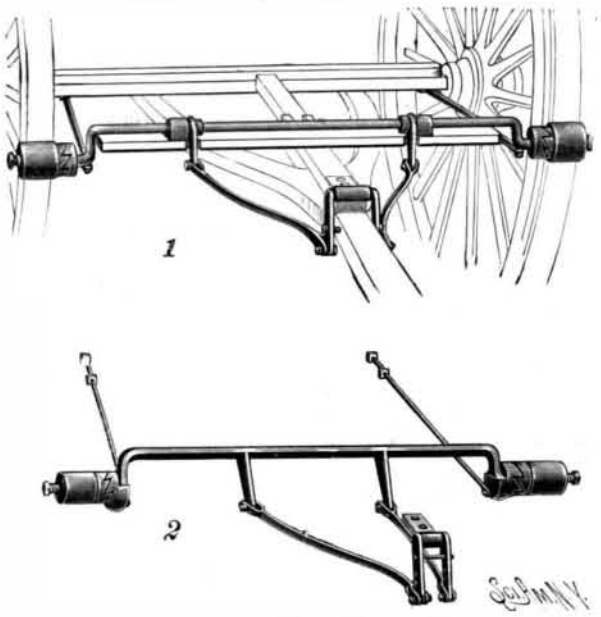
AN AUTOMATIC VEHICLE BRAKE.

This brake, which has been patented by Mr. H. D. Cool, is applied by the team in holding back, as in going down hill, and is so constructed that, without removing the shoes from engagement with the wheels, the vehicle may be as readily backed as if the brake were not applied. Fig. 1 represents the application of



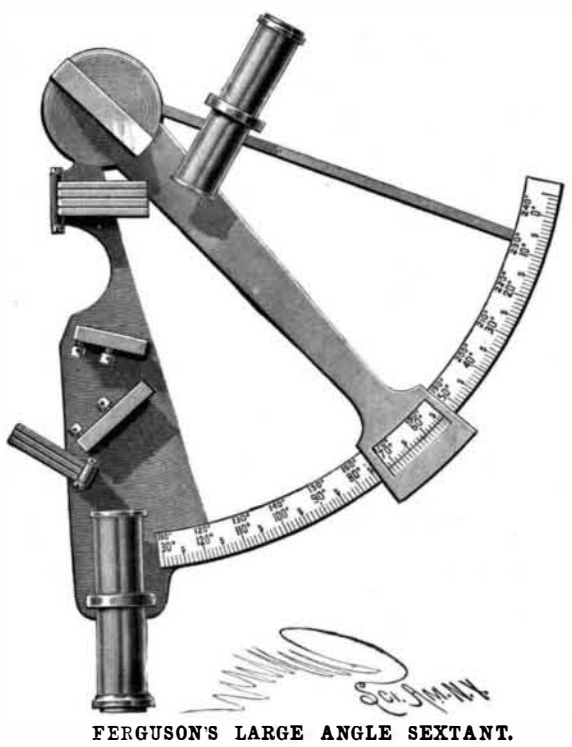
COOL'S VEHICLE BRAKE.

the device, it being shown in Fig. 2 detached from the vehicle. Mounted on or supported from the rear hounds is a rockshaft having at each end a crank arm in front of each rear wheel, and each arm carries a cylindrical shoe made in two sections, both loosely mounted, and having opposing clutch faces. The outer section is constantly held in engagement with the inner one by a spring confined on the crank arm by a cap or stop, and the space between the sections is guarded from dirt by a shield. The movement of the brake to and from the wheel is controlled by rods pivotally connected with the inner sections of the shoes, eccentrically or concentrically, the opposite ends of the rods being attached to an axle. The reach of the vehicle has more or less end movement, and to it it attached a clevis connected by links with crank arms on the rock shaft, the links being adjustably connected that the power with which the brake is applied may be increased or diminished. The holding back on the part of the team, causing a rearward movement of the reach, effects the application of the brake, the inner sections of the shoes being held stationary by the rods projecting from the axle, and by the engagement of the clutch teeth, preventing the revolution to the rearward of the outer sections of the shoes, which are at the same time brought into contact with the periphery of the wheel. As the outer sections of the shoes are, however, free to revolve in the opposite direction, the backing of the vehicle will not be interfered with.

This improvement is being introduced by Mr. Charles G. Locke, of Randolph, N. Y.

A LARGE ANGLE SEXTANT.

