STEAM RAILROAD FERRIES BETWEEN ENGLAND AND FRANCE.

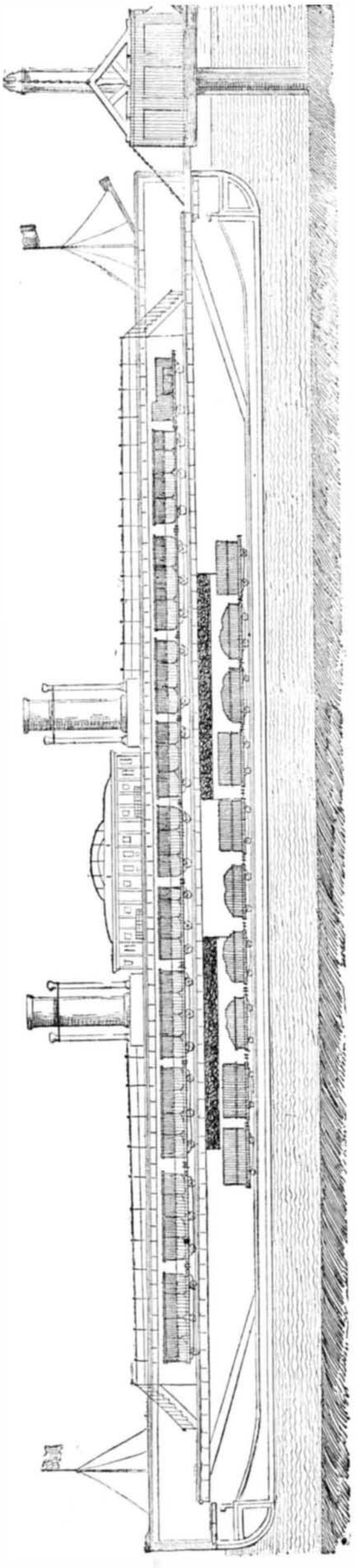
It has been mentioned in these columns that an English company has been formed with a view to effect a simple and practical solution of the problem of quick, safe, and comfortable transportation, across the Straits of Dover, between France and England, for railway passengers. The plan adopted seems to us far more feasible than the bridges and tunnels hitherto proposed.

The method is due to Mr. Fowler, who proposes to use an immense steam ferry-ship, capable of receiving entire trains on its ample decks, with all their passengers, freight, and baggage.

