IMPROVED VISE.

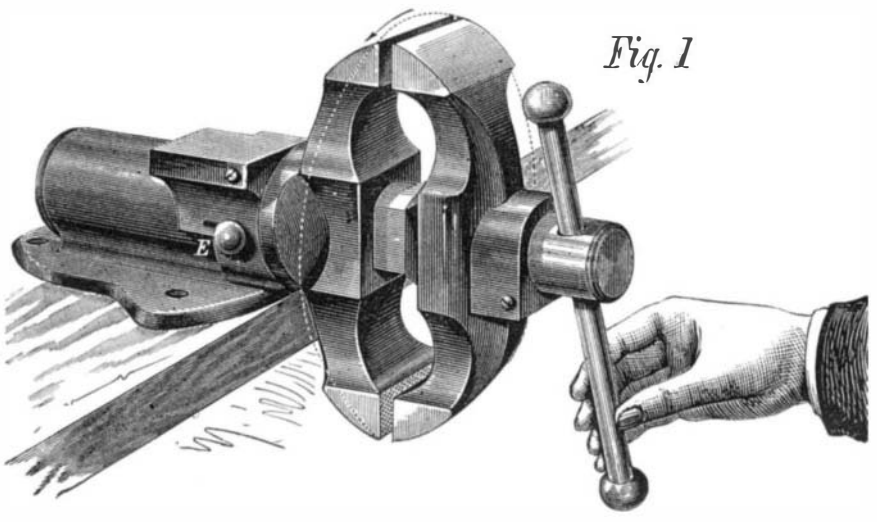
We illustrate herewith a novel form of vise, of simple and strong construction, and possessing double jaws, which may be adjusted so as to hold an object at any desired angle with great firmness. This arrangement offers considerable advantages to the operator, since he can thus place his work in whatever position is best suited to his convenience. A perspective view of the invention is given in Fig. 1, and sectional views in Figs. 2 and 3.

The fixed jaw, A, is grooved at B, Fig. 3, to receive an annular projecting portion of the standard, C, and also has a shank which enters into a socket in said standard. To hold the jaw in its place, a score is cut around the shank, and a similar score is made above in the socket. Into the aperture thus formed a hardened steel pin, D, is placed. This pin prevents the jaw, A, from being drawn out, while it does not interfere with the rotating of said jaw in the direction of the arrow, and as indicated by the dotted lines in Fig. 1. Fig. 3 shows the rear face of the jaw, A, and exhibits in the groove, B, a number of holes. On the standard is a spring bolt, shown at E, Fig. 1, which, when it is desired to adjust the jaws at an angle, is drawn back, and, when the jaw is set, is slipped into one of the apertures, holding it firmly. The movable jaw, F, has a hollow shank which enters the jaw, A, and the standard. Into the end of said shank is placed the flanged nut, G, into which passes the vise screw. The latter is held in place in the movable jaw by a pin, H, arranged in similar manner, to the pin, D, already described. It will be seen, from the shape of the shank of the movable jaw, that that jaw turns with jaw, A, and is held with the latter. The gripping of the jaws is effected by turning the handle in the usual manner, the screw acting in the nut and drawing the parts together very tightly. All parts of the vise are made to gage, so that, when any portion becomes broken, it can be replaced by sending number and size of jaw to the manufacturer.

The faces of one pair of jaws are roughened, and those of the other pair left smooth, to suit different kinds of work. The general construction is such as to prevent any dirt entering the working parts. The pins, H and D, present a novel and ingenious mode of securing the jaws; and although of hardened steel, they sustain but very little of the thrust, and hence are not likely to wear out. They are easily removed, admitting of the implement being taken apart for oiling, etc. A screw thread cut on one end, engaging in a similar thread made in the jaw for pin, H, and in the standard for pin, D, holds each pin firmly in place.

Patented January 26, 1875. For further information address the manufacturer, Elmore Penfield, Middletown, Conn.

Fig. 1



PENFIELD'S IMPROVED VISE.

FOX'S REVERSIBLE CAP.

