

(No Model.)

J. WILLS.  
ELECTRIC RECORDING GAGE.

No. 409,891.

Patented Aug. 27, 1889.

Fig. 1.

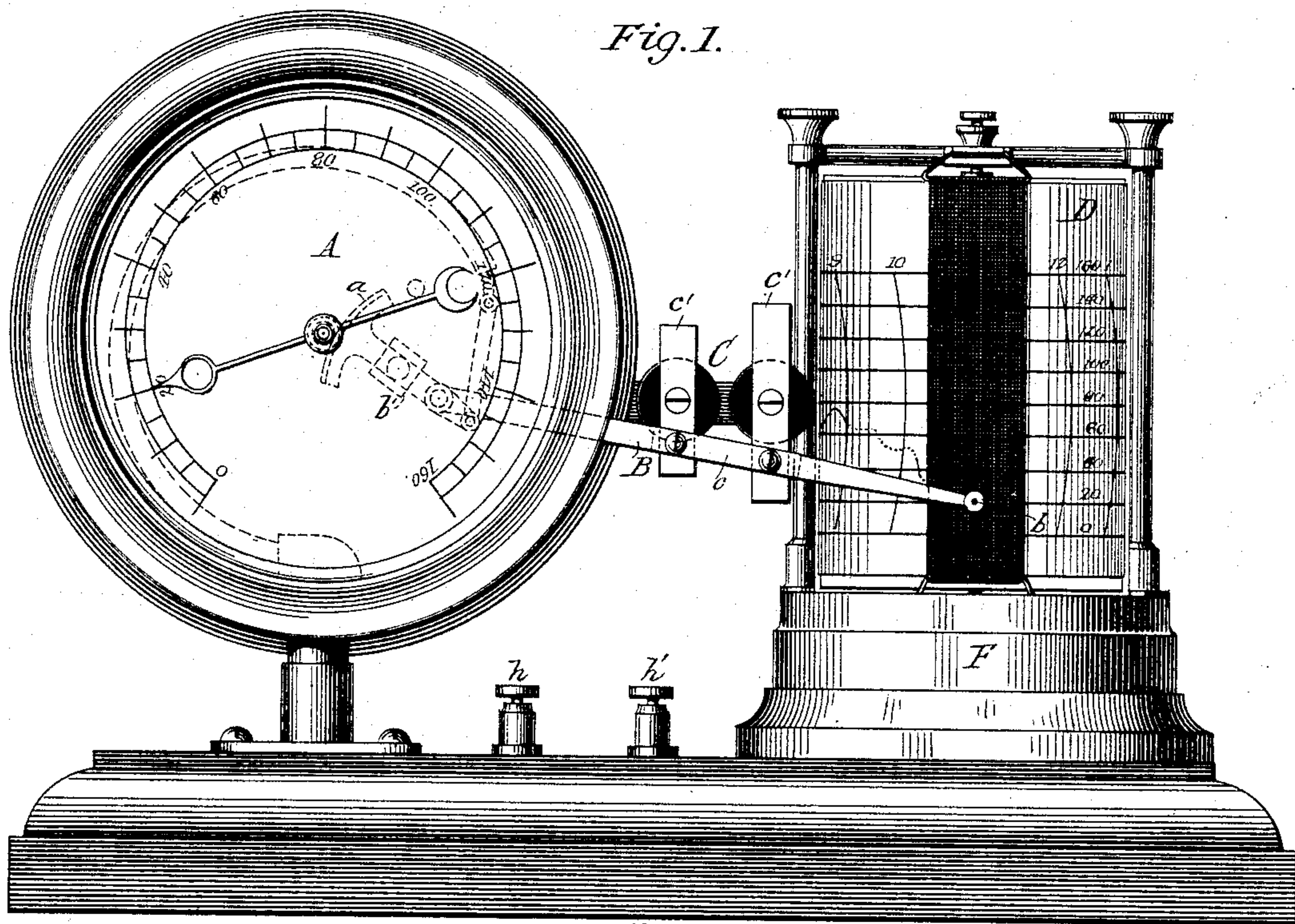
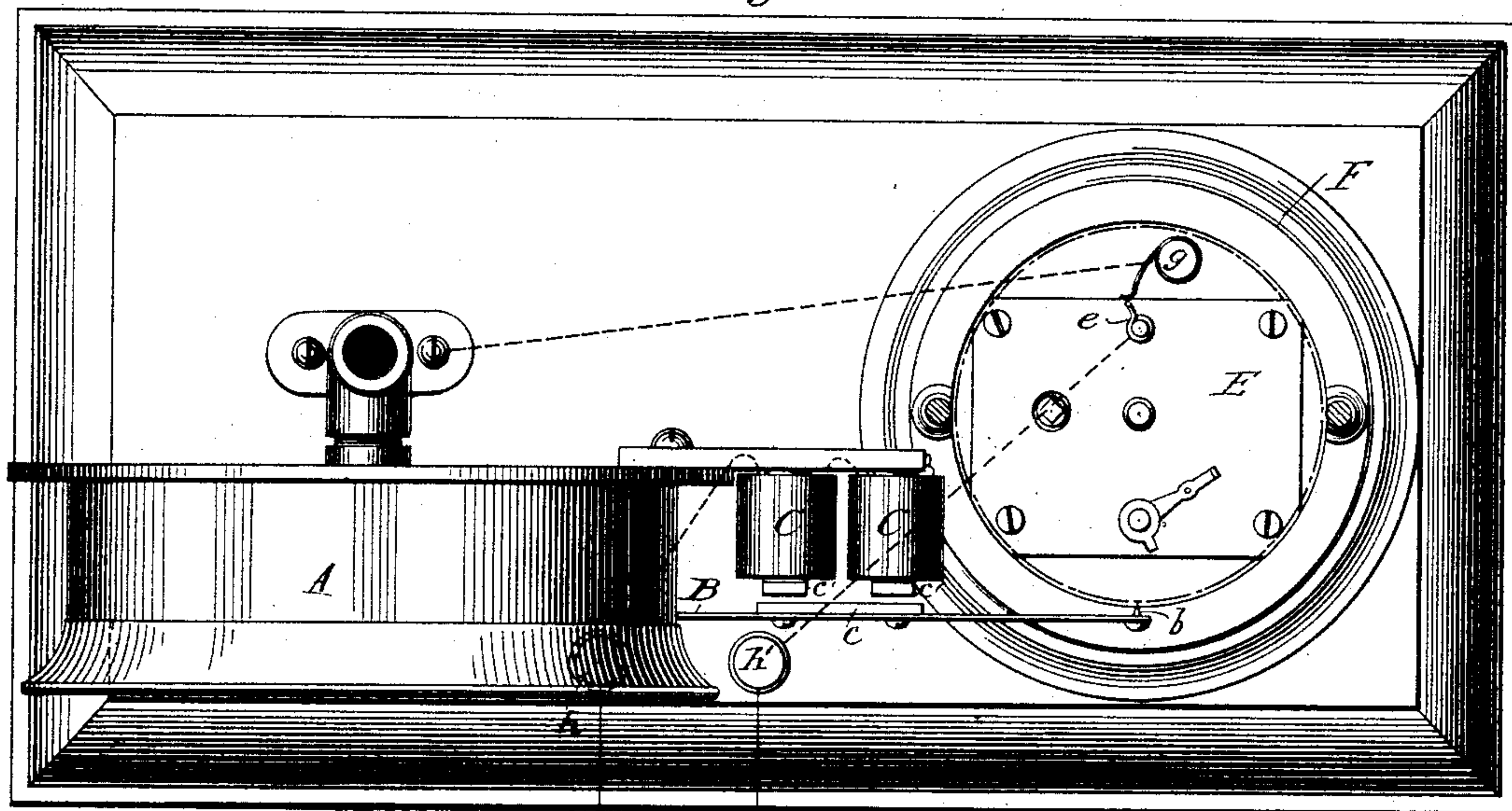


