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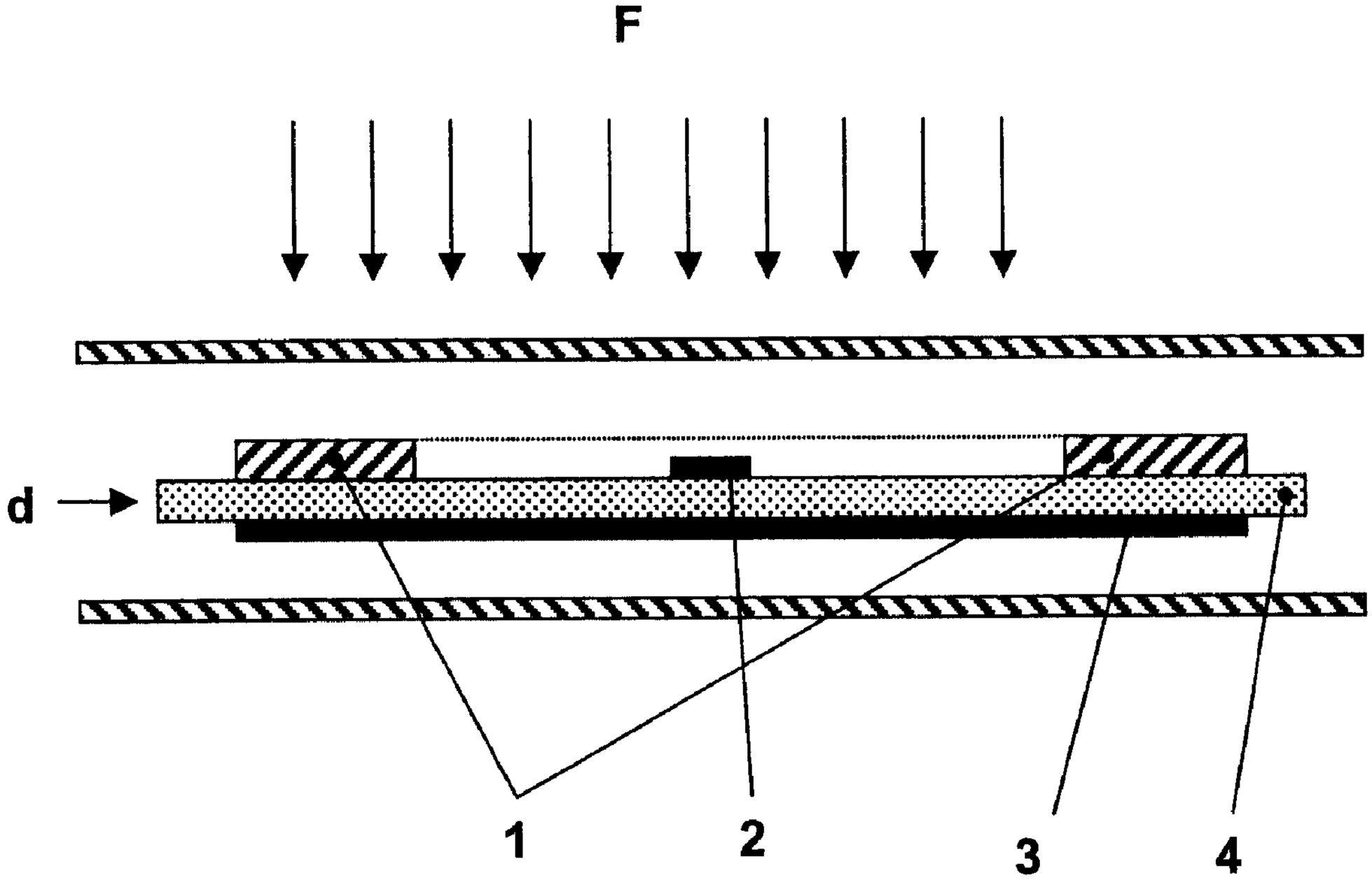


(57) Abrégé/Abstract:
One characteristic of electronic labels is that they can be read and written on without electrical contact through the communication coil (1). The reading head is then positioned at some distance and communicates with the label through electromagnetic waves. When these labels are placed on metallic objects, reading becomes difficult even impossible because of the dispersion of the waves in the object. To overcome this drawback, the invention proposes the adding of an electromagnetic conductive element (3, 3') to the coil (1) in order to insulate it (1) and enhance the reception quality.

