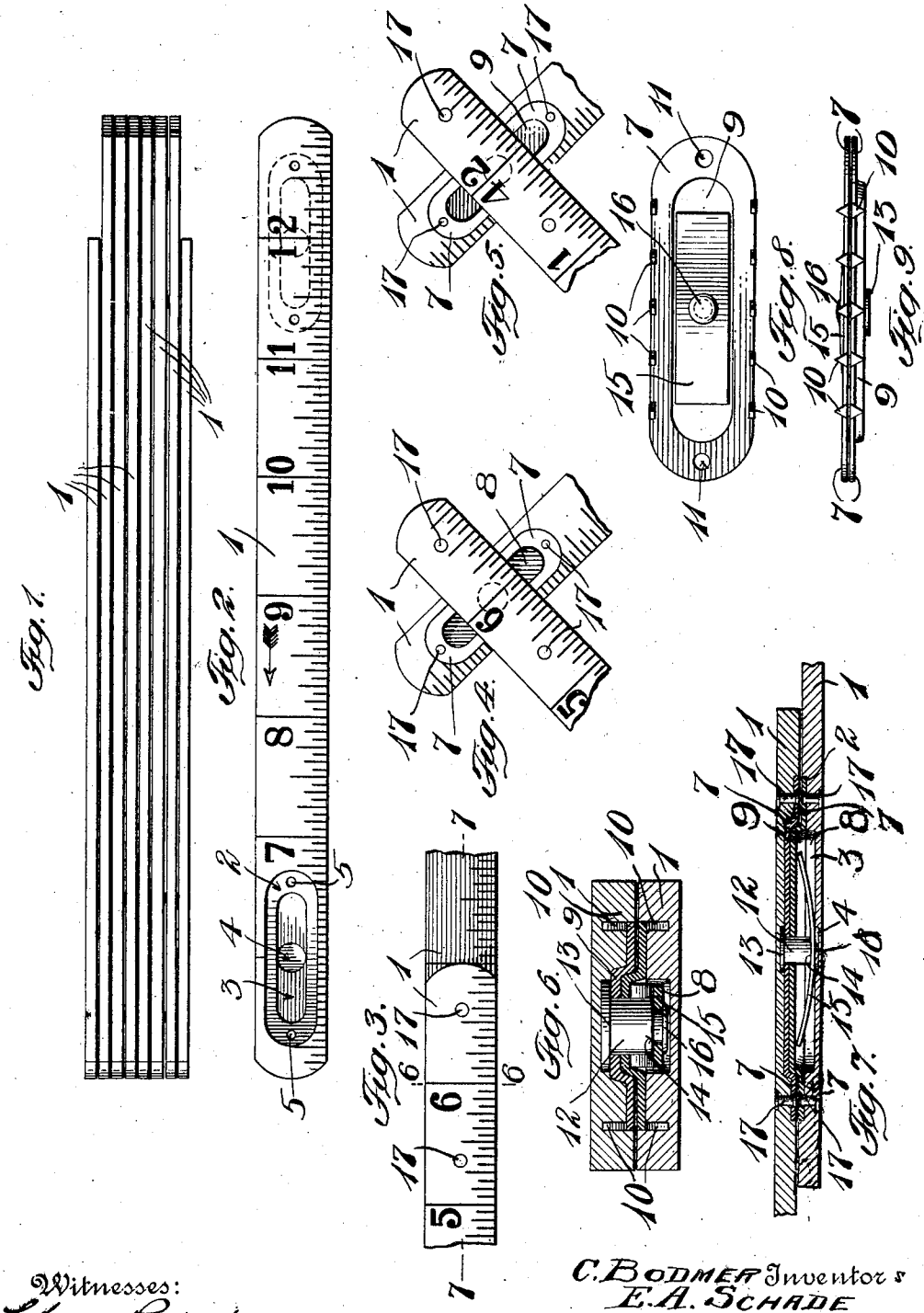
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FOLDING RULE JOINT.

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1,080,192.

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CHRISTIAN BODMER AND EDMUND A. SCHADE, OF NEW BRITAIN, CONNECTICUT, ASSIGNORS TO THE STANLEY RULE & LEVEL COMPANY, OF NEW BRITAIN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

FOLDING-RULE JOINT.

1,080,192. Specification of Letters Patent. Patented Dec. 2, 1913.

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To all whom it may concern:

Be it known that we, CHRISTIAN BODMER and EDMUND A. SCHADE, citizens of the United States, residing at New Britain, Hartford county, State of Connecticut, have invented certain new and useful Improvements in Folding-Rule Joints, of which the following is a full, clear, and exact description.

The present invention relates to improvements in joints for folding rules of the "snake" or "zig-zag" type in which the several sections of the rule are connected by a pivot passing through the flat surfaces at the overlapping end of the several rule sections.

