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SLIDE RULE CURSOR

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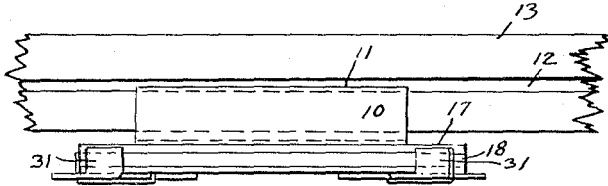


FIG. 2

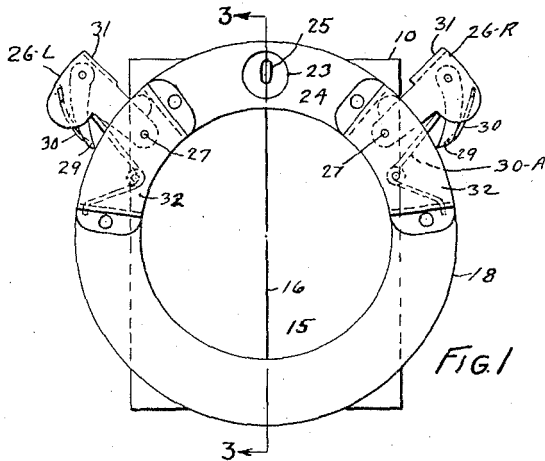


FIG. 1

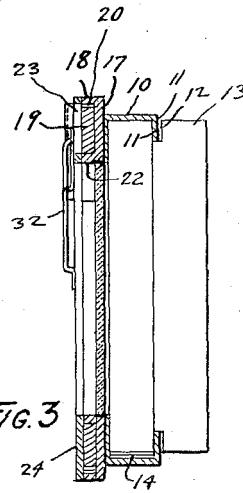


FIG. 3

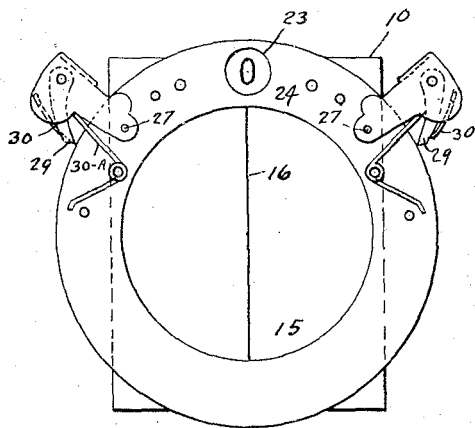


FIG. 4

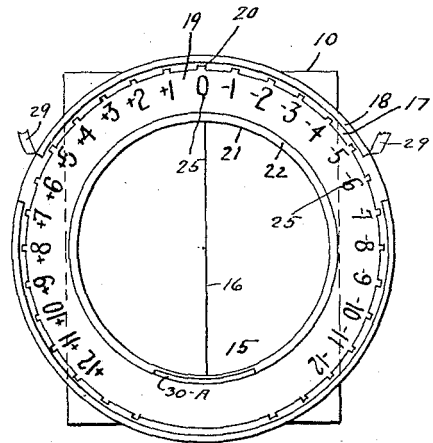


FIG. 5

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SLIDE RULE CURSOR

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2 Claims. (Cl. 235—64.3)

REISSUED

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This invention relates generally to scientific instruments and particularly to an attachment for slide rules.

The main object of this invention is to provide a means for facilitating slide rule computation and to reduce the chance for error in making such computation.

The second object is to free the mind of the slide rule operator of the necessity of carrying any figures in his mind in order to place the decimal point correctly when the answer to a problem has been found on the slide rule.

The third object is to free the mind of the operator from the unnecessary retention of values in order to enable him to concentrate on the actual problem at hand and its solution, thereby permitting faster and surer slide rule computations.

The fourth object is to provide a means for indicating the decimal point place without referring to any notes or remembering anything or without making any mental calculations.

