April 22, 1941. S. LÓRÁND 2,239,330

RECORDING DEVICE

Filed Feb. 11, 1938 2 Sheets-Sheet 1

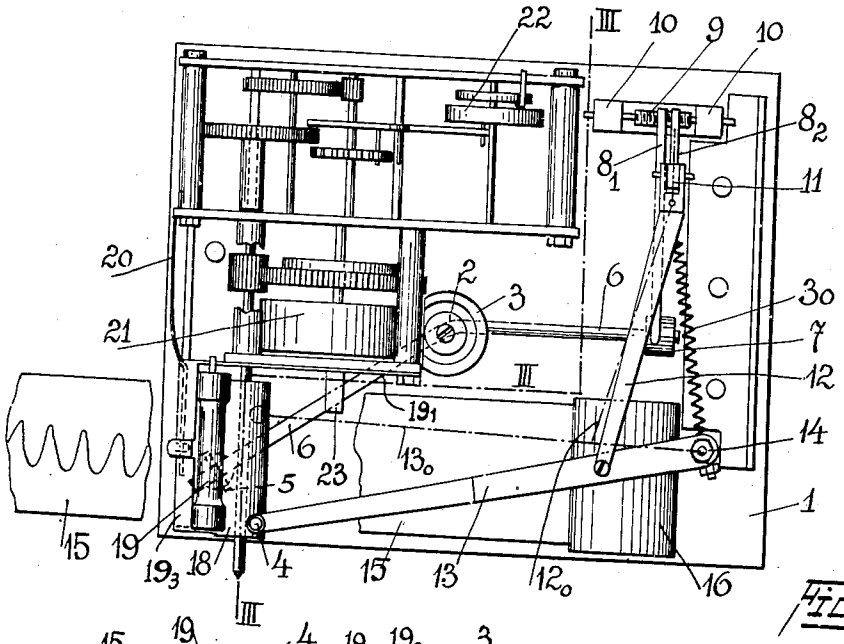


Fig. 1

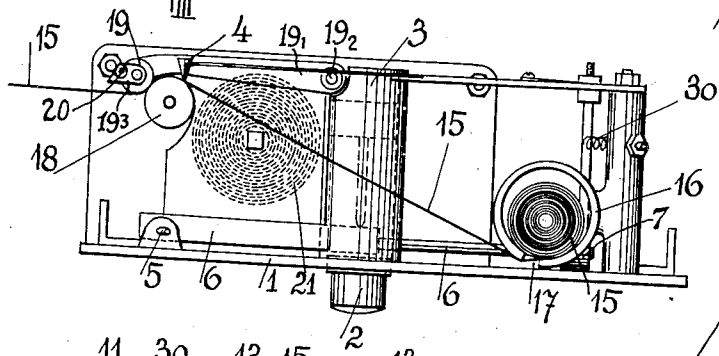


Fig. 2

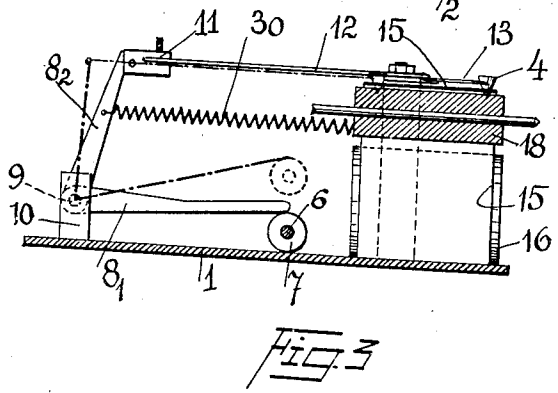


Fig. 3

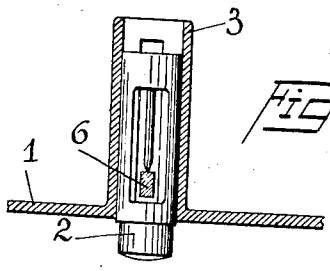


Fig. 4

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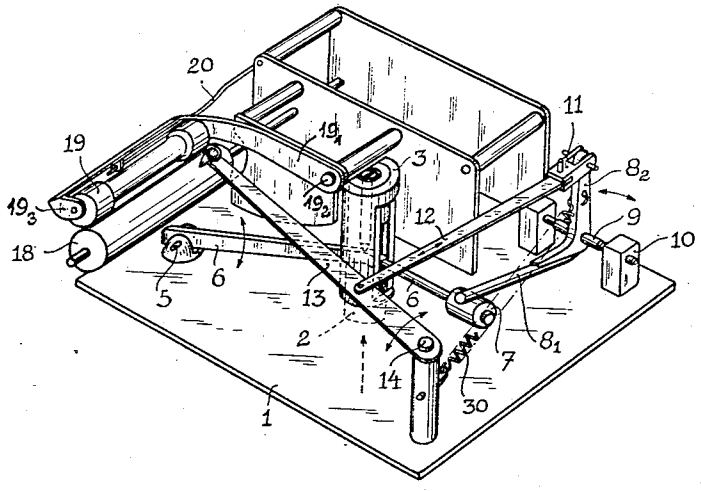


Fig. 5.

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UNITED STATES PATENT OFFICE

2,239,330

RECORDING DEVICE

Sándor Lóránd, Budapest, Hungary

Application February 11, 1938, Serial No. 189,983

3 Claims. (Cl. 128—2)

My invention relates to recording devices and more especially to means for automatically recording the development of birth throes.

It is an object of my invention to provide a device enabling the periodical contractions of the uterus musculature to be automatically recorded on a paper strip moved at constant speed. This recording is effected automatically inasmuch as the stylus is actuated by the muscles of the uterus of the patient. As every physician knows, the periodically occurring contraction of these muscles forms a reliable measure of the labour pains.

This labour pains indicator enables a complete analysis to be made of the activity of the uterus and of the abdomen press and characteristic types of pains to be ascertained. The device further offers the advantages of rendering possible from the beginning, in consequence of the timely recognition of pathological types of throes, an individualistic and rational treatment of pathologic births, the individualistic application of labour pains remedies and the study of their action on the human uterus. It also furnishes the means of defining measurable units for the labour activity of the uterus and the abdomen press and of expressing the observations of the physician in definite figures. The device thus to a certain extent replaces special obstetrical knowledge and experience.

