

the Bessemer converter. The first trials, although they proved the possibility of converting old iron rails into steel in that manner, gave an unsatisfactory commercial result. It was found that the rails required to be heated to a white heat before being introduced into the converter, that no more than one third of such rails could be added to the proportion of two thirds of very graphitic pig iron, and, with all this, that there was a greater waste in the converter, and more "scull" in the ladle, than with pig iron. Messrs. Martin, on the contrary, are able to use a proportion up to two thirds of old rails to one third of pig iron; they can manage the fusing very completely, and without excessive waste, and with a moderate consumption of fuel, advantages which are all due to the Siemens furnace which they employ. Mr. Siemens has himself very recently patented an application of his furnace to the manufacture of iron and steel direct from the ore, and he has exhibited a model of such a furnace in Paris, to which is added a small piece of steel produced in that manner direct from the iron ore. The furnace is constructed somewhat similar in form to the Rachette furnace, viz., with two parallel sides sloping downward so as to form a kind of trough between them. The ore is charged at both sides on the top of the furnace, and slides down the inclined planes of the two sloping sides. At the bottom of the furnace the gases from the producer and the necessary supply of air are admitted, and produce an intense flame, the products of combustion rising upward through the masses of ore, which are acted upon in a similar manner to that in the blast furnace. With very pure manganese ores it is possible to manage the process so as to decarburize the newly produced iron immediately after it is made, or rather the heat can be made sufficient for melting a metal which contains less carbon than common cast iron as made in the blast furnace, and at a lower temperature. This metal is natural steel, or "raw" steel, and, made from ores of sufficient purity, may have all the qualities of the best cast steel. The specimen exhibited by Mr. Siemens, and made, we understand, at his Model Steel Works in Birmingham, where the first experiments with this new process have been carried out, is of very fair quality as far as can be judged from its general appearance and fracture. We have been informed that Mr. Siemens is now erecting a similar furnace at Barrow-in-Furness, intending to make steel from hematite ore direct, at the Barrow Steel Works. Mr. Siemens' new process, if successful and economical, would do away with blast furnaces, and all other processes for making and refining iron now in use, but it is too little advanced at this moment to allow of a judgment of the probability of its practical success, to say nothing about relative economies. Its practicability remains to be established; but if we consider how difficult it was to believe in the success of the Siemens furnace itself when first brought out, and how completely they have succeeded in this respect, we may be justified in entertaining some hope that this new invention will ultimately prove equally successful, although at present it may appear very revolutionary and contrary to adopted notions.—*Engineering.*

MEE'S HOSE COUPLING.

The intention of the inventor in this device, is to make a tight coupling without the aid of a washer, or of the loose setting-up ring, or of any device for forcing the two parts of the coupling together in the line of their axes, in order to form a water-tight joint. This coupling does not depend upon the mechanical force exerted to close the joint, but the pressure of the water itself makes the joint tight.

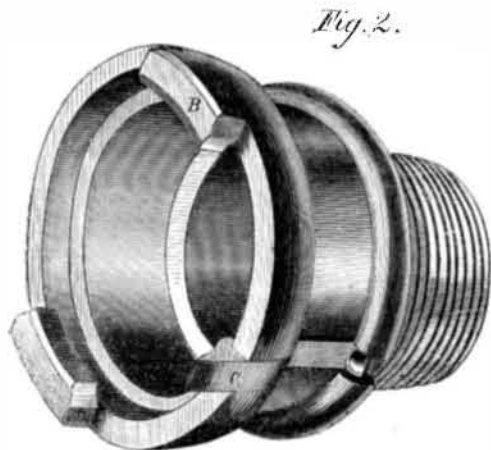
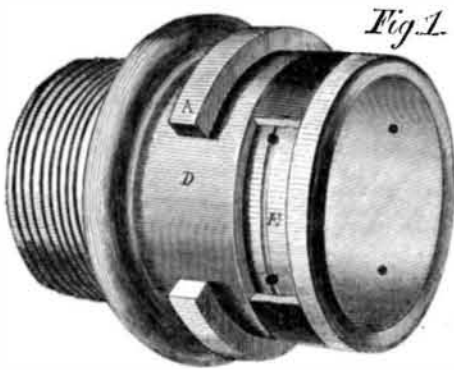
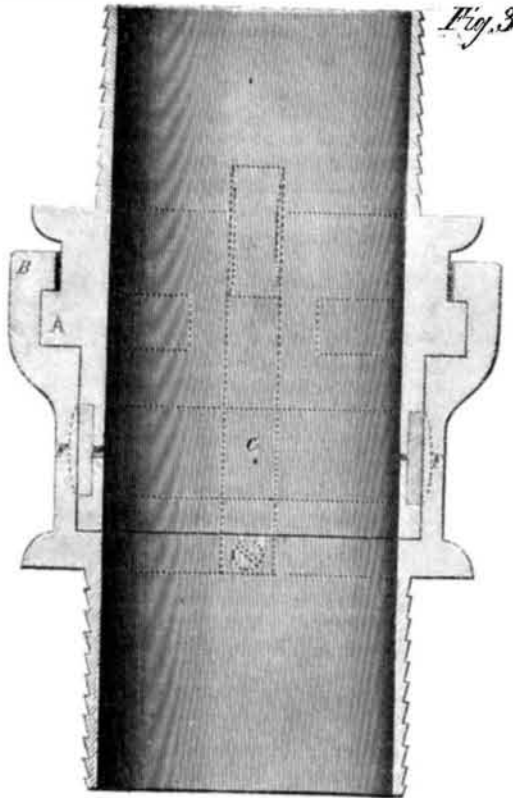


