# United States Patent [19]

**Hemgren**

[11] **3,797,795**

[45] **Mar. 19, 1974**


[54] **CLAMPING ROD FOR THE SUSPENSION OF MATERIAL IN THE FORM OF SHEETS OR THE LIKE**


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[22] Filed: **Apr. 3, 1972**

[21] Appl. No.: **240,644**

[30] **Foreign Application Priority Data**

May 28, 1971 Sweden ..... 6937/71

[52] **U.S. Cl.** ..... **248/316 R**, 40/156

[51] **Int. Cl.** ..... **A47h 21/00**

[58] **Field of Search** ..... 248/316 R, 316 D, 473, 248/489; 211/45; 40/156, 11 R; 24/255 S, 255 FC, 259 FC, 259 PF; 160/392, 395, 371; 52/502



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,918,244 | 12/1959 | Laney | 248/316 D X |
| 3,696,857 | 10/1972 | Torte | 160/371 |
| 344,555 | 6/1886 | Wood | 248/316 D |
| 793,162 | 6/1905 | Schmidt | 248/316 D X |
| 2,995,795 | 8/1961 | Samson | 24/259 PF |
| 3,225,409 | 12/1965 | Daniels | 160/392 X |
| 3,513,902 | 5/1970 | Merillet | 160/392 |
| 3,350,045 | 10/1967 | Mayers | 248/316 D X |



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[57] **ABSTRACT**

The present invention concerns a clamping rod for the suspension of material, especially sheet-formed material, such as signs and the like. Said clamping rod comprises two substantially rigid flanges which are mutually parallel or convergent and whose edges define a gap into which said material is insertable. A V-formed leaf spring is clamped between said flanges in such a position thereto that a first leg of said spring in said gap abuts against a first one of said rigid flanges along a contact line adjacent the bending line between the two spring legs, and the outer edge of the other leg thereof resiliently presses against the other rigid flange at a distance inside of said gap. Upon insertion, the material is retained between said other flange and the outer edge of said other spring leg.