I accomplish these and other objects in the manner set forth in the following specification as illustrated in the accompanying drawing, in which

Fig. 1 is a front elevation of the device showing same mounted on a portion of a slide rule.

Fig. 2 is a plan of Fig. 1.

Fig. 3 is a transverse section taken along the line 3—3 in Fig. 1.

Fig. 4 is a front view with the lever guards removed.

Fig. 5 is a front elevation of the dial and pawl mechanism, with the parts in front of same removed for clearness.

Similar numerals refer to similar parts throughout the views.

Referring in detail to the drawing, there is shown a runner 10 whose inturned edges 11 engage the grooves 12 in the slide rule 13. A spring 14 affords the desired amount of friction between the runner 10 and the slide rule 13. The transparency 15 is mounted in the sight opening of the runner 10 and has on it an indicator line 16. The device thus far described is now in common use.

Referring particularly to my invention, same will be seen to consist of a circular ring 17, which is secured to the front of the runner 10, and its inner diameter approximates that of the sight opening of the runner 10. The ring 17 is provided with a rim 18 around the major portion of its circumference. Within the rim 18 is disposed a revoluble dial 19, which is provided with ratchet

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teeth 20 on its outer circumference. The interior edge 21 of the ring 17 is provided with a rim 22, on which the dial 19 is capable of rotation. An opening 23 is formed in the cover plate 24 and through this opening can be seen one value 25 at one time. These figures run from zero to plus or minus twelve, in opposite directions.

Portions of the rim 18 are cut away on each side of the opening 23 to make room for the lever arms 26R and 26L, whose pivot 27 is mounted on the cover plate 24. Springs 30A urge the outermost ends of the levers 26R and 26L toward the opening 23.

Each lever arm 26R and 26L is provided with a pawl 29, which is urged by a spring 30 into engagement with the ratchet teeth 20 when the lever arm 26R or 26L is moved downwardly. This downward movement is accomplished by the manual operation thereof by means of the operator's finger on the upper side of the slide rule. It will be noted that when the pawls 29 are in retracted positions, they ride upon the outer side of the rim 18 in order to hold the pawls out of engagement with the teeth 20. The portion 31 of each lever 26R and 26L is turned inwardly, as indicated. A spring 30A is interposed between the parts 19 and 22.

In order that the levers 26R and 26L may be shielded, there is provided for each of same the curved guard 32, which permits a limited amount of free movement of the lever arms referred to. The guards 32 are secured to the cover plate 24 in any convenient manner. It is important that the cut away portions of the rim 18 and the travel of the pawl 29 are such that only one characteristic at a time can be made to pass the opening 23 so that careless or fast or slow operation of the lever arms 26R or 26L will always produce but one change in the characteristic value.

In order that the purpose of this invention may be better understood, there are set forth the rules for its use and the manner of using this device. Primarily, the device is used with a characteristic system using positive and negative characteristics algebraically combined.

To find the position of the decimal point or the number of digits in the product when multiplying together two numbers; if the slide projects to the left, take the algebraic sum of the characteristics of the multiplier and multiplicand, and the result will be the characteristic of the product. If the slide projects to the right, add algebraically minus 1.

To fix the characteristic of the quotient when dividing; change the sign of the characteristic

of the divisor. If the slide projects to the left, combine characteristics algebraically. If the slide projects to the right, add algebraically plus 1.

When using the reciprocal scale, that is, the CI or inverted C scale, for multiplication or division the rules for the projection of the slide must be reversed.

Reciprocals: To read the reciprocal of a number, change the sign of the characteristic, and combine algebraically with plus 1.

Square root: If the characteristic of the given number is an even number, use right half of scale A. To fix characteristic of root, divide characteristic of given number by 2. If characteristic of the given number is an odd number, use left half of scale A. To fix characteristic of root, combine characteristic of given number with plus 1, divide this sum by 2. Quotient will be characteristic of root.