ABSTRACT

One characteristic of electronic labels is that they can be read and written on without electrical contact through the communication coil (1). The reading head is then positioned at some distance and communicates with the label through electromagnetic waves.

When these labels are placed on metallic objects, reading becomes difficult even impossible because of the dispersion of the waves in the object.

To overcome this drawback, the invention proposes the adding of an electromagnetic conductive element (3, 3') to the coil (1) in order to insulate it (1) and enhance the reception quality.

ELECTRONIC LABEL

This invention concerns the domain of electronic labels, more particularly labels designed to be placed on a metallic object.

By electronic label one understands, a set having at least one support, an antenna and an electronic chip. This set can include several antennas or several chips according to the requirements. One finds them in the form of a button, in chip cards and even in luggage labels. Thanks to their antennas, they can communicate with a remote reader. The antenna serves not only as a means of communication, but also to produce the necessary energy to feed the electronic chip.

Some of these labels do not include electronic chips but passive components such as resistors or fuses. They are used to identify objects, for example in an anti-theft application.

According to the embodiments, the antenna is fitted to the flexible support or directly engraved or cut on this same support.

There are a lot of chips, which differ because of their functionalities, for example certain ones allow only the reading of information while others allow memorization and modification of their memory. The latter are used among other reasons for electronic cash card applications, which obviously need, a read / write feature in order to modify the contents according to the consumption of the user.

Another important application field is identification of the objects. In fact, in an automatic manufacturing cycle, it is indispensable than the automaton knows exactly which component it is in front of. The tendency in this kind of use is to replace the "bar-code" labels by labels equipped with an electronic chip. This not only allows identification of the object but also inversely allows the object to remember the manufacturing steps that it has been through.

Nevertheless, the problem that this kind of using comes from the nature of the object. In fact, these labels work according to the principle of a link by a magnetic field, they are disturbed by the proximity of a metallic mass absorbing the waves that allow communication.

In order to overcome this drawback, it is necessary to bring the label reader nearer to a distance of some millimeters to restore the communication.

In certain applications, one easily imagines that this distance constraint can present major drawbacks for objects having an angular outline for example.

There are solutions in which such a label comprises an electric conductive layer. There is for example the case in the document US5'920'290 where one of the executions describes a set of an antenna and a conductive sheet to create a resonant circuit. The aim of such a sheet, whose structure can also be obtained as well by metal coating as by carbon supplying, shows that the aim and the means to achieve this are far from the object of the present application.

Other documents describe the use of a conductive layer inside an electronic label that makes the necessary tracks for the routing of electric signals. There is the case in document WO00/03354 that is about the manufacturing of a TAG by assembling different layers. No mention of a magnetic reflector function is present in relation to these conductive layers.

Document WO00/25263 describes a protection method of a transponder against discharges of static electricity. This protection is achieved with a sheet of semi-conductor material placed on a section of the coil. With its structure, it forms a diode limiter between the turns of the coil. Otherwise said, this sheet constitutes a filter in charged to eliminate parasitic signals created by static discharge or electromagnetic disturbances which could harm the good work of the transponder. Such a semi-conductor sheet cannot thus in any case be magneto reflective because its role is limited, on the contrary, to reducing or to absorbing undesirable electromagnetic signals. By the way, this document does not mention electromagnetic field reflection by a component of the transponder or possible problems caused by the support where this transponder would be applied.

The aim of this invention is to propose an electronic label whose reading distance is distinctly improved in order to allow a less accurate placement of the readout head.