**7 Claims, 10 Drawing Figures**

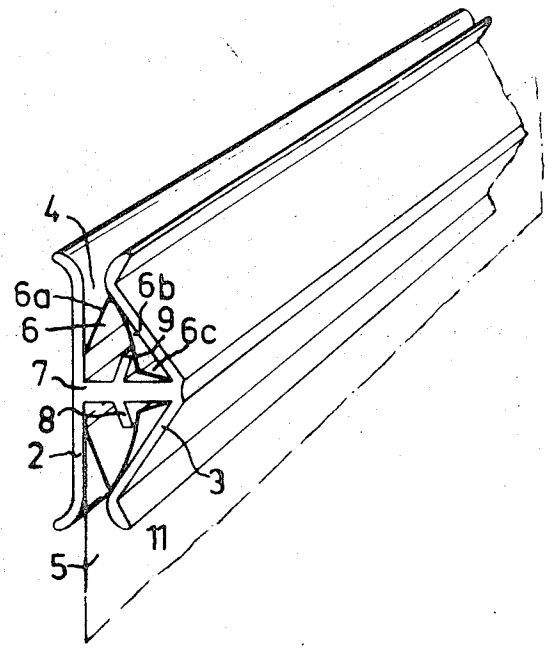

FIG.1

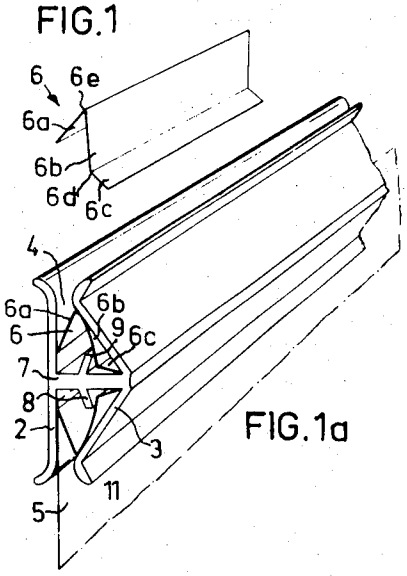


FIG.1a

FIG.3

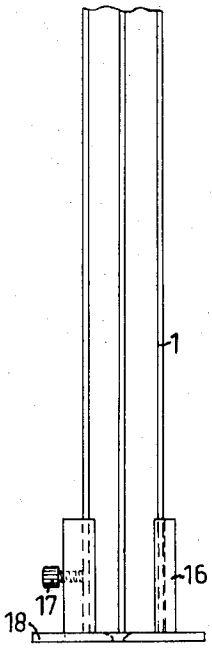


FIG.4

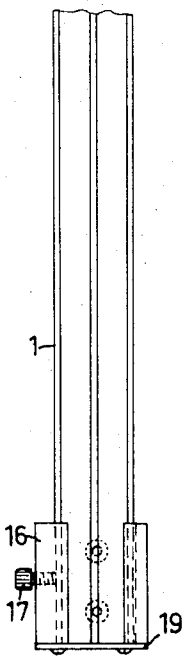


FIG.2

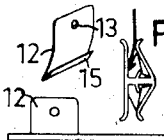


FIG.2a

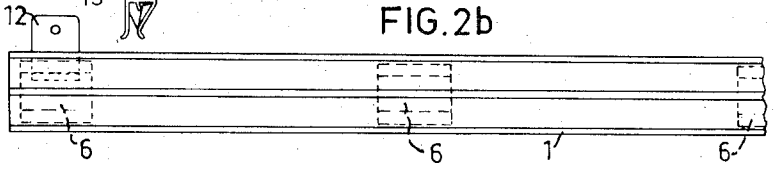


FIG.2b

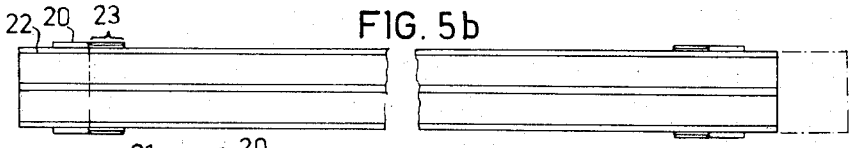


FIG. 5b

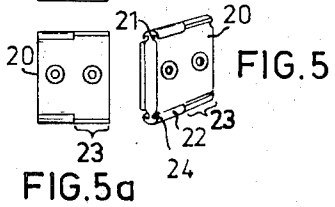


FIG.5

FIG.5a

# CLAMPING ROD FOR THE SUSPENSION OF MATERIAL IN THE FORM OF SHEETS OR THE LIKE

The present invention concerns a clamping rod for the suspension of material in form of sheets.

A great number of devices for the suspension of sheet-formed material, such as notices, signs and the like, are known and the construction thereof varies from a single board of wood on which the material is secured by means of drawing pins to a sheet of magnetic material on which the material is held fast by means of small magnets. Devices having a clamping action are also known, such as simple spring clips attached to a support or clamping devices having displaceable members which hold the material by pressing same against a support under the action of gravity.

All the previously known devices have different disadvantages. The first of the abovementioned devices thus require loose members, i.e., drawing pins and magnets which are easy to lose and sometimes hard to apply. The use of other known devices is limited by the fact that the devices must be placed in a given position so that the gravity may be employed.

Another feature influencing the usefulness of devices of this kind is the appearance thereof. The intention is to present an information of some kind to a public and a notice or a sign is easier noticed and more often read if it is shown in an attractive manner.

Accordingly, the aim of the present invention is to provide a clamping rod for the suspension of sheet-like material, which overcomes the abovementioned disadvantages and may be adapted to a number of uses not attained before. The clamping is furthermore fully independent of its mounting position and can be used when arranged horizontally or vertically and also in an arbitrary inclined position. A further advantage resides in the fact that a clamping rod with the same effectiveness suspends a thin sheet of paper as a thick piece of cardboard. Furthermore, the clamping action becomes stronger when the weight of the suspended object increases, so that said weight practically is only limited by the strength of the object or its package.

The present invention therefore consists of a clamping rod for the suspension of sheet material, for instance signs, which clamping rod comprises two substantially rigid flanges which are mutually parallel or convergent and whose edges define a gap into which said sheet material is insertable, and which is mainly characterized by a V-formed leaf spring which is clamped between said flanges, so that a first leg of said spring abuts in said gap against a first one of said rigid flanges along a contact line adjacent the bending line between the two legs of said spring, and so that the outer edge of the other leg thereof presses against the other rigid flange at a distance inside of said gap.