Our improved construction is designed to provide structural details providing for the maintenance of absolute accuracy of the graduations in the assembled sections throughout the entire length of the rule; to afford a continuous unbroken line of graduations or division marks along the edge of the entire rule; to present a continuous unbroken ruling edge; and to provide a simple and effective structure for accomplishing these ends. These and other advantages resultant from our improved construction will be apparent from the more detailed description following, taken in connection with the accompanying drawings forming part thereof and in which:

Figure 1 is a side elevation of a folded rule provided with the improved joint forming the subject matter of the present invention. Fig. 2 is a top plan view of a single rule section showing the recesses formed therein to receive the parts of the joint. Fig. 3 is a top plan view of parts of two extended joint sections. Fig. 4 is a top plan view of such section parts partially folded. Fig. 5 is a reverse plan view of the parts shown in Fig. 4. Fig. 6 is a transverse sectional view on an enlarged scale, taken on the line 6—6 of Fig. 3. Fig. 7 is a longitudinal section on an enlarged scale taken on the line 7—7 of Fig. 3. Fig. 8 is a top plan view of the joint parts assembled and ready for insertion between the overlapping ends of two rule sections. Fig. 9 is a side elevation of the parts shown in Fig. 8.

Referring to the drawings by numerals: 1 indicates the several rule sections upon which proper graduations are placed in the usual manner. These several sections overlap at their ends and the overlapped portions are connected by suitable pivotal means whereby said sections may be straightened out into line for the purposes of measurement. The improved form of joint forming the subject-matter of our present invention is designed to be inserted between the overlapping ends of these sections. In order to accomplish this, each section adjacent each end thereof and on opposite faces thereof is provided with an annular recessed portion 2 and with a second annular recessed portion 3 within and concentric with the first recessed portion 2. A central and concentric socket 4 is formed in the rule section within this second annular recessed portion. Extending through each rule section at opposite ends of the annular recessed portion 2 are rivet holes 5 spaced apart a determined distance, this distance in the case of each recess being always the same and the recesses themselves being always positioned at determined distances apart. These recesses lie within the edges of the rule section and are adapted to receive the parts providing the joint. This joint is effected through complemental joint plates arranged in sets of two each for each joint, each plate being provided with an outer flanged portion 7 shaped and adapted to be seated within and over the annular recessed portion 2 with which it coöperates. One of these plates is provided with a projected portion 8 struck up longitudinally and centrally thereof, and the other and coöperating plate of the set is provided with a recessed portion 9 likewise struck up longitudinally and centrally of its plate, these recessed and projected portions forming locking recesses on one part and cooperating locking projections on the other part. The walls bounding these projected and recessed portions 8—9 are beveled so that the two joint plates 6—6 of each set may be swung around one upon the other when sufficient force is applied, it being understood, of course, that the projected portion of each plate of a set is made slightly smaller than, and fits within, the recessed portion of its coöperating plate when the plates are either extended or folded and therefore in position to register with each other. A plurality of fastening tangs 10 are struck up from the outer longitudinal

edges of each joint plate, while rivet holes 11 are formed in opposite ends of the flanges 7—7, these holes being spaced at determined intervals so that they will register with each other in the plates of each set, and with the rivet holes 5 in the overlapping ends of each section. The joint plates of each set are held together by pivot pins 12 inserted from the exterior through a central recess in the recessed portion 9 of the one plate and in the projected portion 8 of the other, the flanged end 13 of the pivot pin pressing against the exterior of said recessed portion 9. Adjacent its end this pivot pin is provided with a shoulder 14 upon which is seated a leaf spring 15 extending longitudinally of the interior of the projected portion 8 of the joint plate and locked on its seat by upsetting the end of the pivot pin against the outer face of the spring as at 16. This construction effectively holds the spring on its seat, and by reason of the shoulder 14, part of the strain of the compression and expansion of the spring is taken off the upset end 16 of the pivot, thereby tending to prevent the wearing off of this headed or upset end by the turning of the parts when the joints are opened and closed.

The two coöperating plates forming a set are shown assembled in Figs. 8 and 9 of the drawings, the leaf spring 15 normally tending to press the projected portion 8 of the one plate into the recessed portion 9 of the coöperating plate, and the pivot pin 12 pivotally securing the two plates together so that, as before stated, if sufficient force is applied, one plate may be swung around on the other, this being permitted by the fact that the walls of the interlocked projected and recessed portions are beveled or inclined so that the two pivoted joint plates may be swung around one upon the other against the force of the leaf spring 15, which tends normally to interlock the projected and recessed portions. In order to assemble these joint plates with the recesses of the overlapping ends of the two rule sections, the plates, as assembled in a set (as shown in Figs. 8 and 9) are seated between the overlapping ends of two joint sections with their flanges 7 resting upon the recessed portions 2 of the respective rule sections, and pressure is applied to force the fastening tangs 10 into the material of the rule sections. This will securely hold the two pivoted joint plates to their respective rule sections so that one section may be swung around upon the other to expose the rivet holes 11 in the flanges 7 of each section. As before stated, these rivet holes will coincide with the rivet holes 5 extending through the recessed portions 2 of the rule sections. Rivets 17 may now be inserted through these rivet holes and the joint plates securely and accurately positioned within the recesses designed to receive them. The flanged end 13 of the pivot pin will seat within the central socket 4 of one overlapping end, and the upset end 16 of the pivot pin will, when the joint plates are interlocked (see Fig. 7) seat within the corresponding socket 4 in the opposite overlapping end of the coöperating rule section. Inasmuch as the joint plates are secured to these sections, one section may be swung around upon the other by the application of sufficient force, this action withdrawing an interlocking part of one joint plate from engagement with the coöperating interlocked part of the other joint plate, the pivot pin 12 moving up through the apertures in the joint plates and compressing the leaf spring 15. This action occurs when one of the sections of the folding rule is moved upon and relatively to another section and from extended to folded position or vice versa. When the sections of the rule are being unfolded or extended for the purpose of measurement, this disengaging action of the interlocked parts will take place upon the initial movement from folded position, and when each section has been straightened out in the line with its adjacent section, the spring 15 will snap the projected and recessed portions of each joint plate into interlocking engagement and will hold them rigidly against accidental displacement. When the rule is folded up, the same disengaging action takes place, the interlocking portions again snapping into interlocked engagement when the sections of the rule are folded upon each other to return to the parallel position they occupy when folded.

