1,108,480.

Patented Aug. 25, 1914.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.
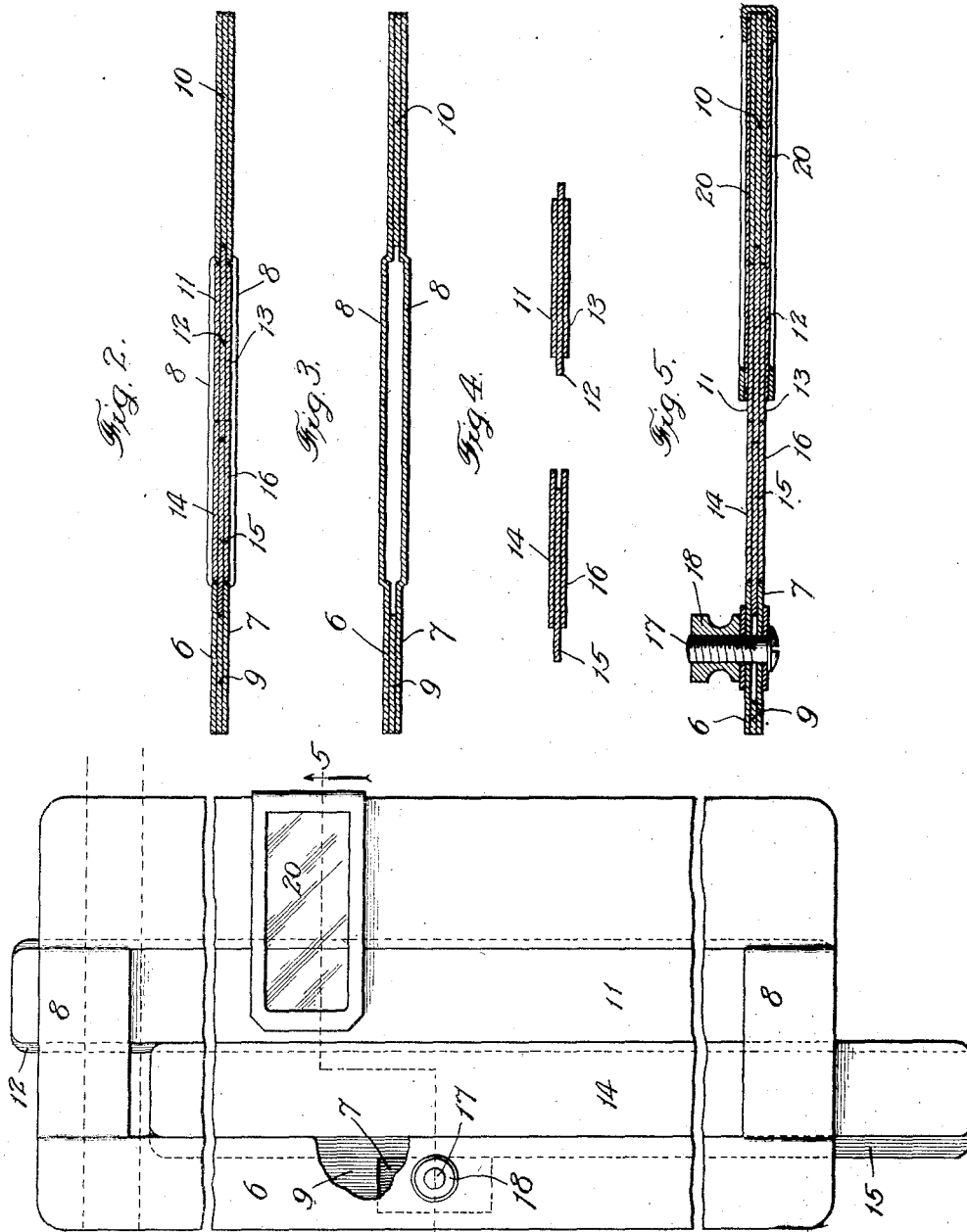
Fig. 1.

