July 19, 1955 C. ZELNICK 2,713,206

FOLDING RULE JOINT

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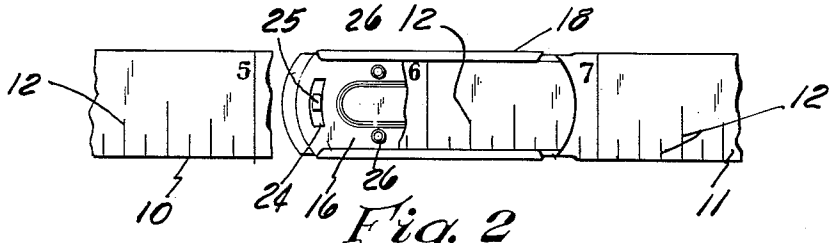


Fig. 2

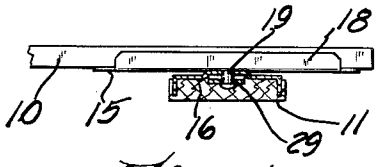


Fig. 1

Fig. 3-A

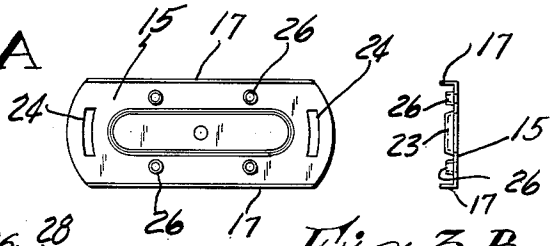


Fig. 3-B

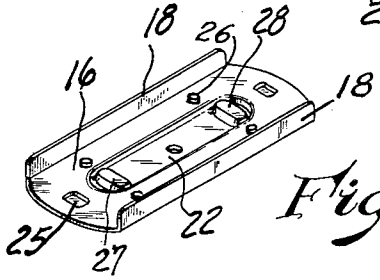


Fig. 6

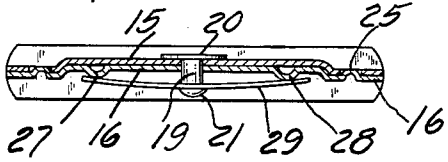


Fig. 4

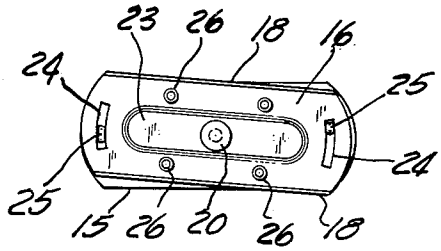


Fig. 5

INVENTOR.
Charles Zelnick
BY
Fairmant & Fairman
ATTORNEYS

United States Patent Office

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FOLDING RULE JOINT

Charles Zelnick, Saginaw, Mich., assignor to The Lufkin Rule Company, Saginaw, Mich.

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4 Claims. (Cl. 33—115)

This invention relates to folding rules and more particularly to the spring controlled joints thereof and certain novel improvements therein.

It is customary practice to provide a joint for the superposed ends of adjacent rule sections comprising a pair of cooperating plates which are similarly embossed and thence oppositely disposed so that the embossed portion of one of the plates nests within the embossed portion of the other plate. Normally bowed strip springs mounted on a central pivot which connects the plates have been employed to oppose separation of the plates, and accordingly, when the rule sections are pivoted out of longitudinal alignment and the plates separated, the resilient springs are flattened with the result that upon return to longitudinal alignment, the cooperating plates snap back into nesting relation. Since for best results and because of space limitations, the spring has been mounted in the depressed area of the nesting portion of the one plate, it has been customary to curl or turn up the outermost edges of the spring so that when it flattens out, it will not catch the ends of the depressed area.