Fig. 1 represents one end of the coupling, formed where the eather or rubber is attached precisely like any other, but otherwise differing. It has a projecting ring, A, around the barrel part, a portion of which ring is cut away to receive

the hooks or snugs, B, Fig. 2, which pass by the ring, A, and, by a slight turn of one or the other part, securely lock the two lengths of hose or the two parts of the coupling together. This partial turning is, of itself, a sufficient lock to the parts, but to render "assurance doubly sure" a spring catch, C, is introduced which springs into the space, D, Fig. 1, between the parts of the ring, A, and prevents the parts from unlocking unless force is used to raise it from its seat.

Near the end of Fig. 1 is turned an annular groove in which is seated a rubber ring, or a ring of some elastic substance to



act as a packing. It will be noticed that a row of small holes is bored through from this annular recess to the inside of the coupling, the holes communicating on the outside with one another by a channel, E. Through these holes the water inside the hose or coupling finds its way, and its pressure forces out the elastic ring against the inner surface of the section shown in Fig. 2, making a perfectly water-tight joint. Fig. 3 is a longitudinal section, and will give a correct idea of the invention. It represents the parts, as connected, with a recess at F, which, if thought expedient, could be made to receive the extension of the flexible packing when the pressure is applied, although it is believed from numerous experiments this is not necessary.

A patent for this improved coupling was obtained by Barney Mee, May 7, 1867. It is manufactured by Mee & Jackson, Troy, N. Y. Applications for rights, etc., will be promptly attended to if addressed as above. It can be seen in this city in use at No. 99 Wooster street, on engine No. 13.

Mechanical Uses of Castor Oil.

We find in one of our exchanges the following remarks relative to the use of castor oil in the trades, more particularly its application to leather: It is much better to soften and to redeem old leather than any other oil known. When boots and shoes are greased with it, the oil will not at all interfere with the polishing afterward, as is the case with lard, olive, or any other oil. In Harrisburg, Pa, the old leather hose of some of the fire companies was greased with it, and found to become almost as soft and flexible as new leather. Leather belts for transmitting motion in machinery will usually last three to five years, according to the wear and tear they are exposed to; when greased with castor oil they will last ten years or more, as they always remain flexible and do not crack. Beside this advantage, castor oil will prevent slipping, so that a belt three inches wide, impregnated with it, will be equal to a belt four and a half inches without castor oil. It is necessary, however, to wait twenty-four hours, till the oil has disappeared from the surface and penetrated the leather, otherwise the freshly greased surface will cause slipping. The rats and other vermin detest anything impregnated with castor oil, and will not touch it;—another advantage.

Geography of Plants.

In an article on this subject by M. T. Lippincott, of New Jersey, the following rules were given, for determining the fitness of districts in the United States for the growth of certain varieties of wines.

Those places which have a summer temperature of 65.6°, a hot month of 70°, and a September of 60°, will ripen Delaware, Clinton, Perkins, Iona, Logan, Israella, with other hardy varieties. The temperature of their growing season corresponds to a mean of 65° and upward, and an aggregate of heat of about 8,000° Fah.

Those places which have a summer of 70°, a hot month of 72°, and a September of 63°, will ripen Concord, Hartford Prolific, Diana, Creveling, etc. Their season of growth corresponds to a mean of 67°, and an aggregate of 8,500°.

The Isabella requires a summer of 72°, a hot month of 73°, and a September of 65°, and a mean during its growing season of 70°, and an aggregate of 10,000°, of heat, etc. etc.

