

UNITED STATES PATENT OFFICE.

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PARALLEL-RULER.

1,357,462.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HANS A. LUND, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Parallel-Rulers, of which the following is a specification.

This invention relates to mathematical instruments of the type known as parallel rulers, and is especially designed to produce a form of parallel ruler for use in connection with ship's charts for navigation purposes.

The object of the invention is to provide a device of this character in which a pair of rulers are provided with connecting mechanism that operates to maintain the rulers in parallelism, and which will permit one or both of the rulers to move longitudinally or endwise without movement of the other ruler or of the connecting mechanism; and which connecting mechanism is attached to the rulers to permit each rule to be swung on a longitudinal axis relative to the connecting mechanism and to the other rule.

In the accompanying drawing showing one embodiment of my invention, Figure 1 is a perspective view of the device.

Fig. 2 is a plan view, illustrating in broken lines one ruler moved a greater distance apart from the other ruler and at the same time given an endwise movement.

Fig. 3 is an end view enlarged, indicating in broken lines one rule swung to extend at a right angle to the other rule and to the connecting mechanism.

Fig. 4 is a fragmentary view enlarged at one end of the device showing the assembling of the parts.

Fig. 5 is another plan view showing the relative endwise movement of the rulers in extreme position.

As shown in the drawings, the device comprises a pair of rulers 2 and 3, of any desired form, that are connected by a pair of levers 4 and 5. These levers are connected at their central portions by a bolt 6 passing through apertures in the levers; and the lever 5 is shown as having offset portions at 7 and 8, whereby to bring the end portions of the levers in the same plane, as indicated in Fig. 3.

These levers at their ends are connected to the rulers 2 and 3 by means of guide

members, that are attached to the rulers to have a sliding movement longitudinal of the rulers; and these guide members are also connected with the rulers whereby each ruler can swing relative to the guide members, the rulers being pivotally connected at the four ends to the four guide members respectively.

In the construction illustrated, I provide a pair of sleeves 9 and 10 arranged to slide along a rod 11 that is secured at its end portions only to the rule 3, by suitable means such as posts 12 and 13. One end of the lever 5 is pivoted to the sleeve 10 by a screw 14, and similarly one end of the lever 4 is pivoted to the sleeve 9 by a screw 15. The other rule 2 has a similar connection with the levers 4 and 5. A rod 16 is secured at its ends to the ruler 2 by posts 17 and 18, and sleeves 19 and 20 are slidable on the rod 16, these sleeves being pivoted to the two ends of the levers 4 and 5 by screws 21 and 22 respectively.

On each of the rods 16 and 11, I place a ring 27 of rubber or other suitable material to act as a buffer or cushion when the sleeve is advanced to the end of the rod.

In Fig. 4 the sleeve 20 is shown provided with a boss 23, that may be secured to the sleeve by suitable means such as soldering or brazing, the boss having a threaded bore to receive the screw 22. In this view the post 12 is shown as secured to the ruler 2 by means of a screw 24. If desired the rulers may be provided with knobs 25 and 26 respectively.

From this construction it will be readily understood that when the rules are moved apart or together, the levers will swing on their center pivot, as well as on the four sleeves, and that the sleeves will move together or apart on their supporting rods, which will give the desired parallel movement of the rulers when moved in their plane. But it will be seen that each ruler having the guide rod secured thereto is movable with the rod by sliding in its two sleeves, and hence each ruler has a comparatively large range of endwise movement, without any movement of either the other rule or the connecting mechanism, that is, the two levers and the four sleeves pivoted thereto. Furthermore, each ruler carrying its rod can swing on the axis of the rod and attached sleeves, whereby the rule can swing

through an arc of ninety degrees, as shown in Fig. 3. This double movement is of especial advantage in the use of parallel rulers for determining a course in the navigation of a ship, by moving the ruler over the chart. This movement frequently is in a somewhat diagonal direction relative to a given line, and the rule is stepped across the chart. This method is by placing one ruler against the given line, then extending the other ruler the maximum distance, then bringing the first ruler up against the stepped ruler, and repeating this process until the device has advanced across the chart to reach the desired location thereon. Where this location is in a diagonal direction relative to the base line, as the ruler is extended, the rule advanced is slid endwise relative to the other rule at each step, which will require a less number of steps across the chart. In this operation of advancing the rules to and from each other, the rule that is moved is first elevated off the chart, that is permitted by reason of each rule having a swinging connection with the pivoted levers, that will greatly facilitate the operation. By reason of the reduction in the number of operations in stepping the device across the chart the liability to error is greatly reduced, and accuracy of operation is assured.

What I claim is:—

1. A parallel ruler, comprising a pair of rules, guide supporting means on each rule, a pair of elongated guide members longitudinally slidable on each said supporting means, and also arranged to swing on a common axis longitudinal of the rule, and a pair of levers pivoted together at their centers and each having one end pivoted to one of said guide members, whereby each rule can swing on said common axis of the guide members relative to the said levers, and each rule can slide endwise on its guide members without movement of the other rule or of the levers.

2. A parallel ruler, comprising a pair of rules, a rod secured longitudinally on each rule, a pair of sleeves slidable and also rotatable on each rod, and a pair of levers pivoted together at their centers and each having one end pivoted to one of said sleeves, whereby each rule can swing relative to the levers on the axis of its sleeves, and each can also slide longitudinally in its sleeves without movement of the levers or the other rule.

Signed at New York city, N. Y., on December 2nd, 1919.

HANS A. LUND.