Mr. Morris Fox, of New York city, has recently invented

Fig. 1.

a new form of cap for the use of car drivers and others exposed in winter, by their occupations, to the inclemency of

Fig. 2.

the weather. It has a double back section, marked B, in Fig. 1, over the crown of the head, and a double front section, E, Fig. 1, over the front of the head. The front piece, D, is also made double. By detaching loops by which the the sections are fastened when the cap is worn as shown in Fig. 1, the folded rear part, B, may be reversed and extended down to the neck, as shown in Fig. 2; the supplementary crown section, E, is then swung over the front, below the chin, to cover the ears and front part of the neck, and the upper front is thrown over the lower part of the front piece, D, forming a head covering which is claimed to be perfectly waterproof in the roughest weather. The inventor proposes to make one side of each section of fur, as in Fig. 1, and the reverse side of rubber cloth or other waterproof material.

Fig. 3

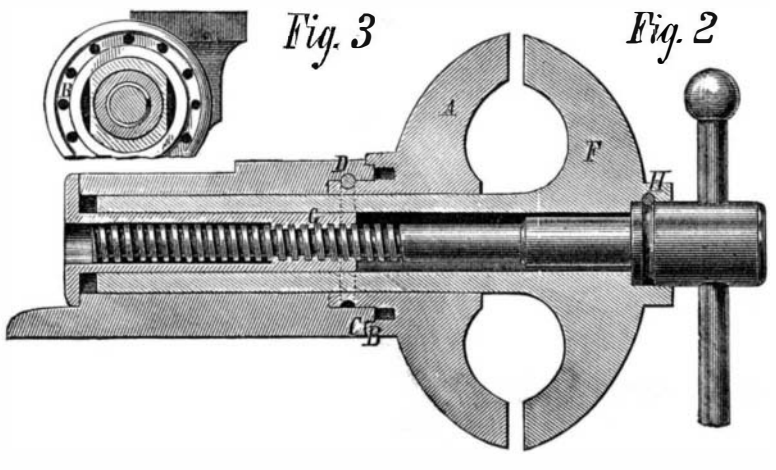
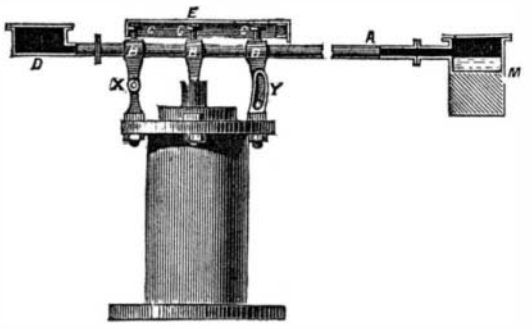


Fig. 2

A MERCURIAL SAFETY VALVE.

A new safety valve, the patented invention of Mr. E. W. Colls, is in operation at Erith, near London, and is said to answer exceedingly well. The action of the valve is such that, the moment it begins to move in consequence of an excess of pressure, it opens fully, so as to allow a free escape of steam until the pressure becomes sufficiently reduced in the boiler, when the valve closes as quickly as it opened. This action is brought about in the following manner: A lever, A, consists of a metal tube, having at each end a closed metal box. This tube passes through eyes in the pillars, B B B. One of these pillars, jointed at X, forms the fulcrum upon which the lever works; another presses upon the valve itself, and the third is unattached at its lower extremity, where it has a stud which works up and down in the curved slot, Y. This slot acts as a guide preventing the valve from being forced out of its seat. The screws, C C C, passing through the pillars at the top, press upon and hold the lever, A. To the end of the lever, A, behind the fulcrum, is secured a cast iron box, D, the inside of the bottom of which is a prolongation of the lower level of the tube. At the opposite end of the lever is another box of cast iron, much deeper, the bottom being of thick cast iron to give weight. The space intervening between the floor of this box and the lower level of the tube is filled with mercury, M. The pressure upon the valve is regulated by setting this weighted end of the lever at a proportionate distance from the fulcrum. For this purpose, the lever is duly adjusted, and then secured in its place by the screws, C. When once the lever is adjusted by the engineer or other responsible person, it may be secured from being altered by the man in charge of the boiler by sliding over the head of the screws, C, a tubular cap, E, having a slot formed along it at the bottom for the stems of the screws to pass through. The cap is closed at one end, and at the other is provided with a cover which is applied to it when the cap has been slipped over the heads of the screws. The cap is then secured by a padlock, and all access to the screws is thus prevented