Further advantageous developments of the clamping rod according to the invention are defined in the attached sub-claims.

In the following, the invention will be described in detail with reference to the attached drawing in which

FIG. 1 is an isomeric view of a clamping rod according to the invention with a piece of sheet-formed material inserted into said rod,

FIG. 1*a* is an isomeric view of a leaf spring forming a part of the clamping rod,



FIG. 2 is an isomeric view of a suspension bracket for the clamping rod,

FIG. 2*a* is an end view of a clamping rod and a cooperating suspension bracket,

FIG. 2*b* is a plane view of a clamping rod with a mounting means for the same,

FIG. 3 is a plane view of a clamping rod with a mounting means for the same,

FIG. 4 is a corresponding view showing a somewhat modified embodiment of the mounting means,

FIG. 5 is an isomeric view of a mounting bar for the suspension of a clamping rod,

FIG. 5*a* is a plane view of said mounting bar,

FIG. 5*b* is a plane view of a clamping rod with a mounting means for the same.

Principally, the clamping rod consists of two rigid flanges 2 and 3 which longitudinally extend parallely to each other and between which a gap 4 is provided, into which one edge of a sheet-formed piece 5 of material is insertable. Between said flanges a leaf spring 6 is so arranged that one free end thereof extends from said gap 4 in the direction of insertion of said material piece 5 and said free end resiliently rests against the flange 2. Said flanges 2 and 3 may be parallel or converge towards said gap 4.

When said material piece 5 is displaced inwardly, it lifts said spring leaf end from said flange 2 and is clamped fast between said end and said flange. On account of the fact that said lift spring 6 extends in the direction of insertion, a movement of the material piece 5 in the opposite direction will tend to carry the spring end along and due to the extension of said spring, said end will be pressed harder against the material piece 5 and the underlying flange 2, so that the retaining force is increased. However, the material piece 5 can easily be removed by means of a sharp pull in same.

The clamping rod shown in FIG. 1 is constructed according to this principle but modified in certain respects, so that further advantages are provided.

The two rigid flanges 2,3 thus converge towards said gap 4 and at the opposite edges thereof they are rigidly interconnected by means of a web 7. One flange 2 extends perpendicularly to said web 7 and the other flange 3 forms an acute angle thereto.

Between said two flanges the web 7 is provided with a ridgelike projection 8, extending parallel with said flange 2,3 along the whole length of the clamping rod 1. The projection 8 forms an angle with the web and the outer edge thereof is situated at a greater distance from the flange 2 extending perpendicular to said web 7 than the foot part thereof. The corner of the projection 8 facing the other flange 3 is comparatively sharp.

The leaf spring 6 arranged between the flanges 2,3 is bent into an angle and comprises a shorter leg 6*a*, a longer leg 6*b* and the outer end portion 6*c* of the latter is angle-bent relatively to the longer leg 6*b* in a direction away from the shorter leg 6*a*. The leaf spring 6 formed in the above-described way is clamped between the flanges 2 and 3 in such a way that the outer edge of the angle-bent end portion 6*c* rests in the apex of the angle between the web 7 and the flange 3 of the clamping rod 1. The longer spring leg 6*b* abuts against the sharp corner 9 of the projection 8 along a line at some distance from the bending line 6*d* between this spring leg 6*b* and said end portion 6*c*. said longer spring leg 6*b* furthermore abuts against the inner side of the rigid flange 3 forming an acute angle with said web 7, the

contact line being situated somewhat inside the bending line 6*e* between the legs of said leaf spring **6.** Said longer spring leg 6*b* is thereby slightly arched with the convex surface thereof facing said flange **3.** The shorter spring leg 6*a* in its turn extends from the lastmentioned bending line 6*e* towards the opposite flange **2** and rests against same with its outer edge. Thus, the bending line 6*e* between the legs 6*a* and 6*b* of the leaf spring **6** extends close adjacent and parallel with said gap **4** and the shorter spring leg 6*a* extends from the gap **4** in the direction of insertion of the material piece **5** resiliently to rest against the flange **2.**

When a thin material piece **5** is insetted into the gap **4,** the shorter leg 6*a* of the leaf spring **6** is pressed away from the flange **2** while swinging around the contact line between the longer spring leg 6*b* and the opposite flange **3.** Unwanted pulling out of the material piece **5** is prevented in the manner described above.