To this end I combine a rigid plate, which may be the foundation plate carrying the recording mechanism, and a piston extending through a hole in this plate and guided for reciprocation therein with a stylus, means for transmitting the reciprocatory movements of this stylus and an endless strip of paper or the like which is conveyed past and in contact with the stylus by a clockwork or other suitable transporting mechanism. The plate is placed on the abdominal wall and is raised and lowered in accordance with the natural functions of breathing and heart palpitation. The piston projecting from the plate makes an impression in the abdominal wall and is influenced by the uterine contractions and expansions in such manner that it is reciprocated relative to the plate in which it is guided. These relative movements of the piston are recorded by the stylus on the paper strip and I thus obtain a record, on which the oscillations of the stylus brought about by the reciprocation of the piston are plotted as the ordinate with respect to the time line forming the abscissa, while the movements of the abdominal wall do not appear on the record.

In the drawings affixed to this specification and forming part thereof a device embodying my invention is illustrated diagrammatically by way of example.

In the drawings,

Fig. 1 is a plan view,

Fig. 2 an end elevation,

Fig. 3 a cross section on the line III—III in Fig. 1,

Fig. 4 an axial cross section of the sleeve guiding the piston, which latter is shown in elevation, and

Fig. 5 is a perspective view showing the main parts of the device.