Witnesses

Inventor:

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Att'ys.

To all whom it may concern:

Be it known that I, HENRY WEBSTER TOMLINSON, a citizen of the United States, residing at Chicago, in the county of Cook

5 and State of Illinois, have invented a new and useful Improvement in Slide-Rules, of which the following is a specification.

My invention relates to certain new and useful improvements in slide-rules, and is

10 fully described and explained in the specification and shown in the accompanying drawings, in which:—

Figure 1 is an elevation of my improved slide-rule; Fig. 2 is a section on the line 2

15 of Fig. 1; Fig. 3 is a section on the line 3 of Fig. 1, but with the slides removed; Fig. 4 is a transverse section through the two slides; and Fig. 5 is a section on the broken line 5 of Fig. 1, showing the means for lock-

20 ing one slide and the construction of the runner.

The present slide-rule is adapted in its construction to receive upon its various members any sort of mathematical mark-

25 ings which may be desired to enable it to accomplish the particular type of calculation or calculations for which it may be designed. The novelty here sought to be covered, however, inheres entirely in the

30 mechanical construction and not in any mathematical arrangement of the figures which will be applied to the members of the rule, and I therefore have not shown any markings whatever upon the various

35 members, it being understood that they may be marked as desired. It may be added that I am engaged in manufacturing the rule of the Winslow Patent No. 766,009, granted July 26th, 1904, and that the present rule

40 is adaptable for receiving the various figures shown therein, either in the identical form therein illustrated, or with certain trifling modifications, which have been adopted for convenience. The primary aim

45 of the present construction is to afford a slide-rule adaptable for receiving the figures of this particular Winslow rule, or any other slide-rule, which rule shall be very compact and of a strong and indestructible

50 character.

Referring to the drawings, 6 and 7 are the two surface plates or members of the frame of the slide-rule, these members constituting fixed scale-receiving members. These

55 surface-members are formed from sheet-

metal or any other suitable material of the size of the complete slide-rule, and a central perforation or opening is cut through said two surface-members leaving the lateral portions of each connected by bridges 60 8 at the end. These bridges 8 are bent in opposite directions from the plane of the surface-members, as is clearly shown in Fig. 3, to afford between them clearance for the slides, which are of the same thickness 65 as the frame. The surface-members of the frame are spaced apart by spreaders or intermediate plates 9 and 10 on the two sides, each of said spreaders being of sheet-metal. The frame thus consists entirely of sheet- 70 metal, and it is of the thickness of three sheets of metal used, except at the ends, where the bridges are bent apart, an additional thickness of the metal each, whereby there is provided between them a clearance 75 for a slide three sheets of metal thick.

In the form of construction illustrated, two slides are used, the construction of which is shown in Fig. 4. One of the slides consists of three thicknesses of metal, 11, 12 80 and 13; the intermediate piece 12 being of greater width than the two surface pieces 11 and 13 and projecting therefrom on the two sides to form tongues. The other slide likewise consists of three sheets of metal, 85 14, 15 and 16, the intermediate member 15 being offset with reference to the two surface members so as to form a projecting tongue on one side and a groove on the other side adapted to receive the tongue 90 formed by the projection of the member 12 on the adjacent slide. The spreaders 9 and 10 in the frame fall sufficiently short of the edges of the opening punched therethrough that the projecting tongues on the two 95 slides can enter the groove thus formed, all as shown in the drawings.