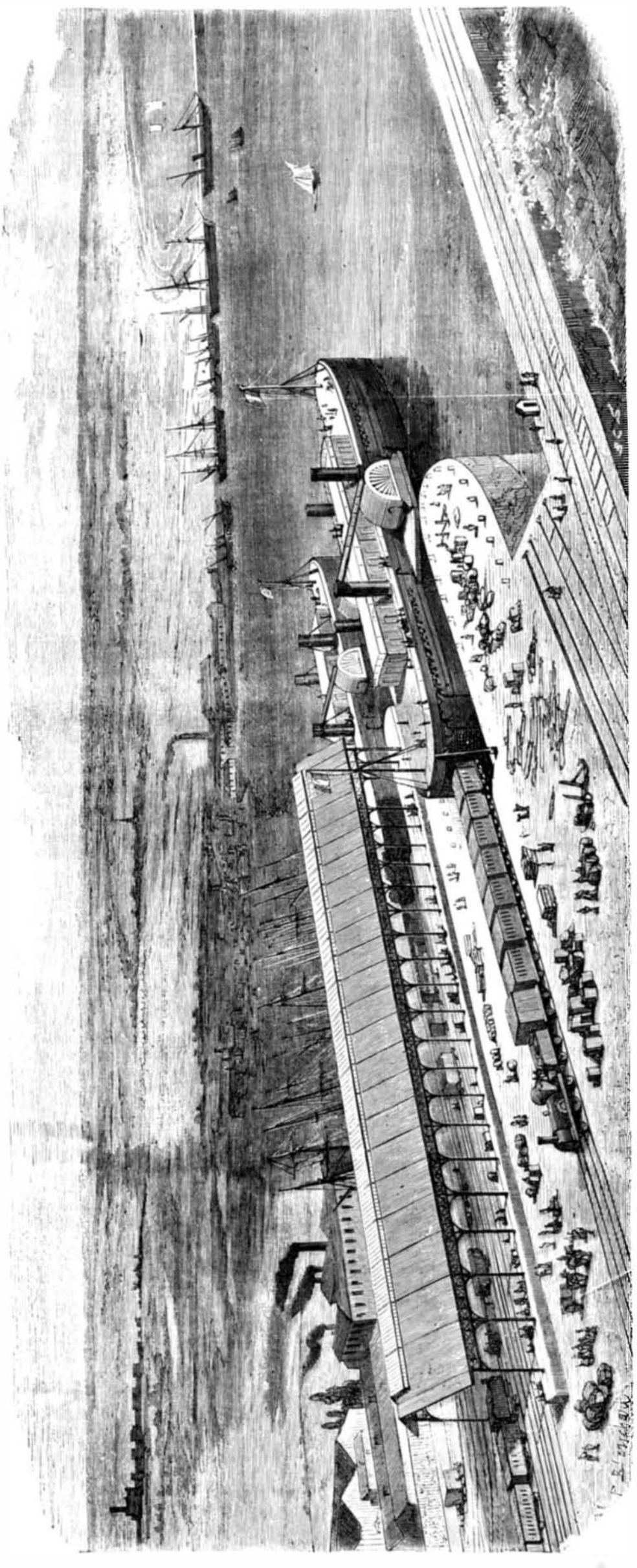
We need not dwell long on the details by which the embarking and disembarking of trains will be accomplished, since the accompanying engravings sufficiently indicate them, and they are in principle the same as those employed on American railway ferries which transport trains.

The differences in the model of the vessel and its details from American vessels used for a similar purpose, are only such as will adapt the ship to the much longer and rougher voyages it will be obliged to encounter.

We may add that the vessel will be only about seventy five feet shorter than the *Great Eastern*, or something more than six hundred feet in length. This great length is intended not only to accommodate the length of trains but also to give immunity to passengers from sea-sickness, as the rolling of the waves cannot much affect the stability of a vessel of this size.



LONGITUDINAL SECTION OF THE BOAT AND LANDING.



BIRD'S-EYE VIEW OF THE DEPOT AND DOCKS TO BE CONSTRUCTED AT ANDRECELLES AND DOVER.

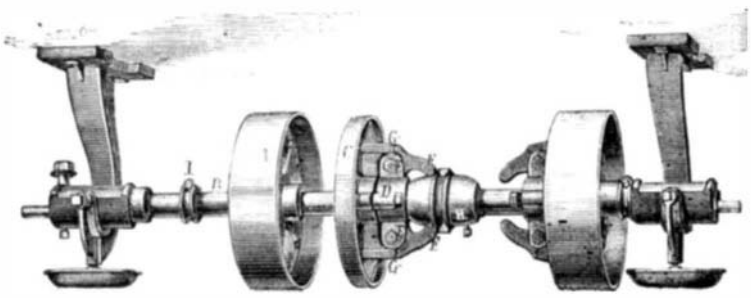
Docks capable of receiving the trains are to be provided at Dover and Andrecelles—the latter point being considered better than Calais for this purpose. The estimates of cost for vessel and docks amount to fifty millions of francs, in round numbers about ten million dollars American currency, and it is thought the execution and putting into operation of the plan will occupy three years.

The system can hardly be regarded as an experiment, except in so far as the magnitude of the vessel and width of water to be traversed are concerned, as it has been already fully tried on American rivers, and even in crossing arms of the sea, in various places. The design of Mr. Fowler is simply, as we have said in substance, a modification of a plan already found feasible.

It is thought the passage in this vessel may be made in one hour, under favorable circumstances of wind and tide.

Improved Friction Clutch.

Our engraving exhibits a new form of friction clutch, claimed to be more simple in construction, more positive in its action, and more easily adjusted and kept in working order by ordinary workmen, than other clutches of the same class, thereby combining a greater degree of utility and durability.



