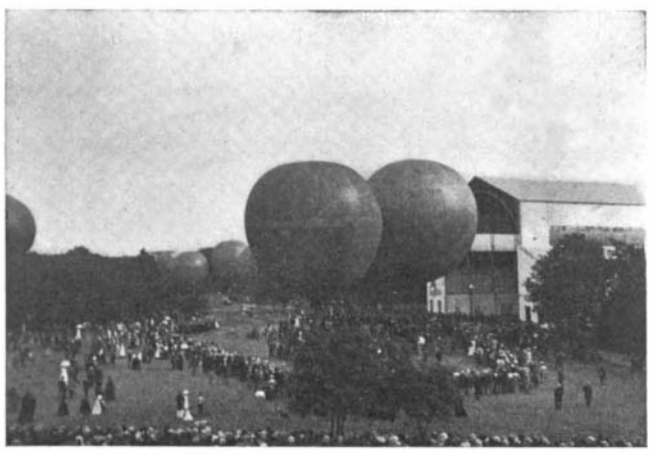
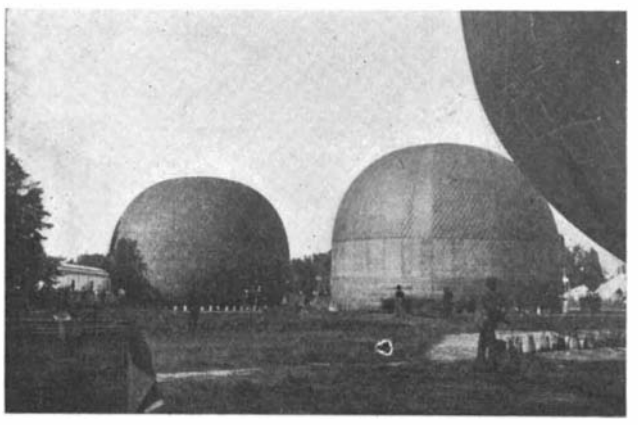
BALLOONS AT VINCENNES.

The illustrations presented herewith are reproductions of photographs taken at the first aeronautical *concours* held during the recent Paris Exposition at Vincennes. From the 17th of June to the 9th of October, 156 balloons, all of French make, varying in gas-capacity from 3,000 cubic meters (105,945 cubic feet) to 350 cubic meters (12,360 cubic feet) were exhibited at the aerostatic park of the Exposition, and made ascents with 327 passengers. Never were so many balloons collected in a single spot. To fill the numerous gas-bags 196,927 cubic meters (6,993,862 cubic feet) of gas were required. One hundred and fifty-eight ascents were made without any accident. On September 16, twenty-six balloons, inflated with 23,311 cubic meters (823,228 cubic feet) of gas, were sent up from the grounds. This was a noteworthy day at the Exposition so far as the number of balloons was concerned. The record for the longest balloon ascension is held by MM. Henry de la Vaulx and Castillon de Saint-Victor, who remained in the air for 35 hours and 47 minutes, and landed in Russia after having traveled 1,935 kilometers (1,202 miles). It has been suggested that the aerostatic park at Vincennes be preserved; but a permanent park could be maintained only by holding each year a *concours* somewhat on the order of the automobile and bicycle shows which have made Vincennes a favorite resort for sportsmen of late years. For the photographs reproduced herewith, and our information, we are indebted to M. Louis Bereau, a well-known aeronaut, who, on the ever memorable 16th of September, made a 15 hour ascent.

A BALLOON ASCENT.



THE AEROSTATIC PARK AT VINCENNES.



INFLATING THE GAS BAGS.

A NEW PILE-DRIVER.

The Chicago, Milwaukee and St. Paul Railway Company, finding it necessary to employ a pile-driver which could be utilized, not only in connection with the ordinary maintenance of bridges, but also in times of emergency, intrusted one of its engineers with the task of designing such a pile-driver. Mr. Willies E. Smith, of the Engineering and Bridge-building Department of the road, Chicago, Ill., recently patented a machine which fully answered all requirements. The improved driver can be used in renewing old piles, as well as in quickly repairing breaks in a burnt or injured bridge. In the latter emergency it is necessary that, without track-supports, the pile-driver should be able to reach far enough ahead to drive a bent to support the further end of a set of stringers, so that when rails have been laid on the newly-driven portion, the pile-driver can advance to drive the piles for the next bent. On the Chicago, Milwaukee and St. Paul Railway pile-driver, designed by Mr. Smith, this extension has been secured in a very simple and ingenious manner.

