THE DYNAMOMETER OF THE GREAT CAPTIVE BALLOON AT THE PARIS EXHIBITION.

Mr. Henry Giffard's great balloon at the Paris Exhibition possesses many peculiar and interesting points. The general construction of the balloon, its valves, and many of its appurtenances have been described in a former number.

The dynamometer which unites the balloon to the cable is suspended in the center of the space surrounded by the annular gallery of the car. It is formed of two steel cylinders, united by light steel bow springs. Four vertical dials indicate by means of hands the amount of traction in kilogrammes to which the dynamometer is subjected. The aerial voyagers may at any time know the excess of ascensional power of the balloon by inspecting either of the dials.

New Engineering Inventions.

Mr. E. A. Hayes, of New York city, has patented an improved Covering for Steam Boilers. This covering is of felt or other fabric applied to the exterior surfaces of steam boilers and various parts of steam engines for the purpose of protecting them from cold and preventing condensation of steam. The principal object of the invention is to provide means for using the covering again after it has been removed from the boiler.

An improved Turbine Wheel and Gate-operating Mechanism has been patented by Messrs. Uriah S. Sheffer and William H. Sheffer, of York, Pa. This invention consists in constructing the wheel with a conical upper plate, a conical lower plate, and radial partitions forming buckets converging downwardly and toward the center of the wheel, the said partitions being extended downwardly to form curved buckets at the point of discharge. This invention also consists in a novel arrangement of mechanism for operating the gates.

Messrs. Robert Decley and John Turl, of New York city, have patented an improved Portable Railway, which is designed especially for use upon sugar plantations for hauling the cane from the field to the mill. It may be used for various other purposes where a temporary track is required.

An improved Rock Washer for Oil Wells has been patented by Messrs. Frank Jeannerat and Lewis E. Simons, of Edenburg, Pa. The object of this invention is to provide a means of keeping open the apertures in the well tubing through which oil issues for the purpose of washing the rock and preventing the accumulation of paraffine. It consists in a spring carrying a pin, which projects through the aperture in the well tubing, and in a ball or enlargement on the valve rod, which engages the spring and causes the pin to make an outward movement for each stroke of the valve rod.

Messrs. William H. Wilder and Charles W. Conant, of Gardner, Mass., have patented an improved Car Brake, which is so constructed as to enable the brake to be applied with much more force than ordinarily constructed brakes.

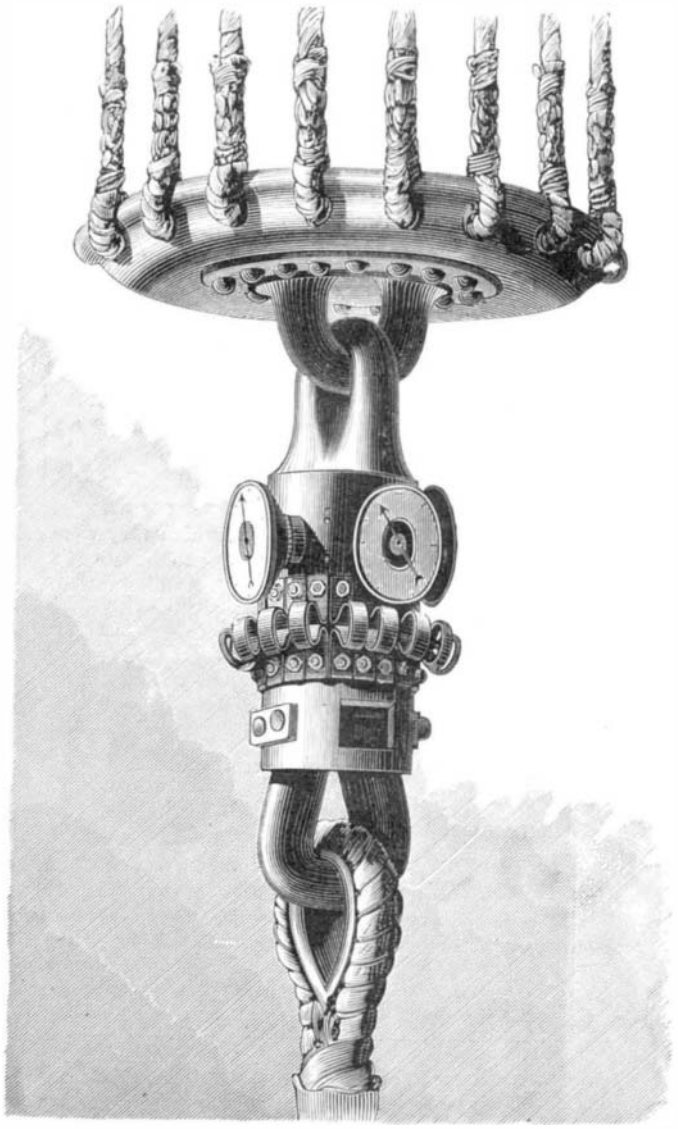
Mr. Maximilian Jacker, of Marquette, Mich., has patented an improved Hoisting Machine, which consists in a single differential friction brake, applied to the winding drum, in connection with gearing, in such a manner that the starting, stopping, and reversing of the drum are accomplished by manipulation of the one brake, and this is done without interfering with the operation of any other winding drum which may be operated from the same main shaft.