PRATT'S IMPROVED FRICTION CLUTCH

A loose pulley, A, fits closely and turns freely on the shaft, B. The inside of the rim of this pulley is beveled, to fit the taper of the wheel, C. The hub of the wheel, C, traverses longitudinally on the shaft, B, or works partially upon the hub of the pulley, A, when it is desired to give the latter a longer and firmer bearing on the shaft. The taper surface of the wheel, C, bears upon the inside of the rim of the wheel, A, throughout its whole circumference when the two are brought into contact.

A collar, D, is fitted to and secured upon the shaft, B, having ears, E, between which are fitted dogs, F, which have a free action on pivots in the ears, E. The ends of these dogs next the wheel, C, take their bearing against prominences, G, formed on the wheel, C, and the opposite ends bear upon the collar, H.

A series of springs act in connection with dowel pins in the collar, D, to throw out the wheel, C, when it is desired to release the pulley, A, from the clutch, the pins also serving to maintain the proper relative position of the wheel, C, to the collar, D.

By pushing the clutch collar, H, toward the wheel, C, in the ordinary way, the outer ends of the dogs, F, are forced apart, their inner ends being at the same time pressed against the prominences, G, on the wheel, C, which is then pressed home to its engagement with the rim of the wheel, A.

The position of these pulleys in the engraving would not admit of this action, the wheels being separated on the shaft in order to show the construction better, but in setting the pulley, A, the collar, I, is employed, by means of which the pulley, A, is held up so closely to the clutch wheel, C, that a very slight motion of the clutch collar, H, is sufficient to complete the engagement.

Patented, Feb. 22, 1870, by Francis A. Pratt. Address for further information Pratt, Whitney & Co., Hartford, Conn.

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Cleansing Boilers.

MESSRS. EDITORS:—It is well known that water impregnated with earthy matters produces, when boiling in a steam boiler, a scum on the surface. If this scum be collected and blown out, the boiler will seldom require to be opened and cleansed; but if the scum be allowed to accumulate and settle upon the plates where the fire impinges, the injury to the boiler will be in proportion to the thickness of the accumulation, which, according to the nature of the deposit, assumes either the form of scale or mud. When it assumes the first named form, the boiler will require to be often opened and cleansed, or the injury from the burning of the plates will be great.

The arrangements, of which I send you drawings, and which are designed to prevent such deposits, consist of a number of hopper-like mouthed vessels introduced into the boiler standing a little above and below the water-line. These vessels communicate, by means of vertical pipes, with a horizontal pipe that passes through to the outside of the boiler, as the scum arises, and falls again in the water, the open mouthed vessels collect it; and, as at intervals, the valve at the end of the pipe spoken of is opened, the collected scum or deposit is "blown out," and the boiler plates are thus kept clean. (See Nos. 1, 2, and 3).

