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(54) DEVICE FOR MEASURING THE FRICTION ON A SURFACE.

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Description

The invention relates to a device for measuring the friction on a surface, the said device comprising a measuring wheel and an axis, so that the said measuring wheel can be made to rotate around the said axis; an arm which is attached to the axis; and a spring which is attached in between the measuring wheel and its axis, and which spring is arranged to resist the rotation of the measuring wheel. When the wheel is, while measuring, moved by the handle on the surface under measurement.

In the prior art there is known, from the German published specification DE 852 161, a device for measuring the friction on a surface, wherein the first shaft moves a pair of wheels interconnected by means of an axis, which pair of wheels in turn move the measuring wheel by intermediation of another shaft. The second shaft, attached to the measuring wheel, is wound around the axis of the pair of wheels. In between the measuring wheel and the second shaft there is provided a spring, which retards the measuring wheel while the device is being moved. The degree of rotation of the measuring wheel at a point where the wheel starts to slide is comparable to the friction between the wheel and the base. The purpose of the pair of wheels is to make the attractive force directed to the measuring wheel parallel to the horizontal level, and it receives the vertical force component directed to the device due to the pulling.

The above described device is relatively large in size and is composed of several different components. Thus it is fairly sensitive to damage for instance during transport.

The object of the present invention is to simplify and to improve the device of the above described type in order to measure the fricton on a surface. This is achieved by means of the characteristic novel features of the invention which are presented in the appended patent claims.

Among the advantagss of the measuring apparatus of the present invention, there is pointed out its simple structure, which means that the device is easy to carry along. Moreover, it is easily maintained, and the manufacturing costs are low.

In the following the invention is explained in detail with reference to the appended drawings, where

figure 1 is a side-view illustration of the measuring device;

figure 2 is a front-view illustration of the measuring device; and

figure 3 illustrates the structure of the measuring wheel.

in figures 1 and 2, the device of the invention comprises the measuring wheel 1, the arm 2, the measuring wheel axis 3 and the spring 6. The measuring wheel 1 is free to rotate around its axis 3. The arm 2 is attached to the axis 3. The spring 6 is attached in between the measuring wheel 1 and its axis 3. The spring 6 is arranged to resist the rotation of the measuring wheel 1, when the measuring wheel 1 is moved by the arm 2 during the measuring operation om the surface 5 under measurement.

The arm 2 is stiff and uniform. At its first end 2a there is provided a straight part 8, which is permanently attached to the axis 2. At the second end 2b of the arm 1 there is provided the pull handle 4 or a corresponding member. The arm 2 is provided with an inclination indicator 9. In the measuring position, the angle of inclination α of the arm 2 is maintained, with respect to the surface 5 under operation, and the pull handle 4 is kept at a further distance than the radius R of the measuring wheel with respect to the surface 5. In order to help maintain the angle α of inclination constant, the arm is bent or folded, and its first part 8 starting from the axis 2 is in the correct position of the arm parallel to the surface 5.

The spring 6 resisting the rotation of the measuring wheel 1 can be attached to the measuring wheel for instance as is illustrated in figure 3. In this case the spring 6 is at one end fastened to the pin 10 provided in the measuring wheel, and at the other end to the protruding part 12 of the plate 11 wound around the axis 3. The rotation of the plate 11 can be prevented by means of the screw 13 which is attached to this protruding part 12.

While measuring friction, the measuring wheel 11 is pushed or pulled on the surface 5 under measurement. The rewinding of the measuring wheel is prevented by means of the spring bolt 14 and the indentation 15 provided on the inner circumference of the wheel 1. The tangential force caused by the tension of the spring 6 and resisting the rotation of the wheel is increased while the wheel is rotated. The tangential force caused by the spring 6 is compensated by the frictional force between the measuring wheel 1 and the surface 5. When there is achieved a situation where the frictional force cannot grow along with the tangential force caused by the tension of the spring 6, the wheel starts to slide. The journey of rotation of the wheel is comparable to the friction between the measuring wheel 1 and the surface 5. The rotation of the plate 11 around the axis 3 is prevented by means of the screw 13 while performing the measurement. The measuring wheel rotates freely when the screw 13 is screwed open. The spring bolt 14, which is at one end attached to the plate 11, prevents the rewinding or winding of the measuring wheel 1 after the wheel starts to slide in a measuring situation.