The joint plates are located well within the edges of the rule sections so that a continuous straight line of graduations or division marks along the edge of the entire rule may be had, thus enabling a continuous straight line to be drawn from one end of the rule to the other without deflection being caused by offsets at the point of the joints of the rule sections.

By making the recesses in the sections of uniformly correct size and spaced always at determined intervals; by drilling the rivet holes therein at uniformly determined points and by forming the joint plates and their pivots to correspond with and accurately fit within these recesses with their rivet holes in alinement with those of the rule section, absolute accuracy in the line of extended graduations is assured.

Having now particularly described our invention, what we claim and desire to secure by Letters Patent is:

1. In a rule joint, the combination with coöperating rule sections overlapping at their ends and having their opposing overlapping faces provided with complemental recesses therein lying wholly within the

edges of said sections, of complemental joint plates shaped to seat wholly within said recesses and secured to the opposing faces of said sections, and provided respectively with male and female interlocking means, a pivot stud positioned wholly within said recesses and connecting said joint plates, and means normally tending to hold said joint plates interlocked.

2. In a rule joint, the combination with cooperating rule sections overlapping at their ends and having their opposing overlapping faces provided with complemental recesses therein lying wholly within the edges of said sections, of an assembled joint unit comprising complemental joint plates provided with means for securing the same respectively to the opposing faces of said overlapping sections, a stud pivotally connecting said plates, said plates being provided with complemental male and female portions and with means normally tending to hold said portions interlocked, and said joint unit seating wholly within the area of said recesses and on the opposing overlapping faces of said sections with its pivot stud lying wholly within said recesses.

3. In a rule joint, the combination with coöperating rule sections overlapping at their ends and provided with recesses in their adjacent faces at such ends and within the edges of said sections, and provided further with rivet holes extending through said recessed portions, of complemental pivoted joint plates seated within said recesses and having fastening tangs projecting therefrom and into said rule sections and having rivet holes therein registering with said rule section rivet holes, with holding rivets in said holes, said joint sections being formed with coöperating projected and recessed portions, and means including a spring normally tending to hold said coöperating portions interlocked when the rule sections are extended or are folded.

4. In a rule joint, the combination with coöperating rule sections overlapping at their ends, of complemental joint plates secured to the overlapping faces of said rule sections and provided with interlocking projected and recessed portions respectively, a pivot stud extending through said portions with one end within said recessed portion and provided with a shoulder thereon, a leaf spring seated on said stud against the shoulder thereon, the end of said stud being headed to retain said spring on said stud and against said shoulder, and said spring resting against said projected portion and normally tending to hold the latter interlocked with said recessed portion.

5. In a folding rule comprising a plurality of overlapping pivoted sections having recesses formed in the adjacent overlapping faces and within the edges thereof, said sections having rivet holes extending through their recessed portions near the ends thereof, and assembled joint units comprising complemental joint plates pivotally connected by a stud centrally thereof and arranged to be seated wholly within the area of said recesses, said joint plates being provided with rivet holes therein corresponding to the rivet holes in said recesses, holding rivets in said rivet holes, the pivot studs of said joint units being arranged to lie wholly within the recessed portion of said sections, said complemental joint plates providing interlocking means located between the rivet holes therein and spring means coöperating with said interlocking means to yieldingly hold said rule sections in alinement when said rule is extended.

6. A folding rule comprising a plurality of overlapping pivoted sections having recesses formed in the adjacent overlapping faces thereof and within the edges thereof, said sections having rivet holes extending through their respective recessed portions near the ends thereof, complemental pivoted joint plates provided with fastening tangs at the edges thereof, said plates being seated in said recesses and having rivet holes therein corresponding to the rivet holes in said recesses, with holding rivets within said rivet holes for holding said plates seated in their respective recesses, complemental recessed and projected portions respectively formed in said plates, and spring means normally tending to hold said complemental portions in interlocking engagement when their respective rule sections are extended.

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