No. 644,221. Patented Feb. 27, 1900.

P. E. WIRT.

SPRING ATTACHMENT FOR SUSPENDERS, &c.

(Application filed Nov. 9, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

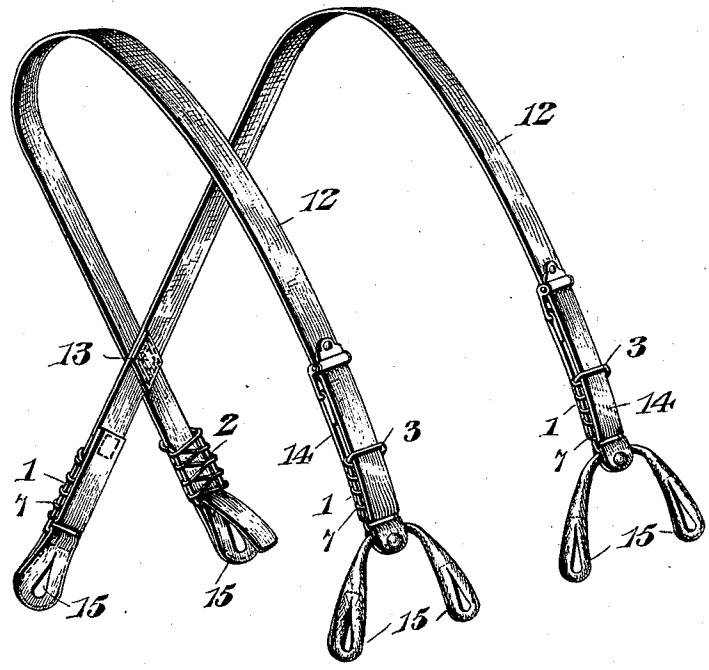


Fig. 2.

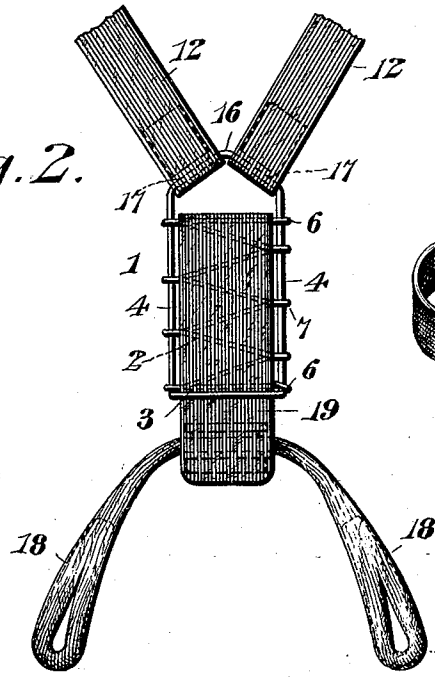
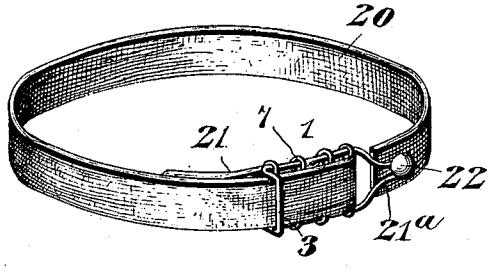


Fig. 3.



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Fig. 4.

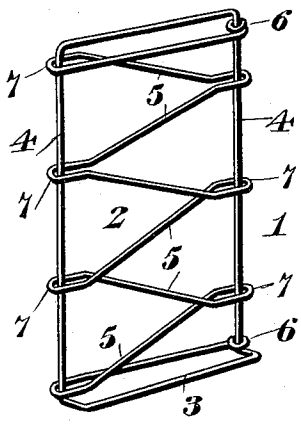


Fig. 11.

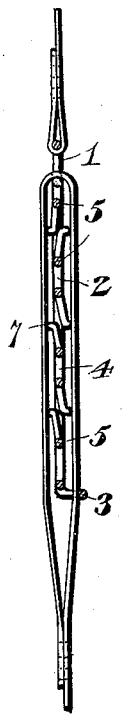


Fig. 7.

