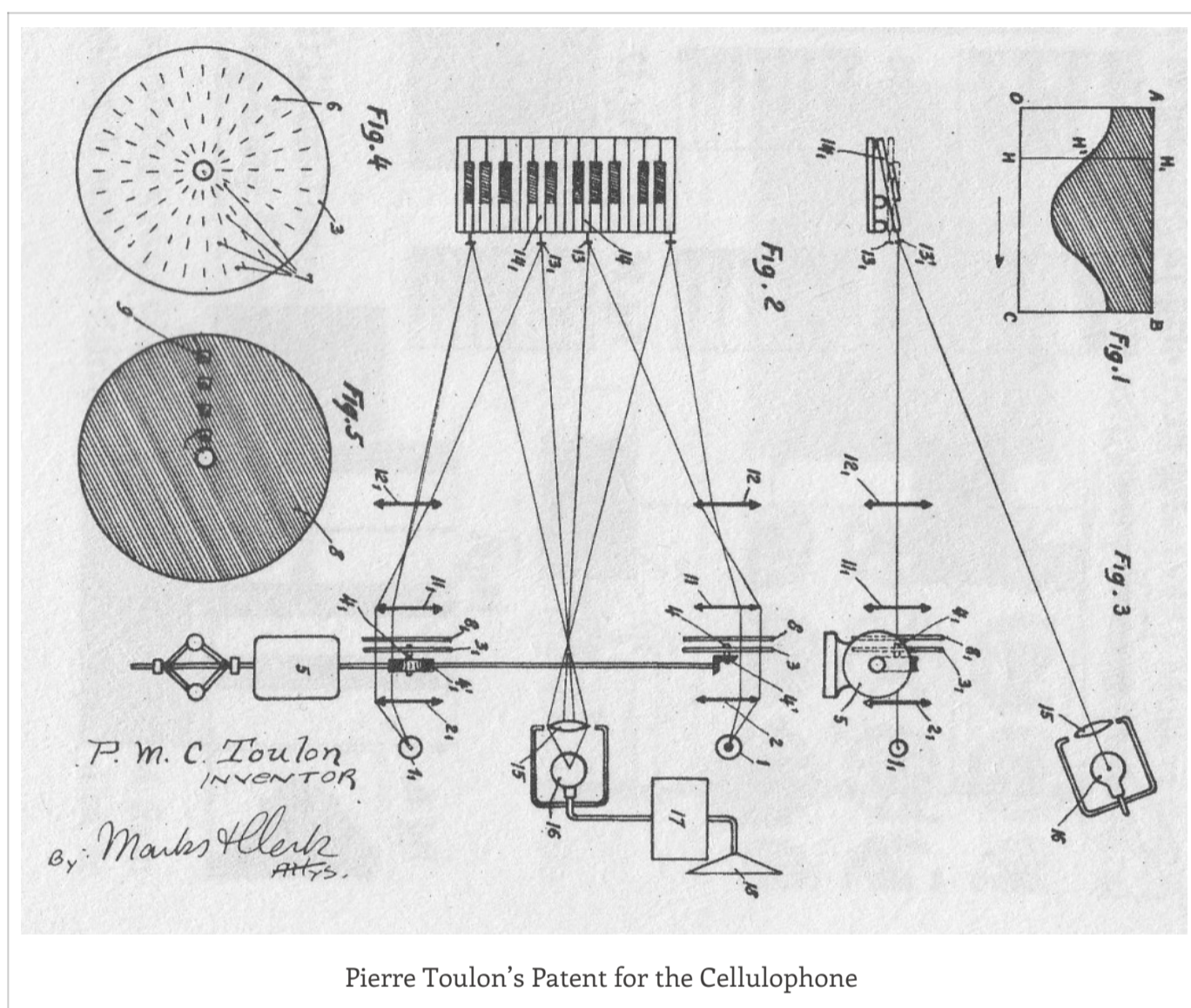


The 'Cellule Photo Electrique'. Pierre Toulon & Krugg Bass, France, 1927.



Invented by the French engineer Pierre Toulon aided by the electronic engineer Krugg Bass, the Cellulophone ("Cellule Photo-électrique") made its debut as a prototype in France in 1927. The Cellulophone was an electro-optical tone generator instrument resembling an electronic organ controlled by two eight octave keyboards and a foot pedal board.

The sound was created by passing a light beam through slits in a vari-speed rotating disk. The single spinning disk was cut with a number of equidistant slits (54 slits for the lowest note) with different shaped masks to create varied timbres. The disks masked a light beam that flashed through the slits and on to a photoelectric cell, the speed of the rotating disk therefore determining the frequency of the output signal from a single vacuum tube oscillator.

One disk was used for all the notes of each octave therefore notes whose frequencies could not be generated by an integral number were out of tune. This system however gave the unique and unusual possibility of having a different timbres for each octave. The Cellulophone was one of a generation of instruments in the 1920-30s using a photo-electric sound generation method; other examples being the "Licht-ton Orgel", the "Photona" and the "Radio Organ of a Trillion Tones". The increased sophistication and reliability of post war electronic circuitry marked the decline of light based synthesis after the 1940s except for a few pioneers such as Daphne Oram who used a similar system not only to synthesise sounds but to sequence sounds.

Pierre Toulon proposed in the 1930s a related technique of speech synthesis using fragments of optical film mounted on a rotating drum.

Sources