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CLIP DEVICE

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2 Claims. (Cl. 24-137)

The present invention relates to a clip device comprising a pair of support pieces connected together by a pivotal pin and a spring provided therebetween and designed such that the support pieces form a pair of jaws at one end closed under constant push exerted thereon by the spring working as a strut means deforming from its normal configuration to a certain definite upward direction regards the support pieces, with the result of the spring exerting to the jaws a closing force increasing in force the more according as the force in terms of the weight load of the object increases.

Prior art clothespins and other clip devices comprising a pivotally or so connected pair of members for clip action and utilizing elasticity of the spring for exertion of pressure on the jaws formed by said members, usually have either helical springs simply wound around the pivot, etc., with their both free ends being made to act on the jaws or ring-like arcuate springs for the purpose, and it requires the use of very powerful springs to make them more effective in clip effect. However, with smaller type clip devices such as clothes-pins, as their size is restricted, the free use of a long and large spring introduces a defect as it unavoidably accompanies with increase in size. There is, in addition, a requisite that the jaws of a clip device should be opened with a light suitable pressure to be given by the hand finger. Thus, for those that utilize elasticity only of the spring, there is a technological limit in production in these respects. There is noted therefore a limit that in clip devices those springs should be utilized, the elastic strength of which should essentially be smaller than the strength which is applied for opening the clip jaws with the hand finger. From the viewpoint of quality of products and the necessary securement thereof even to a modified degree, the use of excessively low-priced and inferior performance springs is to be avoided, but, that of powerful springs invites high price incompatible with the primary requisite of low price for such products. It is desirable to secure therefore such springs that, despite their small size, should give powerful gripping and holding effect to the best possible degree. So, it follows that it is necessary to provide any additional force which should work to help to the force or securely maintain the configuration of the spring as it acts to press on the jaws of the clip device, and that it is desirable at the same time to have an easy opening of the jaws with the hand finger applying an extremely small force.

To avoid prior defects mentioned and secure the clip effect more powerful than that of any prior type, despite keeping to the use of prior strength and size springs, the clip device in accordance with the invention has a spring of special configuration placed in position to receive a special pulling force so that not only the elastic restoring force of the spring but the lever-like performance of it as a strut means is made available that pushes outward on both ends respectively opposite to the jaws of the device to the increase in the spacing between said ends and the maintenance of such condition. Thereby it is made possible to secure a very powerful force of elasticity as should let go no object gripped and held in the jaws but for the surrender of these, in addition to another pressure force of other origin to the securement of the clip effect, on one hand, whilst a very easy opening of the jaws by applying a little force with the hand

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finger because of the absence of resistance of the spring as a strut means, on the other.

Therefore, one of the objects of the present invention is to provide a clip device designed such that a spring therein constantly pushing on a pair of jaws formed by a pair of its support pieces in a direction for the jaws to be closed, is made to work as a strut means deforming from the normal configuration in action with the result of the spring exerting a pressure more powerful than that original of the specific elasticity of the spring applied.

Another object of the invention is to provide a clip device designed such that a spring therein made to work as a strut means deforming from its normal configuration in action has its both free ends held respectively on a pair of its support pieces.

Another object of the invention is to provide a clip device designed such that a spring therein made to work as a strut means deforming from its normal configuration in action has one of its free ends held on one of its support pieces and the other slidably done on the other support piece.

Another object of the invention is to provide a clip device designed such that a spring therein made to work as a strut means deforming from its normal configuration in action is placed in position in an area safe from the pivotal portion connecting the support pieces for the spring.

Further object of the invention is to provide a clip device designed such that a spring therein made to work as a strut means deforming from its normal configuration in action exert pressure on a pair of jaws formed by a pair of its support pieces and having respectively friction fittings of elastic material such as rubber.

The invention will be set forth in the following description on a typical set of clothes-pins as forms of embodiment of the invention with references being made to the attached drawing, in which

FIG. 1 is a longitudinal sectional front view of a type clothes-pin as a form of embodiment of the invention;

FIG. 2 is a longitudinal sectional front view of another type clothes-pin as another form of embodiment of the invention; and

FIG. 3 is a longitudinal sectional front view of another type clothes-pin as another form of embodiment of the invention.

