

400 pounds more than is necessary to balance the revolving weights at the crank pin, that is, so far as vertical effects are concerned, the wheel is 400 pounds out of balance.

Wires which have passed under the wheel at speeds below 30 miles do not vary greatly in thickness. At a speed of 59 miles (333 rev.) however, a very short section of the wire is left entirely round, showing clearly that at this speed there is an instant in the revolution of the wheel when it exerts absolutely no pressure upon the rail, and making it fair to assume that there is another instant when it exerts double the pressure it transmits when at rest. In other words, in half a revolution, occupying less than a fifth of a second, the wheel pressure varies from nothing to 14 tons. The increment of the pressure is really more rapid than this, for it is found that the maximum lift occurs after the counterbalance has passed the vertical by a considerable angle. During the upward action the wheel lags and during the downward action there is a corresponding acceleration.

For speeds above 59 miles the undamaged portion of the wire is longer. Thus for 65 miles it is about 45 inches, showing the wheel to be off the rail for almost a quarter of a revolution, and its return to the rail is correspondingly rapid. The destructive effect of such a blow is enormous.

Complete wires are shown, also a diagram of a typical wire taken at 65 miles in which the vertical scale is greatly increased and the horizontal scale is diminished as compared with the actual dimensions of the wire. This diagram shows, as do all the wires, the lagging of the wheel in its upward motion and the rapidity of its return to the rail.

In addition to the immediate results yielded, this experimental investigation may serve as a means to a more complete mathematical analysis of the subject. This latter phase of the work is now being very skillfully developed by Mr. Daniel Royse, M. M. E., Junior member of the A. S. of M. E., to whom, also, I am indebted for numerical results derived from a study of many wires.

---

THE COLUMBIAN MUSEUM. By JOHN M. COULTER.

[ABSTRACT.]

An explanation of the organization of the Columbian Museum and its scientific possibilities.