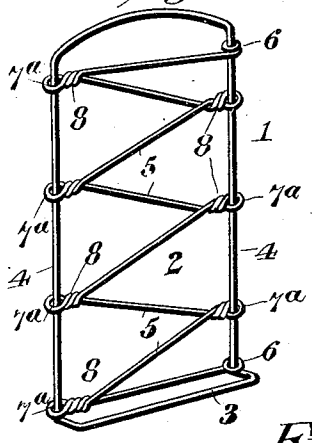


Fig. 8.

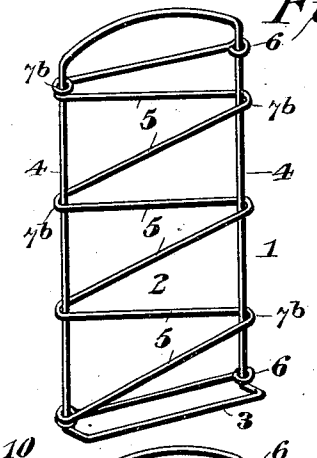


Fig. 5.

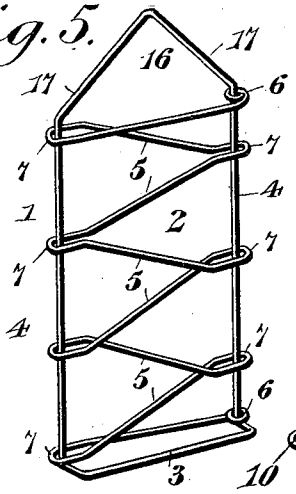


Fig. 10.

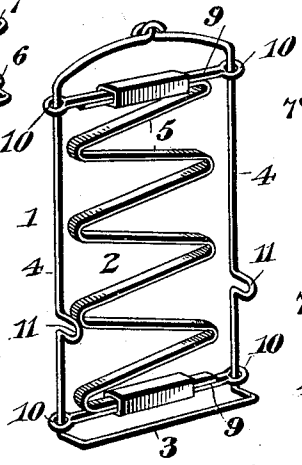


Fig. 9.

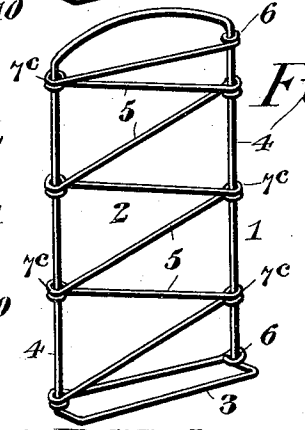
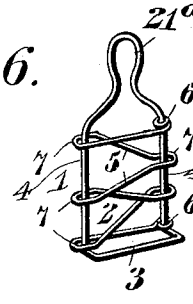


Fig. 6.



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UNITED STATES PATENT OFFICE.

PAUL E. WIRT, OF BLOOMSBURG, PENNSYLVANIA.

SPRING ATTACHMENT FOR SUSPENDERS, &c.

SPECIFICATION forming part of Letters Patent No. 644,221, dated February 27, 1900.

Application filed November 9, 1899. Serial No. 736,398. (No model.)

To all whom it may concern:

Be it known that I, PAUL E. WIRT, a citizen of the United States, residing at Bloomsburg, in the county of Columbia and State of Pennsylvania, have invented a new and useful Spring Attachment for Articles of Wear and Analogous Uses, of which the following is a specification.

This invention relates to a new and useful spring attachment designed as a substitute for the elastic medium which is usually employed in wearing-apparel and analogous articles; and it has for one object the provision of a device of this character which shall be of a simple, cheap, and light construction, while at the same time being exceedingly durable and furnishing a maximum amount of elasticity.

In many articles of personal wear—such as suspenders, belts, garters, bands, shields, and the like—rubber strands or webbing is ordinarily employed to impart the necessary elasticity thereto; but it is well known that by constant use and also by disintegrating influences rubber soon loses its elasticity, and therefore becomes useless for the purpose for which it is intended. The present invention contemplates obviating these objections to the use of rubber as an elastic medium in wearing-apparel and analogous articles by providing a spring device or attachment capable of general attachment in the same manner as rubber and having a novel form of spring which under all conditions will maintain its elasticity and will in fact outlast the article to which it may be applied.