The sextant attachments shown in the illustration convert the ordinary sextant into a measur-



FERGUSON'S LARGE ANGLE SEXTANT.

ing instrument for measuring large angles, extending the range of the sextant to the measurement of angles up to 240 degrees. The improvement has been patented by Mr. Thomas T. H. Ferguson, of the imperial Chinese customs service, Peking, China. The instrument is still essentially a sextant, and may be of the most improved and accurate kind, its affixures rendering it capable of spanning the larger arcs without detriment to its accuracy and nicety of adjustment. The same index arm is used, and the same vernier and arc divisions, but the value of the angle is taken from figures engraved above the old figures on the silver arc, additions which can be made to any sextant by a maker of ordinary skill. The engraving shows the arrangement of parts, there being behind the horizon glass another horizon glass in every respect similar, except that it is slightly broader, and it is mounted perpendicularly, being firmly fixed to an extension of the framework, allowing of the usual adjustments around horizontal and vertical axis. Its center is placed on the line which connects the centers of the old horizon and the index glass, and it makes with the old horizon glass an angle of exactly sixty degrees, its back turned toward the back of the old horizon glass. In newly constructed instruments it is better to mount the two horizon glasses on a common base plate to be fixed to the framework of the sextant. The set of dark glasses usually found behind the horizon glass, being moved from their place by the new horizon glass, must be shifted further back on the visual line of the first telescope, as they have now a double function to perform, for when using the second telescope it is advisable to raise those glasses so as to shade off noxious reflections from the back of the first horizon glass. The improvement enables one to measure each angle over 120° twice, first the angle itself and then its supplement. Supposing all parts to be properly adjusted, a mere shifting of the eye from the usual telescope to another fixed at another part of the instrument is all that is needed to use the sextant in its large angle capacity.

The Falls of Niagara.

The Niagara River extends from Lake Erie to Lake Ontario, a distance of 30 miles. It receives the waters of all the upper lakes—Erie, St. Clair, Huron, Michigan, Superior, and a number of smaller ones. From source to outfall it has a total descent of 334 feet, but greater part of the fall occurs within a distance of 7 or 8 miles, beginning with the rapids, 2 miles above the great falls, which received their name—Niagara, meaning the "thunder of waters"—from the aborigines. Their roar, under favorable circumstances, may be heard at a distance of 15 miles.

There are three distinct falls: The Horseshoe Fall—so called from its crescent shape—is by far the largest, and is in the direct course of the river. It is 2,000 feet wide and 154 feet high. The American Fall is 660 feet wide, and the Central Fall 243 feet, each having a fall of 163 feet.

The water flows on perpetually the same, full and clear; neither the snows of winter nor the evaporation of summer, neither rains nor drought materially affect it—excepting that about once in every seven years there is a gradual rise and fall, which is attributed to some undiscovered disturbance that affects Lake Erie.

"Of all the sights on this earth of ours which tourists travel to see," wrote Anthony Trollope, "I am inclined to give the palm to Niagara. In the catalogue of such sights I intend to include all buildings, pictures, statues, and wonders of art made by men's hands, and also all beauties of nature prepared by the Creator for the delight of his creatures. This is a long word; but, as far as my taste and judgment go, it is justified. I know of no other one thing so beautiful, so glorious, and so powerful."

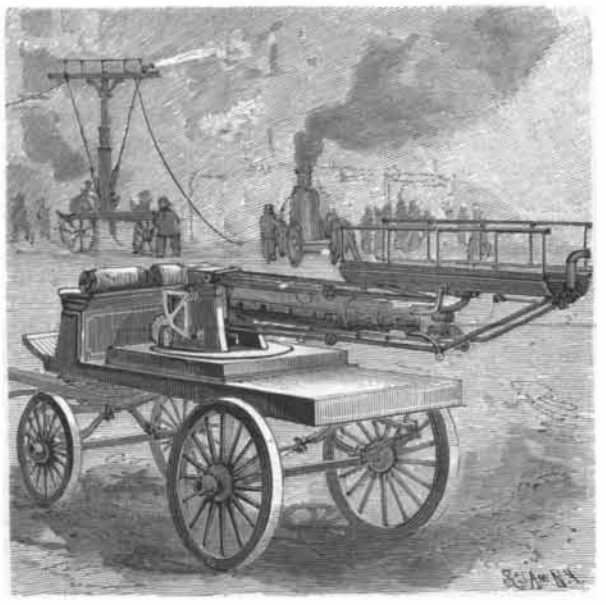
This wonderful cataract is 447 miles from New York, within a single day's journey, and is reached most directly by the New York Central and Hudson River Railway, of which it forms the western terminus.—Dr. A. N. Bell.