Mr. John B. Deeds, of Terre Haute, Ind., is the inventor of an improved Machine for Starting or Moving Railroad Cars upon the track. It is so constructed that it may be conveniently operated by a hand lever to move one car apart from another without the necessity of going in between them, and it will allow of a full throw or movement of the hand lever, even while the cars are close together.

Mr. Richard T. Pascall, of New York city, has devised an improved Steam Trap, which consists in a casing containing a spherical corrugated sheet metal float, and having a strainer for preventing the entrance of dirt, and provided with a balanced discharge valve. It has a device for lifting the float independently of the action of the water, and also a guard placed above the float, to carry the water that enters the trap to the side of the casing.

Mr. Louis Leypoldt, of New York city, has patented an improved Railroad Rail for elevated and surface railroads, by which the annoying noise caused by the contact of wheels and rails may be avoided or deadened.

Mr. John J. Tonkin, of Richmond, Va., has patented an improved Gauge Cock for determining the water level in steam boilers. It consists in constructing the axial portion of the cock in such form that it shall fulfill itself the function of a valve by longitudinal movement, so that, in trying the water level, all that is necessary is to grasp the handle of the tube and force it longitudinally in, and then turn the tube axially until its right angular arm dips into the water, the pressure of the steam within serving to force back the tube and seat its valve upon the valve seat.



DYNAMOMETER OF THE CAPTIVE BALLOON AT THE PARIS EXHIBITION.

Experiments with Fog Signals.

Professor Henry Morton, President of the Stevens Institute of Technology, at Hoboken, was appointed by President Hayes, upon the recommendation of Secretary Sherman, to fill the vacancy in the Lighthouse Board, caused by the death of Professor Henry. At the first meeting of the Board after Professor Morton's appointment, he was elected Chairman of the Committee upon Experiments. During the summer the work of the committee was carried on in connection with fog signals, off the coast of Maine. The Professor was accompanied by Admiral Rodgers, General Duane, Commander Picking, Lieutenant Emery, and Commander Walker. The three steamers, Myrtle, Iris, and Daisy were placed at the disposal of the expedition, which had its headquarters at the Lighthouse Station, at Portland.

On his return to this city, Prof. Morton said that the observations proved that a powerful steam fog whistle of the most improved pattern could be heard distinctly ten miles in one direction, and yet might be entirely inaudible at the distance of only a quarter of a mile in another direction. Professor Henry adopted a theory some years ago in reference to certain anomalous sound phenomena, that the wind, when blowing with greater velocity above the surface of the sea than at the surface, in approaching a source of sound, deflected the sound waves so as to throw them upward, and thus make them pass over the heads of observers stationed upon the sea level. Professor Tyndall maintained that the sounds were absorbed by what he termed "acoustic clouds," or spaces of air of greater or less density than the surrounding portions of the atmosphere, which floated between the source of sound and the observers upon the sea level. Several experiments were made by Professor Morton's expedition which proved the truth of Professor Henry's hypothesis. There has been considerable complaint made against the whistling buoys used by the Lighthouse Board, several of which are in use in the New York harbor. Professor Morton stated that the experiments made by his party demonstrated that these buoys are of great practical importance when moored in deep water, as vessels can approach near enough to hear the whistles under all circumstances.

