MACHINE FOR MAKING SPIKES.

The annexed engraving represents a machine for rapidly making from bars of iron spikes with perfectly shaped heads and points.

The successive steps in the formation of spikes in this machine will be understood on reference to the detail views, these steps being as follows: A piece of iron of the proper length, having been cut from the bar, is bent in the center, as shown, and the bent bar is then severed at the bend, so as to form two spike blanks, each with a hooked end, the spikes being completed by pressing the hooked ends of the blanks to form the heads, and rolling or pressing the opposite ends of the blanks to form the points.

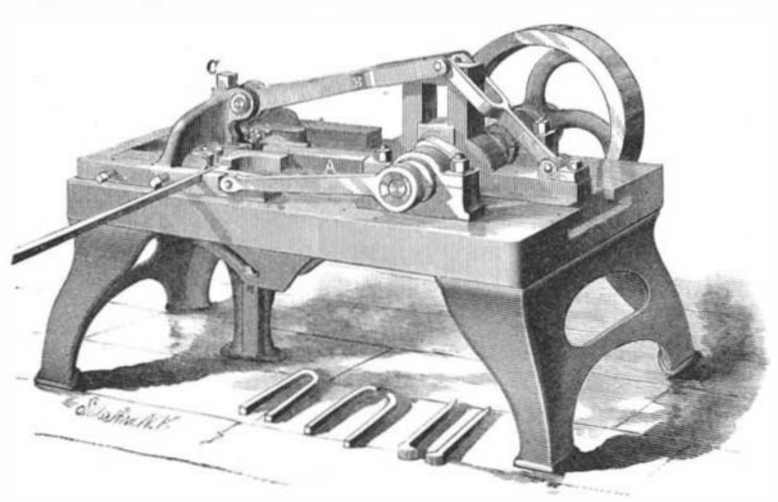
The end of a bar of iron of the proper form and dimensions in cross-section is passed through an opening in one of the side frames of the machine, and through an opening in a knife occupying a central position between the frames, the front end of the bar resting against a gauge plate on the farther side of the machine.

A cutter bar then advances, and the bar of iron being held by the knife, the cutter severs from the bar the portion which is now supported vertically by the forked end of a sliding frame, A, and by the upper end of a sliding bar in the forked end of the frame, A, and having a central slot for the reception and guidance of a central knife. The frame, A, now advances, and those portions of the iron bar which project on the opposite sides of the knife are acted upon by two pairs of rollers, carried by the frame, A; the effect of this action is to bend the bar around a central block immediately in advance of the knife. As soon as the bar is so bent the knife descends and severs the bar at the bend, when the supporting bar descends with the knife, so as to be out of the way during the subsequent operations. As the frame, A, continues to advance the blanks produced by severing the bent bar are clamped between fixed and movable gripping dies, and the outer roller of each pair of rollers on the frame is acted upon by a cam, which causes them to press upon the inner rollers which press upon the blanks held between the gripping dies.

The final effect of the forward movement of the frame, A, is the pointing and heading of the spikes. The pointing is effected by the combined action of dies and cams, the latter acting through the medium of the rollers, and imparting the taper to one side of each spike blank, while the dies impart taper to the opposite sides.

The heading is done between the front end of the anvil or former block and a heading die, carried by the forked frame. A. The clamping dies are carried by a rod, C, which slides vertically in a bearing on the frame, and is operated by a lever, B, the short arm of which engages the rod, while the long arm of the lever is connected by links to a pin on the sliding frame, A, so that as the latter reciprocates a vibrating movement will be imparted to the lever.

This invention has been patented by Mr. J. M. Baker, of Allentown, Pa., who may be addressed for further information.



BAKER'S SPIKE MACHINE.

The Connellsville Coke Industry.

The Pittsburg *Manufacturer* has obtained from parties interested in the Connellsville (Pa.) coke industry the following facts respecting the magnitude of the business of that district. The 8,000 coke ovens of the district have a daily producing capacity of 15,000 net tons.

The most of the coke goes to the West and Northwest. Some of the most distant markets to which it is shipped are Colorado, Utah, New Mexico, and Arizona. Freight charges to these points range from $20.00 to $45.00 per net ton. It is mostly used in iron-making blast furnaces, and in the far West for smelting the precious metals, etc., but it is also largely used in foundries and other works. Its chief distinguishing merits are its high percentage of carbon, its freedom from impurities, and its hardness and consequent ability to bear a heavy burden in the furnace. Following is an analysis of Connellsville coke: Water at 225°, 0·030; volatile matter, 0·460; fixed carbon, 89·576; sulphur, 0 821; ash, 9·113.