Interesting Records of the Wanderings of Derelicts.

In a recent issue we referred to a decision of the Admiralty and Board of Trade of England, which condemned the United States charts referring to the position of derelicts, on the ground that the charts probably exaggerated the danger from this source. The distance which such vessels traverse is, however, much greater than is generally supposed. Such wrecks are sighted from time to time by vessels and their position at the time is recorded, and a careful record of all these observations makes it possible to prepare a chart which, in a general way, will show these wanderings. According to a chart of this kind, recently published, the derelict Fannie E. Wolston has traveled during the past five years somewhat more than 10,000 miles. This calculation is based upon forty-six reports made by various vessels. Another derelict, which started on its wayward course in 1891, drifted about 3,500 miles up to the time it was last seen, or a period of 615 days. Another remarkable derelict, the W. L. White, floated about the North Atlantic for 310 days, covering in that time some 5,910 knots. All these long-lived derelicts have been heavily loaded with lumber and they have, therefore, been able to keep afloat for very long periods. The lumber buoys them up and prevents the storms from crushing them. Derelicts are moved for the most part by the force of various ocean currents. And in general they eventually float to that portion of the North Atlantic known as the Sargasso Sea, where the currents are very sluggish and weak. This region is, fortunately, outside the track of most of the Atlantic commerce. It can readily be seen, however, that in these wanderings the derelicts are likely to prove very dangerous.

A HOSE BRIDGE AND TOWER.

The illustration represents an apparatus for fire departments, which may be collapsed and folded into small compass or extended and raised as required, forming a hose bridge to carry lines of hose over a railway or street. The apparatus is also arranged to discharge water from the bridge without the use of the hose, thus enabling it to be employed as a fire tower, with revoluble nozzle operated from the truck. The improvement has been patented by Messrs. James Blake and Emil F. Begiebing (address E. F. Begiebing, No. 285 Canal Street, New York City). The truck carries a bed plate with circular track supporting rollers on which is a turn table carrying the superstructure, the table being rotated by means of a gear and pinion connection with a crank within easy reach of the driver's seat. On the table are pillow blocks in which are journaled the trunnions of the lower section of the tower, this section having an enlarged casing at its lower ends serving as a housing for the gear at the foot of the tower. The trunnions have toothed segmental racks engaging worms on shafts whose gear wheels engage a driving gear with a crank handle, also near the driver's seat, by which the sections of the tower may be raised to a vertical or turned down to a horizontal position. The lower tower section has



BLAKE AND BEGIEBING'S HOSE BRIDGE AND TOWER.

in its opposite sides anti-friction rollers, enabling the second section to be moved up easily, which is effected by means of a screw whose driving gear is actuated by the turning of a crank, the screw also entering and engaging racks in the third tower section, thus serving to raise both sections. The several sections of the tower have at their upper ends hooks adapted to support ladders, and at the upper end of the top section are brackets for the support of a bridge, so fulcrumed that by removing a pin, the bridge may be swung to lie substantially parallel with the body of the tower. The bridge has hand rails, or guards, and is held rigidly in horizontal position by hinged braces, which are extensible to provide for the varying height of the tower. The apparatus also has telescoping pipes in the tower sections, connecting at the top with a cross pipe to which a hose may be attached, or from which water may be discharged directly upon a fire, the head connected with the pipe having the movement of a universal joint, and being turned by means of pinions and an extensible shaft, with a hand wheel at its lower end, to discharge the water in any desired direction. The apparatus may also be employed as a fire escape.

Wool Scoured with Naphtha.

In a new method of scouring wool, naphtha is employed as the cleansing substance. By means of a pump the naphtha is forced through and through the wool, extracting all the natural oil. It is claimed that the naphtha does not injure the fiber of the wool, as alkali cleansing, but leaves the fleece in better condition than when cleansed by any other process.

A further valuable feature of the new method is that after the grease is extracted from the wool it may be again extracted from the naphtha in a pure state, thereby becoming valuable as a medicinal agent or for a saponification into the purest of soaps. It is claimed that a plant following this method scoured 500,000 pounds of wool, and had saved a product of 80,000 pounds in pure wool oil.

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