The measuring device is calibrated for example so that the friction coefficient of the surface 5 is directly readable on the scale 7. This may be arranged either on the inner circumference of the measuring wheel 1 or on the outer circumference of the plate 11. The tip of the spring bolt 14 indicates the reading in the preferred embodiment of figure 3. The display of the friction coefficient can naturally be arranged in some other fashion, too, for instance by means of an

odometer. Then the friction coefficient is received, by intermediation of a wire cable, to a separate display unit in the vicinity of the pull handle 4.

The measuring device of the invention is operated as follows. The measuring wheel 1 is pulled, in this case by the handle 4, in a standing position, so that the handle is located above the axis 3 of the measuring wheel 1. Now a vertical force component is directed to the measuring wheel 1, which force component reduces the burden of the measuring wheel against the surface 5. When the angle of inclination of the arm 2 is maintained constant, which is carried out by observing the straight part 8 of the arm and/or by observing the inclination indicator 9, the reduction of the burden is always the same with a given tension of the spring 6. A change in the burden is taken into account on the reading scale 7 of the friction coefficient.

The arm 2 of the measuring wheel 1 forms a uniform, stiff shaft extending from the axis. At the end thereof there is provided the pull handle 4, which is advantageously wound in the longitudinal direction of the other end 1b of the arm. As a consequence of this arrangement, the measuring wheel 1 cannot be pressed by the arm 2 from the pull handle 4.

Claims

1. A device for measuring the friction on a surface, the said device comprising a measuring wheel (1), the axis (3) thereof, around which the measuring wheel (1) can be made to rotate, an arm (2), which is attached to the axis (3), and a spring (6), which is attached in between the measuring wheel (1) and its axis (3), and which spring (6) is arranged to resist the rotation of the measuring wheel (1), when the measuring wheel is moved by the arm (2) on the surface (5) under measurement during the process of measuring, characterized in that the arm (2) is stiff and uniform and that the first end (2a) thereof is provided with a straight part (8), which is permanently attached to the axis (3), that the second end (2b) thereof is provided with a pull handle (4) or equivalent member, that the said arm (2) is provided with an inclination indicator (9), so that in the measuring position, the straight part (8) of the arm (2) can be kept parallel to the surface (5) under measurement and that the pull handle (4) is kept further from the surface (5) than the radius (R) of the measuring wheel (1).

2. The device of Claim 1, characterized in that the pull handle (4) is rotatable in the longitudinal direction of the first end (2b) of the arm (2).

Patentansprüche

1. Vorrichtung zur Messung der Reibung auf einer Oberfläche, wobei die Vorrichtung: ein Meßrad (1); dessen Achse (3), um die das Meßrad (1) gedreht werden kann; einen Arm (2), der an der Achse (3) befestigt ist; und eine Feder (6), die zwischen dem Meßrad (1) und dessen Achse (3) angeordnet ist, aufweist, wobei die Feder (6) so angeordnet ist, daß sie der Drehung des Meßrades (1) entgegenwirkt, wenn das Meßrad durch den Arm (2) auf der Oberfläche (5) unter Messen während des Meßverfahrens bewegt wird, dadurch gekennzeichnet, daß der Arm (2) steif und einstückig ist und daß sein erstes Ende (2a) mit einem geraden Abschnitt (8) versehen ist, der permanent mit der Achse (3) verbunden ist; daß dessen zweites Ende (2b) mit einem Haltegriff (4) oder eine entsprechenden Einrichtung versehen ist; daß der Arm (2) mit einem Neigungswinkelindikator (9) versehen ist, so daß in der Meßposition der gerade Abschnitt (8) des Arms (2) parallel zur Oberfläche (5) während der Messung gehalten werden kann und daß der Haltegriff (4) weiter von der Oberfläche (5) gehalten wird, als der Radius (R) des Meßrades (1).

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Haltegriff (4) in Längsrichtung des ersten Endes (2b) des Arms (2) drehbar ist.