The summer temperature of Buffalo, N. Y., is 68°; it has a hot month of 74° and a September of 62°; and it is said that

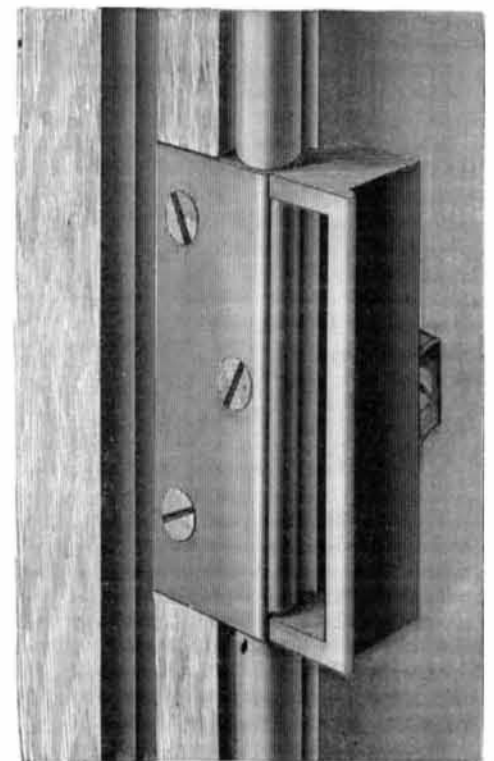
the temperature of places on the banks of the Niagara, north of the city, is from two to three degrees greater.

Washing the Streets.

To keep the streets of a great city clean is a problem which those who have thought the least about it are the most ready to solve. Those who understand it find their greatest difficulty in the cost. In the city of London, where every feasible scheme of street improvement may be tried, Mr. William Haywood, the engineer to the Commissioners, has been trying a series of experiments in "cleansing streets by washing"—a plan that seems very easy but is not very cheap—and has made a report from which the London *Journal of Gas Lighting* extracts the following reliable information. A portion of one of the principal thoroughfares was selected, 2,000 feet long, having a superficial area of carriage way of a little under 10,000 yards. Sixteen hydrants were fixed at a distance of 16 feet from each other. The first experiments were made in September last, and they were continued for a week at a time at different periods of the year; the weather, however, happened on each occasion to be tolerably fine. Ten men were employed with two jets, each morning for two hours and three quarters. Two men, who assisted in moving the hose, also swept the surface near the curbs while the water was playing, so as to save passengers from the annoyance of the jet being directed close to the foot-ways. The straw and refuse which would not go down the gullies was washed into the channels by the action of the water, and was then swept up and removed by scavengers. The quantity was scarcely a quarter of a load daily. The work was generally done between half-past two and six o'clock in the morning. The quantity of water consumed was about two gallons to each square yard. The streets were much cleaner than after ordinary scavenging, and this was most marked when rain came on after washing, for the surface did not become muddy until toward the end of the day, while the other streets of the city became muddy rapidly. On the whole, the comparison was greatly in favor of the surface cleansed by water. The cost of the machinery was £1175 per mile lineal; the cost of washing nearly 20s. for each washing, labor forming about half of that sum. There are about seven miles of thoroughfare in the city similar to those washed, and the annual cost of cleaning them by water would amount to £7932. These seven miles are leading thoroughfares. The cost of water at its present price would amount to £3282 per annum, and for the whole city, to £6000 per annum. But this is filtered water, of the same quality and price as that supplied to the breweries. Mr. Haywood suggests that the water should be obtained direct from the Thames, and if the washing system be adopted, the magnitude of the demand would justify some expense in pumping machinery for obtaining a cheaper supply. It would be objectionable to wash the streets in frosty weather, and in severe weather it would be impossible to use it; therefore the services of a staff of men, carts, and horses must be retained for emergencies. Pavements kept so clean will be more slippery during dry weather, and less slippery in damp greasy weather. The superior cleanliness will make the streets more noisy. Mr. Haywood thinks that the sewers would not be injured, and that the sewage about to be used for the reclamation of waste land would be improved by the admixture of street sweepings.

DA CUNHA'S LOCK CATCH.

Improvements in the form and style of articles in common use are not among those least valuable. Sometimes, indeed, an alteration which at first view appears to be quite superficial and trifling, is proved by use, if not by examination, to



be a radical improvement. Such, we conceive to be that represented in the engraving. It is a catch for ordinary door locks, those which are secured to the outside of the door, and differs from those ordinarily in use in being much stronger in construction, and much more securely attached. The common catch is held to the door jamb by two or more screws, the strain upon which tends continually to draw the screws from the wood.

This catch is of cast or malleable iron made with a project