Referring to the drawings, 1 is a foundation plate supporting the parts constituting the recording device, this plate being designed to be placed on the abdomen of the patient, 2 is the piston serving to transmit the periodical contractions of the uterus onto the stylus, this piston projecting downwardly through a perforation of the foundation plate. The piston is guided for reciprocation in a sleeve 3. The position of the piston shown in the drawings is the position of rest, to which the piston always returns through positive action.

4 is the stylus which, in the embodiment illustrated in the drawings, is arranged for movement in a plane parallel to the foundation plate. 6 is a one-armed lever, one end of which is pivotally mounted at 5, this lever extending through a slot in the piston (Figs. 2 and 4) and having a short cylindrical piece 7 mounted on its free end (Fig. 1). On the cylinder 7 rests the free arm of a two-armed lever 8_1, 8_2 which is fixed to the other arm of lever 8_1, 8_2, the two levers being mounted for rocking movement on an axle 9 supported in blocks 10. The top end of lever 8_2 is linked at 11 to a link 12, the other end of which is pivoted to the one-armed lever 13 carrying the stylus 4 and which is mounted for rotation about the point 14.

Fig. 1 illustrates the position of the link 12 and one-armed lever 13, corresponding to the position of rest of the piston, while the position of these parts, which corresponds to a full stroke of the piston, is shown in dotted lines at 12_0 and 13_0, respectively.

30 is a spring tending to hold or return the arms into the position of rest.

15 is a strip of preferably graduated paper, which is stored in the form of a reel in a barrel 16 formed with a slot 17 through which the strip projects. 18 and 19 are a pair of rollers serving for the movement of the paper strip,

roller 18 forming the platen for the stylus 4 and being driven by the clockwork 22, while roller 19, being pressed against roller 18 by a leaf spring 20, serves for producing the necessary friction. 21 is the clock-spring, 23 is the spring axle serving to wind up the clock.

The paper strip carrying an abscissa line is uniformly moved by the clockwork past the stylus 4. The horizontal oscillations of the stylus corresponding to the vertical strokes of the piston 2 thus appear on the strip as ordinates.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

I claim:

1. In a device for automatically recording the periodical contractions of the uterus preceding delivery in combination, a perforated base plate adapted to support the device on the abdomen of the patient, a piston movable in opposite directions perpendicular to the plate and projecting through and below said plate, means for guiding said piston, a one-arm lever normally disposed in substantially parallel relation to said plate and movable by said piston, said piston engaging said lever at a point between the pivoted and free ends thereof, a two-armed lever arranged in a plane perpendicular to said plate, one arm of the two-armed lever co-acting with the free end of the one-armed lever, a second one-armed lever, a link connection between the other arm of the two-armed lever and the second mentioned one-armed lever at a point between the pivotal axis and free end of the second one-armed lever, the second mentioned one-armed lever being arranged above the first mentioned one armed lever and being adapted to carry a stylus.

2. A device as claimed in claim 1, characterized by the provision of a spring coacting with the several levers to restore the latter to the position of rest.

3. In a device for automatically recording the periodical contractions of the uterus preceding delivery in combination, a perforated base plate adapted to support the device on the abdomen of the patient, a piston movable in opposite directions perpendicular to the plate and projecting through and below said plate, means for guiding said piston, a one arm lever normally disposed in substantially parallel relation to said plate and movable by said piston, said piston engaging said lever at a point between the pivoted and free ends thereof, a two armed lever arranged in a plane perpendicular to said plate, one arm of the two-armed lever coacting with the free end of the one armed lever, a second one-armed lever, a link connection between the other arm of the two-armed lever and the second mentioned one-armed lever at a point between the pivotal axis and free end of the second one-armed lever, the second mentioned one-armed lever being arranged above the first mentioned one-armed lever and being adapted to carry a stylus, a recording strip, a pair of rollers for moving said strip with relation to said stylus and a clockwork for effecting uniform rotation of one of the rollers.

SÁNDOR LÓRÁND.