regular contacted spiral coils or layers of yarn firmly together.

Mr. Floyd Heavener, of Laramie City, Wyoming Ter., has made certain improvements upon the Car Coupling for which letters patent were granted the same inventor August 28, 1877, the design being to secure greater strength and reduce the wear upon the operating parts.

OUR IRON INDUSTRY.

With no less surprise than interest we note the prominent remedies which in various countries are proposed for restoring the vitality of the iron industry.

While here the two political parties are urging in Congress, the one an increase, and the other a decrease of tariff—each party deriving its opposing arguments and support from the iron manufacturers themselves, the English and French manufacturers are almost unanimous in favor of protective duties, and the government of Belgium has appointed a commission to inquire into the best means of enlarging the field for the consumption of iron, so as to increase the demand for the products of the Belgian works.

Evidently none of these measures would afford more than local and temporary relief; the trouble lies deeper, we think, and is to be reached and remedied only by discovering and adopting new methods and economies in manufacture.

Prominent among the many methods that have been presented to the iron manufacturers in the past ten years are two which with great cost and long experiment have been so far developed that but little apparently remains to be done to perfect them sufficiently for general adoption.

The manufacture of wrought iron directly from the ore—the direct process—and the application of pulverized coal to puddling and heating furnaces, are the two improvements we speak of.

The ideas are old and familiar, but their present improved methods of expression are of recent date, and have had but little publicity, especially among manufacturers on this side of the water.

Though, doubtless, quite as many new points in regard to these processes have been determined here as in England, we are able to obtain from the Reports of the Associations of the English Iron Manufacturers fuller knowledge of the progress made there.

And we would here remark that in these associations, at whose meetings every new process or improvement is fully examined, discussed, and criticised, our English cousins possess great advantages over us. While they act together for their mutual benefit, we act independently of or in opposition to each other, because of jealousies of competitive and sectional interests.

Without dwelling on the worth of Clay, Chênot, and scores of others who have successively added to our knowledge of the manufacture of wrought iron directly from the ore, we come to one of the latest experimenters on the subject—Siemens—who has recently obtained results indicative of a very near approach to a practical and economical solution of the problem through intelligent recognition of the necessity for fine pulverization and ultimate mixtures of the ore and reagents.

In our judgment the failure to recognize the importance of these factors has been the chief cause of the non-success that has accompanied the labors of most experimenters in this direction, for we have long held the opinion that unvarying and satisfactory products and proper economies in time and fuel could in no other way be attained; as only by fine pulverization of the furnace charge can the intimate mixture requisite to prompt and effective chemical reactions be secured.

The only things seemingly now required for the perfection of this process are a furnace of less cost and a manner of firing more simple than that of Siemens, for in the matters of economies in fuel, ore, and reagents, and in character of product, but little remains to be desired.

In the application of pulverized coal to the puddling and heating of iron, Crampton in England, at Woolwich and elsewhere, has achieved fair success by using the Danks revolving furnace; and the most intelligent criticism seems to establish the fact that the method would be completely successful, not only with the revolving but with all other heating and puddling furnaces, were the coal economically reduced to a finer powder.

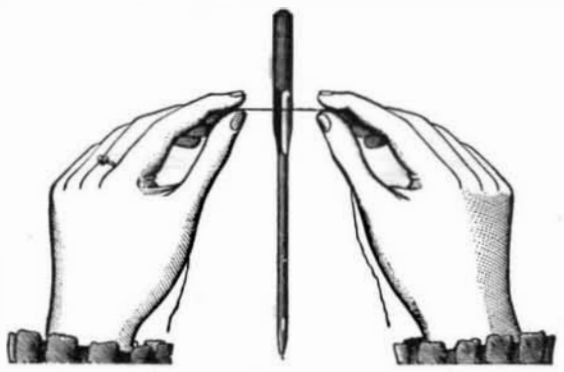
It would therefore appear that the cost of the revolving furnace and auxiliary machinery, and his imperfect yet expensive method of pulverizing, are the only obstacles which retard the general acceptance of Mr. Crampton's process.

Great progress, too, in these directions has been made with us in the past few years, especially toward the point arrived at by Mr. Crampton, so that, judging from the reports from the United States Armory at Springfield, Mass., where a pulverized fuel process has been in operation for several years, but little if any more experiment is required for its perfection. The furnace and the appliances for comminuting and injecting the coal are reported as simple, inexpensive, and durable, and as leaving but little more to be desired.