This aim is achieved by an electronic label having at least one electronic element and a coil, characterized in that the coil comprises, on one of its sides, a magneto reflective element.

By electronic element one understands either an electronic chip, or a passive component such as a fuse or a resistor.

This element is placed on the opposite side of the reader transmission side. With the presence of this element, the magnetic field is let say reflected against the reader instead of being dispersed in the metallic object.

The position and shape of the element play an important role.

In a variant of the invention, the magneto reflective element is disposed in the form of a sheet sensibly at the same size than the coil. The distance between the coil and the sheet is determined to obtain the optimal researched characteristics.

According to another embodiment, the sheet exceeds slightly the surface of the coil, creating an edge effect, which allows the magnetic field to be captured and thus increases the acceptable reading distance.

The testing has shown that the shape and distance of the sheet are determined in function of the characteristics of the label, in particular of the transmission frequency. Thanks to this magnetic sheet, it is possible to read a label placed on a metallic part at an acceptable distance for this kind of application.

This sheet can have non-planar geometric shapes, for example it can go over the rim of the coil. According to the requirements, this sheet can include openings whose shape is determined by the researched magnetic characteristics.

This sheet can be directly placed under the coil or at a predetermined distance, for example by means of an insulating layer.

The invention will be better understood thanks to the following detailed description referring to the attached drawings given as a non-limiting example:

- Figure 1 represents an electronic label with a protection sheet according to the invention,

- Figure 2 represents an electronic label with a magnetic protection ring

In Figure 1, representing a section of an electronic label, one can distinguish the schematized coil 1 as well as the electronic chip 2. Note that although this chip is situated inside the coil, it also can be situated outside the surface defined by the coil.

Under the coil 1, is placed the magneto reflective sheet 3 separated by an insulating layer 4 and defining the distance between the coil and the magnetic sheet. The presence of this insulating layer is not necessary to obtain the desired effect; the magneto reflective sheet can be directly applied onto the coil.

This sheet 3 is placed on the opposite side of the reader (schematized by field lines F), that is to say on the application side of the label on the object having metallic characteristics.

This set can be embedded in a resin or encapsulated between two protection sheets. The shape of this label can be any as a card, a button, or mounted on a flexible support.

According to a variant of the invention, shown in figure 2, the magneto reflective sheet can have other shapes to be placed only on the periphery of the coil. This element can be made in the form of a ferrite ring 3' for example or made as a magnetically conductive mechanically stamped sheet whose center would contain the coil.

The effect of magnetic flux concentrator also operates if the magnetic element is not placed under the coil but on its nearby periphery. For this purpose, it is useful to note that it is not necessary that the magnetic element surrounds the whole periphery of the coil. Positive results have been observed using such an element on only one section of the periphery of the coil.

This embodiment does not exclude the use of a magnetic sheet such as the one previously described placed under the coil in addition to the peripheral element. Furthermore it is possible to make a single piece with these two parts.

CLAIMS

1. Electronic label comprising at least one electronic element (2) and a coil (1), characterized in that the coil (1) includes at least one magneto reflective element constituted by an electro-magnetic conductive element (3, 3') independent of the set formed by the electronic component (2) and the coil (1).

2. Electronic label according to claim 1, characterized in that the magneto reflective element (3, 3') covers all or part of the surface of the coil (1).

3. Electronic label according to claim 1, characterized in that the magneto reflective element (3, 3') is slightly larger than the surface of the coil (1).

4. Electronic label according to claims 1 to 3, characterized in that the magneto reflective element (3, 3') comprises three-dimensional shapes.

5. Electronic label according to claims 1 to 4, characterized in that the magneto reflective element (3, 3') comprises one or several openings on its surface.

6. Electronic label according to claim 1, characterized in that a first magneto reflective element (3, 3') is situated on all or part of the periphery of the coil (1).

7. Electronic label according to claim 6, characterized in that the magneto reflective element (3, 3') comprises a second part which covers all or part of the surface of the coil (1).

