SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVII.—No. 23. (NEW SERIES.) NEW YORK, DECEMBER 7, 1867. $3 per Annum [IN ADVANCE.]

The Celebrated Niagara Suspension Bridge.

For many years it was a question discussed by the merchants and the people on each side of the line which divides the United States from the British possessions, how to make a permanent and safe connection between the opposite shores of the Niagara river. At length, in 1855, the problem was solved by the erection of the suspension bridge, which is to this day unsurpassed by any other similar structure in this or any other country.

The bridge is located about two miles below the falls, and spans the river at a hight of nearly 250 feet above the water. It is supported by four wire cables, nine-and-a-quarter inches diameter, which pass over towers erected on each side of the river. From center to center these towers are 800 feet apart. 14,560 wires were used in the cables, their united strength being estimated at 12,000 tuns. It is a railway and ordinary passenger traffic bridge combined, the carriage and foot ways being twenty-eight feet below the railway track. Its rigity and strength may be conceived when it is stated that under the passage of heavy trains the deflection is less than four inches.

Mr. John A. Roebling was the engineer, who will superintend the erection of the proposed bridge which is to connect New York and Brooklyn.

THE SUSPENSION BRIDGE ACROSS THE NIAGARA.

TELEGRAPHIC METEOROMETERS.—Prof. Wheatstone has devised a new class of instruments for taking observations in stations which for any cause are not accessible for very long periods. The telegraphic thermometer, a type of this class, consists essentially of two parts; the first is the magnetic-motor, constructed on a plan similar to that used by the inventor in his alphobetical magnetic telegraph, and is so arranged that by turning a handle the lever at the other extremity of the line will describe by regular steps a complete circle. The second part consists of a metallic thermometer, in which the unequal expansion of two different metals is made to move a lever or pin around a graduated circle which marks the degrees of temperature. The two parts are in such proximity that the telegraphic lever in passing around the circle must, at some point, come in contact with the pin, which is moved by means of the expanding or contracting metals. This contact breaks one circuit and completes another, and thus transmits to the other extremity of the telegraphic line information of the partiticular degree of heat at that instant indicated by the thermometer. This thermometer is not self-recording, but responds with accuracy when ever questioned.

MONEY'S IMPROVEMENT IN UMBRELLAS.

The insertion of the ordinary wire spring commonly used on umbrellas and parasols necessitates a mortise in the handle, which by being cut nearly through the stock diminishes its strength and makes that portion comparatively weak at the point which should be the strongest.

The slide, in which are pivoted the inner ends of the ribs, as seen in the engraving, is similar to that in ordinary use. It is shown in both the views in section. On a projection on one side of it is pivoted a double lever cam with a thumb piece on each arm of the lever. When, as in the engraving, the lower end of the lever is pressed down the boss of the eccentric or cam impinges rigidly and firmly on the surface of the handle or stick and the umbrella can be held open. On the contrary, when the upper end is forced in toward the staff the pressure of the boss of the eccentric is released from the stick and the umbrella can be readily closed, the slide moving freely on the stick. This position is seen in the small section marked A.

The patent for this device, obtained through the Scientific American Patent Agency, Oct. 29, 1867, is owned by William Money and Edgar McCloud, either of whom may be addressed relative to the sale of rights, etc., at Paterson, N. J.

The First Steam Fire Ship.

Edward Thomason, of Birmingham, England, laid before the Admiralty, in 1796, a model of a vessel propelled by paddle wheels and a steam engine intended for use as a fire ship. The rudder was also to be operated by the engine, the powder and combustibles also to be fired by the same means, as soon as the driving shaft had accomplished a certain number of revolutions. No person was to accompany the vessel. The distance from the English blockading fleet to the French fleet in the harbor being known, also the course of the channel, the steam fire ship was to be adjusted and started. After the engine had made a given number of turns, the rudder would be moved and the vessel's direction changed according to the channel, and so on until the paddles having made the total number of revolutions required to carry the ship into the middle of the hostile fleet, then presto, click, the explosion was to take place and the unsuspecting enemy were to be set on fire or blown sky-high. But in those days the Admiralty did not believe in steam power and so the novel fire ship was never built.

ADDING to the width of a belt and of the faces of the pulleys, increases immensely its power of conveying force. A wide belt is always better than a narrow one strained to its utmost capacity.