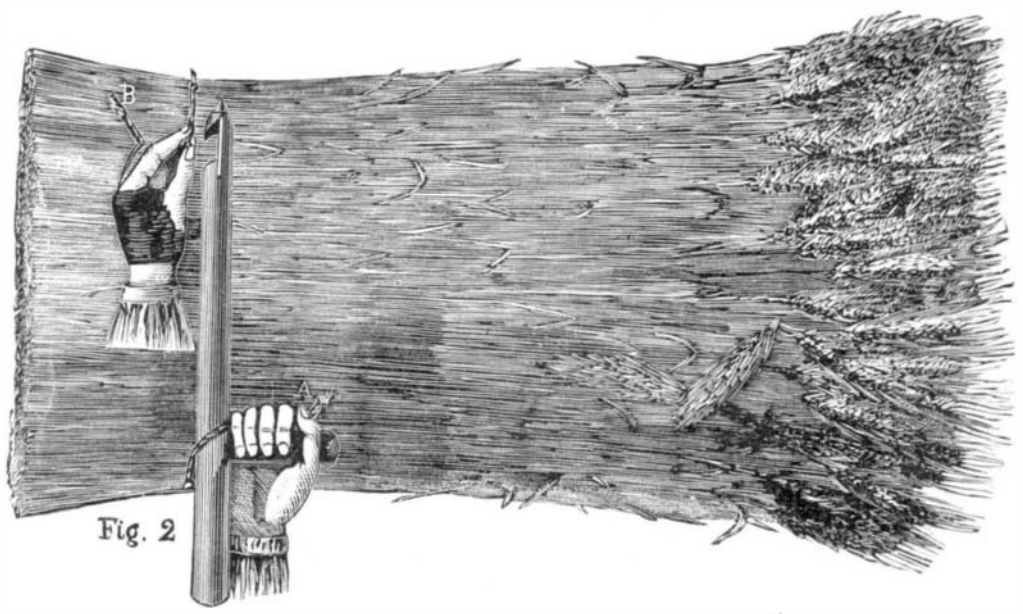
SHEAF BINDING.

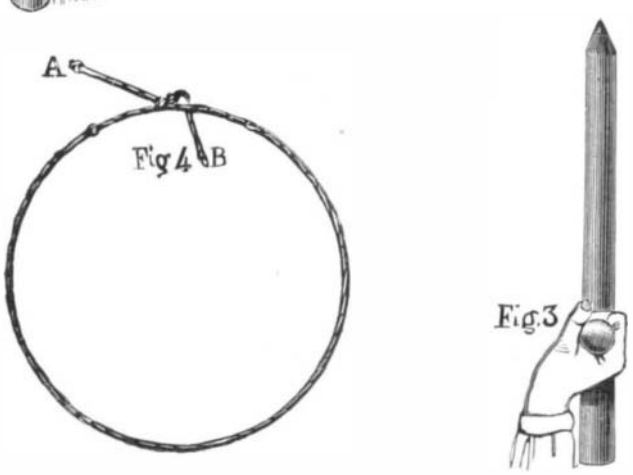
The war between wire and twine for the binding of sheaves has fairly commenced. Wire is more convenient, and so far the most successful machines have used it. Wood, McCormick, and Osborne are fairly before the public in the United States, England, and France, with their automatic binders. Johnston's string binder was shown at the Royal Agricultural Society's Show, at Bristol, which has just closed, and one of his machines is at the Exhibition, as are also the others named above as working with wire. While the heavy troops are thus getting into line, there is also a scattering fire among the pickets, and in the French section are various attempts to obviate the use of the bunch of straw taken from the sheaf to form a band. One man proposes to use the bark peeled from osiers, two or three twisted together; these are sold very cheap. Another has cheap hempen strings cut to length and sold in bundles of one thousand each.

It is estimated that the annual crop of France is about 4,000,000,000 sheaves of grain, and that 50 straw bands contain one franc's worth of grain, the whole representing 80,000,000 francs, most of which is lost by shelling out on to the ground or mildewing under the band. Add to this the loss of time in making and applying, and the injury to the grain in the size of the band, which causes dampness to the sheaf. The figures seem formidable, and the *automatique* band is presented to solve the difficulty.

The mode of using it is evident from the engraving on the next page; the wooden block being held in one hand, one knee of the operator is placed upon the sheaf to compress it, while the other hand draws the cord through the ring. The expansion of the sheaf binds the cord between the ring and the block, and makes a perfectly tight fastening. The cord and block are treated with tar, and are smoked to render them indestructible by humidity and noxious to insects, rats, and lizards. The price is 70 francs ($14) per 1,000, 5 feet long.

Another candidate in the same field offers his sheaf bands with





TOULOUSAIN'S SHEAF BINDER.