Revendications

1. Dispositif pour la mesure d'un frottement sur une surface, ledit dispositif comportant une roue de mesure (1), l'axe (3) de celui-ci, sur lequel la roue de mesure (1) peut être entraînée en rotation, un bras (2) qui est attaché à l'axe (3) et un ressort (6) qui est fixé entre la roue de mesure (1) et son axe (3), ledit ressort (6) étant conçu pour résister à la rotation de la roue de mesure (1) lorsque la roue de mesure est déplacée par le bras (2) sur la surface (5) subissant la mesure, au cours de l'opération de mesure, caractérisé en ce que l'arbre (2) est rigide et uniforme et que la première extrémité (2a) de celui-ci est pourvue d'une partie droite (8), qui est fixée de manière permanente à l'axe (3), que la seconde extrémité (2b) de celui-ci est pourvue d'une poignée de traction (4) ou un élément équivalent, que ledit bras (2) est pourvu d'un indicateur d'inclinaison (9), de manière qu'en position de mesure, la partie droite (8) du bras (2) peut être maintenue parallèle à la surface (5) subissant la mesure et que la poignée de traction (4) est maintenue à une distance par rapport à la surface (5) supérieure au rayon (R) de la roue de mesure (1).

2. Dispositif selon la revendication 1 caractérisé en ce que la poignée de traction (4) peut subir un mouvement de rotation en direction longitudinale de la première extrémité (2b) du bras (2).

