

Letter from Alexander Graham Bell to Gardiner Greene Hubbard, November 16, 1877, with transcript

Scribble No. 2. Nov. 16th, 1877. Dr. Mr. Hubbard,

One return wire can undoubtedly be used for a large number of telephone wires in the same underground cable.

Theory shows that none of the Telephone wires will be affected by Morse wires in the same cable — but under such circumstances I presume that a telephonic conversation would be repeated faintly into all the other telephone wires using the common return wire. This however can be entirely got over by using two wires for every telephone. I believe that this discovery — though doubling the number of wires — may actually prove cheaper than single wires subject to induction.

For you can use the finest insulated copper wire as the conductor — and string up a bundle of two or three hundred wire upon poles or lay them in a pipe underground.

Recommend this to Ponton & to the Boston Telephone Despatch Co. It will work .

I don't know whether I have told you of my bran-new liquid vibratory-circuit-breaker theory which however still remains to be tested.

A liquid or fluid body expands when heated & this is explained by the molecular theory — as due to the vibration or agitation of the molecules — knocking against each other & pushing each other apart — the result being — the expansion of the body as a whole .

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Query “Why should not similar effects be produced by the vibrations of sound”?

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Experiment to be tried —

Construct instr. after model of thermometer. Agitate liquid in bulb by immersed reed caused to vibrate by electro-magnet.

Will liquid rise in pipe & remain at a high level during the vibrating of reed. I think it will especially if sluggish liquid like glycerine is used — or the pipe is narrowed so as to introduce friction or capillary attraction to delay the descent of the liquid in pipe.

A.G.B.