In making calculations, it is frequently desirable to render one factor permanent for constant use through a long series of 100 calculations. In calculating the strength of beams for example, for which the Winslow slide-rule is particularly designed, a given fiber stress is assumed, so as to afford a proper margin of safety for the entire struc- 105 ture and, when this factor is once determined, it may remain constant throughout all the calculations of all the pieces of the building. In this, and similar cases, it is desirable to lock one of the slides in a rela- 110

tively-fixed position and to accomplish this purpose the locking means shown in Figs. 1 and 5, is provided. It will be seen in these figures that the member 9 is cut away at a central point, so as to render the two surface members of the frame yielding at that point, and through this yielding part is passed a screw 17 upon which is a nut 18. When this nut is tightened up, the surface-members of the frame will be sprung together tightly to clasp the tongue of the adjacent slide, locking it in a relatively-fixed position. For the purpose of reaching across the broad side of the frame upon which, in practice, it is sometimes desirable to place a series of scales or a large number of figures, a runner is provided, consisting of a U-shaped sheet-metal piece bent over the edge of the slide-rule, having openings in its two legs or ends in which are placed transparent windows, of celluloid or the like, 20, upon which windows may be drawn lines at right-angles to the sides of the slide-rule whereby to get the usual function of a runner. It will thus be seen that in a peculiarly simple, compact and durable form, I have provided a slide-rule capable of receiving arithmetic or logarithmic markings whereby to fit it for a large number of calculating purposes. The slide-rule, which I have built for the markings in accordance with the foregoing design, is only one-sixteenth of an inch thick, except at the ends, where the bridges make it an eighth of an inch thick. Furthermore, the mechanical construction is such that both surfaces of the rule are practically alike and both faces can be used in accordance with common practice, if desired. Still further, the design is such that when once dies are made for the manufacture of the structure from sheet-metal, manufacturing becomes quite simple and cheap, and it will thus be possible, in accordance with this design, to make slide-rules in various forms and at very low prices, particularly when they are supplied with scales of the types for which there is a large demand.

While in the drawings I have illustrated a structure having a frame with two slides, it will be manifest that as far as certain features of the invention are concerned, either more or less slides could be used and the proportions in dimensions can be varied as desired to suit the arithmetical demands of the particular rule. Therefore, while I have described the present form in detail, I do not intend to be limited thereto, except as pointed out in the following claims in which it is my intention to set forth all the novelty inherent in the construction as broadly as is permitted by the state of the art.

What I claim as new and desire to secure by Letters Patent is:—

1. A slide-rule, comprising a frame formed with an opening, the side walls of which are formed with grooves and the end walls are formed with transverse openings, two adjacent slidable members, each consisting of two surface plates and an intermediate plate, the edges of the intermediate plate of one member projecting beyond the surface plates to form tongues, one of the latter sliding in one of the side grooves in the frame, the surface plates of the companion member extending over one edge of its intermediate plate to form a groove which receives the tongue on the adjacent slidable member, the opposite edge of the aforesaid intermediate plate of the companion member projecting beyond said surface plates to form a tongue which slides in one of the side grooves in the frame, and clamping means acting at a right angle to the surface of the slidable members.

2. A slide rule comprising a frame formed of upper and lower plates provided with elongated registering openings and two side intermediate plates parallel with the side walls of the openings, the ends of the upper and lower plates of the frame between the inner edges of the two intermediate side plates being spaced to form passages for a slidable member, one of the intermediate side plates being cut away, two adjacent slidable members, each consisting of two surface plates and an intermediate plate, the edges of the intermediate plate of one member projecting beyond the surface plates to form tongues, one of the latter sliding in one of the side grooves in the frame, the surface plates of the companion member extending over one edge of its intermediate plate to form a groove which receives the tongue on the adjacent slidable member, the opposite edge of the aforesaid intermediate plate of the companion member projecting beyond said surface plates to form a tongue which slides in one of the side grooves in the frame, and means adjacent the cut away portion of the side intermediate plate for drawing the upper and lower plates of the frame together to bind the tongue of the adjacent slidable member.

In testimony whereof I have hereunto set my hand this 14th day of January, 1913.

HENRY WEBSTER TOMLINSON.

In presence of two subscribing witnesses:
NELLIE B. DEARBORN,
A. C. FISCHER.