When the maximum pressure of steam at which the valve is set is attained, the valve proceeds to lift slightly, as if constructed in the ordinary way; but the moment this takes place the lever is thrown out of its horizontal position, and the mercury from the weight box begins to flow through the tube into the box behind the fulcrum. The weight of the mercury is thereby displaced from the end of the lever, and acts as a lifting force by being transferred to the rear of the fulcrum. Thus the valve is no longer loaded to the same extent as before, and opens freely for the escape of steam. When the boiler has been relieved of pressure to the extent of two or three pounds, the lever weight is sufficiently heavy to close the valve, and the mercury returns to its original position, thereby preventing the valve from opening again until the maximum pressure is once more attained. As used at the Erith oil works, the steam blows off at a pressure of 35 lbs., and closes when it falls to 32½ lbs. The valve is easily set to a pressure ranging from 10 lbs. to 100 lbs., on the square inch.

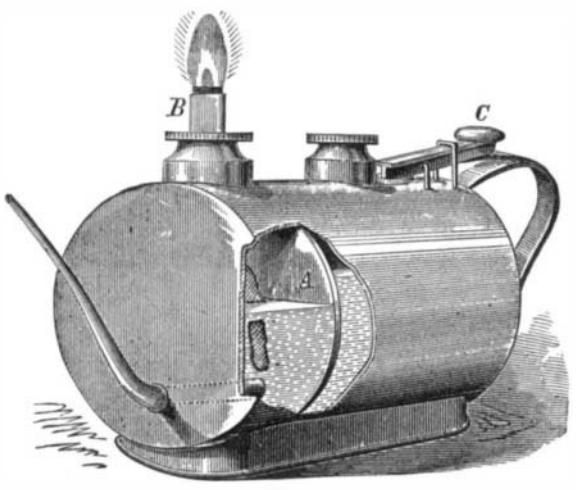
Japanese Variegated Foil.

Professor Lielegg, of Japan, writes to Europe to describe a process used by the Japanese in the production of a metal leaf used for decorative purposes. Thirty or forty thin plates, of gold, silver, copper, and various alloys, are laid one over the other in a given order, and soldered together at the edges, so that the whole forms a stout plate of metal. Punches of various shapes, conical, pyramidal, with triangular, square, or pentagonal sides, are now used to make a pattern of perforated figures, which exhibit on their inner sides concentric circles, triangles, and other forms corresponding to the punches used. The plate so prepared is hammered and rolled until it has become quite thin, the holes disappear, and the figures have spread out, preserving, however, their parallelism. A number of broken, straight, and curved lines are thus produced, their effect being further enriched by the use of acids to modify the colors. Thin plates prepared in this way have an extremely flexible nature, admitting relief, with stamped or engraved designs; and, capable of receiving the most varied colors and forms, will have many uses in decorative art.

ROBERTS' COMBINED LAMP AND OIL CAN.

A simple little invention is illustrated in the annexed engraving, which, we think, will prove of considerable convenience to engineers. Any one who has ever attempted to oil out-of-the-way machinery in the dark, and especially in the confined limits of a steamboat's hold, will understand that keeping one's self clear of the moving parts, while both hands are occupied, the one with a lamp, the other with an oil can, is certainly not an easy, and is in some respects a perilous, operation. The present device, which combines lamp and oil can in one, allows one hand to be free, so that the user can steady and support himself, and in addition a further advantage is offered in having a light so placed as to illuminate the darkest recesses of the machine, which it otherwise might be difficult to light up sufficiently to enable oil cups to be readily found.

As shown in the engraving, a cylindrical vessel is provided



with a flanged stand, and is divided within by a partition, A. The large space nearest the handle serves to hold lubricating oil, and the spout therefor passes through the partition and the small space, which contains lamp oil, and extends in a nozzle outside the can in the usual manner. The lamp oil space is filled through the aperture, at B, in the cover of which a lamp burner is arranged carrying the usual wick. The flow of lubricating oil is regulated by a spring lever, C, by which a small air hole is closed or opened at will.