These two methods, then, which have been of very gradual growth, would seem to offer the iron manufacturer a way out of existing troubles. The manufacturers of iron *per se* must make cheaper and better iron if they would enlarge the field for its consumption, or even if they would hold their own against the steel manufacturers. They must seek new methods of manufacturing rather than changes in tariffs

COMBINATION NEEDLE AND THREAD CUTTER.

The annexed engraving represents a handy little arrangement, which every lady who uses a sewing machine will readily appreciate. It consists simply in forming on the shank of the sewing machine needle a knife edge, by which the thread is divided when pressed against it. Scissors are apt to be mislaid and time lost in searching for them, but with this device, so long as the machine is used, the thread



cutter is constantly at hand. The cutter is of the same fine steel, and receives the fine temper of the needle itself, so that it will retain its edge over an indefinite period. For further particulars address the Domestic Needle Works Company, Middleborough, Mass.

Cotton.

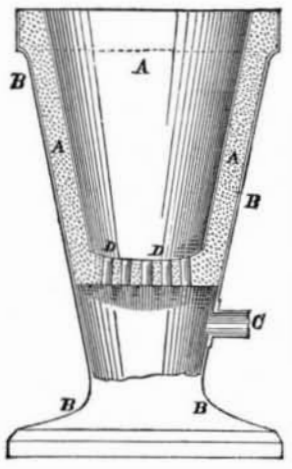
In 1860 the United States took 227,000,000 yards of British cotton goods. In 1877 we took only 61,000,000 yards. In the year first mentioned, Great Britain used half the whole cotton crop of the world; last year she used only 3,017,000 bales, against 8,959,000 bales used elsewhere. English manufacturers explain the relative falling off by the increase of capital elsewhere, and the ability of other nations to cope with them in power of organization; and add that the race will be to the frugal, the industrious, and enduring. They might well have added also the honest; for the credit of English makers has been sadly lowered in the East, and American competition favored, by the excessive adulteration of English goods, aggravated by short measure.

Risky Mining.

Speaking of the terrible explosion at the Haydock colliery, and the appalling frequency of such disasters in British mines, the *Tribune* remarks that these great slaughters do not prove that the skillful inventions and ingenious systems devised to reduce the danger of coal mining are worthless; they indicate rather that for every step of invention there has been a parallel step in taking greater risk. Mines that could not have been worked at all before are now filled with busy laborers, and the chances for loss of life have been little reduced. The frequency of such accidents is a disgrace to the supervision of mining which the British Government undertakes.

A SIMPLE FURNACE.

Mr. M. A. Beck, of Waterloo, Iowa, sends us the annexed sketch of a simple little furnace, well suited for brazing, hardening, and tempering small taps, dies, drills, etc. A is an ordinary flower pot, having a number of small holes, D, drilled in the bottom. B is a frame or casing made of sheet metal, and C is a blast pipe, to be connected with a small blower. The plan might be still further cheapened by setting the flower pot bodily into another one of smaller size, the space between the bottoms then forming the chamber into which the blast is conducted, without materially affecting the result.



Strength of Solar Heat.

Sir John Herschel ("Familiar Lectures on Scientific Subjects," page 64) says: "I have seen the thermometer four inches deep in the sand in South Africa rise to 159° Fah., and have cooked a beefsteak and boiled eggs hard by simple exposure to the sun in a box covered with a frame of window glass and placed in another box so covered."

HONOR TO AMERICAN SCIENCE.—The Huyghens medal of the Society of Sciences, at Haarlem, Holland, a medal awarded once in twenty years to the astronomer who has, during that time, contributed most to science by his discoveries and investigations, has been unanimously given to Professor Simon Newcomb, of Washington, the Superintendent of the Nautical Almanac.

To prevent the hair falling out, the common application, in Oriental countries, is the bruised bulbs of the *Asphodelus bulbosus*, garlic, or onions, mixed with gunpowder. An infusion of the small leaves of the orange or lemon tree in red wine, containing 20 grains of tannin per liter, has also proved serviceable.

Communications.

The Microphone.

