Dec. 12, 1939. R. WRIGHT 2,182,859

APPARATUS FOR ORIENTING MATERIALS

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Fig. 1.

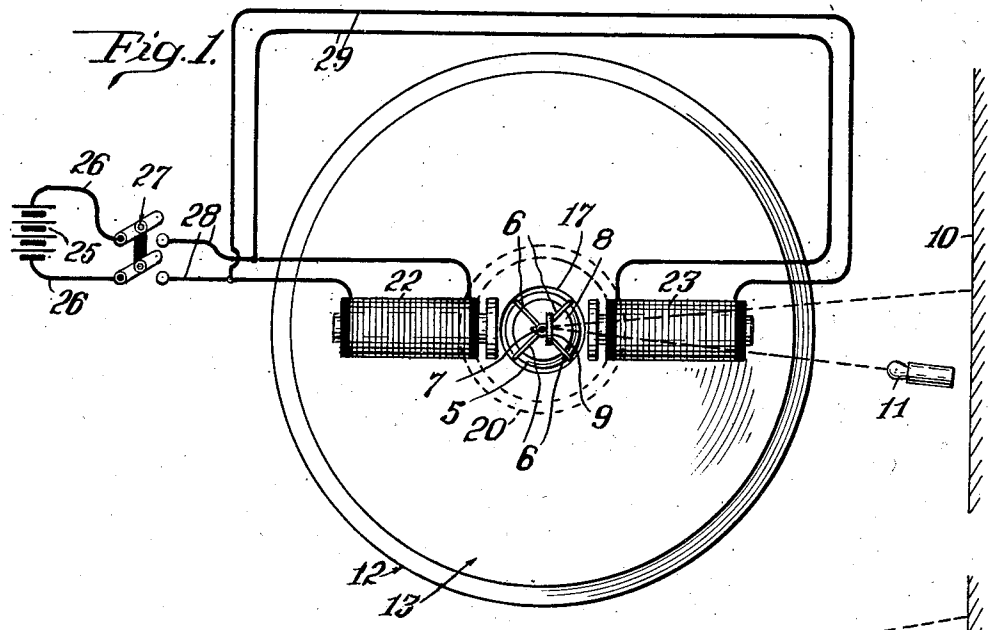
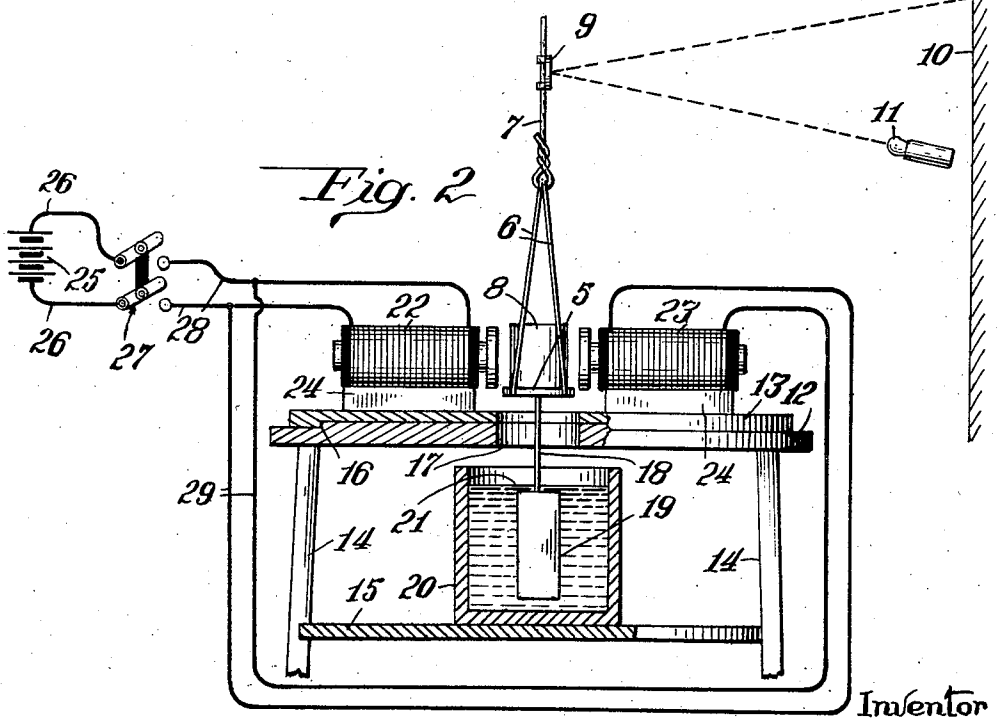


Fig. 2.



