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COMPLETE SPECIFICATION.

**Improvements in and relating to Apparatus for use in the
Photographic Recording of Sound.**

I, EUGENE AUGUSTIN LAUSTE, of 12A, Melbourne Square, Brixton, London, S.W., Electrical Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 This invention relates to improvements in apparatus for use in the photographic recording of sound by the direction upon a uniformly moving sensitive surface of an obturated beam of light, the obturation of which is varied in accordance with the amplitude and character of the sound vibrations to be recorded so that a greater or less portion of the sensitive surface is illuminated.

10 For this purpose it is advantageous to direct, through a narrow slit transversely disposed to the direction of movement of the sensitive surface, a beam of light fringed at one side by a band of shadow, the line of demarcation being sharply defined, and to record the vibrations of sound in the form of variations of the light and shadow.

15 The invention has for its object to provide an extremely sensitive device by which a variation of the light and shadow corresponding accurately with the vibrations of the sound to be recorded may be effected.

It is known that if a wire is stretched, preferably with adjustable tension, in a magnetic field, for instance, between the poles of a magnet, and a varying
20 current is passed through it, the wire is deflected accordingly.

According to the invention a device of this character is used in which the wire is stretched between the poles of a magnet upon a two-part frame whose members are relatively adjustable in position for the regulation of the tension of the wire.

25 In use the wire is connected in circuit with a microphone or microphones adapted to be receptive to the sounds to be recorded. The wire is arranged in the path of the beam of light in such manner that its shadow may serve as the limiting edge to the beam of light, and be projected with the light upon the sensitized surface through a suitable lens or lenses and a narrow-slit.

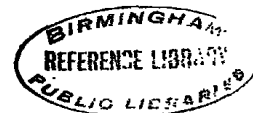
30 The device according to the invention is illustrated in the accompanying drawings.

Figure 1 is a plan view of the device, the pole pieces being shown in section.

Figure 2 is a section on the line A A of Figure 1.

35 According to the construction illustrated in the drawings there are secured to a suitable base plate 1 two sets of permanent magnets 2 having common pole pieces 3 whose adjacent faces are disposed close together. Between the two pole pieces, longitudinally of the two sets of magnets, there is stretched a wire 4 which can be vibrated in sympathy with the sound vibrations to be recorded. The wire is stretched under slight tension between the upwardly projecting
40 arms of two L shaped members 5 which are longitudinally disposed with reference to the magnets and carried in slide guides 6 secured to the underside

[Price 8d.]



Improvements in Apparatus for use in the Photographic Recording of Sound.

of the base plate 1. The adjacent ends of the said members are distorted laterally to permit them to lie side by side, and the adjacent side faces are formed with rack teeth for engagement with an operating pinion 7 by means of which they may be moved relatively in the longitudinal direction for the purpose of stretching the wire. By such a device the tension is maintained without the necessity of any independent means for locking the parts, but if desirable such means may be provided. 5

In order to permit the beam of light to be thrown upon the wire the pole pieces 3 are formed with suitable holes 8 across the coincident apertures of which the wire lies. 10

The wire is mounted upon the L shaped members 5 in such manner as to permit its adjustment in position across the said apertures. For this purpose its respective ends are received in metal sockets 9 provided upon slide blocks 10 of insulating material mounted in slots or channels 11 formed in the outwardly projecting arms of the L shaped members 5 and the adjustment is effected by means of adjusting screws 12 which are mounted in the said members 5 in plain bearings at the inner end and slot bearings at the outer end where they are formed with collars to prevent longitudinal movement and held by retaining plates 13 and they are adapted to engage threaded holes in the slide blocks 10. The wire 4 is held at the ends in the sockets 9. 15 20

The wire 4 may be of any desired cross-section, and of any diamagnetic material such as copper, aluminium, platinum or phosphor bronze. The means by which it is mounted may be varied but require to be such as to insulate it from the other parts of the device. Thus it may be mounted in insulating packing. Current may be lead through it by any suitable means. 25

In order to damp out unnecessary vibrations of the wire and render it dead beat dampers 15 of felt or the like are provided to bear lightly upon the wire, such dampers being carried by resilient supports and adjusted in position by adjusting screws. 30

