circumstances that the picking shafts with the sticks, cams, and studs are precisely the same in principle as the most approved looms of the present day. The plan had been thrown aside or forgotten, and many years elapsed before it was again taken up or re-invented. The date also is eleven years earlier than Dr. Cartwright's first patent, but it is probable the doctor knew nothing of the matter.

Fig. 258 is a copy of Messrs. Barber's drawing attached to the specification, and their own description of the invention is also given as follows:—"L,

until the return of the sluice suffers them to flirt into them again. 4, 4, two upright shafts, with spindles at top and bottom, each of them two arms. These shafts stand on the outside of the loom. 5, 5, the two low arms in the shafts 4, 4, with each a castor for the wheel catches, to press back and continue holding till the cut part comes round again. 6, 6, the upper arms with straps to the springs. 7, 7, 7, 7, four arms, with wheels in the points, to press down the traddles. 8, 8, the flat or top part of a frame (mark'd with red ink), fixt up almost as high as the bottom of the layth 1, and goes under it; the other end comes back to two uprights 9, 9. 9, 9, two standards, which also supports the weights and the carriage. 10, 10, a carriage to run backward and forwards occasionally upon frame 8, 8, having four small wheels running in grooves in 8, 8, where dotted. 11, an iron catch, axled, held down at tail by a spring. 12, a spring to hold down the iron catch. 13, an iron stop for

two wires, which carry shuttle triggers. 20, 20, a weight, which, fix'd to a strap running over a wheel, pulls back the carriage. 21, 21, two springs fix'd upon the layth. 22, 22, two bandages for the upper arms of the shafts. 23, 23, two bandages from springs to shuttle triggers. 24, a button fix'd on frame. 8, traps of spring. 12, the motion. The cog wheel, being moved by the main power, turns the shaft gently round. Two of 7, 7, press down the two of 16, 16. One of the lavers, 15, rolls up carriage 10, whose catch lays hold upon 13. The lever quits the wheel by its circular motion, and the weight 20 strikes forward the layth to the work, at which time the spring is trapt of by 24, and, being released, returns one of the 3, 3, having the cut-out place upwards. 5 is plucked back into the adjutage by 21, and its bandage 22, which is buckled at point of 6. At the same instant the bandage 23 plucks 18, which drives the shuttle to the opposite side. Thus one course is wove in half a revolution, &c."

It does not appear that Barber's loom was ever

brought into use, and nothing more is heard of a power loom until 1785, when Dr. Cartwright took out his first patent, the doctor's own account of which has been previously given. This, the first of the doctor's patents, was for a vertical power loom, but it was a very crude affair, and was abandoned. In 1786 he took out a second patent, and in 1787, 1788, 1789, and 1792 he obtained other patents for various improvements and additions to his loom, &c.; but the 1789 patent was his famous patent for combing, dressing, &c., and not weaving.

In these various patents are to be found the first attempts to accomplish certain operations that are indispensable to the power loom. Thus he attempted means to stop the loom when the weft thread broke, and to stop the loom suddenly when the shuttle failed to be driven through the shed, and several other matters of more or less importance that have since been perfected and brought into general use. But as we have before related, the doctor was un-

fortunate, and did not meet with the success his endeavours deserved. From his second patent, Fig. 259 is taken, and represents (reduced) his loom.

But although Dr. Cartwright did not succeed in carrying out his inventions, they were followed by other inventors who ultimately became successful. There were three patents that led to that result, viz.: Robert Miller, 1796, invented the "wiper" loom, so-called from the cam, called a "wiper," to throw the shuttle. In 1803 Thomas Johnson patented another form of loom which was long known as the "dandy" loom. This Mr. Johnson was a clever mechanic, and made the loom under the directions of Mr. W. Radcliffe, who, not only invented the loom, but was the original inventor of the dressing frame. Mr. Radcliffe had his patents taken out in Johnson's name, it is stated, so that "foreigners" should not have their attention drawn to them, which otherwise his own name would be sure

to do from the reputation he had. The third patent was that of William Horrocks, cotton manufacturer, of Stockport, 1803. Mr. Horrocks' loom was long known as the "crank" loom, and Figs. 260, 261 is a copy of the drawing attached to the specification. Further improvements were made upon this loom, and it ultimately came into general use.