Squaring a number: If the answer lies on the right half of scale A, multiply the characteristic of given number by 2. If on the left half of scale A, combine algebraically with minus 1 (after multiplying by 2). The result will be the characteristic of the square.

Cube root: Mark off the number whose cube root is to be found, in groups of three figures from the decimal point. The characteristic of the root equals the number of groups in the given number.

The K scale: For numbers larger than 1, mark off the number into groups of three figures beginning at the decimal point and proceeding to the left. If the last group contains one, two, or three figures use K1, K2, K3, respectively. Examples: 7/894/243—(K1), 89/352—(K2),

740/894/471—(K3)

If the number is a decimal fraction mark off the fraction in groups of three figures beginning at the decimal point and including ciphers, proceeding to the right. If the first group containing digits after the ciphers contains one, two, or three digits, use K1, K2, K3, respectively. Examples: .001/275/8—(K1), .092/375/43—(K2), .000/567/4—(K3).

If the cube root of a number is found from K1, K2, K3, to fix the characteristic of the root, combine the characteristic of the number algebraically with plus 2, plus 1, and 0 respectively, and divide by 3.

Cubing a number: If the cube of a number is found on K1, K2, K3, to fix the characteristic of the cube multiply the characteristic of the number by 3, add algebraically minus 2, minus 1, and 0 respectively.

When using B, C and A scales to cube a number, if C index is set on a number on D that is over the extreme left portion of the K scale (from 1 to 215), multiply characteristic of given number by 3 and add algebraically minus 2. If over the middle portion of K scale (from 215 to 465) multiply by 3, and add algebraically minus 1. If over right portion of K scale (to the right of 465 on D) multiply by 3.

When dividing, multiplying, etc., with the aid of either of these instruments, it is necessary

to simply follow the rules. For instance, in multiplying $262 \times .202$, set the C index on 262, the characteristic of this number is plus 3 so the plus plunger in the instrument should be pushed three times. The characteristic of .202 is zero, so it is unnecessary to use the instrument at all. However, the slide projects to the right, so add algebraically minus 1, by pushing the minus plunger once. The digits of the answer on the rule are 529, the number on the instrument is plus 2, so the correct answer is 52.9.

It can be seen from the foregoing that if the operator wished a plus 4 characteristic, he would simply operate the plunger 2R until he brought the value plus 4 into the opening 23. He would then proceed with his computation and at the time of pointing off his result, he would merely need to glance at the value in the window or opening 23 in order to determine the location of the decimal point.

I am aware that numerous forms of counters and indicators have been constructed in the past. I therefore do not cover such devices broadly, but I do intend to cover all such forms and modifications thereof as fall fairly within the appended claims.

I claim:

1. A cursor for slide rules consisting of a circular frame adapted to be mounted slidably on a rule, said frame having an enclosed circular dial revoluble therein, said frame having an opening therein through which a portion of said dial may be observed, said dial having ratchet teeth formed thereon, a pair of lever arms hinged to said frame, each of said lever arms having a pawl mounted thereon, one of said pawls engaging said ratchet teeth to drive same in a clockwise direction and the other pawl engaging said ratchet teeth in a counter clockwise direction, one unit at a time, said dial being provided with two series of characteristics ranging from zero to plus and minus values ranging from zero to twelve.

2. A cursor for slide rules consisting of a circular hollow frame, a rotatable dial mounted within said frame, said dial having plus and minus characteristics indicated thereon starting at zero and ranging from plus one to plus twelve on one side and from minus one to minus twelve on the other side of the said dial, said dial having ratchet teeth formed on the outer edge thereof, a lever arm mounted at each side of said frame, each of said lever arms having a pawl thereon, said frame being cut away to permit said pawls to engage said teeth and impart movement thereto through one unit of space on said dial, said frame having an opening therein through which one of said characteristics may be viewed.

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REFERENCES CITED

The following references are of record in the file of this patent:

FOREIGN PATENTS

Number	Country	Date
489,501	British	July 28, 1938
352,510	French	June 5, 1905