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A. QUENOT

3,623,230

FOLDING MEASURING RULE

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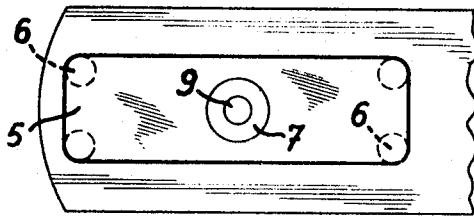
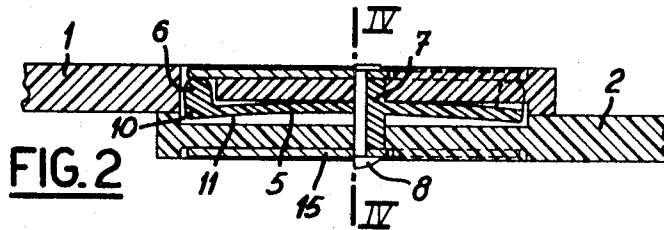
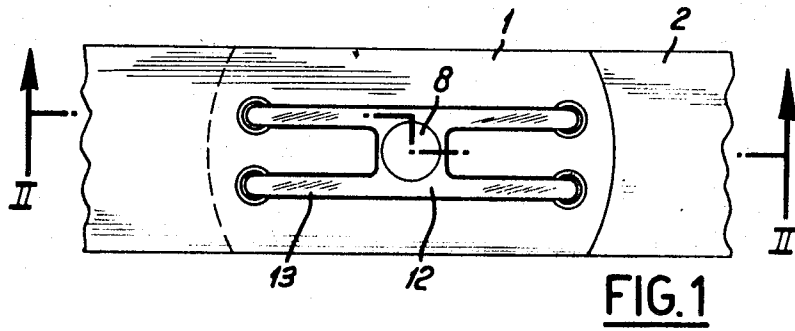


FIG. 3

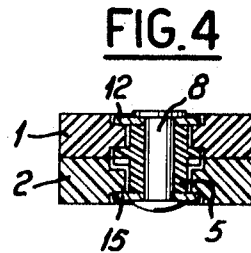


FIG. 4

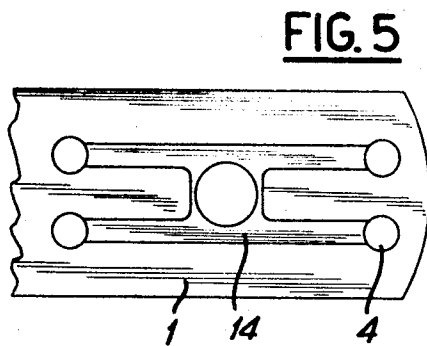


FIG. 5

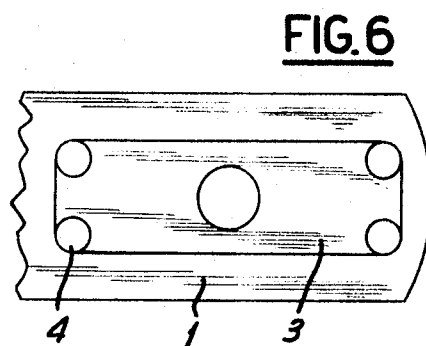


FIG. 6

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FOLDING MEASURING RULE

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7 Claims

ABSTRACT OF THE DISCLOSURE

In a folding measuring rule each pair of adjacent limbs is pivotally hinged by a rivet. Each such hinge includes a resilient locking element extending between the two limbs and with at least one projection out of the plane of the rule. One of the limbs of the pair has at least one depression into which said projection is engageable when the limbs are in full open or closed position, the locking element being resiliently displaceable away from the limb with depressions during pivoting of the limbs.

This invention relates to folding measuring rules. Rules are known of the type which are made of a number of limbs which fold one upon another at hinges formed by rivets and are made of a synthetic plastics material. These rules may include means for ensuring the maintenance of the folded or unfolded position of two adjacent limbs, namely two metallic springs mounted on the ends of the limbs in the same manner as on folding rules made of wood or of duralumin of a conventional type.