Referring to FIGURE 1, a pair of support pieces 11 and 12 are pivotally connected to each other by means of pin 13 at tongue and groove portions 22 for the support pieces having therebetween spring 14 which has an elastic potential energy stored by being curved in V-shape, and its ends 15, 15 held in groove ways 16, 16 prepared at upper ends of support pieces 11, 12 respectively. Spring 14 has, in the central portion or so, engagement point 17 in a form of loop, a force point, to which is fixedly or removably connected the lower end of hanger rod 19 having hook 18 at end. 20 and 21 are jaws formed by lower opposite ends of two support pieces 11, 12 respectively, from which sidewise project, in tongue and groove, wall-like ears 22 connected to each other by a penetrating element such as pin 13. Each of jaws 20, 21 has friction fittings 23, 23 fitted or so, of rubber or the like material, which contributes to better clip effect and additionally better prevention of mis-clip and damage of the jaws.

Referring to FIGURE 2, the type differs in the design of the spring means illustrated in FIGURE 1. Like numbers designate like elements or portions as illustrated in FIGURE 1. Here spring 14 has its one free end 15 held in groove way 16 in one 11 of the support pieces in like manner as the type illustrated in FIGURE 1, but

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engagement point 17, a force point, unlike that for connection of hanger rod 19 illustrated in FIGURE 1, is designed simply as a force point movable and the following integral portion as sliding portion 25 slidable in guide groove way 24 in other support piece 12, the portion being designed larger in length than that 26 secured in support piece 11 at end 16, that it lies overhead from the top of support piece 12 with its end formed into hook 18 as to work as a hanger rod just like hanger rod 19 illustrated in FIGURE 1.

Referring to FIGURE 3, this type is a modified form based on the same idea of the one illustrated in FIGURE 1. Like numbers designate like elements or portions. Here engagement point 17 of spring 14 is not a loop but an inverted U, i.e. open at the bottom. This type is the same as the one illustrated in FIGURE 1 except the engagement point in loop, and susceptible of being directly hanged on the line etc., by means of engagement point 17 which is free at the bottom.

Referring to a variety of types as forms of embodiment of the invention, the push of support pieces 11, 12 at upper end with the finger in the inward direction so as to separate them from each other, opens jaws 20, 21 formed by the support pieces at lower end, despite elastic force of spring 14 in action, the washing is inserted, support pieces 11, and 12 are let go at upper end from finger, the jaws 20, 21 are closed by force of the elastic potential energy stored in spring 14, the clip device grips and holds at lower end the washing in the jaws. The hook of hanger rod 19, either connected to or integrally formed in spring 14 at engagement point 17, is hanged on the line, pole or peg. With the form illustrated in FIGURE 1, the clip device, together with the weight of the object gripped and held, is inclined as a whole to go downward, whilst hanger rod 19 to remain stopped by the line or any other associated item; so the pulling force through engagement point 17 on spring 14 acts as external force proportional to the weight of the object gripped and held, besides exerting elastic restoring force, displacing engagement point 17, as force point, of spring 14 and naturally deforming this: both ends 15, 15 of spring 14, as a strut means in tension as though a lever, push outward upper ends of support pieces 11, 12 apart from each other increasing the spacing therebetween, while on the other hand, exerting a resultant force of two component forces, i.e. the restoring force of spring 14 and another ascribable to the spring as a strut means, to the jaws 20, 21 formed at lower end by support pieces 11, 12, so that the object is very effectively gripped and held by the clip device and will not be stripped out in usual use but for damage of the object at end gripped and held. With the form illustrated in FIGURE 2, hanger rod 19, integral with spring 14 and as an elongated portion of this, has engagement point 17, simply working as a force point, make a remarkable upward movement because of the direct upward pull of sliding portion 25 of spring 14 made by the gripping and holding and hanging of the object, resulting in a circular upward deformation of the counterportion 26 opposite to sliding portion 25 of spring 14 fastened at end 15, counterportion 26 therein working as a lever-like strut means as in the form illustrated in FIGURE 1, and powerfully pushing outward support pieces 11, 12 at upper end apart from each other, exerting a powerful pressure; a resultant force of the components, the proper elastic force of spring 14 and the force of this as a strut means, to the jaws 20, 21, in the same fashion with as much effectiveness in gripping and holding as illustrated in FIGURE 1.

With the form of embodiment illustrated in FIGURE 3, this is a modified form of that illustrated in FIGURE 1. Its action and the effect are entirely the same, except engagement point 17 which as hook 18 can be directly hanged on the line, etc.

