THE IMPROVED HAND LOOM EUGENIE.

The annexed cut, taken from the *Illustrirte Zeitung*, shows a new hand weaving machine or loom invented by Miss Eugenie Wernicke. By means of this apparatus, silk, wool, yarn, cords, strips of fabric, etc., can be woven into pieces that can be used for pillow-covers, shams, curtains, parts of dresses, etc.

In using the machine, the warp threads are first arranged parallel, either on the backs of two chairs or secured to the knobs of two doors. The warp threads are then passed through the heddles, arranged on suitable frame, and then the ends of the warp threads are tied together and fastened to the back of the chair upon which the person operating the loom sits, and the other ends of the threads are held in a suitable clamp on the table. The heddle frame or comb is raised by means of the left hand, whereby the threads are separated, and then the shuttle is passed through the warp threads, the warp threads shifted, the shuttle passed through in the inverse direction, and so on. Different fancy patterns can easily be produced on the machine. It is evident that broad pieces cannot be woven, and the machine is designed only for producing long strips for household use.

THE IMPROVED HAND LOOM EUGENIE.

THE IMPROVED HAND LOOM PENELOPE.

The holder, A, is provided with a screw for holding the entire apparatus on a table, and on the said holder an upright frame, B, is held, which is provided with rollers, C D, over which straps pass for raising and lowering the heddle frames, E and F, in which heddle frames heddles of the usual construction are held, provided with eyes through which the warp threads are passed. Two hinged arms, G and H, are fastened by means of hinges on the holder, A, and can be locked in place by means of a latch, J. The warp threads are secured on the warp beam, K, mounted on a frame, L, on the end of the arm, H, and is provided with a crank for turning it, and with a spring, M, for locking it in place.

The cloth beam, O, is pivoted in the frame, N, on the end of the arm, G, and is also provided with a crank and with a locking device. The heddle frames, E and F, are worked up and down; when one is raised the other is lowered, and thereby the warp threads are separated, and the shuttle can be passed through them. No lay is used for driving the threads home, as this is done by the operator, who pulls the threads taut after having passed the shuttle.—*Illustrirte Zeitung.*

Petroleum in Russia.

The Russian oil region covers an area of over 14,000 square miles, with forty-two oil wells in one district, over a hundred in another, four hundred in a third, and richer regions waiting to be developed to produce still greater results. One spouting well produces, it is said, two millions of gallons a day. The oil is found in places at a depth of a hundred feet, and no well has gone below eight hundred and twenty-five feet. Three Swedish brothers, and a few others, Americans and Englishmen, as well as Russians, who have been in America, have introduced method and system, pipe lines, oil-carrying barges and steamers, tank cars, refineries, joint stock companies, railroads, and now produce 800,000 tons of crude and 200,000 tons of refined petroleum, and are rapidly finding new markets. In America there are over 25,000 drilled petroleum wells; in Baku, the Russian oil region of most activity, there are 400, but a single one of these, it is claimed, has thrown up as much oil in a day as nearly the whole of the 25,000 in America put together.

Spouting wells in Russia are both frequent and constant, and the overflow is sometimes a serious difficulty, in some cases run into the sea or low land, and burned to get rid of it.

Revolution in the Iron Trade.—Making Steel Cheaply.

In another column the reader will find an interesting account of the progress steel has made toward displacing wrought iron, and there appears another statement, in the New York *Tribune* from a Pittsburg correspondent, which seems to confirm the fact that steel is to take the place of iron in most places where the latter has been used. The metal manufacturers seem to be alive to the change which has come over the public in its appreciation of the superiority of steel.