The most amazing feature of this industry is the enormous waste of gas it involves, and of the by-products that would be got were the gas saved and purified.

SOME kinds of stains may be removed from silk by the application of essence of lemon, one part; spirits of turpentine, five parts. Mix, and apply to the spot by means of a linen rag.

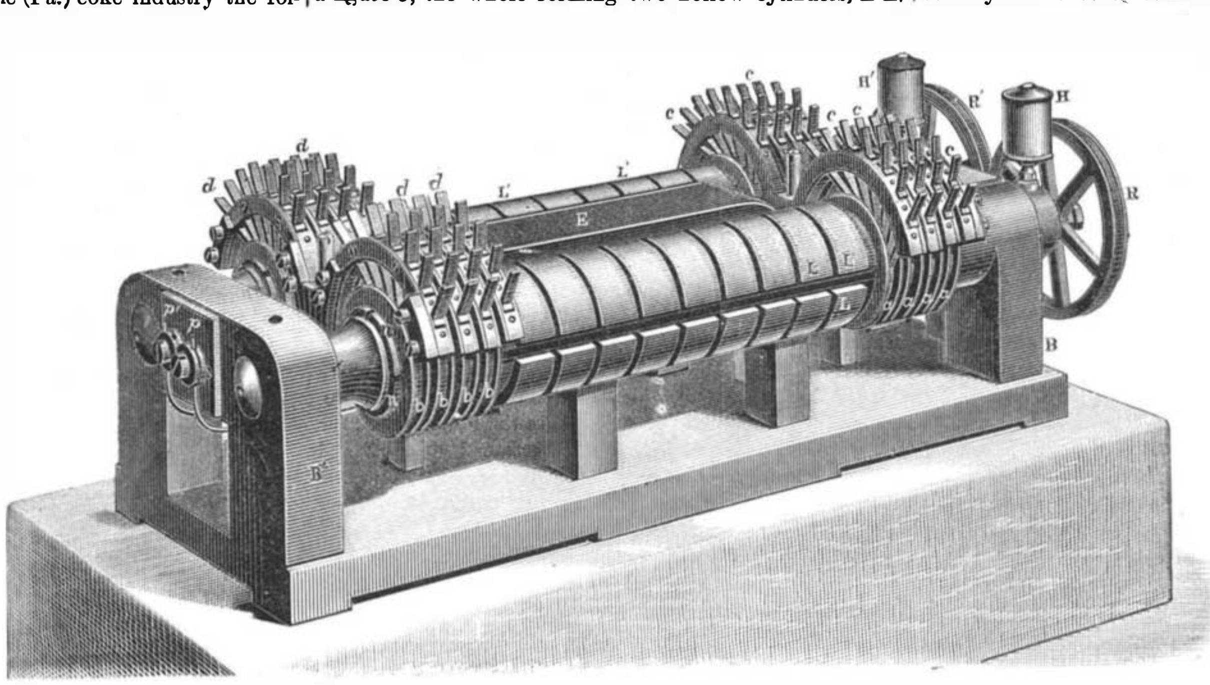
SIEMENS' UNIPOLAR MACHINE.

In an article published in a former number we called attention to an invention of Mr. Siemens' called a "unipolar machine," founded upon the induction produced in a copper cylinder revolving around the pole of a magnet.

The apparatus was formed essentially of a large, vertical, two-armed magnet, whose cores were twice the length of the arms. The two cores were surrounded by two hollow cylinders of copper which revolved with them. The lower part of each of the cylinders was connected by a rubber with one of the ends of the wire of the electros. Two other insulated rubbers communicated with the upper parts of the cylinder and served to take up the current. The electromotive power of this apparatus was about one volt, and, as its resistance was very weak, it permitted of quite a notable intensity being obtained. The performance, however, was not in proportion to the large dimensions of the machine. Mr. Kirchhoff suggested to Mr. Siemens the idea of increasing the electromotive power by cutting the cylinder into a certain number of longitudinal bands supported by an insulating material, and disposing the rubbers in such a way as to add to the electromotive power. To effect this, each band was to be in communication through each of its extremities with an insulated ferrule, and the current was to be collected by means of rubbers arranged circularly, while the concordant electromotive power would be added thereto.

At the time Mr. Siemens made known this idea of Mr. Kirchhoff, difficulties in the way of construction had prevented him from carrying it out; but these difficulties were due to the fact that it had only occurred to him to have the copper bands revolve around the pole of the magnet, and it was thus very hard to arrange the ferrules and collectors properly. But the problem has since been solved quite easily by reversing the first construction of the machine, and inserting hollow poles in whose interior revolve the divided cylinders. A machine constructed on such a principle figured at the International Exhibition of Electricity, and is shown in the accompanying cut.