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APPARATUS FOR ORIENTING MATERIALS

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2 Claims. (Cl. 175—182)

My invention relates more especially to apparatus for orienting substrata cores or other material with respect to their original positions in the earth's magnetic field, as for example core samples obtained in the course of drilling; the apparatus enabling the magnetic polarity of the removed cores to be utilized to orient the core with reference to direction; the apparatus being especially adapted for use in oil or mineral drilling and causes the sample or core to orient itself, with respect to its original position in the earth's magnetic field, under the influence of an electro-magnetic field.

My improved apparatus, more specifically stated, consists in suspending the core or material in such manner as to be as free as possible in order to permit it to turn under the influence of electro-magnetic means, in conjunction with other means whereby the movement of the core or material will be indicated by a corresponding movement or change in the angle of reflection of a beam of light.

The present application is a continuation in part of my pending application Serial Number 139,902; this application relating to the subject matter covered by certain claims deleted from said application.

The invention, its objects and advantages will all be comprehended from the detailed description of the accompanying drawing, wherein:

Figure 1 is a plan view of my improved apparatus, illustrated in a more or less schematic nature.

Figure 2 illustrates the apparatus in elevation and partly in section.

In the particular exemplification of my invention, a suitable platform 5, preferably of disc-like form, is suspended from the ceiling of a room or other suitable overhead structure, by means of the cords 6, which meet or connect with a single flexible member 7—such as number 00 piano wire, whose upper end is properly secured to the ceiling or overhead structure. The cords 6 diverge and are secured to or adjacent the perimeter of the platform 5, which is preferably of wood, cardboard, or some other non-magnetic material and is adapted to hold the core or other material 8.

It is essential, of course, that this suspension mechanism be as light in weight as possible and that the elements constituting the mechanism be of non-magnetic material, at least so far as the core or material holding portion is concerned; and the cord or member 7 should be of material offering minimum resistance to torsion in order that the platform with the core or material 8 may readily respond to the magnetic influence of electro-magnetic means hereinafter described.

The single member or wire 7, at a suitable point, is provided with a reflecting element or mirror 9 arranged parallel with the wire 7 and also with a side wall indicated at 10, and is adapted to reflect onto the side wall a beam of light projected onto the mirror 9 from some suitable light source which is generally indicated at 11. It will be understood that the mirror is attached to the wire 7 so as to turn therewith as well as with the suspended platform 5 and the core supported thereon, with the result that the position of the reflection on the wall or other vertically disposed surface 10 will correspondingly vary; the changes in position of the reflection, due to the effect of the magnetic field—to be described—being the method of ascertaining the direction of residual magnetism in the material or core.

The material or core, indicated at 8, should be placed on the platform 5 with its original top and bottom disposed upwardly and downwardly, respectively.

A suitable table preferably consisting of two superposed discs 12 and 13, of wood or other non-magnetic material and supported by suitable standards 14, is provided, which also support a lower platform 15. The upper top member or disc 13 is rotatably mounted on the member or disc 12, as for example by means of the annular shoulder on the lower disc 12 which fits into an annular depression on the lower face of the top disc 13, as shown at 16 in Figure 2. This permits the top disc 13 to be rotated concentrically on the lower disc 12; and the centers of the two discs are provided with an opening at 17 for the passage of an inflexible rod 18 which is connected to the bottom of platform 5; while the lower end of rod 18 is provided with a vane 19 made of comparatively light material, as for example Celluloid.

Mounted on the lower platform 15 is a vessel or jar 20 provided with a liquid 21, in which the vane 19 is immersed. The viscosity of the liquid damps the oscillatory movement of the material being tested—namely, the platform 5 with the core 8, through the medium of the vane 19 and rod 18.