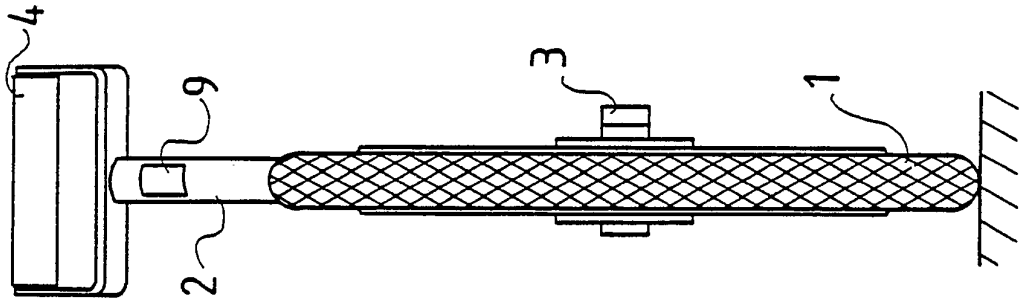

Fig.2

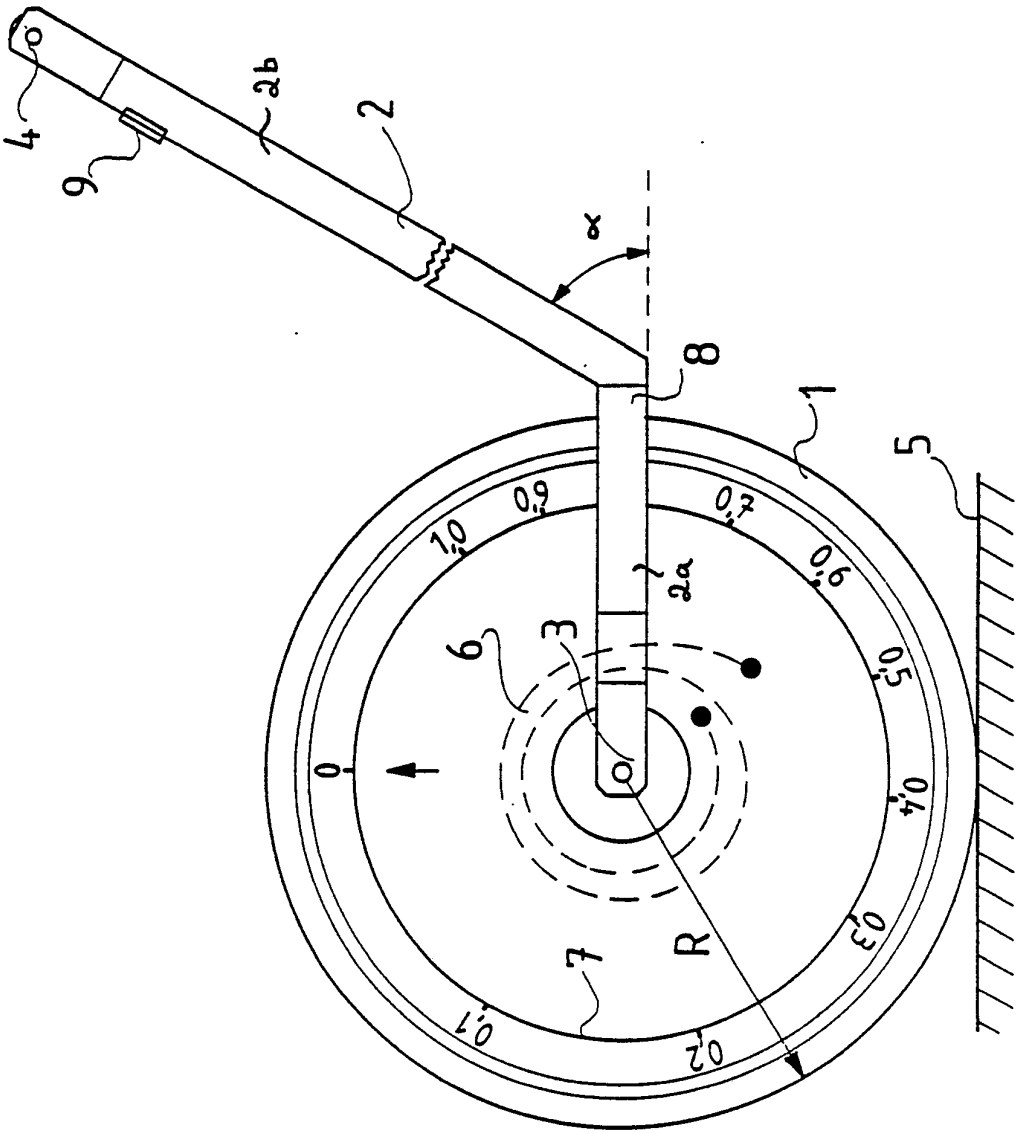

Fig.1

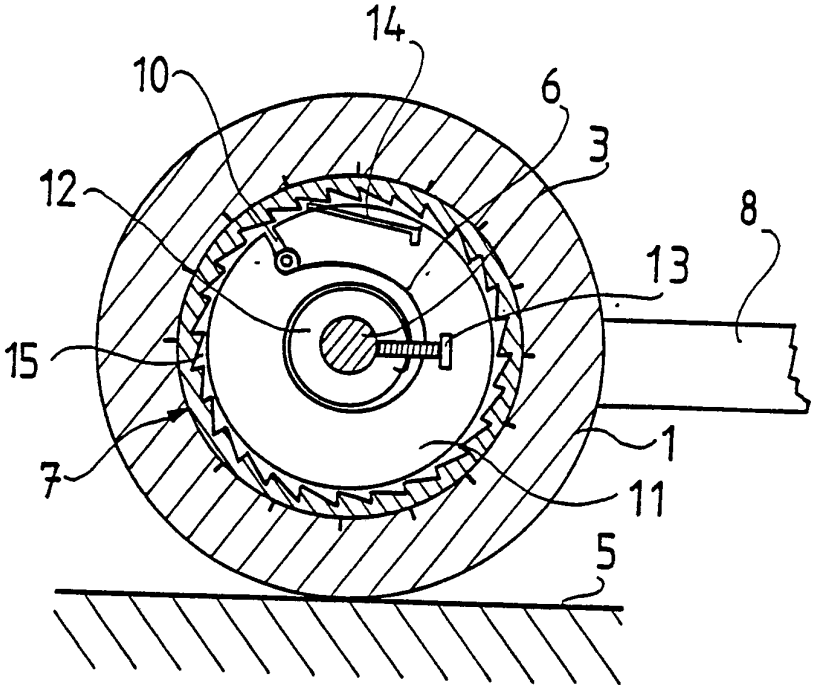

Fig. 3