It has also already been proposed to form directly by injection moulding the reliefs and bosses allowing the engagement of two adjacent limbs in open or closed position. This technique, which consists in forming on the limbs in a synthetic plastics material, the springs of plastics material already used on the duralumin rules, ensures a better friction at the level of the articulation whilst being of a lower cost to manufacture. However, the elasticity of such a hinge is practically nil and rules thus made would in practice not be useable. To remedy this difficulty, it is already known to provide the hinge of a metallic spring by a piano wire passing the head of the rivet joining two adjacent branches. It is thus possible to lightly swing aside the two limbs one from another at the moment of their rotation.

The first type of folding rule with metallic springs inserted is relatively expensive and its hinges do not show any progress with respect to those of rules of the conventional type.

In the case of hinges with bosses made directly by injection, the friction of the two limbs one on the other leads fairly rapidly, despite the use of a piano wire spring, to the gradual wearing of the surfaces present whilst the chemical alternation of the plastics material leads to the progressive disappearance of the intrinsic elasticity of the said surfaces. At the end of a certain time, only the elasticity of the metallic spring is then effective, but the relative displacement of the two limbs along the hinge rivet then leads to the wearing of the rivet or the portion of the limb co-operating with the rivet. The amount of play at the hinge then becomes excessive in all directions and can result in the total deterioration of the articulation. According to the nature of the synthetic material forming the limbs of the folding rule, this effect can be further increased by the relatively increased friction of two surfaces of identical nature rubbing one against the other.

It is therefore an object of the invention to provide a

folding measuring rule which may be made of synthetic material, wherein the various disadvantages described above are overcome and which has a considerably increased life of its hinges.

According to the invention there is provided a folding measuring rule wherein each pair of adjacent limbs is pivotally hinged by a rivet, wherein each such hinge includes a locking element made of resilient material which extends between the two limbs and has at least one projection out of the plane of the rule, and one of the limbs of the pair has at least one depression into which said projection is engageable when the limbs are in fully open or closed positions, the locking element being resiliently displaceable away from the limb having the depressions during pivoting of the limbs.

The invention will be further described with reference to a preferred embodiment thereof as shown in the accompanying drawings, wherein:

FIG. 1 represents a view from above of a hinge and portions of the adjacent limbs of a rule according to the invention which is in the open position.

FIG. 2 is a section along line II—II of FIG. 1;

FIG. 3 is a view from below of the upper limb, the lower limb being removed;

FIG. 4 is a transverse section of the rule and hinge, passing through the rivet on line IV—IV of FIG. 2;

FIGS. 5 and 6 are views from above and below respectively of the upper limb without its hinge mechanism.

Referring to FIGS. 1 and 2, the folding rule according to the invention comprises limbs such as 1 and 2 made of a synthetic material, for example, covered or reinforced by some fibre (such as glass). The end of the upper limb 1 is provided, at its lower face, with a recessed area 3 of rectangular shape. Four holes 4 pass through the limb 1 at the corners of the recessed area 3, and said recessed area receives a locking bar 5 made of synthetic self-lubricating material, for example of the type sold under the trade mark "Delrin."

The locking bar 5 which is of rectangular shape has at its four corners, four circular projections (bosses or teats) 6 which can engage in the holes 4. The locking bar also has a central annular projection 7 extending both above and below the bar and projecting into pivoting holes of corresponding dimensions which are formed in the limbs 1 and 2. A rivet 8, which may be metallic, passes through the projection 7 through a central hole 9 formed therein, and effects the connection between the two limbs 1 and 2 at the hinge.

The locking bar 5 also preferably has a certain intrinsic elasticity which permits its two extremities situated at the level of the projection 6 to merge above the lower face of the limb 1 so as to form reliefs such as that shown at 10 in FIG. 2. These reliefs penetrate into a corresponding depression 11, of rectangular form, formed in the upper face of the limb 2. Locking together of the two limbs is thus effected by means of this penetration of the bar 5 into the hole 11.

During the relative rotation of the limbs 1 and 2 with respect to one another, the bar 5 can be temporarily displaced within the rectangular hollow 3 which allows the two branches to pivot one over the other practically without deformation of the limbs at the level of their overlapping avoids the limbs made of synthetic material being subjected to permanent deformation since the limbs are not subjected to any constraint.

Furthermore, the self-lubricating character of the synthetic material forming the locking bar, which avoids the friction of the limbs of the same type one on another, reduces the friction of the bar with the lower limb which thus reduces the risk of deterioration and wearing of the hinge.

