

SLIDE RULE.

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# UNITED STATES PATENT OFFICE.

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## SLIDE-RULE.

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Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, CARL F. DIECKMANN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Slide-Rules, of which the following is a specification.

My invention relates to slide rules, and the general object of the invention is to provide a rule so constructed that a desirable amount of friction will always be created whenever the slide is moved, thereby preventing the slide from being moved too easily on the one hand and on the other hand permitting the slide to be moved when a slight but firm longitudinal pressure is exerted upon it.

It is well known to makers and users of slide rules that the action of the slide is frequently influenced by atmospheric conditions, the slide having a tendency to stick or requiring excessive pressure if the weather is too damp, and moving too freely if the rule is left where the air is dry and comparatively warm. Rules of this character are also subject to warping, in which case the device may be rendered practically useless.

The object of my invention is to produce a rule which will not be affected by temperature conditions and which will still be operative even though the parts should become warped to a limited extent.

More specifically, the object of the invention is to provide means for yieldingly holding one of the rules in close contact with the slide. In carrying out this object in the preferred manner shown in the drawings, I employ spring mechanism located wholly within the device and, in the ordinary design, both invisible and inaccessible from the outside of the rule. The spring here illustrated is of especially advantageous construction as will hereinafter be explained.

I accomplish my objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is a view showing the top of the rule and slide. Fig. 2 is a view of the bottom of the slide with a portion of the facing removed to reveal the spring mechanism. Fig. 3 is a perspective view of the spring in its preferred form. Figs. 4 and

5 are sectional views on the lines 4—4 and 5—5 respectively. Fig. 6 is a longitudinal section on the line 6—6 of Fig. 2 showing the spring in position.

Similar numerals refer to similar parts throughout the several views.

The slide 1 is of ordinary form and of ordinary marking, a suitable form of marking being suggested in Fig. 1. Under ordinary circumstances the markings—that is, the scales—are imprinted upon facing strips 1<sup>a</sup> of celluloid or other suitable substance. On each side of the slide is a rule, the rule 2 being integral with the base 3 and the rule 4 being separate. Said rules have internal longitudinal grooves 5 which receive the longitudinal tongues 6 in the ordinary manner.

My invention consists more particularly in the manner of connecting the separate rule 4 to the base 3. At suitable intervals along the base, in the bottom thereof, I form slots 8, the number of these slots in the present instance being three. Each of these slots is for receiving the vibrating end of the spring 10 shown separately in Fig. 3. At the stationary end the spring has an eye 11, and in manufacturing these devices I remove, under ordinary circumstances, enough of the wood of the base to let the stationary portion of the spring into the base without splitting the latter. In other words, in constructing the parts, approximately one-half of the spring is let into the base from the bottom snugly enough to prevent any movement of the stationary portion of the spring, while the remaining portion of the spring, which for convenience I term the vibrating portion, lies within the slot 8. By reason of the width of the slot the vibrating portion of the spring is free to swing from side to side for a considerable distance in either direction before coming into contact with the wall of the slot. Slot 8 preferably extends through from top to bottom of the base substantially in line with and beneath the center of the movable rule 4; and by preference the spring is of a height equal to the height of the base of the rule at this point. Two laterally projecting ears 12, 12, are formed at the bottom of the spring, these ears underlying the bottom of the base but being countersunk thereinto far enough to leave a smooth sur-



face at the bottom of the base. Another ear 13, which is preferably of larger size, also underlies the base. A countersink or recess 14 is formed in the bottom or base for permitting free lateral movement of said ear and the vibrating portion of the spring. The spring is securely fastened to the movable rule 4 by a tongue 15, which projects up into the body of the movable rule, and has two ears 16, which overlie the top of the movable rule and prevent the latter from rising. The ears 16 extend in opposite directions in the preferred construction, and the rule should be countersunk sufficiently to let the top of the ears 16 come flush with the top of the rule. As a result of this construction the rule is free to adjust itself transversely to the left of the device but is firmly held in every other respect by the spring. The eye 11 prevents the spring from shifting longitudinally within the base, and the ears 12 and 13 prevent the spring from rising in the base, while the ears 16 prevent the rule from rising from the base. Thus all relative movement between the rule 4 and base 1 is prevented except the transverse movement of the rule 4.

