Feb. 22, 1944. H. TREVASKIS 2,342,561

APPARATUS FOR AIDING IN THE LOCATION OF UNSEEN BODIES

Filed Feb. 3, 1943

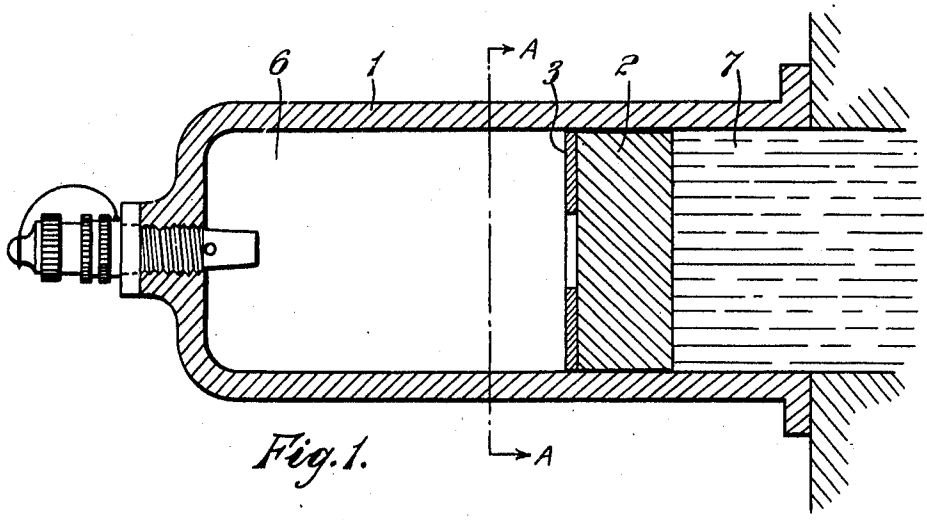


Fig. 1.

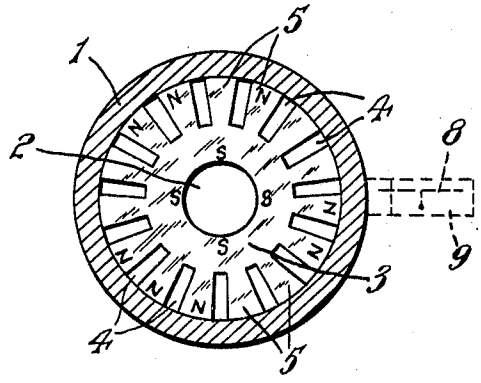


Fig. 2.

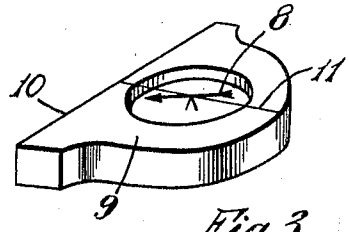


Fig. 3.

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Patented Feb. 22, 1944 2,342,561

UNITED STATES PATENT OFFICE

2,342,561

APPARATUS FOR AIDING IN THE LOCATION OF UNSEEN BODIES

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Application February 3, 1943, Serial No. 474,625
In Great Britain January 29, 1942

6 Claims. (Cl. 73—151)

My invention relates to simple and novel means for determining the position of one part of a structure movable relative to another part concealing such movement. Such means may be readily employed, for example, to determine the position of a bulk-head, piston, or like inner part within a closed cylinder, chamber or like outer part.

According to this invention a structure of non-magnetic material comprising an inner part reciprocable within an outer part, is provided with a ferrous portion on the inner part sufficiently magnetic to be detected outside said outer part.

In order that the invention may be more easily understood and readily carried into effect the same will now be described with reference to the accompanying drawing in which

Fig. 1 is a diagrammatic sectional view of a structure having an inner part provided with a magnetic portion in accordance with the invention.

Fig. 2 is a sectional view of the structure on the line A—A of Fig. 1.

Fig. 3 is a perspective view of a magnetic needle and housing adapted for use with the structure shown in Figs. 1 and 2.

As shown in the drawing a structure comprises an outer part 1 of non-magnetic material such as duralumin which encloses an inner part 2 of similar material provided with a ferrous portion 3.

In the preferred construction shown in the drawing the ferrous portion 3 consists of a thin steel disc which is magnetised so as to have a north seeking polarity around its outer edge and an opposite polarity around its centre.

The outer edge of the disc is recessed with a series of slots 4 which extend inwardly in a radial direction from the outer edge of the disc to constitute a plurality of air gaps separating a series of adjacent pole portions 5 of similar polarity, these poles providing a magnetic field which extends outside the wall of the structure.

The magnetic disc or ring may be fitted in a recess in the inner part 2 the edge of which recess may be spun over to secure the disc, or it may be positioned by screws or in any other convenient manner.

An annular ring the inner and outer surfaces of which are oppositely magnetised may also be employed, or one or more bar or horseshoe magnets which may be radially disposed to the wall of the structure.

As an alternative to the disc or other forms of magnets described above, the ferrous portion may consist of a thin disc of soft iron or of one or more soft iron plates in which magnetism is induced by the immediate proximity of a compass or like magnetised needle outside the wall of the structure.

In the particular application of the invention illustrated the inner part 2 constitutes a bulk-head in the form of a piston without a piston rod hereinafter referred to as a free piston, which free piston constitutes a displaceable barrier separating a column of compressed air contained within the outer end 6 of the structure from a reservoir of oil or other incompressible fluid contained in a chamber 7 at the opposite end of the structure.

In this particular example it is necessary in practise to ensure that the column of compressed air in the cylinder is sufficient to return the free piston after its forward stroke under the pressure of the oil or other incompressible fluid. The present invention provides a simple method for checking the position of the free piston by moving a small magnetic compass 8 along the exterior surface of the cylinder. Immediately the centre of the compass comes into line with the magnetic disc or ferrous portion carried by the free piston, the compass needle will swing round and point directly to the edge of such disc or portion.

To enable the position of the piston to be determined as accurately as possible, the compass is housed in a casing 9 having a flat bearing surface 10 adapted to slide on the wall of the cylinder as shown by dotted lines in Fig. 2, the casing having a glass cover which is engraved or marked with a fine hair line 11 passing through the centre of the compass and at right angles to the flat bearing surface.

The operator can thereby quickly and accurately ascertain the position of the free piston in relation to the cylinder, the position being indicated by the coincidence of the needle with the hair line on the casing, and, if necessary the operator can drain the oil from the cylinder and top-up the air pressure to bring the piston to the desired position within the cylinder.

Having described my invention what I claim is:

1. A cylinder of opaque non-magnetic material, an element movable longitudinally in said cylinder and a disk of magnetic material movable in fixed position relative to said movable element with its plane at right angles to the axis of said cylinder and with its outer edge moving in close contact with the inner surface of said cylinder.

2. A cylinder of opaque non-magnetic material, a piston movable longitudinally in said cylinder and a disk of magnetic material mounted on said

piston with its plane transverse to the axis of the piston and of the cylinder.

3. The apparatus of claim 2 in which said disk is magnetized radially.

4. A cylinder of opaque non-magnetic material, a piston movable longitudinally in said cylinder and an annular flat disk of magnetic material mounted on said piston with its plane transverse to the axis of the piston and cylinder, said disk being magnetized radially.

5. The apparatus of claim 4 in which said disk has slits extending radially inwardly from its periphery at spaced angular positions.

6. The apparatus of claim 2 in which the diameter of the disk is approximately equal to the inner diameter of the cylinder to bring the edge of the disk in close contact with said inner surface of the cylinder.

HENRY TREVASKIS.