The patent to Witchger, #1,829,975, granted November 3, 1931, and the patent to Lindhe, #2,629,179, issued February 24, 1953, illustrate the manner in which the end edges of the spring have been upturned to prevent them from catching or gouging when the spring is flattened. While hardened steel, stock which can be cut to form strip-springs of the type necessary, is available on the market, it has heretofore been necessary to purchase a relatively soft steel and provide dies to form or curl the ends of the cut strips, after which the strips are treated to harden them. My new construction eliminates this die cost, also the treating process, much of the labor cost, and further provides a more economical construction.

One of the prime objects of the instant invention is to provide a joint construction in which it is unnecessary to curl the ends of the pre-tensioned spring which tends to retain the joint plates in nesting relation.

Another object of the invention is to provide a joint construction of the type described, which will not require additional space and thus not demand larger recessed areas which would weaken the rule sections for housing the joint assembly.

A further object of the invention is to provide a joint construction which has less friction and consequently a greater spring force or snap is obtained from a spring of reduced length and thickness, and the spring-controlled action of the joint is enhanced.

A still further object of the invention is to design a rule joint of strong and durable construction which is much more economical to manufacture and assemble.

Still a further object is to provide a spring which forms a perfect bow, thus providing equal bearing on the opposite ends thereof.

With the above and other objects in view, the present invention consists in the combination and arrangement

of parts, hereinafter more fully described, illustrated in the accompanying drawing, and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportion, and minor details of construction, without departing from the spirit, or sacrificing any of the advantages of the invention.

In the drawing:

Fig. 1 is an edge elevational, sectional view showing the hinge plate and ends of the rule section in superimposed relation.

Fig. 2 is a top plan view of a rule joint with portions thereof broken away to illustrate the relative portions of the rule sections and hinge plates.

Fig. 3A is a plan view of the outer face of the upper hinge plate. Fig. 3–B is an end elevational view thereof.

Fig. 4 is an enlarged, sectional, edge elevational view similar to Fig. 1 with the wood sections omitted and the upper and lower plates in alignment.

Fig. 5 is a plan view of the assembled plates with the upper plate swung slightly out of alignment with the lower plate.

Fig. 6 is a perspective plan view of the outer face of the lower hinge plate.

Referring now more particularly to the accompanying drawing in which I have shown the preferred embodiment of my invention, the numerals **10** and **11** indicate a pair of adjacent rule sections which are provided with graduation lines **12**, the inner faces of the ends of the sections being recessed or routed as usual so that the rule provides a housing for the joint assembly which connects the sections in the usual manner.

The joint assembly comprises a pair of thin metal hinge plates **15** and **16** which are attached to the adjacent ends of the sections **10** and **11**. The plate **15** is provided with a pair of marginal flanges **17** and the plate **16** with a pair of marginal flanges **18** which are folded around the beveled edges of the rule sections **10** and **11** respectively in the usual manner to clamp them firmly thereto.

Provided to pivotally connect the plates **15** and **16** in back-to-back relation is a rivet **19** with the ends **20** and **21** thereof upset in the usual manner to retain the plates in assembled relation. It is to be observed that the plate **15** is embossed to provide a depressed portion **23**, and the oppositely disposed plate **16** is similarly embossed to provide a complemental raised portion **22** which nests in the portion **23** when the sections **10** and **11** are superposed in aligned relation. Additionally, arcuate slots **24** constructed in accordance with Patent #1,829,975 granted to Eugene J. Witchger on November 3, 1931, are provided in the ends of the plates **15**, and cooperating projections **25**, formed on the plate **16**, lock the plates against relative longitudinal shifting when they are in longitudinal alignment to prevent undue wear of the pivot **19** which would render the rule inaccurate. To prevent the plates **15** and **16** from shifting on the wood sections **10** and **11**, annular projections **26**, struck from the plates **15** and **16**, are adapted to anchor therein respectively.

The structure thus far described is conventional and forms no part of the instant invention, except in combination with the novel structure which I shall now describe.