Fig. 1

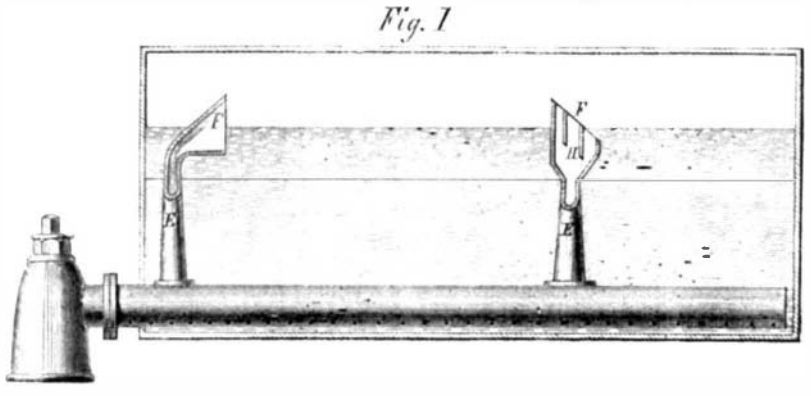


Fig. 2

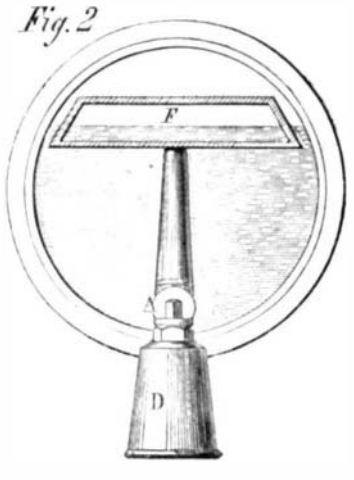
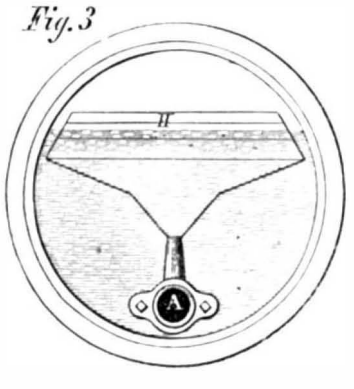


Fig. 3



In diagrams annexed the longitudinal pipe, extending from end to end, is shown at A, Fig. 2, which is perforated with two rows of small holes, communicating by the pipe, to the cock or valve, D. At the top of the longitudinal pipe, A, there are vertical pipes, E, each mouthed by a cast-iron funnel, F, at the level of the water, which funnel faces the front or firing end of the boiler. The cast-iron funnel in diagrams, Nos. 1 and 3, is supplied with elevated partitions, H, leading to the receiving chamber at the top of the vertical pipe, E. The heat from the firing end causes a continual roll or flow of the water towards the back end, by which means the scum enters the funnels, from whence, by opening wide the cock, or valve, D, it is swept away into the sewer or drain.

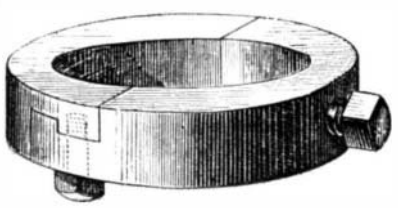
The apparatus can be so modified as to suit every description of boiler, whether multitubular, two-flued, or cylinder boilers, and of any length, can be cleansed from end to end in less than one minute, without stopping the working. In water there is a great difference in quality for steam purposes, some waters scarcely give out any deposit, while with others the deposit is great, and this is the cause of considerable difficulty, if not constantly removed.

It therefore behooves the engineer, when he has to work with water of the latter description, to be exceedingly attentive, and to look well after the interior as well as the exterior of his boiler, and particularly where the water has spent dyewares and acids mixed up with it, as is often the case in manufacturing districts. In this matter, as in many others, he may lay it down as a rule, that the utmost cleanliness possible will result in a saving of fuel, and in the prevention of much "wear and tear" to the boiler. T. C.

Philadelphia, Pa.

Securing Collars and Eccentrics to Shafts.

MESSRS. EDITORS;—In the course of travel I came across the device herewith illustrated, for securing collars and eccentrics, particularly those on locomotives, which is a most excellent plan, and one of those simple arrangements that commends itself to all mechanics at a glance. It is as good as a solid collar, and has the advantage that it can be put on or taken off without disturbing any other details of the machine.



This device is the invention of Mr. T. G. Gorman, Master Mechanic of the Toledo, Wabash & Western Railroad shop, at Springfield, Ill., and explains itself to every intelligent person. EGBERT P. WATSON.

Prevention of Incrustation in Boilers.

MESSRS. EDITORS:—Three years ago I had charge of a tubular boiler in the Stanley Rule & Level Co.'s Works, New Britain. The water was hard, forming a hard, brittle scale, and the method tried there was a battery in the inside of the top of the boiler, designed to keep the iron charged with electricity, and prevent the formation of scale. It was effectual, for after something over a year's trial, the tubes and shell were found to be entirely free from scale.

The arrangement alluded to is patented, and I think it is as good as anything that can be used, as it is simple, and causes no trouble after it is put in. I should like to hear from others whether similar success has been met with when water of a different quality has been used.