Fig. 2.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

JOSEPH WILLS, OF NASHVILLE, TENNESSEE.

## ELECTRIC RECORDING-GAGE.

SPECIFICATION forming part of Letters Patent No. 409,891, dated August 27, 1889.

Application filed August 15, 1888. Serial No. 282,815. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH WILLS, a citizen of the United States, residing in Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Electric Recording-Gages, of which the following is a specification.

My invention relates to the recording of the fluctuations of the pressure of a fluid by means of electricity. In all devices for this purpose heretofore known to me the apparatus has been complicated, and very often of such delicate nature as not to be valuable for practical purposes.

It is, therefore, the object of my invention to provide a practical apparatus, or one which has not the disadvantages above mentioned.

To this end the invention consists in the combination, with a pressure-gage or the movable element thereof, of a striker or stylus for imprinting upon a movable chart and an electro-magnet which actuates said striker, whose circuit is completed at regular intervals of time, the construction of the magnet being such that the striker in all of its possible positions will be under its influence.

In the accompanying drawings, Figure 1 represents a front elevation of the apparatus, showing the circuit; and Fig. 2, a plan of the device.

A represents a steam-gage. The moving element *a* of the gage has attached to it, either directly or through gearing, an arm B, which extends radially outward through a slot in the frame of the gage. The weight of this arm B is counterbalanced, so as not to affect the operation of the gage, by an adjustable weight *b'*. The arm is of some considerable length, and is provided at its outer end with a point or style *b*. Connected with this arm is the armature *c* of the magnet C. This magnet is supported on a bracket fixed to the frame of the gage. The cores of the magnet are extended to form poles *c' c'* in both directions laterally, for a purpose that will be hereinafter explained.

The arm B may be formed into a spring, so that its normal position will be away from the poles of the magnet, or else the arm may be inflexible and the pull of the magnet opposed by a spring suitably placed.

D represents a rotating drum, upon the outside of which may be secured, by rubber bands or in any other manner desired, a strip of paper having printed thereon the lines and numbers of a chart or scale. This drum is mounted on a shaft geared to one of the shafts of a clock-work E, placed in the housing F, and is rotated regularly by said clock-work. I have extended across the face of the drum, in the path of the stylus, a strip of inked material for the purpose of recording upon the chart the place struck by the stylus or striker. There is also connected with one of the shafts of the clock-work an insulated contact-brush *e*, as shown in Fig. 2, which makes about four rotations a minute. This brush, however, may be placed on any shaft, so that it may be rotated at any speed desired. There is mounted adjacent to the clock-work, upon a post *g*, another contact or circuit-terminal, which extends into the path of the said brush and makes connection with the brush once every rotation.

The electric circuits are as follows: from battery G to binding-post *h*, to magnet, to the metallic frame of the gage, to post *g* and its terminal, thence across to the brush *e*, to binding-post *h'*, and to battery. It will thus be seen that the magnet-circuit is completed at regular intervals.

The operation of the device is as follows: The pressure of fluid in the gage swings the arm vertically in front of the magnet in exact proportion to the pressure. The magnet-circuit being closed, say, every fifteen seconds, the armature connected with the arm will be attracted in whatever position it happens to be, and will print a dot upon the chart carried by the revolving drum at every closure of the circuit. The movement of the drum represents time and the movement of the arm pressure. The resultant upon the chart will be an irregular dotted line, as shown.

The object of the extended pole-pieces *c'* of the magnet is now easily understood, to wit: The arm will always be under the influence of the magnet, no matter what the pressure is, or, rather, what position the arm takes within its range of movement.

I do not confine myself to the particular location of the parts with respect to each



other, as it is obvious the magnet might be supported upon a separate standard, and that the arm carrying the style might be elongated or set a considerable distance from the gage, 5 but connected therewith by any suitable gearing.

It is obvious that the herein-described invention may be used in an indicating-instrument, whether said instrument be used for 10 measuring the pressure or tension of steam, air, gas, electricity, or the movements of a thermometer or similar device. The main idea is, therefore, the combination, with the movable element of a meter or gage of any 15 description, of the devices herein described.

Having described my invention, I claim—

1. The combination, with a fluid-pressure gage, of an arm adapted to move in accordance with the variations of the fluid-pressure, 20 and an electro-magnet located adjacent to said arm and provided with pole-pieces extended across the field of movement of said arm, the armature of the said magnet being connected with the moving arm, as set forth.

25 2. A fluid-pressure gage and a chart, in combination with an arm carrying a stylus and moving in accordance with the variations

of the fluid-pressure, and an electro-magnet located adjacent to said arm and provided with pole-pieces extended across the field of movement of said arm, the armature of the said 30 magnet being connected with the moving arm, as set forth.

3. A fluid - pressure gage, a moving chart, and a clock-work for imparting to said chart 35 a regular movement, a circuit-closer operated at regular intervals by said clock-work, all in combination with an arm geared to the moving element of said gage and adapted to move in front of said chart, a stylus connected with 40 said arm, and an electro-magnet whose circuit is controlled by said circuit-closer and whose pole-pieces are extended across the field of movement of said arm, the armature of the 45 said magnet being connected with the moving arm, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOSEPH WILLS.

Witnesses:

W. D. FOX,  
LEE BRIGGS.