

[54] **APPARATUS FOR PRESSING A RECORDING OR ENGRAVING INSTRUMENT AGAINST A SURFACE MOVING RELATIVE THERETO**

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[56]

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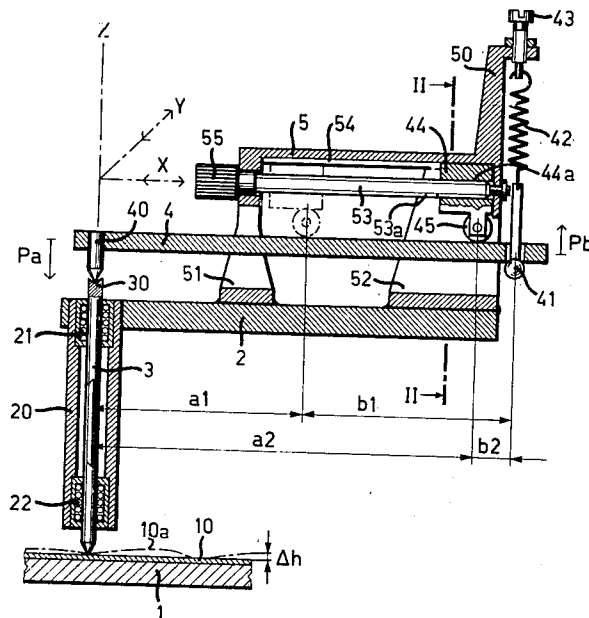
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**ABSTRACT**

An apparatus for pressing a recording- or engraving instrument, typically a writing or engraving stylus, against a surface moving relative thereto wherein the pivot mounting arrangement of a double-arm lever serving for transmitting the force of an elastic pressure generator means to the recording or engraving instrument is adjustable in the lengthwise direction of the lever.

**4 Claims, 2 Drawing Figures**





# APPARATUS FOR PRESSING A RECORDING OR ENGRAVING INSTRUMENT AGAINST A SURFACE MOVING RELATIVE THERETO

## BACKGROUND OF THE INVENTION

The present invention relates to a new and improved apparatus for pressing a recording- or engraving instrument, typically in the form of a writing or engraving stylus or needle, against the surface of a body moving relative thereto.

Equipment of this type is required, for instance, in conjunction with drafting- and engraving devices which operate automatically in accordance with a prescribed program and the purpose of which is to press the writing or engraving stylus which is movable in axial direction by means of a pre-adjustable force against the surface of the body, this force being accommodated to the nature of the stylus and the surface to be imprinted upon. In this connection the magnitude of the pressure force, upon overcoming unavoidable irregularities of the surface to be imprinted, should change as little as possible in order to avoid irregular marking or engraving. On the other hand, the absolute magnitude of the pressure force acting upon the stylus or the like should be adjustable within wide limits.

## SUMMARY OF THE INVENTION

Therefore, it is a primary object of the present invention to provide an improved apparatus for pressing a writing- or engraving instrument, typically a stylus, against a surface moving relative thereto in a manner which fulfills the aforementioned requirements.

A further significant object of the present invention relates to a new and improved construction of apparatus for pressing a writing- or engraving instrument against a relatively movable surface in an extremely reliable and positive manner with a relatively constant contact force which can be selectively varied within wide limits.

Now in order to implement these and still further objects of the invention with simple, space-saving means, the apparatus of this development is manifested by the features that the pivotal mounting arrangement of a double-arm lever serving to transmit the force of an elastic pressure generator to the writing- or engraving instrument is displaceable in the lengthwise direction of the lever.

## BRIEF DESCRIPTION OF THE DRAWING

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawing wherein:

FIG. 1 is a schematic vertical sectional view of a preferred constructional form of inventive apparatus; and

FIG. 2 is a cross-sectional view of the apparatus of FIG. 1, taken substantially along the line II—II thereof.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Describing now the drawing, the exemplary embodiment of inventive apparatus for pressing a recording- or engraving instrument, typically a writing or engraving stylus, against a relatively movable body surface will be

seen to comprise a fixed table plate 1 which forms a support for the surface such as a paper- or metallic foil clamped or otherwise suitably secured thereon and which is to be imprinted with any suitable marking or the like. Now the phantom lines 10a of the paper or metallic foil 10 represent unavoidable surface irregularities of thickness  $\Delta h$ . A movable support plate 2 serving for guiding a writing or engraving instrument or stylus 3 in two coordinate directions X and Y in known manner carries in the direction of the vertical axis Z a bearing sleeve 20. The writing or engraving stylus 3 is displaceably mounted at the bearing sleeve 20 through the agency of two bearings 21 and 22 for movement in the direction of vertical axis Z and is preferably rotatable about axis Z with the aid of known and therefore not particularly illustrated means.