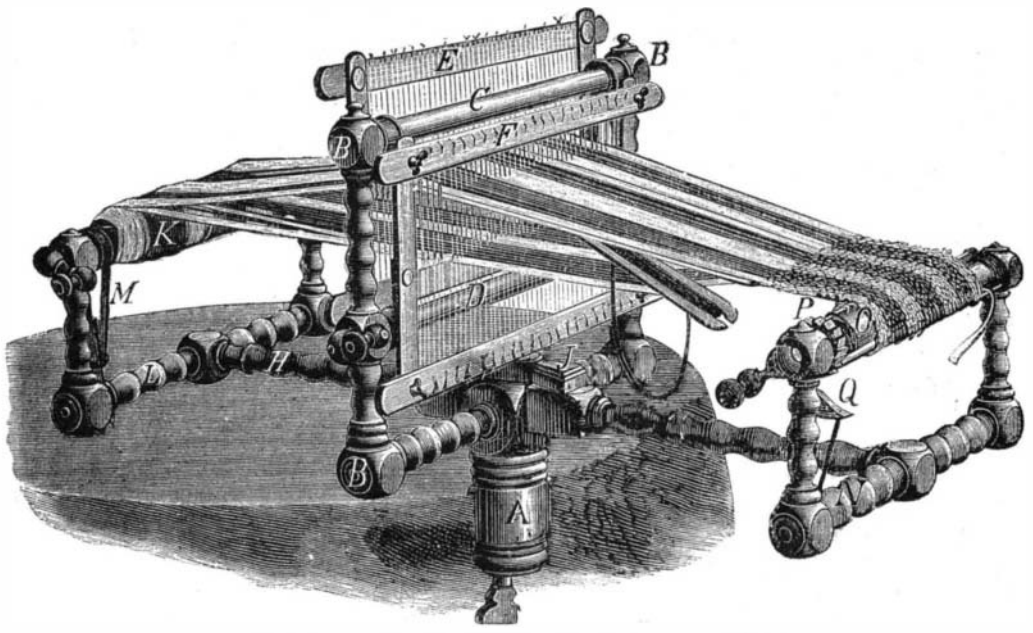
Early last year people about Pittsburg had their curiosity much aroused by mysterious performances at the works of Oliver Brothers. A part of the establishment was carefully boarded and locked, and jealously guarded from all intrusion, and for a long time nobody was admitted. Indeed, while everybody wondered what was going on, and among iron workers particularly a great deal of curiosity was excited, the secret was so well kept that the nature of the operation did not become known to anybody until in the last month, unless it be to those who had special information of the affairs and prospects of the great firm of Oliver Brothers after its suspension. But now, through papers submitted at the annual meeting of the American Institute of Engineers and publications in local journals, the public is assured that a new process for working iron has been thoroughly tested, and has not only met the scrutiny of experts, but has demonstrated its immense practical value.

Its effect upon the future wages of skilled iron workers will probably be appreciated from the statement now made, that, while steel of a peculiarly excellent quality, and specially adapted to many uses in preference to malleable iron, has been produced in large quantities and placed upon the market, only one workman in the whole establishment has needed such skill or training as to receive wages averaging as much as $2.50 a day. By the new process, which is entitled the Clapp-Griffiths process, the silicon is so completely removed from the iron that, notwithstanding the presence of a proportion of phosphorus usually found fatal, steel of a high grade and of a remarkably useful quality is made. To the practical iron worker, however, the most startling fact remains that the cost of this treatment is less than half the present cost of making the ordinary pig iron into muck bar.

At the wages now paid in Pittsburg, it is reckoned that it costs $12.75 per ton to make muck bar from pig iron, but by the new process a metal far more useful, in better shape for handling, is produced at less waste, with a cost of only $6 a ton added to the cost of the pig. Moreover, it is shown that, by applying the comparatively inexpensive plant required in this process in connection with ordinary blast furnaces, and taking the molten iron as it is required hot from the blast furnace for treatment in the converter, the cost of producing the ton of steel will be only $3 or $4 more than the cost of producing the ton of iron.

In the last year, adds the writer, Oliver Brothers & Phillips have turned out many hundred tons of this metal in different forms, such as tacks, rivets, wire rods, telegraph wire, lightning rods, horseshoe nails, pipe strips, plates, sheets, bars, angles, shovels, spades, and stamping iron, which have given great satisfaction to consumers. The metal possesses, according to Captain R. W. Hunt, of Troy, who reported on the subject to the American Institute of Engineers, "an ever-constant welding property with great toughness." He further says: "I obtained steel with 54 per cent of phosphorus, and my surprise certainly did not decrease when I saw the test piece bend double, cold, and the metal work beautifully when hot." As respects the cost, Mr. Witherow, of New Castle, Pennsylvania, who has been associated with Mr. Oliver in the work, presented a paper in which he stated that careful account of expenses while making about 2,000 tons of this steel had been kept, and "including cost of the ferro-manganese, coke, and keeping up the plant, expenses for steam power, labor, and everything connected with the process, it did not exceed $6.50 per ton over the price of the pig iron used." But, as he further showed, much greater economy can be had in a production of the steel blooms in direct connection with the blast furnace.

Another great innovation in steel making processes is announced in England, which, according to the London *Iron and Coal Trades Review*, will put an almost certain end to the malleable iron trade at once, as steel ingots could be made at far less cost than that at which puddled bars are now made. It will be observed that this process appears from the description to be like the one so successfully introduced in Pittsburg, at least in general results, and in probable economy of working.



THE IMPROVED HAND LOOM PENELOPE.

Replacing Teeth.

A correspondent writes describing a sled accident by which a ten year old girl had two front upper teeth knocked out.

She was taken to a dentist, who replaced the teeth and strapped up her jaw. For two days she could scarcely speak, no solid food was allowed, but the operation was successful, and the teeth are as firmly set as ever. They are a little chipped, but later on, when it is safe to work on them, they can be patched with gold and be about as good as ever.