A further object of the invention is to provide a novel construction of spring device which dispenses with the use of a casing or housing of any kind for the spring, thereby obviating the objectionable tendency of the parts to "screech" or bind, and in carrying out this object the invention also contemplates a light strong spring which provides for the utmost extension or elasticity without undesirable friction and requiring a minimum use of material in the construction of the same, as well as in the construction of the frame necessary to support or carry the same.

With these and many other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

The fundamental feature of the invention, involving a suitable carrying-frame and a zigzag or equivalent spring strung within the frame, is necessarily susceptible to various modifications without departing from the spirit or scope of the invention; but the preferred embodiment of the improvements is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a pair of suspenders, showing the front and back ends of the suspender-straps fitted with spring attachments constructed in accordance with the present invention. Fig. 2 is a detail elevation of the back portion of a pair of suspenders, showing the carrying-frame for the spring shaped to permit of a single loop carrying the back ends of the suspenders. Fig. 3 is a detail in perspective of a garter or band fitted with the spring attachment embodying the present invention. Fig. 4 is a detail in perspective of the preferred form of spring attachment shown in Fig. 1 of the drawings. Fig. 5 is a similar view of the preferred form of spring attachment shown in connection with the type of frame illustrated in Fig. 2 of the drawings. Fig. 6 is a detail in perspective of the form of the attachment shown applied for use in Fig. 3 of the drawings. Fig. 7 is a detail in perspective of a modified form of attachment, showing a different way of forming the guide-eyes at the bends or apices of the spring. Fig. 8 is a detail in perspective of another modification, showing the plain bends at the apices of the spring, constituting the guide-eyes therefor. Fig. 9 is a perspective view of another modification, showing the spring formed with coiled guide-eyes at the bends or apices thereof. Fig. 10 is a detail in perspective of another modification, in which the zigzag spring is shaped in more of a serpentine form and is connected with crossbars, one or both of which carry the guide-eyes which slidably engage with the side members of the carrying-frame. Fig. 11 is a longitudinal sectional view of the attachment.

Like numerals of reference designate corre-

sponding parts in the several figures of the drawings.

In all forms of the invention the same involves two essential parts—namely, a carrying-frame and a zigzag or equivalent spring arranged within the frame and having members slidably engaging the same, whereby the spring will expand and contract within the plane of the frame, thereby taking up a minimum space, while at the same time affording a maximum resiliency and effectiveness. Several ways of associating the frame and the spring may be resorted to in adapting the device for practical use in connection with different articles—such as suspenders, belts, garters, or the like—but for illustrative purposes it has only been deemed necessary to show the invention in a few of its applied uses in order that a comprehensive understanding thereof may be obtained.

Without reference to these various uses to which the attachment or device may be applied the same essentially consists of a carrying-frame 1 and a zigzag spring 2, supported by said frame and arranged to move wholly within the longitudinal plane thereof, said spring having one member of an article connected therewith and its carrying-frame having another member of the same article suitably connected thereto, so that a movement of the members of the article thus connected toward or away from each other will cause the contraction and expansion of the spring in the same manner and for the same purpose as the elastic or elastic webbing which is ordinarily used in articles of personal wear.

The carrying-frame 1 for the spring 2 is preferably constructed of a single length of steel or spring wire bent into the form of a skeleton frame, which does not afford a complete housing for the spring, yet at the same time provides for sustaining the same in operative relation to the band or member of the article with which it may be combined. In the ordinary forms of the device or attachment the carrying-frame 1, which may be of strip metal, as well as of wire, is usually of a general rectangular shape and is provided at one end with a laterally-deflected offset 3, forming a guide-loop disposed at one side of the longitudinal plane of the side bars 4 of the carrying-frame, and thus permitting of the free passage of the band of the article to which the invention is applied, whereby such band may be disposed at one side of the plane of the spring 2, and thus cannot possibly interfere with the free expansion and contraction thereof.