If a material piece **5** of comparatively great thickness is inserted, the longer spring leg 6*b* is displaced away from the gap **4** so that the end portion 6*c* is brought closer to the web **7** and in extreme cases will abut against same. Thereby the portion of the longer leg 6*b* of the leaf spring **6,** which is situated between the corner **9** of the projection **8** and the contact line with the flange **3,** is shortened while the radius of curvature of the longer leg 6*b* simultaneously is decreased, so that the distance of said contact line from the bending line 6*e* between the legs 6*a* and 6*b* is increased. The insertion of a thicker material piece thus results in a greater swinging movement of the shorter spring leg 6*a*, but the total active spring length is simultaneously increased, wherefore a compensation takes place and the pressing force against the material piece **5** will substantially remain constant independent of the thickness of the said piece. The force necessary to remove a piece of material is therefore also substantially constant, while unintentional removal of said piece is counteracted by a force which substantially varies with the weight of said material piece.

As shown in FIG. **1** the clamping rod **1** is preferably symmetric with respect to said web **7,** so that a gap **4** opens in each direction and is defined by one pair of rigid flanges **2, 3** each. The leaf spring **6** may be subdivided into several pieces, spaced in the longitudinal direction of said clamping rod.

FIG. **2** shows a suitable means for the suspension of a clamping rod according to FIG. **1.** Said means comprises at least two brackets consisting of a plate strip **12** provided with a hole **14** or the like at one end for fastening the bracket to a support. The opposite edge **15** of the plate strip **12** is bent approx. 180° so that a groove is formed between said strip and said edge **15.** As seen in FIG. 2*a*, the bracket is inserted in the gap **4** of the clamping rod **1** in such a way that the free edge of the shorter spring leg 6*a* engages into said groove. The weight the bracket is able to carry is thus only dependent on the strength of the leaf spring.

FIGS. **3** and **4** show another mounting device for a clamping rod **1** according to the invention, which also allows vertical mounting. Said device consists of a fitting **16** provided with a longitudinal groove in which a clamping rod **1** is insertable, said groove being recessed along both sides so that it grips over the edges of the clamping rod. A lock screw **17** is screwed in through one side wall of the groove to secure the clamping rod.

By the embodiment according to FIG. **3** said fitting **16** is attached to a foot plate **18** which by means of screws may be fastened to a support. Said foot plate **18** covers one end of said groove and serves as a stop member for the clamping rod. The fitting **16** is suitable for attachting a clamping rod at an angle to a support.

By the embodiment of FIG. **2** the fitting is attached to the support by means of screws which pass through holes in the bottom of the groove and are counter-sunk therein, thus in a position parallel to the support. One end of the groove is closed by means of a plate **19** serving as a stop member.

A further means for suspending clamping rod **1** according to the invention is shown in FIG. **5.** Said suspension means is formed as a suspension bar **20** for each end of the clamping rod. Said suspension bar **20** is slightly broader than the clamping rod, as measured over the edges of the opposing flanges **2** being perpendicular to said web **7.** Along the opposite edges thereof, said suspension bar **20** is provided with grooves **21** extending parallely to said edges and being formed to take up one edge **10** each of said flanges **2.** Said grooves **21** have such a form that each of them includes a portion **22** engageable over said flange edges **10,** so that a clamping rod **1** is only engageable with a suspension bar **20** by means of longitudinal displacement and simultaneous insertion of the flange edges **10** into said grooves **21.**

When a clamping rod **1** is suspended into suspension bars **20** of the abovementioned type, it may happen that the surroundings prevent a sufficient longitudinal displacement of the clamping rod to attain engagement with or disengagement from said suspension bars **20.** To overcome this disadvantage, the overengaging portion **22** of the grooves **21** of said bars **20** can be cut away a distance **23** in over said bar from one end thereof. The clamping rod **1** can then be mounted in such a way that one end thereof is placed against the cooperating suspension bar **20** with said end aligned with the border line (shown with a dash-dot line in FIG. 5*a*) between said cut-away portions **23** and the remaining overengaging portions **22.** Thereafter the clamping rod is longitudinally displaced so far, while bringing said end into engagement with the grooves **21,** that the opposite end of the clamping rod can be brought into alignment with the corresponding border line of the cooperating suspension bar **20,** whereafter said clamping rod is longitudinally displaced in the opposite direction into the position shown in full lines, while said end is fitted into said grooves **21.** Thus, the space necessary for the displacement of the clamping rod may be materially diminished.