For the pile-driver in question a 45-foot car is employed, two extra truss rods being placed under the car to prevent sagging, and the transoms of the truck being extended beneath the outer sill of the car-body. To the top of the transoms a heavy plate carrying a jack-screw is riveted. The screw can be turned up against the car-sill to prevent side-tipping. Only when the leaders are swung far out from the center of the track are these jacks needed. In order that the pile-driver may be coupled to any train, the leaders are so proportioned that they do not project beyond the car when lowered, and the driving deck is equal in length to the car. The highest point of the pile-driver itself is 16 feet 8 inches above the top of the rail.

By means of a capstan connected by chain gearing with a sheave at the center of the driving-deck, a vertical shaft is operated provided with a pinion which engages a rack along the side of one of the center car-sills. Thus the driving-deck is moved. In order to permit a back and forth and a swinging movement, an intermediate deck is provided, between the 5-inch channels of which are located a number of 5-inch wheels traveling on 1 inch plates secured to the top of the car-sills.

In order to raise and lower the leaders a novel construction is employed, which comprises a pair of quadrant rockers forming part of the framework of the leaders. As the rockers pass from a horizontal to a vertical position, they roll on the deck, and elevate the leaders.

The leaders are supported at the apex of a four-cornered tower, 20 feet above the deck. Two legs of this tower consist of a pair of angles over the front corner of the deck, and an oblique ladder behind, and are matched by two members serving the same purpose. The fixed portion of this tower is the "A" bent in front, the rockers with their radial struts, the platform seven feet above the deck, and two rear braces from this platform up to the apex of the tower. That portion of the rear braces which extends from the platform down to the deck is hinged and jointed to permit the rocker to roll back when the leaders are to be lowered. Pins are used as connections. The rear brace folds up like a jack-knife, but at no time is the tie between the apex of the tower and the deck of the driver entirely broken. Hence the leaders and framework cannot clear the end of the driver if carelessly raised.

The tread for the rocker is a T-shape, with the head laid on the deck. The rocker itself consists of two plates with a filler between, one plate riding on each

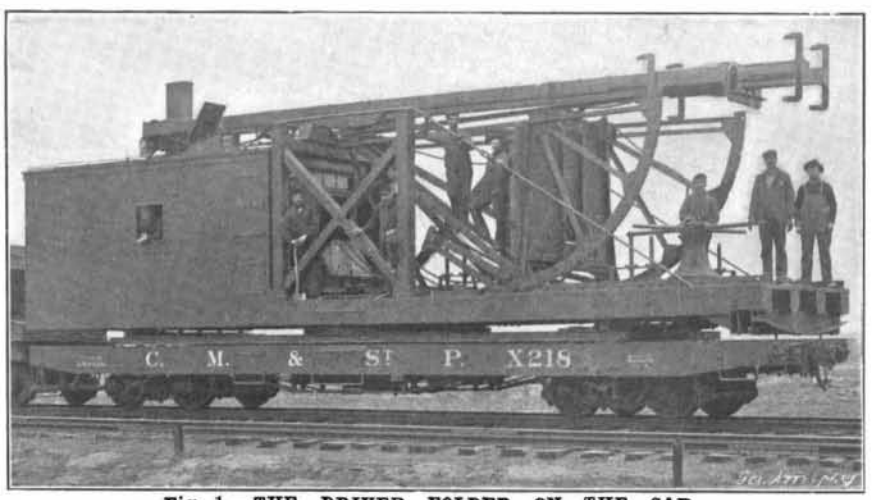


Fig. 1.—THE DRIVER FOLDED ON THE CAR.

Fig. 2.—DRIVING DECK SWUNG ACROSS THE CAR.

Fig. 3.—LEADERS BATTERED.