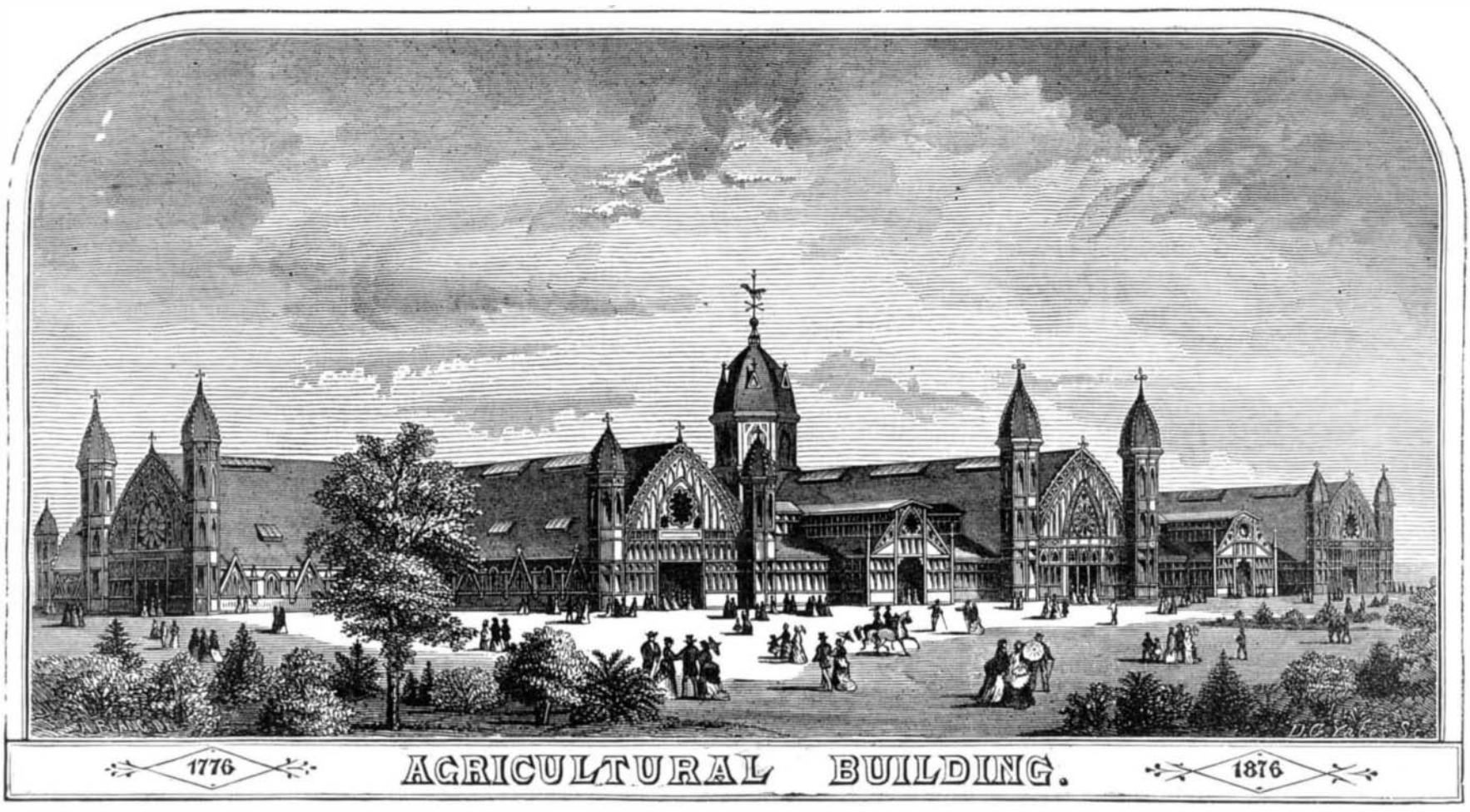
Patented through the Scientific American Patent Agency

June 22, 1875. For further particulars regarding sale of rights, etc., address the inventor, Mr. William Roberts, Quincy, Adams county, Ill.

THE CENTENNIAL BUILDINGS.