In the use of the device a beam of light, passing through a condenser from a suitable source, is directed through the hole 8 of one of the pole pieces upon the wire 4 and passes out towards the sensitive surface through the hole of the other pole piece. The size of the shadow of the wire may be increased to the desired extent for effective use on the sensitive surface by means of a projecting microscope 16, from which the beam of light emerges in the direction of the arrow and falls upon a lens serving to direct it through a narrow slit in a screen on to the sensitive surface in a manner that is known. 35

The lens serves to make the image of light and shade thrown upon the sensitive surface as bright and fine as possible, and is advantageously cylindrical. 40

The wire is connected in circuit with a microphone or microphones serving to receive the sound vibrations, so that current passing through these instruments passes also through the wire and the consequent vibration of the wire causes its shadow to vibrate. 45

It is advantageous, in order to secure the best results, to use a longer beam of light and shade, which, however, necessitates that the apparatus should be extended correspondingly. The disadvantage may be overcome by providing a pair of plane mirrors, arranged parallel at a short distance apart, and directing the beam of light from the recording device upon one of the mirrors so that it is reflected on to the second mirror and back to the first, thus following a zig-zag path, the number of reflections depending upon the length of the mirrors and the angle at which the beam strikes the first mirror. The long beam of light thus occupies only a fraction of its length. The mirrors must be such that in each case there is reflection from the face only. 50

The device according to the invention is peculiarly adapted for use in the production of sound records upon strips of film, for use, for example, in conjunction with cinematographic apparatus, but it is generally applicable for the optical or photographic production of sound records. 55

Improvements in Apparatus for use in the Photographic Recording of Sound.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

- 5 1. A device for use in the photographic recording of sound by the projection upon a sensitive surface of a beam of light varied in cross-sectional area in accordance with the variations of the sound to be recorded, consisting of a wire arranged in a magnetic field and stretched upon a two-part frame whose members are relatively adjustable in position for the regulation of the tension of the wire, and connected in circuit with the microphone or other instrument receiving
10 the sound vibrations, and serving to transmit an electric current varying in accordance with the sound vibration, the shadow image of the wire serving to effect the recording of the sound vibration upon a moving sensitised surface.
2. A device, as set forth in Claim 1, wherein the wire is stretched in the plane of the magnets producing the magnetic field, substantially as described.
- 15 3. A device, as set forth in Claim 1 or 2, wherein damping devices are provided for the purpose and substantially as described.
4. A device, as set forth in Claim 1, in combination with an arrangement of parallel mirrors or reflecting surfaces, substantially as described.
5. A device constructed and operated in the manner substantially as described.

20 Dated this 22nd day of July, 1913.

EDWARD EVANS & Co.,
27, Chancery Lane, London, W.C.;
Agents for the Applicant.

[This Drawing is a reproduction of the Original on a reduced scale]

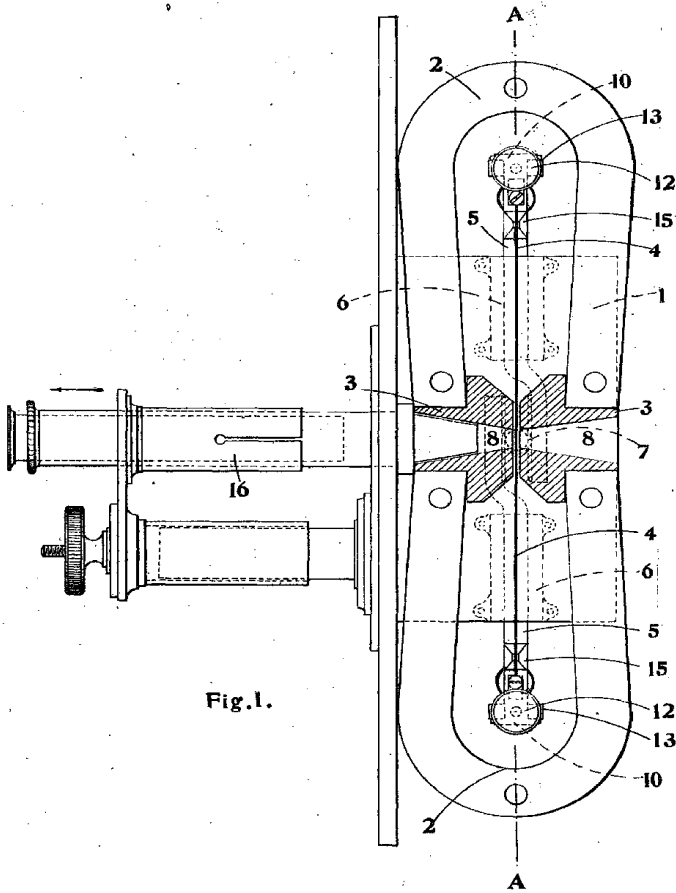


Fig. 1.