Provided in the recess or depression formed by the portion **22** near the ends thereof, are a pair of transversely disposed pillow-shaped projections **27** and **28** which are embossed therein. It is to be observed that the edge of these projections **27** and **28** are beveled or crowned and that the faces thereof are substantially flush with the face of the plate **16**. The ends of a normally bowed spring **29**, which is pre-tensioned by the rivet **19**,

bear on the projections **27** and **28** and tend to lock the plates **15** and **16** in nested relation. The spring **29**, will, of course, yield under the cam-like action of the raised portion **22** to permit the separation of the plates whenever the portion **22** is moved about the pivot **19**, it being understood that the embossed portions **22** and **23** have sloped marginal walls as usual, enabling the spring **29** to return them to nested position with a final snap when the sections are once again swung into longitudinal alignment. The central portion of the pre-loaded spring **29** preferably projects only very slightly beyond the ends thereof when the plates **15** and **16** are in nested position, and when the plates are swung out of nesting relation to further tension the spring **29**, the ends preferably project slightly beyond the central portion thereof.

From the foregoing description it will be apparent that I have perfected an improved joint for folding rules which enhances their spring-actuated action, which will not become loose and sloppy with use, which will wear for a long period of time, and which permits them to be more economically manufactured and assembled.

What I claim is:

1. In combination, a rule joint comprising a pair of hinge plates adapted to pivotally connect a pair of adjacent rule sections, each of said plates being formed with a longitudinally disposed, elongated, pressed out portion to provide a recess in one plate and a similarly shaped, elongated projection on the companion plate, said plates being oppositely disposed so that the projection portion of one plate nests in the recess of the other plate when said plates are superposed in alignment, raised bosses formed in the recess in said elongated projection, a substantially centrally fixed normally bowed pre-tensioned spring disposed in the recess formed by said projection with the ends thereof bearing on the raised bosses to enhance the spring action of said joint, and a substantially central pivot connecting said plates and pre-tensioning said spring so that the central portion thereof is almost in alignment with the ends thereof.

2. In combination, a rule joint comprising a pair of oppositely disposed hinge plates fixed on the superposed ends of a pair of adjacent rule sections, a central pivot connecting said plates, each of said plates being formed with a similar longitudinally disposed, pressed out portion to provide a recess in one plate and a projection on the companion plate, said projection nesting in said recess when the plates are superposed in alignment, transversely disposed, spaced-apart, raised bosses provided in the recess formed by said projection and extending substantially flush with the face of said plate, the bosses being spaced from the ends of said recess, and a longitudinally disposed leaf spring pre-tensioned by said pivot

lying in the recess formed by said projection with its ends bearing on said transversely disposed, raised bosses, the ends of said spring terminating slightly beyond said bosses at spaced distances from the ends of said recess at points in positions where they cannot engage the marginal edges of the recess formed by said nesting projection on flexing of said spring to bow the spring oppositely.

3. The combination defined in claim 2 in which the edges of the upper face of said transversely disposed, raised bosses are rounded.

4. In combination, a rule joint comprising a pair of oppositely disposed hinge plates fixed on the superposed ends of a pair of adjacent rule sections, a central pivot including a head thereon, connecting said plates and projecting a predetermined distance beyond the plates when they are superposed in alignment and facial engagement, each of said plates being formed with a similar longitudinally disposed, pressed out portion to provide a recess in one plate and a projection on the companion plate, said projection resting in said recess when the plates are superposed in longitudinal alignment, transversely disposed, spaced apart, raised bosses provided in the recess formed by said projection and terminating a predetermined distance short of the head of said pivot, said bosses extending substantially flush with the face of said plate and being spaced from the ends of said recess, and a longitudinally disposed leaf spring pretensioned by said pivot lying in the recess formed by said projection with its ends bearing on said transversely disposed bosses, the head of said pivot holding the intermediate portion of said spring disposed only slightly beyond said bosses so that said normally bowed spring is almost flat when the plates are in longitudinal alignment and will be bowed in the opposite direction when the plates are separated as one is pivoted out of longitudinal alignment with the other, the ends of said spring terminating slightly beyond said bosses at spaced distances from the ends of said recess so as not to engage the marginal edges of the recess on flexing of said spring to bow the spring oppositely.

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