Waterbury, Conn. W. E. CRANE.

A Cheap and Efficient Low Water Detector.

MESSRS. EDITORS:—Noticing in the last issue of your paper the criticism of Mr. B. Franklin on the use of the fusible plug of common tinman's solder for a low water detector, I desire to ask Mr. Franklin a few questions. First, would any boiler be safe to use with a scale over the iron or the fire-box plate so thick that steam under the usual pressure would not find vent through a ½-inch hole?

Second. Would not the iron become hot enough to meet solder before a scale would make over the plug, so as to prevent the escape of steam?

Third. Was such a plug ever recommended as a low water indicator, or was it simply as a detector? There is quite a difference between the two purposes.

Fourth. If the water gets below the crowning sheet so as to heat it sufficiently to melt out the plug, is it not time that the fire in the furnace was put out?

Fifth. Would Mr. Franklin recommend keeping up the fire and running right along after it was ascertained that the water was below the crowning sheet? If so, then water must be pumped into the boiler with the crowning sheet red hot. Would not this endanger explosion at once?

In the last report, as published in the SCIENTIFIC AMERICAN, of the Hartford Steam Boiler Inspection and Insurance Company they report twenty-five burned plates. These plates were either burned by the water getting below them or by the collection of scale or sediment, so that the water did not come in contact with the iron.

The fusible plug may be made long enough to project through the inner surface of the sheet half an inch or even more if necessary. This would prevent the scale or incrustation from forming over the end of the plug, so as to prevent escape of steam in case the plug melted.

What objection would there be to the use of such a plug in the boilers of steamers? Could not a ½-inch hole be stopped at any time by driving in a pine plug if necessary?

INQUIRER.

Shoemakers' Measure.

MESSRS. EDITORS:—Stimulated by your generous invitation to "some one" to state what is the true shoemakers' measure, and gravely concluding that I am "some one," as well as any other man, I betook myself to my footman, *vulgo* shoemaker, and made the necessary inquiry by inspection of his "measure." The same revealed the following facts, to wit:

No. 1 *is* 4⅜ inches, and every additional number ⅓ of an inch more, but only for children's feet. For adults, No. 1 is 8⅓ inches, and every additional number ⅓ of an inch more, so that No. 10 is 11⅓ inches. "Constant Reader," whose No. 10 shoe measures 11⅛ inches, does evidently rejoice in the possession of a stout understanding, as the leather thereof adds ⅛ of an inch to the length of the last, to which the measure is actually applied. OCCASIONAL READER.

Welding Cast Steel.

MESSRS. EDITORS:—Noticing an inquiry in your paper for a recipe for welding cast steel, and having had considerable experience in that direction, I will attempt a few practical suggestions, and the result of my experience.

So much, however, depends upon the skill of the operator, that in unskillful hands any instructions might fail to be of use.

I have welded stone drills, points into mining picks (into the solid steel, not the iron), points into cold chisels as an experiment, and cast steel bars of various sizes, in the following manner: First, by upsetting the two ends that are to be welded considerably larger than the welded part is to be when hammered down to the proper size; then split one of the ends a little deeper than the bar is thick; draw out the ends of the lips, and narrow them up at the points. The end to be welded into this I draw out into a blunt wedge shape, narrowing the end also. I make a cut with a cold chisel on one side of the wedge-shaped end in order to prevent it from slipping out when sticking them together, as hereinafter explained. I then heat the two ends that are to be united to a cherry red, using common borax, unite them in the usual way, driving them together endwise, then closing down the two lips with the hammer, at a bright cherry red, they will stick together. Then put on plenty of borax, and heat in a charcoal fire to a point just above a bright cherry red, but not to a sparkling heat as in welding iron. At the proper welding heat of cast steel, the borax can be seen in a charcoal fire to run over the steel and curdle, giving the appearance of curdled milk on the bottom of a dish. At this heat, if done quickly, as perfect a weld can be made of common cast steel as can be made in welding iron, and not injure the steel in the least.

In this manner I have welded stone drills and cold chisels