To the Editor of the Scientific American:

In *Nature* of May 16th is an article upon the above subject, in which it appears Professor Huxley presented to the Royal Society the microphone as an invention of Professor Hughes, of Kentucky. The device used on that occasion was a glass tube about 2 inches long, fitted with pencils of carbon, through which the battery current was transmitted. Professor Huxley on speaking to this was enabled to transmit words to an ordinary Bell telephone. If Professor Huxley had placed ordinary lead shot in the tube, about number 12, he could have received as well as transmitted by pressing the neck of a common glass funnel to the tube and applying the ear to the cone. We have repeatedly received through such an arrangement, and also by a device arranged on the principle of the Trevelyan rocker; that is to say, we have received without a diaphragm or electro-magnet. As to the wonderful discovery accredited to Professor Hughes, we can only say that we see no need whatever of supposing that "we are beginning to tap sources and modes of energy hitherto undreamed of," nor that the discoveries furnish "a new method of attaching and quantifying molecular motions." Nor is Mr. Edison justified in supposing that he has discovered new and important properties in carbon, for all his results, as well as those of Professor Hughes, can be explained by old and well known causes, which are present in all the experiments published. We have been engaged in investigations on this subject in the same direction as Professor Hughes for the past half year. Many of our experiments are identical with his, and give the same general results. While we agree with him as to facts, we cannot, however, accept his conclusions, nor those of Mr. Edison. All our own experiments, as well as those published by Professor Hughes and Mr. Edison, when closely examined, support us in our conclusion that the effects produced must be ascribed to the well known facts of *contact resistance* at the surfaces of contact between the different parts of a non-continuous conductor. This was in fact the point of departure for all our investigations, and all our experiments were especially arranged so as to determine whether or not this cause is sufficient to produce the required effect (transmission of articulate speech). We succeed not only in transmitting articulate speech where nothing but contact resistance could have been the cause, but also in receiving with some of our contact transmitters, as indicated above. We are still engaged in experiments to determine the conditions under which a conductor containing surfaces of contact can act as telephonic receiver. Now, as contact resistance can be proved to be sufficient to produce all the effects obtained by Professor Hughes and Mr. Edison, and as this element is certainly present in all their experiments so far published, the true and simple logic of science compels us to reject their conclusions until they have obtained the same results after having completely eliminated that element from their experiments. At a future day we expect to give to the public a detailed account of the experiments which have led us to our conclusions.

W. H. PITT,
W. H. DOPP.

Central School Laboratory, Buffalo, June 11, 1878.

The Antiquity of Civilization.—A Query for Professor Newcomb.

To the Editor of the Scientific American:

Under the heading "Planetary Population," in your number for June 1st, 1878, page 346, Professor Newcomb is reported as saying, "The latter (the earth) has probably been revolving in its orbit 10,000,000 years; man has probably existed on it less than 10,000 years; civilization less than 4,000 years." As a student of archæology and anthropology, I would like to ask Professor Newcomb, who being a scientist of some eminence in his line is supposed to know what he is talking about, how and where he obtained the data for these most astonishing figures—especially the two latter (although I imagine paleontologists and geologists would be equally anxious concerning the first).

Under these estimates of time what becomes of the discoveries of Lepsius, Mariette, and others in Egypt, where they declare they have unearthed structures, monuments, tombs, statues, etc., dating back 4,500 to 5,000 years before our era? The deciphering of hieroglyphics, which has attained a high degree of certainty, shows us that nearly, if not quite, 7,000 years have passed since the Fourth King of the First Dynasty built the Pyramid of Cochomé, the first that greets the traveler toward the desert on leaving Cairo. Three thousand years before Solomon built his temple to the "most high" God on Mount Moriah, or the Assyrian reared his altars to Baal on the platform of Koujunjik, Egypt was an old country, her architecture grand and imposing in style and perfect in execution, her language not only fully formed, but reduced to writing, her statuary natural, and her paintings vivid in coloring and truthful in design. I have before me on the table a *fac simile* of the hieroglyphs on the "Gliddon Mummy Case," in the National Museum (*Smithsonian Contributions to Knowledge*, No. 208). Egyptologists are agreed that this case and the writings on it date back to a period antecedent to the reign of Sesorthus or Tosorthus, who flourished B.C. 3,240 to 3,211. Who will look at the exquisite drawing and coloring of this ancient piece of work and be willing to admit that the scribe who executed it was not civilized? nay, that he lived 1,000 years before civilization existed upon earth? And this was already in the fifth dynasty