As comes out clearly from the description as far made, the direction spring 14 moves in deformation can be either upward just like in the illustrated forms, or side-

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ward or downward, depending on the specific configuration of the spring. Spring 14 should be placed in position in such area as lies overhead safe from the pivotal portion with pin 13, in consideration of the move in deformation of spring 14; such position contributes to preventing the washing from being soiled, when the clip device is concerned for example with the clothes-pin, etc., and to producing the by-effect of preventing the spring itself from opportunities to get rusty for water content. The fitting of jaws 20, 21 with elastic friction means 23 of rubber, etc., material, as illustrated in FIGURES 1 and 2 is protective and expedient for more secure gripping and holding with the device for the tight-fit, non-slipping and flexible properties of the material serving to prevent possible undesirable traces of jaws when these are used naked, contaminations from the soiled support pieces. The provision of the inventive device with such means will contribute much to the attainment of the objects of the invention.

In contrast to prior art clothes-pins and other clip devices utilizing spring elasticity, i.e. deformation by curving or bending and elastic potential energy stored thereby, going no further than the simple utilization of material and size used for gripping and holding purpose, the clip device in accordance with the invention consists in the utilization of the spring as a strut means in which the spring means makes a positive movement from its original position and exert a force to push outward the upper ends of the clip device in opposite direction, adding thereby a mechanical force to its proper elastic force and producing a resultant powerful gripping and holding force and performance scarcely to be seen in any prior art clip devices.

Even if spring 14 in the form of embodiment illustrated in FIGURE 2 is assumed devoid of elasticity, it is sure that the movement of counterportion 26 acts to push outward support piece 12 at end which results in the upward movement of hanger rod 19 and the exerted force being proportional to the weight of the hanging object. Consequently, the greater the weight, the greater the force, which is directed to jaws 20, 21. As the proper elastic force is added to said force it is possible to easily obtain a gripping holding force exceptionally strong so as ever was obtained in prior art clip devices. The design in accordance with the invention, when adopted in clothes-pins, etc., may allow the washing be directly hanged on the line, etc., to be sooner dried up without being necessarily folded up in two, etc., in contrast to prior art clothes-pins with only unsatisfactory performance. Furthermore the inventive clip device answers many requisites in actual use.

As it is naturally most suitable for spring 14 to be provided in V-shape overhead away from the pivotal portion of the pair of support pieces 11, 12, spring 14, in being used in clothes-pins, does not get rusty for water content, and prevents the washing from being soiled thereby, which means another advantage. Furthermore, when support pieces 11, 12 are mutually inwardly pushed in use, as spring 14 makes only an obtuse-to-acute-angled deformation and does not act nor offer resistance as a strut means to support pieces 11, 12, these may open the jaws with very little pressure application. In this respect, the form illustrated in FIGURE 2 is advantageous where spring 14 admits of downward slide of sliding portion 25. The necessary arrangement for providing spring 14 in accordance with the invention is simpler and easier than that for winding a helical spring around pin 13 or the like in prior types; and of course spring 14 may be interchanged. In accordance with the invention, it may well be expected to increase general durability of clip devices and is an especial advantage that the necessary structure lies simplified relative to prior art devices. It is understood that all other modified forms of embodiment of the invention might be adopted, all coming within the scope of the claims which follow.

What I claim is:

1. A self energizing clip device of the kind described comprising a pair of jaws, each jaw including a clip end, a body portion and a free end opposite to the clip end; means pivotally connecting the body portions of said pair of jaws intermediate its ends; a spring means consisting of a strip of elastic metal curved in a V shape and having two ends each of which engages one of said free ends and continually urges said free ends apart and said clip ends together so as to grasp an object firmly between said clip ends; means intermediate the ends of said spring means for engaging a hangar; and a hangar means the lower end of which is secured to said means at a point above said pivotal connection and intermediate of the ends of said spring, the upper end of said hangar being adapted to engage a support, whereby the weight of an object supported between the said clip ends acts to deform said spring and to increase the effectiveness of said spring means to spread the free ends apart and therefore to urge

said clip ends together in proportion to the weight of said object.

2. The clip device of claim 1 wherein the spring which is deformed when said clip is supporting an object has each of its ends held respectively in each of the free ends of said jaws.

References Cited in the file of this patent

UNITED STATES PATENTS

685,974	Cote	Nov. 5, 1901
1,176,586	Megahan	Mar. 21, 1916
1,213,392	MaLoney	Jan. 23, 1917
2,526,810	Curtis	Oct. 24, 1950
2,569,371	Cohen	Sept. 25, 1951
2,920,365	Colangelo	Jan. 12, 1960
2,996,776	Cassell	Aug. 22, 1961

FOREIGN PATENTS

804,675	Germany	Apr. 26, 1951
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