

### Making Telegraph Rates.

THERE are 20,000 cities and villages in the United States to which the Western Union runs its wires, and naturally the task of making rates between each of these places and all the others is a grave problem. Four hundred million of rates must be made, and every agent must know them all. When the company was confined to the space between Buffalo and Chicago, the process of arranging a tariff was comparatively simple. But when a boundless continent became its domain, the subject was no longer insignificant. The present method is so plain that the wayfaring man, though a fool, has no excuse for erring thereon. The whole country is blocked out on a map in squares of fifty miles each, and the rate is fixed between each and all of these squares, and printed in a book that is newly revised and issued every six months. The public is greatly indebted to the competition of the smaller companies which from time to time have sprung up as rivals within certain territories to the Western Union for many additional simplifications of this system.

In the East there is but one tariff rate, and between adjoining states a similar arrangement usually exists. These smaller companies have been nearly all swallowed up in the Western Union, but their usefulness to the public in compelling reductions is not slight. The average business done in the main office of this giant monopoly is about 1,400 mes sages. As many as 2,800 have been sent out in a single day, and as 180 other offices are open in this city, these figures tell only a small part of the story. But they serve well to show the immense development of an art and a trade that sprang into existence within the memory of men still young, and which, were they suddenly lost to human knowledge and craft, would leave the world in a strange and dismal darkness.—*New York Tribune.*

### Making Pig Iron With Gas.

THE *American Manufacturer* says that Mr. Jacob T. Wainright, a well known metallurgical engineer of Pittsburg, Pa., has succeeded in making pig iron with natural gas as fuel. His furnace differs from the ordinary blast furnace in this, that, while dispensing with coke, it has overcome the great difficulty noted in connection with other experiments in gas furnaces by a mechanical device for supporting the burden. This device consists of a series of pipes covered with fire clay tiles, and at the same time ventilating the pipes with a current of air. A combustion chamber is also connected with the furnace, which reduces the amount of gas needed to produce the required heat, and also prevents the chilling of the furnace, which has been a great obstacle to the success of other experiments.

In the new furnace the ordinary cupola blower is used, and the gas and air are introduced in a very simple manner into the combustion chamber in a separate pipe. The current for cooling the tubes, already mentioned, is supplied from the same air blast, and from thence may be utilized in the furnace. Ordi-

nary cupolas may be easily altered, so as to do the required work, by adding the combustion chamber and the protected tubes for supporting the burden.

The tests were made at the iron and lead works of William G. Price on Pine Street, where the inventor had the hearty co-operation of the manager, Mr. David Carlin. Mr. Carlin says that the furnace worked rapidly, and that its success is no longer an experiment.

### The Rotary Snow-Plow.

As it is probable that the rotary snow plow will be in use on the Intercolonial and possibly other Canadian railways next year, the following account of its working in the North west taken from an American exchange, will be of interest. "One of the machines started out about the middle of January after a terrible storm, and while the thermometer was still 30 degrees below zero. The first work done was the cleaning of sidings. The snow on these ranged from one to three feet deep, and one eight-wheel engine pushed the machine through the whole way. The next operation was to open the Northern division from Jamestown to Minnewaukan, some 100 miles, which was packed solid. The first obstacle of any consequence encountered was a cut having twelve feet depth of solid snow. The deep part extended about twenty-five feet, and for one hundred feet more the drift varied in depth from three to five feet. The machine was pushed by two 18 x 24 mogul engines, but they succeeded in pushing into the deep cut only about five feet, when they stalled. They then hacked out and examined the drift, and found that the cut on which the rotary cutters had been working resembled polished granite in shine and consistency. They then shoveled down the sides of the face, and by repeated attacks worked through the obstruction. An officer of the company who went out to the cut and waited to see the two first trials, returned to Jamestown and reported that would not get to Minnewaukan in six weeks. Nearly all the snow-plows belonging to the road were smashed in trying to open the same cut in the previous spring, so it did not seem unlikely that the new machine would fail also, but it did not. Within three hours they had opened that cut and another one five hundred feet long and varying from two to eight feet deep, and gone up to an abandoned and buried train.

The snowed-up train was resurrected and taken to Jamestown, and the snow-plow started again the next morning. During the day an advance of 46 miles was made. Two cuts 600 feet and 800 feet long, blocked with snow from two to eight feet deep, were cleared out. In the deepest parts the snow was packed so solidly and frozen so hard the two powerful moguls could not keep the machine up into the bank, and it was necessary for shovellers to break down the top of the drifts. But the worst cut was opened in fifteen minutes. The previous time that this cut was opened by an ordinary snow-plow, it took 35 shovellers in addition to the plow and

pushers, and they worked hard on it for twelve hours.

Where the snow is not hard packed, that is, not of the consistency where an ox can walk on top and not sink two inches, the rotary plow can be kept into snow ten or twelve feet deep, and it clears out the mass of snow while moving two or three miles an hour. When the machine is not working to its full capacity, it throws the snow over the tops of the telegraph poles—but when the wheel is crowded the snow is dropped from 15 to 40 feet from the track. The machine does extremely heavy work where the snow is deep and hard, for it throws an immense weight of material every minute. The engine operating the machine used close on 3,000 gallons of water in cleaning out five cuts from 4 feet to 6 feet deep, and about 700 feet long each. But this was the Dakota species of snow.

A striking feature about the work done is its thoroughness. The snow is thrown far enough from the track to prevent banking, the rails are properly flanged, and no men are needed behind the machine to clean up anything.

The experience of this winter will suggest some improvements on the rotary snow shovel, but without change it is a remarkably efficient machine."

### The Vestibule Patent Dispute.

WHEN the Pullman Car Company first began running vestibule cars, they made such a strong advertising card of the alleged improvement, that their rival the Wagner Car Company, had also to indulge their patrons with the novelty, luxury or latest fashion in cars—a covered platform. When the latter company got their vestibule train running, the former applied to the courts for an injunction to prevent them from using the invention, and the case was argued at great length lately in Chicago before Judge Gresham. In the course of the hearing some very absurd claims were made, as for instance, that the use of the vestibule cars had materially increased the travel between New York and Chicago. Mr. George M. Pullman testified that a valuable patent had been granted on the vestibule as a new feature of car construction, and that the Wagner company had attempted to share in the benefits of the invention by stealing the patent.

On the other hand, evidence was given that the invention was an old device revived, and that it had frequently been tried on American and foreign roads years ago. It was shown that several patents had been granted in the United States and in England for inventions that covered the ground covered by the vestibule patents. The fact that the English Government have used vestibules between their mail cars was proved, and Mr. T. A. Bissell testified that eighteen or twenty years ago a canopied train similar to the Pullman vestibule train was run on the Michigan Central Railroad. By the decision made, the Wagner Company are restrained from using one feature of the Pullman vestibule, but when the change is made passengers will not know the difference.