The suspension bar **20** may be further modified by bending the outer end **24** of at least one of its overengaging portions **22** into the grooves **21** in order to serve as a stop means for the clamping rod **1.** The supporting bar **20** according to this modification may be used for vertical or inclined mounting of clamping rods **1.**

The suspension bar **20** is attached to a support by means of screws which extend through the web portion thereof and are counter-sink therein. Said web portion may preferably have such a form that it engages and supports the outer sides of the cooperating flanges **2.**

From the preceding description it should be evident that clamping rods according to the invention may be used in many circumstances, some but not all of which

are listed below: For the suspension of signs, price notices and the like at counters, deep-freeze showcases and at other places in shops, and also for showing merchandise, preferably such packed in plastic bags, for sign boards of all kinds, for suspension of cut films in viewing devices for X-ray plates and negatives, and for retouch stands, for drawing tables etc. In the lastmentioned cases the clamping rod is preferably countersunk into the support, so that the top surface thereof is aligned with the inner surface of the flanges **2.**

The clamping rod according to the invention may furthermore be manufactured in short pieces, for instance corresponding to the length of one of the spring pieces mentioned earlier, or in arbitrary lengths. As pointed out above, the mounting position is of no consequence, since the clamping rod fulfills its function whether it is horizontal, vertical, or inclined. The thickness of the sheet material may also vary within wide limits.

What I claim is:

**1.** A clamping rod for the suspension of sheet material, for instance, signs, which clamping rod comprises two substantially rigid flanges which are mutually parallel or convergent and whose edges define a gap into which said sheet material is insertable, characterized by a V-formed leaf spring which is clamped between said flanges so that a first leg of said spring abuts in said gap against a first one of said rigid flanges along a contact line adjacent the bending line between the two legs of said spring, and so that the outer edge of the other leg thereof presses against the other rigid flange at a distance inside of said gap, the edge of the flanges opposite to those defining said gap being rigidly interconnected by means of a web, whereby said first flange converges relatively to said other flange which is perpendicular to said web, said web between and parallel to said flanges being provided with a ridge-like projection, and the outer end portion of said first leg of said leaf spring being angle bent relatively to said first leg in a direction away from said other spring leg, the outer edge of said outer end portion resting in the apex of the angle between said web and said first flange and one edge of said projection engaging the side of said first spring leg, facing away from the cooperating flange, intermediate the bending lines between said spring legs and between said first spring leg and said end portion, respectively.

**2.** A clamping rod as claimed in claim **1,** characterized in that said first leg of said leaf spring intermediate said bending lines is convexly arched towards said first flange.

**3.** A clamping rod as claimed in claim **1,** characterized in that said leaf spring is sub-divided into short lengths spaced in the longitudinal direction of said clamping rod.

**4.** A clamping rod as claimed in claim **1,** characterized in that two pairs of rigid flanges symmetrically protrudes in opposite directions from said web and that a leaf spring is clamped between the flanges of each pair.

**5.** A clamping rod as claimed in claim **1,** characterized in that the edges of said flanges defining said gap are bent away from each other.

**6.** A clamping rod for the suspension of sheet material, for instance signs, which clamping rod comprises two substantially rigid flanges which are mutually convergent and whose edges define a gap into which said sheet material is insertable, a V-formed leaf spring defined by legs joined along a bending line, said leaf spring being clamped between said flanges so that the bending line between the legs of said spring is positioned in said gap and a first leg of said spring in said gap abuts against a first one of said rigid flanges along a contact line adjacent the bending line between the two legs of said spring, and the outer edge of the other leg of said spring pressing against the other rigid flange at a distance inside of said gap.

**7.** A clamping rod as claimed in claim **6,** a suspension bracket consisting of a plate strip having a hole at one end and an edge portion at the other end bent approximately 180° thereto, said bracket being insertable with the lastmentioned end into the clamping rod gap, wherein the free end of the leaf spring engages between said edge portion and said plate strip.

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