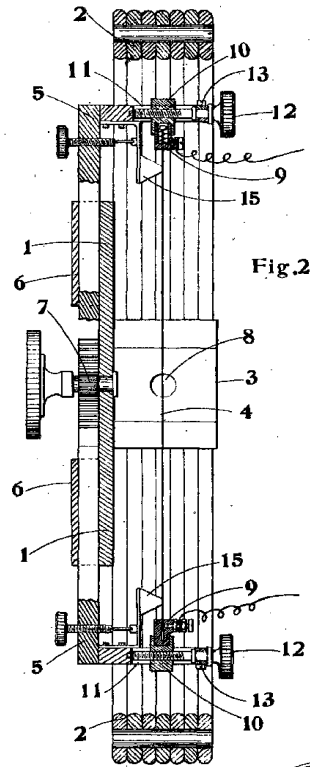


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]

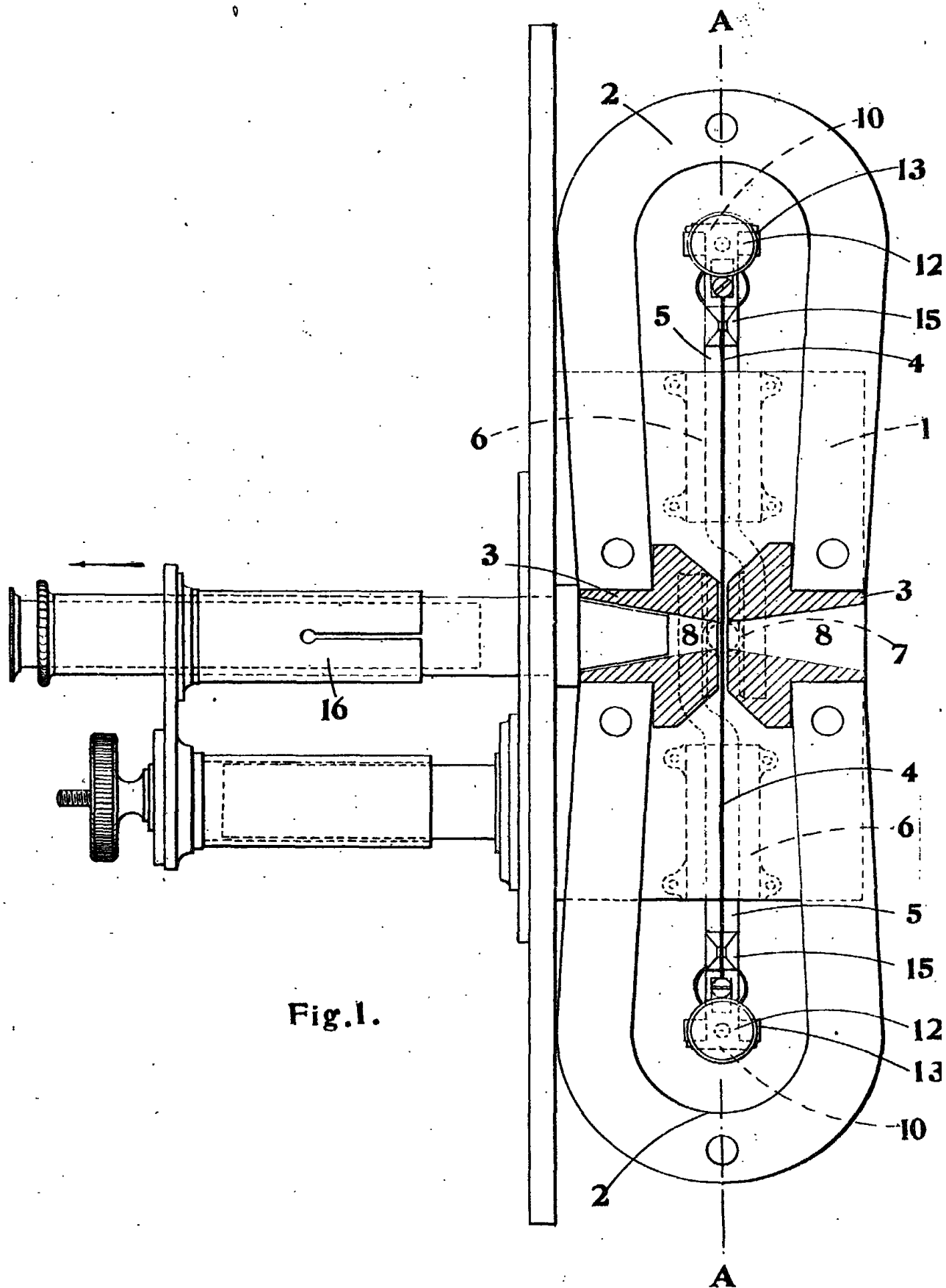


Fig. 1.

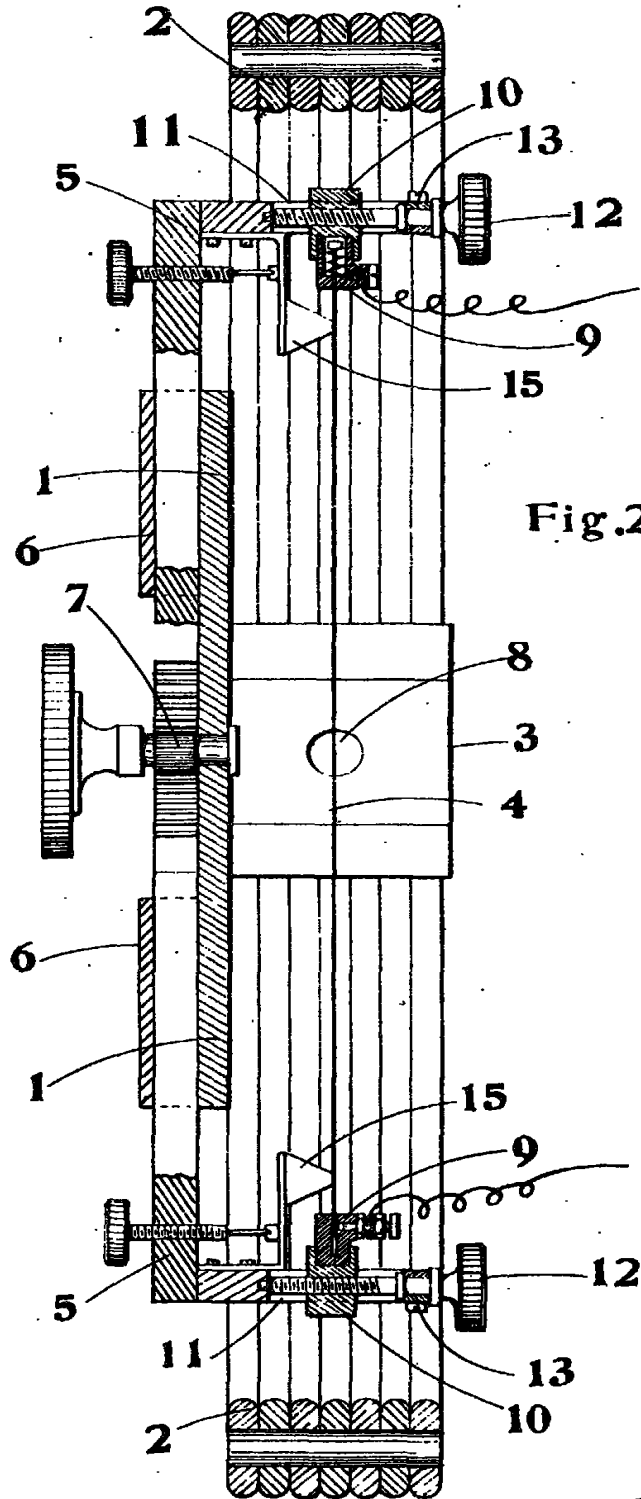


Fig. 2.