We have already published complete views of three of the buildings now being erected for the purposes of the Centennial Exposition to be held in Philadelphia next year; and we now add a representation of the large structure to be devoted to the agricultural show. It will stand north of the Horticultural Building, and on the eastern side of Belmont avenue, Fairmount Park. It will illustrate a novel combination of materials, and is capable of erection in a few months. Its materials are wood and glass. It consists of a long nave crossed by three transepts, both nave and transept being composed of Howe truss arches of a gothic form. The nave is 820 feet in length by 125 feet in width, with a hight of 75 feet from the floor to the point of the arch. The central transept is of the same hight, and has a breadth of 100 feet, the two end transepts being 70 feet high and 80 feet wide.

The four courts inclosed between the nave and transepts, and also the four spaces at the corners of the building, having the nave and end transepts for two of their sides, will be roofed to form valuable spaces for exhibits. Thus the ground plan of the building will be a parallelogram of 540



by 820 feet, covering a space of above ten acres. In its immediate vicinity will be the stock yards for the exhibition of horses, cattle, sheep, swine, poultry, etc.

Several foreign countries will erect buildings, more or less important in size and appearance, in the park. These will add importantly to the appearance of the whole, and many of them will be attractive specimens of modern architecture. Altogether, the Commission must be congratulated on their success in obtaining the necessary buildings for the Exposition.

Progress of Engineering.

At the meeting of the British Association for the Advancement of Science, which took place at Bristol on the 25th ult. Sir John Hawkshaw delivered the address, devoting himself especially to the history and progress of engineering. "Inventions," he said, "were lost and found again. The art of casting bronze over iron was known to the Assyrians, though it has only lately been introduced into modern metallurgy; and patents were granted in 1609 for processes connected with the manufacture of glass which had been practised centuries before. An inventor in the reign of Tiberius devised a method of producing flexible glass, but the manufactory of the artist was totally destroyed in order to prevent the manufacture of copper, silver and gold from becoming depreciated.

ANCIENT ENGINEERING.

A high tribute to the wonderful engineering capacities of the Romans was paid by Sir John. Wars, with all their attendant evils, often indirectly benefited mankind, as when, under the Romans or Napoleon, great systems of roads and bridges were instituted for military purposes. Roads followed the tracks of Rome's legions into the most distant provinces of the empire. Three hundred and seventy-two great roads are enumerated, together more than 48,000 miles in length, according to the itinerary of Antoninus. The water supply of Rome during the first century of our own era would suffice for a population of 7,000,000, supplied at the rate at which the present population of London is supplied. A rapid glance was taken at the progress of mechanical skill in the manufacture of textile fabrics and the immense growth of steam traffic on the ocean, traffic which a distinguished member of the association had said, at one of its meetings, forty years ago, was impossible. Similar advancement has been recorded in the department of telegraphy; and what a splendid success had not the railroads proved! The railways in the British islands now produce, or rather save to the nation, a much larger sum annually than the gross amount of all the dividends payable to the proprietors, without at all taking into account the benefit arising from the saving in time. The benefits under that head defy calculation, and cannot with any accuracy be put into money: but it would not be at all overestimating this question to say that in time and money the nation gains at least what is equivalent to 10 per cent on all the capital expended on railways. It follows that, whenever a railway can be made at a cost to yield the ordinary interest of money, it is in the national interest that it should be made.

COMPARATIVE SAFETY OF RAILWAYS.

Speaking of accidents on railways, Sir John said that they were fewer now than they had been; indeed, that there is only one passenger injured in every 4,000,000 miles traveled, or that, on an average, a person may travel 100,000 miles each year for forty years, and the chances be slightly in his favor of his not receiving the slightest injury.

TEXTILE INDUSTRIES.

More ingenuity and creative mechanical genius is perhaps displayed in machines used for the manufacture of textile fabrics than by those used in any other industry. It was not until late in historical times that the manufacture of such fabrics became established on a large scale in Europe. Although in China man was clothed in silk long ago, and although Confucius, in a work written 2,300 years ago, orders with the greatest minuteness the rules to be observed in the production and manufacture of silk, yet it was worth nearly its weight in gold in Europe in the time of Aurelian, whose empress had to forego the luxury of a silk gown on account of its cost.