In finishing the rule it is desirable to apply a surface strip 4<sup>a</sup> to the top of the rule 4, and a surface strip 3<sup>a</sup> to the top of the rule 3. Said strips are preferably of celluloid or other suitable substance and bear the scale markings which cooperate with the scale markings on the surface strips 1<sup>a</sup> on the slide. The surface strip 3<sup>b</sup> is similar and may have any suitable markings thereon such as data commonly used by engineers. The strips 3<sup>b</sup> and 4<sup>a</sup> serve the additional purpose of covering up the slots and ears of the spring with the result that in the finished article the spring and its various projections are all invisible.

In operation, the springs force the movable rule 4 firmly but gently against the edge of the slide 1 thus creating a reasonable amount of friction and holding the slide at any position to which it may be set, without in any manner binding it. The width of the slots 8 permits considerable transverse play and hence within any reasonable limit the springs will permit the movable rule 4 to accommodate themselves to any changes in the parts due to variations of atmospheric conditions. Furthermore, the rule will remain operative even though the slide or other parts of the rule should become warped within any reasonable limits. The springs permit transverse play but on account of the various ears with which it is provided it prevents the movable rule 4 from being lifted from the base, and on account of its peculiar conformation effectually prevents the movable rule from moving longitudinally upon the base. As the

construction affords resilience through a comparatively wide range of movement, adjusting means are entirely dispensed with and the spring mechanism may be and is entirely inclosed within the device.

Having thus described my invention, what I claim, as new and desire to secure by Letters Patent, is:—

1. In a slide rule, the combination of a slide, a base having a flat upper surface parallel to the plane of the rule, a guide for said slide seated on the flat upper surface of the base, and a leaf spring arranged on edge and extending, in the main, longitudinally of the rule, said spring being fastened at one end to the base and at the other end to the guide whereby the guide is held in contact with the upper surface of the base but permitted to slide thereon for frictionally holding the slide.

2. In a slide rule, the combination of a slide, a base having a flat upper surface parallel to the plane of the rule, a guide for said slide seated on the flat upper surface of the base, and a leaf spring arranged on edge and extending in the general direction of the length of the rule, one end of the spring being embedded in the base and the other end embedded in the guide, and one of the parts being slotted for permitting lateral movement of the spring, to permit the guide to yield and slide along the surface of the base when pressed by the slide.

3. In a slide rule, the combination of a slide, a base, a rule for guiding said slide, and a flat spring for securing said rule to said base and permitting transverse movement of said rule, said spring being arranged on edge, and the major portion thereof terminating beneath the bottom of said rule, said spring rising at one point up into said rule and being there securely fastened, the base being slotted to permit transverse movement of the spring where it rises into the rule, and the other end of the spring being fastened to the base, substantially as described.

4. In a slide rule, the combination of a slide, a base having a flat upper surface, a guide seating upon said surface, a leaf spring embedded in the base and extending longitudinally thereof, the base being slotted adjacent to the spring for a portion of the length thereof to permit the spring to move laterally, the laterally moving end of the spring extending up into and being fastened to the guide, whereby the guide is held in frictional contact with the slide and is prevented from leaving its seat upon the flat upper surface of the base.

5. In a slide rule, in combination, a base, a slide, a separate rule mounted upon said base for guiding said slide, said base having a longitudinal slot lying beneath said rule, a leaf spring arranged on edge, one



portion of said spring lying within said slot and projecting upward at its end into and through the rule and being fastened to said rule, the remaining portion of said spring  
5 being securely fastened to the base and an ear projecting transversely from said spring at the bottom thereof at the slotted portion of the base and underlying a portion of the base, said ear being slidable upon the under

surface of the base for preventing the rise 10 of said spring.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

CARL F. DIECKMANN.

Witnesses:

M. S. ROSENZWEIG,  
SELINA E. HIGGINS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."