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It is thus possible to increase the firmness of the resilient bar assembly 5 by including on the upper part of the limb 1, and held by the rivet 8, an H-shaped metallic spring 12 (FIG. 4). The limbs 13 of this spring 12 are cambered downwardly so that the ends of the limbs engage over the projections 6 so as to ensure a precise positioning of the adjacent limbs in open or closed position. The H-spring 12 is preferably arranged inside a correspondingly shaped depression (FIG. 5). The spring 12 thus does not increase the thickness of the hinge and can also contribute to ensure a further rigidity to the limb 1 at the region of the hinge.

It is also possible to arrange, under the lower face of the limb 2, and in a hollow of corresponding form to that of the depression 14, a spring 15 (FIG. 4) identical to the spring 12. This spring 15, which is also previously cambered, further allows the general elasticity of the hinge to be increased. It is to be noted that the springs 12 and 15 do not extend to the edges of the rule and this allows the continuation as far as the end of each limb of the centimetric or other gradation of these limbs.

The invention is not limited to the particular form described. Thus the shape of the engagement element such as the locking bar can be altered and the reliefs which are formed thereon can have any configuration provided that they co-operate with complimentary reliefs or depressions of the adjacent limb. The elasticity of the engagement elements can be of the same nature as that of the bar or of the springs described or even of a combination of the two. The limbs of the rule can have a certain looseness along the rivet or can have only a very short play along this rivet according to different embodiments.

What is claimed is:

1. In a hinge for connecting two sections of a folding measuring rule, an improvement comprising, in combination, first and second sections of a folding measuring rule, each said section having a recessed area in an end portion thereof, a rivet pivotally joining said end portions of said sections wherein said recessed areas are disposed in a face-to-face relation, and wherein said rivet is disposed centrally of said recessed area of said second section, a resilient locking member disposed within said recessed area of said first section and extending longitudinally of said first section, said locking member having a free end and having an opposing end fixed with respect to said first section, and means for resiliently urging said free end of said locking member into said recessed area of said second section to impede pivotal relative movement of said sections when said sections are aligned longitudinally, wherein said relative pivotal movement causes deflection of said locking member out of said second recess, and whereby said first and second sections are resiliently held in place when aligned longitudinally and are pivotal with respect to each other in a deflection-free manner.

2. A hinge for connecting two sections of a folding measuring rule as set forth in claim 1, in which said first section has a hole passing therethrough in communication with said recessed area of said first section and in alignment with said free end of said locking member, and in which said means for urging said free end of said locking member into said second recessed area comprises a projecting portion connected to the free end of said locking member and extending into said hole, and first spring

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means attached to said first section and extending over said hole to contact said projecting portion to resiliently impede movement of said projecting portion further into said hole.

3. A hinge for connecting two sections of a folding measuring rule as set forth in claim 2, further comprising second spring means disposed between a head of said rivet and said second section for resiliently urging said first and second sections into close contact.

4. In a hinge for connecting two sections of a folding measuring rule, an improvement comprising, in combination, first and second sections of a folding rule, each said section having a rectangular recessed area in an end portion thereof, a rivet pivotally joining said end portions of said sections wherein said recessed areas are disposed in a face-to-face relation, and wherein said rivet is disposed centrally of both said recessed areas, a rectangular, plate-shaped, resilient locking member disposed within said recessed area of said first section, said locking member having a transverse sleeve fixed centrally thereof and extending through said first and second sections and receiving said rivet therethrough, and means for resiliently urging the longitudinally remote portions of said locking member into said recessed area of said second section to impede pivotal movement when said sections are aligned longitudinally.

5. A hinge for connecting two sections of a folding measuring rule, as set forth in claim 4, in which said first section has four holes therethrough at the corners of its said recessed area, and in which said means for urging said locking members into said second recessed area comprises four projections connected one each to the respective corners of said locking member for extending into said holes, and first spring means connected to said first section for covering said holes to engage said projections and resiliently urge said locking member toward said second section.

6. A hinge for connecting two sections of a folding measuring rule, as set forth in claim 5, further comprising second spring means disposed between a head of said rivet and said second section for resiliently urging said first and second sections into close contact.

7. A hinge for connecting two sections of a folding measuring rule, as set forth in claim 5, in which said first spring means comprises an H-shaped spring having an interconnecting member and four legs extending therefrom, wherein said interconnecting member receives said rivet therethrough for being held in place, and wherein said four legs cover said four holes.

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