The spring 2 preferably consists of a single length of steel or spring wire or of a single length of a spring-strip, and to secure the maximum efficiency from the standpoint of elasticity the wire or strip from which the spring 2 is formed is provided with a series of alternate bends, with intermediate inclined portions 5 connecting the opposite bends, and thereby providing what may be properly termed a spring of "zigzag" shape; but I will have it understood that this term is necessarily used synonymously with the terms "serpentine" or "sinuous," as it may not be found necessary in the practical carrying out of the invention to have the bends of the spring so sharply angular as illustrated in the preferred form of the invention, it being understood that the essential feature of the invention resides in the fact that the same is provided with a plurality of folds lying within the plane of the carrying-frame 1. To provide for maintaining the proper relation between the carrying-frame 1 and the spring 2 and to insure the movement of said spring in a fixed plane, it is necessary to provide a slidable connection between suitable portions of the spring and the carrying-frame, and the preferred way of securing this result is shown in the preferred form of the invention illustrated in Figs. 4, 5, and 6 of the drawings. Referring particularly to these forms of the invention, it is to be observed that the terminals of the spring-wire strip are formed with terminal eyes 6, engaging the side bars 4 of the carrying-frame 1, and at this point it may also be observed that in the construction of the carrying-frame 1 it is necessary to provide said frame with suitable portions slidably engaged by the spring; but the preferred construction involves the side bars 4, which are maintained in parallelism. In addition to the terminal eyes 6, engaging the side bars 4 of the carrying-frame, the spring 2 is provided at the alternate bends or apices thereof with elongated guide-eyes 7, produced by a half bend or twist of the apices of the spring, it having been found by practical experiment that this construction permits of the free sliding movement of the spring members upon the carrying-frame, while at the same time securing a maximum resiliency.

In connection with the construction of the spring described it is to be noted that there is no spring action about or around the carrying-frame 1, as the entire spring force or elastic action is exerted between the side bars of the carrying-frame and is not even exerted at the points where the guide-eyes of the spring slidably engage with the carrying-frame. This is due to the fact that the guide-eyes 7 in the preferred forms of the invention are so formed as to prevent any spring action at these points, and thereby insure an even and uniform expansion and contraction of the spring, according to the pressure exerted thereon.

While the form of guide-eyes shown in Figs. 4, 5, and 6 of the drawings represents the preferred construction, it will of course be understood that various expedients may be resorted to to effect a slidable guide connection between the spring and its carrying-frame. One of these expedients is shown in Fig. 7 of the drawings, in which the spring is provided at its apices or bends with twisted portions 8, producing rigid guide-eyes 7^a, slidably em-

bracing the side bars 4 of the carrying-frame, while in Fig. 8 of the drawings the spring is illustrated as having the plain bends thereof extending around the side bars 4 of the carrying-frame, whereby the said bends constitute the guide-eyes 7^b, which slidably engage with the carrying-frame to insure the proper guidance of the spring as it expands and contracts within the frame. Another modification of the feature referred to is illustrated in Fig. 9 of the drawings, and in this modification the spring is provided at the bends or apices thereof with circular coils producing guide-eyes 7^c, slidably engaging the side bars or members 4 of the carrying-frame. These several modifications—namely, those shown in Figs. 4 to 9, inclusive—represent different ways of providing guide-eyes for slidably engaging the carrying-frame; but another way of accomplishing substantially the same result is represented in the modification shown in Fig. 10 of the drawings. In this modification the strip forming the spring 2, while of a zigzag shape, is bent into more of a serpentine or sinuous form, thereby illustrating the slightly-different shape of spring which may be resorted to in carrying out the invention; but in the modification in question instead of providing the guide-eyes at the bends or apices of the spring the opposite ends of the latter are connected with cross-bars 9, provided at their extremities with eyes 10, receiving the side bars 4 of the carrying-frame. One or both of these cross-bars may have a sliding movement to provide for properly maintaining the spring within its working plane; but in the construction in question the desired movement may be secured by simply having the lower of said cross-bars 9 free to slide upon the side bars of the carrying-frame. The modification shown in Fig. 10 also involves providing the side bars 4 at a suitable point intermediate their ends with the laterally-offset stop projections 11, which prevent the spring when compressed from going so far as to break; but in connection with some of the other forms of the invention, notably those shown in Figs. 4, 7, and 9 of the drawings, the manner of forming the guide-eyes renders it impossible for the spring to be compressed to such a degree as to cause the breakage thereof or to destroy its elastic force.

