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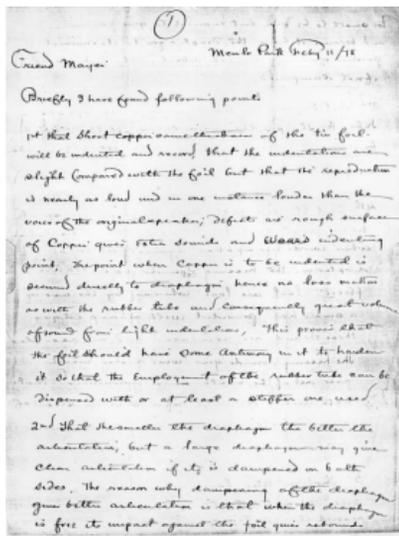
Menlo Park Feby 11/78

To Alfred Mayer

Friend Mayer

Briefly I have found following points¹

1st that Sheet copper same thickness of the tin foil will be indented and record, that the indentations are slight compared with the foil but that the reproduction is nearly as loud and in one instance louder than the voice of the original speaker; defects are rough surface of copper gives extra sounds and wears^a indenting point. The point when copper is to be indented is secured directly to diaphragm hence no loss motion as with the rubber tube and consequently great vol-



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ume of sound from light indentations. This proves that the foil should^a have some antimony in it to harden it so that the employment of the rubber tube can be dispensed with or at least a stiffer one used²

2nd That the smaller the diaphragm the better the articulation; but a large diaphragm may give clear articulation if it is dampened on both sides. The reason why dampening of the diaphragm gives better articulation is that when the diaphragm is free its impact against the foil gives rebounds too small to be seen but enough to give harmonics and because it brings the diaphragm to its normal position quicker after each vibration than it would if not dampened.

3rd That the smaller the chamber in the speaking tube the sharper the articulation, if the chamber be increased the articulation is muffled (I mean when the speaking & reproduction takes place with chamber)

4th. That the size of the hole through which^b you speak has a great deal to do with the articulation. when words are spoken against the whole diaphragm the hissing sounds as in shall fleece last are lost whereas by the use of a small hole provided with sharp edges these sounds are reinforced and are recorded The hissing sounds give wind rushes which pass out of the mouth ~~at is~~ downward = That teeth around the edge of a slot instead of a round hole gives the hissing consonants clearer:³

5 That an extra lever placed in the mouth piece connected to the diaphragm may record the lip movements and in reproduction the same lever may possibly^b be used to open and close the aperture to the diaphragm (the lever I have tried, the last not)

6 That the best reading is obtained when the mouthpiece is covered with several thickness of cloth so that the scraping noise on the foil is rendered less audible.⁴

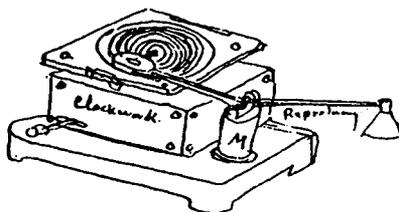
7th That with the hand machine,⁵ (well adjusted)—a sentence of 100 words may be read in the presence of a person and he will generally read every word in one case 8 hours after hearing it read, but that a person who has not heard it ~~it~~ cannot be read until it has been reproduced several times. (this is like shorthand reporters their notes are only aids to memory because generally one shorthand reporter cannot read the others notes. Yet if both were present and the subject had 10 000 words both would read the notes readily even days after =

8 Another phenomenon I have noticed is that If a p two simple but^e different sentences are put on the machine, and a person who had never heard of such an apparatus be brought in and told to listen he will not even after a dozen repetitions be able to say what it is, but if the first sentence is told him & then reproduced he generally says why thats perfect the second sentence is now reproduced when he generally reads it or part of it the first time and the whole the second time if simple= The same thing has been noticed in the telephone, and I think it lack of confidence, or some obscure effect of the mind upon the hearing apparatus. They do not expect or imagine at that a machine can talk hence cannot understand it words

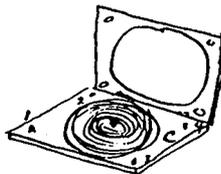
9th That it does not appear to make much difference in the articulation what shape the indenting point is made

10th That the scraping noise is less on composition foil than with pure tin foil although the latter appears to have a smoother surface

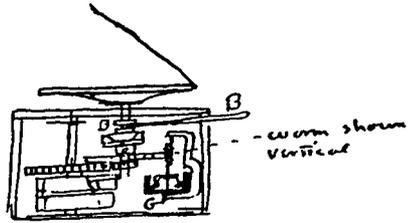
There are many other small things, but the above is what may be called results of experiments in the last few days= Below is rough sketch of the new machine we are making⁶ Will keep you posted on any new results, and send you sheet of copper upon which I made records in Ansonia, that could be heard Read^b 275 feet in open air, and perhaps further if it had been tried.⁷



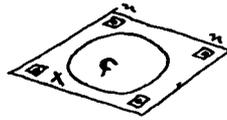
M Swivel lever & post⁸



C the revolving plate with volute spiral the inner half to guide arm outward the outer half to indent upon 1, 2, 3, & 4 pins to pass in eyelets, holes in frame fit over them; eyeletting done in a gauge.



Vulcanite wheel in worm to lessen noise.⁹ winds by lever like music box B.B. friction clutch for stopping & starting plate instantly allowing clockwork to go on G a friction-pendulus governor



prepared sheet X is paper f is foil stretched over it. n n eyelets for registration. Yours Truly

T A Edison

ALS, NjP, Hyatt & Mayer. ^aObscured overwritten letters. ^bInterlined above. ^c“simple but” interlined above.

1. On 9 February, Mayer had written Edison about his experiments with the phonograph he had just received and indicated that he would “have an illustrated article on it, out in about 2 weeks, and I naturally wish all I can get from you to make the information it contains up to date Could you not favor me with a concise account of what you have done since I last saw you, & put it in such form that it could be published in my article? (DF [TAEM 97:620]).” In his 14 February reply to this letter, Mayer stated that he would “embody results in the article; which I think you will like. It will be illustrated with about 15 cuts. It is, of course, of a popular character,” and in a letter dated 6 March he told Edison the article was for *Popular Science Monthly* (DF [TAEM 18:918, 935]). The “popular character” of the journal in that era meant only that articles were not written for specialists and avoided most mathematics, but articles frequently provided lengthy and intricate discussions of difficult subjects by highly respected authors. Mayer eventually prepared eighteen illustrations but then had to severely reduce the article’s length and eliminate all but three of the figures (Mayer 1878a; Mayer to TAE, 7 Mar. 1878, DF [TAEM 18:939]).

2. Cf. Doc. 1188.

3. Mayer quoted this paragraph in his *Popular Science Monthly* article (Mayer 1878a, 724). This result drew upon Edison’s prolonged work on related problems with telephones.

4. Mayer quoted this paragraph in his article (Mayer 1878a, 724).

5. That is, a hand-powered phonograph. Edison had already experimented with a weight-drive clockwork powering a cylinder phonograph

(see Doc. 1204) and was working on at least one other clockwork design—the plate phonograph described below.

6. Calculations for the gear ratios and drawings of the new plate phonograph from mid-February are in Vol. 17:51–57, Lab. (*TAEM* 4: 918–24).

7. See Doc. 1188. Mayer quoted from this sentence in his article (Mayer 1878a, 724).

8. The funnel at the end of the “Reproducing” arm pivots on “M” to rest on the diaphragm and stylus for playback. Text on base is “Clockwork.”

9. Text is “worm shown vertical.”