At the upper end of the writing or engraving stylus 3 such is provided with a concave bearing socket or bushing 30 for receiving the tip of a pressure pin or bolt 40 provided at one end or end region of a pressure transmission lever 4 possessing a constant acting length. The other end or end region of the aforementioned lever 4 is connected through the agency of a joint or hinge arrangement 41 with a pressure generator means. In the exemplary embodiment there can be advantageously employed as the pressure generator means a helical spring 42 secured to an auxiliary support 5 bearing via the braces or column supports 51 and 52 upon the movable support plate 2. The auxiliary support 5 is provided for this purpose with an angled projection 50 at which is threadably connected a screw 43 serving for adjusting the pre-bias or stress of the spring 42. A threaded spindle 53, oriented substantially parallel to the lever 4 is rotatably and axially non-displaceably mounted at the column supports 51 and 52 of the auxiliary support 5. A hand-operated rotary knob 55 or equivalent structure serves to selectively rotate the threaded spindle 53.

The threading 53a of the spindle 53 engages with the internal threading 44a of a carriage 44 which is mounted for lengthwise displacement in a profiled groove 54 of the auxiliary support 5. Carriage 44 carries at its underside a roller or roll 45 against which is pressed the lever 4 under the action of the pre-stressed spring 42. This roller 45 thus forms a pivotal mounting arrangement which can be selectively displaced along the length of the lever 4, and which thus may further sub-divide the lever into two lever arms a1 and b1 and a2 and b2 respectively.

Now in the position of the carriage 44 illustrated in full lines in the drawing the pressure force Pa transmitted to the writing or engraving stylus 3 assumes the value  $Pa_1 = b_2/a_2 \cdot Pb \approx 1/10 Pb$ , (wherein  $Pb =$  spring force)

The length changes transmitted to the spring 42 also only amount to approximately one-tenth of the irregularities  $\Delta h$  of the foil 10 to be imprinted.

On the other hand, in the phantom line position of the carriage 44 the pressure force Pa transmitted to the writing or engraving stylus 3 assumes the value  $Pa_2 = b_1/a_1 \cdot Pb \approx Pb$ , that is to say it is approximately 10 times greater than in the other terminal position of the carriage 44. Accordingly, the force changes brought about by the irregularities  $\Delta h$  of the foil 10 can be approximately 10 times larger. It will be observed that the double-arm lever 4 possesses a constant acting length, i.e. irrespective of the position of the carriage 44 and roller

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45 the total length of the two lever arms, such as lever arms *a1* and *b1* and similarly *a2* and *b2* remains constant.

Finally it is mentioned that in place of a helical or spiral spring 42 there also can be utilized as the elastic pressure generator means a pneumatically actuated piston arranged in a cylinder.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims.

What is claimed is:

1. An apparatus for pressing a writing- or engraving instrument against a body surface wherein relative movement occurs between the instrument and the surface, comprising a writing or engraving instrument, a double-arm lever possessing a constant acting length and provided with opposed end regions, one of said end regions of the double-arm lever acting upon said instrument, an elastic pressure generator means acting upon the other end region of said double-arm lever for applying a force to the writing instrument through the agency of said double-arm lever, means providing a pivot mounting for said double-arm lever, and means for adjusting said pivot mounting means in the lengthwise direction of said lever.

2. The apparatus as defined in claim 1, wherein said double-arm lever is provided at said one end region

with a pressure transmission pin disposed substantially coaxially with respect to the instrument and extending transversely from said one end region of said lever, said other end region of said lever being operatively connected with said elastic pressure generator means which serves to press the lever against said lengthwise adjustable pivot mounting means.

3. The apparatus as defined in claim 2, wherein said adjusting means for said pivot mounting means comprises a carriage, a rotatable threaded spindle disposed approximately parallel to said lever and connected with said carriage for adjusting said carriage in the lengthwise direction of the lever, and said pivot mounting means comprising a roller member secured to said carriage.

4. An apparatus for pressing a writing- or engraving instrument against a body surface wherein relative movement occurs between the instrument and the surface, comprising an instrument, a double-arm lever possessing two lever arms, the total length of said lever arms being constant, said double-arm lever having an end portion acting upon said instrument, an elastic pressure generator means for applying a force to the instrument through the agency of said double-arm lever, means providing a pivot mounting for said double-arm lever, and means for adjusting said pivot mounting means in the lengthwise direction of said lever.

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