"Phono-Electric" Wire.

Up to the present time hard-drawn copper and composite wire of copper and steel have been the main reliance of engineers, but the constant breaking of trolley, telephone and telegraph lines, and the consequent interruption of service, has caused the engineer to realize more and more the importance of having a wire conductor, able to withstand all sorts of trying conditions, to endure extraordinary strains and to prove absolutely trustworthy under all conditions.

In this connection engineers are showing great interest in a new wire, called "Phono-Electric," manufactured by the Bridgeport Brass Co.

The manufacturers claim that "Phono-Electric" wire is perfectly homogeneous both in its mechanical and molecular structure, and does not depend upon a hardened skin for its strength, as do other drawn wires. A series of tests were made on this point by removing successive strata from the surface of "Phono-Electric" wire, and its tensile strength was found to be uniform throughout its whole diameter.

Hard-drawn copper wire was subjected to the same treatment and it was found that, once the skin is removed or injured in any way, the strength of the wire is reduced to that of ordinary soft copper.

This perfect homogeneity of "Phono-Electric" gives it a tensile strength for the various sizes of wire from 40 to 45 per cent greater than that of hard-drawn copper-wire. It is tough as mild steel, vastly more durable and four times as good a conductor.

Standard with tensile strength in a wire is the power of enduring severe strains without taking a permanent stretch, thereby weakening the wire for future emergencies. A set of comparative tests on this point showed "Phono-Electric" wire to have an elastic limit 40 per cent greater than that of hard-drawn copper-wire. It is tough as mild steel, vastly more durable and four times as good a conductor.

Equally important with tensile strength in a wire is the power of enduring severe strains without taking a permanent stretch, thereby weakening the wire for future emergencies. A set of comparative tests on this point showed "Phono-Electric" wire to have an elastic limit 40 per cent greater than that of hard-drawn copper-wire.

The torsional strength of "Phono-Electric" wire is well shown from the fact that a No. 14 "Phono-Electric" wire stood 120 turns in six inches, while hard-drawn copper wire of the same size and length broke at 47 turns.

In electric railway work, especially, the trolley wire comes in for very hard service. At turnouts it often comes in for hard knocks from the trolley, pounding, wrenching and occasional vicious arcs.

After a hard-drawn copper wire is exposed to the arching of a trolley wheel, its hardened skin is destroyed and the weakened wire rapidly succumbs. "Phono-Electric" wire is free from this serious difficulty, for it does not maintain an arc readily, and there is nothing about it to anneal. Its fusing point is high, and it is free from constituents easily vaporized, hence does not furnish enough metallic vapor to keep an arc going.