8. Electronic label according to claim 7, characterized in that the second part of the magneto reflective element (3, 3') is slightly larger than the surface of the coil (1).

9. Electronic label according to claims 7 and 8, characterized in that the second part of the magneto reflective element (3, 3') comprises three-dimensional shapes.

10. Electronic label according to claims 7 to 9, characterized in that the second part of the magneto reflective element (3, 3') comprises one or several openings on its surface.

11. Electronic label according to claims 7 to 10, characterized in that the first and second parts of the magneto reflective element (3, 3') are made in a single piece.

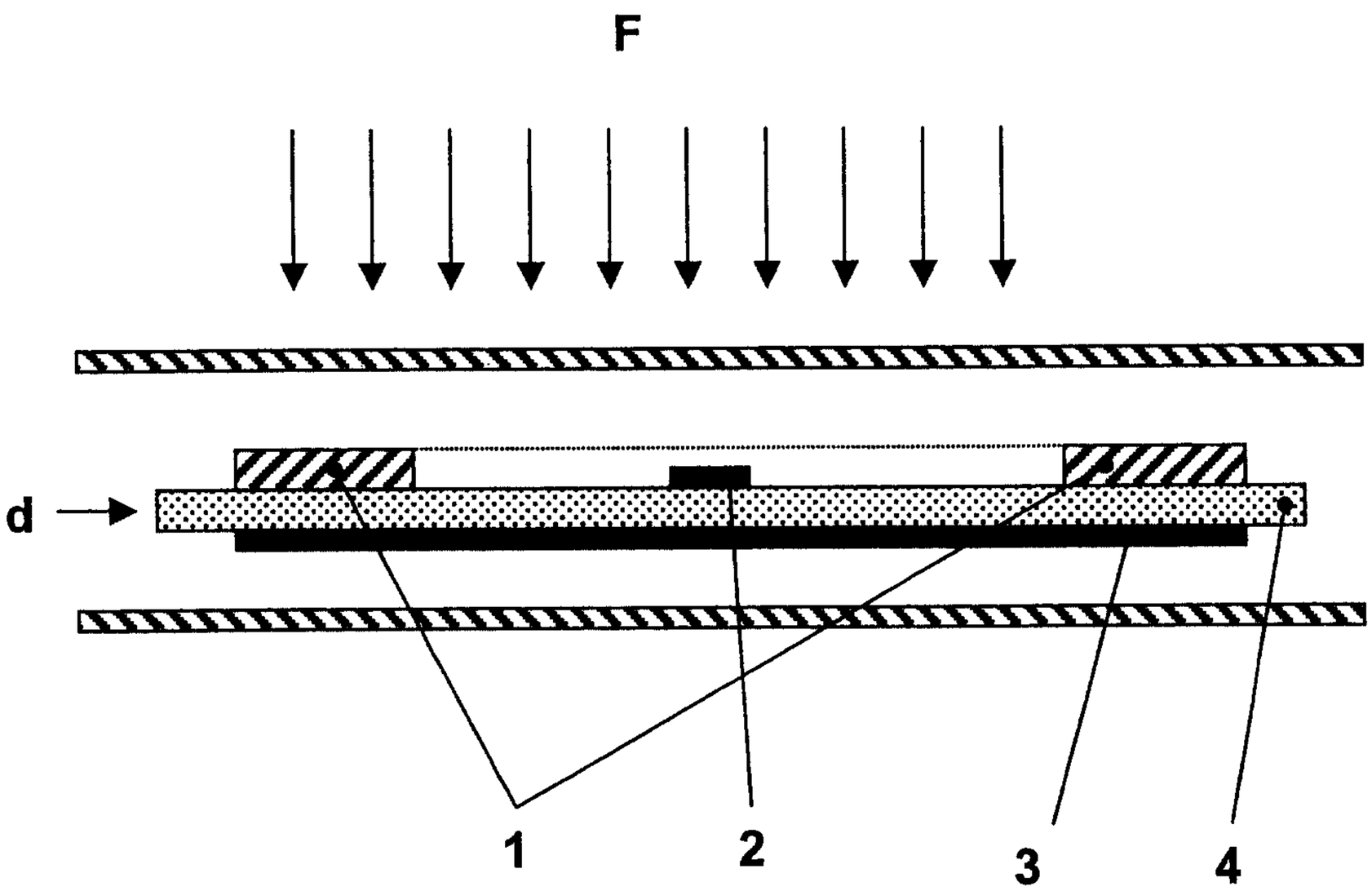


Fig. 1

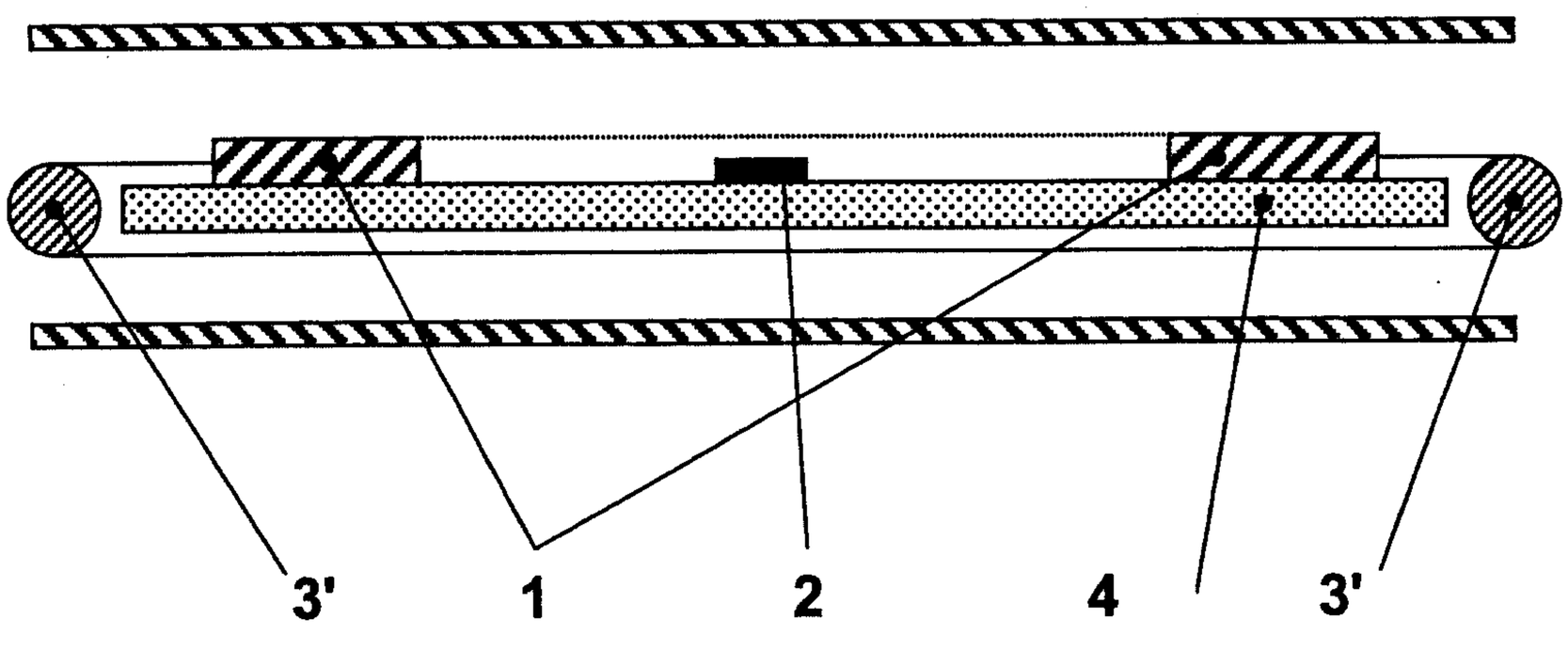
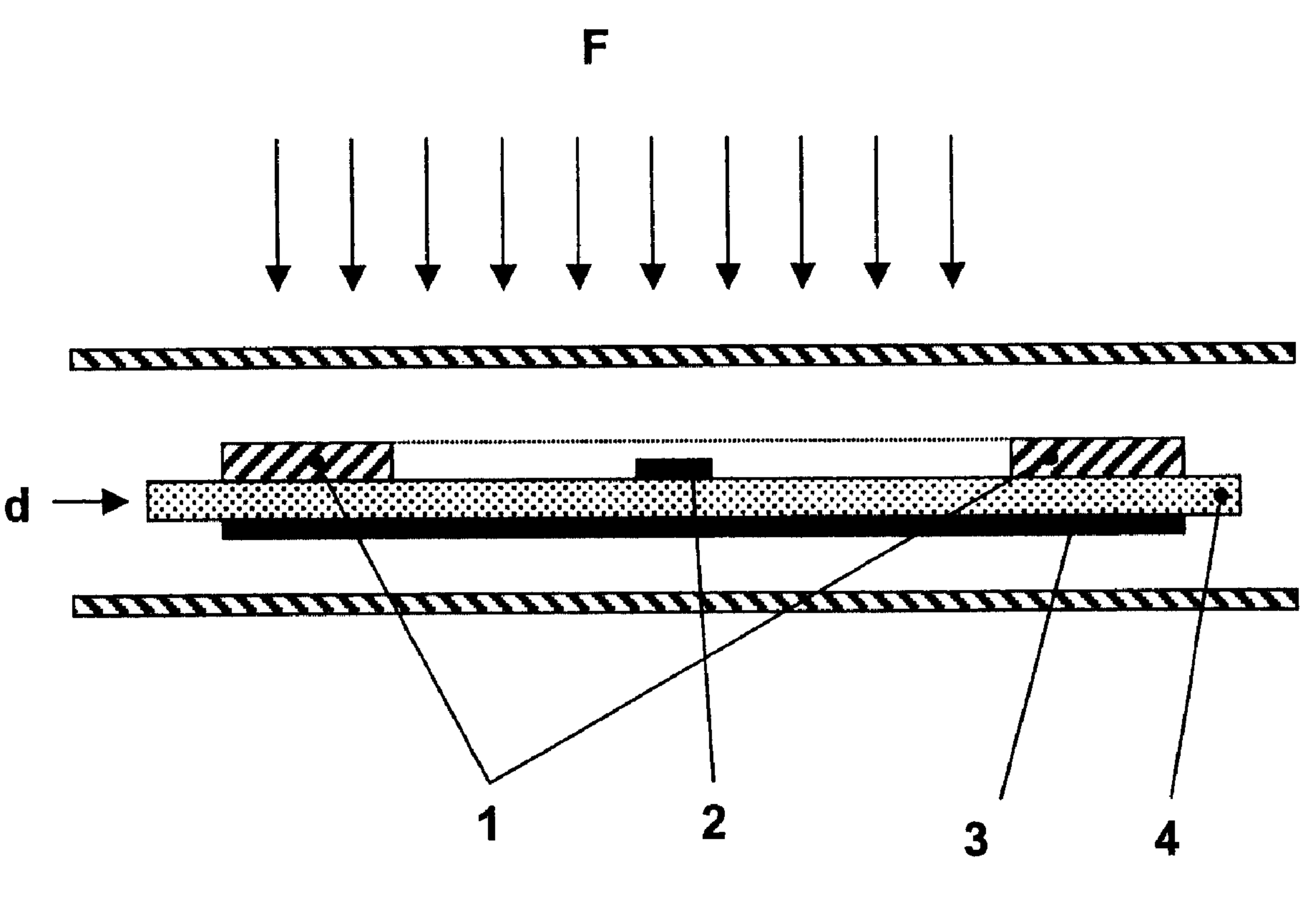


Fig. 2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