It will be understood that the lower disc 12 is stationarily mounted and this disc is shown slightly larger than the upper disc 13; and if desired the exposed peripheral portion of the lower disc 12 may be provided with graduations

or degrees, while the upper disc may have a suitable indicating mark or notch adapted, in conjunction with the graduations on the lower disc, to indicate the degree of rotational movement of disc 13.

The upper disc 13 is shown with two electro-magnets 22, 23, mounted thereon with their pole faces in close proximity to the suspended core sample or material 8; the magnets being disposed on opposite sides of the core in line with each other and the electro-magnets are so arranged and electrically connected that the north pole of the one magnet is facing the south pole of the other with the platform therebetween.

The pole faces of the electro-magnets are of a diameter comparable to the size of the core or piece of material under investigation; the largeness of the pole faces allowing the magnetic lines of forces affecting the material to be relatively straight from pole to pole, with the flaring lines of force thus being comparatively far away from the piece of material.

The electro-magnets preferably rest on wooden blocks or supports 24, 24 and are of such electrical and magnetic constants as to be capable, when energized, of exerting sufficient electro-magnetism to turn a properly placed and polarized sample or core.

The electro-motive force for energizing the magnets may be provided by a battery 25, having suitable leads 26, 26 connected with a suitable switch as at 27, which may be made to reverse the direction of the current if so desired; and the voltage may be varied, if necessary, by using one, two or three cells of the storage battery 25.

The points of switch 27 are shown provided with leads or wires 28 connected with electro-magnet 22, and leads 28 are shown tapped by leads 29 which connect with electro-magnet 23; the connections with the magnets being such that the north pole of one magnet faces the south pole of the other magnet. Consequently the south and the north poles in the material are respectively attracted by the north and the south poles of the magnets; and in moving to satisfy this force, the mirror 9 is likewise turned and the position of the light beam on the wall 10 is consequently altered.

In operation, the core or material is properly placed on the platform 5 as heretofore mentioned and the platform brought to rest or substantially so which is assisted by the vane 19 in the liquid 21. The light is then turned on so the beam of light strikes the mirror or reflector 9 and the position of the reflection of this light on the wall or vertical surface 10 noted. Current is then turned into the electro-magnets 22, 23 and if there is a change in the position of the reflection, this is noted.

The electro-magnets are then deenergized and the positions of the magnets relative to the core or material 8 changed by rotating the upper disc 13; the rotation being merely through a portion or arc of a circle. The current is again turned on and the new position of the reflection on the wall is noted; the core being turned by the attraction and repulsion of its poles by the opposite and like poles, respectively, of the electro-magnets.

The exemplification is a simple embodiment of the invention but certain modifications may be possible without, however, departing from the spirit of my invention.

What I claim is:

1. Apparatus of the character described comprising a material holding non-magnetic platform suspended from above by a vertically disposed torsion non-resisting flexible element so as to be free to oscillate horizontally; a rigidly held vane depending from the bottom of the platform; a reflector vertically secured to said element to rotate therewith; a light-beam providing source fixedly arranged to direct the light-beam on said reflector; a vertically disposed reflection receiving member; a table provided with a rotatable top having a central opening for passage of said vane therethrough, said top being arranged beneath the material-holding platform; magnetic means arranged on said rotatable table top substantially in the horizontal plane of the material on said platform and in predetermined spaced relation with and on opposite sides of the material holding member; and controllable means whereby said magnetic means may be energized and deenergized.

2. Apparatus of the character described comprising a material holding non-magnetic platform suspended by a torsion non-resisting flexible element so as to be free to rotate horizontally; a vane rigidly secured to the bottom of said platform and depending therebeneath; a supporting table arranged beneath said material holding platform and provided with a rotatable top having a central opening concentric with the vertical axis of said vane and through which said vane extends; a fluid holding vessel stationarily mounted on the table beneath said opening and adapted to receive said vane and thereby damp the oscillatory movement of said holding member; a reflector operatively connected with said holding member so as to rotate therewith; a fixedly held light-beam providing member arranged to direct the light-beam on said reflector; electro-magnetic means mounted on said rotatable table-top on opposite sides of said central opening and in predetermined spaced relation with said material holding member; and a controllable source of current for said electro-magnetic means.

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