Having described the essential features of construction involved in the different forms of the invention, reference will now be made to some of the uses to which the attachment or device may be applied. In Fig. 1 of the drawings is shown a pair of ordinary suspenders essentially consisting of the shoulder-straps 12, crossed in the back and secured together at the point of crossing, as at 13. In carrying out the present invention the shoulder-straps 12 may be of inelastic material, and each terminal of these straps may be formed with a loop 14, which is passed around one end or one of the end bars of the spring 2, with one side of the loop 14 passing through the guide-loop formed by the laterally-deflected offset 3 at one end of the carrying-frame 1, thus permitting the opposite portions of the loop 14 to freely work at opposite sides of the plane of the spring 2, so as to not interfere in the least with the expansion and contraction of the separate folds thereof. In thus applying the attachment to the loops 14 at the front and back ends of the suspender-straps 12 it is necessary to suitably connect the button-tabs or suspender-ends 15 with one end of the carrier-frame 1, as plainly shown in Fig. 1 of the drawings.

In adapting the attachment to different kinds of articles it may be necessary, of course, to change the shape of the carrier-frame—such, for instance, as shown in Figs. 2 and 5 of the drawings. In these figures of the drawings the carrier-frame is shown provided at its upper end with a U-shaped loop 16, having separate inclined portions 17 to receive the back ends of both shoulder-straps 12 of the suspenders, thereby permitting of the use of a single connection for the back ends or button-tabs 18 of the suspenders. In this way of applying the invention for use the back end or button-tab 18 is connected with a loop, band, or strap 19, which is looped over one end of the spring 2.

Another way of applying the invention for use is suggested in Fig. 3 of the drawings, in which figure a garter-band 20 is shown provided at one end with a loop 21, engaging over one end of the spring 2 of the attachment, while the carrying-frame 1 of the attachment is extended at one end and provided with an engaging eye 21^a, adapted to coöperate with a button 22, fitted to the opposite end of the band.

Various other ways of applying the invention to use will suggest themselves to those familiar with the use of elastic or elastic webbing in wearing-apparel and analogous articles, and it will also be observed that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. A spring attachment of the class described comprising a carrying-frame, and a zigzag spring located within the frame and having guide-eyes freely sliding upon opposite portions of the frame.

2. A spring attachment of the class described, comprising a carrying-frame having straight side bars, a zigzag spring lying in the space between the side bars and provided at opposite sides thereof with guide-eyes having a free sliding engagement with the side bars.

3. A spring attachment of the class described, comprising a carrying-frame having side bars, and a zigzag spring arranged in the space between said side bars and having at

the opposite bends or apices thereof guide-eyes freely sliding upon the side bars.

4. A spring attachment of the class described, comprising a rectangular open carrying-frame having straight parallel side bars, and a zigzag spring lying in the space between the side bars, and having at the bends or apices thereof guide-eyes freely sliding upon the side bars.

5. A spring attachment of the class described, comprising a rectangular carrying-frame provided at one end with a laterally-deflected offset forming a guide-loop, disposed at one side of the longitudinal plane of the side bars of the frame, and a zigzag spring arranged to work within said frame and provided at the bends or apices thereof with guide-eyes slidably engaging the side bars of the frame.

6. A spring attachment of the class described, comprising a carrying-frame having side bars, and a zigzag spring lying in the space between the side bars, said spring being provided at the opposite bends or apices thereof with half-twists forming elongated guide-eyes freely sliding upon the side bars.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

PAUL E. WIRT.

Witnesses:
GEO. S. ROBBINS,
C. C. PEACOCK.