It consists of a long electro-magnet, E, arranged horizontally, and having for core a series of iron plates on each side of the bobbin, and which, considered two by two, represent a figure 8; the whole forming two hollow cylinders, L L.



SIEMENS' UNIPOLAR MACHINE.

L' L', on each side of the bobbin. Each of these hollow cylinders constitutes one of the poles of the electro-magnet. In its interior are placed upon one axis 4 copper plates, *n n*, each of which communicates at its extremities with two ferrules, *a* and *b*, that are insulated from the other bands. There are thus eight ferrules for each pole, and sixteen for the entire machine. Above these ferrules there are arranged fixed metallic arcs, into which are set at intervals collecting plates, *c c*, *d d*, so as to embrace about a quarter of the circumference of each ferrule. These collectors can be coupled so as to unite the movable plates either for tension or for quantity; and two wheels, R R', moved by one and the same cord, communicate to the two cylinders formed of copper plates a motion in the same direction.

We have not the exact figures in regard to the electromotive power obtained with this machine, but it is evident that with such an arrangement the power must be perceptibly increased.—*Lumière Electrique.*

Ships that Cannot Sink.

Capt. R. B. Forbes, inventor of the well known Forbes rig for ships, makes the following very practical suggestions:

Supposing this ship to be built of steel, and to be divided into at least ten compartments on two decks, exclusive of those occupied by the motive power and the fuel; supposing that the two lower decks are to be of metal, and the hatches secured so as to be water tight like the manhole in a boiler, the ship would have twenty water-tight cargo spaces. I assume that the upper of these decks would be near the mean or average water line, and that every compartment have means to pump *in* air and to pump *out* water. Such a ship, if laden with an ordinary cargo, could not very well sink even if the space devoted to the fuel and to the motive power should be fractured, leaving the working of the pumping gear intact.

Now, supposing that all the goods in the twenty compartments be packed in water tight bales, boxes, or casks, and that every package would float if left to itself, and supposing that every one of the compartments should have a fracture in it, the ship could not sink even if the means for pumping in air and pumping out water could not be availed of. The amount of water which could, under such improbable conditions, be found in the cargo spaces would at the worst only bring the ship down a foot or two; but suppose the system which I advocate should be completely arranged, and all goods be packed in square or nearly square boxes or bales, the amount of water would be very much less than if the goods were packed in casks. Still I should, as a general rule, prefer casks, because they would have nearly their original value when unpacked, whereas bales and boxes would not. Casks would be available for return goods.

In the days of the East India Company, all the goods sent to China were in water tight bales, and valuable goods were sent to the Philippine Islands packed in copper cases; or, I should say, in wooden boxes carefully soldered. At first sight it would seem that this was costly; but it was not so, for the reason that the copper paid no duty and was worth more than it cost.

I assume that if we can afford to import Bordeaux wine, costing from $60 to $100 a cask, we certainly can afford to put goods of from two to ten times those values into the same sort of packages. I assume that insurers would be glad to take risks free from claims for partial loss on goods packed as I suggest for very much less than when packed as is now the custom, and subject to a claim for partial loss. This saving to the merchant would pay for the better packing ten times over.

It would be easy to cite statistics to show that the large amount of valuable goods coming from Europe to this country and to other countries would warrant packing in water tight packages. The *theory* of water tight packages is well illustrated in China, where every chest of tea is lined with lead; the object being to preserve the flavor of the precious herb, but not one chest in ten is really tight; raw silk and silk piece goods are packed in bales and boxes quite pervious to water.

Ostriches for an Experimental Farm.

There are now in Central Park twenty-two ostriches, probably the largest flock of these interesting birds ever seen in this part of the world. They belong to Dr. Prother, of Buenos Ayres, who has brought them here for the purpose of starting an ostrich farm. He already has a large farm in Buenos Ayres, which he has found quite profitable. He expects to succeed still better here owing to the large and protected market for the feathers, the abundance of food for the birds, and the absence of those protracted droughts which leave such heavy losses among the ostrich farmers in South Africa. The farm will probably be in one of the Southern States, as the birds cannot endure a temperature much below the freezing point, and the cost of warming the ostrich houses in winter would be a considerable item in the Northern States. The ostriches in Central Park are picked birds, yielding the highest grades of feathers, and are valued at $1,400 each.