Until 1738, in which year the improvements in spinning machinery were begun, each thread of worsted or cotton wool had been spun between the fingers in this and all other countries. Wyatt, in 1738, invented spinning by rollers instead of fingers, and his invention was further improved by Arkwright. In 1770 Hargreaves patented the spinning jenny, and Crompton the mule in 1775, a machine which combined the advantages of the frames of both Hargreaves and Arkwright. In less than a century after the first invention by Wyatt, double mules were working in Manchester, with over 2,000 spindles. Improvements in machines for weaving were begun at an earlier date. In 1579 a ribbon loom is said to have been invented at Dantzic, by which from four to six pieces could be woven at one time, but the machine was destroyed and the inventor lost his life. In 1800 Jacquard's most ingenious invention was brought into use, which, by a simple mechanical operation, determines the movements of the threads which form the pattern in weaving. But the greatest discovery in the art of weaving was wrought by Cartwright's discovery (in 1784) of the power loom, which led eventually to the substitution of steam for manual labor, and enabled a boy with a steam loom to do fifteen times the work of a man with a hand loom.

For complex ingenuity few machines will compare with those used in the manufacture of lace and bobbin net. Hammond, in 1768, attempted to adapt the stocking frame to this manufacture, which had hitherto been conducted by hand. It remained for John Heathcoat to complete the adaptation in 1809, and to revolutionize this branch of industry, reducing the cost of its produce to one fortieth of what the cost had been before Heathcoat's improvements were effected.

TELEGRAPHY.

There is no more remarkable instance, of the rapid utilization of what was in the first instance regarded by most men as a mere scientific idea, than the adoption and extension of the electric telegraph.

The first useful telegraph was constructed upon the Blackwall Railway in 1838, Messrs. Wheatstone's and Cooke's instruments being employed. From that time to this the progress of the electric telegraph has been so rapid that, at the present time, including land lines and submarine cables, there are in use in different parts of the world not less than 400,000 miles of telegraph.

Among the numerous inventions of late years, the automatic telegraph of Mr. Alexander Bain, of Dr. Werner Siemens, and of Sir Charles Wheatstone are especially worthy of notice. Mr. Bain's machine is chiefly used in the United States, that of Dr. Werner Siemens in Germany. In Great Britain the machine invented by Sir Charles Wheatstone, to whom telegraphy owes so much, is chiefly employed. By his machine, after the message has been punched out in a paper ribbon by one machine, on a system analogous to the dot and dash of Morse, the sequence of the currents requisite to transmit the message along the wire is automatically determined in a second machine by the perforated ribbon The second operation is analogous to that by which, in Jacquard's loom, the motions of the threads requisite to produce the pattern are determined by perforated cards. By Wheatstone's machine, errors inseparable from manual labor are avoided; and what is of even more importance in a commercial point of view, the time during which the wire is occupied in the transmission of a message is considerably diminished.

By the application of these automatic systems to telegraphy, the speed of transmission has been wonderfully accelerated, being equal to 200 words a minute, that is, faster than a shorthand writer can transcribe; and, in fact, words can now be passed along the wires of land lines with a velocity greater than can be dealt with by the human agency at either end.

Owing partly to the retarded effects of induction and other causes, the speed of transmission by long submarine cables is much smaller. With the cable of 1858 only 2½ words per minute were got through. The average with the Atlantic cable, Dr. C. W. Siemens informs me, is now 17 words, but 24 words per minute can be read."

Steam at 500 lbs. Pressure.

For several years the successful experiments of Mr. Loftus Perkins, in England, in the use of steam at enormous pressures, rising as high as 500 lbs. per square inch, have been known, but the explanations for the delay in the manufacture have not until now been made public. It appears, from the law proceedings in a suit lately brought by Mr. Perkins against the Yorkshire Engine Company, that Mr. Perkins assigned the exclusive license under his patents to the Company, they in turn agreeing to proceed with the building of the new engines and boilers forthwith. But this the Company failed to do, and so the invention became as it were locked up, and Mr. Perkins was compelled to appeal to the courts for relief. The case recently came on before Justice Fields, Nisi Prius Court, Leeds, when the following interesting explanation was elicited:

In opening the case, Mr. Wills said that his client, Mr Loftus Perkins, was a civil engineer, who resided in London. He was the inventor and constructor of various devices for