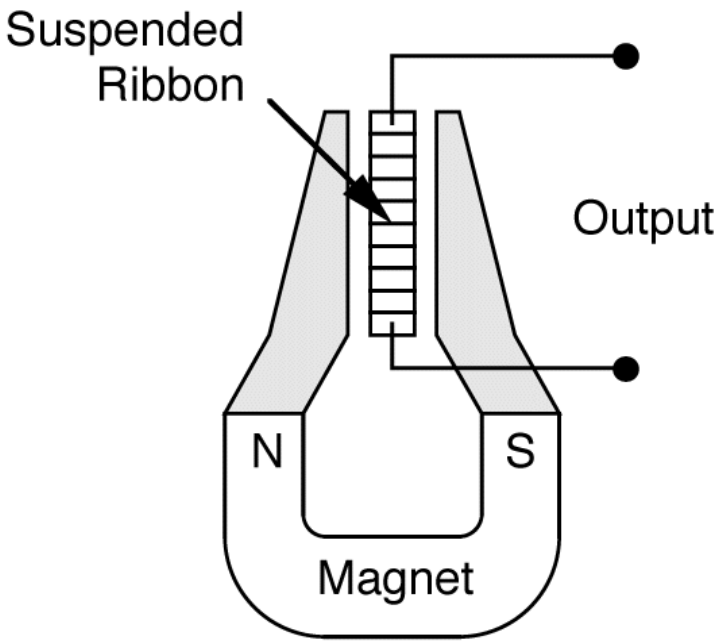
Another type of {early} differential pressure microphone is the so-called ***ribbon*** microphone, as shown in the figure below:



The very thin {corrugated} metal ribbon diaphragm is open to the ambient pressure on both sides of it. The thin metal ribbon diaphragm is corrugated to suppress excitation of low-frequency mechanical vibrational modes of the ribbon. Since the metal ribbon diaphragm is conducting and immersed in a strong, transverse magnetic field $\vec{B}_o\left(Tesla\right)$, a differential over-pressure $\Delta\tilde{p}_{ribbon}\left(\vec{r},t\right)$ exerts a net force on the ribbon diaphragm of this microphone of magnitude $\left|\tilde{\vec{F}}\left(\vec{r},t\right)\right| = \Delta\tilde{p}_{ribbon}\left(\vec{r},t\right)A_{ribbon}\ \hat{n}\bullet\hat{k} = \Delta\tilde{p}_{ribbon}\left(\vec{r},t\right)A_{ribbon}\cos\Theta$, causing the ribbon of mass m_{ribbon} to accelerate (again by Newton's 2nd law – if no other forces act on the microphone diaphragm) $\tilde{\vec{a}}_{ribbon}\left(\vec{r},t\right) = \tilde{\vec{F}}\left(\vec{r},t\right)\big/m_{ribbon}$ and thus move back-and-forth in response to the differential over-pressure. Since the thin corrugated metal ribbon diaphragm is immersed in the static transverse magnetic field $\vec{B}_o$, a magnetic/Lorentz force acts on the free electrons in the metal ribbon $\tilde{\vec{F}}_m = -e\tilde{\vec{v}}_e \times \vec{B}_o = -e\tilde{\vec{E}}$, where $\tilde{\vec{v}}_e\left(\vec{r},t\right) = \tilde{\vec{v}}_{ribbon}\left(\vec{r},t\right)$ is the velocity vector of the free electrons associated with the macroscopically vibrating metal ribbon. Since $\tilde{\vec{v}}_{ribbon}\left(\vec{r},t\right) \perp \vec{B}_o$ then:

$$\tilde{\vec{v}}_{ribbon}\left(\vec{r},t\right)\times\vec{B}_o = \left|\tilde{\vec{v}}_{ribbon}\left(\vec{r},t\right)\right|\cdot\left|\vec{B}_o\right|\underbrace{\sin\theta}_{=1} = \left|\tilde{\vec{v}}_{ribbon}\left(\vec{r},t\right)\right|\cdot\left|\vec{B}_o\right|$$

A time-varying *EMF* (*i.e.* a voltage) $\tilde{\varepsilon}\left(t\right) = \left|\tilde{\vec{v}}_{ribbon}\left(\vec{r},t\right)\right|\cdot\left|\vec{B}_o\right|\cdot\ell_{ribbon}$ {where $\ell_{ribbon}\left(m\right)$ is the length of the metal ribbon immersed in the *B*-field} is induced across the top/bottom of the corrugated metal ribbon diaphragm due to the differential over-pressure $\Delta\tilde{p}_{ribbon}\left(\vec{r},t\right)$ acting on it.